

# **Bam Construction Ltd**

## **Wrexham ARC**

Ecological Assessment

October 2012

AMEC Environment & Infrastructure UK Limited



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**Report for**

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**Bam Construction Ltd****Wrexham ARC**

Ecological Assessment

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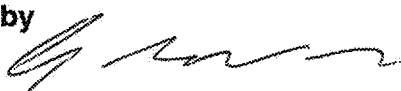
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October 2012

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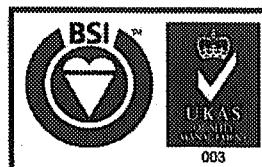
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# 1. Introduction

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## 1.1 Wrexham ARC

The Welsh Ambulance Service Trust (WAST) proposes to develop an Ambulance and Fire Station on a site ('the site') recently purchased from the Council at Croesnewydd Road, Wrexham. The site (Figure 1) is situated at National Grid Reference (NGR) SJ3194 5037. It is on the western side of Wrexham town centre and is bounded to the north by Wrexham Maelor Hospital (specifically the hospital car park on the disused railway), to the west by the Croesnewydd Road, and to the south by the River Gwefro. This site is a component of the wider 'Western Gateway' development, which is part of ongoing development within Wrexham Technology Park.

BAM Construction Ltd, assisted by Nightingale Associates, is preparing the planning application for the proposed development on behalf of WAST. The proposed Ambulance and Fire Station covers approximately 3,400m<sup>2</sup> of internal floor space arranged over two stories and will house:

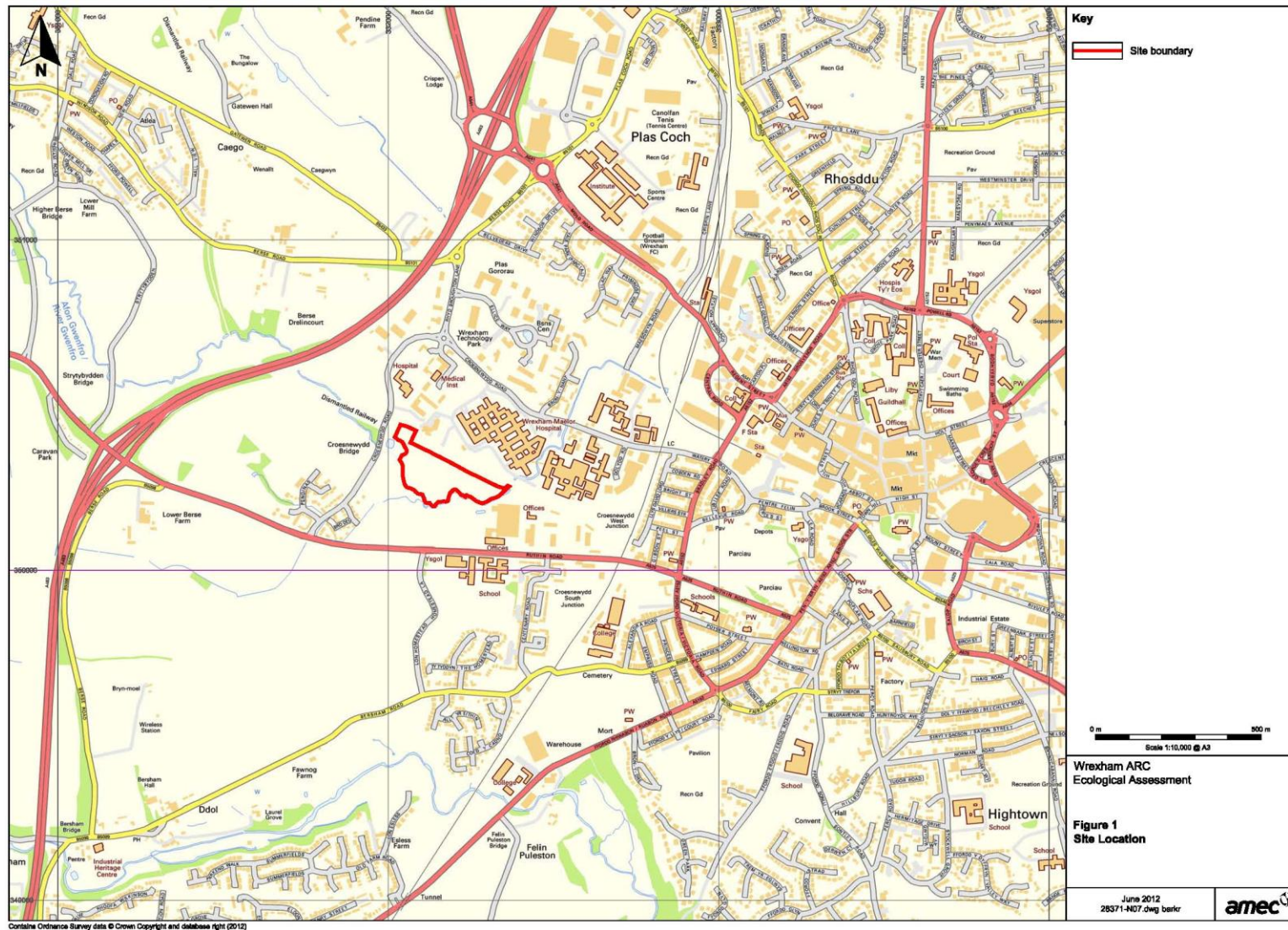
- 8 No. Fire Appliance Vehicles;
- 6 No. Ambulance Vehicles in an internal garage;
- Up to 3 No. Ambulance Vehicles in an internal cleaning and restocking bay; and
- Up to 5 No. Ambulance Vehicles in a vehicle maintenance garage.

The accommodation for personnel will include:

- Rest room, dining and kitchen facilities;
- Lockers, changing rooms and toilet facilities;
- Training room facilities;
- Support offices for operational functions;
- Store rooms for equipment and supplies; and
- Administrative offices.

Other features of the development of the site will include:

- A hard standing 'apron' in front of the vehicle garages;
- Car parking for 135 cars;
- A vehicle washing and refuelling area;
- A yard and compound for the ambulance vehicle maintenance operations;



- Various outbuildings, including oil stores, transformer and generator housings, covered parking for 12 ambulance vehicles, bin stores and cycle shelter;
- A Fire Training House, to simulate wet (water), cold smoke, and blackout rescue conditions (but not live fire or hot smoke conditions); and
- A compound to simulate rescue from Road Traffic Collision situations.

The development masterplan (Drawing Reference: AR ARC 00 PL 100 021) is included as part of the planning application documents.

## 1.2 Scope of Work

The development of the site and associated works could have effects on flora and fauna within the site and/or the surrounding area, including species and habitats/sites that are legally protected and those that are of nature conservation value on a non-statutory basis. Therefore AMEC Environment & Infrastructure UK Ltd has been commissioned by BAM Construction Ltd to undertake an Ecological Assessment of the proposed development.

The objectives of the Ecological Assessment are to identify any habitats and/or species of notable nature conservation value that occur, or have previously been recorded, on/near the site and which could be affected by, or impose constraints on, the proposed development. The predicted effects of the redevelopment of the site on these receptors has been assessed. Where necessary, measures have been identified at this stage that will be incorporated into the development design to minimise, avoid or mitigate predicted effects on species and habitats of notable nature conservation value.

The Ecological Assessment has been informed by a desk-based study and an extended Phase 1 Habitat survey. The legal status of species and habitats has been used in the evaluation of the site's nature conservation importance, alongside other standard evaluation criteria. The methods are based on Guidelines for Ecological Impact Assessment in the United Kingdom (Institute of Ecology and Environmental Management [IEEM] 2006<sup>1</sup> and Institute of Environmental Assessment [IEA] 1995<sup>2</sup>).

## 1.3 Planning Policy and Legislative Context

### 1.3.1 Planning Policy

Technical Advisory Note (TAN) 5: Nature Conservation and Planning provides national guidance on how government policies for the conservation and enhancement of biodiversity should be reflected in land use planning in Wales.

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<sup>1</sup> Institute of Ecology and Environmental Management (2006). *Guidelines for Ecological Impact Assessment in the United Kingdom* (version 7 July 2006) <http://www.ieem.org.uk/ecia/index.html>.

<sup>2</sup> Institute of Environmental Assessment (1995). *Guidelines for Baseline Ecological Assessment*. Chapman and Hall E & FN Spon. London.

The UK Biodiversity Action Plan (UKBAP): identifies UK priority habitats and species for conservation action. This list of priority species and habitats was last updated in 2007 (Biodiversity Reporting and Information Group 2007<sup>3</sup>). Those BAP priority species recorded at/near the site have been identified in this report.

A review of regional and local planning policy is beyond the scope of this assessment. However relevant policies included in the Wrexham Unitary Development Plan (UDP) include:

- Policy EC4: *Development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted.*
- Policy EC6 *Development either within or close to sites of biodiversity interest will only be permitted where it can be clearly demonstrated that the need for the development outweighs the need to safeguard the intrinsic nature conservation value of the site. Where such development is permitted, damage should be kept to a minimum, and compensatory measures should be provided. Measures to improve the biodiversity value of sites and enhance their natural conservation interest and landscape quality including the establishment of local nature reserves, will be supported.*

The Wrexham Local Biodiversity Action Plan (LBAP) identifies priority species and habitats targeted for conservation action within a local context. LBAP species and habitats that have been recorded on/near the site have been identified in this report.

### 1.3.2 Legislative context

The legal status of species and habitats has been used in the assessment of the site's nature conservation importance, alongside other standard evaluation criteria. The following legislation and European Directives afford protection to wildlife and have informed this assessment:

- *Wildlife and Countryside Act (1981)* (as amended);
- *The EC Birds Directive (Directive 79/409/EEC)*, as transposed into UK law by *The Conservation of Habitats and Species Regulations 2010*;
- *The EC Habitats Directive (Directive 92/43/EEC)* as transposed into UK law by *The Conservation of Habitats and Species Regulations 2010*;
- *The Protection of Badgers Act (1992)*; and
- *The Hedgerows Regulations (1997)*.

In addition to the specific legal protection afforded species and habitats, Section 40 of *The Natural Environment and Rural Communities (NERC) Act (2006)* places a statutory duty on every public authority to, 'in exercising its functions, have regard, so far as is consistent with

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<sup>3</sup> Biodiversity Reporting and Information Group (2007). *Report on the Species and Habitat Review*. Report to the UK Biodiversity Partnership

*the proper exercise of those functions, to the purpose of conserving biodiversity*'. In accordance with Section 41 of the Act, the National Assembly for Wales has published a list of habitats and species of Principal Importance for conserving biodiversity in Wales. This list is intended to guide public bodies and statutory undertakers in carrying out their normal functions and specifically identifies those species or habitats that should be given priority when implementing their NERC Section 40 duty.

## **1.4 This Report**

Sections 2 and 3 of this report describe the approach to, and results of, the Ecological Assessment, including the evaluation of ecological receptors recorded at the site or within the surrounding areas. Section 4 summarises the conclusions of the assessment and identifies a number of measures to minimise the risk of effects on ecological receptors; ensure legal compliance; and maximise the credits that would be available under the BREEAM criteria that relate to ecology.

An Ecological Impact Assessment of the wider Western Gateway development has recently been undertaken (Marches Ecology 2009) and this Ecological Assessment has been informed by a review of the corresponding reports as described in Section 2.1. References to the status of species/habitats included in this report relate to their status specifically at the ARC site, apart from where specified to provide context of their status within the wider area.

The survey data collected to inform the assessment of the Western Gateway development are now approximately 3 years old. A site survey in 2012 confirmed that the habitats within the site did not differ significantly from those recorded in 2009. Therefore the status of species populations within the site is also unlikely to have changed significantly since 2009 and the 2009 data are deemed to be sufficient to inform this ecological assessment.



## 2. Approach

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### 2.1 Desk Study

An Ecological Impact Assessment of the wider Western Gateway development has recently been undertaken (Marches Ecology 2009) and this Ecological Assessment has been informed by a review of the following reports:

- Marches Ecology (2009a). *Western Gateway Ecological Impact Assessment - Ecological Background Data Search*. Technical report prepared for Wrexham County Borough Council (see Appendix A); and
- Marches Ecology (2009b). *Western Gateway, Wrexham Technology Park, Wrexham Ecological Impact Assessment*. Technical report prepared for Wrexham County Borough Council (see Appendix B).

The latter report presents details of a number of species-specific surveys undertaken during 2009 which included:

- Bats;
- Otter (*Lutra lutra*);
- Water vole (*Arvicola amphibius*);
- Great crested newt (*Triturus cristatus*);
- Reptiles;
- Badger (*Meles meles*);
- Breeding birds.

All of the surveys were undertaken by Marches Ecology using recognised good practice survey methodologies described in published guidance relating to each species/group.

This desk-based review was undertaken to obtain information relating to statutory and non-statutory nature conservation sites, priority habitats and species (Box 2.1), and legally protected and controlled species (Box 2.2) that have been recorded or are known to occur within the site and surrounding area (2km for statutory sites and 1km for non-statutory sites and notable habitats and species). These are the sites, habitats and species that are of sufficient nature conservation value that effects on them could be significant and are therefore the focus of this Ecological Assessment.

#### **Box 2.1 Designated nature conservation sites and priority habitats and species**

##### **Statutory nature conservation sites**

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance (SCI), Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as nature conservation. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of borough-level importance for biodiversity.

#### Non-statutory nature conservation sites

Non statutory nature conservation sites in Wrexham are designated as 'Wildlife Sites'.

#### Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats/species of principal importance for the conservation of biological diversity in Wales (second bullet point below) are identified as of national species/habitat importance, reflecting the fact that these species/habitats have been categorised as important at a national level. The level of importance pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued (other than for waterfowl, for which site/area thresholds have been defined for national/international population importance).

- National importance: Habitats and species of principal importance for the conservation of biological diversity in Wales. These include those UK BAP priority habitats and species that occur in Wales.
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern Red List (Eaton et al., 2009<sup>4</sup>)
- National importance: Nationally Scarce species, which are species recorded from 16 -100 10 x 10km squares of the national grid.
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600).
- County importance: Habitats and species listed in the Wrexham Biodiversity Action Plan.

### Box 2.2 Legally protected and controlled species

#### Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this ES, legal protection refers to:

- species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981 (as amended)*, excluding species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the Scheme does not include any proposals relating to the sale of species;
- species included on Schedules 2 and 5 of the *Conservation of Habitats and Species Regulations 2010*; and
- badgers, which are protected under the *Protection of Badgers Act 1992*.

#### Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981 (as amended)* lists species of animal that it is an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

<sup>4</sup> Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD (2009) Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp296–341

## 2.2 Site Survey

A Phase 1 Habitat Survey (JNCC 2007<sup>5</sup>) of the site was undertaken on 14<sup>th</sup> June 2012 by an AMEC Ecologist. The purpose of the survey was to verify the Phase 1 Habitat Survey of the site undertaken previously as part of the Ecological Assessment of the Western Gateway. The survey method involved mapping habitats on and adjacent to the site at an appropriate scale using standard colour codes and/or acronyms and according to standard habitat definitions (JNCC 2007). Numbered ‘Target Notes’ were added to the maps to record the location of, and describe, notable ecological features of the site. The survey method was extended to include an assessment of the potential of the habitats on/near the site to support legally protected species and BAP priority species. The methods that are typically used to establish the presence or potential presence of notable species and species groups that are often recorded on/near development sites are summarised in Table 2.1, although the list is not exhaustive and not all of these methods are applicable to every site.

**Table 2.1 Methods employed to assess potential presence of protected and notable species**

| Species/group                | Summary of site assessment methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Breeding Birds (All Species) | The suitability of habitats within the site for nesting birds is assessed, including species of nature conservation concern or birds listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Schedule 1 birds are relatively uncommon and/or vulnerable to disturbance and receive additional protection over the legal protection that is afforded the majority of bird species in the UK.                                                                                                                                                                                                                      |
| Otter                        | The banks of watercourses and adjacent riparian corridors are searched for evidence of otter activity, including spraints, holts, footprints, couches and feeding remains.                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Water Vole                   | The banks of watercourses and adjacent riparian corridors are searched for evidence of water vole activity, including burrows, latrines/droppings, spraints, footprints and feeding remains.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Bats (All Species)           | Built structures (e.g. bridges) and trees on the site are assessed for their potential to support roosting or hibernating bats. The assessment of trees primarily focuses on mature trees and includes recording the presence of cavities, split limbs, cracks, holes or loose bark, or trees with a dense covering of ivy ( <i>Hedera helix</i> ). Where required trees/buildings are inspected using binoculars and any accessible crevices are examined for evidence of bat activity, such as scratch marks and staining. Potential bat foraging habitat and commuting routes within and connected to the site are also recorded. |
| Badger                       | The site is searched for evidence of badger activity including setts, badger paths/tracks, foraging marks, dung pits and hairs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Great crested newts          | Accessible ponds situated within 250m of the site are inspected and the suitability of these ponds for great crested newts is assessed. 250m is towards the upper limit of the distance great crested newts most commonly disperse to terrestrial habitats (Langton et al 2001 <sup>6</sup> ). This distance is sometimes extended to 500m, which is the distance great crested newts are known to disperse between ponds (English Nature 2001 <sup>7</sup> ) and to colonise new ponds.                                                                                                                                             |

<sup>5</sup> JNCC (2007). *Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit*, revised reprint 2003, reprinted 2007. ISBN 0 86139 636 7

<sup>6</sup> Langton, T., Beckett, C., and Foster, J. (2001). *Great Crested Newt Conservation Handbook*. Published by Froglife.

<sup>7</sup> English Nature (2001). *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

| Species/group             | Summary of site assessment methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | <p>The Habitat Suitability Index (HSI) of ponds is assessed. This is based on guidelines produced by the National Amphibian and Reptile Recording Scheme (NARRS 2008). The approach makes use of measurable habitat features in order to determine the quality of habitat for great crested newts (Oldham et al. 2000<sup>8</sup>). An HSI is assigned to ten separate features of a pond (for example size; macrophyte cover; pond permanence; proximity to other ponds; surrounding terrestrial habitat types; and presence of fish and waterfowl) in order to derive an overall numerical score of between 0 and 1. This score provides an indication of the suitability of the pond for great crested newts.</p> <p><b>In this instance a pond assessment has not been carried out as great crested newt surveys have recently been undertaken as part of the Ecological Assessment of the Wider Western Gateway site).</b></p> |
| Reptiles                  | The site's potential to support reptiles is assessed by considering the presence of potential natural and artificial refugia; variable topography; interface or edge habitats; and shade free areas near dense vegetation. Potential reptile refugia such as woody and discarded debris are also examined.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Wintering/passage birds   | The suitability of habitats within and near the site for wintering/migrating/passage birds is also assessed, notable assemblages of wintering birds are often associated with wetlands/waterbodies; estuaries and coastal habitats in particular.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Dormouse                  | An assessment of semi-natural woodland, ancient woodland, hazel coppice and/or mature/diverse hedgerows either within the site or connected to it.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Terrestrial Invertebrates | The site's potential to support notable assemblages of invertebrate species is assessed, for example sites that include mosaics of mid-succession habitats and/or expanses of semi-natural habitats in particular often support diverse/notable invertebrate assemblages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Other Species             | <p>The suitability of the habitats on the site for any other protected species and species of notable nature conservation value is also considered, including BAP species.</p> <p>The location of any observed stands/areas of invasive, non-native species, such as Japanese knotweed (<i>Fallopia japonica</i>) for example, are routinely recorded, reflecting the legal requirement to avoid causing the spread of many invasive non-native species.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## 2.3 Nature Conservation Evaluation

In order to assess the effects of development on flora and fauna it is necessary to define the habitat areas and species that need to be considered, recognising that a development can affect flora and fauna not only within the area of land-take required for the development but also 'off-site'. It is impractical to consider every species and habitat within and surrounding the site, therefore the approach that has been taken is to focus on statutory and non-statutory nature conservation sites, priority habitats and species (Box 2.1), and legally protected and controlled species (Box 2.2) that have been recorded or are known to occur within the site and surrounding area. These are the sites, habitats and species that are of sufficient nature conservation value that effects on them could be significant and are therefore the focus of this Ecological Assessment.

<sup>8</sup> Oldham R.S., Keeble J., Swan M. J. S., and Jeffcote M. (2000). *Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155

## 3. Results

### 3.1 Desk Study

#### 3.1.1 Designated Sites

There are no statutory or non-statutory sites of nature conservation value within the site or adjacent to it. There is one statutory site situated within 2km of the site as summarised in Table 3.1. Additionally the River Gwenfro flows through the site and is a tributary of the River Clywedog, which flows into the River Dee and Bala Lake SSSI and SAC. Therefore, although this SSSI/SAC is over 10km from the site it is hydrologically linked to the site and the reasons for its designation are summarised in Table 3.1. There are three non-statutory sites situated within 1km, also summarised in Table 3.1.

**Table 3.1 Designated sites situated within 2km of the site**

| Site                        | NGR       | Reasons for designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Approx. distance from site (nearest point)             |
|-----------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <b>Statutory sites</b>      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                        |
| Gatewen Marsh SSSI          | SJ317 515 | One of only three significant examples in the former county of Clwyd of the "southern mesotrophic mires" wetland type. This type is more characteristic of south-west Wales and, in North Wales, is largely restricted to Ynys Môn and Dwyfor. The site occupies the flat valley bottom of a tributary of the River Gwenfro, the stream running through the eastern side of the marsh. At its northern end the marsh is bounded by the spoil banks of the former Gatewen Colliery, and mining subsidence, following closure of the colliery, has been a major factor in creating suitable conditions for the development of wetland vegetation. | 800m (North)                                           |
| River Dee and Bala Lake SAC | SJ413478  | <p><b>Habitats that are a primary reason for site selection:</b> Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation</p> <p><b>Species that are a primary reason for site selection:</b> Atlantic salmon (<i>Salmo salar</i>); and Floating water-plantain (<i>Luronium natans</i>).</p> <p><b>Species present as a qualifying feature:</b> Sea lamprey (<i>Petromyzon marinus</i>); Brook lamprey (<i>Lampetra planeri</i>); River lamprey (<i>Lampetra fluviatilis</i>); Bullhead (<i>Cottus gobio</i>); Otter (<i>Lutra lutra</i>)</p>                               | <p>&gt;10km (East)</p> <p>Surface water connection</p> |

| Site                                    | NGR      | Reasons for designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Approx. distance from site (nearest point)   |
|-----------------------------------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| River Dee and Bala Lake SSSI            | SJ413478 | Afon Dyfrdwy (River Dee) is of special interest for its fluvial geomorphology, Carboniferous geology, range of river habitat types, saltmarsh transition habitats, populations of floating water plantain ( <i>Luronium natans</i> ), slender hare's-ear ( <i>Bupleurum tenuissimum</i> ), sea barley ( <i>Hordeum marinum</i> ), hard-grass ( <i>Parapholis strigosa</i> ), otter, salmon, bullhead, brook lamprey, river lamprey, sea lamprey, club-tailed dragonfly ( <i>Gomphus vulgatissimus</i> ) and other aquatic invertebrates. | >10km (East)<br><br>Surface water connection |
| <b>Non-statutory sites (within 1km)</b> |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                              |
| New Broughton Meadow Wildlife Site      | SJ306513 | This site comprises a mosaic of semi-natural habitats including a pond, wet Alder/ Willow carr, marsh and neutral grassland, particularly associated with an old mineral railway.                                                                                                                                                                                                                                                                                                                                                        | 450m (northwest)                             |
| Erddig Estate Wildlife Site             | SJ330484 | Woodlands, semi-improved neutral grasslands and marshes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1600m (northwest)                            |
| Berse Drenlicourt Wildlife Site         | SJ315507 | This site comprises a mosaic of semi-natural habitats including neutral grassland and a stream corridor with wooded banks. It directly borders an old mineral railway.                                                                                                                                                                                                                                                                                                                                                                   | 1000m (southeast)                            |

### 3.1.2 Legally Protected and Notable Species

A number of legally protected species and other species of notable nature conservation value have previously been recorded within 1km of the site. These records were collected during the desk study (Marches Ecology 2009a, Appendix A) and ecological/protected species surveys (Marches Ecology 2009b, Appendix B) undertaken to inform the assessment of the wider Western Gateway Site. The status at the site of protected/notable species that have been recorded within 1km of the site and which the site is potentially suitable for are summarised below (Table 3.2).

**Table 3.2 Status at the site of protected/notable species previously recorded within 1km**

| Species/Group | Reasons for designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bats</b>   | There are trees within the site that are potentially suitable as bat roosts, situated close to the banks of the River Gwenfro. Some of these trees have moderate to high potential to support roosting bats. Bridges over the river Gwenfro and disused railway are likely to have only limited potential to occasionally support individual/low numbers of roosting bats. A number of mature trees within the site were subject to dusk emergence surveys on the 24th June and 29th July 2009. No bats were recorded emerging from the trees. Bat activity surveys that followed the emergence surveys recorded small number of bats: common pipistrelle ( <i>Pipistrellus pipistrellus</i> ) and whiskered or Brandt's ( <i>Myotis mystacinus/ brandtii</i> ). Whiskered/Brandt's bats were recorded foraging along the tree line adjacent to the River Gwenfro. Common pipistrelle bats were also recorded within the north, east and south of the site. The greater levels of bat activity appear to be associated with the River Gwenfro corridor, which extends along the southern boundary of the site. The tributary is a commuting corridor for common pipistrelle bats and it is possible these bats roost in residential properties adjacent to Croesnewydd Road. |

| Species/Group              | Reasons for designation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Otter</b>               | The site has been extensively surveyed to assess the status of otters. Evidence of otter activity was recorded within the site along the River Gwenfro and also at the pond to the north west of the site boundary. A number of spraints, footprints and lie-up sites were recorded during four survey visits to the site between 15th December 2008 and 31st July 2009. No otter holts were recorded. The River Gwenfro is therefore likely to be a core part of an otter's territory.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Water vole</b>          | The River Gwenfro provides sub-optimal habitat for water voles, as it has very limited aquatic and marginal vegetation and also supports brown rat ( <i>Rattus norvegicus</i> ) and American mink ( <i>Mustela vison</i> ), both of which predate water voles. The presence of mink in particular means that it is unlikely water voles would be present. The small tributary that joins the River Gwenfro adjacent to the site is also sub-optimal habitat for water voles due to limited aquatic and marginal vegetation, heavy shading, and the presence of mink and brown rat. The River Gwenfro borders the site and there is a pond to the north west, both of which were surveyed to determine presence/absence of water voles on the 26th May and the 22nd July 2009. No water voles were recorded, therefore this species is not considered further as part of this assessment. |
| <b>Great crested newts</b> | No great crested newts were recorded during surveys of the four ponds situated within approximately 500m of the site, undertaken between 21st April and 14th May 2009. Two of these are within the wider Western Gateway Development footprint to the west of the site, west of Croesnewydd Road. The other two are outside and immediately adjacent to the site, one to the north west and one to the south west. Previous surveys of the four ponds in 2002 did not record great crested newts. There are no records of great crested newts occurring within 500m of the site. As this species was not recorded within 500m of the site during the any of the previous surveys it is not considered further as part of this assessment.                                                                                                                                                |
| <b>Reptiles</b>            | The mosaic of habitats within the site provide suitable habitat to support reptiles such as common lizard ( <i>Zootoca vivipara</i> ), slow worm ( <i>Anguis fragilis</i> ) and grass snake ( <i>Natrix natrix</i> ). Historically, reptiles have been extensively recorded in the wider area, with the closest records within 100m of the site. However no reptiles were recorded on the site during reptile presence/absence surveys undertaken between 15th April and 24th June 2009. Therefore this species is not considered further as part of this assessment.                                                                                                                                                                                                                                                                                                                    |
| <b>Badger</b>              | No badger setts or evidence of badger activity were recorded within the site. The habitats within the site are suitable for badgers. The earth bunds in particular provide habitat in which badgers could excavate setts and the grassland, scrub and woodland are potential foraging habitats. As badgers are common and widespread, it is feasible that they could inhabit the site in the future.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Wintering Birds</b>     | A wintering bird survey was undertaken of the entire Western Gateway Development site in 2005 (TEP) and 31 species were recorded. Six of these are of conservation concern: barn owl ( <i>Tyto alba</i> ); herring gull ( <i>Larus argentatus</i> ); kestrel ( <i>Falco tinnunculus</i> ), mallard ( <i>Anas platyrhynchos</i> ); grey partridge ( <i>Perdix perdix</i> ) and song thrush ( <i>Turdus philomelos</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Breeding Birds</b>      | A total of 41 bird species (excluding corvids and pigeon) were recorded during the breeding bird survey of the Western Gateway Development site between 15th April and 24th June 2009. A total of 21 species were found to have bred within the Western Gateway site in 2009 while a further 14 are considered possibly breeding although conclusive evidence was not recorded. Of the bird species recorded, 15 are included on one or more of the following: Section 42 of the Natural Environment and Rural Communities Act 2006 (NERC Act); the Welsh Biodiversity Action Plan (WBAP); UK Biodiversity Action Plan (UK BAP); or the Birds of Conservation Concern 2009 (BoCC) Red and Amber lists.                                                                                                                                                                                   |

## 3.2 Site Survey

### 3.2.1 Habitats

The habitats within the site predominantly comprise tall-ruderal vegetation; neutral semi-improved grassland; scattered scrub and ephemeral/short-perennial vegetation, the latter being associated with a series of vegetated spoil mounds within the north western area of the site. There is also broad-leaved woodland and scrub within the site, bordering the River Gwenfro,

which flows along the southern boundary of the site. The River Gwenfro is a tributary of the Clwedog and adjacent to the site comprises riffle and run sequences with gravel, pebble and cobble substrate and localised/discrete silt/sand deposits. This habitat is suitable for a range of aquatic invertebrate and fish species, including salmonids, lamprey and bullhead.

There is a large pond enclosed within a Herras fence immediately outside the site boundary to the northwest. It is surrounded by tall ruderal vegetation and scrub and immature alder and sycamore. It supports a stand of bulrush (*Typha latifolia*) and has areas of deep open water.

The distribution of habitat types recorded during the survey is generally consistent with those previously recorded during the Phase 1 Habitat survey of the Western Gateway site (Figure 3b in Appendix B) and therefore the habitats have not been re-mapped.

The majority of the habitats within the site are of limited nature conservation value, with the exception of the River Gwenfro corridor. Rivers are listed under Section 42 of the *Natural Environment and Rural Communities Act 2006* (NERC Act) as habitats of principal importance for the conservation of biological diversity in Wales and are UK and Wales Biodiversity Action Plan (UK BAP) habitats.

### 3.2.2 Legally Protected and Notable Species

During the walkover survey three otter spraints were observed on the bank of the River Gwenfro at similar locations where they had previously been recorded (Marches Ecology 2009). A pair of buzzards was also observed and this species is likely to nest in trees along the River Gwenfro adjacent to the site. An outlier badger sett, with a single entrance, was recorded in the upper part of a vegetated spoil mound, situated within the northwest part of the site. The sett had recently been created. Himalayan balsam (*Impatiens glandulifera*) was recorded on the site and appears to be restricted to the river bank.

## 3.3 Nature Conservation Evaluation

Table 3.3 summarises the ecological receptors recorded at the site and surrounding area, including an assessment of their likely nature conservation value at the site.

**Table 3.3 Evaluation of Ecological Receptors**

| Receptor                | Legal requirements | Policy status/ Other | Nature conservation value <sup>9</sup> | Rationale                                                                        |
|-------------------------|--------------------|----------------------|----------------------------------------|----------------------------------------------------------------------------------|
| <b>Designated sites</b> |                    |                      |                                        |                                                                                  |
| Gatewen Marsh SSSI      | WCA - SSSI         | None                 | National                               | SSSIs are notified because of their national importance for nature conservation. |

<sup>9</sup> The nature conservation value of designated sites; habitat areas; and/or populations of species that occur at the site. Where the status of a species is unknown an estimate of its likely status based on the site characteristics is provided.

| Receptor                           | Legal requirements                   | Policy status/ Other | Nature conservation value | Rationale                                                                                                                                             |
|------------------------------------|--------------------------------------|----------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| River Dee and Bala Lake SAC        | Habs Dir. – SAC                      | None                 | International             | SACs are designated because of their nature conservation value within a European context.                                                             |
| River Dee and Bala Lake SSSI       | WCA - SSSI                           | None                 | National                  | SSSIs are notified because of their national importance for nature conservation.                                                                      |
| <b>Non-statutory sites</b>         |                                      |                      |                           |                                                                                                                                                       |
| New Broughton Meadow Wildlife Site | None                                 | WS                   | County                    | Wildlife Sites are designated because of their nature conservation value within a local (up to County) context.                                       |
| Erddig Estate Wildlife Site        | None                                 | WS                   | County                    | Wildlife Sites are designated because of their nature conservation value within a local (up to County) context.                                       |
| Berse Drenlicourt Wildlife Site    | None                                 | WS                   | County                    | Wildlife Sites are designated because of their nature conservation value within a local (up to County) context.                                       |
| <b>Habitats</b>                    |                                      |                      |                           |                                                                                                                                                       |
| River                              | None                                 | UKBAP<br>LBAP        | County                    | The river is likely to support a range of aquatic species, including UK BAP species that are of importance in a county-context.                       |
| Ponds                              | None                                 | UKBAP<br>LBAP        | Less than District        | There is a single pond to the northwest of the site, which is unlikely to be of notable nature conservation value.                                    |
| Woodland                           | None                                 | LBAP                 | Less than District        | The areas of broad-leaved woodland are within the site are relatively small and restricted to the River Gwenfro corridor                              |
| <b>Fauna</b>                       |                                      |                      |                           |                                                                                                                                                       |
| Otter                              | WCA – Sch 5<br>Habs. Dir – Annex IV  | UKBAP<br>LBAP        | District                  | The reach of the river Gwenfro adjacent to the site is part of an otter territory.                                                                    |
| Common pipistrelle bat             | WCA – Sch 5<br>Habs. Dir. – Annex IV | None                 | Less than District        | One of the most common and widespread bat species in the UK which, based on recent survey data, is likely to forage within the site in small numbers. |
| Whiskered/Brandts bat              | WCA – Sch 5<br>Habs. Dir. – Annex IV | None                 | Less than District        | One of the most common and widespread bat species in the UK which, based on recent survey data, is likely to forage within the site in small numbers. |

| Receptor        | Legal requirements                    | Policy status/<br>Other | Nature conservation value | Rationale                                                                                                                                                                         |
|-----------------|---------------------------------------|-------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Badger          | <i>Protection of Badgers Act 1992</i> | LBAP                    | Less than District        | A common and widespread species, likely to forage within the site and occupy a single outlier (a single hole/entrance) sett within the site.                                      |
| Wintering birds | WCA - General                         | UKBAP<br>LBAP           | Less than District        | Although UKBAP species have been recorded on/near the site, it is small and the grassland habitats are unlikely to support bird assemblages of notable nature conservation value. |
| Breeding birds  | WCA - General                         | UKBAP<br>LBAP           | Less than District        | Although UKBAP species have been recorded on/near the site, it is small and the grassland habitats are unlikely to support bird assemblages of notable nature conservation value. |

**Key:**

Habs. Dir. = Council Directive of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (92/43/EEC) – used as a prefix for:

- SAC = Special Area of Conservation, designated under the Directive
- Annex I on natural habitat types whose conservation requires the designation of SACs
- Annex II on animal and plant species whose conservation requires the designation of SACs
- Annex IV (Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2010)

WCA = Wildlife and Countryside Act 1981 (as amended) – used as a prefix for:

- Sch.1 = Schedule 1 bird species (where species is breeding).
- General = the majority of birds and their nests, young and eggs are legally protected, including many species not included in the table.
- Sch. 5 = Schedule 5 animal species
- Sch. 8 = Schedule 8 plant species
- SSSI = Site of Special Scientific Interest

UK BAP = UK Biodiversity Action Plan Priority Species/Priority Habitat

Local BAP = Local Biodiversity Action Plan Priority Species/Priority Habitat

WS = Non-statutory Wildlife Site

## 4. Ecological Impact Assessment

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### 4.1 Designated Sites

#### 4.1.1 Statutory Designated sites

The site is over 0.5km from Gatewen Marsh SSSI. The proposed development is non-residential and therefore unlikely to increase recreational use of this designated site. Hence the proposed development is likely to have no effects on the conservation status of the habitats and species within this site and is therefore also likely to have no significant effects on its integrity.

The River Dee and Bala Lake SAC and SSSI is over 10km from the site, however it is hydrologically connected to the site via the River Gwenfro, a tributary of the Clywedog. Otters occur on the Gwenfro and are a feature of the SAC and the Gwenfro also potentially supports SAC fish species, for example bullhead and lamprey. However the development is unlikely to have significant effects on these species as described below.

#### 4.1.2 Non-statutory Designated sites

Erddig Estate Wildlife Site and Berse Drenlicourt Wildlife Site are approximately 1km or more from the site. New Broughton Meadow Wildlife Site is approximately 450m from the site and on the opposite side of a busy main road. As the proposed development is non-residential, it is unlikely to increase recreational use of these designated sites. Hence the proposed development is likely to have no effects on the conservation status of the habitats and species within these sites and is therefore also likely to have no significant effects on their integrity.

### 4.2 Habitats

#### 4.2.1 River Gwenfro

The majority of habitats recorded within the site are of limited nature conservation value. The River Gwenfro corridor, which extends along the southern site boundary, including the adjacent mature trees and scrub and its tributary are however of notable nature conservation value. Rivers are a UKBAP habitat and the Gwenfro provides a dispersal corridor for a number of notable and legally protected species, including otters and bats. It is also likely to support a number of fish species of nature conservation value, some of which are features of the River Dee and Bala Lake SAC/SSSI.

The River Gwenfro corridor will be demarcated within a 15m wide exclusion/buffer zone prior to the commencement of development and no work, habitat disturbance or disposal of materials will take place within this corridor. Site working practices will include adherence to Environment Agency Pollution Prevention Guidelines (PPGs). This will include appropriate silt and site run-off control measures, minimising the risk of contaminated or turbid site run off entering surface watercourses. It would be appropriate for the development to incorporate Sustainable Urban Drainage Systems, including for example vegetated swales developed early

during construction to attenuate site run-off. All drainage control measures would be in accordance with the site drainage study and Flood Consequence Assessment.

The 15m wide buffer between the River Gwenfro and the edge of the development footprint will be retained as part of the completed development layout and will not be modified, preserving its integrity as a dispersal corridor for a number of species. The riparian habitats within this buffer will be allowed to mature over time, improving their function in screening the development from the river and maintaining habitat connectivity. This riparian corridor would be monitored and any deterioration addressed through a Habitat Management Plan as described below (Section 4.4).

Direct illumination of the river corridor will also be avoided and the lighting scheme incorporated within the development will be designed specifically to minimise light scatter onto the river corridor and the associated risk of adverse effects on riparian species such as otter and foraging/commuting bats.

As a result of the design measures set out above the proposed development is unlikely to have significant effects on the nature conservation status of habitats and associated species.

## **4.3 Species**

### **4.3.1 Otter**

The reach of the River Gwenfro and pond adjacent to the site appear to be core areas of an otter's territory. The demarcation and protection of a 15m wide riparian corridor as described above (Section 4.2.1) will maintain the integrity of the riparian habitats and minimise the risk of failure to comply with nature conservation legislation relating to otters (Appendix C). The riparian buffer will be demarcated within fences during construction/remediation/landscaping and no staff or contractors will enter this area or discard materials within it. The 15m riparian corridor will be retained as part of the development design and will be managed in accordance with a Habitat Management Plan to allow it to mature until it comprises predominantly scrub and trees.

The approach to all site works will include measures to minimise the risk of effects on otters, including maintaining a connected, undisturbed riparian corridor that is 15m wide throughout the works, and avoiding illumination of the river corridor. It is important that all environmental protection measures are formalised within a Site Environmental Management Plan, Code of Construction Practice or similar. This document would be prepared in advance of any works and would govern all site working practices. These measures will mean there is limited scope for adverse effects on otters and the development is unlikely to have significant effects on this species.

### **4.3.2 Bats**

A small number of common pipistrelle and Brandt's/whiskered bats were recorded foraging within and commuting through the site. The main commuting routes for bats within the site include the River Gwenfro corridor extending along the southern boundary of the site. A number of trees within this corridor are also likely to be suitable to support roosting bats. The retention and protection of the riparian corridor and trees as described above will retain trees

that are potential bat roosts and minimise the risk of adverse effects on bats. Bat boxes will also be installed on the site, enhancing the site's capacity to support roosting bats.

No site lighting will be left on at night during construction. The completed development will incorporate lighting designs that are sensitive to the use of the site by bats. This may include for example, low-level directional light positioned away from, and avoiding illumination of bat habitats. A detailed lighting scheme has not yet been designed, but will be based on the following principles:

- No lighting will be installed adjacent to, or directly illuminating the River Gwenfro and riparian corridor.
- Use of lighting will be minimised both spatially and temporally i.e. lights will only be installed where necessary and will be switched off whenever possible, for example through motion-activated security lights or timers, ensuring there are dark periods after dusk.
- Use of UV light will be avoided wherever feasible.
- Use of directional LEDs where possible will minimise light spill.
- Low pressure sodium lamps will be used in favour of high pressure sodium lamps wherever possible. Mercury lamps will be avoided.
- Light shields/hoods will be installed on all non-directional lighting to reduce light spill.
- Lighting will be erected at the lowest height feasible and directed downwards using shields/hoods.

The above measures will minimise the risk of adverse effects on bats during both construction and operation of the development.

### **Badger**

A single outlier badger sett has been recorded on the site. The sett has a single entrance hole. The development will therefore potentially displace a badger, although this is unlikely to have a significant effect on the status of badger populations in the area. However the sett will be monitored to assess whether it remains active. Should the sett remain active, to ensure compliance with legislation relating to badgers (Appendix C), it will be closed under a Countryside Council for Wales licence prior to any earthworks occurring within 30m of it. This will ensure compliance with nature conservation relating to badgers.

### **Birds**

The site provides potential nesting habitat for a variety of bird species – suitable habitats mainly comprising the woodland/broad-leaved trees that border the River Gwenfro and patches of dense scrub and the watercourses. There is limited potential for the site to support ground nesting birds due to the high levels of disturbance and taller ruderal vegetation cover in many places. The site is unlikely to support populations of breeding or wintering birds that are of notable nature conservation value. Therefore the development is likely to have no significant effects on birds.

Vegetation clearance would be undertaken outside of the birds' breeding season, avoiding the period mid-February to August inclusive. This is necessary to ensure compliance with legislation relating to nesting birds (Appendix C). Where vegetation clearance within this period is unavoidable, an ecologist will first inspect the vegetation for active nests and active nests would be demarcated within a buffer exclusion zone and work would only commence in these area once the absence of nesting birds had been verified or once the young birds have fledged.

## 4.4 Environmental Measures

### 4.4.1 Measures Incorporated Into the Development

Table 4.1 summarises the environmental measures that are incorporated into the development masterplan (Drawing Reference: AR ARC 00 PL 100 021) and planned approach to remediation and construction that will minimise the risk of effects on sensitive ecological receptors. The responsibility for the implementation of these measures and the mechanism by which compliance with them is expected to be secured is also summarised.

**Table 4.1 Implementation of Environmental Measures**

| Environmental measure                                                                                                                           | Responsibility for implementation | Compliance mechanism                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Demarcation and protection of 15m wide riparian corridor throughout remediation/construction                                                    | Developer/Contractor              | Site/Remediation/Construction Environmental Management Plan (SEMP) secured through a planning condition<br><br>Arboriculture Method Statement compliant with BS5837 included in SEMP |
| Maintenance of a 15m riparian corridor/buffer as part of the completed development                                                              | Developer/Contractor              | Site Masterplan (Ref: AR ARC 00 PL 100 021)                                                                                                                                          |
| Approach to vegetation clearance to avoid adverse effects on nesting birds (e.g. avoiding period mid Feb to Aug) or advance checks by ecologist | Developer/Contractor              | SEMP secured through a planning condition<br><br>Legal requirement                                                                                                                   |
| Badger sett to be closed under licence in the event that monitoring confirms it remains active.                                                 | Developer                         | Legal requirement - Badger licence                                                                                                                                                   |

| Environmental measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Responsibility for implementation | Compliance mechanism                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|
| <p>Fences to enclose 15m wide riparian exclusion zone and retained riparian corridor during construction and enabling works.</p> <p>Site fences included as part of the completed development to restrict access to 15m riparian corridor</p> <p>No site material to be stored or discarded within 30m of the river and no staff to enter 15m wide, fenced riparian exclusion zone.</p> <p>No illumination of the corridor and no work within 30m of the river bank at/after dusk and/or at/before dawn, other than when unavoidable in winter and then not within 30m of river.</p> <p>Riparian corridor to be allowed to mature into scrub and woodland.</p> | Developer/Contractor              | <p>SEMP secured through a planning condition</p> <p>Habitat Management Plan secured through Planning Condition</p> |
| Bat boxes to be installed within the riparian corridor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Developer                         | Landscape plan secured through a planning condition.                                                               |
| Lighting scheme sensitive to bats and otters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Architect/Developer               | Lighting scheme to be submitted to the LPA for approval, secured by a planning condition                           |
| Implementation of Environment Agency's Pollution Prevention Guidelines and dust abatement measures during remediation and construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Developer/Contractor              | SEMP secured through a planning condition.                                                                         |
| In late May/early June, in advance of site works, the working areas will be inspected and any Himalayan balsam within it will be removed (by hand) and composted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Developer/Contractor              | SEMP secured through a planning condition.                                                                         |
| Management of retained habitats to benefit nature conservation including maintenance of riparian corridor integrity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Developer                         | Habitat Management proposals outlined below (Section 4.4.3) secured through a planning condition.                  |

#### 4.4.2 Method Statements

The planned measures to be incorporated into the development to minimise the risk of effects on sensitive ecological receptors are summarised in Table 4.1 above. The specific methods to be employed and timing will be set out in a Site Environmental Management Plan (SEMP), the preparation and approval of which is expected to be the subject of a planning condition.

A separate Method Statement detailing the measures planned to protect otters at the site will be prepared as part of the SEMP. As outlined above the main measures proposed to protect otters include:

- Site fence included as part of the completed development will restrict access to riparian corridor.
- Demarcation/protection of 15m wide corridor of riparian habitats within fences to restrict access to it during construction and enabling works;

- No site material to be temporarily stored or discarded within 30m of the river bank and no staff to enter fenced riparian corridor. Staff to be made aware of the need to avoid disturbance of the riparian corridor and the need to drive slowly when travelling to/near and arriving at the site.
- Retention of the 15m wide riparian corridor as part of the completed development design and minimal management of habitats within it, allowing them to become denser and more mature/established scrub and trees, improving screening between the development and river corridor and providing cover for otters.
- Lighting scheme that minimise light spill onto the riparian corridor, with negligible light spill within 15m of the river. No lights will be left on over night during construction.
- No works will take place at or before dawn and at or after dusk, other than where this is unavoidable in winter and then not within 30m of the river.

#### 4.4.3 Habitat Management

Limited habitat management is planned within the site, primarily to leave the 15m wide riparian corridor undisturbed and protected, allowing it to develop into denser, more mature vegetation. As described above this is intended to improve screening between the development and river corridor and provide cover for otters.

The site fence will be designed to restrict public access to the riparian corridor, as well as dissuading otters from dispersing onto the development. Regular (e.g. six monthly) monitoring and maintenance of the riparian corridor and fence will be undertaken. Damage to the fence will be rectified and tree planting will take place in the event that trees within the riparian corridor die or are damaged. This would be on the basis of two planted for each one lost.

## 4.5 Conclusions

The conclusions of the assessment of the effects of the proposed development on flora and fauna are summarised in Table 4.2 and conclude that, providing the measures outlined in Section 4.4 are implemented, there will be no significant effects on ecological receptors as a result of the proposed development.

**Table 4.2 Summary of Significance of Effects on Flora and Fauna**

| Receptor and effects | Magnitude of effect <sup>1</sup> | Sensitivity or Value <sup>2</sup> | Significance <sup>3</sup> Level | Summary Rationale                                                                                                    |
|----------------------|----------------------------------|-----------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Gatewen Marsh SSSI   | Negligible                       | National                          | NS                              | c.800m from site and unlikely to be any mechanism by which the development could have an adverse effect on this site |

| Receptor and effects               | Magnitude of effect <sup>1</sup> | Sensitivity or Value <sup>2</sup> | Significance <sup>3</sup> Level | Summary Rationale                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|----------------------------------|-----------------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| River Dee and Bala Lake SAC        | Negligible                       | International                     | NS                              | >10km from the site. Adherence to PPGs will minimise the risk of contaminated or turbid run-off entering watercourses during construction.<br><br>Drainage design will prevent the operational development contaminating surface watercourses                                                                                                  |
| River Dee and Bala Lake SSSI       | Negligible                       | National                          | NS                              | >10km from the site. Adherence to PPGs will minimise the risk of contaminated or turbid run-off entering watercourses during construction.<br><br>Drainage design will prevent the operational development contaminating surface watercourses.                                                                                                 |
| New Broughton Meadow Wildlife Site | Negligible                       | County                            | NS                              | c.450m from the site and on opposite side of a main road. Unlikely to be any mechanism by which the development could have an adverse effect on this site                                                                                                                                                                                      |
| Erdig Estate Wildlife Site         | Negligible                       | County                            | NS                              | >1km from the site. Unlikely to be any mechanism by which the development could have an adverse effect on this site                                                                                                                                                                                                                            |
| Berse Drenlicourt Wildlife Site    | Negligible                       | County                            | NS                              | >1km from the site. Unlikely to be any mechanism by which the development could have an adverse effect on this site                                                                                                                                                                                                                            |
| River Gwenfro                      | Low                              | County                            | NS                              | Retention and protection of 15m - wide riparian corridor. Adherence to PPGs during construction and appropriate drainage designs incorporated into the development.                                                                                                                                                                            |
| Woodland                           | Low                              | Less than District                | NS                              | Small areas of woodland on site are restricted to the riparian corridor and will be protected during construction                                                                                                                                                                                                                              |
| Ponds                              | Negligible                       | Less than District                | NS                              | Pond is likely to be of limited nature conservation value and will be retained.                                                                                                                                                                                                                                                                |
| Otter                              | Low                              | District                          | NS                              | The riparian corridor (15m) will be protected during construction/remediation and retained and managed as part of the completed development. Fences will restrict access to the riparian corridor. Scheme lighting will be designed to minimise illumination of riparian corridor and no site lighting left on over night during construction. |

| Receptor and effects | Magnitude of effect <sup>1</sup> | Sensitivity or Value <sup>2</sup> | Significance <sup>3</sup> Level | Summary Rationale                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------|----------------------------------|-----------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bats                 | Low                              | Less than District                | NS                              | The riparian corridor (15m), including all mature trees, will be protected during construction/ remediation and retained as part of the completed development. Scheme lighting will be designed to minimise illumination of riparian corridor and avoid adverse effects on bats. No site lighting left on over night during construction. Bat boxes to be erected in riparian corridor |
| Badger               | Low                              | Less than District                | NS                              | Small numbers of badger on site, including a single outlier sett. Sett will be closed under licence should it remain active.                                                                                                                                                                                                                                                           |
| Birds                | Low                              | Less than District                | NS                              | Site is unlikely to support notable bird assemblage. Vegetation clearance will avoid breeding season.                                                                                                                                                                                                                                                                                  |

**Key/footnotes:**

|    |                                       |    |                                                 |    |                                         |
|----|---------------------------------------|----|-------------------------------------------------|----|-----------------------------------------|
| 1. | High<br>Moderate<br>Low<br>Negligible | 2. | International<br>National<br>County<br>District | 3. | S = Significant<br>NS = Not-significant |
|----|---------------------------------------|----|-------------------------------------------------|----|-----------------------------------------|

# **Appendix A**

## **Western Gateway Ecological Assessment (Marches Ecology 2009a)**

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|                     |                                                                                     |
|---------------------|-------------------------------------------------------------------------------------|
| <b>Report Title</b> | Western Gateway Ecological Impact Assessment -<br>Ecological Background Data Search |
| <b>Client</b>       | Wrexham County Borough Council                                                      |
| <b>Date</b>         | September 2009                                                                      |

this report was produced by



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This report has been prepared by Marches Ecology with all reasonable skill, care and diligence within the terms of the Contract with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

|                            |                                                                                     |
|----------------------------|-------------------------------------------------------------------------------------|
| <b>Report Title</b>        | Wrexham Gateway Ecological Impact Assessment -<br>Ecological Background Data Search |
| <b>Client</b>              | Wrexham County Borough Council                                                      |
| <b>Marches Ecology Ref</b> | C076/EBDS/Draft                                                                     |
| <b>Date issued</b>         | September 2009                                                                      |
| <b>Authors</b>             | Tom Knight and Max Ellson                                                           |

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*Figure 1 – Location Plan*

*Figure 2 – Statutory and non-statutory protected sites*

*Appendix 1 – Records provided by Cofnod*

## 1 INTRODUCTION

### 1.1 Project Background

1.1.1 Marches Ecology was commissioned by Wrexham County Borough Council (WCBC) to undertake an Ecological Impact Assessment (EclA) of the proposed Western Gateway development site; part of the Wrexham Technology Park, Wrexham (OS Grid Ref. for central point: 331724, 350389). The site extends to 272,200 m<sup>2</sup> including existing roads (27.22 hectares). The proposal concerns a mixed use development to include employment development and residential housing. This EclA is provided in support of the planning application for the primary infrastructure (spine road, swales and associated utility provision), the proposed development areas (earth-works to establish 'plateaus'), Junction 2 and Junction 3 improvements and the A483/ A525 interchange improvements only [WCBC to confirm]. As the development areas are to be provided over several phases; the design of individual buildings and layout of related infrastructure is to remain flexible, they will be subject to separate planning applications (and ecological assessment) at such time as a plot is brought forward. The EclA is provided in Marches Ecology (2009a). The location of the proposed development site is shown in *Figure 1*.

1.1.2 The ecological background data search and review had two principal aims:

- to identify existing ecological resources, and thereby establish the baseline condition, within a potential zone of influence through desk-top study; and
- to detail any requirement for field survey indicated by the results of the desk-top study.

1.1.3 A separate confidential report has been produced with regards Badger (*Meles meles*) (Marches Ecology 2009b).

### 1.2 The Proposed Development

1.2.1 The following provides a brief summary; Marches Ecology (2009a) should be referred to for full details. The development site comprises approximately 23.47 hectares; 14.16 hectares of employment land and 7.28 hectares of residential land (the latter acquired in December 2008) with 2.02 hectares of former railway land. The site has outline planning permission (granted in 2004) for employment use and for 150 homes on the residential land. WCBC's proposal for the site concerns an exemplar mixed use but sustainable development; an extension to the existing Technology Park and the creation of new affordable housing; predominantly to the east of Croesnewydd Road. The aim of the employment site is to attract high technology businesses while maintaining the highest environmental standards. It is currently envisaged that the Western Gateway development will be delivered over an approximate 10 to 20 year period in a series of phases. The delivery period will largely be determined by demand and market forces.

1.2.2 The first phase of construction would see the provision of a spine road, associated junctions and utilities, and also drainage features such as the proposed swales. The spine road is approximately 600 m in length with an 11 m wide carriageway. The spine road enters the site from the A525 (where a new roundabout will be provided); Junction 2 and exits the site

at Croesnewydd Road (where a new junction and bridges will be required); Junction 3. Preparatory works at Junction 3 are likely to be completed as permitted development. The B5098 Berse Road will also be extended east to join the new Ruthin Road roundabout from the south. The creation of development plateaus and key landscape features would also be completed at this stage. Improvement works (widening of the south-bound off-slip) to the A483/ A525 interchange are also required

### **1.3 Structure of this Report**

#### **1.3.1 The remainder of this report is structured as follows:**

*Section 2* lists the information sources consulted and organisations contacted;  
*Section 3* describes protected sites in the area;  
*Section 4* presents the species records;  
*Section 5* provides data on fisheries and water quality (associated with the River Gwenfro);  
*Section 6* provides information on biodiversity plans and strategies; and  
*Section 7* presents the conclusions.

Further sections give references and a summary of key legislation.

## 2 INFORMATION SOURCES

- 2.1.1 Ecological information was gathered from archival sources to provide background information on the ecological status of the site and its surroundings. Locations of designated sites are provided in *Figure 2* and responses from consultees (where appropriate) are provided in the appendices.
- 2.1.2 Statutory organisations and other relevant bodies were contacted to request information within three search areas. These search areas and data requirements were identified following a brief review of available information regarding the proposed development in order to delineate a potential zone of influence. The extent of each search area was subsequently defined using standard guidelines for Ecological Impact Assessment (EclA) (e.g. Institute of Environmental Assessment 1995; Institute of Ecology and Environmental Management 2006). The search areas were initially developed in relation to the area associated with the proposed development known as 'employment land'; this was the subject of the consultation exercise. Subsequently an adjacent area, known as 'residential land' was added to the project. As this is located on the eastern side of the 'employment land' any extended search area would be associated with Wrexham town centre only – consequently an additional consultation exercise was not undertaken as it was considered that few species records would be provided.
- 2.1.3 The following information was requested within 1 km of the proposed development site:
- non-statutory designated sites for nature conservation (e.g. County Wildlife Site - CWS);
  - Ancient Woodland, or long-established semi-natural woodland;
  - species protected by the *Wildlife and Countryside Act 1981* (as amended);
  - species protected by European directives;
  - species listed in the UK Biodiversity Action Plan (UK BAP), Wrexham Biodiversity Action Plan (WBAP), *Section 42 of the Natural Environment and Rural Communities Act 2006* (referred to in the text as 'Section 42 species');
  - red data book species;
  - other species listed as scarce or notable in literature issued by conservation organisations or learned societies.
- 2.1.4 The following information was requested within 2 km of the proposed development site:
- international and national statutory sites for nature conservation (e.g. RAMSAR, SPA, SAC, SSSI, LNR).
- 2.1.5 The following information was requested within 5 km of the proposed development site:
- Records of all bat species.
- 2.1.6 Information was requested on other organisations and other relevant local wildlife groups to contact, e.g. bat, local mammal, herpetofauna and bird groups. Specific information was also requested from Environment Agency Wales regarding fish and water quality data for the River Gwenfro.
- 2.1.7 Widely available contextual information was consulted as follows:
- the National Biodiversity Network Gateway (<http://data.nbn.org.uk/>);

- the MAGIC (Multi-Agency Geographical Information for the Countryside) environmental database (<http://www.magic.gov.uk>);
- UK BAP;
- Wrexham BAP  
([http://www.wrexham.gov.uk/english/planning\\_portal/biodiversity/wxmbap.htm](http://www.wrexham.gov.uk/english/planning_portal/biodiversity/wxmbap.htm));
- Wrexham LANDMAP  
([http://www.wrexham.gov.uk/english/planning\\_portal/landmap/spg.htm](http://www.wrexham.gov.uk/english/planning_portal/landmap/spg.htm)); and
- the Countryside Council for Wales 'Protected Sites' web-site  
<http://www.ccw.gov.uk/interactive-maps/protected-areas-map.aspx>.

2.1.8 *Table 1* lists the statutory organisations and other relevant bodies that were contacted and presents a brief description of the consultation process.

*Table 1 – Summary of consultation.*

| Organisation                                                                             | Contact date                   | Date reply received and summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Countryside Council for Wales (Matthew Ellis, Regional Species and Biodiversity Officer) | 07 <sup>th</sup> October 2008  | <b>13<sup>th</sup> October 2008.</b> Map provided indicating locations of bat, Great Crested Newt and reptile records, as well as a Site of Special Scientific Interest (Gatewen Marsh).                                                                                                                                                                                                                                                                                                                                                                                        |
| Wrexham County Borough Council (Zara Lomax, Ecologist)                                   | 07 <sup>th</sup> October 2008  | <b>14<sup>th</sup> October 2008.</b> Information regarding County Wildlife Sites and protected species records within search area held by the Council obtained during an office visit.                                                                                                                                                                                                                                                                                                                                                                                          |
| Cofnod (North Wales Environmental Information Service)                                   | 07 <sup>th</sup> October 2008  | <b>27<sup>th</sup> October 2008.</b> Comprehensive report and associated maps received indicating one statutory national site, ancient woodland, non-statutory Wildlife Sites, protected/notable species records within 2 km of the site and bat records within 5 km of the site. Species records include data provided by the following organisations: North East Wales Amphibian and Reptile Network, NE Wales Bat Roosts Database, Countryside Council for Wales and the National Biodiversity Network, as well as records uploaded onto the Cofnod Online Recording System. |
| Clwyd Bat Group                                                                          | 07 <sup>th</sup> October 2008  | No information provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| North East Wales Wildlife Trust                                                          | 07 <sup>th</sup> October 2008  | No information provided.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Environment Agency Wales                                                                 | 12 <sup>th</sup> November 2008 | <b>28<sup>th</sup> November 2008.</b> Excel data supplied for water quality sampling records from three locations on River Gwenfro between 2000 and 2008. Data supplied on fish sampling exercise at one location on River Gwenfro in 2007.                                                                                                                                                                                                                                                                                                                                     |

2.1.9 The response from Cofnod is reproduced as *Appendix 1*.

### 3 PROTECTED SITES

#### 3.1 Statutory Designated Sites

- 3.1.1 There is one statutory designated site within the 2 km search area; Gatewen Marsh Site of Special Scientific Interest (SSSI) (refer to *Table 2* below and *Figure 2*). SSSIs are of national importance and are designated under *The Wildlife and Countryside Act 1981 (as amended)*, and are also affected by the *CROW Act 2000*. The summary description in *Table 2* is adapted from the individual site citation sheet available from the Countryside Council for Wales.

*Table 2 – Statutory Designated Sites*

| Site name and designation | Grid Reference | Approximate distance from proposed development site boundary | Summary Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|---------------------------|----------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gatewen Marsh SSSI        | SJ 317 515     | 650 m                                                        | <p>Gatewen Marsh is designated as it is one of only three significant examples in the former county of Clwyd of the “southern mesotrophic mires” wetland type. This type is more characteristic of south-west Wales.</p> <p>The site occupies the flat valley bottom of a tributary of the River Gwenfro, the stream running through the eastern side of the marsh. The marsh is unusual in containing substantial stands of Bulrush in shallow water with other plants including Brooklime, Water Plantain and Bottle Sedge. The fringes of these areas support stands of Common Spike-rush with Water Mint, Gipsy-wort, Narrow-leaved Water-parsnip and Lesser Spearwort. There are also stands of Great Pond-sedge and Bur-reed with Reed-grass on the fringes and Broad-leaved Pondweed in open channels.</p> |

- 3.1.2 In addition to the above, the River Gwenfro (that partly bisects, and partly is located immediately adjacent to, the proposed development site) is directly linked to the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SSSI/ Special Area of Conservation (SAC), via the River Clywedog. The River Dee SSSI/ SAC is located approximately 14.6 km downstream of the proposed development site boundary. SACs are areas of European importance designated under *The Conservation (Natural Habitats, etc.) Regulations 1994* (as amended).
- 3.1.3 *Annex I* habitats that are a primary reason for selection of the SAC are ‘*Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation*’. Atlantic salmon (*Salmo salar*) and Floating water-plantain (*Luronium natans*) are *Annex II* species that are a primary reason for selection of the site. Sea lamprey (*Petromyzon marinus*), Brook lamprey (*Lampetra planeri*), River lamprey (*Lampetra fluviatilis*), Bullhead (*Cottus gobio*) and Otter (*Lutra lutra*) are *Annex II* species which are present as a qualifying feature.

### 3.2 Non-statutory Designated Sites

- 3.2.1 There are three Wildlife Site (WS) within the 1 km search area (refer to *Table 3* and *Figure 2*). The summary description in *Table 3* is adapted from the individual site citation sheets available from WCBC.

*Table 3 – Non-statutory Designated Sites*

| Site name and reference     | Grid Reference | Approximate distance from proposed development site boundary | Summary Description                                                                                                                                                               |
|-----------------------------|----------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Berse Drelincourt (W335)    | SJ315507       | 50 m (separated from site by A483)                           | This site comprises a mosaic of semi-natural habitats including neutral grassland and a stream corridor with wooded banks. It directly borders an old mineral railway.            |
| Erddig Estate (W317)        | SJ330484       | 820 m                                                        | National Trust estate with woodlands, semi-improved neutral grasslands and marshes.                                                                                               |
| New Broughton Meadow (W334) | SJ306513       | 950 m                                                        | This site comprises a mosaic of semi-natural habitats including a pond, wet Alder/ Willow carr, marsh and neutral grassland, particularly associated with an old mineral railway. |

- 3.2.2 Three additional WS's lies just outside the 1 km search area: Higher Berse Marsh (W333), Moss Valley (W311) and Big Wood (W217).
- 3.2.3 The criteria used to select Wildlife Sites in Wrexham County Borough have been developed in conjunction with North Wales Wildlife Trust, Countryside Council for Wales and other local authorities. WCBC identify Wildlife Sites as follows:
- 'areas of substantive value including both the most important and most distinctive species, habitats, geological and geomorphological features within a national, regional and local context'.*
- 3.2.4 Cofnod have provided information on Ancient Woodland – a small part of one area associated with Erddig Estate WS is located within the 1 km search area (approximately 820 m to the south-east at its closest point). Another stand associated with Big Wood WS is located approximately 1.1 km to the south-west.

## 4 SPECIES

### 4.1 Introduction

4.1.1 Cofnod provided the following species records:

- **Category 1 Species:** species with International or UK Legal Protection, Section 42 [NERC] Species and UK BAP Priority Species;
- **Category 2 Species:** Global Red List, British Red Data Book, Rare & Scarce, and Welsh Red and Amber Birds, where these are not identified in Category 1; and
- **Category 3 Species:** LBAP Species not identified under Categories 1 & 2.

4.1.2 Data on the following species groups was provided:

- mammals (Badger, Otter, Bats (several species), Hedgehog, Polecat, Stoat);
- amphibians (Great Crested Newt);
- reptiles (Slow-worm, Grass Snake, Common Lizard); and
- invertebrates (several Moth species and a Dragonfly).

4.1.3 Species records were provided for a 1 km search area centred on the site, and a 5 km search area for bats as requested. The species records included data provided by North East Wales Amphibian and Reptile Network, NE Wales Bat Roosts Database Countryside Council for Wales and the National Biodiversity Network as well individual records and incidental records uploaded onto the Cofnod Online Recording System.

4.1.4 Cofnod provided two sets of species records – a set which includes detailed grid references and which are not authorised for release into the public domain, and an additional ‘Public Version’ where the accuracy of some of the grid references has been reduced (*i.e.* whereby six-figure grid references have been reduced to four-figure grid references). ‘Public Version’ records are utilised in this document. Although this has not allowed exact measurement of the distance from the site or location of the records, the reduced accuracy is not considered to affect the overall conclusions provided. A few records have a six-, or ten-figure grid reference which has enabled an approximate measurement of the distance from the site boundary to be undertaken. In these cases, distances are recorded from the edge of the proposed development site. The proposed development site is located in the 1 km grid squares SJ3150 and SJ3250.

4.1.5 Maps indicating the location of the records were provided by Cofnod, although these were not provided for the ‘Public Version’. A summary of all the records is presented in the sections below.

### 4.2 Bats

4.2.1 All species of British bat are listed on *Schedule 5 of the Wildlife and Countryside Act 1981 (as amended)*, and receive full protection under *Section 9*. They are also listed as European Protected Species on *Schedule 2 of the Conservation (Natural Habitats, etc) Regulations 1994* which gives them full protection under *Regulation 39*. Protection was extended by the *Countryside and Rights of Way Act 2000* (the *CRoW Act*).

4.2.2 Under the above legislation it is an offence to intentionally or recklessly:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

4.2.3 Several species of bat, including the Common Pipistrelle (*Pipistrellus pipistrellus*) are included as priority species in the UK BAP and also as species of principal importance for the conservation of biological diversity in Wales under *Section 42* of the *NERC Act*. The WBAP includes a Species Action Plan (SAP) for Lesser Horseshoe Bat (*Rhinolophus hipposideros*).

4.2.4 All species of British bat are also protected under *Schedule 6* of the *Wildlife and Countryside Act 1981 (as amended)*. This protection relates specifically to trapping and direct pursuit of the species.

4.2.5 Records supplied by Cofnod were from a 5 km search area and are summarised in *Table 4* below. Records were provided with a four-figure grid reference and it was therefore not possible to determine distance from the proposed development. The status (e.g. roosts or otherwise) of these records was also not provided. CCW provided a number of bat records located on a map – these corresponded with the records provided by Cofnod and are not further detailed below. The NBN gateway does not include any additional records.

4.2.6 No bat records occur within the proposed development site boundary, although two records occur in the same grid squares as the proposed development – a 1999 record for *Plecotus auritus* (Brown Long-eared Bat) and a 2002 record of *Chiroptera* species.

*Table 4 – Bat records provided by Cofnod – 5 km search area*

| Species name                                          | No. of records within 5 km search area | Dates             | Summary (Grid reference)                                                                                                                                                                                                                                      |
|-------------------------------------------------------|----------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Pipistrellus pipistrellus</i> (Common Pipistrelle) | 42                                     | From 1985 to 2003 | 1 record – SJ3155, SJ3647, SJ3046, SJ3152, SJ2651, SJ2947, SJ3245, SJ3453, SJ3454, SJ3449, SJ3153, SJ3349, SJ2945, SJ3346, SJ2946, SJ3445<br>2 records – SJ3151, SJ3251, SJ3355, SJ3452, SJ2851, SJ3148, SJ3547<br>3 records – SJ3249, SJ3051, SJ3551, SJ3248 |
| <i>Chiroptera</i> species                             | 36                                     | From 1982 to 2004 | 1 record – SJ3248, SJ3452, SJ2954, SJ3155, SJ3152, SJ3349, SJ3347, SJ3354, SJ2952, SJ2955, SJ3051, SJ3355, SJ3247, SJ2752, SJ3053, SJ2850, SJ2847, SJ3348, SJ3249, SJ3350<br>2 records – SJ3250, SJ3148, SJ3350<br>3 records – SJ3547, SJ3551                 |

| Species name                                              | No. of records within 5 km search area | Dates             | Summary (Grid reference)                                                                |
|-----------------------------------------------------------|----------------------------------------|-------------------|-----------------------------------------------------------------------------------------|
|                                                           |                                        |                   | 4 records – SJ3449                                                                      |
| <i>Plecotus auritus</i><br>(Brown Long-eared Bat)         | 10                                     | From 1987 to 1999 | 1 record – SJ3248, SJ3147, SJ3049, SJ3549, SJ3450, SJ3451<br>2 records – SJ3150, SJ3149 |
| <i>Pipistrellus</i> species                               | 7                                      | 2000 to 2003      | 1 record – SJ2749, SJ3045, SJ3447<br>2 records – SJ3249, SJ3253                         |
| <i>Plecotus</i> species                                   | 5                                      | 1987              | 1 record – SJ3248<br>4 records – SJ3149                                                 |
| <i>Rhinolophus hipposideros</i><br>(Lesser Horseshoe Bat) | 3                                      | From 1999 to 2000 | 3 records – SJ2850                                                                      |
| <i>Myotis daubentonii</i><br>(Daubenton's Bat)            | 2                                      | 1998              | 2 records – SJ3455                                                                      |
| <i>Myotis</i> species                                     | 2                                      | 1996 and 1999     | 1 record – SJ3348, SJ3247                                                               |
| <i>Myotis mystacinus</i><br>(Whiskered Bat)               | 1                                      | 2000              | SJ32847                                                                                 |
|                                                           |                                        |                   |                                                                                         |

### 4.3 Otter

4.3.1 The Otter (*Lutra lutra*) is listed on *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), and receive full protection under *Section 9*. The 1981 Act was amended by the *Countryside and Rights of Way Act 2000* (the CRoW Act) which further extends the protection. It is also listed on *Annexe IV* of the European Union Directive on *Natural Habitats and Wild Fauna and Flora (Council Directive 92/43/EEC)*, which is implemented in the UK by the *Habitats Regulations 1994 (The Conservation (Natural Habitats, &c.) Regulations 1994)* as amended. It is included on *Schedule 2* of the *Habitats Regulations* which gives it full protection under *Regulation 39*. The Otter is therefore a so-called European Protected Species.

4.3.2 Under the above legislation it is an offence to intentionally or recklessly:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

4.3.3 The Otter is also a UK BAP priority species and is included in *Section 42* of the *NERC Act 2006* as a species of principal importance for the conservation of biological diversity in Wales.

- 4.3.4 Cofnod provided one 2007 record for Otter from SJ319503 (near to the Croesnewydd Road bridge). This record is located within the proposed development site boundary. The associated comments state the following '1 male Otter killed by dumper truck in this area, where road crosses River Gwenfro. Also an Otter road kill here on a separate occasion.' The NBN gateway does not include any additional records.

#### 4.4 Other Mammals

- 4.4.1 Cofnod provided two records for West European Hedgehog (*Erinaceus europaeus*) and one record of Polecat (*Mustela putorius*) from the 1 km search area; these are summarised in Table 5 below. Both West European Hedgehog and Polecat are UK BAP priority species and are also included in Section 42 of the NERC Act 2006 as species of principal importance for the conservation of biological diversity in Wales. The NBN gateway does not include any additional records.

Table 5 – Other mammal records provided by Cofnod

| Species name                                        | No. of records within 1 km search area | Dates         | Grid reference, location                                                                         | Approximate distance from proposed development site |
|-----------------------------------------------------|----------------------------------------|---------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <i>Erinaceus europaeus</i> (West European Hedgehog) | 2                                      | 2002 and 2003 | SJ325500, Pwll Bwlch Gwyn, Brymbo Road, Wrexham<br>SJ310513, Weston Road, New Broughton, Wrexham | 0.25 km<br>0.9 km                                   |
| <i>Mustela putorius</i> (Polecat)                   | 1                                      | 2005          | SJ306507, B5430, ½ mile east of Coedpoeth                                                        | 0.7 km                                              |

#### 4.5 Great Crested Newts

- 4.5.1 Great Crested Newts (*Triturus cristatus*) are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receive full protection under Section 9. The 1981 Act was amended by the Countryside and Rights of Way Act 2000 (the CROW Act) which further extends the protection. It is also listed on Annexes II and IV of the European Union Directive on Natural Habitats and Wild Fauna and Flora (Council Directive 92/43/EEC), which is implemented in the UK by the Habitats Regulations 1994 (The Conservation (Natural Habitats, &c.) Regulations 1994). It is included on Schedule 2 of the Habitats Regulations which gives it full protection under Regulation 39. The Great Crested Newt is therefore a so-called European Protected Species. The legislation applies to all life stages of the Great Crested Newt, including eggs, larvae, juveniles and adults.
- 4.5.2 Under the above legislation it is an offence to intentionally or recklessly:
- kill, injure or take an individual of such a species;
  - possess any part of such species either alive or dead;

- damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

4.5.3 The Great Crested Newt is a priority species in the UK Biodiversity Action Plan (DoE 1995; UK Biodiversity Steering Group, 1998a & b), which includes objectives and targets to protect and restore newt habitats and to create new sites through habitat management and re-creation. *Section 42* of the *NERC Act 2006* provides a list of habitats and species of principal importance for the conservation of biological diversity in Wales. The Great Crested Newt is included on this list. It also has a SAP in the WBAP.

4.5.4 Cofnod supplied one record for Great Crested Newt within the 1 km search area. CCW provided a number of records on a map as well as an excel spreadsheet. One record is located within the 1 km search area as follows: a 1996 record from SJ304502 (Plas Power Park), located approximately 0.75 km west of the proposed development site (from which it is separated by the A483 road). A further three records are located within the 2 km search area. The NBN gateway does not include any additional records.

#### 4.6 Reptiles

4.6.1 Viviparous Lizard, Grass Snake, Slow-worm and Adder are all listed under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), in respect of *Section 9(5)* and part of *Section 9(1)*. This protection was extended by the CRow Act. All four species have recently been added to the UK BAP priority species list and are included on the provisional list of locally important/ endangered species in the Wrexham BAP.

4.6.2 Under the above legislation it is an offence to:

- intentionally or recklessly kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

4.6.3 Records for three common species of reptile – Grass Snake (*Natrix natrix*), Slow-worm (*Anguis fragilis*) and Viviparous Lizard (*Zootoca vivipara*) – were provided by Cofnod and are summarised in *Table 6* below. CCW provided the locations of three reptile records on a map (no details) one of which is the same location as a Cofnod record. A 2004 record for Viviparous Lizard is located within one of the grid squares occupied by the proposed development site (SJ3250). All three species of reptile are UK BAP priority species and are also included in *Section 42* of the *NERC Act 2006* as species of principal importance for the conservation of biological diversity in Wales. The NBN gateway does not include any additional records.

Table 6 – Reptile records provided by Cofnod and CCW

| Species name                                     | No. of records within 1 km search area | Dates   | Grid reference, location                                                | Approximate distance from proposed development site |
|--------------------------------------------------|----------------------------------------|---------|-------------------------------------------------------------------------|-----------------------------------------------------|
| Slow-worm<br>( <i>Anguis fragilis</i> )          | 2                                      | 1990    | SJ324496, railway track, Wrexham                                        | 0.5 km                                              |
| Grass Snake<br>( <i>Natrix natrix</i> )          | 2                                      | 1990    | SJ324496, railway track, Wrexham                                        | 0.5 km                                              |
| Viviparous Lizard<br>( <i>Zootoca vivipara</i> ) | 1                                      | 2004    | SJ327502, Wrexham, 100+ on railway triangle site                        | 0.21 km                                             |
| Unknown                                          | 2                                      | Unknown | Approx grid references estimated from CCW map –<br>SJ325494<br>SJ326495 | 0.75 km<br>0.75 km                                  |

## 4.7 Invertebrates

- 4.7.1 Cofnod provided a small number of invertebrate records. Two species – *Allophytes oxyacanthae* (Green-brindled Crescent) and *Tyria jacobaeae* (Cinnabar) are UK BAP priority species and are also included in *Section 42* of the *NERC Act 2006* as species of principal importance for the conservation of biological diversity in Wales. Three others are listed on the Rare and Scarce List (Falk & Crossley, 2005). These records are summarised in *Table 7* below.

Table 7 – Invertebrate records provided by Cofnod and CCW

| Species name                                               | No. of records within 1 km search area | Dates         | Grid reference, location   | Approximate distance from proposed development site |
|------------------------------------------------------------|----------------------------------------|---------------|----------------------------|-----------------------------------------------------|
| <i>Allophytes oxyacanthae</i><br>(Green-brindled Crescent) | 1                                      | 1982          | SJ324501, Wrexham Hospital | 0.1 km                                              |
| <i>Tyria jacobaeae</i><br>(Cinnabar)                       | 2                                      | 1978 and 1982 | SJ324501, Wrexham Hospital | 0.1 km                                              |
| <i>Campsicnemus pusillus</i>                               | 1                                      | 1988          | SJ318514, Gatewen Marsh    | 0.8 km                                              |
| <i>Phaonia atriceps</i>                                    | 2                                      | 1988          | SJ318514, Gatewen Marsh    | 0.8 km                                              |
| <i>Pilaria scutellata</i>                                  | 3                                      | 1988          | SJ318514, Gatewen Marsh    | 0.8 km                                              |

- 4.7.2 Additional invertebrate records are provided in Cheshire Ecological Services (2004), obtained during ecological surveys of the railway corridor between Gatewen and Croesnewydd Triangle in 2004. A total of 222 species were recorded along the entire length of the corridor (some of which is located within, or immediately adjacent to the proposed development site boundary). A summary of the survey records is as follows (numbers of species associated with each category in brackets), specific details are only provided for the two nationally notable categories:

Nationally Notable (Scarce) Category A – Notable A (2)

- *Lassioglossum quadrinotatum* (a bee) – 1<sup>st</sup> record in Wales. Recorded from 'just above the [Maelor] hospital bridge'. Considered to be outwith the proposed development site boundary.
- *Cassida hemisphaerica* (Tortoise Beetle). No information provided on location of record.

Nationally Notable (Scarce) Category B – Notable B (3)

- *Hylaetus signatus* (Yellow-faced Flower-bee) – 2<sup>nd</sup> record for Wales. 'Several netted from behind the [Maelor] hospital.' Considered to be outwith the proposed development site boundary.
- *Apion pubescens* (a Weevil) – Recorded from 'behind the [Maelor] hospital'. Considered to be outwith the proposed development site boundary.
- *Chorisops nagatomii*. No information provided on location of record.

Unknown (5)

Local (25)

Common (183)

## **5 OTHER RECORDS**

### **5.1 Introduction**

- 5.1.1 Environment Agency Wales provided water quality and fisheries data for the River Gwenfro. This data is summarised below.

### **5.2 Water Quality**

- 5.2.1 Water quality data was provided for three sampling point locations along the River Gwenfro, as follows:
- Willow Road (EA Wales sampling point ref: 167), estimated four-figure grid reference SJ2852 – located approximately 5 km upstream of the development site boundary.
  - Brook Street (ref: 165), estimated four-figure grid reference SJ3350 – located approximately 2 km downstream of the development site boundary.
  - Maelor Hospital Bridge (ref. 158), estimated four-figure grid reference SJ3250 – located approximately 200 m downstream of the development site boundary.
- 5.2.2 *Tables 8a-c* overleaf provide a summary of the data provided.

Table 8a – Water Quality Summary for Sampling Point 167

| Sample Point 167 (Willow Road, Samples taken between 01/01/2000 and 28/11/2008)                                                    |         |         |         |
|------------------------------------------------------------------------------------------------------------------------------------|---------|---------|---------|
|                                                                                                                                    | Average | Minimum | Maximum |
| pH (PHUNITS)                                                                                                                       | 8.12    | 7.42    | 8.78    |
| Conductivity @ 20C (uS/cm)                                                                                                         | 671     | 408     | 1101    |
| Temp Water (CEL)                                                                                                                   | 10.27   | 2.00    | 19.40   |
| Conductivity @ 25C (uS/cm)                                                                                                         | 695     | 432     | 847     |
| Dissolved oxygen % Saturation                                                                                                      | 99.6    | 80.2    | 116.0   |
| Dissolved oxygen (mg/l)                                                                                                            | 11.4    | 9.6     | 13.5    |
| Biochemical Oxygen Demand 5 day ATU (mg/l)                                                                                         | 1.7     | 0.5     | 7.9     |
| Chemical Oxygen Demand as O2 (mg/l)                                                                                                | 33      | 12      | 228     |
| Total Ammonia (mg/l as N)                                                                                                          | 0.099   | 0.010   | 1.150   |
| Oxidised Nitrogen (mg/l)                                                                                                           | 3.146   | 1.299   | 6.260   |
| Nitrate (mg/l as N)                                                                                                                | 3.12    | 1.26    | 6.25    |
| Nitrite (mg/l as N)                                                                                                                | 0.0237  | 0.0040  | 0.2400  |
| Un-ionised Ammonia NH3 (mg/l)                                                                                                      | 0.00164 | 0.00008 | 0.01910 |
| Suspended solids @105C (mg/l)                                                                                                      | 20      | 2       | 507     |
| Hardness (mg/l as CaCO3)                                                                                                           | 341     | 207     | 430     |
| Alkalinity pH 4_5 (mg/l as CaCO3)                                                                                                  | 185     | 103     | 239     |
| Chloride (mg/l)                                                                                                                    | 50.2    | 35.5    | 63.2    |
| Ortho-phosphate (mg/l)                                                                                                             | 0.0     | 0.0     | 0.2     |
| Phosphate (mg/l)                                                                                                                   | 0.1     | 0.0     | 0.4     |
| Potassium - dissolved (mg/l)                                                                                                       | 10.5    | 7.9     | 13.4    |
| Magnesium - dissolved (mg/l)                                                                                                       | 19.3    | 10.1    | 24.4    |
| Magnesium - total (mg/l)                                                                                                           | 19.6    | 15.6    | 23.5    |
| Calcium - dissolved (mg/l)                                                                                                         | 104.5   | 66.4    | 133.0   |
| Calcium - total (mg/l)                                                                                                             | 104.4   | 77.9    | 128.0   |
| Oil & Grease Visible? (Present = 1/Absent = 0)                                                                                     |         | 0.0     | 1.0     |
| Copper - dissolved (ug/l)                                                                                                          | 2.9     | 1.1     | 44.9    |
| Zinc - total (ug/l)                                                                                                                | 16.8    | 3.3     | 198.0   |
| Dissolved oxygen % Saturation (field reading)                                                                                      | 102.8   | 80.4    | 142.0   |
| Dissolved oxygen (mg/l) (field reading)                                                                                            | 11.5    | 8.3     | 14.7    |
| <b>Scores Grade B for General Water Quality Assessment (GQA) Chemistry, Grade 2 for GQA Phosphate and Grade 3 for GQA Nitrate.</b> |         |         |         |

*Table 8b – Water Quality Summary for Sampling Point 165*

| <b>Sample Point 165 (Brook Strret, Samples taken between 01/01/2000 and 28/11/2008)</b> |                |                |                |
|-----------------------------------------------------------------------------------------|----------------|----------------|----------------|
|                                                                                         | <b>Average</b> | <b>Minimum</b> | <b>Maximum</b> |
| <b>pH (PHUNITS)</b>                                                                     | 8.11           | 7.36           | 8.76           |
| <b>Conductivity @ 20C (uS/cm)</b>                                                       | 647            | 411            | 765            |
| <b>Temp Water (CEL)</b>                                                                 | 9.41           | 4.64           | 15.61          |
| <b>Biochemical Oxygen Demand 5 day ATU (mg/l)</b>                                       | 1.5            | 0.5            | 5.0            |
| <b>Chemical Oxygen Demand as O2 (mg/l)</b>                                              | 26             | 12             | 131            |
| <b>Total Ammonia (mg/l as N)</b>                                                        | 0.071          | 0.030          | 0.297          |
| <b>Oxidised Nitrogen (mg/l)</b>                                                         | 3.089          | 2.240          | 4.490          |
| <b>Nitrate (mg/l as N)</b>                                                              | 3.08           | 2.24           | 4.47           |
| <b>Nitrite (mg/l as N)</b>                                                              | 0.0125         | 0.0040         | 0.0240         |
| <b>Suspended solids @105C (mg/l)</b>                                                    | 45             | 3              | 444            |
| <b>Chloride (mg/l)</b>                                                                  | 49.1           | 35.8           | 62.4           |
| <b>Ortho-phosphate (mg/l)</b>                                                           | 0.043          | 0.020          | 0.110          |
| <b>Dissolved oxygen (mg/l) (field reading)</b>                                          | 10.96          | 8.81           | 12.98          |

Table 8c – Water Quality Summary for Sampling Point 158

| <b>Sample Point 158 (Maelor Hospital Bridge, Samples taken between 01/01/2000 and 28/11/2008)</b>                                 |                |                |                |
|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|
|                                                                                                                                   | <b>Average</b> | <b>Minimum</b> | <b>Maximum</b> |
| pH (PHUNITS)                                                                                                                      | 8.20           | 7.35           | 9.00           |
| Conductivity @ 20C (uS/cm)                                                                                                        | 642            | 391            | 783            |
| Temp Water (CEL)                                                                                                                  | 10.2           | 2.0            | 20.6           |
| Conductivity @ 25C (uS/cm)                                                                                                        | 689            | 410            | 855            |
| Dissolved oxygen % Saturation (lab analysis)                                                                                      | 97.9           | 78.5           | 127.0          |
| Dissolved oxygen (mg/l) (lab analysis)                                                                                            | 11.2           | 9.4            | 14.8           |
| Biochemical Oxygen Demand 5 day ATU (mg/l)                                                                                        | 1.8            | 0.5            | 14.5           |
| Chemical Oxygen Demand as O2 (mg/l)                                                                                               | 26             | 12             | 134            |
| Total Ammonia (mg/l as N)                                                                                                         | 0.100          | 0.010          | 1.260          |
| Oxidised Nitrogen (mg/l)                                                                                                          | 3.229          | 0.200          | 6.441          |
| Nitrate (mg/l as N)                                                                                                               | 3.21           | 6.37           | 0.20           |
| Nitrite (mg/l as N)                                                                                                               | 0.0236         | 0.0040         | 0.2310         |
| Un-ionised Ammonia NH3 (mg/l)                                                                                                     | 0.00165        | 0.00008        | 0.02080        |
| Suspended solids @105C (mg/l)                                                                                                     | 25             | 2              | 416            |
| Hardness (mg/l as CaCO3)                                                                                                          | 351            | 213            | 464            |
| Alkalinity pH 4_5 (mg/l as CaCO3)                                                                                                 | 177            | 68             | 263            |
| Chloride (mg/l)                                                                                                                   | 44.6           | 30.8           | 61.4           |
| Ortho-phosphate (mg/l)                                                                                                            | 0.039          | 0.002          | 0.280          |
| Phosphate (mg/l)                                                                                                                  | 0.071          | 0.012          | 0.329          |
| Potassium - dissolved (mg/l)                                                                                                      | 12.44          | 8.44           | 16.00          |
| Magnesium - dissolved (mg/l)                                                                                                      | 19.63          | 9.59           | 26.10          |
| Magnesium - total (mg/l)                                                                                                          | 20.54          | 15.70          | 28.30          |
| Calcium - dissolved (mg/l)                                                                                                        | 107.7          | 69.1           | 137.0          |
| Calcium - total (mg/l)                                                                                                            | 107.4          | 84.9           | 139.0          |
| Oil & Grease Visible? (Present = 1/Absent = 0)                                                                                    | 0              | 1              | 36             |
| Copper - dissolved (ug/l)                                                                                                         | 2.74           | 1.26           | 8.00           |
| Zinc - total (ug/l)                                                                                                               | 19.06          | 2.32           | 298.00         |
| Dissolved oxygen % Saturation (field reading)                                                                                     | 102.4          | 70.6           | 130.0          |
| Dissolved oxygen (mg/l) (field reading)                                                                                           | 11.51          | 9.07           | 14.77          |
| <b>Scores Grade B for General Water Quality Assessment (GQA) Chemistry, Grade 2 for GQAPhosphate and Grade 3 for GQA Nitrate.</b> |                |                |                |

- 5.2.3 Sample points 158 (Maelor Hospital Bridge) and 167 (Willow Road) score Grade B 'good' for General Quality Assessment (GQA) Chemistry<sup>1</sup>, Grade 2 'low' for GQA Phosphate<sup>2</sup> and Grade 3 'moderately low' for GQA Nitrate<sup>3</sup>. The EA Wales have advised that these scores are based on the most recent assessments that uses 2005 to 2007 data.
- 5.2.4 At sample point 158 the River Gwenfro has a River Quality Objective (RQO) of RE1<sup>4</sup> 'water of very good quality suitable for all fish species', with water quality currently complying with this criteria. At sample point 167 the River Gwenfro has a River Quality Objective of RE2 'water of good quality suitable for all fish species', with water quality currently complying with this criteria. The EA Wales have advised that these scores are based on the most recent RQO assessment that uses 2004 to 2006 data.

### 5.3 Fisheries Data

- 5.3.1 Fisheries data was provided for a single point on the River Gwenfro (SJ3496449456) for 28.08.2007; located approximately 4.5 km downstream of the proposed development site boundary. The results were as follows: Bullhead – 27, Stoneloach – 6, Salmon – 3, and Trout – 13. The River is classified as 'fair' grade D for salmon and 'fair' grade D for trout on the National Fishery Classification Scheme (NFCS) (Mainstone *et al*, 1994). NFCS describes 'fair' Grade D as '*in the bottom 40% for a fishery of this type*'.

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<sup>1</sup> GQA Chemistry – the basic chemical grade of the GQA scheme is defined by standards for the concentrations of BOD, ammonia and dissolved oxygen. The overall grade assigned is determined by the worst of the three grades for the individual determinants.

<sup>2</sup> GQA Phosphate – total reactive phosphorus is measured and the results are recorded as measurements of orthophosphate. Concentrations that are 'high' are considered to be indicative of possible existing or future problems of eutrophication.

<sup>3</sup> GQA Nitrate – Scoring system is from very low to very high.

<sup>4</sup> The Environment Agency Wales assigns a target River Quality Objective (RQO) to each classified river stretch using the River Ecosystem Classification System. Target RQOs range from RE1 to RE5, with RE1 having the highest water quality standard.

## 6 BIODIVERSITY PLANS AND STRATEGIES

### 6.1 UK Biodiversity Action Plan

- 6.1.1 The UK Biodiversity Action Plan (UK BAP) sets out the Government's response to the Convention on Biological Diversity signed in 1992. It describes the UK's biological resources and commits to a detailed plan for the protection of these transcribed into 391 Species Action Plans (covering 475 UK BAP priority species), 45 Habitat Action Plans and 162 Local Biodiversity Action Plans with targeted actions. A further 104 UK BAP priority species were given Species Statements rather than full plans with the expectation that the conservation of some of these species would be delivered through habitat conservation measures.
- 6.1.2 The UK BAP provides a starting point for identifying regional and local biodiversity policies. In Wales, UK BAP priority species and habitats are also listed as species and habitats of principal importance for the conservation of biodiversity under *Section 42* of the *Natural Environment and Rural Communities Act 2006*. This requires local planning authorities to conserve, enhance and add to these priority habitats (and the habitats of priority species) and also that they should consider these species and habitats when determining planning applications.

### 6.2 The Wrexham Biodiversity Action Plan

- 6.2.1 The framework document for the Wrexham Biodiversity Action Plan (WBAP) was written in 2003 and is an ongoing document. The WBAP states that 17 UK Priority Habitats were selected for Wrexham County Borough as follows: upland oak woodland, wet woodland, upland mixed ash woodland, lowland wood pasture and parkland, blanket bog, lowland raised mire, ancient hedgerows, cereal field margins, upland heath, lowland heath, calcareous grassland, lowland meadows, lowland dry acid grassland, floodplain grazing marsh, fens, purple moor-grass and rush pasture and ponds. Of these it is intended that Action Plans will be prepared for each priority. Currently eight Habitat Action Plans (HAPs) are included within the WBAP: woodland (all types), veteran trees, upland moorland, rivers, streams and canals, ponds, lowland bog, gardens, and derelict and industrial land.
- 6.2.2 The WBAP also states that 22 UK Priority species were selected for Wrexham County Borough as follows
- Mammals: Water Vole, Brown Hare, European Otter, Pipistrelle Bat, Lesser Horseshoe Bat, Red Squirrel.
  - Birds: Skylark, Nightjar, Linnet, Reed Bunting, Spotted Flycatcher, Tree Sparrow, Bullfinch, Black Grouse, Song Thrush, Grey Partridge.
  - Amphibians: Great Crested Newt.
  - Invertebrates: Grey Scalloped Bar Moth, Argent & Sable Moth, Lesser Silver Water Beetle
  - Plants: Slender Green Feather Moss, Prickly Sedge, Floating Water Plantain

6.2.3 Of these it is intended that Action Plans will be prepared for each priority. Currently seven Species Action Plans (SAPs) are included within the WBAP: Badger, Otter, Lesser Horseshoe Bat, Barn Owl, Song Thrush, Great Crested Newt and Black Poplar.

6.2.4 The WBAP also includes a 'Provisional List of Locally Important/Endangered Species'.

### **6.3 Wrexham LANDMAP Landscape Character Area**

6.3.1 Wrexham LANDMAP identifies the proposed development site as being mainly located within Landscape Character Area 7d: West Wrexham Ridges and Valleys. This is described as *'a complex area of former mining villages, industry, farmland and woodland in a landscape of distinct ridges and valleys which are aligned towards Wrexham town.'* It further describes the ecological character as being dominated by improved grassland or arable, with Gatewen SSSI and the Gwenfro valley as providing an important wetland resource.

6.3.2 The northern boundary of the proposed development site immediately abuts Landscape Character Area 10: Wrexham Town, described as *'a thriving historic market town set on a lowland plateau'*.

## **7 CONCLUSIONS**

- 7.1.1 The proposed development site is located in Landscape Character Area 7d: West Wrexham Ridges and Valleys. Only one statutorily protected site; Gatewen Marsh Site of Special Scientific Interest, lies within 2 km of the proposed development (approximately 650 m away at its closest point) and three Wildlife Sites within 1 km. Berse Drelincourt WS is located approximately 50 m from the proposed development site boundary (separated from the site by the A483 road).
- 7.1.2 Species (both protected and otherwise of conservation interest) and species groups previously recorded in the vicinity of the site that may be important for the assessment process include Badger, bats, Otter, West European Hedgehog, Polecat, Great Crested Newt, reptiles (Grass Snake, Slow-worm and Viviparous Lizard) and a small number of invertebrates. There are a number of species and species groups for which the desk-study to date has provided limited information (e.g. birds, amphibians and Water Vole). Fisheries and water quality data has also been provided for the River Gwenfro.

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## 9 KEY LEGISLATION AND REGULATIONS

This section provides a brief summary of key general legislation and regulations relevant to ecology and nature conservation. It should not be considered a comprehensive review and is not meant to be so. How this legislation relates to specific species is covered in *Section 4* of this report where relevant. The species-specific information provided in *Section 4* and the more general summary provided here is for information only and is not intended to replace specialised legal advice. It does not replace the text of the legislation, but summarises the salient points.

### **The Berne Convention on Conservation of European Wildlife and Natural Habitats, 1979.**

This aims to conserve wild flora and fauna and their natural habitats, particularly endangered and vulnerable species. In the UK it has effect through the *Countryside Act, 1968* and the *Wildlife and Countryside Act, 1981*.

### **The Bonn Convention on Conservation of Migratory Species of Wild Animals, 1979.**

This aims for management of migratory species across national or jurisdictional boundaries. This Convention is implemented in UK law by the *Environmental Protection Act, 1990*.

### **The EC Directive on Conservation of Wild Birds, 1979 (The 'Birds Directive').**

This requires Member States to take measures for the conservation of wild birds by the designation of Special Protection Areas (SPAs). The Directive is implemented in the UK through the *Conservation (Natural Habitats, &c.) Regulations, 1994*.

### **The Wildlife and Countryside Act, 1981 (WCA).**

This strengthened protection for Sites of Special Scientific Interest (SSSIs), provided additional safeguards for particular types of area, and restricted the killing, taking from the wild and disturbance of various species.

### **The Convention on Biological Diversity, 1992.**

Key objectives are the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits of the utilisation of genetic resources. The UK's non-statutory strategy for achieving these commitments was published in 1994, Biodiversity – The UK Action Plan.

### **The EC Directive on Quality of Freshwaters Needing Protection or Improvement to Support Fish Life, 1978.**

This intended to protect or improve the quality of freshwaters capable of supporting fish life. It has been implemented by the *Surface Waters (Fish Life) Classification Regulations, 1997* under *Section 82* of the *Water Resources Act, 1991*.

### **The EC Directive on Conservation of Natural Habitats and of Wild Fauna and Flora, 1992 (The 'Habitats Directive').**

This contributes to the conservation of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species at favourable conservation status by the designation of Special Areas of Conservation (SACs). It modifies the *Birds Directive*.

***The Conservation (Natural Habitats, &c.) Regulations 1994, (The ‘Habitats Regulations’, or ‘Conservation Regulations’).***

***Conservation (Natural Habitats, & c.) (Amendment) Regulations 2007.***

***Conservation (Natural Habitats, & c.) (Amendment) Regulations 2009.***

This gives UK implementation to the *EC Directive on Conservation of Natural Habitats and of Wild Fauna and Flora, 1992*.

***The National Parks and Access to the Countryside Act, 1949.***

This introduced the concept of National Nature Reserves and SSSIs and conferred powers on local authorities to create Nature Reserves. The *Countryside Act, 1968* strengthened many powers under the 1949 Act.

***The Environmental Protection Act, 1990.***

This established three country conservation councils (English Nature, Countryside Council for Wales and Scottish Natural Heritage) and the Joint Nature Conservation Committee to succeed the Nature Conservancy Council; and provided further protection for SSSIs.

***The Ground Game Act, 1880 and the Hare Protection Act, 1911.***

These Acts gave Brown Hares limited protection.

***The Protection of Badgers Act, 1992.***

This protects Badgers and their setts.

***The Hedgerow Regulations, 1997.***

These regulations, made under *Section 97* of the *Environment Act, 1995*, require prior consent for the removal of a hedgerow.

***The Countryside and Rights of Way Act, 2000 (The CROW Act).***

This is the first major wildlife and countryside legislation since the Acts of 1949, 1968 and 1981. The Act covers the right of access to open land, updates to the public rights of way system, the legislation of the Biodiversity Action Plan, more stringent management, protection and consenting measures for SSSIs, greater penalties for wildlife crime, and new duties within Areas of Outstanding Natural Beauty. In addition, the Act lists species and habitats of principal importance for biodiversity (*Section 74*). It introduced a statutory duty for Government to promote steps “to further the conservation” of habitats and species listed in *Section 74*.

***The Natural Environment and Rural Communities Act, 2006 (The NERC Act)***

*Sections 40 to 42* of the NERC Act replace *S74* of the CROW Act. *Section 40* of the NERC Act extends to all public authorities (including local planning authorities) the existing *S74* duty to have regard to biodiversity as far as is consistent with the proper exercise of their functions.



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Marches Ecology

**C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Background Data Search**

**Figure 1 – Site Location**

Drawn by: ME

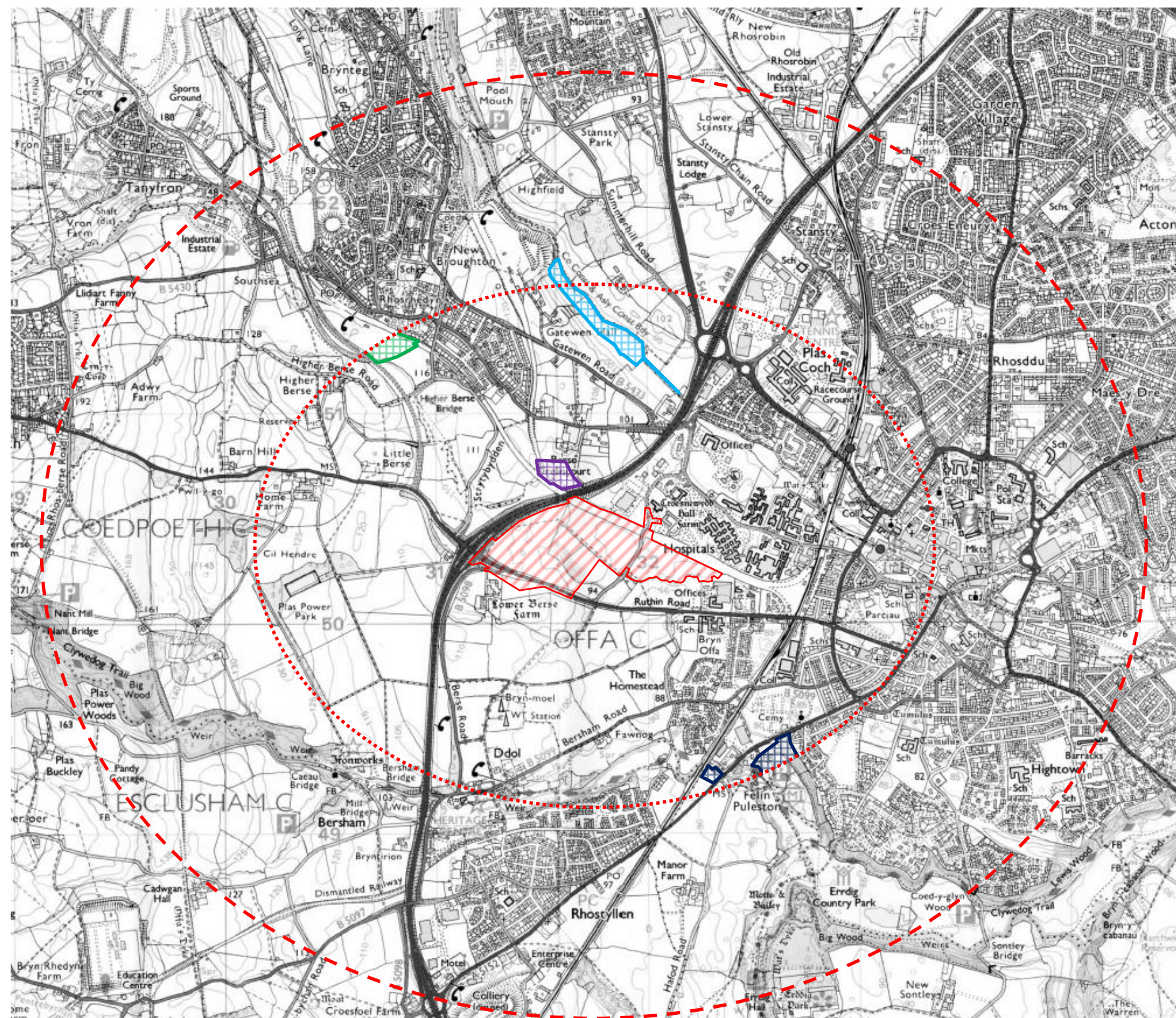
Checked by: TK

Date: 03.09.09

**Key**



Approximate boundary



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### Key

-  Site Location
-  Approximate 1 km boundary
-  Approximate 2 km boundary

-  Gatewen Marsh Site of Special Scientific Interest
-  Berse Dreincourt Wildlife Site (W335)
-  New Broughton Meadow Wildlife Site (W334) \*
-  Erdigg Estate Wildlife Site (W317) \*

NB –All boundaries are approximate only. \* Only parts located within 1 km shown.

## Marches Ecology

C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Background Data Search

Figure 2 – Statutory and Non-statutory Protected  
Sites

Drawn by: ME  
Checked by: TK  
Date: 03.09.09

***Appendix 1 – Records provided by Cofnod***

Biodiversity Information Search (Species, Habitats & Sites)

PUBLIC VERSION



Please read **Important Issues** and **Notes** before interpreting the following information.

| Our Ref. | Client Name     | Date Run   | Your Ref.            |
|----------|-----------------|------------|----------------------|
| E00748   | Marches Ecology | 27/10/2008 | C076 Western Gateway |

| Site Name/Reference |
|---------------------|
| Wrexham Gateway     |

Category 1 Species (Species with International or UK Legal Protection, Section 42 [NERC] Species & UK BAP Priority Species) within 1000m buffer - 39 records

| In | Grid Reference                       | Taxon Name                                                             | Date                                    | Recorder(s)              | Abundance        | Record Type                   | Site Name                             | Comments                                                                                                                                                                 | Dataset ID                 | Lists                                | V |
|----|--------------------------------------|------------------------------------------------------------------------|-----------------------------------------|--------------------------|------------------|-------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------------|---|
| S  | SJ319503                             | Lutra lutra ( <i>European Otter/Dyfrgi</i> )                           | Spring 2007                             | Zara Lomax               | 1                |                               | Near to Croesnewydd Bridge            | 1 male otter killed by dumper truck in this area, where road crosses River Gwenfro. Also an otter road kill here on a separate occasion. Both otters from River Gwenfro. | D1117/001/06 (1201324)     | Bern, HDir, S42, UKBAP, WCA5         | 6 |
| S  | SJ312503                             | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 17/05/2004                              | John Gill                | 1                |                               | Denbighshire                          |                                                                                                                                                                          | D0969/001/01 (822220)      | BA                                   | 6 |
| B  | SJ324501 ( <i>Centroid</i> )         | Allophyes oxyacanthae ( <i>Green-brindled Crescent/Cilgant Brych</i> ) | 1982                                    | M.Newstead               | 1 Adult          | Attracted to a lighted window | Wrexham hospital                      |                                                                                                                                                                          | D0057/001/01 (553345)      | S42, UKBAP                           |   |
| B  | SJ324496                             | Anguis fragilis ( <i>Slow-worm/Neidr Ddefaid</i> )                     | 2 records, both in 1990                 | Mark Lee; Anon           |                  |                               | Railway track, Wrexham                |                                                                                                                                                                          | D0035/001/02, D1076/001/01 | S42, UKBAP, WCA5                     |   |
| B  | SJ3250 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> )                                       | 05/09/2002                              | Anon                     | 1                |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (683069)      | Bonn, WCA5                           |   |
| B  | SJ325500                             | Erinaceus europaeus ( <i>West European Hedgehog/Draenog</i> )          | 2003                                    | Anon                     | 1                |                               | Pwll Bwlch Gwyn, Brymbo Road, Wrexham | Alive                                                                                                                                                                    | D0971/001/01 (825983)      | S42, UKBAP                           | 4 |
| B  | SJ3105751297                         | Erinaceus europaeus ( <i>West European Hedgehog/Draenog</i> )          | 01/09/2002                              | Anon                     | 1                |                               | Weston Road, New Broughton Wrexham    | Alive                                                                                                                                                                    | D0971/001/01 (825925)      | S42, UKBAP                           | 4 |
| B  | SJ306507                             | Mustela putorius ( <i>Polecat/Ffwlbart</i> )                           | 09/10/2005                              | Brian Burnett            |                  |                               | B5430, half mile E of Coedpoeth.      | Dead on road, markings clearly polecat.                                                                                                                                  | D0112/001/01 (757675)      | HDir, S42, UKBAP                     | 5 |
| B  | SJ324496                             | Natrix natrix ( <i>Grass Snake/Neidr y Gwair</i> )                     | 2 records, both in 1990                 | Anon; Mark Lee           |                  |                               | Railway track, Wrexham                |                                                                                                                                                                          | D1076/001/01, D0035/001/02 | S42, UKBAP                           |   |
| B  | SJ3249 ( <i>Estimated from Map</i> ) | Pipistrellus ( <i>Pipistrellus</i> )                                   | 26/06/2003                              | Anon                     | 0                |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (683511)      | Bonn, WCA5                           |   |
| B  | SJ3249 ( <i>Estimated from Map</i> ) | Pipistrellus pipistrellus ( <i>Common Pipistrelle/Ystlum Lleiaf</i> )  | 16/07/1997                              | Anon                     |                  |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (683867)      | Bonn, Bern, HDir, S42, WCA5          |   |
| B  | SJ3151 ( <i>Estimated from Map</i> ) | Pipistrellus pipistrellus ( <i>Common Pipistrelle/Ystlum Lleiaf</i> )  | 2 records, in 1988 and 24/05/1989       | Anon                     |                  |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02               | Bonn, Bern, HDir, S42, WCA5          |   |
| B  | SJ3251 ( <i>Estimated from Map</i> ) | Pipistrellus pipistrellus ( <i>Common Pipistrelle/Ystlum Lleiaf</i> )  | 14/10/1999                              | Anon                     | 1                |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (683628)      | Bonn, Bern, HDir, S42, WCA5          |   |
| B  | SJ313493                             | Plecotus ( <i>Plecotus</i> )                                           | 1987                                    | Pulford, E.A.            |                  |                               | Wrexham,Bersham                       |                                                                                                                                                                          | D1072/001/01 (409887)      | Bonn, WCA5                           |   |
| B  | SJ3150 ( <i>Estimated from Map</i> ) | Plecotus auritus ( <i>Brown Long-eared Bat/Ystlum Hirglust</i> )       | 13/09/1999                              | Anon                     | 1                |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (683989)      | Bonn, Bern, HDir, S42, UKBAP, WCA5   |   |
| B  | SJ3149 ( <i>Estimated from Map</i> ) | Plecotus auritus ( <i>Brown Long-eared Bat/Ystlum Hirglust</i> )       | 21/08/1987                              | Anon                     |                  |                               | Site Name Withheld                    | Comments Withheld                                                                                                                                                        | D1049/001/02 (684115)      | Bonn, Bern, HDir, S42, UKBAP, WCA5   |   |
| B  | SJ3037050200                         | Triturus cristatus ( <i>Great Crested Newt/Madfall Ddwr Gribog</i> )   | 1996                                    | I.S.                     |                  |                               | Plas Power Park                       |                                                                                                                                                                          | D1125/001/01 (756271)      | Bern, Global, HDir, S42, UKBAP, WCA5 |   |
| B  | SJ324501 ( <i>Centroid</i> )         | Tyria jacobaeae ( <i>Cinnabar/Teigr y Benfelen</i> )                   | 2 records, on 17/05/1978 and 11/05/1982 | M.Newstead               | 1 Adult, 1 Adult | MV Light; Daytime observation | Wrexham hospital                      |                                                                                                                                                                          | D0057/001/01               | S42, UKBAP                           |   |
| B  | SJ327502                             | Zootoca vivipara ( <i>Common Lizard</i> )                              | 2004                                    | Pete Lancashire          |                  |                               | Wrexham                               | 100+ on railway triangle site                                                                                                                                            | D0035/001/02 (297431)      | S42, UKBAP, WCA5                     |   |
| S  | SJ3150#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 7 records, all on 29/03/2002            | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: A50.5. Please contact CBG for more details.; CBG Ref: A50.6; CBG Ref: A50.0; CBG Ref: A50.4; CBG Ref: A50.1; CBG Ref: A50.2; CBG Ref: A50.3                     | D0059/001/01               | BA                                   |   |
| SB | SJ3250#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 30/04/2002                              | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: A76.0. Please contact CBG for more details.                                                                                                                     | D0059/001/01 (802951)      | BA                                   |   |
| B  | SJ3249#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 2 records, on 01/01/2003 and 19/04/2007 | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: B40.0. Please contact CBG for more details.; CBG Ref: B1.0                                                                                                      | D0059/001/01               | BA                                   |   |
| B  | SJ3049#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 25/02/2003                              | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: B26.0. Please contact CBG for more details.                                                                                                                     | D0059/001/01 (804413)      | BA                                   |   |
| B  | SJ3151#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 01/04/2002                              | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: A69.0. Please contact CBG for more details.                                                                                                                     | D0059/001/01 (802944)      | BA                                   |   |
| B  | SJ3050#                              | Meles meles ( <i>Eurasian Badger/Mochyn Daeear</i> )                   | 2 records, both on 25/02/2003           | Clwyd Badger Group (CBG) |                  | Badger Sett                   |                                       | CBG Ref: A40.0. Please contact CBG for more details.; CBG Ref: A40.1                                                                                                     | D0059/001/01               | BA                                   |   |
| B  | SJ3051#                              | Pipistrellus pipistrellus ( <i>Common Pipistrelle/Ystlum Lleiaf</i> )  | 1985                                    | Anon                     |                  |                               |                                       |                                                                                                                                                                          | D1072/001/01 (408442)      | Bonn, Bern, HDir, S42, WCA5          |   |
| B  | SJ3149#                              | Plecotus ( <i>Plecotus</i> )                                           | 1987                                    | Anon                     |                  |                               | Bersham                               |                                                                                                                                                                          | D1072/001/01 (409843)      | Bonn, WCA5                           |   |

| Category 2 Species (Global Red List, British Red Data Book, Rare & Scarce, and Welsh Red and Amber Birds, where these are not identified in Category 1) within 1000m buffer - 6 records |                |                                                        |                                              |                               |                                 |                          |                                     |          |                                 |       |   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------------------------------|----------------------------------------------|-------------------------------|---------------------------------|--------------------------|-------------------------------------|----------|---------------------------------|-------|---|
| In                                                                                                                                                                                      | Grid Reference | Taxon Name                                             | Date                                         | Recorder(s)                   | Abundance                       | Record Type              | Site Name                           | Comments | Dataset ID                      | Lists | V |
| B                                                                                                                                                                                       | SJ318514       | Campsicnemus pusillus ( <i>Campsicnemus pusillus</i> ) | 03/08/1988                                   | Welsh Peatland Invert. Survey | 1 present                       | Pitfall Trap             | WPIS Sample 1, Gatewen Marsh (WPIS) |          | D1226/001/01 ( <i>1146636</i> ) | RS    |   |
| B                                                                                                                                                                                       | SJ318514       | Phaonia atriceps ( <i>Phaonia atriceps</i> )           | 2 records, on 03/08/1988 and 12/10/1988      | Welsh Peatland Invert. Survey | 2 present, 37 present           | Water Trap               | WPIS Sample 1, Gatewen Marsh (WPIS) |          | D1226/001/01                    | RS    |   |
| B                                                                                                                                                                                       | SJ318514       | Pilaria scutellata ( <i>Pilaria scutellata</i> )       | 3 records, between 05/07/1988 and 03/08/1988 | Welsh Peatland Invert. Survey | 1 present, 1 present, 2 present | Pitfall Trap; Water Trap | WPIS Sample 1, Gatewen Marsh (WPIS) |          | D1226/001/01                    | RS    |   |

| Category 3 Species (LBAP Species not identified under Categories 1 & 2) within 1000m buffer - 2 records |                |                                         |            |                 |           |             |                                      |                            |                                |         |   |
|---------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|------------|-----------------|-----------|-------------|--------------------------------------|----------------------------|--------------------------------|---------|---|
| In                                                                                                      | Grid Reference | Taxon Name                              | Date       | Recorder(s)     | Abundance | Record Type | Site Name                            | Comments                   | Dataset ID                     | LBAPs   | V |
| B                                                                                                       | SJ315506       | Aeshna mixta ( <i>Migrant Hawker</i> )  | 27/08/2004 | Bryan Formstone | 1 Adult   |             | Gatewen old railway, west of Wrexham |                            | D0067/001/01 ( <i>638362</i> ) | GWY,SNO |   |
| B                                                                                                       | SJ317512       | Mustela erminea ( <i>Stoat/Carlwm</i> ) | 20/06/2006 | Brian Burnett   |           |             | Caego, wrexham side of garden centre | Ran across road, c.midday. | D0112/001/01 ( <i>757679</i> ) | ANG,FLI | 5 |

| Bats within 5000m buffer - 104 records |                                      |                                  |                                         |             |           |             |                    |                   |                                |            |   |
|----------------------------------------|--------------------------------------|----------------------------------|-----------------------------------------|-------------|-----------|-------------|--------------------|-------------------|--------------------------------|------------|---|
| In                                     | Grid Reference                       | Taxon Name                       | Date                                    | Recorder(s) | Abundance | Record Type | Site Name          | Comments          | Dataset ID                     | Lists      | V |
| B                                      | SJ3547 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 26/07/1987                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683325</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3248 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 2 records, on 31/05/1996 and 28/07/1999 | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02                   | Bonn, WCA5 |   |
| B                                      | SJ3452 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 1994                                    | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683262</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3551 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 2 records, both on 24/06/1982           | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02                   | Bonn, WCA5 |   |
| B                                      | SJ2954 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 15/07/1996                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683233</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3155 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 1987                                    | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683252</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3152 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 1994                                    | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683261</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3349 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 12/07/1982                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683217</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3347 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 12/10/1989                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683218</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3449 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 14/08/1986                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683228</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3449 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 04/07/1988                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683156</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3547 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 05/07/1999                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683159</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3449 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 09/08/1988                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683201</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3148 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 08/07/1983                              | Anon        | 5-8       |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683145</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3148 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 03/07/1986                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683150</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3350 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 03/10/1990                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683154</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3354 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 24/06/1983                              | Anon        | 32        |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683119</i> ) | Bonn, WCA5 |   |
| B                                      | SJ2952 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 01/07/1987                              | Anon        | 34        |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683120</i> ) | Bonn, WCA5 |   |
| B                                      | SJ2955 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 31/07/1997                              | Anon        | 139       |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683136</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3051 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 29/06/2000                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683414</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3355 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 05/07/2001                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683430</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3449 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 30/12/1999                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683441</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3551 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 17/05/2004                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683379</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3551 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 15/06/1996                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683395</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3247 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 30/12/1999                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683408</i> ) | Bonn, WCA5 |   |
| B                                      | SJ2752 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 2 records, both on 31/08/1999           | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02                   | Bonn, WCA5 |   |
| B                                      | SJ3053 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 02/09/1993                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683373</i> ) | Bonn, WCA5 |   |
| B                                      | SJ2850 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 13/08/1985                              | Anon        | 10        |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683106</i> ) | Bonn, WCA5 |   |
| B                                      | SJ2847 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 14/10/1997                              | Anon        | 15        |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683111</i> ) | Bonn, WCA5 |   |
| B                                      | SJ3348 ( <i>Estimated from Map</i> ) | Chiroptera ( <i>Chiroptera</i> ) | 14/01/2002                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 ( <i>683078</i> ) | Bonn, WCA5 |   |

| In | Grid Reference                     | Taxon Name                                                          | Date                                    | Recorder(s) | Abundance | Record Type | Site Name          | Comments          | Dataset ID               | Lists                       | V |
|----|------------------------------------|---------------------------------------------------------------------|-----------------------------------------|-------------|-----------|-------------|--------------------|-------------------|--------------------------|-----------------------------|---|
| B  | SJ3350 <i>(Estimated from Map)</i> | Chiroptera <i>(Chiroptera)</i>                                      | 01/10/1998                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683097) | Bonn, WCA5                  |   |
| B  | SJ3249 <i>(Estimated from Map)</i> | Chiroptera <i>(Chiroptera)</i>                                      | 12/07/1994                              | Anon        | 2         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683099) | Bonn, WCA5                  |   |
| B  | SJ3547 <i>(Estimated from Map)</i> | Chiroptera <i>(Chiroptera)</i>                                      | 31/03/2003                              | Anon        | 0         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683067) | Bonn, WCA5                  |   |
| B  | SJ3250 <i>(Estimated from Map)</i> | Chiroptera <i>(Chiroptera)</i>                                      | 05/09/2002                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683069) | Bonn, WCA5                  |   |
| B  | SJ3350 <i>(Estimated from Map)</i> | Chiroptera <i>(Chiroptera)</i>                                      | 12/07/1999                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683077) | Bonn, WCA5                  |   |
| B  | SJ3348 <i>(Estimated from Map)</i> | Myotis <i>(Myotis Species)</i>                                      | 31/05/1996                              | Anon        | 3         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683444) | Bonn, WCA5                  |   |
| B  | SJ3247 <i>(Estimated from Map)</i> | Myotis <i>(Myotis Species)</i>                                      | 30/06/1999                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683448) | Bonn, WCA5                  |   |
| B  | SJ2847 <i>(Estimated from Map)</i> | Myotis mystacinus <i>(Whiskered Bat/Ystlum Barfog)</i>              | 25/08/2000                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683470) | Bonn, Bern, HDir, WCA5      |   |
| B  | SJ2749 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 19/07/2002                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683522) | Bonn, WCA5                  |   |
| B  | SJ3253 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 19/08/2003                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683523) | Bonn, WCA5                  |   |
| B  | SJ3045 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 05/06/2000                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683551) | Bonn, WCA5                  |   |
| B  | SJ3249 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 26/06/2003                              | Anon        | 0         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683511) | Bonn, WCA5                  |   |
| B  | SJ3447 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 25/06/2002                              | Anon        | 0         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683514) | Bonn, WCA5                  |   |
| B  | SJ3253 <i>(Estimated from Map)</i> | Pipistrellus <i>(Pipistrellus)</i>                                  | 16/07/2003                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683520) | Bonn, WCA5                  |   |
| B  | SJ3551 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 27/07/1992                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683786) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3155 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 03/09/1999                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683792) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3355 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 04/07/1995                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683795) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3151 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 2 records, in 1988 and 24/05/1989       | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02             | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3249 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 16/07/1997                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683867) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3647 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 06/07/1993                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683803) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3046 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 10/05/1995                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683817) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3152 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 24/07/1992                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683773) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3051 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 23/07/1985                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683778) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ2651 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 06/06/1993                              | Anon        | 23        |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683678) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3248 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 03/06/1993                              | Anon        | 27        |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683683) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3452 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 21/07/1998                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683770) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3551 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 2 records, on 16/07/1987 and 23/07/1987 | Anon        | 15, 18    |             | Site Name Withheld | Comments Withheld | D1049/001/02             | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ2947 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 12/07/1982                              | Anon        | 21        |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683676) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3245 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 28/07/1997                              | Anon        | 2         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683647) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3453 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 28/07/1997                              | Anon        | 4         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683656) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3551 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 05/07/1994                              | Anon        | 6         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683659) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3251 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 14/10/1999                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683628) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3454 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 2 records, on 11/06/1998 and 30/06/1999 | Anon        | 1, 1      |             | Site Name Withheld | Comments Withheld | D1049/001/02             | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3449 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 12/07/1999                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683634) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3249 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 25/08/1999                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683610) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ2851 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 06/06/2003                              | Anon        | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683614) | Bonn, Bern, HDir, S42, WCA5 |   |
| B  | SJ3153 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i> | 30/07/1982                              | Anon        |           |             | Site Name Withheld | Comments Withheld | D1049/001/02<br>(683966) | Bonn, Bern, HDir, S42, WCA5 |   |

| In | Grid Reference                     | Taxon Name                                                                 | Date                                         | Recorder(s)   | Abundance | Record Type | Site Name          | Comments          | Dataset ID            | Lists                                      | V |
|----|------------------------------------|----------------------------------------------------------------------------|----------------------------------------------|---------------|-----------|-------------|--------------------|-------------------|-----------------------|--------------------------------------------|---|
| B  | SJ3349 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 31/08/1999                                   | Anon          | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683587) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3452 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 25/06/1993                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683951) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3148 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 26/06/1989                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683952) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3148 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 20/07/1988                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683958) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ2945 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 07/08/1992                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683930) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ2851 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 16/07/1990                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683932) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3547 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 31/07/1985                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683937) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3346 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 28/07/1989                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683890) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ2946 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 05/09/1996                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683894) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3248 <i>(Estimated from Map)</i> | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 02/09/1987                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683913) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ313493                           | Plecotus <i>(Plecotus)</i>                                                 | 1987                                         | Pulford, E.A. |           |             | Wrexham,Bersham    |                   | D1072/001/01 (409887) | Bonn, WCA5                                 |   |
| B  | SJ3248 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 30/12/1999                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (684081) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3149 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 21/08/1987                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (684115) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3147 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 01/08/1989                                   | Anon          | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683999) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3049 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 13/07/1988                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (684052) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3549 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 11/11/1991                                   | Anon          |           |             | Site Name Withheld | Comments Withheld | D1049/001/02 (684053) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3150 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 13/09/1999                                   | Anon          | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683989) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3450 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 09/09/1999                                   | Anon          | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683992) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ3451 <i>(Estimated from Map)</i> | Plecotus auritus <i>(Brown Long-eared Bat/Ystlum Hirglust)</i>             | 1996                                         | Anon          | 1         |             | Site Name Withheld | Comments Withheld | D1049/001/02 (683997) | Bonn, Bern, HDir, S42, UKBAP, WCA5         |   |
| B  | SJ2850 <i>(Estimated from Map)</i> | Rhinolophus hipposideros <i>(Lesser Horseshoe Bat/Ystlum Pedol Lleiaf)</i> | 3 records, between 10/06/1999 and 21/01/2000 | Anon          | 5, 5, 32  |             | Site Name Withheld | Comments Withheld | D1049/001/02          | Bonn, Bern, Global, HDir, S42, UKBAP, WCA5 |   |
| B  | SJ3455#                            | Myotis daubentonii <i>(Daubenton's Bat/Ystlum y Dwr)</i>                   | 2 records, on 02/08/1998 and 23/08/1998      | Anon          |           |             | Site Name Withheld | Comments Withheld | D1111/001/01          | Bonn, Bern, HDir, WCA5                     |   |
| B  | SJ3051#                            | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 1985                                         | Anon          |           |             |                    |                   | D1072/001/01 (408442) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3547#                            | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 1985                                         | Anon          |           |             |                    |                   | D1072/001/01 (408445) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3248#                            | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 1987                                         | Anon          |           |             | Erddig             |                   | D1072/001/01 (408470) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3355#                            | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 1987                                         | Anon          |           |             | Llay               |                   | D1072/001/01 (408487) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3445#                            | Pipistrellus pipistrellus <i>(Common Pipistrelle/Ystlum Lleiaf)</i>        | 1982                                         | Anon          |           |             | Wrexham nr         |                   | D1072/001/01 (408516) | Bonn, Bern, HDir, S42, WCA5                |   |
| B  | SJ3149#                            | Plecotus <i>(Plecotus)</i>                                                 | 1987                                         | Anon          |           |             | Bersham            |                   | D1072/001/01 (409843) | Bonn, WCA5                                 |   |
| B  | SJ3248#                            | Plecotus <i>(Plecotus)</i>                                                 | 1987                                         | Anon          |           |             | Erddig Hall        |                   | D1072/001/01 (409857) | Bonn, WCA5                                 |   |

|                                            |                                                                                                                                                                                                                                                                    |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Designated Sites intersecting 2000m buffer | SSSI: GATEWEN MARSH                                                                                                                                                                                                                                                |
| Wildlife Sites intersecting 1000m buffer   | Moss Valley, Berse Dreincourt, Erddig Estate, Big Wood, Afon Gwenfro, New Broughton Meadow, Higher Berse Marsh                                                                                                                                                     |
| NWWT Reserves intersecting 1000m buffer    | None                                                                                                                                                                                                                                                               |
| RSPB Reserves intersecting 1000m buffer    | None                                                                                                                                                                                                                                                               |
| RIGS intersecting 1000m buffer             | None                                                                                                                                                                                                                                                               |
| Habitat type(s) intersecting site boundary | Amenity Grassland, Arable, Buildings, Caravan Site, Dense Scrub, Ephemeral/Short Perennial, Fen, Gardens, Improved Grassland, Introduced Scrub, Not Accessed Land, Running Water, Semi-improved Neutral Grassland, Standing Water, Swamp, Tall Ruderal Herb, Track |
| Ancient Woodland intersecting 1000m buffer | Ancient and Semi Natural Woodland, Plantation on Ancient Woodland Site                                                                                                                                                                                             |

Important Issues

1. Usage of the above information is governed by Cofnod's **Terms and Conditions of Data Release** (available from Cofnod on request).
2. Records shown in bold typeface are sensitive species records. In this public version of the original report, the resolution of sensitive species grid references have been reduced and site names and comments have been removed.
3. Past records of presence of a habitat or species do not guarantee continued occurrence; absence of records does not imply absence of a species, merely that no records are held at Cofnod; Cofnod cannot guarantee the accuracy of supplied data; copyright of records remains with the original recorder.

Notes

This report should be used in conjunction with any relevant maps, where these are supplied.

Cofnod uses a search system which reports all priority or protected species within a specified search radius or buffer. Where required a search will also include high priority 'Mobile Species', such as bats, otters, amphibians and certain invertebrates, which lie outside the specified search radius. These species are highlighted on the report with an **asterisk**. They have been selected as 'Mobile Species' as their territory (possibly due to foraging activity or life cycle) could intersect with the search radius.

Records with 4 figure grid references are displayed as 1km squares on any relevant maps. They are listed separately in reports and highlighted in grey *italic* script.

**Sites** - Designated Sites and non-designated Wildlife Sites within 50m of the grid reference are highlighted in red. Wildlife Sites which remain unconfirmed by the relevant Local Authority are given 'Candidate' status and are displayed with the (c) suffix. The following reasons for candidate status apply: 1. Anglesey and Flintshire Wildlife Sites were identified by survey but have not been formally confirmed. 2. Conwy and Gwynedd Wildlife Sites were identified by survey and air photos and remain candidate until evaluated using selection criteria.

**Dataset ID** - All species records within the reports include Dataset ID codes, which can be used to cross-reference back to the relevant Metadata. The number below the Dataset ID is the individual record ID. Please quote this if you need more information on a specific record.

**'V' column** - Record Verification Level, for records from Category 5 and 6 datasets only. The following abbreviations apply: **4:** Probably correct, **5:** Known correct, **6:** Unconfirmed. Dataset Categories and Record Verification Levels are explained in more detail within Cofnod's policy on Data Quality, and Dataset Categories are listed within the Metadata report which accompanies this report.

Lists

**ABirds** - The Population Status of Birds in the UK: Birds of Conservation Concern 2002-07 (Welsh Amber listed), **BA** - Protection of Badgers Act, **BDir** - EC Birds Directive, **Bern** - Bern Convention, **Bonn** - The Bonn Convention on the Conservation of Migratory Species of Wild Animals, **Global** - Global IUCN Red List of Threatened Species, **HDir** - EU Habitats and Species Directive, **RBirds** - The Population Status of Birds in the UK: Birds of Conservation Concern 2002-07 (Welsh Red listed), **RDB01** - Red listing based on 2001 IUCN guidelines, **RDB94** - Red Listing based on 1994 IUCN guidelines, **RDBpre** - Red Data book listing based on pre 1994 IUCN guidelines, **RS** - Rare and scarce species (not based on IUCN criteria), **S42** - Natural Environment and Rural Communities Act 2006 (Section 42), **UKBAP** - UK Biodiversity Action Plan Priority Species, **WCA1.1** - Wildlife and Countryside Act Schedule 1 Part 1, **WCA1.2** - Wildlife and Countryside Act Schedule 1 Part 2, **WCA5** - Wildlife and Countryside Act Schedule 5, **WCA8** - Wildlife and Countryside Act Schedule 8

Abbreviations

Abbreviations

**ANG** - Isle of Anglesey, **CON** - Conwy, **DEN** - Denbighshire, **FLI** - Flintshire, **GWY** - Gwynedd, **SNO** - Snowdonia National Park, **WRE** - Wrexham, **LBAP** - Local Biodiversity Action Plan, **NWWT** - North Wales Wildlife Trust, **RSPB** - Royal Society for the Protection of Birds, **RIGS** - Regionally Important Geodiversity Sites.

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## **Appendix B**

# **Western Gateway Ecological Assessment (Marches Ecology 2009b)**

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|                         |                                                                                     |
|-------------------------|-------------------------------------------------------------------------------------|
| <b>Report<br/>Title</b> | Western Gateway, Wrexham Technology Park,<br>Wrexham - Ecological Impact Assessment |
| <b>Client</b>           | Wrexham County Borough Council                                                      |
| <b>Date</b>             | September 2009                                                                      |

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This report has been prepared by Marches Ecology with all reasonable skill, care and diligence within the terms of the Contract with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

|                            |                                                                                  |
|----------------------------|----------------------------------------------------------------------------------|
| <b>Report Title</b>        | Western Gateway, Wrexham Technology Park, Wrexham - Ecological Impact Assessment |
| <b>Client</b>              | Wrexham County Borough Council                                                   |
| <b>Marches Ecology Ref</b> | C076/EcIA/Draft                                                                  |
| <b>Date issued</b>         | September 2009                                                                   |
| <b>Author</b>              | Tom Knight                                                                       |
| <b>Reviewed by</b>         | Max Ellson                                                                       |

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*Figure 1 – Site Location*

*Figure 2 – Ecological Mitigation Plan*

*Figure 3a – Extended Phase 1 Habitat Survey (West)*

*Figure 3b – Extended Phase 1 Habitat Survey (East)*

*Figure 4 – Bat Activity Survey*

*Figure 5 – Otter Survey; Spot-check Locations*

*Figure 6 – Otter Survey; Sheets 1-4*

*Figure 7 – Otter Survey; Target Notes*

*Figure 8 – Ponds within 500 m of the Proposed Development*

# 1 INTRODUCTION

## 1.1 Project Background

1.1.1 Marches Ecology was commissioned by Wrexham County Borough Council (WCBC) to undertake an Ecological Impact Assessment (EclA) of the proposed Western Gateway development site; part of the Wrexham Technology Park, Wrexham (OS Grid Ref. for central point: 331724, 350389). The site extends to 272,200 m<sup>2</sup> including existing roads (27.22 hectares). The proposal concerns a mixed use development to include employment development and residential housing. This EclA is provided in support of the planning application for the primary infrastructure (spine road, swales and associated utility provision), the proposed development areas (earth-works to establish 'plateaus'), Junction 2 and Junction 3 improvements and the A483/ A525 interchange improvements only [WCBC to confirm]. As the development areas are to be provided over several phases; the design of individual buildings and layout of related infrastructure is to remain flexible, they will be subject to separate planning applications (and ecological assessment) at such time as a plot is brought forward. The location of the proposed site is shown in *Figure 1*.

1.1.2 The following ecological surveys have been completed to inform the EclA process;

- An Extended Phase 1 Habitat Survey;
- A botanical update survey;
- A Badger (*Meles meles*) survey;
- An Otter (*Lutra lutra*) survey;
- A Water Vole (*Arvicola terrestris*) survey;
- A bat survey;
- A reptile survey; and
- A breeding bird survey.

This report presents the findings of the ecological surveys listed above and previous ecological surveys undertaken at the site/ adjacent land (outlined in *Section 1.2*). The results of the ecological surveys have been used to:

- provide an appraisal of the ecological value of the survey area and local ecological resource (thereby updating information collated during the Background Data Search, outlined in *paragraph 1.1.3* below);
- detail further surveys that may be required; and
- identify potential constraints relating to ecology, assess any predicted impacts and outline potential mitigation/ reasonable avoidance measures.

1.1.3 An associated confidential Badger Survey Annex (Marches Ecology 2009a) has been compiled. A separate Ecological Background Data Search report (Marches Ecology 2009b) report has also been produced that collates existing ecological information for a defined study area from various sources. Both of these reports compliment this EclA report and all three documents should be considered together.

1.1.4 While the EclA outlines required mitigation and compensation measures a separate Ecological Method Statement (Marches Ecology 2009d) and an Ecological Management Plan (Marches Ecology 2009e) have been produced. The purpose of the Ecological Method

Statement will be to guide all mitigation measures required during the first phase of the development. A key component of this document will be to detail how the development areas can be maintained in the short to long-term to minimise ecological risk to future developments. It will also detail establishment of compensatory habitat. The Ecological Management Plan will concern ongoing long-term management of these newly created habitats as well as retained habitats and other features of ecological importance.

## 1.2 Previous Ecological Surveys

- 1.2.1 Most of the Western Gateway site has been the subject of a previous ecological assessment:
- TEP (2005). *Ruthin Road, Wrexham – Ecological Assessment* (Report Ref. 922.001B). Unpublished report produced on behalf of Redrow Homes (NW) Ltd.
  - TEP (2008). *Ruthin Road – River Gwenfro and Otter 10 Year Management Plan* (Report Ref. 922.032A). Unpublished report produced on behalf of Redrow Homes (NW) Ltd.
- 1.2.2 In addition use has been made of survey reports produced with regards adjacent/ nearby land parcels wherever available:
- Cheshire Ecological Services (2004). *Railway Corridor Gatewen to Croesnewydd Triangle, Wrexham – Ecological Surveys*. Unpublished report produced on behalf of WCBC.
  - Paul Chester & Associates Ltd (2008). *Land off Croesnewydd Road, Wrexham – Ecological Survey and Assessment*. Unpublished report produced on behalf of Harrow Estates Plc.
- 1.2.3 All of these sources of information are reviewed in *Section 3* and used to consolidate the evaluation of the ecological resource (*Section 4*). They are acknowledged throughout as appropriate.

## 1.3 The Proposed Development

- 1.3.1 The Western Gateway 'employment land' is identified in the Wrexham Unitary Development Plan as Wrexham: Ruthin Road Development Area (Ref. 39) and is allocated under Policy E1 for high quality (B1) employment development in accordance with Policy E2. Policy E2 establishes that '*Development will be low density, with buildings and hard surfaced areas of high quality design and materials set within an attractive natural and designed landscaped setting*'. The 'residential land' is identified as Ruthin Road (Ref. 21) and is allocated under Policy H1 for housing development. The disused railway land is identified as a walking/ cycling route in accordance with Policy T10. The 'employment land', 'residential land' and disused railway land are shown on *Figure 2*.
- 1.3.2 The development site comprises approximately 23.47 hectares; 14.16 hectares of employment land and 7.28 hectares of residential land (the latter acquired in December 2008) with 2.02 hectares of former railway land [WCBC to confirm as does not tally with figures provided]. A Masterplan and Development Brief – henceforth referred to as the Masterplan – (subject to peer review) was produced for the employment land in October 2007 (Terence O'Rourke 2007a & 2007b). The site has outline planning permission (granted in 2004) for employment use and for 150 homes on the residential land and it has been

identified as a strategically important employment site in the West Cheshire-Northeast Wales sub-region (Terence O'Rourke 2007a).

- 1.3.3 WCBC's proposal for the site concerns an exemplar mixed use but sustainable development; an extension to the existing Technology Park and the creation of new affordable housing; predominantly to the east of Croesnewydd Road. The aim of the employment site is to attract high technology businesses while maintaining the highest environmental standards. It is currently envisaged that the Western Gateway development will be delivered over an approximate 10 to 20 year period in a series of phases. The delivery period will largely be determined by demand and market forces.
- 1.3.4 The first phase of construction would see the provision of the spine road (*Figure 2*), associated junctions and utilities, and also drainage features such as the proposed swales. The spine road is approximately 600 m in length with an 11 m wide carriageway. The spine road enters the site from the A525 (where a new roundabout will be provided); Junction 2 and exits the site at Croesnewydd Road (where a new junction and bridges will be required); Junction 3. Preparatory works at Junction 3 are likely to be completed as permitted development. The B5098 Berse Road will also be extended east to join the new Ruthin Road roundabout from the south. The creation of development plateaus and key landscape features would also be completed at this stage. Improvement works (widening of the south-bound off-slip) to the A483/ A525 interchange are also required.
- 1.3.5 The Masterplan establishes a number of guiding principles that will be applied across the Western Gateway development. However it should be noted that the layout of the development plots, buildings and internal roads, *etc* (other than the spine road) are likely to be different to that presented in the Masterplan. The new site layout is not available for this assessment work. *Figure 4* in the Masterplan establishes the proportions of the 'development areas' (land uses) within the employment land as follows:
- Built development: 52%.
  - Soft Landscape Areas (including swales/flood alleviation areas): 48%.
  - Ecology resources: 31% (included in Soft Landscape Areas total).
- 1.3.6 The current proposal will adopt these proportions throughout the site. The Masterplan has been used to inform overall planning for ecological mitigation/ compensation both in this document and the Method Statement (Marches Ecology 2009d) and Management Plan (Marches Ecology 2009e). *Figure 8* (superseded by *Figure 2* in this document) of the Masterplan presents a landscape and ecology strategy, noting '*areas of nature conservation significance*' (employment land only). These three areas of significance are:
- The central woodland with associated stream/ wetland.
  - The central hedgerow/ ditch and associated swamp.
  - A small patch of Willow/ Bramble scrub near the southwest corner.

Beyond these three broad areas the disused railway line, the River Gwenfro and the western site boundary are also noted as of significance.

## **1.4 Structure of this Report**

### **1.4.1 The remainder of this report is structured as follows:**

*Section 2* describes the survey methodology and scope;

*Section 3* describes the results of the ecological surveys;

*Section 4* presents the evaluation;

*Section 5* presents the impact assessment and outlines mitigation measures; and

*Section 6* contains the target notes.

Further sections give references and tables of data.

## 2 METHODOLOGY

### 2.1 Extended Phase 1 Habitat Survey

- 2.1.1 An Extended Phase 1 Habitat Survey was carried out on 8<sup>th</sup> October 2008 of the land to the west of Croesnewydd Road by Tom Knight and Max Ellson of Marches Ecology. The weather was sunny with patchy clouds and a light breeze. An Extended Phase 1 Habitat Survey was also subsequently completed of the land parcel to the east of Croesnewydd Road following its acquisition by WCBC. This second survey was carried out on 24<sup>th</sup> June 2009 by Max Ellson. These initial surveys focussed on the Western Gateway site including both the employment and residential land (hereafter referred to as the survey area and defined on *Figure 2*) and areas of immediately adjacent habitat. Adjacent land outside the survey area boundary was viewed from access boundaries where possible.
- 2.1.2 The standard initial habitat survey method is Phase 1 Habitat Survey. It involves identifying areas or features of particular interest either in terms of their botanical interest, and/or habitat potential for protected or other notable species.
- 2.1.3 This basic survey has been adapted as 'extended' Phase 1 Habitat Survey where more information is required to inform site assessment. The methods used centre on the Phase 1 Habitat Survey approach (JNCC 2003) as extended for use in Environmental Impact Assessment (Institute of Environmental Assessment 1995). Extended Phase 1 Habitat Survey is necessarily a more holistic approach than Phase 1 Habitat Survey and provides an understanding of habitat use by faunal groups (IEEM 2005). This involves the following elements:
- Habitat mapping using a set of standard colour codes to indicate habitat types on a Phase 1 Habitat map.
  - Description of features of ecological or nature conservation interest in notes relating to numbered locations on the Phase 1 Habitat maps, called target notes. Target notes are recorded for habitat and features of possible botanical interest and features relating to animals including protected vertebrates.
- 2.1.4 In addition to the habitat maps and target notes, a plant species list was compiled (*Table 10* in *Section 8*). Plant nomenclature in this report follows Stace (1997).
- 2.1.5 October (west of Croesnewydd Road) is a sub-optimal time of year for general botanical recording. Many early-flowering and summer plants may not be visible. June (east of Croesnewydd Road) is an optimal time of year. Although it is unrealistic to suppose that walk-through surveys can generate completely exhaustive species lists, the list in this report indicates the character of the vegetation and the ecological value of the area inspected.
- 2.1.6 Habitats and other features were assessed for protected and other notable vertebrates that are likely to occur in the region and within the survey areas. Evidence of activity was noted when encountered. In addition a subjective assessment of the relative ecological value of the survey area, based on professional experience, was completed. Further information describing the methods employed for particular species where deemed relevant to the site are provided in *Section 2.2* (sub-sections entitled '*Habitat Assessment*'). Target notes were

made for features of interest, and these are given in *Section 6* and mapped on *Figure 3a* and *3b*.

### **Botanical Update**

- 2.1.7 A botanical update survey was undertaken on 22<sup>nd</sup> July 2009 by Tom Knight and Max Ellson of Marches Ecology. It involved a walk-over survey to record any additional plant species to that recorded during the Extended Phase 1 Habitat Survey. This also provided an opportunity to refine both the *Target Notes* and the habitat map (the latter provided as *Figure 3a* and *b*). July is an optimal time of year for general botanical recording.

## **2.2 Faunal Surveys**

### **Badger**

- 2.2.1 Information and results pertaining to Badgers is included within a confidential annex to this report (Marches Ecology, 2009a).

### **Bats**

#### *Habitat Assessment*

- 2.2.2 Initial survey for bats during the Extended Phase 1 Habitat Survey involved making an assessment of the habitat for foraging, and assessing locations for roosting. Trees are briefly described and features that increase the likelihood of them being used for roosting are identified (given as *Target Notes* in *Section 6*). If any definite signs of bats had been found (such as droppings and feeding remains), they would have been recorded.
- 2.2.3 A general assessment of trees within the survey area was completed during the Extended Phase 1 Habitat Survey. An individual external inspection of each tree was not undertaken at this time due to the number of trees present. No ladders or other climbing equipment were used during this assessment work. Cracks were not inspected internally and it is therefore possible that bats or evidence of bats could have been overlooked if located out of view. It should not be considered an exhaustive survey of the trees. The methodology for this bat assessment work was carried out from surveyor experience and followed methodologies adapted from Bat Conservation Trust (2007).

#### *Assessment of Bat-roost Potential*

- 2.2.4 Trees were classified on roosting opportunities for bats, and the general condition of the tree. Potential bat roosting features including any significant cracks, splits, hollows or holes in the trunk or branches, areas of loose bark, and features such as dense *Hedera helix* (Ivy) cover, or branches that overlap were also recorded. This information enabled each tree to be categorised as follows:
- *High Bat Roost Potential.* Trees with good bat roost potential have numerous or extensive cavities, such as major sections of hollow trunk. They are likely to be used by bats and could be suitable for a maternity roost.
  - *Moderate Bat Roost Potential.* Trees with moderate bat roost potential are those with small holes such as woodpecker nest-holes, or cracks. They could be used by individual bats and might be suitable for a maternity roost or other types of roost.

- *Limited Bat Roost Potential.* Trees with limited bat roost potential are those with superficial cracks and holes or small sections of loose bark and/or dense growths of *Hedera helix* (Ivy). They might be used as occasional or transient roosts, but are unlikely to be suitable for large colonies.
- *No Bat Roost Potential.* Trees with no bat roosting potential are those with no holes or cracks, often young trees in good condition. This category was used to identify and discount features or locations of a type which can in some cases potentially be suitable for roosting bats.

2.2.5 There are no buildings present within the survey area. There are a small number of structures, mainly bridges, which were included in the assessment. A similar procedure as that detailed above was used to assess these structures.

#### *Detailed Survey*

2.2.6 A day-time inspection in relation to potential foraging habitat and or commuting routes was undertaken to supplement information collected during the Extended Phase 1 Habitat Survey. At the same time trees and built structures were assessed for their potential to provide roosting conditions for bats. These trees/ structures were initially identified during the Extended Phase 1 Habitat Survey enabling a targeted approach to the detailed inspection. This work was undertaken on 8<sup>th</sup> January 2009 (when foliage was absent and it was easier to view the entire tree).

2.2.7 Between 19<sup>th</sup> May and 30<sup>th</sup> July 2009 five nocturnal activity surveys (three on the land to the west of Croesnewydd Road and two on the land to the east) were completed to assess foraging activity and commuting flight-lines. Where tree roost potential was identified during the earlier inspection dusk emergence observations were made prior to undertaking the activity surveys. Emergence observations were not undertaken at the built structures (bridges) due to the assessed level of potential for roosting bats; further detail is provided in *Section 3.3*.

2.2.8 The night-time surveys were conducted by two surveyors using heterodyne and time expansion bat detectors to record and analyse bat echolocation calls with computer software. On completion of the emergence surveys variable transects were walked by each surveyor with contact maintained via two-way radio to communicate bat activities at any given point of each transect. This aided assessment of how the site is being used by bats. Field recordings were subsequently analysed with suitable computer software in order to verify species identification. The transects covered the peak foraging period following roost emergence, e.g. approximately two hours thereafter. Results of the activity surveys are summarised on *Figure 4*.

2.2.9 The detailed bat surveys were lead by Mr. S. Irwin, a highly experienced and licensed bat ecologist (CCW Bat Licence number OTH:CSAB:90:2007).

#### **Water Vole**

##### *Habitat Assessment*

2.2.10 Watercourses/ water bodies were assessed for their suitability for Water Vole (*Arvicola terrestris*) during the Extended Phase 1 Habitat Survey. The assessment method was

adapted from that described in Strachan & Moorhouse (2006) as recommended by IEEM (2005), and JNCC (2004). The key environmental factors are as follows:

- water level regime;
- channel management regime;
- bank material/ substrate;
- availability of food (year-round);
- channel dimensions;
- predation (presence of Mink *Mustela vison* and possibly domestic cats);
- bank-side/ emergent vegetation and cover (cover should usually be at least 60%);
- level of disturbance;
- size and continuity of habitat;
- livestock access;
- water quality; and
- competition (particularly the presence of Brown Rat *Rattus norvegicus*).

#### *Presence/ Absence Survey*

- 2.2.11 The Water Vole survey was carried out on 26<sup>th</sup> May and 22<sup>nd</sup> July 2009 by Tom Knight and Max Ellson of Marches Ecology. Tom Knight holds a current Countryside Council for Wales (CCW) 'disturbance' licence (No. OTH:SA:217:2008). All vegetation within 2 m of the bank-top is searched for signs of Water Vole activity including sightings, latrines, feeding remains and platforms, paths and footprints, burrows and above-ground nests. All of this information is recorded on a standard survey form (Strachan & Moorhouse 2006).

#### **Otter**

##### *Habitat Assessment*

- 2.2.12 The habitat within the site was assessed for its suitability for Otter (*Lutra lutra*) during the Extended Phase 1 Habitat Survey. The habitat along the River Gwenfro was mapped in detail on 4<sup>th</sup> November 2008 utilising the River Corridor Survey technique (NRA 1992).

##### *Detailed Survey*

- 2.2.13 A survey of all watercourses (e.g. the River Gwenfro and watercourse associated with the retained woodland) and other potentially suitable waterbodies located entirely within or partly within the site was undertaken for signs of Otter activity. The area surveyed is mapped along with the positions and densities of spraints, feeding remains, footprints, holts, couches, and other field signs. The survey methodology broadly followed that outlined in NRA (1993) and Chanin (2003a) conforming to the level of effort outlined in the Design Manual for Roads and Bridges Volume 10: Nature Conservation Advice in Relation to Otters (dated February 2001).
- 2.2.14 There is some difficulty in identifying Otter resting places, refuges and holts and similarly there is a range of terms applied to these features but no standard. For transparency the terms holt and resting place will be utilised in this report as follows:
- A holt is usually a secure underground resting place usually associated with breeding locations. This may be applicable to the natal den (as defined in Liles, 2003) and is taken to be the small space occupied by the female when she gives birth and where the

cubs stay for up to three months. Liles (2003) also makes a distinction between the natal site and breeding site. The term breeding site describes an area of land, or open water and land large enough to provide a breeding Otter with all the required resources. These resources include one or more potential natal den sites.

- A resting place is a temporary 'bivouac' often used at the end of a foraging period or to rest overnight. An Otter will have many resting opportunities within its usable range often under exposed tree roots or undercut riverbanks, in pollard trees, drains, thick vegetation like Bramble, scrub, reed-beds and stands of tall-herbs. Resting places can be located above or below ground. They are often referred to as couches, hovers or lie-ups and are the most frequently used and encountered Otter resting site (Woodroffe, 2001).

2.2.15 The survey was extended by up to 2 km either side of the site (upstream and downstream) with both banks surveyed in order to establish the extent of their presence and how the habitat is utilised. In addition spot-checks were also conducted at bridges (or similar structures) up to 5 km either side of the proposed development site. Six potential spot-check locations were identified (from appropriate OS mapping) on the River Gwenfro upstream of the site and 12 potential spot-check locations down-stream of the site. All of these locations were visited on 4<sup>th</sup> and 7<sup>th</sup> November 2008 to assess their suitability. Five upstream spot-checks and 7 downstream spot-checks were subsequently used during the detailed survey visits. These spot-check locations are identified on *Figure 5*. *Figure 6* (Sheets 1-4) presents the results of the detailed survey visits.

2.2.16 Survey visits were conducted as follows:

- Visit 1 (15/12/08) – Full survey of site, 2 km up/ downstream and spot-checks (2-5 km up/ downstream);
- Visit 2 (18/02/09) – Full survey of site, 2 km up/ downstream and spot-checks (2-5 km up/ downstream);
- Visit 3 (26/05/09) – Detailed survey/ search of site and at least 100 m up/ downstream for (potential) holt sites and other resting places *etc*; and
- Visit 4 (31/07/09) – Full survey of site, 2 km up/ downstream and spot-checks (2-5 km up/ downstream).

### **Great Crested Newt**

#### *Habitat Assessment*

2.2.17 The quality of terrestrial and aquatic habitat for Great Crested Newt (*Triturus cristatus*) was assessed during the Extended Phase 1 Habitat Survey. The assessment of aquatic habitat was based on the Habitat Suitability Index (Oldham, *et al.* 2000) that identifies several criteria that influence the suitability of ponds for Great Crested Newts. These criteria are as follows:

- Geographic location;
- Pond area (Dimensions);
- Pond permanence (Will it dry out?);
- Water quality (Clarity, eutrophic status and substrate);
- Pond shading (Percentage of the pond that is shaded);
- Presence of wildfowl and/ or fish;
- Pond density/ isolation (Is the pond isolated or near other water bodies?);

- Surrounding terrestrial habitat (“newt friendly habitat”);
- Macrophyte content (Including marginal and aquatic vegetation); and
- Barriers to the proposed works (Major roads, rivers, large expanses of developed land).

#### *Presence/ Absence Survey*

- 2.2.18 A presence/ absence survey was conducted in April/ May 2002 by TEP (TEP 2005). The results of this survey are summarised in *Section 3*. Due to the age of this data it was deemed appropriate to repeat this survey and all four waterbodies were re-visited.
- 2.2.19 The detailed presence/ absence survey comprised four survey visits to each pond between 21<sup>st</sup> April and 14<sup>th</sup> May 2009. The presence/ absence survey was conducted in accordance with the CCW Level III methodology detailed in the Great Crested Newt Guidance Note Number 7 (Version 2002/1). Level III survey requires a standardised torch and/or bottle trap survey in suitable weather conditions.
- 2.2.20 During each of the survey visits a combination of the following three survey techniques was employed:
- Egg search – conducted at each waterbody on each of the survey visits unless a Great Crested Newt egg is found. Egg searches involve the careful inspection of marginal plants for newt eggs that are laid on suitable leaves, with the leaf subsequently folded over the egg. If an egg is found the remaining survey visits may not be needed unless a population assessment is required.
  - Torch surveys – conducted at each waterbody on each of the survey visits using a 1.5 million candlelight power clu-lite torch. This involves shining the torch into the waterbodies at night when newts are most active and therefore more visible.
  - Bottle-trapping – involves the setting of funnel-traps (2-litre plastic bottles with the tops inverted) into the pond margins. The traps are usually set during the evening of one survey visit and have to be collected early the following morning. Under the CCW survey licence, restrictions are placed on how long these traps are left in place principally for welfare considerations. This technique is particularly useful in weed-filled ponds or where visibility is otherwise poor.
- 2.2.21 Both Tom Knight and Max Ellson hold current Countryside Council for Wales (CCW) Great Crested Newt ‘survey/disturbance’ licences (Tom Knight No. OTH:SA:213:2008 and Max Ellson No. OTH:SA:210:2008).

### **Reptiles**

#### *Habitat Assessment*

- 2.2.22 Areas that are potentially suitable for reptiles, including potential basking areas, hibernation sites and foraging habitat were identified during the Extended Phase 1 Habitat Survey. English Nature (2004) provides further information on the distribution and ecology of the four widespread species. Habitat requirements differ between species but can be summarised as follows after Beebee & Griffiths (2000):
- Viviparous Lizards (*Zootoca vivipara*) use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland.
  - Slow-worms (*Anguis fragilis*) use similar habitats to Common Lizards, and are often found in rough grassland, gardens and derelict land.

- Grass Snakes (*Natrix natrix*) have broadly similar requirements to Common Lizards with a greater reliance on ponds and wetlands for their food source.
- Adders (*Vipera berus*) use a range of fairly open habitats with some cover, but are most often found in dry heath.

#### *Presence/ Absence Survey*

- 2.2.23 A reptile presence/ absence survey was completed during April to June 2009. Although reptiles are largely active between March and October, the best survey months tend to be April – June and September. A total of 144 artificial refugia (a combination of 0.5 m<sup>2</sup> pieces of roofing felt and corrugated metal sheets) were deployed around the site; 100 on the employment land and 44 on the residential land. Survey effort concentrated on potentially valuable habitat or other features for reptiles identified during the Extended Phase 1 Habitat Survey. The refugia were re-visited during the survey period and all reptiles found recorded.
- 2.2.24 When walking between refuges the surveyor notes down any reptiles seen as some species do not use refuges as readily as others. Froglife (1999) indicates that for general survey purposes five to ten refuges per hectare is adequate, although the number used in the survey area was greater than this to give a better chance of recording reptiles if present. Froglife (1999) suggests that at least seven visits in suitable weather conditions are required for a presence/absence survey. Ten visits were completed to the survey area on the following dates:
- 15<sup>th</sup> and 29<sup>th</sup> April 2009.
  - 7<sup>th</sup>, 11<sup>th</sup>, 21<sup>st</sup>, 25<sup>th</sup> and 29<sup>th</sup> May 2009.
  - 4<sup>th</sup>, 16<sup>th</sup> and 24<sup>th</sup> June 2009.

#### **Birds**

##### *Habitat Assessment*

- 2.2.25 Birds observed during the Extended Phase 1 Habitat Survey were recorded and notes were made on the suitability of the survey area for nesting birds.

##### *Detailed Surveys*

- 2.2.26 The breeding bird survey utilised the British Trust for Ornithology's (BTO) Common Bird Census technique (Marchant 1983; Gilbert *et al.* 1998). The Common Bird Census (CBC) utilises territory mapping and is an established and generally accepted methodology (IEEM 2005). It requires repeated visits to a site during the bird breeding season. Five to ten visits is appropriate; open habitats would be at the bottom of this range, while woodland would be at the top (Sutherland 1996). Due to the largely open character of the site five survey visits during the breeding period were completed to provide sufficient data on distribution, relative abundance and records of species of conservation interest (Hill *et al.* 2005). An additional two evening visits were completed to consider species such as owls and Woodcock (*Scolopax rusticola*). As bird territories are unlikely to align with the survey area boundary birds outside this area were recorded where appropriate. Survey visits were completed on the following dates:
- 6<sup>th</sup> April 2009.
  - 4<sup>th</sup> May 2009.
  - 29<sup>th</sup> May 2009.

- 3<sup>rd</sup> June 2009 (evening).
- 15<sup>th</sup> June 2009.
- 25<sup>th</sup> June 2009 (evening).

2.2.27 A survey of wintering birds was conducted in January – March 2005 by TEP (TEP 2005). The results of this survey are summarised in *Section 3*.

### **Survey Constraints**

2.2.28 The weather throughout much of the key survey period has been a constraint and influenced results. The scheduling of bird and reptile survey visits was hampered particularly during the early part of the season (April/ May) by often heavy and persistent rain; several visits had to be aborted. Similarly Otter survey visits have been made difficult throughout the summer (April to July) due to inclement weather conditions. As a result of heavy and continued rain the water level in the river has frequently been high; survey visits were aborted both due to the weather at the time of survey and the level of the water.

2.2.29 A large amount of in-channel and bank clearance work had been undertaken immediately prior to the December Otter survey visit between downstream spot-check 6 (Caia Park) and spot-check 12 (King's Mills). This may have removed several potential sprainting locations.

2.2.30 Reptile refugia were regularly tampered with particularly those aligned along the mineral railway. Due to public access to this area and safety considerations only roofing felt was used along the railway. The refugia along the railway were entirely replaced twice having been stolen. On the third occasion sheets of metal found on the site were utilised and remained in place.

## **2.3 Site Evaluation**

2.3.1 The ecological value of habitats and/or species is often assessed according to a number of widely used criteria of which perhaps the most frequently used are naturalness, extent, rarity, and diversity. For the purpose of this report the ecological value of the habitat and species present on the site has been determined using the approach detailed in IEEM (2006) (*paragraphs 3.20 to 3.42 and 3.52 to 3.55*). Broadly speaking habitat value should be obtained by using published, ideally local, site selection criteria and legal or in some instances conservation status. The ecological value of a species considers its distribution and legal or conservation status, the latter is mostly due to inherent rarity.

2.3.2 Significant species were defined as follows:

- species protected by the *Wildlife and Countryside Act 1981* (as amended);
- species protected by European directives;
- species listed under *Section 42* of the *Natural Environment and Rural Communities Act 2006* (the NERC Act);
- red data book species; and
- other species listed as scarce or notable in literature issued by conservation organisations or learned societies.

2.3.3 Biodiversity Action Plans and lists of declining species (e.g. The of Birds of Conservation Concern: Eaton *et al.*, 2009) have been used only where there is insufficient information to

identify local status and can only provide indicative value. Such Action Plans and lists are more important for guiding proposals for habitat creation/enhancement.

### 3 RESULTS

#### 3.1 Site Description

- 3.1.1 The site is located approximately 1.5 km west of Wrexham town centre. It is bounded to the west by the A483(T) road and to the south by the A525 Ruthin Road. Further to the west and south there is open agricultural land; predominantly cattle and sheep-grazed pastures with some arable fields. The northern boundary is variously formed by the former Croesnewydd Triangle to Gatewen railway line or land associated with Wrexham Maelor General Hospital (located on the disused railway line). Further to the north there is a range of brown-field plots and recent development associated with the Wrexham Technology Park. Much of this recent development comprises small commercial/ office premises. To the northeast is located the extensive grounds and buildings of Wrexham Maelor General Hospital. The site is bisected by Croesnewydd Road; the main part of the survey area is located to the west of this road with a further triangle of land to the east. The south-eastern boundary is variously bordered by a small brook, the River Gwenfro and a recent residential housing development at Pentre Bach. Further to the east there are WCBC offices and the Highways Maintenance depot.
- 3.1.2 The site is located within the lower section of the valley associated with the River Gwenfro. At this location the valley is shallow and the site is located on an undulating plain. Most of the site was farmed until 2005. The soils across the site are primarily derived from glacial till with alluvial soils along the watercourses (Terence O'Rourke 2007a).

#### 3.2 Habitats and Flora

##### Survey Area

- 3.2.1 The survey area supports a complex mosaic of habitats; broadly it comprises two separate land parcels to the west and east of Croesnewydd Road. Land to the west of Croesnewydd Road includes two field units that support mosaics of tall-ruderal vegetation and neutral grassland and a third field unit that supports semi-improved neutral grassland. A block of semi-natural broad-leaved woodland is aligned along a stream corridor in the centre of these fields. An old mineral railway line (partly characterised by unimproved neutral grassland) and part of the associated River Gwenfro corridor are located along the northern margin of this area. Land to the east of Croesnewydd Road is dominated by two land parcels located to the north and south of the River Gwenfro corridor. They are both characterised by mosaics of tall-ruderal vegetation and neutral grassland, ruderal vegetation and ephemeral/ short-perennial vegetation.
- 3.2.2 The Extended Phase 1 Habitat map is provided as *Figures 3a* and *3b*. Habitat types recorded are as follows:
- Broad-leaved semi-natural woodland;
  - Broad-leaved plantation woodland;
  - Scrub (both continuous and scattered);
  - Individual broad-leaved trees;
  - Hedgerows (both species-rich and species-poor);
  - Neutral grassland (unimproved, semi-improved and poor semi-improved);

- Amenity grassland;
- Swamp;
- Standing water;
- Running water (River Gwenfro and an un-named tributary);
- Ditch;
- Bracken;
- Tall-ruderal vegetation;
- Tall-ruderal/ neutral grassland mosaic;
- Ephemeral/ short-perennial vegetation; and
- Hard-standing.

#### *Woodland and scrub*

- 3.2.3 Two stands of semi-natural broad-leaved woodland (*Target Notes 3 and 3b*) and a stand of tall-herb vegetation (*Target Note 3a*) are associated with a stream corridor. The broad-leaved woodland at *Target Note 3* is open in structure, and comprises scattered mature trees, mainly *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) with occasional *Quercus robur* (Pedunculate Oak). The field-layer comprises *Urtica dioica* (Common Nettle) dominated tall-herb vegetation. The adjacent tall-herb vegetation at *Target Note 3a* is similar in composition, although in places, where the ground is damp, *Epilobium hirsutum* (Great Willowherb) and *Equisetum telmateia* (Great Horsetail) become more abundant.
- 3.2.4 At *Target Note 3b* the woodland is possibly ancient in origin and is largely aligned along a stream corridor. The canopy is mainly dominated by *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) with locally frequent *Alnus glutinosa* (Alder) (mainly alongside the stream) and *Quercus robur* (Pedunculate Oak), and rarely *Pinus sylvestris* (Scot's Pine). In the north of this woodland belt the shrub layer is fairly sparse, comprising occasional *Crataegus monogyna* (Hawthorn) bushes with tree saplings. Where adjacent to the stream it is much denser, comprising frequent *Ilex aquifolium* (Holly), and occasional *Corylus avellana* (Hazel), *Sambucus nigra* (Elder), *Viburnum opulus* (Guelder-rose), *Rosa arvensis* (Field-rose) and *Prunus spinosa* (Blackthorn). The field layer is also variable – low-lying damp stands support plants such as *Carex remota* (Remote Sedge), *Caltha palustris* (Marsh Marigold), *Allium ursinum* (Ramsons), *Chrysosplenium oppositifolium* (Opposite-leaved Golden-saxifrage), *Equisetum telmateia* (Great Horsetail), *Urtica dioica* (Common Nettle) and *Solanum dulcamara* (Bittersweet). Where drier the field layer often supports a carpet of *Hedera helix* (Ivy) with other scattered plants recorded including *Geum urbanum* (Wood Avens), *Mercurialis perennis* (Dog's Mercury), *Geranium robertianum* (Herb-robert), *Viola riviniana* (Common Dog's-violet), *Anemone nemorosa* (Wood Anemone), *Conopodium majus* (Pignut), *Deschampsia cespitosa* (Tufted Hair-grass) and rarely, *Hyacinthoides non-scripta* (Bluebell). An internal bank by a ditch supports locally frequent *Melica uniflora* (Wood Melick) and *Carex sylvatica* (Wood-sedge) with a small amount of *Bromopsis ramosa* (Hairy-brome) and *Festuca gigantea* (Giant Fescue).
- 3.2.5 Other stands of semi-natural broad-leaved woodland are restricted to narrow zones associated with the corridors of the River Gwenfro and its tributary (*Target Notes 39, 41 and 42*) and part of the disused mineral railway (*Target Note 18*). To the east of Croesnewydd Road, both the tributary of the River Gwenfro (*Target Note 42*) and the River Gwenfro downstream of the confluence with this tributary (*Target Notes 39 and 41*) are characterised by a narrow woodland fringe dominated by mature *Alnus glutinosa* (Alder) and or *Salix*

*fragilis* (Crack Willow) trees. Other canopy tree species recorded include *Fraxinus excelsior* (Ash), *Acer pseudoplatanus* (Sycamore) and *Ulmus procera* (English Elm). The associated shrub layer broadly comprises occasional *Sambucus nigra* (Elder), *Corylus avellana* (Hazel) and *Crataegus monogyna* (Hawthorn). The field-layer appears mainly species-poor, being either dominated by *Urtica dioica* (Common Nettle) or *Petasites hybridus* (Butterbur). At *Target Note 42*, the field-layer was slightly more species-rich with a number of common woodland herbs being recorded.

- 3.2.6 The resource at *Target Note 18* is young, being comprised of dense, self-sown *Alnus glutinosa* (Alder) growing over railway ballast. It has a sparse shrub layer and a species-poor field-layer.
- 3.2.7 The remaining semi-natural woodland and scrub resource present includes a stand of scrub-woodland (*Target Note 20*), a small stand of young trees/ mature scrub at *Target Note 2*, mature scrub (dominated by *Rubus fruticosus* agg. (Bramble)) along the southern embankment of the mineral railway (*Target Note 10*), and scrub fringing the River Gwenfro (*Target Note 47*). Scattered scrub is a feature of much of the site, being associated with grassland and or tall-herb vegetation; this resource has not been prescribed specific target notes.
- 3.2.8 The scrub-woodland resource at *Target Note 20* (located between the River Gwenfro and the disused mineral railway to the west of Croesnewydd Road) comprises a complex area of open woodland/ scrub-woodland and tall-herb vegetation. It often comprises scattered mature *Crataegus monogyna* (Hawthorn) bushes with associated tall-herb vegetation dominated by the alien invasive *Impatiens glandulifera* (Indian Balsam). Mature trees present include *Alnus glutinosa* (Alder) (especially immediately adjacent to the River Gwenfro), *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore). Locally this vegetation is dominated by young *Alnus glutinosa* (Alder).
- 3.2.9 Broad-leaved plantation woodland characterises the A483 road embankment (*Target Note 1*) as well as several small areas associated with the Ruthin Road interchange (*Target Notes 33 and 34*). These areas are located mostly directly adjacent to but outside the survey area. At *Target Note 1*, canopy tree species present include *Alnus incana* (Grey Alder), *Acer pseudoplatanus* (Sycamore), *Acer campestre* (Field Maple), *Fagus sylvatica* (Beech) and *Ulmus procera* (English Elm). The sub-canopy contains *Crataegus monogyna* (Hawthorn) and small amounts of *Ilex aquifolium* (Holly). In places *Ulmus procera* (English Elm) is locally frequent in the canopy and sub-canopy. Occasional low-growing *Rubus fruticosus* agg. (Bramble) occupies the shrub layer; the field-layer is mostly species-poor. The stand at *Target Note 33* is similar but is frequently more open and generally with larger trees.

#### *Hedgerows and trees*

- 3.2.10 Species-rich hedgerows are located at *Target Notes 6, 12, 14 and 28*; species-poor hedges at *Target Notes 25 and 26*. The hedgerows at *Target Notes 6 and 12* are field-hedges and are similar in character being unmanaged and overgrown. They are characterised by a wide range of woody species, none of which achieve particular dominance; these include *Prunus spinosa* (Blackthorn), *Sambucus nigra* (Elder), *Crataegus monogyna* (Hawthorn), *Acer campestre* (Field Maple), *Salix caprea* (Goat Willow), *Ilex aquifolium* (Holly), *Rosa canina* agg. (Dog-rose) and *Acer pseudoplatanus* (Sycamore). Young *Acer pseudoplatanus* (Sycamore) and *Fraxinus excelsior* (Ash) trees also occur. The associated field-layer is

mostly bare, or locally dominated by *Urtica dioica* (Common Nettle). A shallow, dry ditch is located on the southern margin of the hedge. The hedge at *Target Note 6* is further characterised by frequent dead *Ulmus procera* (English Elm) trees. The hedge at *Target Note 14* is more akin to a line of scrub and is slightly less species-rich (in terms of its woody species).

- 3.2.11 The hedge at *Target Note 28* is located adjacent to the southern side of Ruthin Road. The woody component is locally dominated by both *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn), although a wide range of other woody species were recorded, mostly at low levels of abundance. These include *Acer pseudoplatanus* (Sycamore), *Ulmus procera* (English Elm), *Corylus avellana* (Hazel), *Acer campestre* (Field Maple), *Sambucus nigra* (Elder), *Ilex aquifolium* (Holly) and *Fraxinus excelsior* (Ash). The field-layer appears well shaded and species-poor. The Locally Scarce<sup>1</sup> scrambler *Bryonia dioica* (White Bryony) is present. At *Target Notes 25* and *26* the hedgerows, which both border roads, are species-poor being dominated by *Crataegus monogyna* (Hawthorn) with few woody associates; they have species-poor field-layers.
- 3.2.12 Individual broad-leaved trees of note were recorded at the following locations:
- *Quercus robur* (Pedunculate Oak): two mature trees at *Target Note 5* (an old field boundary); a semi-mature tree adjacent to a hedgerow at *Target Note 12b*; a mature tree adjacent to a hedgerow at *Target Note 12c*; and a semi-mature tree at *Target Note 14a* (on the site boundary).
  - *Acer pseudoplatanus* (Sycamore): a semi-mature tree adjacent to a hedgerow at *Target Note 12a*; several semi-mature trees (with associated *Alnus glutinosa* (Alder) trees) adjacent to the River Gwenfro at *Target Note 17*; and a mature tree adjacent to a hedgerow at *Target Note 30*.
  - *Fraxinus excelsior* (Ash): a mature tree located adjacent to the tributary of the River Gwenfro at *Target Note 43*; and a mature tree adjacent to the River Gwenfro at *Target Note 46*.

#### Grassland

- 3.2.13 The vast majority of the grassland resource is located to the west of Croesnewydd Road. Species-rich neutral grassland is located on part of the disused mineral railway at *Target Note 10*. The sward comprises a variety of grasses including *Holcus lanatus* (Yorkshire-fog), *Agrostis capillaris* (Common Bent) and *Festuca rubra* (Red Fescue) with occasional tussocks of *Dactylis glomerata* (Cock's-foot). A wide variety of low growing herbs and forbs are present including two Locally Scarce plants: *Linaria repens* (Pale Toadflax) and *Trifolium arvense* (Hare's-foot Clover), both recorded at relatively low levels of abundance. Other plants recorded include locally abundant *Lotus corniculatus* (Common Bird's-foot-trefoil), frequent *Anthyllis vulneraria* (Kidney Vetch), locally frequent *Pilosella officinarum* (Mouse-ear-hawkweed), *Geranium pyrenaicum* (Hedgerow Crane's-bill), occasional *Achillea millefolium* (Yarrow), *Centaurea nigra* (Common Knapweed), *Knautia arvensis* (Field Scabious), *Centaurea erythraea* (Common Centaury), *Hypericum perforatum* (Perforate St. John's-wort), *Clinopodium vulgare* (Wild Basil), *Rhinanthus minor* (Yellow-rattle), *Plantago lanceolata* (Ribwort Plantain), *Potentilla reptans* (Creeping Cinquefoil) and *Rumex acetosa*

<sup>1</sup> In Vice County 50, a scarce plant is described as being recorded in 4-15 10 km squares (Green, 2006).

(Common Sorrel). Occasional scattered shrubs of *Rosa canina* agg. (Dog-rose) and *Crataegus monogyna* (Hawthorn) are scattered, especially at the edges.

- 3.2.14 A field unit supporting semi-improved neutral grassland is located directly south of the mineral railway at *Target Note 11*. Here the sward appears to be dominated by the grasses *Holcus lanatus* (Yorkshire-fog) and *Festuca rubra* (Red Fescue) with a range of other grasses present such as *Agrostis capillaris* (Common Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Cynosurus cristatus* (Crested Dog's-tail) and occasional tussocks of *Dactylis glomerata* (Cock's-foot). The sedges *Carex nigra* (Common Sedge) and *Carex hirta* (Hairy Sedge) were also recorded, the latter being locally frequent where the substrate is damp. Here it forms small stands with the rushes *Juncus effusus* (Soft-rush) and *Juncus inflexus* (Hard Rush), as well as *Galium palustre* (Common Marsh-bedstraw) and *Agrostis stolonifera* (Creeping Bent). Overall this grassland resource is variable but includes a range of common herbs and forbs: locally abundant *Lotus corniculatus* (Common Bird's-foot-trefoil), frequent *Ranunculus bulbosus* (Bulbous Buttercup), *Achillea millefolium* (Yarrow), *Ranunculus acris* (Meadow Buttercup), *Trifolium repens* (White Clover), locally frequent *Trifolium pratense* (Red Clover), *Centaurea nigra* (Common Knapweed) and lesser amounts of *Luzula campestris* (Field Wood-rush), *Odontites vernus* (Red Bartsia), *Cerastium fontanum* (Common Mouse-ear), *Malva moschata* (Musk-mallow) and *Hypericum perforatum* (Perforate St. John's-wort). The most species-rich area is towards the western end where *Dactylorhiza fuchsii* (Common Spotted-orchid) was recorded scattered around the edges of the scrub. Five spikes of the Locally Scarce species *Ophrys apifera* (Bee Orchid) were also recorded in this area.
- 3.2.15 At *Target Note 29*, frequently mown semi-improved neutral grassland is located on a roadside verge. Overall, this resource appears to be species-poor. A small area of amenity grassland is located in the north of the survey area, adjacent to Croesnewydd Road.

#### *Aquatic Habitats*

- 3.2.16 Standing water is restricted to three locations; a small pond at *Target Note 3c*, a swamp at *Target Note 13* and a pond at *Target Note 22*. The pond at *Target Note 3c* is near the source of the stream described below in *Target Note 3d* that is believed to be spring-fed. The pond flows into the stream. It measures approximately 5 m by 8 m. It is full of silt and woody debris, and is well shaded by adjacent trees. The depth of water ranges between 0.1 and 0.3 m. It supports wetland vegetation throughout with abundant *Apium nodiflorum* (Fool's Water-cress), *Rorippa nasturtium-aquaticum* (Water-cress) and lesser amounts of *Solanum dulcamara* (Bittersweet), *Phalaris arundinacea* (Reed Canary-grass) and *Mentha aquatica* (Water-mint).
- 3.2.17 The swamp (*Target Note 13*) has developed in a depression along a field boundary. It is dominated by *Equisetum fluviatile* (Water Horsetail) with locally dominant *Typha latifolia* (Bulrush). A range of other wetland plants are scattered throughout. At *Target Note 22*, the pond is located adjacent to, and just to the east of Croesnewydd Road. It is roughly circular and measures approximately 20 m across. Approximately 75% of the pond is dominated by *Typha latifolia* (Bulrush). The western side is shaded by *Alnus glutinosa* (Alder) trees growing on the adjacent bank. The pond appears to have poor water-quality and is characterised by frequent litter and other debris. Occasional *Potamogeton obtusifolius* (Blunt-leaved Pondweed), a Locally Scarce plant, was the only submerged or floating-leaved

aquatic vegetation recorded. It is heavily silt-laden and as such contains little depth of water during the summer months.

- 3.2.18 The River Gwenfro (*Target Notes 7, 15, 41 and 47*) enters the survey area underneath the disused mineral railway, before flowing in a largely southeast direction through the site (passing beneath Croesnewydd Road). To the east of Croesnewydd Road it forms part of the southern boundary of the site. The river itself is largely similar in character throughout this length, being approximately 2 to 3 m wide and 0.2 to 0.5 m deep with a moderate flow. The river generally flows over pebbles/ gravel/ cobbles with earth banks. It is often well shaded by adjacent trees/ shrubs. No aquatic or marginal vegetation was recorded.
- 3.2.19 A small stream (*Target Notes 3d and 42*) partly forms the southern boundary of the survey area to the east of Croesnewydd Road and is a tributary of the River Gwenfro. The stream is generally approximately 1 m wide. At the time of the survey the water within the channel was approximately 0.05 m with a slow flow over a silty substrate. Marginal vegetation appeared limited to very occasional *Oenanthe crocata* (Hemlock Water-dropwort). The stream is fringed on both sides by a narrow corridor of mature woodland.
- 3.2.20 Where this stream (*Target Note 3d*) is located within the woodland at *Target Note 3* it has a channel up to approximately 2 m wide and 0.2 m deep. It is heavily silted and full of leaf matter and woody debris. It has a slow to moderate flow and is devoid of vegetation in places. Small amounts of *Apium nodiflorum* (Fool's Water-cress) were noted. It originates from a small pond at *Target Note 3c* (described in *paragraph 3.2.16* above).

#### *Other Habitat Types*

- 3.2.21 The remaining habitat largely comprises complex mosaics of rank species-poor grassland, extensive stands of tall-herbs and small colonising patches of *Rubus fruticosus* agg. (Bramble) scrub (*Target Notes 4, 38 and 45*) and associated species-poor tall-herb vegetation (*Target Notes 40 and 44*) that have developed on ex-arable fields, as well as sparse short-perennial/ ephemeral vegetation and associated mixed vegetation that has developed on recently disturbed/ man-made ground (*Target Notes 35, 36 and 37*).
- 3.2.22 The stands of rank grassland associated with these mosaics are often dominated by coarse-leaved grasses with a range of common grassland forbs and tall-herbs scattered throughout at low levels of abundance. The associated stands of tall-herbs variously comprise *Epilobium hirsutum* (Great Willowherb), *Chamerion angustifolium* (Rosebay Willowherb), *Urtica dioica* (Common Nettle) and *Cirsium arvense* (Creeping Thistle). Very locally slightly more species-rich stands of neutral grassland occur [too small to map on *Figures 3a and 3b*], mostly towards the boundary with the Wrexham Maelor Hospital (car park) and adjacent to the River Gwenfro at *Target Note 45a*.
- 3.2.23 The sparse short-perennial/ ephemeral vegetation is locally fairly species-rich (*Target Note 36*), being characterised by abundant *Hypericum perforatum* (Perforate St. John's-wort) with frequent *Tripleurospermum inodorum* (Scentless Mayweed), low-growing, stunted grasses and a range of other herbs scattered throughout (generally at low levels of abundance). Elsewhere (*Target Notes 35 and 37*) a mixture of disturbed vegetation types occur, being dominated by tall-herbs with associated short-perennial/ ephemeral vegetation. Hard-standing is associated with part of the disused mineral railway corridor immediately to the east of Croesnewydd Road, as well as various access tracks.

### Previous Surveys

- 3.2.24 The survey area as well as some adjacent land was surveyed in 2004 (TEP 2005). The habitat resource mapped is broadly similar to that surveyed in 2008/ 2009 for the present assessment work. There are three key differences as follows:
- The large field unit at *Target Note 4* was mapped as arable; it is now a mosaic of tall-herbs, rough grassland and young scattered scrub.
  - The two field units at *Target Notes 38/ 40* and *45* were mapped as semi-improved neutral grassland; they are now a mosaic of tall-herbs and species-poor rough grassland.
  - The residential housing development at Pentre Bach has since been constructed replacing areas previously mapped as arable and some semi-improved neutral grassland.
- 3.2.25 The mineral railway that is partly included within the survey boundary and partly abuts it, was subject to National Vegetation Classification (NVC) survey in September 2004 as part of a wider survey of the mineral railway between Gatewen and Croesnewydd Triangle (CES 2004). Where appropriate, the results of this survey has been utilised to inform the habitat description provided above.

### 3.3 Fauna

- 3.3.1 Birds and other animals recorded during the surveys are presented in *Tables 11* and *12* (*Section 8*) respectively.

#### Badger

- 3.3.2 Survey results for Badger are provided in a separate confidential Badger Survey Annex (Marches Ecology 2009a).

#### Bats

##### *Habitat Assessment*

- 3.3.3 The survey area is bordered to the south (on the opposite side of the A525 road) and west (on the opposite side of the A483 road) by an intensively farmed landscape of agriculturally improved grassland fields and some cereal crops with boundary hedgerows. To the north and east the landscape is predominantly characterised by commercial/ office buildings, and more locally a number of residential properties. It is possible that bats inhabiting these areas may also forage over parts of the site. The hedgerow network in the surrounding landscape (although being fragmented by large roads) connects to the hedgerows and therefore blocks of woodland on the site. Nearby residential properties could contain bat roosts. Bats utilising these roosts may use the hedgerow network as sheltered flyways for foraging and as links to favoured foraging places such as field ponds and woodland.
- 3.3.4 The survey area is largely characterised by a mosaic of tall-herb vegetation and rough grassland with small blocks of woodland, scattered patches of scrub, a small number of hedgerows and the River Gwenfro. The tall-herb/ rough grassland is structurally, and in places, floristically diverse and as such this habitat resource may provide a potentially valuable foraging resource. Habitat features that are likely to be of particular value for foraging/ commuting bats are the central woodland and associated habitat (*Target Notes 3*

and 3a-3e), the River Gwenfro and disused railway (*Target Notes 7, 10, 15, 18, 20, 39, 41 and 47*), a small stream (*Target Note 42*), hedgerows (*Target Notes 6, 12, 14, 25, 26 and 28*) and waterbodies (*Target Notes 13 and 22*). In addition linear features such as the plantation on the A483 embankment (*Target Note 1*) may be of value for commuting/ foraging by species that utilise such landmarks.

- 3.3.5 The area to the west of Croesnewydd Road is likely to be of comparatively greater value to bats due to the greater diversity of habitat types; this was reflected in activity levels recorded during the detailed survey. The presence of good foraging areas close to a roost is of particular importance to bats that do not or are not capable of flying long distances (this is applicable to most of the species likely to be present in the local area). To the east of Croesnewydd Road habitat of value to bats is more-or-less concentrated along the river corridor.

#### *Inspection of Trees*

- 3.3.6 A number of trees were identified during the Extended Phase 1 Habitat Survey within the survey area with some potential for roosting bats (*Target Notes 1, 3/3b, 5, 10, 12a-d, 14a, 15, 17, 20, 30, 39, 41, 43 and 46*). As the central woodland (*Target Note 3/3b*) is to be retained individual trees at this location were not assessed however features were observed within some of the trees that can be considered of high potential value for roosting bats. A small number of trees were identified with limited to moderate potential value for roosting bats; two mature Pedunculate Oaks by the central woodland (*Target Note 5*), two Pedunculate Oaks within the central hedgerow (*Target Notes 12c and 12d*), a few trees by the River Gwenfro (*Target Note 15*), and a Sycamore by the entrance track to Lower Berse Farm (*Target Note 30*).
- 3.3.7 A number of trees/ groups of trees were identified with limited potential value for roosting bats; the plantation on the A483 embankment (*Target Note 1*), a few trees along the disused railway (*Target Note 10*), trees within the central hedge (*Target Notes 12a, 12b and 14a*), various trees by the River Gwenfro (*Target Notes 17, 20, 39, 41 and 46*) and a tree adjacent to the stream (*Target Note 43*). It should be noted that many of these trees were not individually assessed at this stage. A number of trees identified here as being of limited potential have been included due to the presence of dense *Hedera helix* (Ivy) on the trunk and not necessarily any other features of potential value. Individual or small numbers of bats can roost beneath Ivy; such roosts are usually transient in nature.
- 3.3.8 Two mature Sycamore trees adjacent to the entrance track to Lower Berse Farm are located outside the survey area (*Target Notes 31 and 32*). These trees are considered to provide limited to moderate potential value for roosting bats.
- 3.3.9 Most of the trees within the site are either too young or otherwise do not contain features that are suitable for roosting bats and are considered to be of no value for roosting bats (e.g. *Target Notes 1, 2, 18, 20, 27, 33 and 34*).
- 3.3.10 There are no buildings located within the survey area. A small number of built structures have been identified within the survey area that have some potential value for roosting bats (*Target Notes 8, 9, 15, 21 and 24*). Most of these structures are bridges (*Target Notes 9, 21 and 24*) although there is also a culvert beneath the disused railway (*Target Note 15*) and a

retaining wall (*Target Note 8*). All of these structures are considered to provide limited potential opportunities for roosting bats at most.

3.3.11 The detailed inspection of trees and structures targeted those features identified above (during the Extended Phase 1 Habitat Survey). This inspection identified the following trees as being of greater than moderate potential value for roosting bats:

- Two mature Sycamore trees adjacent to the entrance track to Lower Berse Farm (*Target Notes 31 and 32*) assessed as of high potential value [outside survey area];
- Two mature Pedunculate Oaks (*Target Note 5*). Minor splits and a hole were noted but it was not possible to view them in detail from ground level;
- The central woodland was not fully investigated (*Target Note 3/3b*); however there are high value tree roost opportunities in several trees;
- A Pedunculate Oak within the central hedgerow is of limited to moderate potential value (*Target Note 12c*);
- An Ash by the River Gwenfro is of limited to moderate potential value (near *Target Note 20*);
- A mature Alder tree (near *Target Note 46*) contains a split/cavity that may be of moderate potential value; and
- Four Alder trees were recorded along the River Gwenfro to the east of Croesnewydd Road that contained limited/ moderate roost potential. It was also noted that a number of trees along the river corridor are clad in Ivy that could have concealed further cavities/ splits.

3.3.12 All of the built structures were inspected and most were found to be of no/ very limited potential value for roosting bats. Some small crevices were noted in the bridge that spans the River Gwenfro at Croesnewydd Road (*Target Note 24*) and the low bridge beneath the disused rail way (*Target Note 9*). The crevices identified at these features are only suitable for single bats for occasional or hibernation use. As such these two structures are of limited (at most) potential value to roosting bats. Due to this very low potential emergence observations concentrated on potential tree roost sites.

#### *Detailed Survey*

3.3.13 PCA Ltd (2008) provides the results of single nocturnal survey visits undertaken in 2005 and 2008 of the land parcel (owned by Harrow Estates plc) to the north of the disused railway line and west of Croesnewydd Road. Small numbers of Common Pipistrelle (*Pipistrellus pipistrellus*) bats were recorded largely commuting/ foraging along the disused railway/ River Gwenfro. A map included in TEP (2005) presents bat records provided by CCW. The closest of these records is from within approximately 100 m of the survey area boundary; south of Ruthin Road. The record appears to be from a residential area south of Bryn Offa High School and may therefore refer to a roost.

3.3.14 CES (2004) provides the results of a detailed inspection of trees/ culverts and bridges associated with the mineral railway that is partly included within the survey area and partly abuts it. Nocturnal survey(s) were also undertaken, although it is unclear how many visits were involved. No trees with bat roost potential were recorded along the mineral railway between the A483 and the Croesnewydd Road bridge. It was however noted that Ivy covered trees may support '*single or small numbers of bats*'. The A483 road bridge was considered to provide occasional opportunities for roosting bats. Three Common Pipistrelle

(*Pipistrellus pipistrellus*) were recorded flying between the A483 and the Croesnewydd Road bridge. Similar levels of activity were recorded on other sections of the mineral railway corridor. Noctule (*Nyctalus noctula*) was recorded on parts of the corridor further to the west of the current survey area.

- 3.3.15 No bats were recorded emerging from any potential roost sites within the survey area during the five visits conducted on 19<sup>th</sup> May, 30<sup>th</sup> June and 30<sup>th</sup> July 2009 (west of Croesnewydd Road) and 24<sup>th</sup> June and 29<sup>th</sup> July 2009 (east of Croesnewydd Road) for the present assessment. The following is a summary of the activity transects conducted:

#### West of Croesnewydd Road

- Small numbers of Common Pipistrelle (*Pipistrellus pipistrellus*) commuting along a hedge (*Target Note 26*) from an easterly direction, continuing west where foraging activity was recorded at a small clump of trees (*Target Note 2*). Foraging activity at *Target Note 2* was recorded on 19/05/09 and 30/07/09.
- Small numbers of Common Pipistrelle commuting/ foraging along the central hedgerow (*Target Notes 6/ 12/ 14*) on all survey dates.
- Limited foraging along the disused railway track (*Target Note 10*) by Common and Soprano Pipistrelle (*Pipistrellus pygmaeus*) on 19/05/09. Sporadic Common Pipistrelle and Whiskered/ Brandt's (*Myotis mystacinus/ brandtii*) bat foraging activity along disused railway track on 30/06/09. Small numbers of Common Pipistrelle bats feeding along the disused railway on 30/07/09.
- Continuous foraging activity by Common and Soprano Pipistrelle bats close to the central woodland edge (*Target Note 5*) on 19/05/09. Common Pipistrelle bats were again recorded commuting/ foraging along the central woodland edge on 30/07/09.
- Four Noctule bats (*Nyctalus noctula*) entered the site from a westerly direction followed by general foraging for approximately twenty minutes on 30/06/09.
- Four Common Pipistrelle bats foraging over grassland in the middle of the site on 30/06/09.
- 1 Noctule and 1 Soprano Pipistrelle bat arrived from a northerly direction at Lower Berse Farm on 30/07/09. The Soprano Pipistrelle continued to feed around the trees adjacent to the farm access road.
- Continuous Common and Soprano Pipistrelle feeding around the Sycamore trees by the access track to Lower Berse Farm on 30/07/09.

#### East of Croesnewydd Road

- A single Whiskered/ Brandt's bat foraging along the tree line by the River Gwenfro south of the earth mound at *Target Note 37* on 24/06/09.
- Common Pipistrelle bats feeding/ commuting along the tree line adjacent to the River Gwenfro (*Target Note 41*) on 24/06/09 and 29/07/09. Two Whiskered/ Brandt's bats were recorded feeding in the same area on 29/07/09.
- Limited Common Pipistrelle activity recorded at the pond (*Target Note 22*) on 24/06/09.
- Common Pipistrelle bats recorded feeding over vegetation across the eastern end of the site (*Target Note 40*) on 29/07/09.

## Water Vole

### Habitat Assessment

- 3.3.16 There are five waterbodies/ watercourses located within the site; ponds at *Target Notes 3c* and *22*, an area of swamp at *Target Note 13*, the River Gwenfro (*Target Notes 7, 15, 41* and *47*) and a small stream (*Target Notes 3d* and *42*). *Table 1* below presents a summary of the potential habitat provided by these features and assesses their potential suitability for Water Vole.

*Table 1 – Potential Water Vole Habitat*

| Target Note | Description                                                                                                                                                                                                                                    | Qualitative Assessment           | Potential Suitability |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------|
| 3c          | Small pond, shaded by trees and with shallow depth of water. Low earth banks provide potential burrowing opportunities and abundant marginal vegetation.                                                                                       | Poor – sub-optimal               | Yes but unlikely.     |
| 3d          | Spring-fed stream (same as <i>Target Note 42</i> ) linked to pond at <i>Target Note 3c</i> . Shaded by trees and with shallow depth of water. Marginal vegetation is limited. Low earth banks provide potential burrowing opportunities.       | Poor – sub-optimal               | Yes but unlikely.     |
| 7           | River Gwenfro. Channel 2 to 4 m wide with a moderate to fast flow and fluctuating water level. Earth banks provide potential burrowing. Good bank-side vegetation but virtually no aquatic or marginal vegetation. Brown Rat and Mink present. | Locally reasonable – sub-optimal | Yes but unlikely.     |
| 13          | A small area of swamp containing some shallow water. Good, diverse vegetation. No banks for burrowing. Due to size subject to high level of disturbance.                                                                                       | Good but small                   | Yes.                  |
| 22          | Large pond containing shallow water. Water quality may be poor. Little aquatic or bank-side vegetative cover but good stand of Bulrush in pond. Earth banks provide potential burrowing opportunities. Brown Rat present.                      | Poor – sub-optimal               | Yes but unlikely.     |
| 42          | A stream; tributary of River Gwenfro. Channel approximately 1 m wide with a depth of 0.05 m and a slow flow. No aquatic vegetation and marginal vegetation is limited due to shading. Brown Rat and Mink present.                              | Poor – sub-optimal               | Yes but unlikely.     |

- 3.3.17 The only feature considered to provide potential habitat of good quality for Water Vole is the swamp (*Target Note 13*). However this swamp is small, isolated, subject to wide fluctuations in the water level, provides no burrowing opportunities and is subject to a relatively high level of disturbance. The main factors that are likely to limit the presence of Water Vole on the

other identified features are as follows: flow-rate, fluctuating water levels, presence of Mink, presence of Brown Rat, presence of domestic cats, absence of aquatic/ marginal vegetation and isolation from other suitable habitat.

#### *Detailed Survey*

- 3.3.18 The River Gwenfro and tributary watercourse that flow through parts of the site were surveyed in 2002 and August 2004 (TEP 2005) and no evidence of Water Voles was recorded. PCA Ltd (2008) surveyed a small section of the River Gwenfro in 2005 and 2008; no evidence of Water Voles was recorded. It is assumed that the surveyed stretch is that to the north of the disused railway and west of Croesnewydd Road. Evidence of both Mink (*Mustela vison*) and Brown Rat (*Rattus norvegicus*) was recorded during the latter survey.
- 3.3.19 No evidence of Water Voles was recorded during the 2009 survey. The presence of Mink and Brown Rat was noted on the River Gwenfro and tributary; the latter was also found to be present on the pond at *Target Note 22*.

#### **Otter**

##### *Habitat Assessment*

- 3.3.20 Target notes recorded during the River Corridor Survey (RCS) are reproduced in *Section 6* and mapped on *Figure 7* (referred to in the text as *Otter Target Notes*). These target notes have been supplemented by information collected during other survey visits. The RCS was undertaken following overnight light rain that may have obscured some signs. A brash line up to 2 m back from the river bank was noted indicating high water levels from the previous week.
- 3.3.21 The River Gwenfro rises in the foot-hills to the north of Coedpoeth and Esclusham Mountain and is a tributary of the River Clywedog; the confluence is located at King's Mills approximately 5 km downstream of the site. The River Clywedog in turn is a tributary of the River Dee. The River Gwenfro is one of a number of small rivers that drain a large upland plateau which as a result are typically flashy in nature. It is a minor watercourse that within/ adjacent to the survey area extends to approximately 2 to 3 m wide. It has a moderate to fast flow and the channel includes a number of features indicative of a natural active watercourse (e.g. unvegetated earth cliffs).
- 3.3.22 The entire stretch within/ adjacent to the survey area is well wooded or otherwise bordered by scrub and or tall-herb vegetation. This vegetation, particularly patches of dense Bramble scrub, provide a number of features suitable as potential resting places (e.g. *Otter Target Notes 2, 3, 3a, 6, 9, 10, 11, 11a, 13, 14, 15a, 15b and 17*). Some of these features are brash piles that provide potential resting places that are temporary by their very nature. Evidence that indicated possible use of three resting places was recorded during the survey visit on 26<sup>th</sup> May 2009 (*Otter Target Note 3a*).
- 3.3.23 Large trees or other features that could potentially provide suitable holt sites are limited along this stretch of the River Gwenfro (e.g. *Otter Target Notes 11a, 15b and 16*). However, there are a small number of, mainly Alder trees, downstream of the disused railway culvert that may be suitable. Although no entrances or cavities were found it is possible that an underground entrance to a suitable chamber could exist. Most of the more suitable trees are found between the mineral railway culvert and Croesnewydd Road.

- 3.3.24 To the west of the A483 there are several tree-lined stretches that offer similar habitat to that described above. The use of potential holt sites along the upstream section of the surveyed stretch, particularly west of Tanyfron is likely to be limited by the availability of prey items although it could provide an important seasonal resource. Between Croesnewydd Road and the grounds of the Maelor Hospital there is a short tree-lined stretch which again provides some potential resting places and to a much lesser extent potential holt sites. Much of the channel through the town centre and the Caia Park area of Wrexham is heavily modified including two culverted sections. However just upstream of the confluence with the River Clywedog there is a little-disturbed, well wooded section that provides good cover and may provide potential holt sites.
- 3.3.25 The two culverted sections beneath the town centre are between St Giles Way and Brewery Place and the junction of Bridge Street (Island Green Retail Park); eastern section (approximately 225 m) and Island Green and the active railway to the east of Maesgwyn Road/ Maelor Hospital; western section (approximately 450 m). They were surveyed on 07/11/08. Survey of these sections was not repeated due to health and safety considerations. The culverted sections are separated by a short open section (approximately 50 m) by the Island Green Retail Park with high vertical walls on all sides.
- 3.3.26 The western (culverted) section has no exposed banks along the eastern half; the culvert is approximately 3.5 m wide, 1.5 m high to the top of the culvert above the water and with water to a depth of 1 m. Otters would have to swim along this stretch and it does not appear initially encouraging although fish were noted here. The western half is likely to have exposed banks to approximately 0.3 m wide when the water level is low. The channel splits and there is an approximately 70 m long flood channel that was dry at the time of the survey. This flood channel is approximately 3 to 4 m wide with large amounts of debris (e.g. a tree trunk to 0.4 m by 2 m long). Otters may not travel through at times of high water however footprints of one animal were noted in sand all the way through the flood channel.
- 3.3.27 Within the eastern (culverted) section there is exposed concrete (to approximately 0.5 m wide at the time of survey) on either side of the watercourse. A number of pipes are aligned along the northern bank and all the spraints recorded were found on these pipes. Twelve spraints were recorded throughout the eastern section with one cluster of six; they were all fairly fresh. Between the eastern section and western section there is a short (approximately 50 m) open stretch.

#### *Food Resource*

- 3.3.28 Information supplied by the Environment Agency indicates that the River Gwenfro supports a reasonable population of small fish at least towards the confluence with the River Clywedog. Fish survey data from August 2008 at a point just upstream of the confluence (OS Grid ref. SJ 34964 49456) indicates a good population of Bullhead (*Cottus gobio*), as well as lesser numbers of Stone loach (*Noemacheilus barbatulus*), Salmon (*Salmo salar*) and Trout (*Salmo* sp.). However the fisheries classification based on these results suggest that the fish population is lower than might be expected for a stream of this type (Marches Ecology 2009b). During the various survey visits small silver fish, possibly Roach (*Rutilus rutilus*), and Brown Trout (*Salmo trutta*) were noted as frequent between Strytybydden bridge and the River Clywedog, with particular abundance noted downstream of the site in the town. A small number of Bullhead were also observed.

- 3.3.29 The Envirocheck Report referred to in (Terence O'Rourke 2007b) gives the water quality of the River Gwenfro as ranging from B to the northeast of the site to E further east by the hospital. At the confluence with the River Clywedog it was A. Marches Ecology (2009b) provides further interpretation with regards water quality data. The Environment Agency assigns a target river quality objective (RQO) to each classified river stretch, using the River Ecosystem classification scheme. Target RQOs range from RE1 to RE5, with RE1 having the highest quality standard. At a sample point at the Maelor Hospital, the River Gwenfro complies with RE1: '*water of very good quality suitable for all fish species*'.
- 3.3.30 Small numbers of Common Frog (*Rana temporaria*) were recorded at Waterbodies 1 to 3 (Figure 8). Amphibians may provide a valuable early season resource. A spraint recorded from Waterbody 3 was found to contain fur suggesting that the prey item was a mammal, possibly a Brown Rat.

#### *Detailed Survey*

- 3.3.31 The River Gwenfro and tributary watercourse that flow through parts of the site were surveyed in August 2004 (TEP 2005). Otter spraint was recorded on the River Gwenfro somewhere to the east of Croesnewydd Road. No further details are provided and no other signs were recorded. It was concluded that no evidence to suggest breeding was found. A short section of the River Gwenfro (to the north of the railway and west of Croesnewydd Road) was surveyed in 2008 (PCA Ltd 2008). Footprints of a single animal were recorded on one occasion; it is not clear how many survey visits were completed. No holt/ potential holt sites were identified and the report states that while dense vegetation could be used as a resting place usage is likely to be limited due to disturbance by people/ dogs.
- 3.3.32 As part of the current study four detailed survey visits were completed. The results of these survey visits are graphically reproduced in Figure 6, sheets 1-4. These results indicate that the level of use of the River Gwenfro varies throughout the year and also that river is more regularly visited/ heavily used within the site and downstream of it. In contrast upstream of Strytybydden bridge is less frequently visited; fewer signs of use and less heavily used sprainting spots.
- 3.3.33 Along the stretch of the River Gwenfro adjacent to the site a relatively small number of widely distributed spraints and footprints were generally recorded. However, for example, spraints were recorded from the sand/ silt bar beneath the Croesnewydd Road bridge on every visit (the highest number being five not dry<sup>2</sup>, with a further five dry intact 5 m downstream). During the May survey visit a notably high level of use was recorded along this stretch with five spraints or more recorded at four locations. During the other three visits less than or equal to four spraints were recorded at each location.
- 3.3.34 The survey revealed that Otters access the pond (Waterbody 3) via a 0.3 m diameter overflow pipe which is directly linked to the River Gwenfro approximately 0.1 m above the water level. Claw scratches were noted both within the pipe and at the entrance. There is an old foot-stool on the edge of the pond directly adjacent to the pipe; up to 3 spraints were recorded here on 3 of the 4 visits.

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<sup>2</sup> Chanin (2003) defines spraint condition as 'not dry', 'dry intact' and 'dry fragmented'; likely to indicate their relative age with the former the most recent.

- 3.3.35 Each of the spot-check locations was visited four times. Evidence was recorded on at least two occasions at all of the downstream spot-checks. Evidence was recorded at spot-checks 3, 9 and 12 on all four visits with spot-check 4 used 3 times. All of these locations appear to be important sprainting points. Spot-check 9 is so regularly used that it was not possible to discern between individual spraints; on 7<sup>th</sup> November 2008 four discrete piles were noted the largest measuring approximately 15 cm by 15 cm and 5 cm high. A maximum of 19 spraints was recorded at spot-check 3, 13 at spot-check 4 and 19 at spot-check 12. Similarly there are 3 important sprainting locations within the 2 km survey area; all within the grounds of the hospital. The most heavily used is beneath a covered pedestrian bridge where a maximum of 26 spraints was recorded (and never less than 19).
- 3.3.36 Evidence of use was recorded at only two (out of five) of the upstream spot-checks; and never upstream of Tanyfron. One of the upstream spot-checks was used twice with up to 6 spraints, while the other upstream spot-check was used only once; a single spraint. Generally between the A483 road and Tanyfron a small number of widely distributed spraints and occasional footprints were recorded.
- 3.3.37 A single dry fragmented [relatively old] spraint was recorded by the culvert at Ruthin Rd along the stream within the site on 18<sup>th</sup> February 2009. No other signs were recorded along this stream. This stream is carried beneath the Ruthin Road and Croesnewydd Road via 2 approximately 0.3 m diameter concrete pipes. Metal grills have been fitted across the culvert entrances.
- 3.3.38 All of the footprints found during the survey visits appeared to be of a single large animal. No more than one set of prints were recorded at any location at any one time.

### **Great Crested Newt**

#### *Habitat Assessment*

- 3.3.39 The terrestrial habitat within the survey area is potentially suitable for foraging/ hibernating Great Crested Newts. Terrestrial habitat can vary but usually dense ground vegetation is preferred where prey species are readily available along with the presence of voids in the substrate to allow refuge (English Nature 2001). Areas of woodland/ dense scrub are often particularly favoured.
- 3.3.40 There are three waterbodies within the survey area that provide potential aquatic habitat for Great Crested Newts (Waterbodies 1 to 3; *Figure 8*). *Table 2* (following page) presents a summary of the potential habitat provided by these features and assesses their potential suitability for Great Crested Newts.

Table 2 – Potential Great Crested Newt Habitat

| Waterbody                             | Description                                                                                                                                                                                                                             | Qualitative Assessment | Potential Suitability                                        |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------|
| Waterbody 1 ( <i>Target Note 3c</i> ) | Small pond (5 by 8 m), shaded by trees and with shallow depth of water. Abundant emergent vegetation particularly Fool's Water-cress and Water-cress. Small fish noted in connecting stream and may be able to access pond.             | Poor – sub-optimal     | Yes for foraging only. Unlikely to be suitable for breeding. |
| Waterbody 2 ( <i>Target Note 13</i> ) | A small area of swamp containing some shallow water (to approximately 0.3 m deep). Good, diverse vegetation.                                                                                                                            | Poor – sub-optimal     | Yes.                                                         |
| Waterbody 3 ( <i>Target Note 22</i> ) | A large pond (20 m diameter) containing shallow water. Water quality may be poor. Little aquatic or bank-side vegetative cover but good stand of Bulrush in pond. Three-spined Stickleback and Goldfish previously recorded (TEP 2005). | Poor – sub-optimal     | Yes but unlikely.                                            |

- 3.3.41 A review of the OS map 1:25, 000 scale, the MAGIC web-site and Microsoft Virtual Earth indicates that there may be four waterbodies (other than ditches and streams) within approximately 500 m of the site boundary. This includes the three waterbodies located on the site.
- 3.3.42 Descriptions for Waterbodies 1 to 3 are provided at *Target Notes 3c, 13* and *22* respectively. Waterbody 4 is located just to the southeast of the survey area on the opposite side of the River Gwenfro; approximately 20 m from the site boundary. It is roughly oval in shape and measures approximately 25 m by 7 m. The depth is unknown but in places may be in excess of 1 m. The open water is dominated by a species of moss with *Potamogeton natans* (Broad-leaved Pondweed) locally frequent and a small amount of *Potamogeton obtusifolius* (Blunt-leaved Pondweed). Marginal vegetation where present is dominated by *Iris pseudacorus* (Yellow Iris). Approximately 50 to 60% of the water surface is shaded by adjacent *Salix* sp. (Willow) scrub. Waterbody 4 serves as a surface water drainage lagoon taking water from the hard surfaces of the adjacent WCBC depot. The banks appear to be lined/ reinforced. It is considered to provide potential aquatic habitat of sub-optimal quality for Great Crested Newts.

#### Detailed Survey

- 3.3.43 Records provided by CCW for a previous assessment (TEP 2005) identified the presence of Great Crested Newts at one waterbody within 500 m of the site, however this record is located to the west of the A483 road in Plas Power Park (Marches Ecology 2009b). It should also be noted that this record appears to be from greater than 500 m away from the present survey area boundary. A [CCW] Level III amphibian survey was conducted in 2002 (TEP 2005); no Great Crested Newts were recorded from the four surveyed waterbodies. This survey was updated in 2009. Waterbody 2 was also subject to egg-search and netting in 2008 (PCA Ltd, 2008); no evidence of Great Crested Newts was recorded. The surveyed waterbodies are presented on *Figure 8*, three of which are within the site; the small

woodland pond at *Target Note 3c*, the swamp at *Target Note 13* and the round pond at *Target Note 22*.

- 3.3.44 As part of a wider survey of the mineral railway between Gatewen and Croesnewydd Triangle, terrestrial searching for Great Crested Newts was undertaken; including detailed finger-tip searches and utilising artificial refugia (tin sheets) (CES 2004). No Great Crested Newts were recorded.
- 3.3.45 No Great Crested Newts or other species of newt were recorded during the presence/absence survey. Small numbers of Common Frog (*Rana temporaria*) were observed at all four waterbodies. *Table 3* below provides details of the weather conditions recorded during the Great Crested Newt survey visits.

*Table 3 – Weather Conditions*

| Date     | Temperature at dusk | Wind (Beaufort scale) | General weather conditions     |
|----------|---------------------|-----------------------|--------------------------------|
| 21/04/09 | 8°C                 | 0                     | Clear, dry.                    |
| 28/04/09 | 7 – 8°C             | 0-1                   | Cloudy, light rain.            |
| 04/05/09 | 11°C                | 1-2                   | Cloudy, light drizzle.         |
| 06/05/09 | 11°C                | 2-3                   | Cloudy, dry.                   |
| 12/05/09 | 8°C                 | 1-2                   | Cloudy, occasional light rain. |
| 14/05/09 | 9°C                 | 1-2                   | Cloudy.                        |

## Reptiles

### *Habitat Assessment*

- 3.3.46 The extensive areas of tall-herb vegetation, range of grassland types of varying heights, scattered, and patches of dense scrub and features that can be used for basking and for hibernation within the survey area provide suitable habitat for reptiles that may be considered of moderate to high quality. Of particular note are the species-rich grassland and scrub along the disused railway (*Target Note 10*), the semi-improved grassland field with fringing scrub (*Target Note 11*), coarse grassland (e.g. *Target Note 38*) and the waterbodies and watercourses.

### *Detailed Survey*

- 3.3.47 TEP (2005) considers certain parts of the site to be suitable for reptiles, particularly Slow-worm and Viviparous Lizard. No reptiles were recorded through direct observation on the site in 2002 (TEP 2005) or on the land to the northeast of the disused railway in 2008 (PCA Ltd 2008).
- 3.3.48 CES (2004) provides the results of a terrestrial search for reptiles; including detailed finger-tip searches and utilising artificial refugia (tin sheets) in 2004. Over 150 Viviparous Lizards were recorded in the Croesnewydd Triangle (located approximately 210 m to the east of the survey area of the current study at its nearest point). Eight Lizards were recorded along the

section of railway located between the Croesnewydd Triangle and Croesnewydd Road; this section lies immediately north of the current survey area but has since been largely developed as a car-park. The brook and pond habitats located adjacent to this area (presumably located within the current survey area) were described as providing good potential habitat for Grass Snake. Two Viviparous Lizards were recorded along the section of railway located between Croesnewydd Road and the A483 – this is located within the current survey area. It was also noted that '*anecdotal evidence provided by local residents....suggests that many Slow-worms are present along the southern bank and field area adjacent to this area*'; this is also presumed to be located within the current survey area. No reptiles were recorded on the mineral railway corridor further west of the current survey area.

- 3.3.49 No reptiles were recorded during the presence/ absence survey conducted in 2009. This indicates that a significant population does not inhabit the survey area at the present time. However species (in particular the Grass Snake), that have a large home range may traverse the site, may hunt along suitable habitat features (e.g. stream/ river corridors). *Table 4* below provides details of the weather conditions recorded during the reptile survey visits.

*Table 4 – Weather Conditions*

| Visit | Date       | Time of Visit | Temperature Range | Wind (Beaufort scale) | General weather conditions                           |
|-------|------------|---------------|-------------------|-----------------------|------------------------------------------------------|
| 1     | 15.04.2009 | PM            | 15 – 16 °C        | 2-3                   | Dry, sunny.                                          |
| 2     | 29.04.2009 | PM            | 15 – 16 °C        | 2                     | Dry, cloudy/ muggy with sunny spells.                |
| 3     | 07.05.2009 | AM            | 14 – 16 °C        | 2-3                   | Some cloud, sunny, after several days' rain.         |
| 4     | 11.05.2009 | PM            | 14 – 16 °C        | 2-3                   | Sunny, some cloud.                                   |
| 5     | 21.05.2009 | PM            | 16 °C             | 2-3                   | Some light rain showers, sunny, some cloud.          |
| 6     | 25.05.2009 | PM            | 17 °C             | 1-2                   | Cloudy/ muggy.                                       |
| 7     | 29.05.2009 | AM            | 17.5 °C           | 1                     | Cloudy to start, muggy, clearing to bright sunshine. |
| 8     | 04.06.2009 | PM            | 15 – 16 °C        | 0-1                   | Dry, sunny, some cloud.                              |
| 9     | 16.06.2009 | PM            | 20 °C             | 1                     | Dry, sunny, some cloud.                              |
| 10    | 24.06.2009 | AM            | 18 – 22 °C        | 1                     | Dry, clear, sunny.                                   |

## Birds

### *Habitat Assessment*

- 3.3.50 The survey site provides nesting opportunities for a range of species of bird. These opportunities are largely restricted to the woodland, patches of dense scrub/ tall- herb vegetation, watercourses/ waterbodies. There are limited opportunities for ground-nesting species; the potential value of the site for ground-nesting birds is likely to be reduced by the

relatively high levels of disturbance and height of the vegetative cover in many places. Opportunities for species typical of wetland habitat (other than the river) are also limited.

#### *Detailed Survey*

- 3.3.51 TEP (2005) completed a wintering bird survey in January, February and March 2005. 31 species were recorded. Six of the species recorded are identified as being of particular conservation concern (though this does not include Birds of Conservation Concern in the UK); Barn Owl (*Tyto alba*), Herring Gull (*Larus argentatus*), Kestrel (*Falco tinnunculus*), Mallard (*Anas platyrhynchos*), Grey Partridge (*Perdix perdix*) and Song Thrush (*Turdus philomelos*). The Barn Owl was recorded on one occasion attempting to roost in trees 'along the Gwenfro tributary'. A single Grey Partridge was also noted during one visit.
- 3.3.52 54 species of bird were recorded during the various surveys for the present assessment (Table 11, Section 8). 41 species were recorded during the breeding bird survey (excluding corvids and species of pigeon); 21 were found to have bred within the survey area in 2009 while a further 14 are considered to be possible breeding species where conclusive evidence was not recorded. The results of the breeding bird survey are summarised in Table 5 (following page) which provides an estimate of breeding pairs supported by the site. Breeding birds are more-or-less restricted to the areas of woodland and scrub with a few utilising tall-herb vegetation (e.g. Whitethroat). It should be noted that the division of breeding pairs is entirely arbitrary as many of the territories mapped are likely to overlap with one or more of the survey units and indeed outside the survey area.
- 3.3.53 The Song Thrush (*Turdus philomelos*) is a UK BAP priority species, *NERC Act* species of principal importance and is included on the Birds of Conservation Concern Red List (Eaton *et al.* 2009). The Dunnock (*Prunella modularis*) and Bullfinch (*Pyrrhula pyrrhula*) are UK BAP priority species, *NERC Act* species of principal importance and are included on the Birds of Conservation Concern Amber List. Two other confirmed breeding species are included on one or more of these lists: Willow Warbler (*Phylloscopus trochilus*) and Whitethroat (*Sylvia communis*). Six possible breeding species are also included on one or more of the above lists.
- 3.3.54 No species listed on *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) was recorded during the breeding bird survey. A Barn Owl was noted hunting to the north of the central woodland on 30<sup>th</sup> June during a bat survey visit.
- 3.3.55 No specific wintering bird survey was completed during the present assessment work. The site is likely to be of value during the winter period for several of the species listed in Table 11, e.g. Woodcock (*Scolopax rusticola*).

Table 5 – Breeding Birds and their Status

| Species                                             | Conservation Status               | Site Status      | Notes                                                                                                                                |
|-----------------------------------------------------|-----------------------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <i>Accipiter nisus</i> (Sparrowhawk)                |                                   | Possible breeder | Only recorded hunting.                                                                                                               |
| <i>Aegithalos caudatus</i> (Long-tailed Tit)        |                                   | 5-7 pairs        |                                                                                                                                      |
| <i>Alectoris rufa</i> (Red-legged Partridge)        |                                   | 1 pair?          | Employment land <sup>3</sup> .                                                                                                       |
| <i>Anas platyrhynchos</i> (Mallard)                 | Amber List                        | Possible breeder | No evidence of breeding. Very limited opportunities.                                                                                 |
| <i>Apus apus</i> (Swift)                            | Amber List                        | Non-breeder      |                                                                                                                                      |
| <i>Ardea cinerea</i> (Grey Heron)                   |                                   | Non-breeder      | Only recorded hunting.                                                                                                               |
| <i>Buteo buteo</i> (Buzzard)                        |                                   | Possible breeder | Single bird recorded on most visits. No evidence of breeding though large trees limited.                                             |
| <i>Carduelis carduelis</i> (Goldfinch)              |                                   | 2-3 pairs        | 1 employment land, 1-2 residential land                                                                                              |
| <i>Carduelis chloris</i> (Greenfinch)               |                                   | 1-2 pairs        | 0 employment land, 1-2 residential land                                                                                              |
| <i>Carduelis spinus</i> (Siskin)                    |                                   | Non-breeder      |                                                                                                                                      |
| <i>Certhia familiaris</i> (Treecreeper)             |                                   | 1 pair           | Central woodland, employment land.                                                                                                   |
| <i>Cinclus cinclus</i> (Dipper)                     |                                   | Possible breeder | Breeds on River Gwenfro, nest believed to be upstream of site. 3 old nests found on mineral railway bridge west of A483 on 15/12/08. |
| <i>Delichon urbica</i> (House Martin)               | Amber List                        | Non-breeder      | Small number of pairs on adjacent housing estate.                                                                                    |
| <i>Dendrocopos major</i> (Great Spotted Woodpecker) |                                   | 1 pair           | Central woodland, employment land – located in large Ash.                                                                            |
| <i>Emberiza schoeniclus</i> (Reed Bunting)          | S42, UKBAP, WBAP Long, Amber List | Possible breeder | Single male recorded in two places on several occasions. No evidence of breeding.                                                    |
| <i>Erithacus rubecula</i> (Robin)                   |                                   | 4-5 pairs        | 3-4 employment land, 1 residential land                                                                                              |
| <i>Falco tinnunculus</i> (Kestrel)                  | S42, WBAP Long, Amber List        | Possible breeder | Up to two birds, only recorded hunting.                                                                                              |
| <i>Fringilla coelebs</i> (Chaffinch)                |                                   | 3-5 pairs        | 2 employment land, 1-3 residential land                                                                                              |
| <i>Hirundo rustica</i> (Swallow)                    | Amber List                        | Non-breeder      |                                                                                                                                      |

<sup>3</sup> Where the territory overlaps both the employment land and residential land the pair concerned has been included in the employment land total.

| Species                                        | Conservation Status                 | Site Status      | Notes                                                                      |
|------------------------------------------------|-------------------------------------|------------------|----------------------------------------------------------------------------|
| <i>Motacilla alba</i> (Pied Wagtail)           |                                     | Possible breeder | No evidence of breeding.                                                   |
| <i>Motacilla cinerea</i> (Grey Wagtail)        | Amber List                          | Possible breeder | Bred along River Gwenfro, believed to be outside site.                     |
| <i>Parus ater</i> (Coal Tit)                   |                                     | 1 pair           | Employment land – A483 embankment.                                         |
| <i>Parus caeruleus</i> (Blue Tit)              |                                     | 5-9 pairs        | 4-6 employment land, 1-3 residential land                                  |
| <i>Parus major</i> (Great Tit)                 |                                     | 4 pairs          | 3 employment land, 1 residential land                                      |
| <i>Phasianus colchicus</i> (Pheasant)          |                                     | 2 pairs          | Employment land                                                            |
| <i>Phylloscopus collybita</i> (Chiffchaff)     |                                     | 5-6 pairs        | 3 employment land, 2-3 residential land                                    |
| <i>Phylloscopus trochilus</i> (Willow Warbler) | Amber List                          | 2 pairs          | 1 employment land, 1 residential land.                                     |
| <i>Pluvialis apricaria</i> (Golden Plover)     | S42, Amber List                     | Non-breeder      |                                                                            |
| <i>Prunella modularis</i> (Dunnock)            | S42, UKBAP, Amber List              | 4-5 pairs        | 2 employment land, 2-3 residential land                                    |
| <i>Pyrrhula pyrrhula</i> (Bullfinch)           | S42, UKBAP, WBAP Long, Amber List   | 1-2 pairs        | 1 employment land, 1? residential land                                     |
| <i>Regulus regulus</i> (Goldcrest)             |                                     | 1 pair?          | 1? residential land                                                        |
| <i>Sitta europaea</i> (Nuthatch)               |                                     | 1 pair           | Central woodland, employment land                                          |
| <i>Strix aluco</i> (Tawny Owl)                 |                                     | Possible breeder | Recorded once during day being mobbed. Not recorded during evening visits. |
| <i>Sturnus vulgaris</i> (Starling)             | S42, UKBAP, WBAP Long, Red List     | Possible breeder | Breeding opportunities largely limited to large trees in central woodland. |
| <i>Sylvia atricapilla</i> (Blackcap)           |                                     | 7-8 pairs        | 4 employment land, 3-4 residential land                                    |
| <i>Sylvia borin</i> (Garden Warbler)           |                                     | Possible breeder | No evidence of breeding.                                                   |
| <i>Sylvia communis</i> (Whitethroat)           | Amber List                          | 8-10 pairs       | 4-5 employment land, 3-5 residential land                                  |
| <i>Troglodytes troglodytes</i> (Wren)          |                                     | 10-14 pairs      | 6-8 employment land, 4-6 residential land                                  |
| <i>Turdus merula</i> (Blackbird)               |                                     | 9-13 pairs       | 5-7 employment land, 4-6 residential land                                  |
| <i>Turdus philomelos</i> (Song Thrush)         | S42, UKBAP, WBAP Priority, Red List | 2-4 pairs        | 2-3 employment land, 1? residential land                                   |
| <i>Turdus viscivorus</i> (Mistle Thrush)       | Amber List                          | Possible breeder | Up to two birds recorded on several occasions. No evidence of breeding.    |
|                                                |                                     |                  |                                                                            |

## 4 EVALUATION

### 4.1 Introduction

- 4.1.1 In evaluating the ecological resources within the survey site reference has been made to a number of texts. Three key texts are:
- The *Guidelines for the Selection of Biological SSSIs* (Nature Conservancy Council 1989). This text was used to determine whether each resource either separately or as part of a functioning ecosystem may be of national or greater importance as recommended by IEEM (2006). As no ecological resources of SSSI quality occur within the survey area, this text was used for reference only.
  - *UK Biodiversity Action Plan; Priority Habitat Descriptions* (BRIG 2008).
  - *Wildlife Sites Guidance Wales: A Guide to Develop Local Wildlife Systems in Wales* (Wales Biodiversity Partnership [WBP] 2008). In the absence of published local guidance for selection and grading of locally valuable sites (County Wildlife Sites) this text was used to identify resources of local, district, county and where possible regional value.
- 4.1.2 The value categories assigned to each of the ecological resources are described in *Table 7, Section 5.1*.

### 4.2 Habitats and Flora

#### *Introduction*

- 4.2.1 There are no statutory or non-statutory protected sites within or directly adjacent to the survey area. As indicated previously (*Section 2.3*) Biodiversity Action Plans are more important for guiding policy than for evaluating resources (e.g. IEEM 2006). However BRIG (2008) provides useful definitions and in some cases qualifying criteria with which to evaluate habitats. All of the UK BAP priority habitat types applicable to the survey area are also listed as habitats of principal importance for the conservation of biological biodiversity in Wales (under *Section 42* of the *Natural Environment and Rural Communities Act 2006*). This provides a more robust legislative basis for evaluating the importance of these habitats.
- 4.2.2 *Section 42* and UK BAP priority habitats present within the survey area include lowland mixed deciduous woodland, wet woodland, hedgerows, lowland meadows, rivers, open mosaic habitat on previously developed land and ponds. The applicability of the habitats within the survey area to the habitats of principal importance/ UK BAP priorities is discussed in more detail below where relevant. The Wrexham BAP (Wrexham County Borough 2003) includes Habitat Action Plans (HAP) for derelict and industrial land, river, stream and canal, woodland and ponds.

#### *Woodland*

- 4.2.3 Small stands of semi-natural woodland are located at *Target Notes 3, 18* and *20*. The woodland at *Target Note 3* (termed the 'central woodland') may include elements of both lowland mixed deciduous woodland and wet woodland. Both the woody component and in particular the rich ground flora suggest that at least some parts of this woodland may be

ancient in origin; ancient woodland is a rare habitat in Wrexham (WCB 2003). This woodland (including the resource located outside the immediate site boundary) extends to just less than a hectare. The majority of woodlands in Clwyd are much larger than this; 98.2% are over 2 hectares although this includes plantations (Forestry Commission 2002). Small woodlands where Oak is the principal species are frequent and widespread although no figures are provided for Alder (Forestry Commission, *op. cit.*). WBP (2008) suggest that the following should be considered for selection (as a County Wildlife Site):

- undesignated semi-natural woodlands, of whatever size, which support an assemblage of ancient woodland indicator species.
- all undesignated semi-natural woodland with a wet woodland component.
- all undesignated semi-natural woodland with a mixed deciduous woodland component.

The central woodland (when considered on its own) would meet all of the above listed criteria and so despite its size may qualify for selection as a Wildlife Site, and therefore be of county importance. The central woodland is located outside the development site but inside the survey area.

- 4.2.4 The woodland, or more accurately scrub-woodland, at *Target Note 20* is very small and has been subject to historic disturbance. While a number of woodland plants (e.g. Bluebell, Ramsons) are recorded in places along the immediate banks of the River Gwenfro much of the ground layer here is species-poor and dominated by the non-native plant Indian Balsam. It would satisfy the third of the criteria listed above but as a woodland habitat is unlikely to be county value. It is also considered more appropriate to assess this habitat as part of the River Gwenfro corridor; *paragraph 4.2.8*. The secondary woodland at *Target Note 18* is small in extent and structurally and floristically poor. It is considered of local value only.

#### *Hedgerows*

- 4.2.5 The UK BAP priority habitat 'hedgerows' now covers all hedgerows consisting predominantly (*i.e.* 80 % or more cover) of at least one woody UK species (Biodiversity Reporting & Information Group, 2008). In this instance a hedgerow is defined as any boundary line of trees or shrubs over 20 m long and less than 5 m wide, and where any gaps between the trees or shrub species is less than 20 m wide (Bickmore 2002). There are four hedgerows within the survey area (*Target Notes 6/12/14, 25, 26 and 28*) and all would qualify under the simplistic UK BAP priority habitat description. None of the hedgerows on the site is likely to meet any of the criteria listed in WBP (2008) as they are not part of an important hedgerow network and individually are unlikely to be assigned as Grade 1 under the Hedgerow Evaluation and Grading System (Clements & Tofts, 1992); and are therefore not of county value.
- 4.2.6 In order to provide a meaningful evaluation and determine whether these hedges are of site, local or district value the previous UK BAP definition of ancient/ species-rich hedges will be used (e.g. those with more than five woody species in a 30 m stretch) and adapted as 30 m samples have not been recorded. For the purposes of this evaluation a species-rich hedge is identified as containing six or more native woody species in the entire stretch. Two hedgerows within the survey area qualify as species-rich on this basis; at *Target Notes 6/12/14 and 28* and are considered of district value. The hedgerow at *Target Note 28* also supports a Locally Scarce plant; *Bryonia dioica* (White Bryony). It should be noted that

these hedgerows may qualify as Important under the *Hedgerow Regulations 1997* (Wildlife criteria only). The hedges at *Target Notes 25 and 26* are of local value at most.

#### Grassland

- 4.2.7 The Lowland Meadows UK BAP priority habitat type covers most forms of unimproved neutral grassland including those grazed by livestock (BRIG 2008). Areas of the site that may be covered by this priority habitat type include the grassland on the disused railway (*Target Note 10*) and the semi-improved grassland field (*Target Note 11*). WBP (2008) states that *all relatively species-rich neutral grasslands... of any significant extent and or examples of neutral grasslands that contain uncommon species*, should be considered for selection (as County Wildlife Sites). The grassland on the disused railway is particularly species-rich and supports two Locally Scarce species of plant. As such it could qualify as a County Wildlife Site and is therefore of county value. The field unit to the south has a variable composition although it is species-rich in places, it also supports one Locally Scarce species of plant. It is considered that this field may be of district value.

#### Rivers

- 4.2.8 The River Gwenfro is a tributary of the River Clywedog which in turn flows into the Afon Dyfrdwy (River Dee) Site of Special Scientific Interest (SSSI)/ River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid (Wales) Special Area of Conservation (SAC). *Annex II* species present as a qualifying feature are Sea Lamprey, Brook Lamprey, River Lamprey, Bullhead and Otter. The latter two species are known to be present on the stretch adjacent to the survey area and WBP (2008) indicates that '*waterbodies supporting resident populations*' of Bullhead should be considered for selection as County Wildlife Sites..
- 4.2.9 The Rivers UK BAP priority habitat type '*includes a very wide range of types, encompassing all natural and near-natural running waters in the UK (i.e. with features and processes that resemble those in 'natural' systems)*' (BRIG 2008). The River Gwenfro would qualify (in accordance with the current draft criteria) to be covered by this priority habitat type due to the presence of *Annex II* Habitats Directive and or UK BAP priority species rather than the quality of the habitat alone. As the stream described at *Target Notes 3d and 42* is a tributary of the River Gwenfro it is recognised as an integral part of this ecological system; they are evaluated together.
- 4.2.10 While the channel of the River Gwenfro adjacent to the survey area has been subject to much modification, disturbance and pollution it retains features of a natural, dynamic pattern of fluviomorphology, e.g. exposed earth banks on meander bends, pools, side and mid-channel gravel bars. WBP (2008) provides four criteria for selection of different types of river as County Wildlife Sites. The most applicable criterion to this stretch of the River Gwenfro is 'all examples of sections of undesignated watercourses (regardless of scale) with exposed sediment and/or erosion features such as soft cliffs'. As such the stretch of the River Gwenfro (and tributary) adjacent to the survey area may be considered of county value; this is further emphasised by their value to several species of conservation interest and as it forms part of the River Dee catchment. While the River Gwenfro is not specifically mentioned in WCB (2003) the River Clywedog is listed as a principal river. WBP (2008) also suggests that where designated any CWS should '*include 'buffer zones' of adjacent habitat up to 7m wide from either bank top*'. On the River Gwenfro this would encompass much of the scrub-woodland discussed in *paragraph 4.2.4* above.

### *Ephemeral Vegetation*

- 4.2.11 The Open Mosaic Habitat on Previously Developed Land UK BAP priority habitat type includes a range of early pioneer communities developing on man-made or disturbed substrates. It is likely to be applicable to the ephemeral vegetation recorded at *Target Notes* 36 and 37. The biodiversity value of derelict and industrial land is recognised in the provision of a specific Habitat Action Plan (HAP) within the Wrexham BAP (Wrexham County Borough 2003). BRIG (2008) provides criteria for selection of qualifying habitats of high nature conservation value; this area is unlikely to meet any of them. The criteria provided by WBP (2008) are a little vaguer. Although this area is not particularly species-rich, it does support two Locally Scarce plants; *Euphorbia lathyris* (Caper Spurge) and *Lactuca serriola* (Prickly Lettuce). However the former species is considered to be a 'garden weed' by Green (2006) while the latter is thought to be under-recorded. Furthermore Wrexham borough contains a large number of post-industrial sites that are comparatively far more valuable. As such this vegetation is considered of site value only.

### *Ponds*

- 4.2.12 Under the UK BAP priority habitat description, ponds '*are defined as permanent and seasonal standing waterbodies up to two hectares in extent*' that meet one or more of the listed criteria (BRIG 2008). The ponds within the survey area (*Target Notes* 3c, 13 and 22) are only likely to qualify if they support any UK BAP priority species, Red Data Book species or legally protected species. The pond at *Target Note* 3c is considered a component part of the wet woodland evaluated above. The pond at *Target Note* 22 does provide an infrequent feeding resource for Otters. However it is unlikely that the two ponds at *Target Note* 13 and 22 would meet the criteria provided in WBP (2008). The pond at *Target Note* 22 does support a Locally Scarce species of plant; *Potamogeton obtusifolius* (Blunt-leaved Pondweed) and that at *Target Note* 13 has diverse marginal/ swamp vegetation. As such these two ponds may be considered of local value.

### *Other Habitat*

- 4.2.13 Other habitat types within the survey area that may be considered of value at the local or site level are:
- Broad-leaved plantation woodland;
  - Scrub (both continuous and scattered);
  - Individual broad-leaved trees;
  - Amenity grassland;
  - Ditch;
  - Bracken;
  - Tall-ruderal vegetation; and
  - Tall-ruderal/ neutral grassland mosaic.

### *Flora*

- 4.2.14 Nine plant species of note were recorded during the various survey visits: *Bryonia dioica* (White Bryony), *Potamogeton obtusifolius* (Blunt-leaved Pondweed), *Euphorbia lathyris* (Caper Spurge), *Linaria repens* (Pale Toadflax), *Mentha spicata* (Spear Mint), *Ophrys apifera* (Bee Orchid), *Papaver somniferum* (Opium Poppy), *Trifolium arvense* (Hare's-foot Clover)

and *Lactuca serriola* (Prickly Lettuce). All nine of these plant species are identified as 'scarce'<sup>4</sup> in VC50 - Denbighshire (Green 2006). However Caper Spurge is listed as a 'garden weed', and both Spear Mint and Opium Poppy are listed as 'established' (e.g. they are not native). Prickly Lettuce is included as a locally important species and Bee Orchid as a locally important species associated with Derelict and Industrial Land (WCBC 2003). Both Cheffings & Farrell (2005) and Dines (2008) categorise all of these species as of 'Least Concern' in the most recent Vascular Plant Red Data List for Great Britain and Wales respectively. It should be noted that several of the Locally Scarce species listed are likely to be under-recorded in Denbighshire.

- 4.2.15 WBP (2008) provides a list of vascular plants and criteria for selection of County Wildlife Sites based on this list. The only species recorded from the survey area that are included on this list are *Potamogeton obtusifolius* (Blunt-leaved Pondweed), *Bryonia dioica* (White Bryony), *Ophrys apifera* (Bee Orchid) and *Blackstonia perfoliata* (Yellow-wort). Based on the presence of the former species alone WBP (2008) suggest that the site or part of the site would qualify for selection. However the list is based on three southern welsh counties and would require a degree of interpretation to be applicable across Wales. Were Blunt-leaved Pondweed not given such a heightened status (and it is one of those species believed to be under-recorded in Denbighshire) then the site would not meet the required criteria. As such populations of these species are unlikely to be of greater than local or district value.
- 4.2.16 *Impatiens glandulifera* (Indian Balsam) is an invasive non-native species that is present in extensive stands along the River Gwenfro corridor. This plant is not currently listed on *Schedule 9* of the *Wildlife and Countryside Act 1981* in relation to non-native species. However plant material is considered a 'controlled waste', requiring a waste management licence, unless one of the exemptions set out in *Schedule 3* of the *Waste Management Licensing Regulations 1994* applies (Environment Agency 2003).
- 4.2.17 *Fallopia japonica* (Japanese Knotweed) was recorded from two locations within the survey area (*Target Notes 16* and *19*). Under the *Wildlife & Countryside Act 1981* it is an offence to 'plant or otherwise cause Japanese Knotweed to grow' in the wild. This includes spreading the species or transferring polluted ground material from one area to another.

### 4.3 Fauna

- 4.3.1 Evidence of the following species that receive specific legal protection was recorded during past and current surveys:

- Badger;
- Bats;
- Otter; and
- Breeding birds.

#### *Badger*

- 4.3.2 Badgers are discussed in a separate confidential annex (Marches Ecology, 2009a).

<sup>4</sup> In Vice County 50, a scarce plant is described as being recorded in 4-15 10 km squares.

### Bats

- 4.3.3 No bat roosts have been identified within the survey area. There are a small number of trees within the survey area that offer moderate to high value potential roosting opportunities. These features could be utilised by roosting bats at any time. Most of these trees are present in the central woodland (*Target Note 3*) or along the River Gwenfro corridor.
- 4.3.4 The frequency that bats are encountered during detailed survey depends on several factors but in particular the number of roosts within or in close proximity to the survey area and the number of individuals in the roost; the availability of quality foraging habitat and the distance to it from a roost; and the quantity and diversity of invertebrates. Four species of bat have been recorded foraging/ commuting throughout much of the survey area; Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Noctule (*Nyctalus noctula*) and Whiskered/ Brandt's bat (*Myotis mystacinus/ brandtii*). In addition to the legislative protection these species receive the former three are *Section 42* species; Soprano Pipistrelle and Noctule are also UK BAP priority species and they are all included on the provisional list of locally important/ endangered species in Wrexham (WCB 2003). Marches Ecology (2009b) details records of at least six species from within 5 km of the survey area although only two records are from the same grid-square.
- 4.3.5 The sheltered areas around individual broadleaved trees and woodlands, hedgerows and the river corridor are likely to support foraging bats throughout their active season. However, the level of feeding activity was found to vary greatly between visits although this is not uncommon and is ultimately linked to prey availability. There are three readily identifiable commuting routes currently being used by Common Pipistrelles across the survey area; two hedgerows (*Target Notes 6/12/14* and *26*), and the stream corridor (*Target Note 42*). The hedgerow at *Target Note 6/12/14* is the more regularly used of the two hedgerows. Common Pipistrelles were recorded on all survey visits (and were the most numerous species) and it appears that from the identified commuting routes a roost may be located within residential properties adjacent to Croesnewydd Road. Due to the low level of Soprano Pipistrelle activity the commuting route of this species was not identified, but is considered to be from a north westerly direction onto the site.
- 4.3.6 Although there are potential roost opportunities for Noctule bats, particularly within the central woodland (*Target Note 3*) no emergence or emergence activity was recorded. However Noctules frequently alternate between tree roosts and the use of any suitable tree holes at some stage cannot be discounted. Due to the foraging patterns utilised by this species and the distances travelled it is difficult to assess the value of the survey area for this species. As the level of activity recorded (only one incidence of foraging was recorded) and as there are likely to be a lot of suitable pastures in the wider area the resource on the site is unlikely to be of particular importance for this species.
- 4.3.7 Whiskered/ Brandt's bats were less frequent than Pipistrelle bats and were limited to foraging activity along the River Gwenfro on either side of Croesnewydd Road (it is possible that they fly beneath the bridge). The results suggest that in certain parts of the survey area favourable habitat exists that provides foraging for more than one species. Whiskered/ Brandt's bat will also use tree holes and could potentially roost on site.
- 4.3.8 WBP (2008) state that '*any undesignated significant roosting sites, vital flight and commuting routes and priority feeding areas attached to roosts*' could be considered for selection as a

County Wildlife Site. While several important flight/ commuting routes exist that are likely to be close to a Common Pipistrelle route it is not known whether they are 'vital'. The survey area remains connected to the wider landscape via several hedgerows, blocks of woodland and the river corridor although this is fragmentary in nature due to roads and built development. This habitat diversity within a reasonably well linked landscape provides potentially moderate quality foraging/ commuting habitat for bats. When considered in this context, and as part of an ecological unit, the habitat within the survey area may be of district value (for foraging/ commuting bats).

#### *Otter*

- 4.3.9 In addition to the legislative protection the Otter receives it is a *Section 42* species, a UK BAP priority species and is included on the provisional list of locally important/ endangered species (WCB 2003). Otters require a large territory that supports an abundant and varied food resource. Depending on the productivity of the river and other factors the range of a male Otter may be up to 70 km (of linear watercourse) while for a female it could be 25-40 km; a male Otter may overlap with two or three female territories (e.g. Woodroffe 2001). Within an occupied territory, Otters may have up to around 30 resting places some used regularly while many more are used only once or a few times.
- 4.3.10 The stretch of the River Gwenfro adjacent and within the survey area provides a number of opportunities for resting places but apparently few potential holt sites. However it should be noted that identification of holt sites is notoriously difficult and there are a small number of trees along this part of the river that could potentially have cavities beneath them with entrances below the water and therefore not visible. Some of the more dense patches of scrub, particularly Bramble, also provide potentially suitable holt sites. This resource is however limited and the value of such locations is likely to be further diminished by the relatively high level of informal recreational use (including dogs) particularly to the west of Croesnewydd Road. It should be noted that such human pressure may only affect Otters where cubs are present; Otter activity is not significantly affected by walkers, dogs or anglers (e.g. Chanin, 2003b; Jones & Jones, 2004). No evidence that would indicate a breeding/ holt site was recorded during the survey. Otters can also be found some distance from water and as such large parts of the survey area provide resting places, for example, the dense stands of tall-herbs (*Target Note 4*) the patches of Bramble scrub around the field at *Target Note 11*.
- 4.3.11 Throughout the survey visits a large number of footprints were recorded but appeared to be from no more than one animal at any time at each location. Nearly all of these footprints were considered to be large and may have been due to one or few, probably male, Otters. A distinctly smaller set of footprints was recorded on a single occasion just west of the A483 road. As female Otters spend most of their time in a core part of their range while males regularly patrol the full extent of their range (travelling up to 16 km in a night in freshwater systems; Grogan *et al.* 2001) it is possible that most of the signs recorded are due to a single male Otter. Population densities for England and Wales have been estimated at one adult per 27 km of water although there is considerable variation (Chanin, 2003b). Marches Ecology (2009b) details two records of Otter casualties from Croesnewydd Road dated 2007.
- 4.3.12 Most of the surveyed stretch of river including that adjacent to the survey area, upstream at least to the A483 road is visited fairly frequently, while upstream of this it is visited more

sporadically. No evidence was recorded upstream of Tanyfron. The level of activity recorded varied between visits; typically this is likely to be in response to prey availability. For example the pond at *Target Note 22* was visited early in the year perhaps due to the presence of Common Frogs, although one spraint recorded here contained mammalian fur, possibly Brown Rat. The EA data and observations made during the survey visits suggest that while the River Gwenfro does not support large populations of fish it may provide an important food resource for Otters; they are opportunistic feeders and will take wide range of prey items in Wales although their core diet consists of small fish and amphibians (Parry 2008).

- 4.3.13 Based on the evidence observed the River Gwenfro forms an important part of the territory of at least one male Otter, and towards the River Clywedog may also to be included within the territory of a/ group of female Otters. But during the present survey no breeding location/ natal site (Liles, 2003, describes key features) was confirmed; although potential sites are available. The most recent national survey recorded signs of Otters from 71% (78% in the River Dee catchment including the River Clywedog) of sites visited (Jones & Jones 2004). The Otter remains a widely distributed species in Wales. However WBP (2008) suggest that '*areas which are critical for nesting, foraging, roosting (laying up), territorial or other significant use*' may be considered for selection as a County Wildlife Site. In terms of resource usage these criteria are met although arguably the Otter population supported by the river is of greater than county value; '*a regularly occurring, locally significant population*'.

#### *Birds*

- 4.3.14 No birds protected under *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) are known to breed on the site. Three species of principal importance under the *NERC Act* (Song Thrush, Dunnock and Bullfinch) have been recorded confirmed as nesting within the survey area while a further three are possible breeders (Reed Bunting, Kestrel and Starling). A number of other species of conservation interest (identified as locally important in the Wrexham BAP or UK BAP priority species; Birds of Conservation Concern) have also bred/ possibly breed within the survey area.
- 4.3.15 The breeding bird interest of the survey area is largely associated with the central woodland (*Target Note 3*), the central hedgerow (*Target Notes 6, 12 and 14*) and the River Gwenfro, tributary stream and associated habitat (*Target Notes 7, 20, 39, 41 and 42*). Of secondary importance are the plantation woodland (*Target Note 1*), tall-herbs/ scattered scrub (*Target Notes 4, 38 and 45*) and the patches of Bramble scrub (*Target Note 11*). However the tall-herb/ scattered scrub vegetation found across large parts of the site is of value for one species in particular; the Whitethroat (although it forms an important part of the territories of several other species). This species is included on the Amber List of Birds of Conservation Concern.
- 4.3.16 The nesting species recorded from the survey area can largely be referred to as woodland species and or scrub-nesters (e.g. Fuller, 1980), although some will breed in other habitat types. Many of these species can also be considered ubiquitous across similar British lowland sites (Fuller *op. cit.*). All three *Section 42* species confirmed as breeders are strongly linked with scrub habitat. None of the species of conservation interest recorded as breeding/ possibly breeding are ground-nesters. The only typically ground-nesting species recorded as breeding within the survey area are the non-native Red-legged Partridge and Pheasant.

- 4.3.17 The breeding bird assemblage within the survey area is unlikely to meet the selection criteria for County Wildlife Site status provided by WBP (2008). However WBP (2008) also suggest that any site supporting a breeding population of Kestrel could be considered for selection. Breeding by this species was not confirmed within the survey area during 2009 although a pair are thought to have nested nearby and used the site for hunting. Further there is the potential for this species to nest within the survey area. This species is identified as a species of principal importance in Wales only; it is not included on the *Section 41* list in England. The Kestrel is listed on the Amber list in the UK (Eaton *et al.* 2009) and previously in Wales (Thorpe & Young 2003) due to its unfavourable conservation status across Europe. Should this species be found to be breeding on site this evaluation could be revised. However similar nesting opportunities and habitat is available outside the survey area. It is therefore considered that the breeding bird assemblage supported by the survey area is of district value.
- 4.3.18 Habitat located within the survey area is utilised by birds for other reasons, e.g. wintering/ roosting/ hunting. A single Barn Owl was recorded on one occasion hunting to the north of the central woodland (*Target Note 3*). This species has previously been recorded at the site during the winter period (TEP 2005). No evidence of breeding has been recorded although a small number of large trees, particularly those in the central woodland may provide nesting opportunities. The Barn Owl is listed on *Schedule 1* of the *Wildlife and Countryside 1981*, the Amber list and as a locally important species (WCB 2003). Small numbers of Woodcock were also recorded during the winter months; wet areas in woodland are likely to be used for feeding. The Woodcock is included on the Amber list and is a locally important species (WCB 2003). TEP (2005) considered the species diversity and density [of winter birds] recorded as 'quite low' and largely typical of woodland/ woodland edge habitat.
- 4.3.19 WBP (2008) suggest that '*wintering or passage refuelling populations, of any size, of Grey Partridge* could be considered for selection as a County Wildlife Site. A single Grey Partridge was recorded on one occasion in 2005 (TEP 2005). However the vegetation on the site is likely to have been more suitable for this species at the time of this survey. This species was not recorded during the present assessment work although no detailed wintering bird survey was undertaken. The site is considered to be of district value at most for wintering birds.

#### *Other Species*

- 4.3.20 Habitat that could potentially support several species that receive specific legal protection is also present. None of these species was recorded during detailed surveys for them. These species are as follows:
- Great Crested Newts;
  - Reptiles; and
  - Water Voles.
- 4.3.21 The terrestrial habitat within the survey area may be considered to be of high potential value for Great Crested Newts. Three waterbodies are located within the survey area, all were subject to presence/ absence survey and no Great Crested Newts were recorded. Generally the quality of the aquatic habitat provided by these waterbodies may be considered sub-optimal or poor. The potential presence of Great Crested Newts in terrestrial habitat is governed more by the proximity of a suitable breeding pond than by the quality of the

terrestrial habitat. The closest Great Crested Newt record to the survey area is approximately 750 m to the west on the opposite side of the A483 road. This dual carriageway section of the road is likely to present a significant barrier to the movement of this species. There are no known ponds located in the agricultural land to the south of Ruthin Road, and Wrexham town is located to the north and east. The site is therefore relatively isolated from a similar terrestrial habitat resource and from the wider pondscape. As such it is considered unlikely that this species may access the survey area at the present time.

- 4.3.22 Marches Ecology (2009b) details several records of Viviparous Lizard, Grass Snake and Slow-worm within 1 km of the survey area boundary. The closest of these records is from approximately 210 m to the east of the survey area. This record is for a population of Viviparous Lizard at the Croesnewydd Triangle on the disused railway. However during a survey in 2004 two Viviparous Lizards were recorded from the disused railway land located between the A483 and Croesnewydd Road bridge and a further eight from the railway land located between the Croesnewydd Road bridge and the Croesnewydd Triangle (CES 2004). CES (2004) also describes anecdotal records of Slow-worm from land within the survey area although this species was not recorded during the 2004 survey. Further records for Slow-worm and Grass Snake are provided from the railway line approximately 500 m away from the survey area.
- 4.3.23 No reptiles were recorded during the presence/ absence survey undertaken in 2009 which included areas where low numbers of Viviparous Lizards have been recorded in the past and parts of the disused railway that was previously connected to the Croesnewydd Triangle. However a large car park has recently been constructed on the disused railway land to the east of Croesnewydd Road at Wrexham Maelor Hospital. This car park has fragmented the potential habitat resource; that within the survey area is now isolated from Croesnewydd Triangle. It is considered likely that either the small population recorded previously from the railway land within the survey area may not now be present (especially as it has been isolated from the source population associated with the Croesnewydd Triangle) or as it is limited to a very few individuals may not have been detected during the present survey. Furthermore, as Viviparous Lizards are relatively sedentary it is considered unlikely that this species may access the survey area (from Croesnewydd Triangle) at the present time.
- 4.3.24 The Grass Snake is known to have a large home range. Many parts of the site may be suitable for this species and in particular the watercourse corridors and habitat around the waterbodies. This species often hunts along such features. As such it is possible that this species may traverse the site.
- 4.3.25 No signs of Water Vole were recorded during the presence/ absence survey and no records were collated as part of the background data search (Marches Ecology 2009b). The available habitat within the survey area is generally considered to be sub-optimal or poor for this species.
- 4.3.26 In addition to species that receive specific legal protection the site supports a number of other species identified in the provisional list of Locally Important/ Endangered Species (WCB 2003):
- Common Frog (*Rana temporaria*);
  - Bullhead (*Cottus gobio*);

- Brown Trout (*Salmo trutta*); identified in HAP only; and
- Slender Ground-hopper (*Tetrix subulata*); identified in HAP only.

4.3.27 WBP (2008) indicates that any site that supports Slender Groundhopper should be considered for selection as a County Wildlife Site. This species was recorded from the swamp at *Target Note 13*. The range of this species in parallel with several other species of orthoptera has been increasing in recent years. It is considered to be under-recorded.

4.3.28 The Cinnabar moth (*Tyria jacobaeae*), mostly recorded from the disused railway, is a UK BAP priority and *Section 42* species.

#### 4.4 Summary of Ecological Value

Table 6 – Ecological Evaluation of the Survey Area

| Ecological Resource                | Resource Value   | Notes                                                                                                                                                                                                                                                                                                             |
|------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Woodland ( <i>Target Note 3</i> )  | Wrexham (county) | Could qualify for selection as a County Wildlife Site in accordance with WBP (2008).                                                                                                                                                                                                                              |
| Woodland ( <i>Target Note 18</i> ) | Local            | A small area of species-poor secondary woodland.                                                                                                                                                                                                                                                                  |
| Hedgerows                          | Local/ district  | None of the hedgerows satisfy the WBP (2008) criteria. Two hedges ( <i>Target Notes 6/12/14 and 28</i> ) are species-rich and one supports a Locally Scarce plant and are considered of district value. The hedges at <i>Target Notes 25 and 26</i> are species-poor and are of local value.                      |
| Grassland                          | District/ county | The species-rich neutral grassland on the railway ( <i>Target Note 10</i> ) meets the criteria for selection in accordance with WBP (2008). Arguably the field to the south ( <i>Target Note 11</i> ) may also meet these criteria but mainly due to its variable composition it is considered of district value. |
| River Gwenfro & tributary          | Wrexham (county) | Could qualify for selection as a County Wildlife Site in accordance with WBP (2008). Supports several species of conservation interest.                                                                                                                                                                           |
| Ephemeral vegetation               | Site             | Limited, species-poor resource that does not qualify under the UK BAP habitat type. Supports two Locally Scarce plant species; one is not native and the second under-recorded.                                                                                                                                   |
| Ponds                              | Local            | Neither of the ponds at <i>Target Notes 13 and 22</i> satisfy the WBP (2008) criteria. The pond at <i>Target Note 22</i> does support a Locally Scarce species of plant and that at <i>Target Note 13</i> has diverse marginal/ swamp vegetation.                                                                 |
| Other habitats                     | Site/ local      | Other habitat presents includes plantation woodland, scrub, tall-herb/ rank grassland, trees and amenity grassland.                                                                                                                                                                                               |
| Flora (VC50 Scarce plants)         | Local/ district  | The survey area supports White Bryony, Blunt-leaved Pondweed, Caper Spurge, Pale Toadflax, Spear Mint, Bee Orchid, Opium Poppy, Hare's-foot Clover and Prickly Lettuce. Several of these species are considered to be under-recorded and or are non-native.                                                       |
| Badger                             | Local            | This species is considered widespread and frequent within the county. Although it receives some level of legal                                                                                                                                                                                                    |

| Ecological Resource                        | Resource Value           | Notes                                                                                                                                                                                                                    |
|--------------------------------------------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                            |                          | protection this largely relates to welfare issues.                                                                                                                                                                       |
| Bats (foraging habitat only and commuting) | District                 | Unlikely to meet the criteria in WBP (2008). The site is used by four species of bat, most frequently by the Common Pipistrelle. Several important foraging/ commuting routes have been identified.                      |
| Otter population                           | Wrexham/ northeast Wales | Meets the criteria in WBP (2008). The River Gwenfro appears to be an important component of the territory of at least one Otter. No breeding location has been identified although potential opportunities exist.        |
| Breeding birds                             | District                 | Unlikely to meet the criteria in WBP (2008). A number of [largely] widespread species of conservation interest have bred at the site. Several Locally Important species identified in the Wrexham BAP also use the site. |
| Wintering birds                            | Local/ district          | Unlikely to meet the criteria in WBP (2008). Use of the site by wintering birds is fairly limited.                                                                                                                       |
| Barn Owl (hunting only)                    | Local/ district          | The grassland within the survey area is occasionally used by hunting Barn Owls. It is not known whether the area is included within a breeding territory.                                                                |
| Common Frog                                | Site/ local              | Small population recorded from three waterbodies.                                                                                                                                                                        |
| Slender Groundhopper                       | Local/ district          | Listed as 'locally important' in the Wrexham BAP.                                                                                                                                                                        |

## **5 IMPACT ASSESSMENT**

### **5.1 Assessment Methodology**

#### **Introduction**

- 5.1.1 The impact assessment process broadly uses and adapts the key concepts and approach proposed in IEEM (2006). These Guidelines have been endorsed by, among other organisations, The Countryside Council for Wales, The Environment Agency and The Wildlife Trusts.
- 5.1.2 Specific potential impacts were identified through consideration of the development proposal using available guidance and professional judgement.

#### **Valuation of Ecological Resources**

- 5.1.3 At the start of the impact assessment process the value of the various ecological resources (sites, habitats, species) was determined. This process has been completed in the previous section of this EclA. According to IEEM (2006) the value or potential value of an ecological resource should be determined within a defined geographical context. The following table uses the recommended frame of reference, adapted to meet local circumstances and with reference to earlier drafts of the IEEM Guidelines.

Table 7 – Valuation of Ecological Resources

| Resource Value               | Examples                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| International                | <ul style="list-style-type: none"> <li>An internationally designated/ candidate site (e.g. SPA, SAC, Ramsar, Biogenetic Reserve) or an area which the Countryside Council for Wales has determined meets the published criteria for such designation, irrespective of whether or not it has been notified.</li> <li>A viable area of a habitat type listed in <i>Annex I</i> of the Habitats Directive, or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</li> <li>Any regularly occurring population of an internationally important species, which is threatened or rare in the UK. i.e. it is a UK Red Data Book species or listed as occurring in 15 or fewer 10 km squares in the UK (categories 1 and 2 in the UK BAP) or of uncertain conservation status or of global conservation concern in the UK BAP.</li> <li>A regularly occurring, nationally significant population/number of any internationally important species.</li> </ul> |
| National                     | <ul style="list-style-type: none"> <li>A nationally designated site (SSSI, NNR) or a discrete area, which the Countryside Council for Wales has determined meets the published selection criteria for national designation irrespective of whether or not it has yet been notified.</li> <li>A viable area of a priority habitat identified in the UK BAP, or of smaller areas of such habitat which are essential to maintain the viability of a larger whole.</li> <li>Any regularly occurring regionally significant population/ number of any nationally important species.</li> <li>A feature identified as of critical importance in the UK BAP.</li> </ul>                                                                                                                                                                                                                                                                                                                               |
| Northeast Wales <sup>5</sup> | <ul style="list-style-type: none"> <li>Viable areas of key habitat of regional value or smaller areas of such habitat which are essential to maintain the viability of a larger whole.</li> <li>Any regularly occurring, locally significant population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK.</li> <li>A regularly occurring, locally significant number of a regionally important species.</li> <li>Sites which exceed the County Wildlife Site (CWS) designation criteria in accordance with WBP (2008) but fall short of SSSI selection guidelines, where these occur.</li> </ul>                                                                                                                                                                                                                                                                                                                                                    |
| Wrexham (borough)            | <ul style="list-style-type: none"> <li>Semi-natural ancient woodland greater than 0.25ha.</li> <li>Wrexham sites and other sites which the designating authority has determined meet the published ecological selection criteria for designation, including Local Nature Reserves (LNRs) selected on regional ecological criteria and CWS's.</li> <li>A viable area of habitat identified in the Wrexham BAP.</li> <li>Any regularly occurring, locally significant population of a species which is listed in a local "red data book" or BAP on account of its regional rarity or localisation.</li> <li>A regularly occurring, locally significant number of Wrexham important species.</li> </ul>                                                                                                                                                                                                                                                                                            |
| District                     | <ul style="list-style-type: none"> <li>Semi-natural ancient woodland smaller than 0.25ha.</li> <li>Areas of habitat identified in the Wrexham BAP.</li> <li>Sites that the designating authority has determined meet the published ecological selection criteria for designation, including LNRs selected on district ecological criteria where available.</li> <li>Sites/ features that are scarce within the district or which appreciably enrich the district habitat resource.</li> <li>A diverse and/ or ecologically valuable hedgerow network.</li> <li>A population of a species that is listed in the Wrexham BAP because of its rarity in the locality.</li> <li>A regularly occurring, locally significant number of a District important species during a critical phase of its life cycle.</li> </ul>                                                                                                                                                                              |
| Local                        | <ul style="list-style-type: none"> <li>Areas of habitat considered to appreciably enrich the habitat resource within the context of the parish or neighbourhood.</li> <li>CWS's and LNRs selected on parish ecological criteria where available.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Within Zone of Influence     | <ul style="list-style-type: none"> <li>Areas of habitat considered to appreciably enrich the habitat resource within the context of the proposed re-development site (zone of influence).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

<sup>5</sup> Wrexham, Denbighshire and Flintshire.

### Significance Criteria

- 5.1.4 In order to determine the significance of any given impact the magnitude of each potential impact is identified and subsequently assessed against the value of the ecological resource using a simple matrix. This diverges somewhat from the approach recommended in IEEM (2006), but is based on previously published and established guidance (e.g. Department for Transport 2004). It is deemed justifiable in this instance to maintain a transparent and simple approach. The magnitude of impact was determined using the scale in the table below. This magnitude of impact scale builds in the extent and duration of the impact, reversibility, timing and frequency as well as the magnitude (IEEM 2006).

*Table 8 – Magnitude of Impact*

| Magnitude             | Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Major negative        | The proposal (either on its own or with other proposals) may adversely affect the integrity of the site, in terms of the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or population levels of special interest. Change is likely to cause a permanent or long-term (more than 10 years) adverse impact.                                                                                                        |
| Intermediate Negative | The site's integrity will not be adversely affected, but the effect on the site is likely to be significant in terms of its ecological objectives. If, in the light of full information, it cannot be clearly demonstrated that the proposal will not have an adverse effect on the integrity, then the impact should be assessed as major negative. Change is likely to have an adverse impact, but recovery is predicted in the medium term (5-10 years) and there is predicted to be no permanent impact. |
| Minor Negative        | Neither of the above applies, but some minor negative impact is evident. Change is likely to have an adverse impact, but recovery is predicted in the short term (0-4 years) and there would be no impact on the integrity of the resource.                                                                                                                                                                                                                                                                  |
| Neutral               | No observable impact in either direction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Positive              | Impacts which provide a net gain for biodiversity overall.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

- 5.1.5 The magnitude of the potential impact(s) on each ecological resource is then used to derive a measure of the impact significance using the matrix below. Effects categorised as Moderate or Large are considered to be significant. Effects categorised as Slight or Neutral are considered to be not significant. Other adverse impacts may be considered important at the relevant geographical scale.

*Table 9 – Significance of Impact*

| Magnitude of Potential Impact | Value of Ecological Resource |                    |                     |                     |                   |                   |                |
|-------------------------------|------------------------------|--------------------|---------------------|---------------------|-------------------|-------------------|----------------|
|                               | International                | National           | Northeast Wales     | Wrexham (borough)   | District          | Local             | Site           |
| Major Negative                | Very large adverse           | Very large adverse | Large adverse       | Moderate adverse    | Moderate adverse  | Slight adverse    | Slight adverse |
| Intermediate Negative         | Large adverse                | Large adverse      | Moderate adverse    | Moderate adverse    | Slight adverse    | Slight adverse    | Neutral        |
| Minor Negative                | Moderate adverse             | Slight adverse     | Slight adverse      | Slight adverse      | Slight adverse    | Slight adverse    | Neutral        |
| Neutral                       | Neutral                      | Neutral            | Neutral             | Neutral             | Neutral           | Neutral           | Neutral        |
| Positive                      | Large beneficial             | Large beneficial   | Moderate beneficial | Moderate beneficial | Slight beneficial | Slight beneficial | Neutral        |

### Assessment of Residual Impacts

- 5.1.6 Following identification of impacts and assessment of the potential significance (*Section 5.2*), mitigation measures are proposed (*Section 5.3*) that seek to minimise or nullify such impacts. Mitigation measures address all negative impacts whether or not they are deemed

significant. Residual impacts are those that remain after implementation of the mitigation measures. Assessment of the residual impacts considers only those that are deemed significant and is completed in *Section 5.4*.

## 5.2 Identification and Assessment of Impacts

### Introduction

- 5.2.1 This section identifies the primary potential impacts of the proposed development scheme (primary infrastructure, development plots, junction improvements and A483 improvements only) where known. The impact on valued ecological resources (see *Table 6*) is subsequently completed. This impact assessment is based entirely on a plan entitled 'Ecological Mitigation Plan' (Drawing no. 07701/28/D) reproduced as *Figure 2*. Information pertaining to the proposed development scheme is provided in the planning documentation that will accompany the application and a summary is presented at *Section 1.3*.
- 5.2.2 It should be noted that due to the nature of, and timescale associated with, the scheme that this impact assessment has a necessarily broad approach (to the whole site). To undertake a detailed assessment of the potential impacts of the proposed development on the ecological resource further details would be required including construction methods and machinery, timing of works, duration of works and access to the construction areas. Mitigation/ compensation is outlined below but further detail is provided in Marches Ecology (2009d and e). It is likely that during the evolution of the project, as each plot is brought-forward for development, and the new and retained habitat develops, that further consideration of potential impacts would be required and development-specific mitigation measures provided.
- 5.2.3 The proposed development scheme will be provided in several phases over a number of years. The first phase of construction would see the provision of the spine road (*Figure 2*), associated junctions and utilities, drainage features such as the proposed swales, earthworks required to establish the development plots and minor improvements to the A483/ A525 interchange. This phase will be implemented in xxxx 2010 [WCBC to confirm] subject to securing the appropriate funding. Subsequent construction within individual development plots will be demand-led and as such it is not possible to identify a timetable for delivery. At the present time it is believed that development of the employment land will be achieved over a period of ten to twenty years. Development of the residential land is also likely to be dictated by the securing of the necessary funding but is also likely to be completed within this time-frame [WCBC to confirm].
- 5.2.4 The total site area excluding the footprint of existing road surfaces is 263, 327 m<sup>2</sup> (with the existing roads it is 272, 200 m<sup>2</sup>). The new area of primary road surface to be provided will be 25, 215 m<sup>2</sup> and secondary road will be 2764 m<sup>2</sup>. The total built area (hard surfaces and footprint of buildings) is 136, 090 m<sup>2</sup> (52% of the total site area). The remaining 126, 399 m<sup>2</sup> (48% of the total site area) will form the ecological compensation areas (31% of the total site area; xxxx m<sup>2</sup>), swales, embankments/ verges and structured landscaping (17% of the total site area; xxxx m<sup>2</sup>). [WCBC to confirm size and design of swales] The developable area (that is excluding road surfaces) within the employment land is 69, 483 m<sup>2</sup> while that in the residential land is 38, 628 m<sup>2</sup>. The employment land has been sub-divided into five development plots of varying size. The residential land has been divided into three development plots bisected by both Croesnewydd Road and the River Gwefro. The

proposed layout for the site is illustrated on a plan entitled 'Ecological Mitigation Plan' (Drawing no. 07701/28/D).

- 5.2.5 Construction impacts may therefore extend over a prolonged period but are likely to be limited in their extent at any one time. The longest and most extensive construction period is likely to be associated with the spine road and associated works. Completion of this first phase is anticipated within xxxx [WCBC to confirm]. It is currently envisaged that most if not all of the landscaping works and associated planting will be provided at an early stage. As such many of these areas will be well established before completion of the development.

### Protected Sites

- 5.2.6 No statutory protected sites will be directly impacted by the proposed development. The only statutory protected site present within 2 km is Gatewen Marsh Site of Special Scientific Interest (SSSI), which is located approximately 650 m north of the proposed development site. This SSSI is particularly noted for its southern mesotrophic mire wetland vegetation type. It occupies a flat valley bottom adjacent to a minor tributary of the River Gwenfro. The tributary of the River Gwenfro partly included within the SSSI joins the Gwenfro downstream of the site. Therefore although there is a hydrological linkage between the SSSI and the River Gwenfro no in-direct impacts are predicted as the protected site is located upstream of the confluence.
- 5.2.7 The River Gwenfro flows into the River Clywedog which is a principal tributary of the River Dee and Bala Lake/ Afon Dyfrdwy a Llyn Tegid SSSI/ Special Area of Conservation (SAC). The River Dee SSSI/ SAC is located approximately 14.6 km downstream of the proposed development site boundary. As such no direct impacts are predicted on this site. The Otter (*Lutra lutra*) is an *Annex II* species identified as a qualifying feature and supported by this protected site. Potential impacts on the local Otter population are considered in detail below; no other potential indirect impacts on this protected site have been identified.
- 5.2.8 No non-statutory protected sites will be directly impacted by the proposed development. There are three County Wildlife Sites within 1 km of the site boundary. The closest of these is Berse Drelincourt, located approximately 50 m to the west at its closest point. This site supports species-rich neutral grassland and a short stretch of the River Gwenfro. As it is located both on the opposite side of the A483 road and upstream of the site no direct or indirect impacts are predicted. The next closest County Wildlife Site is located approximately 820 m from the proposed development site; no impacts are predicted.

### Habitat

#### General

- 5.2.9 The layout of the proposed development site has been configured from an early stage in the design process in order to minimise impacts on the ecological resource. As such permanent habitat loss will predominantly be limited to areas of tall-herb/ species-poor grassland (ex-arable land), disturbed ephemeral vegetation and some semi-improved neutral grassland. Key impacts (in terms of habitat loss) are likely to be associated with the spine road crossing the River Gwenfro and alignment along the mineral railway, the bridge crossing the River Gwenfro on the residential land, loss of the central hedge (*Target Notes 6/12/14*) and swamp (*Target Note 13*), partial loss of a hedge to the south of the A525 road (*Target Note 28*) associated with Junction 2 and loss of the pond at *Target Note 22*.

5.2.10 Broadly the development will result in the loss of the following habitats:

- Secondary semi-natural woodland (approximately xxx hectares);
- Scrub (approximately xxx hectares);
- Hedgerows (approximately xxx metres);
- Semi-improved neutral grassland (approximately xxx hectares);
- A pond and a small area of swamp;
- Tall-herb/ species-poor rough grassland mosaic (approximately xxx hectares); and
- Disturbed ephemeral vegetation (approximately xxx hectares).

5.2.11 As detailed above 136, 090 m<sup>2</sup> of the above listed habitat will be permanently lost to built development. Landscaping (including swales and structured planting) and ecological compensation areas will extend to 126, 399 m<sup>2</sup>. This total includes both retained habitat and created habitat; further detail is provided in Marches Ecology (2009d and e).

5.2.12 All of the retained/ created habitat will be vulnerable to dust deposition and or uncontrolled substance release, the former during the various construction periods; the latter during both construction and operation. The spine road will also present a barrier to the movement of some plant species although the site is already almost entirely enveloped by major roads and or built development. [Further info to be provided by WCBC]

#### *Woodland and scrub*

5.2.13 Small areas of semi-natural woodland will be permanently lost due to the construction of the spine road (*Target Notes 18 and 20*). Small patches of scrub will also be lost. The woodland at *Target Note 20* is considered below as part of the River Gwenfro corridor. The secondary woodland at *Target Note 18* is species-poor and has developed over the exposed substrate along a disused railway. As this woodland and scrub is easily recreatable the magnitude of impact is considered to be intermediate negative on a resource of local value. The potential impact is therefore likely to be slight adverse and not significant.

#### *Hedgerows*

5.2.14 The hedgerows at *Target Notes 6/12/14, 25 [WCBC to confirm], 26 and 28* will be impacted by the proposed development. All of the central hedgerow (*Target Note 6/12/14*) will be lost [WCBC to confirm]. Approximately xxx m of the hedgerow at *Target Note 28* will be lost due to the construction of Junction 2. Approximately xxx m of the hedgerow at *Target Note 26* will be lost due to the provision of a temporary access road off the A525 road and the roundabout at Junction 2. Approximately xxx m of the hedgerow at *Target Note 25* will be lost due to the provision of an access road to the adjacent residential land. While the losses at *Target Notes 25, 26 and 28* may be considered temporary (as replacement lengths of hedge will be planted) the loss of the central hedge is permanent. Fragmentation of these features is likely to affect the movement of animals/ plants along these corridors. This fragmentation will also be permanent due to the construction of new roads. However, other than the hedgerow at *Target Note 28* these hedges are already isolated from the resource in the wider countryside. The magnitude of impact on the hedgerows at *Target Notes 25, 26 and 28* is considered to be intermediate negative. This potential impact is therefore likely to be slight adverse and not significant. The magnitude of impact on the hedgerow at *Target Notes 6/12/14* may be considered to be major negative. This potential impact is therefore likely to be moderate adverse and significant.

### *Grassland*

- 5.2.15 The largest area of semi-improved neutral grassland that will be lost is associated with the field unit at *Target Note 11*. A further small loss is associated with the provision of Junction 2; the road verge at *Target Note 29*. While a very small corner of the field at *Target Note 11* will be retained within an ecological compensation area most of this field will be permanently lost and with it the majority of the existing site resource of this habitat type. The retained area of grassland will remain linked to the disused railway although the composition of the community may be affected by any change in current (Rabbit) grazing levels. The disused railway and the retained grassland will also be increasingly isolated from other similar habitat. In accordance with WBP (2008) this field may be considered to be of at least district value. The magnitude of impact is likely to be major negative. The potential impact is therefore likely to be moderate adverse and significant.
- 5.2.16 The construction of the spine road across part of the disused railway (and the 3 m wide footway/ cycleway) [WCBC to confirm surface/ alignment of cycleway] will result in the loss of a small amount of unimproved neutral grassland (*Target Note 10*). The habitat resource provided by this disused railway is considered to be of Wrexham value. However as it has largely developed over the exposed substrate along a disused railway it is inherently recreatable in the medium term. Due to the limited extent of the permanent loss and the recreatability of this resource the magnitude of impact may be intermediate negative. The potential impact is therefore likely to be moderate adverse and significant.

### *River Gwenfro*

- 5.2.17 The spine road will cross the River Gwenfro at an existing culvert. It will impact scrub, woodland/ trees and grassland associated with the immediate river corridor. A bridge is also to be provided across the River Gwenfro on the residential land that may result in the loss of some scrub and individual trees. Some of these impacts will be permanent although restricted in extent. It is likely that any cleared areas of scrub/ woodland will re-vegetate in the medium-term but that there will be a small permanent loss. The spine road and residential land bridge will result in further fragmentation of the river corridor and a break in vegetated bank-side habitat. The river will also be sensitive to run-off, dust and other forms of pollution, such as accidental spillage, during construction works and run-off during site operation. As such the magnitude of impact may be major negative on a resource of Wrexham value. The potential impact is therefore likely to be moderate adverse and significant. [WCBC to provide further detail re river crossings].

### *Ponds*

- 5.2.18 Junction 3 will result in the loss of the attenuation pond at *Target Note 22*. However a new attenuation pond will be required to receive run-off from the road [WCBC to confirm]. This pond is likely to provide a similar or improved habitat resource in the short to medium-term. The magnitude of this impact (should the new pond be provided as soon as the existing is lost) would be intermediate negative on a resource of local value. The potential impact is therefore likely to be slight adverse and not significant. The swamp/ pond at *Target Note 13* will be permanently lost. The magnitude of this impact would be major negative on a resource of local value. The potential impact is therefore likely to be slight adverse and not significant.

### *Other Habitat*

- 5.2.19 Nearly all of the tall-herb/ rough grassland habitat and all of the disturbed ephemeral vegetation will be permanently lost to built development or habitat enhancement (e.g. new areas of woodland, scrub and or species-rich grassland). The magnitude of this impact (on these habitat types) is likely to be major negative on a resource of site or local value. The potential impact is therefore likely to be slight adverse and not significant. The impact following provision of the newly created habitat is assessed below under *Residual Impacts* (Section 5.4).

### *Flora*

- 5.2.20 Nine Locally Scarce plants have been identified within the site as follows:

- *Bryonia dioica* (White Bryony). Part of the hedge within which this plant was recorded will be lost although the stretch where it is located would be retained. This plant is known to be a frequent constituent of hedges within farm-land to the south.
- *Potamogeton obtusifolius* (Blunt-leaved Pondweed). Pond within which this plant is located will be lost. It was also recorded from a pond just outside the site boundary during the amphibian surveys and is generally considered to be under-recorded.
- *Linaria repens* (Pale Toadflax). Only recorded from the disused railway (*Target Note 10*). Most of the population will be retained.
- *Trifolium arvense* (Hare's-foot Clover). Only recorded from the disused railway (*Target Note 10*). Most of the population will be retained.
- *Ophrys apifera* (Bee Orchid). A small number of spikes recorded from the western end of the field at *Target Note 11*. Most of the population will be retained.
- *Lactuca serriola* (Prickly Lettuce). Much of the disturbed habitat from which this species was recorded will be lost. However similar conditions are likely to be provided throughout the various construction phases.
- *Euphorbia lathyris* (Caper Spurge). The spoil heap on the residential land from which this species was recorded will be lost. It is a 'garden weed'.
- *Mentha spicata* (Spear Mint). Recorded from the swamp at *Target Note 13* and as such will be lost. This species is not native.
- *Papaver somniferum* (Opium Poppy). The spoil heap on the residential land from which this species was recorded will be lost. This species is not native.

- 5.2.21 Of the Locally Scarce species considered to be native only the Blunt-leaved Pondweed would be entirely lost from the site due to the proposal. However as a new attenuation pond is to be provided near to the existing waterbody, and as it has been recorded from a nearby waterbody (off-site) this species may colonise the new habitat. The magnitude of impact on this species may be considered to be intermediate negative (minor negative at most for the other native species). The potential impact is therefore likely to be slight adverse and not significant.

### **Fauna**

#### *General*

- 5.2.22 During construction there will be some form of disturbance of species from both the proposed development site and a wider zone of influence. Disturbance will result through

increased traffic; the activities of the labour force and a variety of construction activities e.g. site clearance and erection of new buildings. Species that currently use the proposed development site are likely to be displaced. Construction at the site will be phased over approximately fifteen to twenty years. Related disturbance will be temporary, for the duration of each construction phase and fairly local in extent (other than the spine road).

- 5.2.23 Detailed surveys have shown the likely absence of Great Crested Newts, reptiles and Water Voles from the site/ adjacent applicable area. These species are therefore not considered further in this impact assessment. However it should be noted that, particularly regarding reptiles, that the project is to be delivered over a considerable time period and therefore the potential presence of these species may need to be considered for future assessment work. As there is a large population of Viviparous Lizards located near to the site (that previously utilised part of the site) a precautionary approach is advocated (*Section 5.3*). Impacts on Badgers are considered in *Marches Ecology* (2009a).

#### *Bats*

- 5.2.24 Four species of bat have been recorded from the survey area; although no roosts were identified roosting opportunities for all of these species are present. The proposed development scheme will result in the loss of a small number of trees identified as being of limited/ moderate potential value to roosting bats as a result of the construction of the primary infrastructure (*Target Notes 5, 12c, 12d, 15 and 30*). Alder trees of limited to moderate potential for roosting bats may also be lost where a bridge is to be provided on the residential land (e.g. *Target Note 46*). A number of other trees with limited potential value for roosting bats will also be lost (*Target Notes 12a, 12b and 17*) [WCBC to confirm trees to be felled]. The River Gwenfro culvert (*Target Note 15*), and the bridges on Croesnewydd Road over the mineral railway (*Target Note 21*) and the River Gwenfro (*Target Note 24*) will be replaced. These structures are of limited potential value for roosting bats at most.
- 5.2.25 Work on the spine road and Junctions 2 and 3 will also be within close proximity to a number of trees of potential value for roosting bats (*Target Notes 3/ 3b, 14a, 31 and 32*) and the residential land (*Target Notes 39, 41, 43 and 46*). Although these trees may not be directly impacted by the scheme and bats that might be using them as a roost may be subject to varying levels of disturbance. As no roosts have currently been identified there are currently no impacts on roosts. However it is appropriate to assess this impact in terms of the loss of potential roosting opportunities at a site that may be of district value for bats. As all of the trees that provide opportunities are at least semi-mature the magnitude of impact must be considered as intermediate negative (as it would take more than 10 years for similar conditions to develop but opportunities are available elsewhere within retained habitat). The potential impact (due to loss of potential roosting) is therefore likely to be slight adverse and not significant.
- 5.2.26 Two of the commuting routes currently utilised by Common Pipistrelles will be affected by the proposed development; the hedgerow at *Target Notes 6/12/14* and that at *Target Note 26*. Parts of the hedgerow at *Target Note 26* will be lost as a result of the Junction 2 roundabout and the creation of a temporary access road. Most of the Pipistrelles that utilise this hedge fly across the land to the north to access the central woodland area and as such would not be affected by these short losses of hedge. Many small bat species rely on linear features, such as hedgerows, for commuting from roosts to favoured foraging areas. However the Pipistrelle (*Pipistrellus* spp.) (which is the most frequently occurring species in urban or semi

urban locations) regularly flies over open spaces including apparently hostile habitat. Given that Pipistrelle bats will and frequently do negotiate their way in and around buildings it is unlikely that this particular commuting route will be severed, even when a building is constructed to the south of the central woodland.

- 5.2.27 The central hedgerow at *Target Notes 6/12/14* is of particular importance to the Common Pipistrelle and will almost entirely be lost. This would result in the fragmentation of a key route between the likely roost location on Croesnewydd Road and some of the important foraging areas within the site. Without provision of an alternative route prior to removal of this hedge the magnitude of impact may be considered to be major negative on a resource of district value. The potential impact (due to loss of commuting routes for Common Pipistrelle) is therefore likely to be moderate adverse and significant.
- 5.2.28 Whiskered/ Brandt's bats commute/ forage along the River Gwenfro corridor on either side of Croesnewydd Road. The spine road crossing and works at Junction 3, and the bridge on the residential land have the potential to sever this route. Common Pipistrelle bats also forage along the disused railway but it is thought that this route will remain available to them throughout construction and operation. Should the spine road/ residential land bridge sever the commuting/ foraging route of the Whiskered/ Brandt's bats the magnitude of impact may be considered to be major negative on a resource of district value. The potential impact is therefore likely to be moderate adverse and significant.
- 5.2.29 The Noctule is a fast-flying bat that ranges over comparatively great distances and often flies at considerable height. It is therefore difficult to assess the potential impact of the proposed development on this species, however it is likely to be limited to potential foraging habitat. As previously stated (*Section 4*) the site is not currently thought to be of particular importance for this species. Similarly a very low level of activity was recorded for Soprano Pipistrelle.
- 5.2.30 Whiskered/ Brandt's bats were only recorded foraging along the River Gwenfro corridor most of which will be retained. Some loss of foraging habitat will result due to the spine road and residential land bridge crossing the river and the alignment of the spine road along part of the disused railway. However as indicated above habitat connectivity is likely to be of greater importance for this species. The Common Pipistrelle was found to forage around the central woodland (*Target Note 3*), along the disused railway (*Target Note 10*), the scrub at *Target Note 2*, the pond (*Target Note 22*), the access track to Lower Berse Farm, the three identified commuting/ foraging routes, the River Gwenfro and tributary to the east of Croesnewydd Road and to a lesser extent the field at *Target Note 11* and the rough grassland/ tall-herbs at *Target Note 40*. The value of the foraging habitat around the central woodland may be indirectly impacted by the proximity of the spine road to the west and development areas to the south and north. The disused railway and the River Gwenfro corridor may also be indirectly impacted. The foraging habitat at *Target Notes 2, 11 and 40* will be entirely lost. Overall the magnitude of impact due to the loss/ indirect impact (e.g. disturbance/ lighting) on the foraging habitat of these two species is considered to be major negative on a resource of district value. The potential impact is therefore likely to be moderate adverse and significant.
- 5.2.31 [WCBC to provide further info re lighting/ noise] External and street lighting can prevent bats from using their commuting routes and foraging areas. Fast-flying species such as Pipistrelles and Noctules are less affected and often attracted to bright lights to feed on

insects but this in turn leaves them more vulnerable to predation (Jones, 2000). Most species of bat prefer their commuting routes to be dark. As such street lighting along the spine road and internal roads, and external lighting on buildings have the potential to disrupt commuting/ foraging routes particularly in close proximity to the central woodland (*Target Note 3*), the hedgerow (*Target Note 26*), the disused railway and River Gwenfro corridor, the River Gwenfro tributary (*Target Note 42*), the hedgerow (*Target Note 28*) and access track by Lower Berse Farm, and any features to be provided in mitigation/ compensation. It should be noted that some of these features are already subject to varying levels of diffuse light pollution. The magnitude of impact due to poorly designed lighting in these areas may be considered to be major negative on a resource of district value. The potential impact is therefore likely to be moderate adverse and significant.

#### Otter

##### 5.2.32 Potential impacts on Otters include:

- Increased risk of road casualties during construction and operation;
- Increased disturbance during construction and operation;
- Loss of potential resting places and to a lesser degree potential holt sites;
- Fragmentation of the river corridor/ severance of home range and loss of immediate vegetative cover. Obstruction of a dispersal route;
- Loss of distant vegetative cover (as much of the site provides suitable cover for Otters);
- Loss of food resource; and
- Indirect effects on habitat/ food resource, e.g. pollution of River Gwenfro, disturbance of river bed.

5.2.33 The spine road (and associated increase in traffic load) and internal road on the residential land will introduce a new hazard to the Otter population that uses the River Gwenfro. Croesnewydd Road and the A483 road present existing hazards; Otters are known to pass under both but despite this a casualty has previously been recorded from Croesnewydd Road. The spine road will cross the river where there is an existing dog-leg in the channel. This may present a particular risk to Otters as they are frequently known to seek the shortest route across bends in watercourses. Similarly any roads/ bridge on the residential land will increase the risk to Otters. Otters are inquisitive animals and may also be attracted onto the construction site to investigate new machinery or spoil heaps<sup>6</sup>.

5.2.34 It is not currently known how significant road casualties are in terms of overall population dynamics (e.g. Grogan *et al.* 2001). It has also been shown that where a male Otter dies a male from a neighbouring area will fairly quickly occupy the territory. It is however likely that regular loss of animals would impede achievement of Favourable Conservation Status (e.g. the carrying capacity of the habitat). The magnitude of this impact may be intermediate negative on a Wrexham value resource. The potential impact is therefore likely to be moderate adverse and significant.

5.2.35 The physical disturbance created by the construction of a new road can seriously affect the activities of an Otter if no mitigation measures are implemented. Noise, lights for night working, the use of machinery, the obstruction of resting places/ holts and paths and the

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<sup>6</sup> DMRB Volume 10, Section 4 (Part 4) HA81/99: Nature Conservation Advice in Relation to Otters.

presence of a large number of human beings can all have detrimental effects. Disturbance during the 'operation' phase of the residential development in particular may impact on Otters although they appear to already tolerate a certain level of disturbance when travelling through Wrexham town centre. The residential development will introduce the constant presence of humans and domestic animals, noise and lighting to an area where they are not currently present. The magnitude of this impact may be intermediate negative on a Wrexham value resource. The potential impact is therefore likely to be moderate adverse and significant.

- 5.2.36 The construction of the spine road and possibly the residential land bridge [WCBC to confirm] will result in the loss of a small number of trees that provide potential resting places and arguably potential holt sites (*Target Notes 15, 17 and 20*). Similarly the spine road river crossing and alignment along the disused railway will result in the loss of small areas of woodland, scrub and tall-herb vegetation that all provide potential resting places. Large swathes of the site are currently characterised by scattered scrub and tall-herb vegetation. Otters could potentially be found throughout this area using such dense vegetation as a resting place. Such habitat is increasingly rare to the east of the A483 road where a range of developments, channel engineering practises and land management have largely resulted in the absence of similar habitat between the site and just upstream of the confluence with the River Clywedog. The magnitude of this impact may be intermediate negative on a Wrexham value resource. The potential impact is therefore likely to be moderate adverse and significant.
- 5.2.37 The spine road and residential land bridge will sever the River Gwenfro and result in the loss of some vegetative cover near the watercourse. Severance of at least one animal's home range may increase the risk due to crossing roads in 'uncontrolled' locations; in extremis it may increase competition with other individuals, prevent migration, exclude an individual from important parts of its home range and fragment areas of suitable habitat. Should the river crossing at the spine road, Croesnewydd Road or the residential land make it unsuitable for Otters to travel along the river it is likely that they would find an alternative route, likely to be across the roads. This increases the likelihood of road casualties. The magnitude of this impact may be intermediate negative on a Wrexham value resource. The potential impact is therefore likely to be moderate adverse and significant.
- 5.2.38 A large area of tall-herb/ rough grassland mosaic and scattered scrub is to be lost across much of the site. This vegetation provides potentially suitable cover for Otters as a resting place. Habitat availability will be reduced although a wide corridor (minimum 15 m wide from the bank-top) of suitable habitat will be retained along the river corridor. This potential impact is included in the assessment at *paragraph 5.2.36*.
- 5.2.39 The pond at *Target Note 22* is to be lost due to the proposed works at Junction 3. This pond provides a food resource for the local Otter population. Although this pond may provide an early season resource it is considered unlikely to be of great importance (the amphibian population it supports is small and the water quality may be poor). A new attenuation pond will also be provided close to this current location. The magnitude of this impact is likely to be minor negative on a Wrexham value resource. The potential impact is therefore likely to be slight adverse and not significant.
- 5.2.40 During the construction phase – direct impacts on river [WCBC to provide further detail re river crossing and drainage].

## Birds

### 5.2.41 Potential impacts on birds include:

- Loss of nesting habitat/ reduction in territory availability;
- Loss of feeding resource;
- Loss of shelter/ roost sites;
- Fragmentation of habitat;
- Increased barrier and collision risk; and
- Increased disturbance during construction and operation.

5.2.42 Most of the habitat to be lost across the site is tall-herb/ rough grassland mosaic with scattered scrub (*Target Notes 4, 38, 40 and 45*). Although few species of bird actually nested within this vegetation during 2009 (the main exception being Whitethroat) many include some within part of their territory. Other habitat to be permanently lost that has/ could support nesting birds includes scrub (*Target Notes 2, 11 and 22*), hedgerows (*Target Notes 6/12/14, 26 and 28*), individual trees (e.g. *Target Note 5*), woodland (*Target Note 18*) and the river corridor (*Target Notes 15, 16, 17 and 20*). Known nest locations (from 2009) that would be directly impacted include: Willow Warbler (1 pair), Chiffchaff (1 pair), Whitethroat (6 pairs), Blackcap (1 pair), Blue Tit (3 pairs), Great Tit (1 pair), Long-tailed Tit (2 pairs), Blackbird (3 pairs), Wren (3 pairs), Dunnock (2 pairs), Chaffinch (1 pair), Pheasant (1 pair) and Red-legged Partridge (1 pair). Partial loss of known territories from 2009 would include: Chiffchaff (3 pairs), Whitethroat (4 pairs), Blackcap (5 pairs), Blue Tit (2 pairs), Great Tit (3 pairs), Long-tailed Tit (3 pairs), Blackbird (7 pairs), Song Thrush (3 pairs), Wren (6 pairs), Robin (3 pairs), Dunnock (2 pairs), Goldfinch (2 pairs), Greenfinch (1 pair), Chaffinch (3 pairs), Bullfinch (2 pairs) and Great Spotted Woodpecker (1 pair). The territories of both Dipper and Grey Wagtail are also likely to be temporarily impacted.

5.2.43 The loss of nest locations/ partial loss of territories should be considered with regard to the phasing of the development; only a proportion of this loss will occur during each phase over 15-20 years. Many of those nesting pairs suffering partial loss of a territory may find suitable alternative areas. Within the overall scheme design a substantial amount of the existing woodland and river corridor habitat will also be retained. In addition the proposed ecological compensation areas and the soft landscaping will incorporate larger areas of scrub and woodland than the current resource. However there will be an absolute loss in tall-herb/ rough grassland habitat which is likely to result in a reduction in the number of pairs of Whitethroat utilising the site (although this species also nests in scrub). It is also recognised that it is not possible to compensate this habitat loss in the short-term as it will take time for the planting scheme to establish. However over the time-span of this project other nesting opportunities will be provided, e.g. in the gardens of the residential properties, the houses themselves, the buildings on the employment land and ecology/ landscape planting. As such many of the displaced birds are likely to find alternative opportunities in the medium to long-term. The magnitude of this impact is therefore considered to be intermediate negative on a resource of district value. The potential impact is therefore likely to be slight adverse and not significant.

5.2.44 As detailed above most of the habitat to be lost is the tall-herb/ rough grassland mosaic that characterises much of the site. Comparatively little feeding behaviour was noted in this habitat type although it may be of greater importance for a few species, e.g. Barn Owl and Willow Warbler where scrub is present. Most of the species recorded from the site forage

within the areas of woodland, along hedgerows, scrub and the river corridor. The majority of this habitat resource will be retained within the proposed development. Feeding opportunities are likely to be greatly enhanced for most species on the site through the provision of large areas of planted trees and scrub. Many of these planted features have been designed to create connectivity between habitat patches. Barn Owls will hunt along linear features where suitable habitat is provided such as the river corridor that will be retained within an ecological compensation area. The magnitude of this impact is therefore considered to be intermediate negative on a resource of district value. The potential impact is therefore likely to be slight adverse and not significant.

- 5.2.45 Most of the existing woodland and other features that may be used for shelter/ roosting will be retained. In the medium-term further opportunities will be presented by the planting scheme and possibly the buildings themselves. As the loss of this resource is very limited it is considered unlikely to result in a significant impact.
- 5.2.46 Habitat features that may be fragmented by the proposed development include the hedgerows at *Target Notes 6/12/14, 26 and 28*, and the river corridor and associated habitat. All of these features will be bisected by the spine road although much of the central hedgerow will be lost to a development plot. Some species of bird forage/ hunt (e.g. Sparrowhawk) by travelling along such features and as such fragmentation of this resource will affect some species. The new road crossing the site will also increase the risk of collisions and therefore road casualties. However due to the size of the road and the likely speed limit (30-40 mph) it is not likely to present a significant barrier. The risk of road casualties cannot be readily mitigated although the landscaping scheme will provide alternative linear features in the medium-term. The magnitude of this impact is therefore considered to be intermediate negative on a resource of district value. The potential impact is therefore likely to be slight adverse and not significant.
- 5.2.47 Noise, activity and visual disturbance may reduce the number of species and the absolute number of birds nesting close to works during the construction period and also the operation period particularly with regards the spine road. Most research on disturbance impacts of roads on breeding birds has concentrated on those with a high traffic load with a continuous flow (e.g. motorways) and therefore is not directly comparable to the proposed development. However it has been shown that breeding populations of certain species can be reduced over relatively large distances even near quiet rural roads (Reijnen *et al.*, 1996). Disturbance distances vary greatly between species and due to traffic loading (Reijnen *et al.*, 1996). Visibility of cars, direct mortality and pollution are considered unimportant (Reijnen *et al.*, 1995).
- 5.2.48 It is likely that the proposed development, particularly the spine road, will result in a reduction in numbers of nesting birds close to such features due to disturbance; the proposed development will result in a greater use (by humans) of the site both spatially and temporally. Similarly wintering birds may be affected although the site is not considered important for this ecological resource. As indicated above with regards habitat loss it is not possible to mitigate this impact in the short-term however alternative habitat will be provided in the medium-term by both the ecological compensation areas and the soft landscaping. Habitat to be created in these areas is likely to be of comparatively greater quality than that provided by the areas to be lost at present. The magnitude of this impact is therefore considered to

be intermediate negative on a resource of district value. The potential impact is therefore likely to be slight adverse and not significant.

#### *Other Species*

- 5.2.49 Two other species of conservation value are identified in *Table 6*; Slender Groundhopper and Common Frog. The Slender Groundhopper was recorded from the area of swamp at *Target Note 13*; this swamp will be entirely lost due to the proposed development. However this species is known to have expanded its range in recent years and has been recorded by Marches Ecology from a range of sites within Wrexham and neighbouring counties (especially Cheshire). It is therefore considered that the value placed on this species by WBP (2008) may be revised. The loss of the swamp will to a certain extent be offset by the provision of swales (**WCBC confirm area of swales**) along the spine road. An attenuation pond is to be located to the east of Croesnewydd Road and further wetland habitat created along the river corridor. Both of these species are therefore likely to find a larger area of better quality habitat in the medium-term. The magnitude of this impact is considered to be intermediate negative on resources of site-district value. The potential impact is therefore likely to be slight adverse and not significant.

#### **Potential Cumulative Impacts**

- 5.2.50 The land parcel to the north of the disused railway is likely to be developed and has been proposed for residential housing (PCA Ltd 2008). This land is currently owned by Harrow Estates plc; there is no timescale for delivery of this development available. The land adjacent to the River Gwenfro and its tributary to the south of the residential land is currently owned by McInernery Homes and has been cleared for development. Construction in this area has been started towards the southwest corner. It is not known when this development will be completed and what mitigation/ compensation measures are to be provided. The Redrow Homes development at Pentre Bach is nearing completion. Wrexham Maelor Hospital has recently completed construction of a car park on the disused railway to the north of the residential land.
- 5.2.51 The cumulative impacts of these various developments is difficult to assess without knowledge of the timescale over which they will be provided and the mitigation/ compensation measures to be implemented. However they will increase overall habitat loss/ availability for a number of species in the area and possibly further exacerbate habitat fragmentation. Disturbance/ displacement of wildlife will also be increased both during the construction and operation phases. For example the residential housing development to the south of the residential land will greatly reduce terrestrial habitat available to Otters and will increase the importance of retaining sufficient habitat within the WCBC land. As residential housing will border both sides of the River Gwenfro along this short stretch it is likely that disturbance will increase through for example direct access by humans and diffuse lighting pollution.
- 5.2.52 The layout of the proposed WCBC Western Gateway scheme has been designed to retain/ create as much habitat connectivity as possible and retain existing wildlife corridors such as the River Gwenfro and adjacent banks. These corridors and habitat patches will be of increasing importance where other developments may impinge on the habitat resource. Overall the habitat to be provided within the ecological compensation areas and the soft landscaping will be of comparatively greater value than that which currently exists. As such

these areas may act as a valuable refuge for wildlife displaced from other sites within the area.

- 5.2.53 PCA Ltd (2008) recommended the retention of a buffer strip adjacent to the River Gwenfro within the site to the north of the WCBC site. It is not known how wide this buffer strip is but where the site directly abuts the river it should be a minimum of 15 m wide from the bank-top. PCA Ltd (2008) further recommends that the buffer strip should be planted with native species coupled with removal of non-native species. Should these recommendations be implemented it would greatly enhance the value of the River Gwenfro corridor and enlarge the area of retained/ created habitat in combination with that within the WCBC land. As the remaining area of the Harrow Estates plc site is of fairly low ecological value it is likely that provision of the buffer strip would greatly enhance the habitat resource. However in the (assumed) absence of mitigation/ compensation measures at the McInernery Homes site the impact of residential housing in close proximity to the river in this location could result in a magnitude of impact of intermediate or even major negative of various resources up to Wrexham value. The potential impact is therefore likely to be moderate adverse and significant.

### **5.3 Mitigation and Reasonable Avoidance Measures**

#### **Introduction**

- 5.3.1 This section briefly outlines measures required to mitigate for all adverse impacts identified in the previous section and where there is potential to impact legally protected species. Further detail regarding mitigation and compensation measures is provided in the Method Statement (Marches Ecology 2009d) and Management Plan (Marches Ecology 2009e). These mitigation and compensation measures address potential impacts due to the construction of the spine road and associated infrastructure, the development plots, junction improvements and A483/A525 improvements. Further measures may be required as these development plots are taken up but this is beyond the scope of this assessment.
- 5.3.2 The Method Statement and Management Plan also detail a programme of monitoring of the created habitat and other (species-specific) mitigation/ compensation measures. Monitoring will review the success of these measures and identify where such provisions may need to be altered. The Management Plan prescribes management of these areas that will be undertaken to benefit the ecological resource of the site, in particular Badger, bats, birds, Otters and certain habitat types. Although there is habitat loss in absolute area there will be a net gain in (enhanced) habitat quality under positive management.
- 5.3.3 The Landscape Strategy (*Appendix 1* to the Masterplan and Development Brief) establishes the following important principles (among others) both for the ecological compensation areas and the soft landscaping:
- Areas of importance or significance for wildlife should be safeguarded and enhanced.
  - In environmental interventions biodiversity should be enhanced and not degraded.
  - New habitat niches should be introduced where feasible to enhance the ecological resources of the development.
  - The environment of the development should be conceived as a dynamic interacting whole and not as a mosaic of alien and isolated habitats.

- Enhancement is to consist of the introduction of new and or restored wildlife corridors linked to the existing network.
- Areas of lost or degraded habitat should be compensated for by the creation of additional or new niches.
- The plant palette should utilise predominantly native and indigenous species.
- To mitigate the incidence of downstream flooding swales are to form part of the flood detention mechanism.
- The lighting strategy for the development should seek to minimise light pollution and utilise as far as possible renewable energy.

### General

5.3.4 Generic measures to mitigate potential impacts on ecological resources principally address the location of the development plots and construction methods as follows:

- where possible, the physical works have been designed to avoid or minimise impacts on features of nature conservation importance;
- where there is potential for impact on protected species, mitigation measures will be designed to ensure compliance with the law and licensing procedures;
- where possible, measures will be taken to minimise adverse impacts on other species (and if necessary, agreed with the appropriate regulatory authority);
- where possible, potential impacts will be avoided through seasonal timing of work, e.g. avoiding vegetation clearance during the bird nesting season;
- through implementation of best practice in relation to construction sites, disturbance to wildlife will be minimised as much as possible. In addition, routine construction site practices will be implemented to control dust, spillages, releases to watercourses, vibration and noise;
- compliance and site awareness will be ensured through the provision of toolbox talks/ method statements to all site personnel as required;
- compliance with the mitigation measures will be ensured through monitoring and auditing; and
- pre-construction surveys will be undertaken to provide up-to-date data to inform mitigation measures.

5.3.5 The development areas, soft landscaping and ecological compensation areas will be laid out before any other work on the site; the latter two landuse types will be defined with suitable protective fencing. The development areas may also need fencing (e.g. with regards Otters). Prior to the commencement of preparatory or development works vegetation clearance will be undertaken across the site as appropriate (outwith landscape/ ecology areas). A working protocol has been established for this work in Marches Ecology (2009d) and will also take into account requirements due to the presence of protected species, e.g. Otter 'development' licence. **[WCBC to confirm – can requisite levels within development plots be achieved if soft landscape areas are fenced and not touched?]**.

5.3.6 Once the development plots have been established they will be maintained in the long-term to ensure they remain unattractive to species of conservation interest. Further detail is provided in Marches Ecology (2009d & e) however this is likely to be achieved through regular cutting of the grass sward height to 5 to 10 cm possibly combined where appropriate with the judicious use of environmentally-benign herbicides **[WCBC to confirm – alternatives: lay to hardcore or cultivate to bare soil?]**. At the start of the construction phase all hedges,

trees and shrubs scheduled for clearance would be removed in accordance with guidelines established here and in Marches Ecology (2009d). All landscape and ecology planting will be completed at an early stage of the construction phase to allow created habitats to develop in parallel with the site. Marches Ecology (2009d) provides a detailed timetable for delivery of mitigation/ compensation measures where possible.

- 5.3.7 The above detailed measures will not remove the requirement for each individual development (whether that be on the employment or residential land) to consider potential impacts on the ecological resource within that plot. However it is assumed that the value of that ecological resource is likely to be low due to the ongoing management and therefore any mitigation/ compensation measures that might be required can be provided within the previously established landscape/ ecology areas or within the development plot itself.

#### **Habitat**

- 5.3.8 The impact assessment has identified four significant potential impacts on habitats associated with the proposal:

- Loss of the hedgerow at *Target Notes 6/12/14*.
- Loss of (the majority of) the semi-improved neutral grassland at *Target Note 11*.
- Loss of (some of) the semi-improved neutral grassland at *Target Note 10*.
- Fragmentation/ loss of adjacent habitat at the River Gwenfro crossing.

Further habitat loss, although not identified as significant includes the swamp (*Target Note 13*), attenuation pond (*Target Note 22*), small areas of scrub (e.g. *Target Note 2*) and woodland (*Target Note 18*).

- 5.3.9 Terence O'Rourke (October 2007a) established that 31% of the total site area will be provided for ecology (the 'ecological compensation areas') and a further 17% as soft landscaping. The swales/ flood alleviation areas which extend to 0.6 hectares are included within the soft landscaping. This 48% of the site will be utilised to offset the significant impacts on the existing habitat through the retention of features of high ecological value (e.g. the central woodland) and further provision of created habitats that are likely to be of greater comparative value. Created habitat will include areas of species-rich grassland as well as the swales that will be sown with a wet grassland seed mix, woodland and scrub planting and new hedgerows.
- 5.3.10 All ecological compensation areas and soft landscaping will be identified and fenced prior to the start of construction works to avoid accidental damage. Appropriate signage, toolbox talks and the Method Statement will be utilised to prevent incidental ingress into these areas. This will also help to minimise potential disturbance impacts. Fencing and signage will remain in place for the duration of construction works.
- 5.3.11 The loss of the hedgerow at *Target Notes 6/12/14* would be offset by the provision of a new hedgerow linking the central woodland to the river corridor and along the eastern boundary with Croesnewydd Road [WCBC to confirm]. Aside from the ecological compensation areas the landscaping around development plots and along the spine road present significant opportunities for species-rich grassland creation to offset the identified losses. For example buildings are to be set-back by 13 to 25 m from the spine road. These strips of land on both sides of the road are available for soft landscaping. The proposed surface water drainage swales (approximately 12 m wide and 1 m deep) were envisaged as open grassland/ wet

meadow habitat lined with shrubs and trees. Lines of trees will also be provided along all roads and paths. Much of the more valuable semi-improved neutral grassland located on the disused railway is to be retained. To ensure that this area is maximised the proposed footway/ cycleway will be diverted to the south to link with the spine road [WCBC to confirm].

- 5.3.12 The fragmentation/ loss of habitat by the River Gwenfro will be compensated through the provision of a wide swathe of land on both sides of the river wherever possible as ecological compensation land and or soft landscaping. These areas will largely be planted with scrub/ woodland to strengthen the existing resource. Two new ponds (one would be an attenuation pond) will be created close to the river.
- 5.3.13 The location of the swamp at *Target Note 13* is likely to retain water. Terence O'Rourke (October 2007a) proposed the creation of a linear lake here. It is considered more appropriate to create a naturalistic waterbody at this location; this would be far less formal and would be in accordance with the Masterplan and Development Brief. It would incorporate a sinuous margin and planting of locally native wetland species. [WCBC to confirm].
- 5.3.14 Where appropriate, impacts on trees (either individual or within woodland) close to works will be minimised by tree surgery (e.g. where the tree canopy is vulnerable to damage from construction machinery). Works on large trees will be undertaken by a qualified tree surgeon subject to supervision by a licensed bat-worker as required. Where appropriate, large trees will be protected by temporary fencing installed in accordance with WCBC (2006).

#### Flora

- 5.3.15 The impact assessment has not identified any significant impacts related to flora. Most of the populations of Locally Scarce species recorded from the site would be retained either partly or wholly and further are likely to find suitable conditions within some of the created habitat. The only Locally Scarce plant that may potentially be entirely lost from the site would be Blunt-leaved Pondweed. If possible, vegetative material could be transferred from the attenuation pond (*Target Note 22*) prior to its loss, to one of the created waterbodies. Should this not be possible it is deemed appropriate to allow for natural re-colonisation of this species from a nearby waterbody.
- 5.3.16 The stands of *Fallopia japonica* (Japanese Knotweed) and *Impatiens glandulifera* (Indian Balsam) on the site will be controlled with appropriate methodologies prior to starting any physical works. Care will be taken with regard to removing both species from the site for disposal to ensure they are not spread throughout the site and elsewhere.

#### Fauna

##### Bats

- 5.3.17 Specific legislation and policy relating to bats is detailed in Marches Ecology (2009b). The impact assessment has identified four significant potential impacts on bats associated with the proposal:
- Loss of commuting routes for Common Pipistrelle.
  - Loss of commuting route for Whiskered/ Brandt's bats.
  - Loss of/ indirect impacts on foraging habitat of Common Pipistrelle and Whiskered/ Brandt's bats.

- Affects of lighting on commuting/ foraging routes.

Other impacts on bats, though not identified as significant include the loss of potential roost sites and potential disturbance of roosts (none are currently known at the site).

- 5.3.18 The hedgerow at *Target Notes 6/12/14* is of particular value for foraging/ commuting Common Pipistrelle bats believed to be from a roost at residential properties on Croesnewydd Road. Nearly all of this hedgerow will be lost which will result in the fragmentation of habitat utilised by this species in close proximity to the roost site. Due to the alignment of the spine road it is not possible to provide an alternative feature close to the original line of this hedge. In order to compensate for the loss of this hedge a band of trees will be planted to link the northeast corner of the central woodland and the river corridor and a wide hedge/ shelterbelt will be provided along the site boundary with Croesnewydd Road [WCBC to confirm]. A link between Croesnewydd Road and the central woodland is of particular importance.
- 5.3.19 Two breaches will also be made in the hedgerow at *Target Note 26*. Lines of trees are to be provided on both sides of the spine road that will provide an alternative route to important foraging areas such as the central woodland. As Common Pipistrelle bats are known to cross open, hostile habitat these breaches are unlikely to be significant and they are likely to adopt suitable alternative linear features. As detailed above the overall ecological compensation and landscape planting scheme will provide new lines of trees/ woodland and hedgerows that will increase general connectivity across the site. The commuting/ foraging routes along the River Gwenfro and its tributary are to be retained as part of the ecological compensation area.
- 5.3.20 Provision of the spine road across the River Gwenfro, replacement of the Croesnewydd Road bridge and provision of a new bridge on the residential land across the river may risk severing/ disrupting the foraging/ commuting route of Whiskered/ Brandt's bats. This species has been recorded from both sides of Croesnewydd Road and is likely to fly beneath the road. As such the new bridges over the river at Croesnewydd Road will be at least as high and wide as the existing bridge [WCBC to provide more details re bridge crossings]. Similarly the spine road bridge and the residential land bridge across the river should also allow for this species of bat to be able to fly beneath it [WCBC to provide more details re bridge crossings]. No lighting will be provided beneath these bridges and the lighting provided on the spine road/ Croesnewydd Road will not leak onto adjacent areas of the river corridor.
- 5.3.21 The river corridor and a wide swathe of land on either side is to be provided as ecological compensation land/ soft landscaping. It will be enhanced through the planting of trees, scrub and two new waterbodies. As such this feature which is utilised by both Common Pipistrelle and Whiskered/ Brandt's bats will be enhanced and safeguarded.
- 5.3.22 As detailed previously most of the tall-herb/ rough grassland vegetation will be lost; some of this resource was utilised by Noctule and Common Pipistrelle for foraging. Further loss of foraging habitat utilised by Common Pipistrelle and Whiskered/ Brandt's bats is largely associated with the spine road crossing the River Gwenfro. Proposed habitat retention/ creation is not like-for-like in terms of the type of habitat; however as new areas of linked scrub, woodland, grassland and two waterbodies are to be provided the value of the foraging habitat it is likely to be enhanced for the Common Pipistrelle and Whiskered/ Brandt's bats.

The level of activity recorded for Noctules does not suggest that the site is of particular importance for this species. However Noctules may still be able to exploit suitable habitat within the ecological compensation area.

- 5.3.23 Work during the construction phase will be undertaken in close proximity to a number of trees with potential value for roosting bats, e.g. the spine road near the central woodland (*Target Note 3*). Appropriate measures will be implemented to reduce or avoid any potential disturbance. Works involving heavy machinery will be minimised wherever possible within the vicinity of trees and works close to trees will not be undertaken during the main bat breeding season (June to end of July).
- 5.3.24 Lighting at the proposed development site will follow guidance provided by the Bat Conservation Trust and Institution of Lighting Engineers (2008). Identified flight-lines and other potential foraging habitat (particularly around the woodland blocks and river corridor) should be retained in darkness wherever possible. External lighting should comprise sodium flat-glass lanterns which would prevent glare and minimise light pollution to the surrounding area. Where possible, all external security lighting will use low pressure sodium lamps and where close to potential foraging habitat will be fitted with baffles and point straight down or to where it is needed to avoid light spillage. The brightness of these lamps should be as low as legally possible and they should be placed as low as possible on the buildings/ poles. Of particular importance is the avoidance of light spillage onto the central woodland (*Target Note 3*), hedgerows at *Target Notes 26* and *28*, the River Gwenfro and associated habitat, the tributary of the River Gwenfro (*Target Note 42*), all bridges across the River Gwenfro and all new habitat features that might be utilised by bats. The street lighting along the spine road will be sympathetically designed in accordance with this guidance.
- 5.3.25 A small number of trees with potential value for roosting bats will be lost [WCBC to confirm which trees will be lost]. This could result in loss of (potential) roost sites. All trees identified as having bat roost potential will be subject to pre-construction survey or, where this is inconclusive or impossible, emergence surveys using acoustic bat-detectors (to prove that the tree is not being used as a roost at that time).
- 5.3.26 If a roost is identified and destruction or significant disturbance cannot be avoided, further emergence surveys may be necessary (to inform the Welsh Assembly Government licensing process, and especially to determine numbers and species) and mitigation measures may include the following:
- all works will be carried out under licence by WAG at appropriate times of year under watching brief by a licensed ecologist;
  - replacement or alternative roost sites (e.g. bat boxes) will be provided where a roost will be lost or disturbed;
  - planting of individual specimen trees within the site which may provide suitable roosting opportunities in the long-term; and
  - disturbance will be reduced by avoidance of night-time working, ensuring that construction personnel are aware of sensitive features, and reduction of noise, dust, fumes and vibration wherever possible.
- 5.3.27 Where trees are suitable for roosts but none are thought to be present, the following mitigation measures will apply:

- work will be carried out under supervision of a licensed bat-worker using best practice techniques to avoid harming bats or the trees will be climbed by a licensed bat-worker/ trained arboriculturalist (supervised by the licensed bat-worker) prior to felling to check for bats. If bats are conclusively proven to be absent then potential access points will be blocked up. Felling can then proceed immediately following confirmation by the licensed bat worker; and
- if bats are discovered at any time during works, work to the tree will stop until a WAG licence has been obtained.

5.3.28 All existing bridges should also be re-inspected by a licensed bat-worker prior to demolition to assess any degradation that may have increased their potential for roosting bats and investigate all existing crevices. A similar procedure to that outlined above for trees would be employed.

5.3.29 To compensate for the loss of potential roost sites a small number of bat-boxes will be erected and maintained. Suitable locations include the central woodland, along the river corridor and if possible the new bridges. Further detail is provided in Marches Ecology (2009d & e).

#### *Otters*

5.3.30 Specific legislation and policy relating to Otters is detailed in Marches Ecology (2009b). The impact assessment has identified four significant potential impacts on Otters associated with the proposal:

- Increased risk of road casualties.
- Increased disturbance.
- Loss of potential resting places/ holts.
- Severance of the river corridor.

Other impacts on Otters, though not identified as significant include the loss of distant vegetative cover, loss of food resource and potential indirect affects.

5.3.31 The construction of two new roads across the River Gwenfro as well as the replacement of the existing bridge represents both a risk (to Otters) and an opportunity to improve the existing situation. Although Otters usually travel beneath the bridge on Croesnewydd Road and there is sufficient height to allow them to do so at times of high water there is currently nothing to prevent them crossing the road should they wish to do so. At least one road casualty has been recorded from this location. Current guidance provided by the Design Manual for Roads and Bridges will be adopted at all of the river crossings. During construction of the bridges one bank will be retained intact for as long as is possible. An alternative route using fencing and underpasses if necessary should be provided if a safe passage along the river bank is not feasible. The river crossings will incorporate the following features [WCBC to provide more detail re the river crossings];

- They will be open-span bridges rather than culverts [WCBC to confirm].
- The span will be as wide as possible.
- There will be space between the river banks and bridge abutments (ideally 9 m wide; Grogan *et al.* 2001) to allow for continuation of the river corridor and to allow Otters to pass at time of high water.

- The abutments should be set back sufficiently to allow the natural river bank and bed to be retained.
- There will be ledges provided on the abutments.
- The base of the road embankments will be fenced (with specialist Otter-proof fencing) to guide the Otters beneath the road. The fence will extend for up to 100 m on either side of the watercourse where possible.
- The water flow rate should not increase beneath the bridge.

It is important that all Otter mitigation measures have been checked by a suitably qualified ecologist and are completed prior to the opening of any new road.

- 5.3.32 In addition to those roads within the control of WCBC, the appropriate authority should be approached with regards the installation of Otter-proof fencing on both sides of the A483 road (subject to funding). The River Gwenfro currently flows through a concrete box-culvert without ledges beneath this road. Although the culvert appears to be over-sized, it is possible that at times of high water flow Otters may prefer to cross the A483. It should however be noted that there is no evidence to suggest that this has occurred. The design and alignment of this fencing would need to take into account the present use of the site by Badgers (see Marches Ecology 2009a).
- 5.3.33 In addition Redrow Homes should be approached to discuss the removal of the grilles that have been installed on the small stream (where it passes beneath Croesnewydd Road) that is a tributary of the River Gwenfro (*Target Note 3d*). These grilles have been fitted to approximately 0.3 m diameter pipes and although they are likely to have prevented Otters from travelling further up the stream they are only likely to have done so when the water level is low due to the size of the pipes. It is important that (whether or not) the grilles are removed that Otter fencing should be installed to prevent Otters crossing either Croesnewydd Road or Ruthin Road at this location. A single old dry fragmented spraint was recorded by one of the pipes on a single occasion so it is possible that Otters may try to cross the road.
- 5.3.34 To minimise potential risks to Otters during the various construction phases all works areas will be enclosed with temporary fencing for the duration of works. Chestnut paling with stakes at a maximum 25 mm interval will be utilised. However the temporary fencing will need to allow for the passage of Badgers. Appropriate signage will inform site personnel of the importance of this fencing and that they should not access outside the fenced areas. Such information would also be covered in an appropriate toolbox talk.
- 5.3.35 Disturbance during the construction phase will be minimised through the fencing of the ecological compensation area and soft landscaping and prevention of all site personnel accessing this area. Night working will also not be allowed within a minimum of 100 m from the watercourses. Any site compounds, storage or re-fuelling facilities will be located as far as possible away from the watercourses.
- 5.3.36 Temporary or permanent lighting may affect Otters that utilise the river and alter behaviour patterns. Lighting will be designed as detailed under the section on 'bats' above. There should be no light spillage onto the river corridor or adjacent retained/ created habitat that Otters might utilise. Further disturbance during the operation phase may occur particularly within the residential land, for example due to increased human access to the watercourse. This potential impact will be minimised through the appropriate use and alignment of fencing

and dense scrub within the retained habitat adjacent to the river corridor. For example dense Blackthorn scrub will be planted to hinder access in some locations. Further consideration of such measures may be required at such time as when a detailed proposal for the residential land and adjacent development plots are available.

5.3.37 It should be noted that further to a recent amendment to the *Habitat Regulations* in January 2009 (HMSO 2009) there is currently no formal guidance provided by the Statutory Nature Conservation Organisations on what constitutes a potential disturbance (offence) to Otters. The amended *Habitat Regulations* refers to disturbance of animals as including *in particular any disturbance which is likely:*

- *to impair their ability -*
  - i. *to survive, breed or reproduce, or to rear or nurture their young; or*
  - ii. *in the case of animals of a hibernating or migratory species, to hibernate or migrate; or*
- *to affect significantly the local distribution or abundance of the species to which they belong.*

5.3.38 In the absence of any current guidance the previous guidance (Natural England and Countryside Council for Wales 2007) produced following amendment of the *Habitat Regulations* in 2007 should be used for reference. This guidance document suggests the use of 30 m protection zones around (potential) resting places and 100-200 m protection zones around holt sites in order to avoid disturbance. However contrary to this guidance Forestry Commission England & Natural England (2007) suggests that a licence may be required with respect to 'Any significant change either to livestock or human disturbance within 100m of a known holt or resting place'.

5.3.39 Due to the level of activity recorded on the River Gwenfro and the extent of potentially suitable habitat across the site it is suggested that a precautionary approach be adopted and the greater of these two distances utilised with respect to this proposal. Therefore all work within 100 m of the River Gwenfro, its tributary and adjacent scrub/ woodland is likely to require a Welsh Assembly Government 'development' licence for it to legally proceed. The licence application and Marches Ecology (2009d) will include the following:

- A pre-construction survey (ahead of each phase) to check for resting places/ holts. Upon completion of this survey (should no Otters be present) the working area would be fenced.
- A working protocol (Reasonable Avoidance Measures scheme) with regards clearance of large areas of tall-herb/ grassland across much of the site.
- A working protocol with regards clearance of dense vegetation, including Bramble scrub, along the banks of the River Gwenfro.
- A working protocol with regards the felling of trees (with potential underwater cavities) adjacent to the River Gwenfro. Likely to involve section felling and mechanical levering of the root-plate. Temporary fencing may be required to ensure Otters do not return.
- A working protocol should a resting place/ holt be identified during construction.
- Provision of compensatory habitat to include a new pond and scrub/ tree planting along the river corridor.
- Detail of (Otter) fencing and bridge designs, etc.
- Methods for the reduction of potential direct and indirect disturbance.

- 5.3.40 Construction of the spine road and residential road bridge in particular will result in the loss/ damage of vegetation or other features close to the river that provide potential resting places/ holts. As detailed above removal of these features will require an appropriate licence and implementation of the agreed mitigation measures. In addition compensatory habitat is to be provided that will in the medium-term offer potential resting places and possibly a breeding site. This will include planting of dense scrub patches (particularly Blackthorn, Hawthorn, Gorse and Dog-rose) and bank-side trees (particularly Ash). Management of these areas will follow guidance provided in Liles (2003). It is not currently proposed to provide an artificial holt due to its likely proximity to a number of roads, the proximity of other development sites outwith WCBC's control and due to likely public access to the area.
- 5.3.41 Further compensatory habitat will be provided to offset the loss of the food resource associated with the existing attenuation pond. A new attenuation pond will be created and a second waterbody will also be created near the river. Waterbody at swamp [WCBC to confirm]. It is likely that these waterbodies will be colonised by amphibians and possibly by fish.
- 5.3.42 All watercourses will be protected during the construction phase through implementation of best practice. This will help to safeguard Otters as well as other riverine species. Mitigation measures will be discussed and agreed with the Environment Agency Wales and other interested parties. Measures to protect watercourses from sediment release, sediment run-off, pollution by fuel and oil and other accidental spillage's during construction will be confirmed. In addition, the general advice contained in the Pollution Prevention Guidance (PPG) leaflets produced by SEPA, EA and the Environment and Heritage Service (Northern Ireland) will be adhered to, particularly the following:
- PPG1: General Guide to the Prevention of Pollution.
  - PPG5: Works in, Near or Liable to Affect Watercourses.
  - PPG6: Working at Demolition and Construction Sites.
  - PPG7: Refuelling Facilities.
- 5.3.43 [WCBC to provide advice re river crossing and details of drainage].

#### *Birds*

- 5.3.44 All species of bird are protected under *Section 1* of the *Wildlife and Countryside Act 1981* (as amended). The protection was extended by the *CRoW Act*. The legislation makes it an offence to intentionally or recklessly:
- kill, injure or take any wild bird;
  - take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
  - take or destroy an egg of any wild bird.
- 5.3.45 Certain species of bird are listed on *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) and receive protection under *Sections 1(4)* and *1(5)* of the Act. The legislation confers special penalties where the above mentioned offences are committed for any such bird and also make it an offence to intentionally or recklessly:
- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
  - disturb the dependant young of such a bird.

- 5.3.46 The impact assessment has not identified any significant potential impacts on birds associated with the proposal. Potential impacts on birds, though not identified as significant include the loss of nesting/ roosting/ feeding habitat, habitat fragmentation, increased risk of road mortalities and disturbance.
- 5.3.47 As described previously the proposed compensation area and soft landscaping will provide a range of nesting opportunities for birds. Most of the birds that currently use the site nest in woodland and or scrub and large areas of suitable habitat will be provided in the medium-term. In addition, to compensate a limited short-term loss of nest-sites, it is proposed to provide a selection of nest-boxes in several parts of the site. Further detail is provided in Marches Ecology (2009d & e).
- 5.3.48 A suitable working protocol for vegetation clearance and any other works with the potential to impact nesting birds will be provided (Marches Ecology 2009d). This working protocol will also be discussed in a toolbox talk. The destruction of any bird nests that are in use is illegal. Measures will be taken to minimise the likelihood of disturbance, injury or mortality of nesting birds, their eggs and chicks. Where possible, potential impacts during physical works will be avoided through seasonal timing of work (outwith March-August inclusive). Wherever possible, vegetation that could be used by nesting birds will be removed outside the bird nesting season.
- 5.3.49 Should this not be possible, surveys will be undertaken immediately prior to habitat removal to confirm that there are no occupied nests. Should any occupied nests be identified, an appropriate buffer zone (determined on the basis of the species concerned and the location of the nest in the context of the surrounding vegetation, but no less than 5m) will be retained until it can be ascertained that the chicks have left the nest. The buffer zone will be appropriately fenced and signed.

#### *Reptiles*

- 5.3.50 Specific legislation and policy relating to reptiles is detailed in Marches Ecology (2009b). Although no reptiles have been recorded on the proposed development site it is possible that individuals from adjacent suitable habitat may access the area. Marches Ecology (2009d) provides a simple watching brief/ appropriate working protocol to ensure suitable habitat will be checked for reptiles prior to the start of work in the area. Actions that should be taken if any reptiles are found during the construction period are also detailed.

#### *Other Species*

- 5.3.51 Other species of conservation value recorded from the site, including Common Frog and Slender Ground-hopper are likely to benefit in the medium-term from the proposed habitat creation and management scheme.
- 5.3.52 No evidence of Water Voles has been recorded during the present assessment work. Where suitable habitat exists (River Gwenfro, swamp at *Target Note 13*, pond at *Target Note 22*) these areas should be subject to pre-construction checks for this species. The checks on the River Gwenfro may be conducted at the same time as those for Otter.

## 5.4 Residual Impacts

| Ecological resource                                                        | Potential impact(s)               | Mitigation                                                                                                                                                                                                                               | Residual impact                                                                                             |
|----------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <b>Habitat</b>                                                             |                                   |                                                                                                                                                                                                                                          |                                                                                                             |
| Loss of hedgerow ( <i>Target Notes 6/12/14</i> )                           | Moderate adverse and significant. | New hedgerow linking central woodland and river corridor. Provision of further hedgerows/ lines of trees within the landscape/ ecology areas.                                                                                            | Slight adverse (and not significant) in the medium-term. Neutral in the long-term.                          |
| Partial loss of neutral grassland ( <i>Target Note 11</i> )                | Moderate adverse and significant. | Retention of a small area including location of Bee Orchids. Creation (and subsequent management) of <b>xxx m<sup>2</sup></b> within the landscape/ ecology areas.                                                                       | Slight adverse (and not significant) in the medium-term. Neutral and potentially positive in the long-term. |
| Partial loss of neutral grassland ( <i>Target Note 10</i> )                | Moderate adverse and significant. | Retention of much of existing resource including Locally Scarce plants. Creation (and subsequent management) of <b>xxx m<sup>2</sup></b> within the landscape/ ecology areas.<br><br>Realignment of cycleway to south [WCBC to confirm]. | Slight adverse (and not significant) in the medium-term. Neutral and potentially positive in the long-term. |
| Fragmentation of River Gwenfro corridor                                    | Moderate adverse and significant. | Retention and enhancement of river corridor within ecology area. Appropriate working protocols for work at river crossings. Sympathetic design of bridges.                                                                               | Slight adverse (and not significant) in the medium-term.                                                    |
| <b>Bats</b>                                                                |                                   |                                                                                                                                                                                                                                          |                                                                                                             |
| Common Pipistrelle commuting route (hedge at <i>Target Notes 6/12/14</i> ) | Moderate adverse and significant. | New hedgerow linking central woodland and river corridor. Provision of further hedgerows/ lines of trees within the landscape/ ecology areas. Appropriate external lighting across site.                                                 | Slight adverse (and not significant) in the medium-term. Neutral and potentially positive in the long-term. |
| Whiskered/ Brandt's bats commuting route (River Gwenfro)                   | Moderate adverse and significant. | Retention and enhancement of river corridor within ecology area. Appropriate working protocols for work at river crossings. Sympathetic design of bridges. No lighting to be provided under bridges and no light                         | Slight adverse (and not significant) in the medium-term. Neutral in the long-term.                          |

| Ecological resource                                            | Potential impact(s)               | Mitigation                                                                                                                                                                                                                                                                                                                                                                                             | Residual impact                                                                                                                              |
|----------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                |                                   | pollution from adjacent areas.                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                              |
| Loss/ indirect impacts on foraging                             | Moderate adverse and significant. | Working protocol for works near to foraging/ potential roost sites. Retention of much of identified high value foraging habitat (e.g. River Gwenfro, disused railway and central woodland). Provision of new habitat and habitat linkages across site. Appropriate external lighting across site.                                                                                                      | Slight adverse (and not significant) in the medium-term. Neutral and potentially positive in the long-term.                                  |
| <b>Otters</b>                                                  |                                   |                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                              |
| Population status (increased risk of road casualties)          | Moderate adverse and significant. | Temporary fencing of construction works and permanent fencing of river crossings. Appropriate design of bridges. Work to be completed under WAG 'development' licence. No light spillage onto river corridor.                                                                                                                                                                                          | Neutral. Potential positive due to fencing being installed at existing road crossing (Croesnewydd Road and possibly A483 [WCBC to confirm]). |
| Population status (disturbance during construction/ operation) | Moderate adverse and significant. | Work to be completed under WAG 'development' licence. Appropriate working protocol to be established for construction. Toolbox talk to be delivered to all site personnel. Site personnel to be excluded from ecology areas during construction. Appropriate external lighting across site. Provision of areas of dense scrub along river corridor to minimise potential disturbance during operation. | Slight adverse (and not significant) in the medium-term. Neutral in the long-term.                                                           |
| Loss of resting places/ potential holt sites                   | Moderate adverse and significant. | Work to be completed under WAG 'development' licence. Appropriate working protocol to be established for construction. Toolbox talk to be delivered to all site personnel. Scrub and tree planting to be provided along river corridor. River corridor/ adjacent habitat retained as ecology area.                                                                                                     | Slight adverse (and not significant) in the medium-term. Neutral and potentially positive in the long-term.                                  |
| Severance of home range                                        | Moderate adverse and significant. | As above. Best construction practice to ensure no pollution of watercourses.                                                                                                                                                                                                                                                                                                                           | Slight adverse (and not significant) in the medium-term. Potential positive in the long-term.                                                |

## 5.5 Conclusions

5.5.1 The impact assessment identified a number of impacts considered to be significant should the proposed development be implemented without appropriate mitigation/ compensation measures. Potential impacts on Badgers are covered by a confidential annex (Marches Ecology 2009a). Significant impacts are identified as follows:

- Loss of hedgerow (*Target Notes 6/12/14*);
- Partial loss of neutral grassland (*Target Notes 10 and 11*);
- Fragmentation of River Gwenfro corridor (in terms of habitat, and value to Otters and bats);
- Loss of Common Pipistrelle commuting route (Hedge at *Target Notes 6/12/14*);
- Disruption to Whiskered/ Brandt's bats commuting route (River Gwenfro);
- Loss/ indirect impacts on bat foraging/ commuting routes;
- Increased risk of Otter road casualties;
- Disturbance of Otters during construction/ operation;
- Loss of Otter resting places/ potential holt sites; and
- Severance of Otter home range.

5.5.2 *Section 5.3* of this document outlines measures proposed to address these possible impacts as well as those assessed as being less significant. Further detail on all mitigation/ compensation measures, long-term management of compensatory/ retained habitat and monitoring of habitats/ species is provided in a Method Statement and Management Plan (Marches Ecology 2009d & e respectively). The Method Statement and Management Plan will be discussed and agreed with the planning authority, and the Countryside Council for Wales as necessary. The success or otherwise of proposed mitigation/ compensation measures will be monitored during the construction phase of the proposed development and for an appropriate time thereafter. Assuming the implementation of all proposed mitigation/ compensation measures the residual impacts of the proposed development have largely been assessed as slight adverse (in the short to medium-term) or neutral/ positive.

## 6 TARGET NOTES

**Target Note 1.** A young broad-leaved plantation on the A483 road embankment. Canopy tree species present include *Alnus incana* (Grey Alder), *Acer pseudoplatanus* (Sycamore), *Acer campestre* (Field Maple), *Fagus sylvatica* (Beech), *Pinus sylvestris* (Scots Pine) and *Ulmus procera* (English Elm). The sub-canopy contains *Crataegus monogyna* (Hawthorn) and small amounts of *Ilex aquifolium* (Holly). In places *Ulmus procera* (English Elm) is locally frequent in the canopy and sub-canopy. Occasional low-growing *Rubus fruticosus* agg. (Bramble) occupies the shrub layer. The field layer is very locally dominated by a carpet of *Hedera helix* (Ivy); elsewhere it appears mainly bare with occasional woodland herbs including *Geum urbanum* (Wood Avens), *Geranium robertianum* (Herb-robert) as well as *Urtica dioica* (Common Nettle).

The trees mostly have approximate dbh's (diameter at breast height) of 0.15 to 0.2 m and are 10 to 12 m tall. Further north a few trees have an approximate dbh of 0.3 to 0.4 m. Some of the trees have *Hedera helix* (Ivy) growing up the trunk; these trees are of limited potential value at most for roosting bats.

The road embankment is steep in places (45-50°) and extends to approximately 5 m above the current level of the site towards the junction. There is a dry ditch along the toe of the embankment. It is approximately 2 m wide and up to 1 m deep with steep banks (60-70°). The ditch contains no vegetation.

**Target Note 2.** A small stand of young trees / mature scrub variously comprising *Acer pseudoplatanus* (Sycamore), *Salix caprea* (Goat Willow) and *Betula pendula* (Silver Birch). In places, this vegetation is surrounded by a narrow band of dense *Rubus fruticosus* agg. (Bramble) scrub with associated locally frequent *Rubus idaeus* (Raspberry). The field layer associated with the scrub is species-poor and dominated by tall-herb vegetation. The scrub is often fringed by species-poor *Urtica dioica* (Common Nettle) dominated tall-herb vegetation.

**Target Note 3.** Open semi-natural broad-leaved woodland comprising scattered mature trees, mainly *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) with occasional *Quercus robur* (Pedunculate Oak). Young trees and shrubs occur occasionally, including *Sambucus nigra* (Elder), *Crataegus monogyna* (Hawthorn) and *Ulmus procera* (English Elm). The field layer comprises *Urtica dioica* (Common Nettle) dominated tall-herb vegetation. This includes a range of coarse-leaved grasses and tall and low-growing herbs such as *Dactylis glomerata* (Cock's-foot), *Epilobium hirsutum* (Great Willowherb), *Stachys sylvatica* (Hedge Woundwort), *Glechoma hederacea* (Ground-ivy), *Silene dioica* (Red Campion) and the scrambler *Galium aparine* (Cleavers). Low-growing *Rubus fruticosus* agg. (Bramble) is scattered throughout.

**Target Note 3a.** Tall-herb vegetation similar in composition to that associated with the field layer of the adjacent open broad-leaved woodland described at **Target Note 3**. It is generally more open and more vigorous than that in the woodland and attains a height of approximately 1.5m. In places, where the ground is damp, *Epilobium hirsutum* (Great Willowherb) and *Equisetum telmateia* (Great Horsetail) are largely co-dominant, with frequent to locally abundant *Rubus fruticosus* agg. (Bramble), frequent *Solanum dulcamara* (Bittersweet), *Galium aparine* (Cleavers), *Cirsium palustre* (Marsh Thistle), *Urtica dioica* (Common Nettle), *Ranunculus repens* (Creeping Buttercup) and occasional *Rumex conglomeratus* (Clustered Dock).

**Target Note 3b.** Semi-natural broad-leaved (possibly ancient) woodland largely aligned along a stream corridor. The canopy is mainly dominated by *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore) with locally frequent *Alnus glutinosa* (Alder) (mainly alongside the stream) and *Quercus robur* (Pedunculate Oak), and rarely *Pinus sylvestris* (Scot's Pine). In the north of this woodland belt the shrub layer is fairly sparse, comprising occasional *Crataegus monogyna* (Hawthorn) bushes with tree saplings. Where adjacent to the stream it is much denser, comprising frequent *Ilex aquifolium* (Holly), and occasional *Corylus avellana* (Hazel), *Sambucus nigra* (Elder), *Viburnum opulus* (Guelder-rose), *Rosa arvensis* (Field-rose) and *Prunus spinosa* (Blackthorn). The woody scrambler *Lonicera periclymenum* (Honeysuckle) is also present. The field layer is also variable – low-lying damp stands support plants such as *Carex remota* (Remote Sedge), *Caltha palustris* (Marsh

Marigold), *Allium ursinum* (Ramsons), *Chrysosplenium oppositifolium* (Opposite-leaved Golden-saxifrage), *Equisetum telmateia* (Great Horsetail), *Urtica dioica* (Common Nettle) and *Solanum dulcamara* (Bittersweet). Where drier the field layer often supports a carpet of *Hedera helix* (Ivy) with other scattered plants recorded including *Geum urbanum* (Wood Avens), *Mercurialis perennis* (Dog's Mercury), *Geranium robertianum* (Herb-robert), *Viola riviniana* (Common Dog's-violet), *Anemone nemorosa* (Wood Anemone), *Conopodium majus* (Pignut), *Deschampsia cespitosa* (Tufted Hair-grass) and rarely, *Hyacinthoides non-scripta* (Bluebell). Various ferns are occasional to locally frequent. An internal bank by a ditch supports locally frequent *Melica uniflora* (Wood Melick) and *Carex sylvatica* (Wood-sedge) with a small amount of *Bromopsis ramosa* (Hairy-brome) and *Festuca gigantea* (Giant Fescue).

There are a number of tall mature trees with approximate dbh's of up to 1 m in particular *Fraxinus excelsior* (Ash), *Quercus robur* (Pedunculate Oak), *Alnus glutinosa* (Alder) and *Pinus sylvestris* (Scot's Pine). A number of these trees contain large splits/ crevices and or rot-holes and as such are of limited to high potential value for roosting bats. Many of the trees were also covered in dense *Hedera helix* (Ivy).

**Target Note 3c.** A small pond near the source of the stream described below in **Target Note 3d** that is believed to be spring-fed. The pond flows into the stream. It measures approximately 5 m by 8 m. It is full of silt and woody debris, and is well shaded by adjacent trees. The depth of water ranges between 0.1 and 0.3 m. It supports wetland vegetation throughout with abundant *Apium nodiflorum* (Fool's Water-cress), *Rorippa nasturtium-aquaticum* (Water-cress) and lesser amounts of *Solanum dulcamara* (Bittersweet), *Phalaris arundinacea* (Reed Canary-grass) and *Mentha aquatica* (Water-mint). *Equisetum telmateia* (Great Horsetail) is abundant on the banks. This pond is considered unlikely to provide suitable breeding conditions for Great Crested Newts although it provides potential aquatic foraging habitat.

**Target Note 3d.** A stream within the woodland described at **Target Note 3b**. The channel is up to approximately 2 m wide and 0.2 m deep. It is heavily silted and full of leaf matter and woody debris. It has a slow to moderate flow and is devoid of vegetation in places. Small amounts of *Apium nodiflorum* (Fool's Water-cress) were noted. The banks extend to approximately 0.2 to 0.3 m above the water level and have a gentle slope (30-40°).

**Target Note 3e.** Marshy grassland/ tall-herbs that grades into the tall-herb vegetation described at **Target Note 3a**. It is locally dominated by *Filipendula ulmaria* (Meadowsweet) and or *Epilobium hirsutum* (Great Willowherb) with locally abundant *Carex nigra* (Common Sedge), frequent *Cirsium palustre* (Marsh Thistle), *Galium palustre* (Common Marsh-bedstraw), *Caltha palustris* (Marsh Marigold), locally frequent *Juncus effusus* (Soft-rush), *Juncus inflexus* (Hard Rush), *Lotus pedunculatus* (Greater Bird's-foot-trefoil) and lesser amounts of *Stellaria uliginosa* (Bog Stitchwort), *Rumex acetosa* (Common Sorrel), *Rumex conglomeratus* (Clustered Dock) and *Carex hirta* (Hairy Sedge).

**Target Note 4.** This ex-arable field is now characterised by a complex mosaic of rank species-poor grassland, extensive stands of tall-herbs, small colonising patches of *Rubus fruticosus* agg. (Bramble) scrub and colonising shrubs/ small trees typically *Salix* spp. and *Betula* sp. The stands of rank grassland are often dominated by the coarse-leaved grasses *Holcus lanatus* (Yorkshire-fog) or *Elytrigia repens* (Common Couch) with a range of other associated grasses and rushes at various levels of abundance such as *Agrostis stolonifera* (Creeping Bent), *Dactylis glomerata* (Cock's-foot), *Arrhenatherum elatius* (False Oat-grass), *Festuca rubra* (Red Fescue), *Juncus effusus* (Soft-rush) and *Poa trivialis* (Rough Meadow-grass). A short Willowherb, *Epilobium obscurum*. (Short-fruited Willowherb), is often abundant within the grass stands; a range of common grassland forbs and tall-herbs are also scattered throughout at low levels of abundance. Some parts of the grassland are more species-rich and support species such as *Centaurea nigra* (Common Knapweed), *Lotus pedunculatus* (Greater Bird's-foot-trefoil), *Carex nigra* (Common Sedge), *Prunella vulgaris* (Selfheal) and *Odontites vernus* (Red Bartsia).

The associated stands of tall-herbs generally comprise *Epilobium hirsutum* (Great Willowherb) and *Chamerion angustifolium* (Rosebay Willowherb) with other plants including *Cirsium arvense* (Creeping

Thistle), *Cirsium vulgare* (Spear Thistle), *Heracleum sphondylium* (Hogweed), *Rumex obtusifolius* (Broad-leaved Dock), *Senecio jacobaea* (Common Ragwort) and *Urtica dioica* (Common Nettle).

This habitat, particularly around scrub edges and the edges of the field, is of potential value for reptiles, especially Viviparous Lizard, Slow-worm and possibly Grass Snake.

**Target Note 5.** Two mature *Quercus robur* (Pedunculate Oak) trees with approximate dbh's of 1 m and 1.4 m. Both contained splits/ crevices and deadwood. They are considered to be of limited-moderate potential value for roosting bats.

**Target Note 6.** An unmanaged, overgrown hedgerow, similar to that described below at **Target Note 12**. It is characterised by frequent dead *Ulmus procera* (English Elm) trees.

**Target Note 7.** The River Gwenfro at this location is approximately 2 to 3 m wide and 0.2 to 0.5 m deep with a moderate flow. The concrete box culvert (number 1200) beneath the A483 road is approximately 2.5 m high and 5 m wide. Rock-filled gabions have been used to reinforce the banks near the entrance to the box-culvert. The river flows over pebbles/ gravel with earth banks. It is largely wooded along this section and therefore well shaded; mostly by *Salix cinerea* (Grey Willow). The banks rise to approximately 1 m above the water level although in places downstream there are higher (1.5-2 m) exposed earth banks. In most places the banks have a fairly gentle slope (30-50°). No aquatic vegetation was observed.

Trees along the banks include *Alnus glutinosa* (Alder), *Acer pseudoplatanus* (Sycamore), *Ulmus glabra* (Wych Elm) with a range of shrubs including *Salix cinerea* (Grey Willow), *Salix viminalis* (Osier), *Crataegus monogyna* (Hawthorn), *Corylus avellana* (Hazel), *Ilex aquifolium* (Holly), *Cornus* sp. (Dogwood) and *Rosa canina* agg. (Dog-rose). Along more open stretches the banks are largely dominated by *Impatiens glandulifera* (Indian Balsam) with abundant *Rubus fruticosus* agg. (Bramble) and *Urtica dioica* (Common Nettle). The woodland herbs *Hyacinthoides non-scripta* (Bluebell), *Mercurialis perennis* (Dog's Mercury) and *Allium ursinum* (Ramsons) are locally frequent on the banks.

**Target Note 7a.** A sand/ gravel bar on the River Gwenfro located on the west side of the A483 road at the upstream end of the box-culvert. A recent set of (large) Otter footprints were present. These footprints are likely to be from the last few nights. A fresh spraint was also located on the bar. Brown Rat and Mink footprints were also frequent.

**Target Note 8.** A stone-block retaining wall on the north side of the mineral railway. The wall is approximately 1.5 m high but has partially collapsed in places. There are a number of trees and shrubs growing out of it; mostly *Crataegus monogyna* (Hawthorn) and *Ulmus glabra* (Wych Elm). The ground layer is dominated by *Hedera helix* (Ivy) with frequent ferns. The woodland plants *Bromopsis ramosa* (Hairy-brome), *Mercurialis perennis* (Dog's Mercury), *Viola riviniana* (Common Dog's-violet), *Melica uniflora* (Wood Melick) and *Moehringia trinervia* (Three-nerved Sandwort) are also present. Where it has collapsed there may be cavities that may be of potential value to roosting bats.

**Target Note 9.** A low bridge beneath the mineral railway that is approximately 2 m high and 3 m wide. It is largely constructed of brick and stone blocks. The mortar-work appears to largely be in good condition. There may be some crevices between the top of the walls and the metal roof girders. Several old Pigeon nests were noted on top of the walls. This structure is considered to be of limited potential value for roosting bats.

**Target Note 10.** A disused mineral railway, in this location supporting species-rich neutral grassland. It is heavily grazed by rabbits. The sward comprises a variety of grasses including *Holcus lanatus* (Yorkshire-fog), *Agrostis capillaris* (Common Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Cynosurus cristatus* (Crested Dog's-tail) and *Festuca rubra* (Red Fescue) with occasional tussocks of *Dactylis glomerata* (Cock's-foot). A wide variety of low growing herbs and forbs are present including two Locally Scarce (Green 2006) plants: *Linaria repens* (Pale Toadflax) and *Trifolium arvense* (Hare's-foot Clover), both recorded at relatively low levels of abundance. Other plants recorded include locally abundant *Lotus corniculatus* (Common Bird's-foot-trefoil), frequent *Anthyllis vulneraria* (Kidney Vetch), locally frequent *Pilosella officinarum* (Mouse-ear-hawkweed), *Geranium pyrenaicum* (Hedge Crane's-bill), *Luzula campestris* (Field Wood-rush), occasional *Achillea millefolium* (Yarrow), *Centaurea nigra*

(Common Knapweed), *Knautia arvensis* (Field Scabious), *Malva moschata* (Musk-mallow), *Arenaria serpyllifolia* (Thyme-leaved Sandwort), *Linum catharticum* (Fairy Flax), *Centaureum erythraea* (Common Centaury), *Hypericum perforatum* (Perforate St. John's-wort), *Clinopodium vulgare* (Wild Basil), *Rhinanthus minor* (Yellow-rattle), *Trifolium campestre* (Hop Trefoil), *Plantago lanceolata* (Ribwort Plantain), *Potentilla reptans* (Creeping Cinquefoil) and *Rumex acetosa* (Common Sorrel). Occasional shrubs of *Rosa canina* agg. (Dog-rose) and *Crataegus monogyna* (Hawthorn) are scattered, especially at the edges. The old clinker is occasionally exposed.

The southern embankment supports mature scrub variously characterised by dense *Rubus fruticosus* agg. (Bramble) with scattered mature bushes of *Salix cinerea* (Grey Willow) and *Crataegus monogyna* (Hawthorn) along with young *Alnus glutinosa* (Alder) and *Betula pendula* (Silver Birch) trees. A few semi-mature *Fraxinus excelsior* (Ash) and *Quercus robur* (Pedunculate Oak) trees occur at the north-western end. The north side of the railway supports a narrow band of broad-leaved woodland.

A small number of the associated trees are of limited potential value for roosting bats but mostly of no value. This area provides potentially suitable habitat for reptiles. As the grassland supports small amounts of *Potentilla reptans* (Creeping Cinquefoil) and *Lotus corniculatus* (Common Bird's-foot-trefoil); it provides potentially suitable habitat at least for the Dingy Skipper (*Erynnis tages*).

**Target Note 11.** A semi-improved neutral grassland field. The sward is largely kept low through browsing by Rabbits and informal recreational usage. It appears to be dominated by the grasses *Holcus lanatus* (Yorkshire-fog) and *Festuca rubra* (Red Fescue) with a range of other grasses present such as *Agrostis capillaris* (Common Bent), *Anthoxanthum odoratum* (Sweet Vernal-grass), *Cynosurus cristatus* (Crested Dog's-tail) and occasional tussocks of *Dactylis glomerata* (Cock's-foot). The sedges *Carex nigra* (Common Sedge) and *Carex hirta* (Hairy Sedge) were also recorded, the latter being locally frequent where the substrate is damp. Here it forms small stands with the rushes *Juncus effusus* (Soft-rush) and *Juncus inflexus* (Hard Rush), as well as *Galium palustre* (Marsh Bedstraw) and *Agrostis stolonifera* (Creeping Bent). Overall this grassland resource is variable but includes a range of common herbs and forbs: locally abundant *Lotus corniculatus* (Common Bird's-foot-trefoil), frequent *Ranunculus bulbosus* (Bulbous Buttercup), *Achillea millefolium* (Yarrow), *Ranunculus acris* (Meadow Buttercup), *Trifolium repens* (White Clover), locally frequent *Trifolium pratense* (Red Clover), *Centaurea nigra* (Common Knapweed) and lesser amounts of *Luzula campestris* (Field Wood-rush), *Odontites vernus* (Red Bartsia), *Cerastium fontanum* (Common Mouse-ear), *Malva moschata* (Musk-mallow) and *Hypericum perforatum* (Perforate St. John's-wort). The most species-rich area is towards the western end where *Dactylorhiza fuchsii* (Common Spotted-orchid) was recorded scattered around the edges of the scrub. Five spikes of *Ophrys apifera* (Bee Orchid) were also recorded in this area.

Small patches of colonising *Rubus fruticosus* agg. (Bramble) scrub are scattered throughout with larger patches towards the edges of the field. There are also stands of tall-herbs such as *Cirsium arvense* (Creeping Thistle) scattered throughout the field. The field is bounded to the southwest and northwest by an over-mature hedge/ line of scrub/ trees (described at *Target Notes 12/14* and *6* respectively). This field provides potentially suitable habitat for reptiles.

**Target Note 12.** An unmanaged, overgrown hedgerow, mostly approximately 5 m tall and 3 m wide, although young shrubs are often spreading into the adjacent fields. A wide range of woody species were recorded, none achieving particular dominance; these included *Prunus spinosa* (Blackthorn), *Sambucus nigra* (Elder), *Crataegus monogyna* (Hawthorn), *Acer campestre* (Field Maple), *Salix caprea* (Goat Willow), *Ilex aquifolium* (Holly), *Rosa canina* agg. (Dog-rose) and *Acer pseudoplatanus* (Sycamore). Young *Acer pseudoplatanus* (Sycamore) and *Fraxinus excelsior* (Ash) trees also occur. Semi-mature/ mature trees present are described in *Target Notes 12a* to *12d* below. The shrubs provide a dense shade and the field layer appeared mostly bare, or locally dominated by *Urtica dioica* (Common Nettle). A shallow, dry ditch is located on the southern margin of the hedge; no aquatic vegetation was observed.

**Target Note 12a.** A semi-mature *Acer pseudoplatanus* (Sycamore) tree with an approximate dbh of 0.5 m. It contains some small rot-holes and is of limited potential value for roosting bats.

**Target Note 12b.** A semi-mature *Quercus robur* (Pedunculate Oak) tree with an approximate dbh of 0.6 m. It has some deadwood and small splits and is of limited potential value for roosting bats.

**Target Note 12c.** A mature *Quercus robur* (Pedunculate Oak) tree with an approximate dbh of 1.4 m. It has a fused branch and a rot-hole and is of limited to moderate potential value for roosting bats.

**Target Note 12d.** A dead *Quercus robur* (Pedunculate Oak) tree with a large split in the trunk and a crevice beneath the bark. It is of limited to moderate potential value for roosting bats.

**Target Note 13.** A small area of swamp that has developed in a depression along a field boundary. It is dominated by *Equisetum fluviatile* (Water Horsetail) with locally dominant *Typha latifolia* (Bulrush). The margins are largely dominated by *Agrostis stolonifera* (Creeping Bent). Other plants recorded included frequent *Lycopus europaeus* (Gypsywort), *Glyceria fluitans* (Floating Sweet-grass), *Galium palustre* (Common Marsh-bedstraw), *Juncus effusus* (Soft-rush), *Juncus inflexus* (Hard Rush) and lesser amounts of *Veronica beccabunga* (Brooklime), *Apium nodiflorum* (Fool's Water-cress), *Sparganium erectum* (Branched Bur-reed) and *Lemna minor* (Common Duckweed). *Potentilla anserina* (Silverweed) is locally frequent on the banks with a small amount of *Rumex conglomeratus* (Clustered Dock). A small number of spikes of *Dactylorhiza fuchsii* (Common Spotted-orchid) were noted where the wetland vegetation extends (10-20 m) into the adjacent field to the south. The area of water extends to approximately 7 m by 12 m and is up to approximately 0.4 m deep. It is not known how much water it holds in the summer. This area provides potential habitat for Water Voles although it is fairly isolated. It also provides potential aquatic habitat for Great Crested Newts.

**Target Note 14.** A short section of unmanaged hedge mostly to 4 or 5 m high; it is more akin to a line of scrub. Woody species recorded include *Prunus spinosa* (Blackthorn), *Crataegus monogyna* (Hawthorn), *Corylus avellana* (Hazel), *Ulmus procera* (English Elm), *Salix cinerea* (Grey Willow) and occasional *Rosa canina* agg. (Dog-rose).

**Target Note 14a.** A semi-mature *Quercus robur* (Pedunculate Oak) tree located on the site boundary. It is of limited potential value for roosting bats.

**Target Note 15.** The River Gwenfro is approximately 3 m wide at this location and mostly 0.2 m deep. It has a moderate to fast flow over pebbles/ cobbles. It is well shaded by adjacent trees and shrubs. There is no marginal or aquatic vegetation. The river is culverted beneath the mineral railway. The culvert is semi-circular and constructed of brick. It is not possible to see the other side of the culvert; it is dog-legged and has a drop of approximately 0.7 m in the channel. Mink footprints were noted just upstream of the culvert. There are some crevices in the mortar work on the north side of the culvert but on the downstream side the mortar-work is in fairly good condition. The culvert is considered to be of limited potential value for roosting bats.

There are occasional large *Acer pseudoplatanus* (Sycamore) and *Fraxinus excelsior* (Ash) trees with approximate dbh's of 1 m along the River Gwenfro corridor. Some of these trees are of limited/ moderate potential value for roosting bats, e.g. several woodpecker holes were noted in an Ash tree.

**Target Note 16.** A small stand of the alien invasive *Fallopia japonica* (Japanese Knotweed) on the margins of the wooded banks of the Gwenfro and a pasture field. This stand comprises scattered plants over an approximately 20 m length.

**Target Note 17.** Several semi-mature *Acer pseudoplatanus* (Sycamore) and *Alnus glutinosa* (Alder) trees adjacent to the River Gwenfro. Some of these trees are of at least limited potential value for roosting bats.

**Target Note 18.** Young secondary broad-leaved woodland on part of the disused mineral railway. This stand is dominated by dense, self-sown *Alnus glutinosa* (Alder) with frequent *Salix caprea* (Goat Willow) and *Acer pseudoplatanus* (Sycamore) growing over railway ballast. The trees mostly have an approximate dbh of 0.15 to 0.2 m. The shrub layer is sparse, comprising occasional *Crataegus monogyna* (Hawthorn) and *Sambucus nigra* (Elder) bushes. The field layer is species-poor, being characterised by frequent *Geum urbanum* (Wood Avens) and *Urtica dioica* (Common Nettle) with a locally frequent carpet of *Hedera helix* (Ivy).

**Target Note 19.** A small stand of *Fallopia japonica* (Japanese Knotweed) occurs here under the woodland canopy. The plants appear to have been subject to treatment in the past, although some have re-established.

**Target Note 20.** A complex area of open woodland/ scrub-woodland and tall-herb vegetation located between the River Gwenfro and the disused mineral railway. This vegetation often comprises scattered mature *Crataegus monogyna* (Hawthorn) bushes with associated tall-herb vegetation dominated by the alien invasive *Impatiens glandulifera* (Indian Balsam). Locally the field layer is dominated by a carpet of *Hedera helix* (Ivy), with associated scattered woodland herbs such as *Silene dioica* (Red Campion), *Geranium robertianum* (Herb-robert) and *Geum urbanum* (Wood Avens). Mature trees present include *Alnus glutinosa* (Alder) (especially immediately adjacent to the River Gwenfro), *Fraxinus excelsior* (Ash) and *Acer pseudoplatanus* (Sycamore). Locally this vegetation is dominated by young *Alnus glutinosa* (Alder) (similar to that described at **Target Note 18**); associated field layer species include *Mercurialis perennis* (Dog's Mercury) and *Petasites hybridus* (Butterbur).

**Target Note 21.** The Croesnewydd Road bridge that passes over the mineral railway. The supports are constructed of stone and brick-work with large metal girders spanning the gap. The mortar work is generally in good condition but there are some small cracks visible. However it appears to be quite damp. The bridge is considered to be of limited potential value for roosting bats. The bridge has been used by nesting birds.

**Target Note 22.** A pond located adjacent to, and just to the west of Croesnewydd Road. It is roughly circular and measures approximately 20 m across. The pond is largely enclosed with palisade security fencing. Approximately 75% of the pond is dominated by *Typha latifolia* (Bulrush). The western side is shaded by *Alnus glutinosa* (Alder) trees growing on the adjacent bank. The banks are steep and largely dominated by stands of *Urtica dioica* (Common Nettle) and patches of *Rubus fruticosus* agg. (Bramble). The pond appears to have poor water-quality and is characterised by frequent litter and other debris. Occasional *Potamogeton obtusifolius* (Blunt-leaved Pondweed) was the only submerged or floating-leaved aquatic vegetation recorded. It is heavily silt-laden and as such contains little depth of water during the summer months.

**Target Note 23.** A relatively recent Otter spraint was noted on top of a detached piece of vegetation in the middle of the river channel. The piece of vegetation measures approximately 1.5 m by 0.5 m and is 0.5 m above the water level. It is approximately 20 m downstream of the bridge.

**Target Note 24.** The Croesnewydd Road bridge that passes over the River Gwenfro. The bridge is constructed of stone blocks although the span is lined with bricks. The span is approximately 3 m high and 3.5 m wide. There are some crevices in the facing mortar work. This bridge is considered to be of limited potential value for roosting bats. Mink footprints were noted both up and downstream of this bridge. A path leading from the south bank to the west of the road was noted – it could not be confirmed as Otter.

**Target Note 25.** A hedge approximately 3 m tall and 2 m wide, located on a small embankment adjacent to the eastern side of Croesnewydd Road. The woody component is dominated by *Crataegus monogyna* (Hawthorn) with other species recorded including *Ulmus procera* (English Elm) and *Ilex aquifolium* (Holly). The field layer appears species-poor, being dominated by a carpet of *Hedera helix* (Ivy).

**Target Note 26.** A hedge approximately 2 m high and wide, located adjacent to the northern side of Ruthin Road. The woody component is dominated by *Crataegus monogyna* (Hawthorn) with other species recorded including occasional/ locally frequent *Fraxinus excelsior* (Ash), occasional *Acer pseudoplatanus* (Sycamore), and rarely *Ulmus procera* (English Elm). The field layer appears species-poor, being dominated by a carpet of *Hedera helix* (Ivy) with associated species including frequent *Galium aparine* (Cleavers) and occasional *Alliaria petiolata* (Garlic Mustard) and *Urtica dioica* (Common Nettle).

**Target Note 27.** A cluster of young *Acer pseudoplatanus* (Sycamore), *Aesculus hippocastanum* (Horse-chestnut), *Salix caprea* (Goat Willow) and *Betula pubescens* (Downy Birch) trees with approximate dbh's of 0.15 m. They are of no potential value for roosting bats.

**Target Note 28.** A managed hedge located adjacent to the southern side of Ruthin Road. It has a variable structure being between 2 and 5 m high and between 1 and 5 m wide. The woody component is locally dominated by both *Crataegus monogyna* (Hawthorn) and *Prunus spinosa* (Blackthorn). A wide range of other woody species was recorded, mostly at low levels of abundance. These include *Acer pseudoplatanus* (Sycamore), *Ulmus procera* (English Elm), *Corylus avellana* (Hazel), *Acer campestre* (Field Maple), *Sambucus nigra* (Elder), *Ilex aquifolium* (Holly) and *Fraxinus excelsior* (Ash). The Locally Scarce scrambler *Bryonia dioica* (White Bryony) was noted. The hedge has a dense structure and accordingly, the field layer appears well shaded and species-poor. It is dominated by a carpet of *Hedera helix* (Ivy) with associated species including *Alliaria petiolata* (Garlic Mustard), *Geranium robertianum* (Herb-robert), *Glechoma hederacea* (Ground-ivy), *Mercurialis perennis* (Dog's Mercury), *Arum maculatum* (Lords-and-ladies) and *Urtica dioica* (Common Nettle).

**Target Note 29.** Frequently mown semi-improved neutral grassland located on a roadside verge. The sward is locally dominated by *Holcus lanatus* (Yorkshire-fog) with other grasses recorded including locally frequent *Lolium perenne* (Perennial Rye-grass) and *Festuca rubra* (Red Fescue), occasional *Dactylis glomerata* (Cock's-foot) tussocks and more rarely *Arrhenatherum elatius* (False Oat-grass) and *Agrostis stolonifera* (Creeping Bent). Overall, this resource appears to be species-poor with associated broad-leaved herbs mostly restricted to species such as *Taraxacum* sect. *Ruderalia* (Common Dandelion), *Plantago lanceolata* (Ribwort Plantain), *Anthriscus sylvestris* (Cow Parsley) and *Ranunculus repens* (Creeping Buttercup). However a wide range of forbs are present at low levels of abundance; these include species such as *Potentilla reptans* (Creeping Cinquefoil), *Achillea millefolium* (Yarrow), *Centaurea nigra* (Common Knapweed), and *Cerastium fontanum* (Common Mouse-ear).

**Target Note 30.** A mature *Acer pseudoplatanus* (Sycamore) tree with an approximate dbh of 1.2 m. Several rot-holes and dense *Hedera helix* (Ivy) on the trunk were noted; it is of limited to moderate potential value for roosting bats.

**Target Note 31.** A mature *Acer pseudoplatanus* (Sycamore) tree with an approximate dbh of 1.5 m. Several large rot-holes were noted; it is of moderate potential value for roosting bats.

**Target Note 32.** A mature *Acer pseudoplatanus* (Sycamore) tree with an approximate dbh of 1.2 m. Several rot-holes were noted; it is of limited to moderate potential value for roosting bats.

**Target Note 33.** Small plantation between Berse Lane and the A483 feeder lane at the Ruthin Road interchange. It is similar to that described at *Target Note 1* but is frequently more open and generally with larger trees (0.2-0.3 m dbh). These trees have not been assessed individually but are generally considered to be of low/ no potential value for roosting bats. In places there are patches of *Rubus fruticosus* agg. (Bramble) scrub with *Urtica dioica* (Common Nettle) as well as small stands of rough grassland/ tall-herb vegetation.

**Target Note 34.** Scattered semi-mature *Acer pseudoplatanus* (Sycamore) and *Salix caprea* (Goat Willow) trees with rank grassland, patches of *Rubus fruticosus* agg. (Bramble) scrub and stands of *Urtica dioica* (Common Nettle). This bank has a slope of approximately 45°.

**Target Note 35.** A mixture of disturbed vegetation types located on a man-made mound. The vegetation is dominated by tall-herbs at varying densities, such as *Cirsium arvense* (Creeping Thistle), *Cirsium vulgare* (Spear Thistle), *Epilobium hirsutum* (Great Willowherb), *Rumex obtusifolius* (Broad-leaved Dock) and *Urtica dioica* (Common Nettle) with frequent coarse-leaved grasses. Interspersed is locally frequent *Hypericum perforatum* (Perforate St. John's-wort) and occasional *Digitalis purpurea* (Fox-glove), *Reseda luteola* (Weld) and *Malva sylvestris* (Common Mallow).

**Target Note 36.** Sparse short-perennial/ ephemeral vegetation, located over gravelly substrate and/or ballast. This vegetation is characterised by abundant *Hypericum perforatum* (Perforate St. John's-wort) with frequent *Tripleurospermum inodorum* (Scentless Mayweed) and low-growing, stunted

grasses. A range of other herbs are scattered throughout (generally at low levels of abundance) such as *Arenaria serpyllifolia* (Thyme-leaved Sandwort), *Potentilla reptans* (Creeping Cinquefoil), *Centaurea erythraea* (Common Centaury), *Plantago lanceolata* (Ribwort Plantain), *Reseda luteola* (Weld), *Dipsacus fullonum* (Teasel) and *Prunella vulgaris* (Self-heal).

**Target Note 37.** A mixture of disturbed vegetation types located on two man-made mounds. Sparse short-perennial/ ephemeral vegetation appears to dominate – this generally comprises scattered tall-herbs, including *Cirsium vulgare* (Spear Thistle), *Cirsium arvense* (Creeping Thistle), *Arctium minus* agg. (Lesser Burdock) and *Senecio jacobaea* (Common Ragwort) with low growing plants interspersed. These include abundant *Arenaria serpyllifolia* (Thyme-leaved Sandwort), locally abundant *Tripleurospermum inodorum* (Scentless Mayweed) and occasional *Plantago major* (Greater Plantain), *Geranium molle* (Dove's-foot Crane's-bill), *Hypericum perforatum* (Perforate St. John's-wort), *Medicago lupulina* (Black Medick), *Cerastium fontanum* (Common Mouse-ear), *Viola arvensis* (Field Pansy) and very locally frequent *Erodium cicutarium* (Common Stork's-bill); a number of stunted grasses also occur. Small areas, generally on the sides of the mounds, are dominated by denser stands of tall-herb vegetation.

**Target Note 38.** A complex mosaic of tall-herb vegetation and neutral grassland. Much of the resource comprises species-poor tall-herb vegetation which is dominated by *Urtica dioica* (Common Nettle) and *Cirsium arvense* (Creeping Thistle), with occasional *Chamerion angustifolium* (Rosebay Willowherb) and *Arctium minus* agg. (Lesser Burdock). Coarse-leaved grasses and the scrambler *Galium aparine* (Cleavers) are scattered throughout. The vast majority of the associated neutral grassland is species-poor being dominated by *Holcus lanatus* (Yorkshire-fog) with locally dominant *Elytrigia repens* (Common Couch), occasional tussocks of *Dactylis glomerata* (Cock's-foot) (amongst other coarse-leaved grasses) and a few associated forbs. Very locally slightly more species-rich stands occur [too small to map on *Figures 3a* and *b*], mostly towards the boundary with the Wrexham Maelor Hospital (car park). Here the sward is grazed by Rabbit and includes a variety of forbs such as *Leucanthemum vulgare* (Oxeye Daisy), *Centaurea nigra* (Common Knapweed), *Achillea millefolium* (Yarrow), *Hypericum perforatum* (Perforate St. John's-wort) and *Potentilla reptans* (Creeping Cinquefoil).

**Target Note 39.** At this location, the River Gwenfro corridor comprises a narrow woodland fringe dominated by mature *Salix fragilis* (Crack Willow) trees. They have an approximate height of 12 m and a maximum dbh of 0.3 m. These trees have not been assessed in detail; however no significant features suitable for roosting bats were noted.

**Target Note 40.** Dense, tall-herb vegetation, dominated by *Urtica dioica* (Common Nettle) and *Rumex obtusifolius* (Broad-leaved Dock). A variety of associates occur, such as frequent *Epilobium hirsutum* (Great Willowherb), *Cirsium arvense* (Creeping Thistle) and *Galium aparine* (Cleavers), occasional *Heracleum sphondylium* (Hogweed), *Petasites hybridus* (Butterbur), *Chamerion angustifolium* (Rosebay Willowherb) and *Pentaglottis sempervirens* (Green Alkanet). A range of coarse-leaved grasses are scattered throughout.

**Target Note 41.** At this location, the River Gwenfro corridor comprises a narrow woodland fringe. The tree resource is dominated by mature *Alnus glutinosa* (Alder) with locally frequent *Salix fragilis* (Crack Willow), occasional *Fraxinus excelsior* (Ash) (mostly young) and very occasional *Acer pseudoplatanus* (Sycamore). The associated shrub layer comprises occasional *Sambucus nigra* (Elder), *Corylus avellana* (Hazel) and *Crataegus monogyna* (Hawthorn) mainly on the edges. The field layer appears species-poor, being either dominated by *Urtica dioica* (Common Nettle) or *Petasites hybridus* (Butterbur). The trees have not been assessed in detail; however no significant features suitable for roosting bats were noted.

**Target Note 42.** A small stream corridor (a tributary of the Gwenfro). The stream itself is generally approximately 1 m wide. At the time of the survey the water within the channel was approximately 0.05 m deep with a slow flow over a silty substrate. Marginal vegetation appeared limited to very occasional *Oenanthe crocata* (Hemlock Water-dropwort). The stream is fringed on both sides by a narrow corridor of mature *Salix fragilis* (Crack Willow) dominated woodland (approximately 10 m across at its widest point). Other canopy trees recorded include *Acer pseudoplatanus* (Sycamore) and *Ulmus procera* (English Elm). The shrub layer is similar to that recorded at **Target Note 39**. The field

layer is variable – either comprising *Urtica dioica* (Common Nettle) or a carpet of *Hedera helix* (Ivy). A number of woodland herbs were recorded including *Allium ursinum* (Ramsons), *Mercurialis perennis* (Dog's Mercury) and *Geranium robertianum* (Herb-robert).

**Target Note 43.** A mature *Fraxinus excelsior* (Ash) tree. It has an approximate dbh of 1.5 m and a height of 25 m. The trunk and many of the branches support a dense growth of *Hedera helix* (Ivy). No significant features suitable for roosting bats were noted, however the dense ivy might obscure any present. This tree offers at least limited bat roost potential.

**Target Note 44.** Dense tall-herb vegetation on the edge of a field-unit. It is mostly dominated by *Urtica dioica* (Common Nettle), *Rumex obtusifolius* (Broad-leaved Dock) and *Cirsium arvense* (Creeping Thistle), with associates including *Galium aparine* (Cleavers), *Anthriscus sylvestris* (Cow Parsley) and *Heracleum sphondylium* (Hogweed), along with various coarse-leaved grasses.

**Target Note 45.** A complex mosaic of tall-herb vegetation and neutral grassland, similar to that described at **Target Note 38**. At **Target Note 45a**, adjacent to the River Gwenfro, the neutral grassland becomes locally slightly more species-rich. Forbs such as *Centaurea nigra* (Common Knapweed), *Rumex acetosa* (Common Sorrel), *Achillea millefolium* (Yarrow), *Vicia sativa* (Common Vetch), *Plantago lanceolata* (Ribwort Plantain), *Angelica sylvestris* (Wild Angelica) and *Stachys sylvatica* (Hedge Woundwort) were recorded here.

**Target Note 46.** A mature *Fraxinus excelsior* (Ash) tree. It has an approximate dbh of 1 m and a height of 2 m. The canopy appears to be in fairly poor condition with frequent dead wood observed. No significant features suitable for roosting bats were noted. This tree offers at least limited bat roost potential.

**Target Note 47.** At this location the River Gwenfro corridor is fringed to the north-east by a narrow margin of young scrub and tall-herb vegetation. The scrub resource is dominated by mature *Crataegus monogyna* (Hawthorn) with frequent young *Alnus glutinosa* (Alder) and occasional mature *Sambucus nigra* (Elder). The associated tall-herb vegetation comprises mosaics of *Cirsium vulgare* (Spear Thistle), *Cirsium arvense* (Creeping Thistle), *Chamerion angustifolium* (Rosebay Willowherb) and *Conium maculatum* (Hemlock).

### Otter Target Notes

**Target Note 1.** Four gabion baskets on the south side of the A483 box culvert. The gabions extend to approximately 4 m by 1 m wide. There is a gap beneath them but this is unlikely to be large enough for Otters.

**Target Note 2.** A large pile of brash and overhanging trees beneath dense *Rubus fruticosus* agg. (Bramble) scrub. Potential resting place.

**Target Note 3.** A mid-channel pile of brash on a gravel bar. Potential resting place. Such resting places are only likely to be available for a short time until they are washed away.

**Target Note 3a.** A probable resting place recorded on 26/05/09. It is located beneath *Crataegus monogyna* (Hawthorn) with fairly dense Bramble and *Urtica dioica* (Common Nettle). The sandy soil beneath had been flattened and two partial foot-prints were noted. Two complete foot-prints were also noted on the adjacent muddy bank. Two spraints were also noted nearby on a tyre in the channel with footprints on the adjacent sand bar (Spraints recorded here on several occasions). A further 3 spraints were located on a nearby gravel bar with a number of foot-prints on the adjacent bank.

Approximately 5 m down-stream a further possible resting place was noted beneath overhanging *Sambucus nigra* (Elder), Bramble and Common Nettle on the north bank. Four spraints were noted on the bank-top at this location.

Approximately 10 m down-stream on the south bank and path was noted leading into dense Bramble/ Common Nettle and brash. The earth appears bare beneath this but could not be viewed in detail. The path is fairly well used and several foot-prints were noted in the exposed mud on the bank. A

fewer older footprints were also noted on the opposite bank. Is close (approximately 10 away) to a point where dogs/ people regularly access the river.

Again nearby and just down-stream on the south bank a further possible resting place was noted. It is located beneath a large Hawthorn and Ash with dense Bramble and Common Nettle. There is a well trampled area on an old stump with bare/ smooth soil. Some possible foot-prints lead to the river. Fairly recent foot-prints were noted on an adjacent sand/ gravel bar.

**Target Note 4.** Possible partial Otter foot-print on sandy bank. Obscured by various dog and Mink foot-prints.

**Target Note 5.** A faint path along the bank-top that is approximately 15 to 20 cm wide and 20 cm high. Not confirmed as Otter.

**Target Note 6.** A dense patch of *Cornus* sp. (Dogwood) scrub. Potential resting place.

**Target Note 7.** Possible partial Otter foot-print on bank-top.

**Target Note 8.** Culvert beneath the mineral railway. Due to the almost 90° dog-leg within the culvert it is not possible to see the light at the other end. There is an approximate 1 m drop halfway through the culvert. A large amount of water flowing over this drop creates a lot of noise. The semi-circular opening to the culvert is approximately 3.5 m wide with a roof 1 to 1.5 m above the water level at the apex. It is possible that Otters go through the culvert but it is more likely that they travel over land at this location.

**Target Note 9.** Dense *Rubus idaeus* (Raspberry) scrub. Potential resting place.

**Target Note 10.** Possible old tree stump obscured by *Ilex aquifolium* (Holly) and *Cornus* sp. (Dogwood). Difficult to access so could not see extent of any cavities that may be present. On the opposite bank there is a large dead *Sambucus nigra* (Elder) overhanging the stream surrounded by dense young Holly. Potential resting places.

**Target Note 11.** Extensive patch of dense Bramble and *Fallopia japonica* (Japanese Knotweed) scrub on steep bank well above high water level. Numerous Rabbit burrows present. Potential resting places.

**Target Note 11a.** A large uprooted *Corylus avellana* (Hazel) shrub and large pile of brash/ woody debris approximately 5 to 7 m long, 4 m wide and 2 m high. Lots of other debris has collected in the pile and there is adjacent Bramble scrub. Several footprints were noted on the adjacent bank on 15/12/08. Potential resting place, unlikely to be potential holt site.

**Target Note 12.** A possible cavity behind a broken section of stone work. Cavity does not appear to be large enough for Otters.

**Target Note 13.** A large patch of dense Bramble and tall-herbs at least 10 m wide. Potential resting places.

**Target Note 14.** A well used path leads from beneath bridge at Croesnewydd Road. It is approximately 0.1 to 0.15 m wide. Both dog and Fox foot-prints were noted on sand bar beneath bridge. The path leads into dense Bramble scrub. Could not be confirmed as Otter.

**Target Note 15.** A cavity beneath a large *Fraxinus excelsior* (Ash) tree that is likely to be too small to be used by Otter.

**Target Note 15a.** A large old decaying Alder tree trunk to approximately 3 m high at a 45° angle. It has a hollow centre. Beneath the overhanging trunk 6 sprouts (5 not dry and 1 dry intact) were noted on 26/05/09. In the void beneath the trunk the soil is compacted and smooth. Potential resting place.

*Target Note 15b.* A large rotten, felled trunk of an Ash tree to approximately 1.5 m high. Foot-prints were noted coming up the bank and around the stump cavity. 3 not dry spraints were found by a hole beneath the trunk. Potential resting place although may just play on it.

*Target Note 16.* A large, slumped earth bank to approximately 5 m high. The earth face is overhung with tree roots largely from a mature *Acer pseudoplatanus* (Sycamore) on top of the bank. At the base of the bank there is a deep pool as it is on the outside of a meander bend. Potential holt site although little evidence recorded here. Foot-prints and a flattened area at the base of the cliff were noted on 26/05/09.

*Target Note 17.* A small mid-channel island with a multi-stemmed Alder tree. Lots of debris caught up around the island. Potential resting place.

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## 8 DATA

*Table 10 – Vascular plant species recorded during the Extended Phase 1 Habitat Survey and Botanical Update Survey*

An \* equates to Locally Scarce as per Green, 2007.

| Plant species                                  |
|------------------------------------------------|
|                                                |
| <i>Acer campestre</i> (Field Maple)            |
| <i>Acer platanoides</i> (Norway Maple)         |
| <i>Acer pseudoplatanus</i> (Sycamore)          |
| <i>Aesculus hippocastanum</i> (Horse-chestnut) |
| <i>Alnus glutinosa</i> (Alder)                 |
| <i>Alnus incana</i> (Grey Alder)               |
| <i>Betula pendula</i> (Silver Birch)           |
| <i>Buddleja davidii</i> (Butterfly-bush)       |
| <i>Carpinus betulus</i> (Hornbeam)             |
| <i>Cornus</i> sp. (Dogwood)                    |
| <i>Corylus avellana</i> (Hazel)                |
| <i>Crataegus monogyna</i> (Hawthorn)           |
| <i>Cytisus scoparius</i> (Broom)               |
| <i>Fagus sylvatica</i> (Beech)                 |
| <i>Fraxinus excelsior</i> (Ash)                |
| <i>Ilex aquifolium</i> (Holly)                 |
| <i>Malus domestica</i> agg. (Apple)            |
| <i>Pinus sylvestris</i> (Scot's Pine)          |
| <i>Prunus avium</i> (Wild Cherry)              |
| <i>Prunus spinosa</i> (Blackthorn)             |
| <i>Quercus robur</i> (Pedunculate Oak)         |
| <i>Rosa arvensis</i> (Field-rose)              |
| <i>Rosa canina</i> agg. (Dog-rose)             |
| <i>Salix caprea</i> (Goat Willow)              |
| <i>Salix cinerea</i> (Grey Willow)             |
| <i>Salix fragilis</i> (Crack Willow)           |
| <i>Salix viminalis</i> (Osier)                 |
| <i>Sambucus nigra</i> (Elder)                  |
| <i>Sorbus aucuparia</i> (Rowan)                |
| <i>Taxus baccata</i> (Yew)                     |
| <i>Tilia x europaea</i> (Lime)                 |
| <i>Ulex europaeus</i> (Common Gorse)           |
| <i>Ulmus glabra</i> (Wych Elm)                 |
| <i>Ulmus procera</i> (English Elm) *           |
| <i>Viburnum opulus</i> (Guelder-rose)          |
|                                                |
| <i>Achillea millefolium</i> (Yarrow)           |
| <i>Aegopodium podagraria</i> (Ground-elder)    |
| <i>Agrostis capillaris</i> (Common Bent)       |
| <i>Agrostis stolonifera</i> (Creeping Bent)    |
| <i>Ajuga reptans</i> (Bugle)                   |
| <i>Allium ursinum</i> (Ramsons)                |
| <i>Alopecurus pratensis</i> (Meadow Foxtail)   |

| Plant species                                                           |
|-------------------------------------------------------------------------|
| <i>Alliaria petiolata</i> (Garlic Mustard)                              |
| <i>Allium ursinum</i> (Ramsons)                                         |
| <i>Anagallis arvensis</i> ssp. <i>arvensis</i> (Scarlet Pimpernel)      |
| <i>Anemone nemorosa</i> (Wood Anemone)                                  |
| <i>Angelica sylvestris</i> (Wild Angelica)                              |
| <i>Anisantha sterilis</i> (Barren Brome)                                |
| <i>Anthoxanthum odoratum</i> (Sweet Vernal-grass)                       |
| <i>Anthriscus sylvestris</i> (Cow Parsley)                              |
| <i>Anthyllis vulneraria</i> (Kidney Vetch)                              |
| <i>Apium nodiflorum</i> (Fool's Water-cress)                            |
| <i>Aquilegia vulgaris</i> (Columbine)                                   |
| <i>Arctium minus</i> agg. (Lesser Burdock)                              |
| <i>Arenaria serpyllifolia</i> (Thyme-leaved Sandwort)                   |
| <i>Artemisia vulgaris</i> (Mugwort)                                     |
| <i>Arrhenatherum elatius</i> (False Oat-grass)                          |
| <i>Arum maculatum</i> (Lords-and-Ladies)                                |
| <i>Asplenium trichomanes</i> (Maidenhair Spleenwort)                    |
| <i>Athyrium filix-femina</i> (Lady-fern)                                |
| <i>Bellis perennis</i> (Daisy)                                          |
| <i>Brachypodium sylvaticum</i> (False-brome)                            |
| <i>Bromopsis ramosa</i> (Hairy-brome)                                   |
| <i>Bromus hordeaceus</i> ssp. <i>hordeaceus</i> (Soft-brome)            |
| <i>Bryonia dioica</i> (White Bryony)*                                   |
| <i>Caltha palustris</i> (Marsh Marigold)                                |
| <i>Calystegia sepium</i> (Hedge Bindweed)                               |
| <i>Cardamine flexuosa</i> (Wavy Bitter-cress)                           |
| <i>Cardamine pratensis</i> (Cuckooflower)                               |
| <i>Carex hirta</i> (Hairy Sedge)                                        |
| <i>Carex nigra</i> (Common Sedge)                                       |
| <i>Carex remota</i> (Remote Sedge)                                      |
| <i>Carex sylvatica</i> (Wood-sedge)                                     |
| <i>Centaurea nigra</i> (Common Knapweed)                                |
| <i>Centaureum erythraea</i> (Common Centaury)                           |
| <i>Cerastium fontanum</i> (Common Mouse-ear)                            |
| <i>Chaerophyllum temulum</i> (Rough Chervil)                            |
| <i>Chamerion angustifolium</i> (Rosebay Willowherb)                     |
| <i>Chrysosplenium oppositifolium</i> (Opposite-leaved Golden-saxifrage) |
| <i>Circaea lutetiana</i> (Enchanter's-nightshade)                       |
| <i>Cirsium arvense</i> (Creeping Thistle)                               |
| <i>Cirsium palustre</i> (Marsh Thistle)                                 |
| <i>Cirsium vulgare</i> (Spear Thistle)                                  |
| <i>Clinopodium vulgare</i> (Wild Basil)                                 |
| <i>Conium maculatum</i> (Hemlock)                                       |
| <i>Conopodium majus</i> (Pignut)                                        |
| <i>Convolvulus arvensis</i> (Field Bindweed)                            |
| <i>Crepis capillaris</i> (Smooth Hawk's-beard)                          |
| <i>Crocsmia</i> sp. (Montbretia)                                        |
| <i>Cruciata laevipes</i> (Cross-wort)                                   |
| <i>Cynosurus cristatus</i> (Crested Dog's-tail)                         |
| <i>Dactylis glomerata</i> (Cock's-foot)                                 |
| <i>Dactylorhiza fuchsii</i> (Common Spotted-orchid)                     |

| Plant species                                                 |
|---------------------------------------------------------------|
| <i>Deschampsia cespitosa</i> (Tufted Hair-grass)              |
| <i>Digitalis purpurea</i> (Foxglove)                          |
| <i>Dipsacus fullonum</i> (Wild Teasel)                        |
| <i>Dryopteris affinis</i> (Scaly Male-fern)                   |
| <i>Dryopteris dilatata</i> (Broad Buckler-fern)               |
| <i>Dryopteris filix-mas</i> (Male-fern)                       |
| <i>Elytrigia repens</i> (Common Couch)                        |
| <i>Epilobium ciliatum</i> (American Willowherb)               |
| <i>Epilobium hirsutum</i> (Great Willowherb)                  |
| <i>Epilobium montanum</i> (Broad-leaved Willowherb)           |
| <i>Epilobium obscurum</i> . (Short-fruited Willowherb)        |
| <i>Equisetum arvense</i> (Field Horsetail)                    |
| <i>Equisetum fluviatile</i> (Water Horsetail)                 |
| <i>Equisetum telmateia</i> (Great Horsetail)                  |
| <i>Erodium cicutarium</i> (Common Stork's-bill)               |
| <i>Erophila verna</i> (Common Whitlow-grass)                  |
| <i>Euphorbia lathyris</i> (Caper Spurge) *                    |
| <i>Fallopia japonica</i> (Japanese Knotweed)                  |
| <i>Festuca gigantea</i> (Giant Fescue)                        |
| <i>Festuca rubra</i> (Red Fescue)                             |
| <i>Filipendula ulmaria</i> (Meadowsweet)                      |
| <i>Fragaria vesca</i> (Wild Strawberry)                       |
| <i>Galium aparine</i> (Cleavers)                              |
| <i>Galium palustre</i> (Common Marsh-bedstraw)                |
| <i>Geranium dissectum</i> (Cut-leaved Crane's-bill)           |
| <i>Geranium molle</i> (Dove's-foot Crane's-bill)              |
| <i>Geranium pyrenaicum</i> (Hedgerow Crane's-bill)            |
| <i>Geranium lucidum</i> (Shining Crane's-bill)                |
| <i>Geranium robertianum</i> (Herb-robert)                     |
| <i>Geum urbanum</i> (Wood Avens)                              |
| <i>Glechoma hederacea</i> (Ground-ivy)                        |
| <i>Glyceria fluitans</i> (Floating Sweet-grass)               |
| <i>Hedera helix</i> (Ivy)                                     |
| <i>Heracleum sphondylium</i> (Hogweed)                        |
| <i>Holcus lanatus</i> (Yorkshire-fog)                         |
| <i>Holcus mollis</i> (Creeping Soft-grass)                    |
| <i>Hyacinthoides hispanica</i> (Spanish Bluebell)             |
| <i>Hyacinthoides non-scripta</i> (Bluebell)                   |
| <i>Hypericum perforatum</i> (Perforate St. John's-wort)       |
| <i>Hypericum tetrapterum</i> (Square-stalked St. John's-wort) |
| <i>Hypochaeris radicata</i> (Cat's-ear)                       |
| <i>Impatiens glandulifera</i> (Indian Balsam)                 |
| <i>Juncus acutiflorus</i> (Sharp-flowered Rush)               |
| <i>Juncus conglomeratus</i> (Compact Rush)                    |
| <i>Juncus effusus</i> (Soft-rush)                             |
| <i>Juncus inflexus</i> (Hard Rush)                            |
| <i>Knautia arvensis</i> (Field Scabious)                      |
| <i>Lactuca serriola</i> (Prickly Lettuce) *                   |
| <i>Lamium album</i> (White Dead-nettle)                       |
| <i>Lapsana communis</i> (Nipplewort)                          |

| Plant species                                             |
|-----------------------------------------------------------|
| <i>Lathyrus pratensis</i> (Meadow Vetchling)              |
| <i>Lemna minor</i> (Common Duckweed)                      |
| <i>Leucanthemum vulgare</i> (Oxeye Daisy)                 |
| <i>Linaria repens</i> (Pale Toadflax) *                   |
| <i>Linaria vulgaris</i> (Common Toadflax)                 |
| <i>Linum catharticum</i> (Fairy Flax)                     |
| <i>Lolium perenne</i> (Perennial Rye-grass)               |
| <i>Lonicera periclymenum</i> (Honeysuckle)                |
| <i>Lotus corniculatus</i> (Common Bird's-foot-trefoil)    |
| <i>Lotus pedunculatus</i> (Greater Bird's-foot-trefoil)   |
| <i>Luzula campestris</i> (Field Wood-rush)                |
| <i>Lycopus europaeus</i> (Gypsywort)                      |
| <i>Malva moschata</i> (Musk Mallow)                       |
| <i>Malva sylvestris</i> (Common Mallow)                   |
| <i>Medicago lupulina</i> (Black Medick)                   |
| <i>Melica uniflora</i> (Wood Melick)                      |
| <i>Mentha aquatica</i> (Water-mint)                       |
| <i>Mentha spicata</i> (Spear Mint) *                      |
| <i>Mercurialis perennis</i> (Dog's Mercury)               |
| <i>Moehringia trinervia</i> (Three-nerved Sandwort)       |
| <i>Myosotis arvensis</i> (Field Forget-me-not)            |
| <i>Myosotis sylvatica</i> (Wood Forget-me-not)            |
| <i>Oenanthe crocata</i> (Hemlock Water-dropwort)          |
| <i>Odontites vernus</i> (Red Bartsia)                     |
| <i>Ophrys apifera</i> (Bee Orchid)*                       |
| <i>Papaver dubium</i> (Long-headed Poppy)                 |
| <i>Papaver somniferum</i> (Opium Poppy) *                 |
| <i>Pentaglottis sempervirens</i> (Green Alkanet)          |
| <i>Persicaria maculosa</i> (Redshank)                     |
| <i>Petasites hybridus</i> (Butterbur)                     |
| <i>Phalaris arundinacea</i> (Reed Canary-grass)           |
| <i>Phyllitis scolopendrium</i> (Hart's-tongue)            |
| <i>Pilosella officinarum</i> (Mouse-ear-hawkweed)         |
| <i>Plantago lanceolata</i> (Ribwort Plantain)             |
| <i>Plantago major</i> (Greater Plantain)                  |
| <i>Poa annua</i> (Annual Meadow-grass)                    |
| <i>Poa trivialis</i> (Rough Meadow-grass)                 |
| <i>Polygonum aviculare</i> (Knotgrass)                    |
| <i>Potamogeton obtusifolius</i> (Blunt-leaved Pondweed) * |
| <i>Potentilla anserina</i> (Silverweed)                   |
| <i>Potentilla reptans</i> (Creeping Cinquefoil)           |
| <i>Primula veris</i> (Cowslip)                            |
| <i>Primula vulgaris</i> (Primrose)                        |
| <i>Prunella vulgaris</i> (Selfheal)                       |
| <i>Pteridium aquilinum</i> (Bracken)                      |
| <i>Ranunculus acris</i> (Meadow Buttercup)                |
| <i>Ranunculus bulbosus</i> (Bulbous Buttercup)            |
| <i>Ranunculus repens</i> (Creeping Buttercup)             |
| <i>Reseda luteola</i> (Weld)                              |
| <i>Rhinanthus minor</i> (Yellow-rattle)                   |
| <i>Ribes rubrum</i> (Red Currant)                         |

| Plant species                                              |
|------------------------------------------------------------|
| <i>Rorippa nasturtium-aquaticum</i> (Water-cress)          |
| <i>Rubus fruticosus</i> agg. (Bramble)                     |
| <i>Rubus idaeus</i> (Raspberry)                            |
| <i>Rumex acetosa</i> (Common Sorrel)                       |
| <i>Rumex conglomeratus</i> (Clustered Dock)                |
| <i>Rumex crispus</i> (Curled Dock)                         |
| <i>Rumex obtusifolius</i> (Broad-leaved Dock)              |
| <i>Sagina apetala</i> (Annual Pearlwort)                   |
| <i>Sagina procumbens</i> (Procumbent Pearlwort)            |
| <i>Scrophularia auriculata</i> (Water Figwort)             |
| <i>Scrophularia nodosa</i> (Common Figwort)                |
| <i>Sedum acre</i> (Biting Stonecrop)                       |
| <i>Senecio jacobaea</i> (Common Ragwort)                   |
| <i>Senecio vulgaris</i> (Groundsel)                        |
| <i>Silene latifolia</i> (White Campion)                    |
| <i>Silene dioica</i> (Red Campion)                         |
| <i>Solanum dulcamara</i> (Bittersweet)                     |
| <i>Sonchus asper</i> (Prickly Sow-thistle)                 |
| <i>Sonchus oleraceus</i> (Smooth Sow-thistle)              |
| <i>Sparganium erectum</i> (Branched Bur-reed)              |
| <i>Stachys sylvatica</i> (Hedge Woundwort)                 |
| <i>Stellaria media</i> (Common Chickweed)                  |
| <i>Stellaria uliginosa</i> (Bog Stitchwort)                |
| <i>Tamus communis</i> (Black Bryony)                       |
| <i>Taraxacum</i> sect. <i>Ruderalia</i> (Common Dandelion) |
| <i>Torilis japonica</i> (Upright Hedge-parsley)            |
| <i>Tragopogon pratensis</i> (Goat's-beard)                 |
| <i>Trifolium arvense</i> (Hare's-foot Clover) *            |
| <i>Trifolium campestre</i> (Hop Trefoil)                   |
| <i>Trifolium dubium</i> (Lesser Trefoil)                   |
| <i>Trifolium pratense</i> (Red Clover)                     |
| <i>Trifolium repens</i> (White Clover)                     |
| <i>Tripleurospermum inodorum</i> (Scentless Mayweed)       |
| <i>Tussilago farfara</i> (Colt's-foot)                     |
| <i>Typha latifolia</i> (Bulrush)                           |
| <i>Urtica dioica</i> (Common Nettle)                       |
| <i>Valeriana locusta</i> (Common Cornsalad)                |
| <i>Verbascum thapsus</i> (Great Mullein)                   |
| <i>Veronica arvense</i> (Wall Speedwell)                   |
| <i>Veronica beccabunga</i> (Brooklime)                     |
| <i>Veronica chamaedrys</i> (Germander Speedwell)           |
| <i>Veronica serpyllifolia</i> (Thyme-leaved Speedwell)     |
| <i>Veronica persica</i> (Common Field-speedwell)           |
| <i>Vicia cracca</i> (Tufted Vetch)                         |
| <i>Vicia hirsuta</i> (Hairy Tare)                          |
| <i>Vicia sativa</i> (Common Vetch)                         |
| <i>Vicia sepium</i> (Bush Vetch)                           |
| <i>Vicia tetrasperma</i> (Smooth Tare)                     |
| <i>Viola riviniana</i> (Common Dog's-violet)               |
|                                                            |

Table 11 – Bird Species Recorded During Surveys

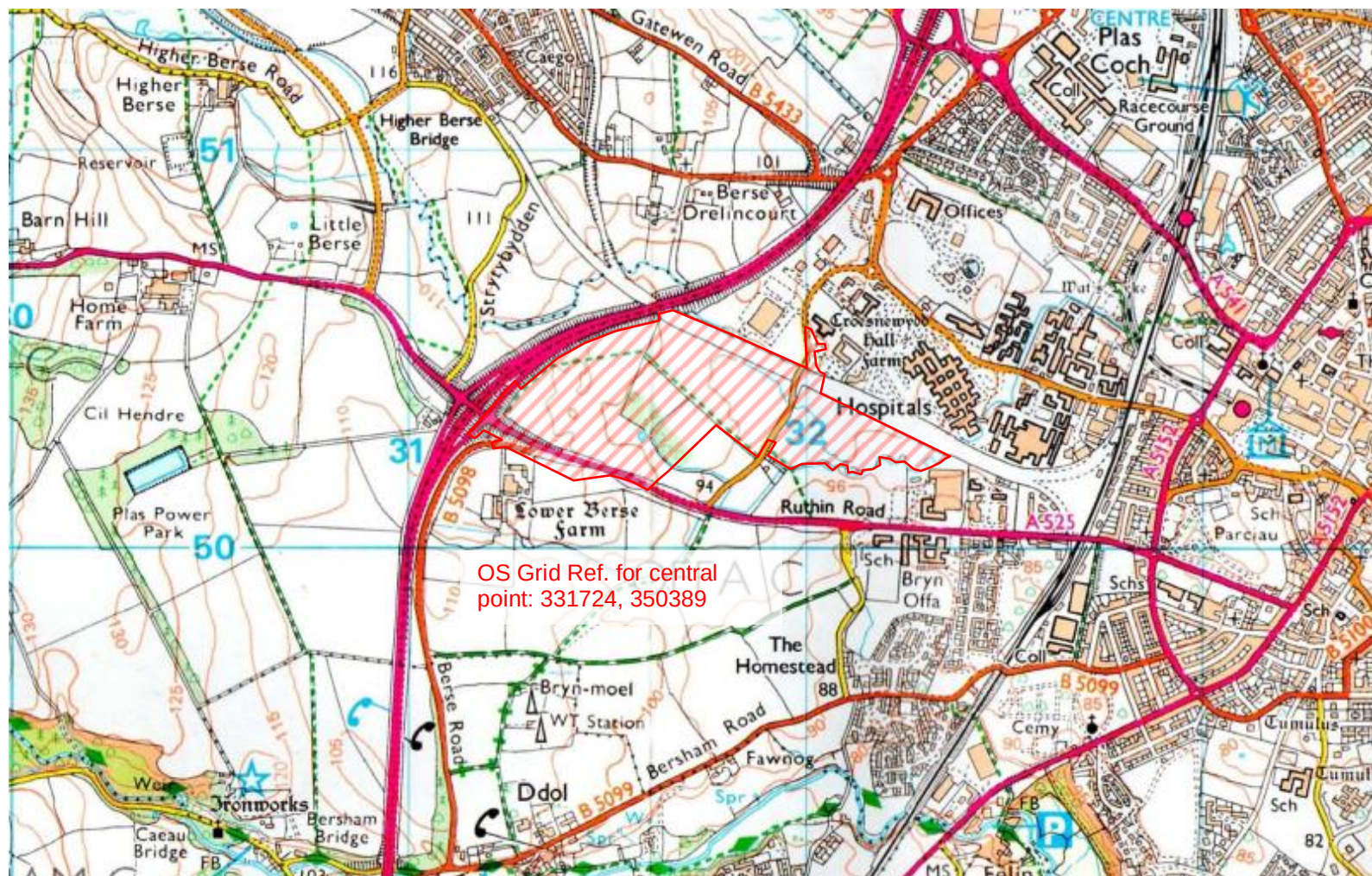
| Species                                             | Notes                                                                                                             |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <i>Accipiter nisus</i> (Sparrowhawk)                |                                                                                                                   |
| <i>Aegithalos caudatus</i> (Long-tailed Tit)        |                                                                                                                   |
| <i>Alauda arvensis</i> (Skylark)                    | 2 flying over.                                                                                                    |
| <i>Alectoris rufa</i> (Red-legged Partridge)        |                                                                                                                   |
| <i>Anas platyrhynchos</i> (Mallard)                 |                                                                                                                   |
| <i>Apus apus</i> (Swift)                            | Flying over.                                                                                                      |
| <i>Ardea cinerea</i> (Grey Heron)                   |                                                                                                                   |
| <i>Buteo buteo</i> (Buzzard)                        |                                                                                                                   |
| <i>Carduelis carduelis</i> (Goldfinch)              |                                                                                                                   |
| <i>Carduelis chloris</i> (Greenfinch)               |                                                                                                                   |
| <i>Carduelis spinus</i> (Siskin)                    |                                                                                                                   |
| <i>Certhia familiaris</i> (Treecreeper)             |                                                                                                                   |
| <i>Cinclus cinclus</i> (Dipper)                     | Several birds regularly seen on River Gwenfro. Old nests found in bridge across mineral railway upstream of site. |
| <i>Columba palumbus</i> (Woodpigeon)                |                                                                                                                   |
| <i>Columba oenas</i> (Stock Dove)                   |                                                                                                                   |
| <i>Corvus corone</i> (Carion Crow)                  |                                                                                                                   |
| <i>Corvus frugilegus</i> (Rook)                     | Flying over.                                                                                                      |
| <i>Corvus monedula</i> (Jackdaw)                    |                                                                                                                   |
| <i>Delichon urbica</i> (House Martin)               | Flying over.                                                                                                      |
| <i>Dendrocopos major</i> (Great Spotted Woodpecker) |                                                                                                                   |
| <i>Emberiza schoeniclus</i> (Reed Bunting)          |                                                                                                                   |
| <i>Erithacus rubecula</i> (Robin)                   |                                                                                                                   |
| <i>Falco tinnunculus</i> (Kestrel)                  |                                                                                                                   |
| <i>Fringilla coelebs</i> (Chaffinch)                |                                                                                                                   |
| <i>Garrulus glandarius</i> (Jay)                    |                                                                                                                   |
| <i>Hirundo rustica</i> (Swallow)                    | Flying over.                                                                                                      |
| <i>Motacilla alba</i> (Pied Wagtail)                |                                                                                                                   |
| <i>Larus argentatus</i> (Herring Gull)              | Flying over.                                                                                                      |
| <i>Larus ridibundus</i> (Black-headed Gull)         | Flying over.                                                                                                      |
| <i>Motacilla cinerea</i> (Grey Wagtail)             | One to two birds on River Gwenfro.                                                                                |
| <i>Parus ater</i> (Coal Tit)                        |                                                                                                                   |
| <i>Parus caeruleus</i> (Blue Tit)                   |                                                                                                                   |
| <i>Parus major</i> (Great Tit)                      |                                                                                                                   |
| <i>Phasianus colchicus</i> (Pheasant)               |                                                                                                                   |
| <i>Phylloscopus collybita</i> (Chiffchaff)          |                                                                                                                   |
| <i>Phylloscopus trochilus</i> (Willow Warbler)      |                                                                                                                   |
| <i>Pica pica</i> (Magpie)                           |                                                                                                                   |
| <i>Pluvialis apricaria</i> (Golden Plover)          | Single bird flying over.                                                                                          |
| <i>Prunella modularis</i> (Dunnock)                 |                                                                                                                   |
| <i>Pyrrhula pyrrhula</i> (Bullfinch)                |                                                                                                                   |
| <i>Regulus regulus</i> (Goldcrest)                  |                                                                                                                   |
| <i>Scolopax rusticola</i> (Woodcock)                | Small numbers noted in wet woodland areas during winter months only.                                              |
| <i>Sitta europaea</i> (Nuthatch)                    |                                                                                                                   |
| <i>Streptopelia decaocto</i> (Collared Dove)        |                                                                                                                   |
| <i>Strix aluco</i> (Tawny Owl)                      |                                                                                                                   |
| <i>Sturnus vulgaris</i> (Starling)                  | Flying over.                                                                                                      |

| Species                                  | Notes                                                             |
|------------------------------------------|-------------------------------------------------------------------|
| <i>Sylvia atricapilla</i> (Blackcap)     |                                                                   |
| <i>Sylvia borin</i> (Garden Warbler)     |                                                                   |
| <i>Sylvia communis</i> (Whitethroat)     |                                                                   |
| <i>Troglodytes troglodytes</i> (Wren)    |                                                                   |
| <i>Turdus merula</i> (Blackbird)         |                                                                   |
| <i>Turdus philomelos</i> (Song Thrush)   |                                                                   |
| <i>Turdus viscivorus</i> (Mistle Thrush) |                                                                   |
| <i>Tyto alba</i> (Barn Owl)              | Single recorded hunting to north of central woodland<br>30/06/09. |
|                                          |                                                                   |

Table 12 – Other Species Recorded During Surveys

| Species                                           | Notes                               |
|---------------------------------------------------|-------------------------------------|
| <b>Mammals</b>                                    |                                     |
| Badger ( <i>Meles meles</i> )                     |                                     |
| Bank Vole ( <i>Clethrionomys glareolus</i> )      |                                     |
| Brown Rat ( <i>Rattus norvegicus</i> )            |                                     |
| Common Shrew ( <i>Sorex araneus</i> )             |                                     |
| Field Vole ( <i>Microtus agrestis</i> )           |                                     |
| Fox ( <i>Vulpes vulpes</i> )                      |                                     |
| Grey Squirrel ( <i>Sciurus carolinensis</i> )     |                                     |
| Mink ( <i>Mustela vison</i> )                     |                                     |
| Mole ( <i>Talpa europaea</i> )                    |                                     |
| Otter ( <i>Lutra lutra</i> )                      |                                     |
| Pygmy Shrew ( <i>Sorex minutus</i> )              |                                     |
| Rabbit ( <i>Oryctolagus cuniculus</i> )           |                                     |
| Wood Mouse ( <i>Apodemus sylvaticus</i> )         |                                     |
| <b>Amphibians</b>                                 |                                     |
| Common Frog ( <i>Rana temporaria</i> )            |                                     |
| <b>Lepidoptera</b>                                |                                     |
| The Cinnabar ( <i>Tyria jacobaeae</i> )           |                                     |
| Comma ( <i>Polygonia c-album</i> )                |                                     |
| Common Blue ( <i>Polyommatus icarus</i> )         | More-or-less restricted to railway. |
| Gatekeeper ( <i>Pyronia tithonus</i> )            |                                     |
| Large Skipper ( <i>Ochlodes venata</i> )          |                                     |
| Large White ( <i>Pieris brassicae</i> )           |                                     |
| Meadow Brown ( <i>Maniola jurtina</i> )           |                                     |
| Orange-tip ( <i>Anthocaris cardamines</i> )       |                                     |
| Painted Lady ( <i>Vanessa cardui</i> )            |                                     |
| Peacock ( <i>Inachis io</i> )                     |                                     |
| Red Admiral ( <i>Vanessa atalanta</i> )           |                                     |
| Small Copper ( <i>Lycaena phlaeas</i> )           |                                     |
| Small Skipper ( <i>Thymelicus sylvestris</i> )    |                                     |
| Small Tortoiseshell ( <i>Aglais urticae</i> )     |                                     |
| Small White ( <i>Pieris rapae</i> )               |                                     |
| Speckled Wood ( <i>Pararge aegeria</i> )          |                                     |
| <b>Odonata</b>                                    |                                     |
| Azure Damselfly ( <i>Coenagrion puella</i> )      |                                     |
| Blue-tailed Damselfly ( <i>Ischnura elegans</i> ) |                                     |
| Broad-bodied Chaser ( <i>Libellula depressa</i> ) |                                     |

| Species                                                 | Notes |
|---------------------------------------------------------|-------|
| Common Blue Damselfly ( <i>Enallagma cyathigerum</i> )  |       |
| Common Darter ( <i>Sympetrum striolatum</i> )           |       |
| Common Hawker ( <i>Aeshna juncea</i> )                  |       |
| Large Red Damselfly ( <i>Pyrrhosoma nymphula</i> )      |       |
| <b>Orthoptera</b>                                       |       |
| Field Grasshopper ( <i>Chorthippus brunneus</i> )       |       |
| Common Green Grasshopper ( <i>Omocestus viridulus</i> ) |       |
| Slender Ground-hopper ( <i>Tetrix subulata</i> )        |       |
|                                                         |       |



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Marches Ecology

# C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Impact Assessment

## Figure 1 – Site Location

Drawn by: ME

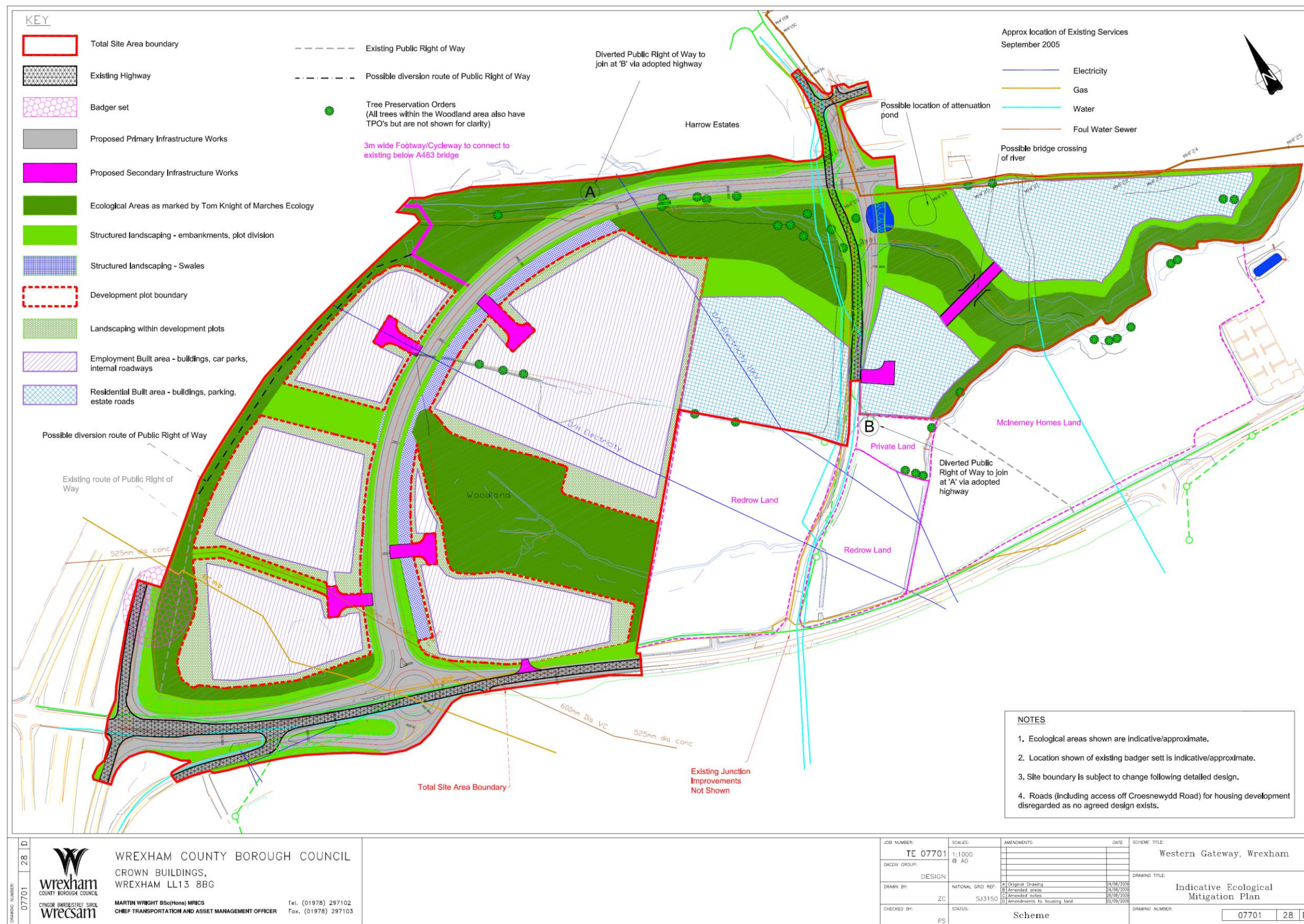
Checked by: TK

Date: 03.09.09

## Key



Approximate boundary





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## Marches Ecology

### C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Impact Assessment

Figure 3a – Extended Phase 1 Habitat Survey (West)

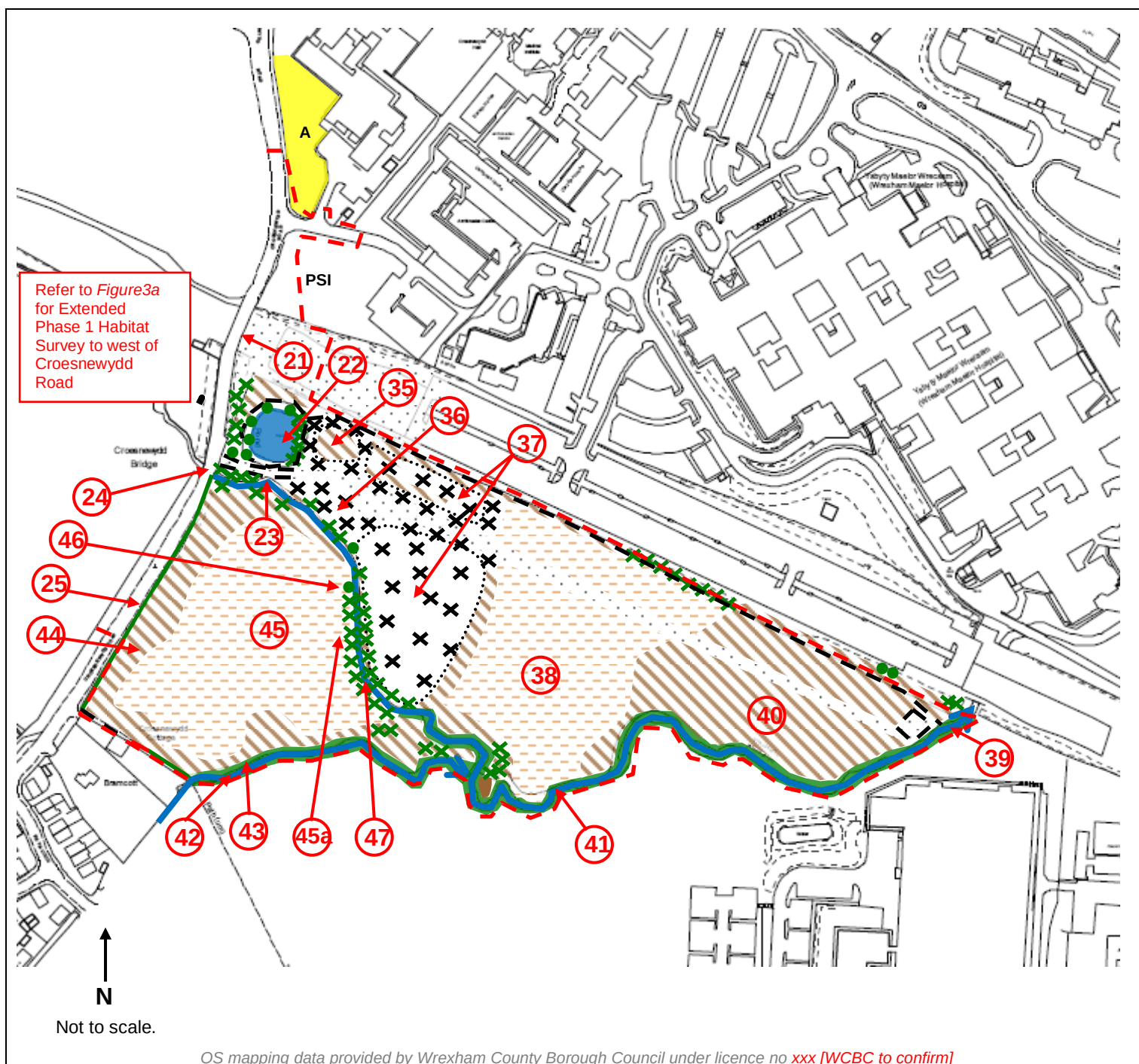
Drawn by: ME  
Checked by: TK  
Date: 03.09.09

#### Key

- Broad-leaved woodland
- Broad-leaved plantation woodland
- Continuous scrub
- Scattered scrub
- Broad-leaved tree (indicative only)
- Species-rich hedge
- Species-poor hedge

- Unimproved neutral grassland
- SI Semi-improved neutral grassland
- PSI Poor semi-improved neutral grassland
- I Improved grassland
- Tall-ruderal
- Tall-ruderal/ neutral grassland mosaic
- Swamp
- Standing water

- Running water
- Ditch
- Hard-standing / other habitat
- Building
- Fence-line / wall
- FJ *Fallopia japonica* (Japanese Knotweed)
- Survey boundary
- Target Note



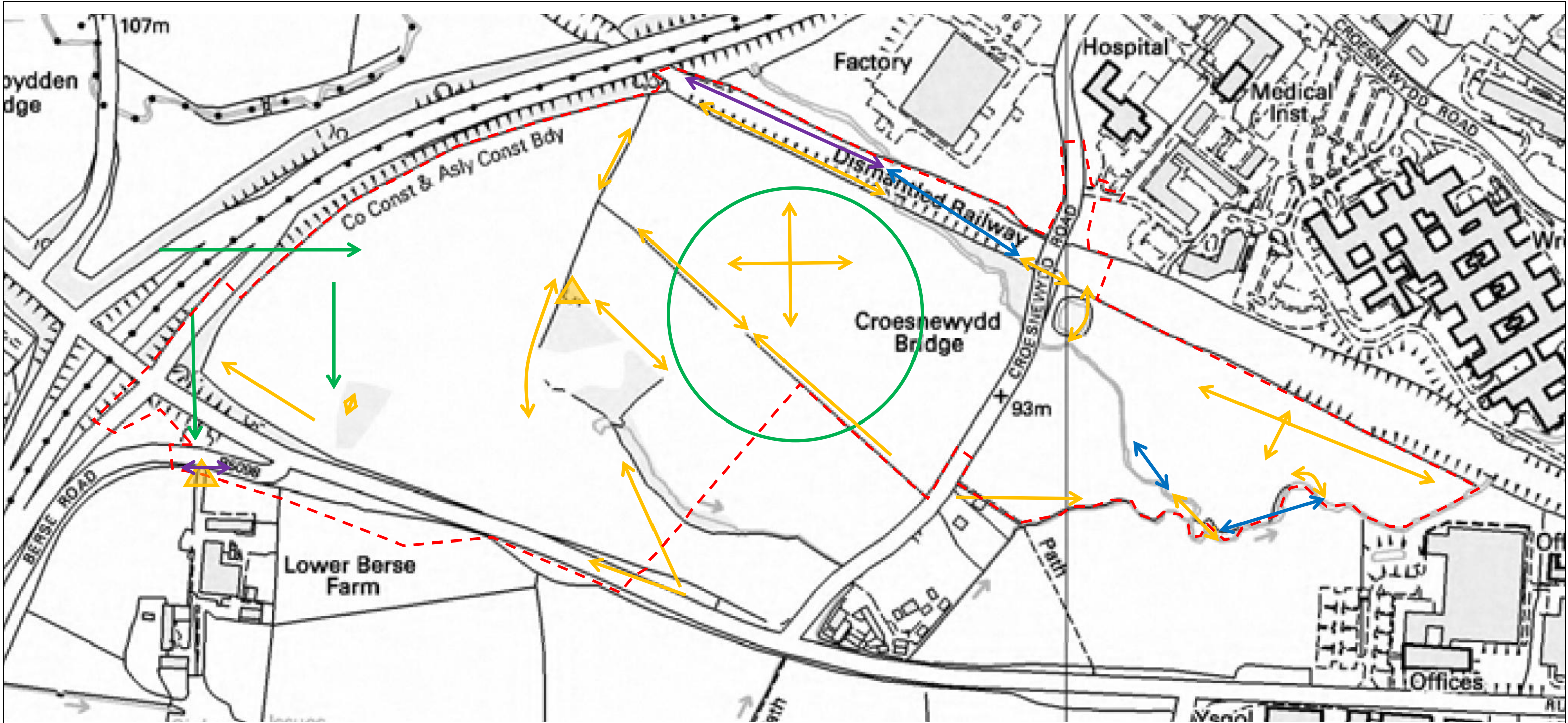
## Marches Ecology

C076 Western Gateway, Wrexham  
Technology Park, Wrexham –  
Ecological Impact Assessment

**Figure 3b – Extended Phase 1 Habitat Survey (East)**

- Key**
- Broad-leaved woodland
  - Scattered scrub
  - Broad-leaved tree (indicative only)
  - Species-poor hedge
  - A  
Amenity grassland
  - Bracken
  - Tall-ruderal
  - Tall-ruderal/ neutral grassland mosaic
  - Ephemeral/ short-perennial
  - Standing water
  - Running water
  - Hard-standing
  - Fence-line / wall
  - Survey boundary
  - 24  
Target Note

Drawn by: ME  
Checked by: TK  
Date: 03.09.09



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**Marches Ecology**

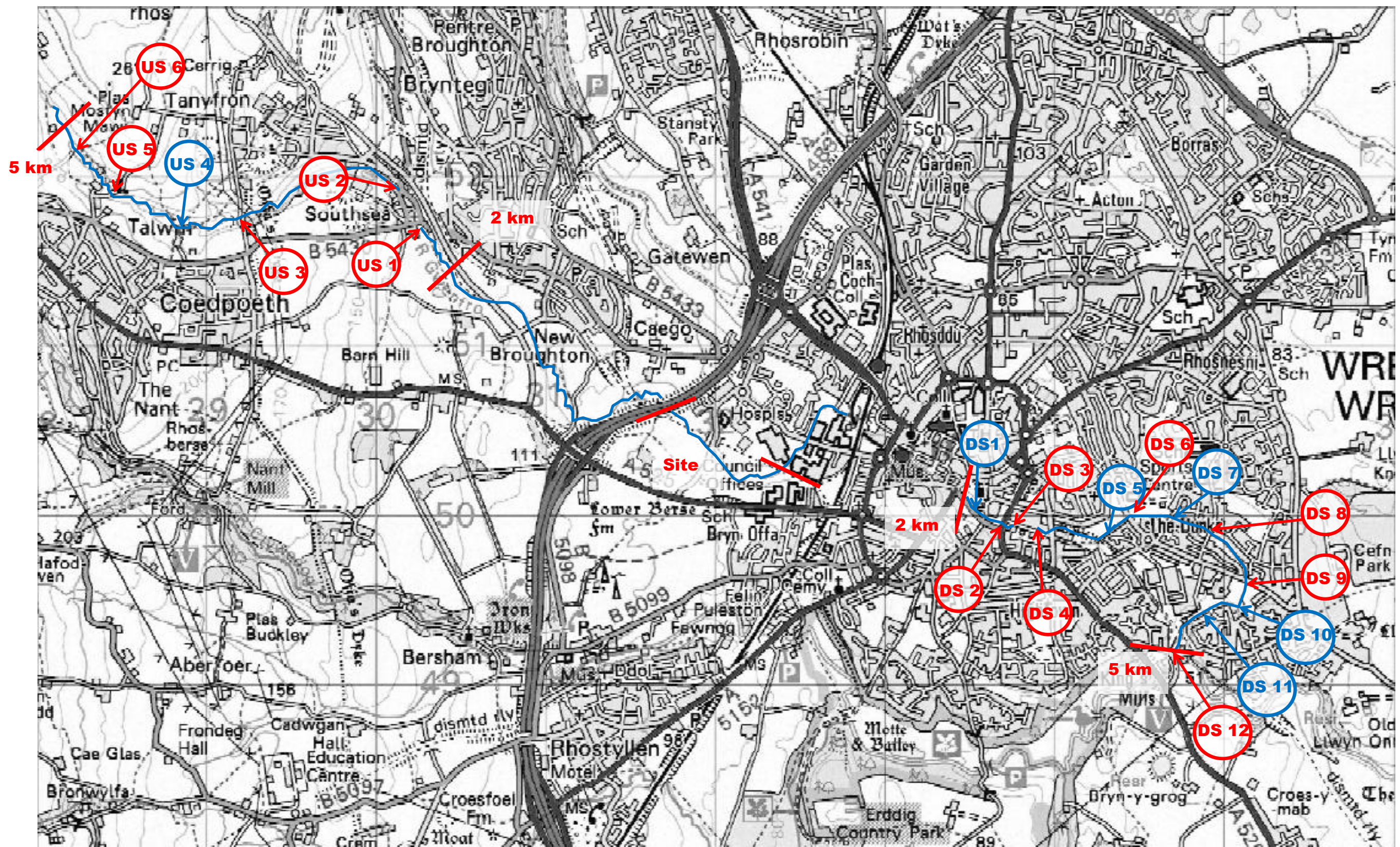
C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Impact Assessment

Figure 4 – Bat Activity Survey

Drawn by: ME  
Checked by: TK  
Date: 03.09.09

**Key**

- |                                                                                                                            |                                                                                                                    |                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|  Commuting route of Common Pipistrelle  |  Foraging Soprano Pipistrelle |  Foraging Whiskered/ Brandt's |
|  Foraging Common Pipistrelle            |  Flight path of Noctule       |  Survey boundary              |
|  Continuous Common Pipistrelle foraging |  Noctule foraging area        |                                                                                                                    |



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## Marches Ecology

C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Impact Assessment

Figure 5 – Otter Survey; Spot-check Locations

Drawn by: ME

Checked by: TK

Date: 03.09.09

### Key



Upstream spot-check location



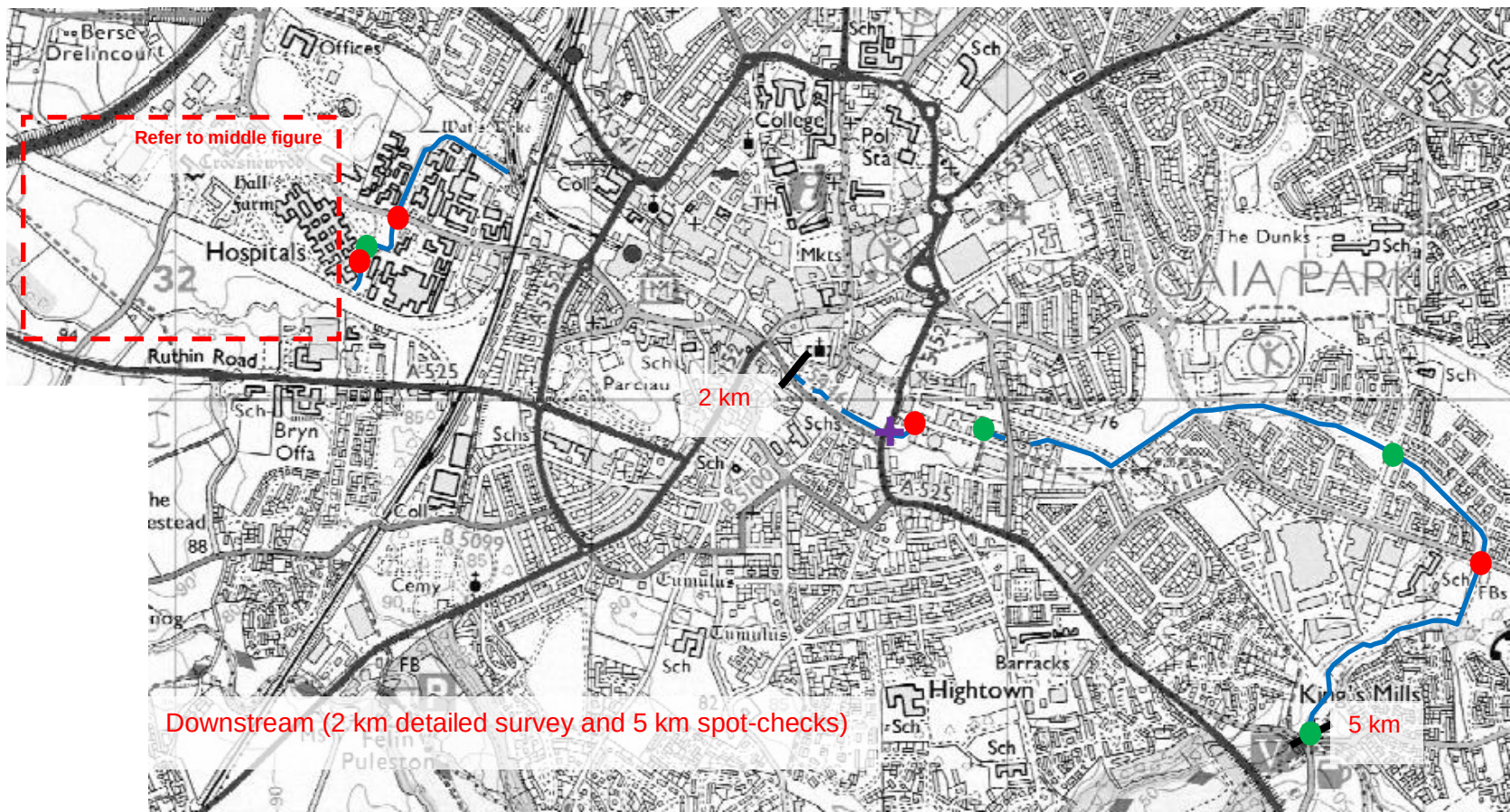
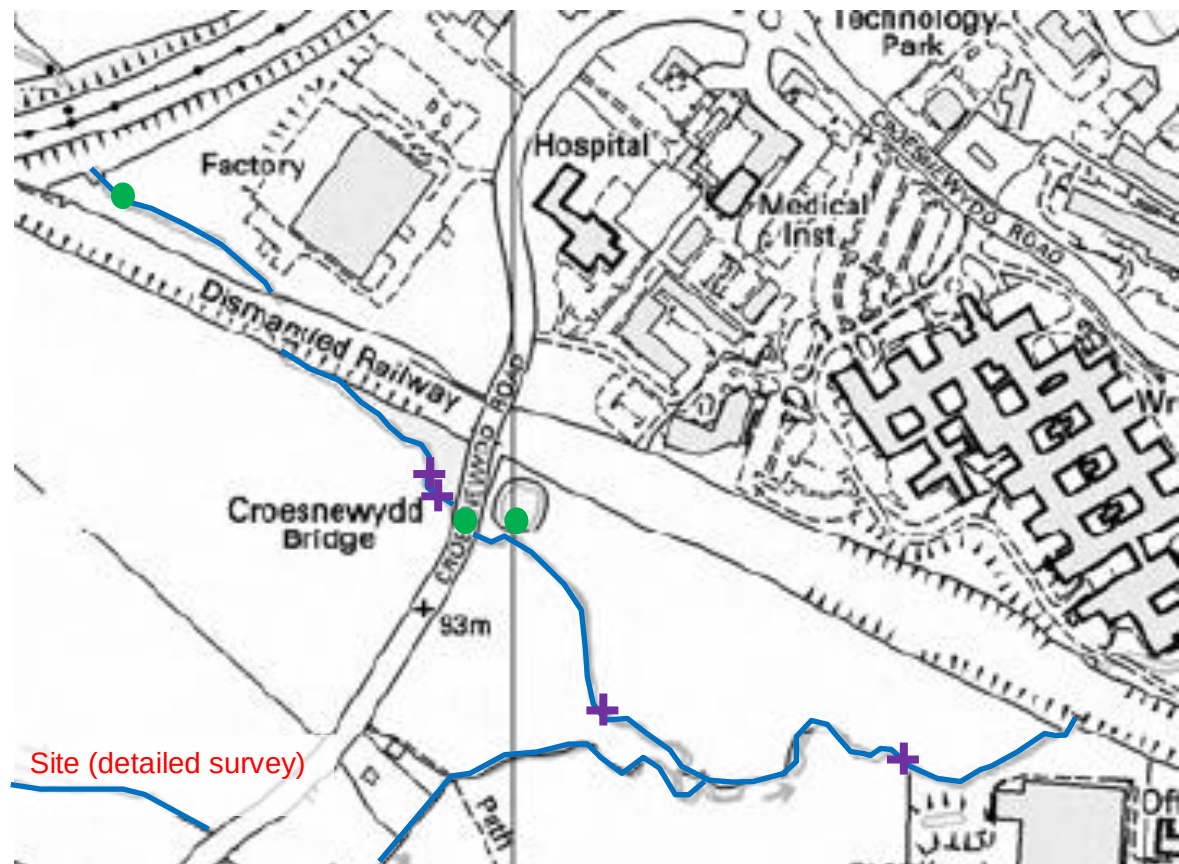
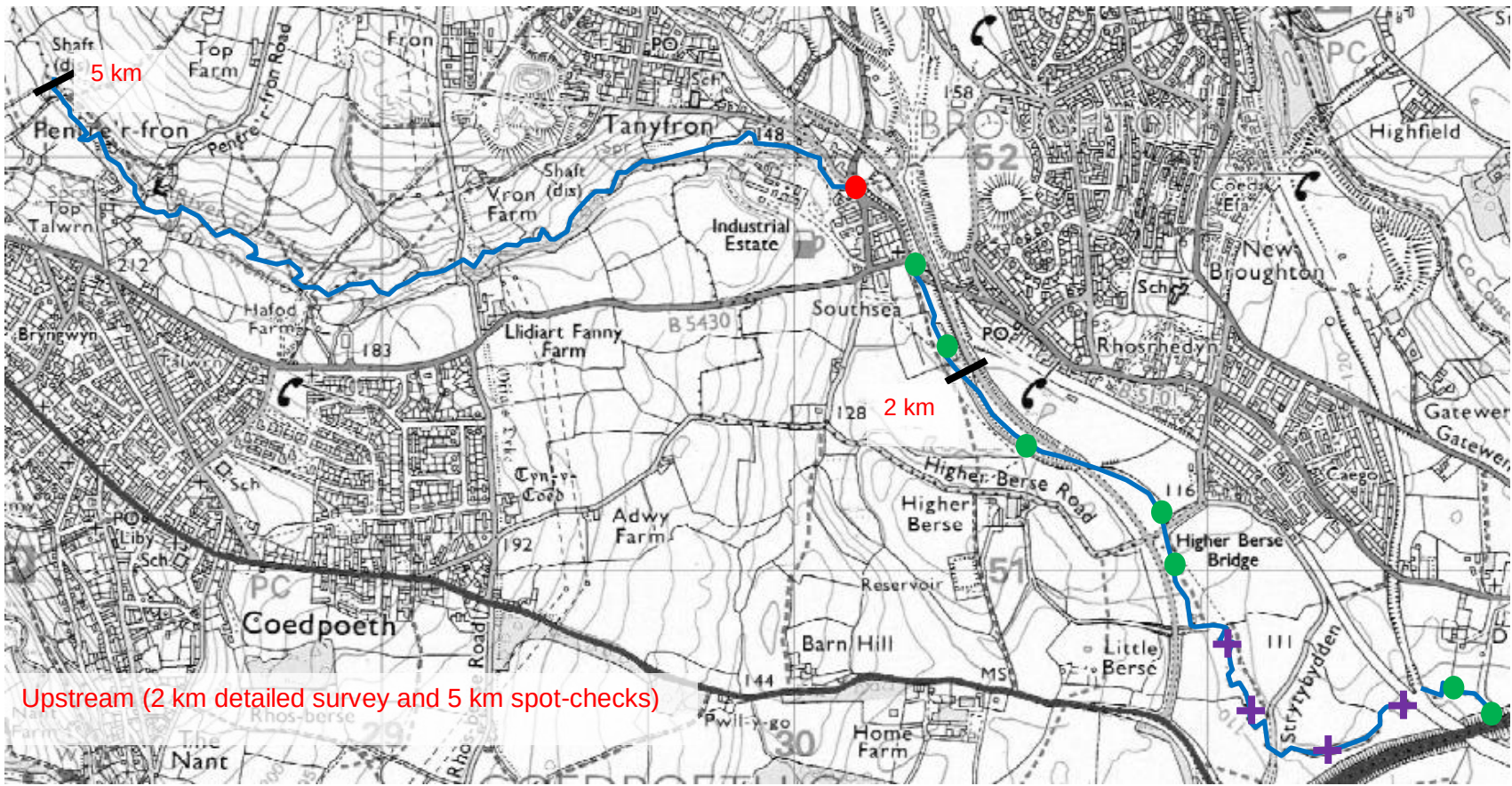
Potential upstream spot-check location (not used)



Downstream spot-check location



Potential downstream spot-check location (not used)



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N

Marches Ecology

C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Impact Assessment

Figure 6 (Sheet 1 of 4) – Otter Survey (Visit 1, 15/12/08)

Drawn by: ME  
Checked by: TK  
Date: 03.09.09

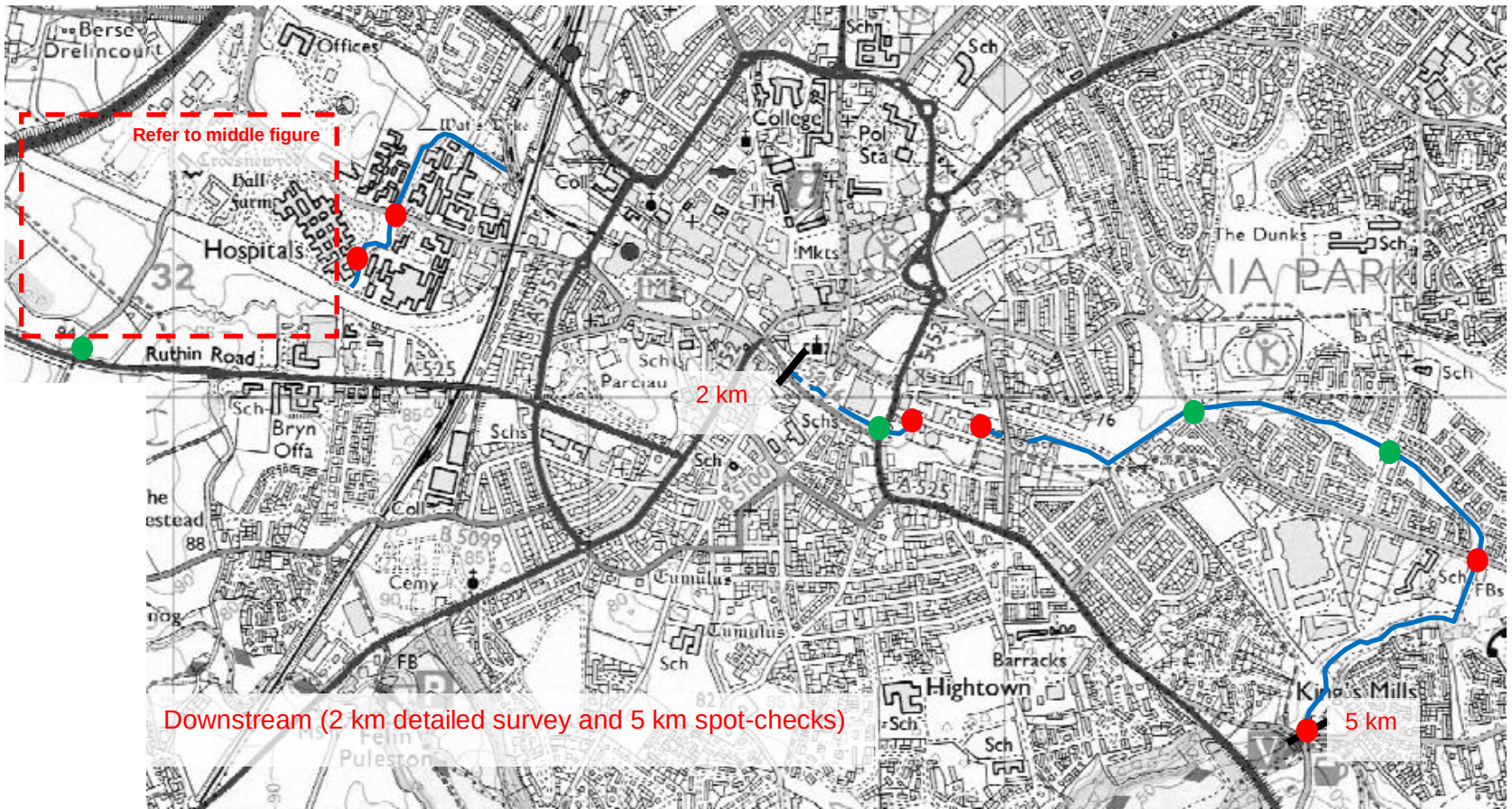
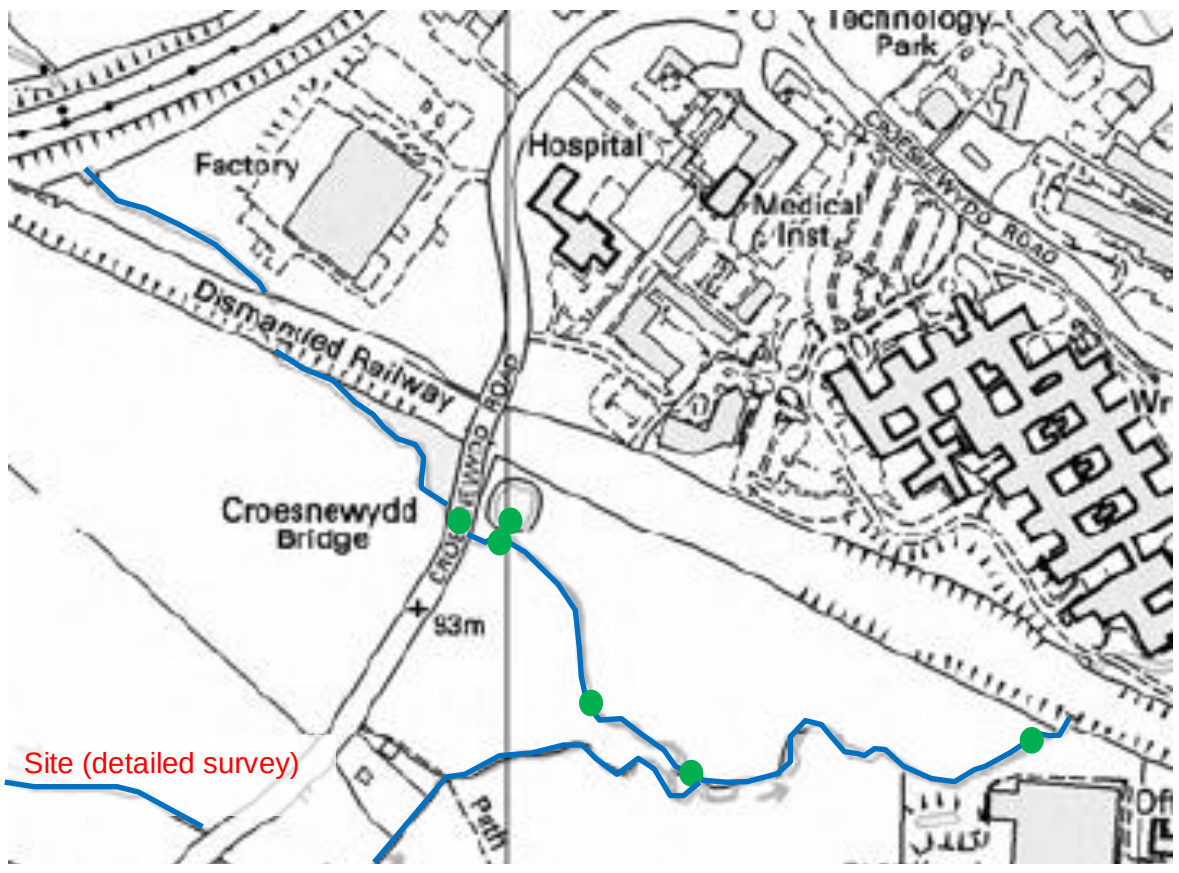
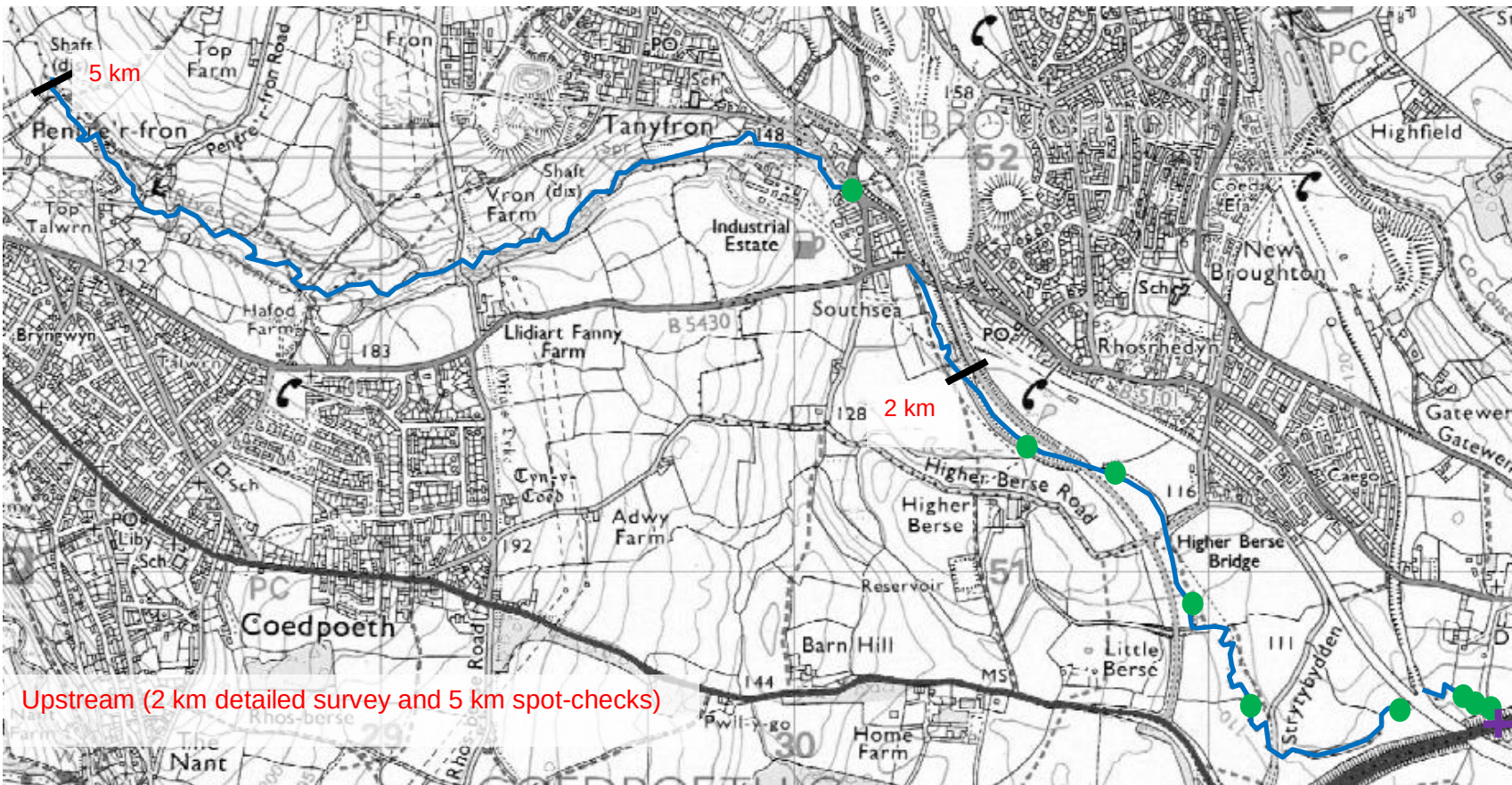
#### Key

● ≥ 5 spraints

● 1-4 spraints

⊕ Footprint(s) only

⊕ Probable lie-up site only



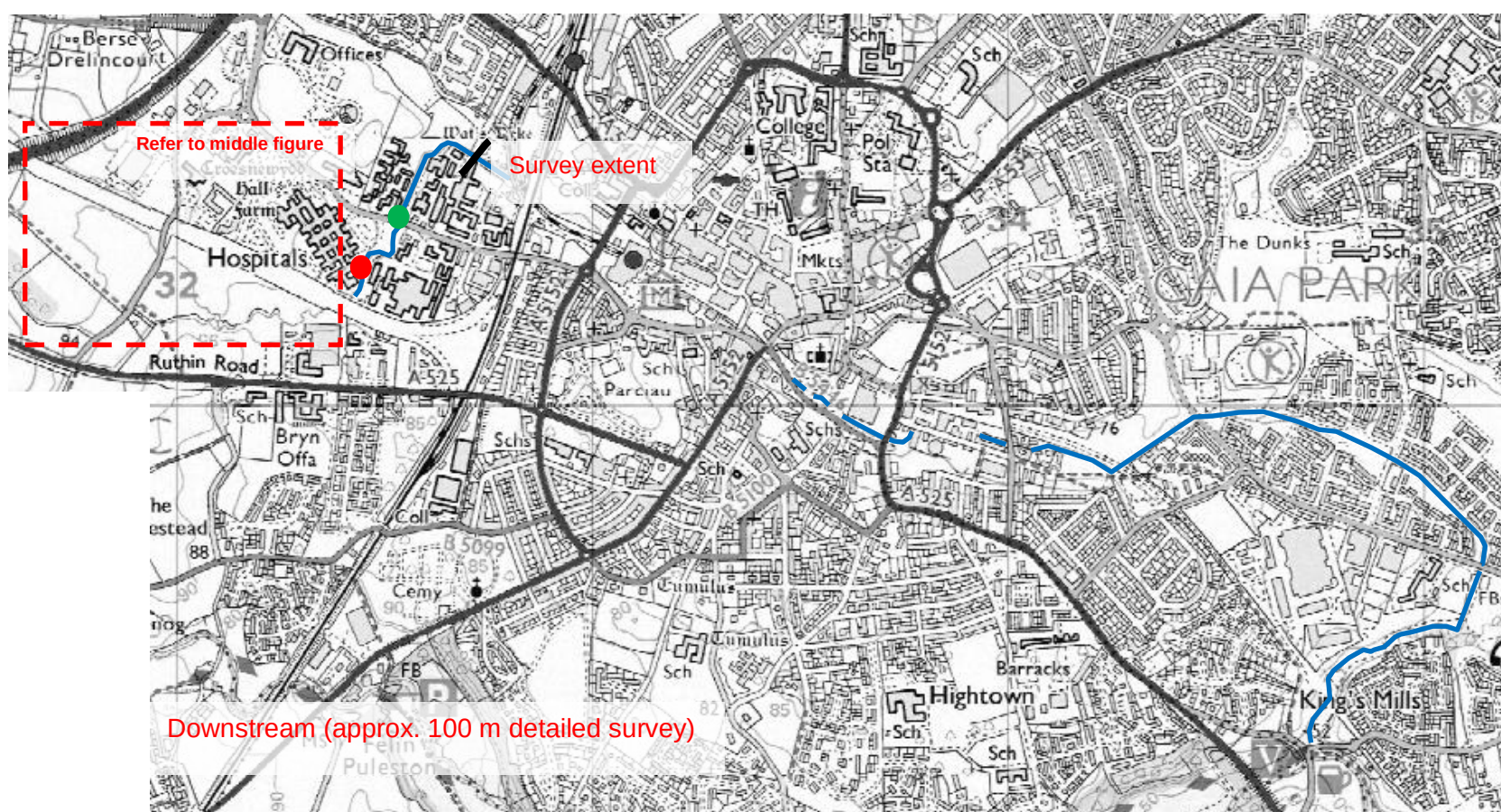
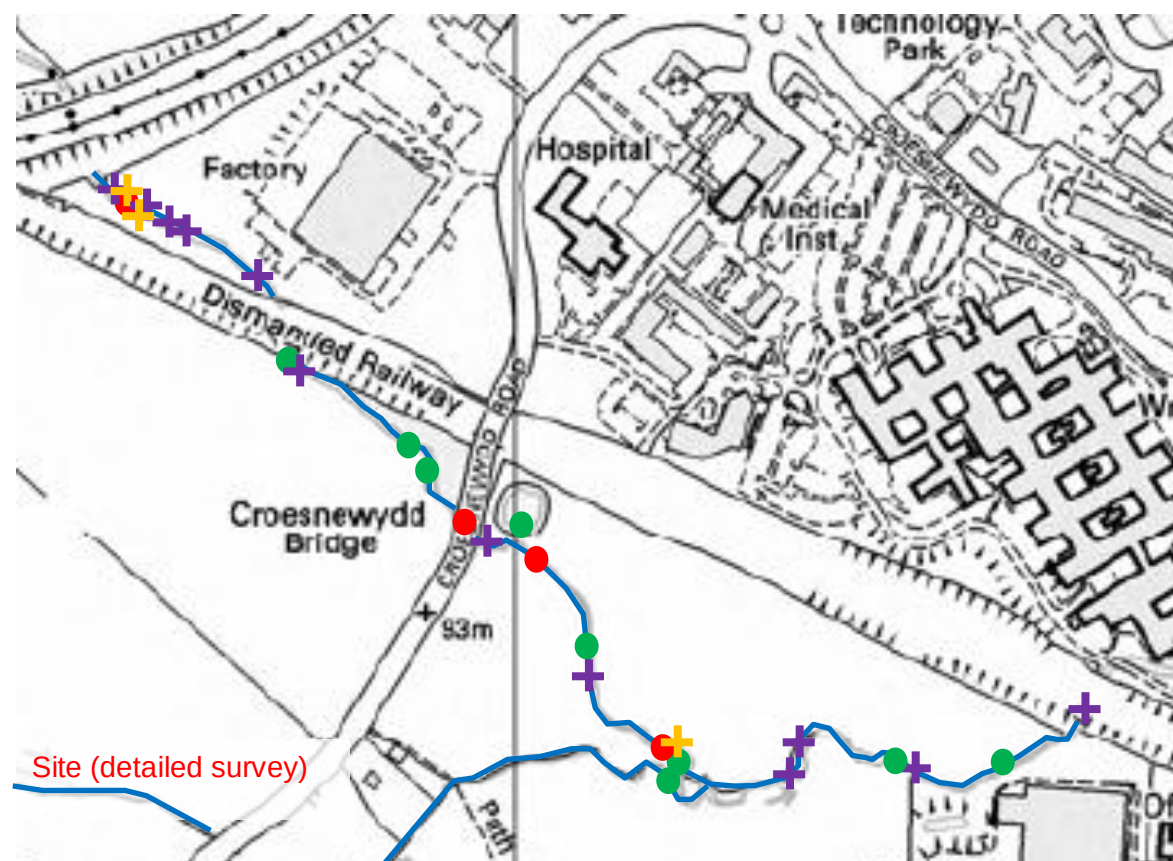
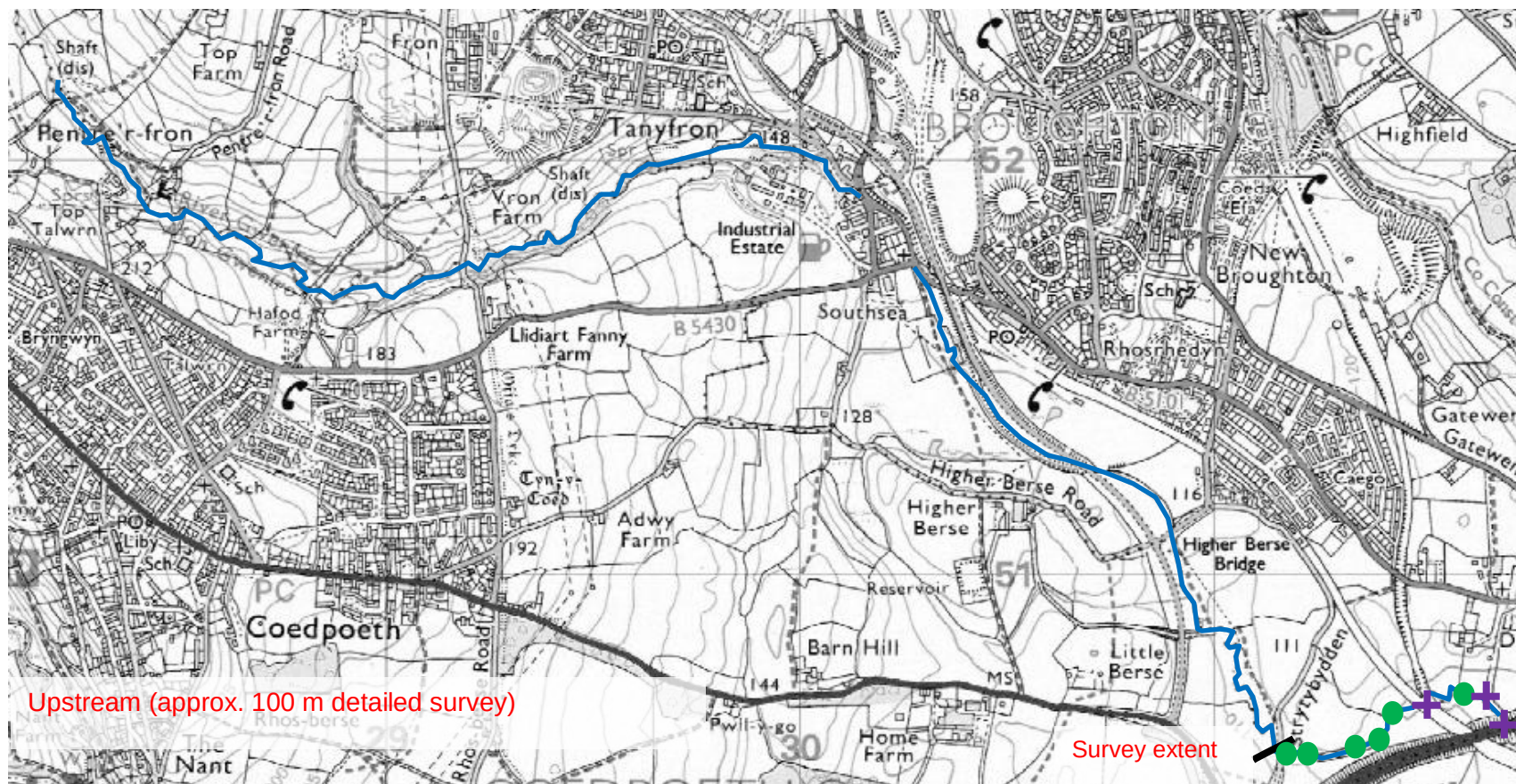
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N

## Marches Ecology

C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Impact Assessment  
Figure 6 (Sheet 2 of 4) – Otter Survey (Visit 2, 18/02/09)  
Drawn by: ME  
Checked by: TK  
Date: 06.08.09

- Key**
- ≥ 5 spraints
  - 1-4 spraints
  - ✚ Footprint(s) only
  - ✚ Probable lie-up site only



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## Marches Ecology

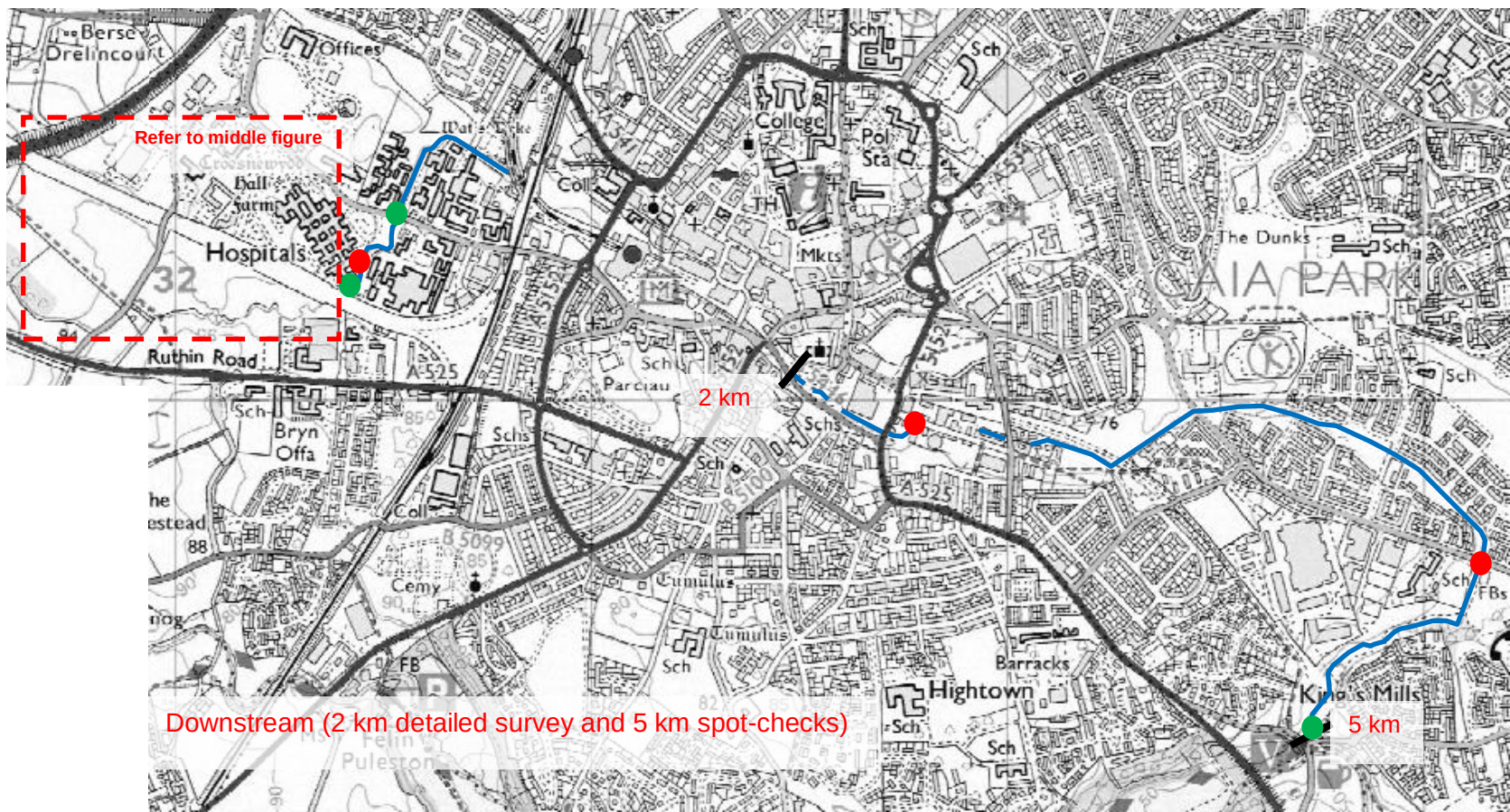
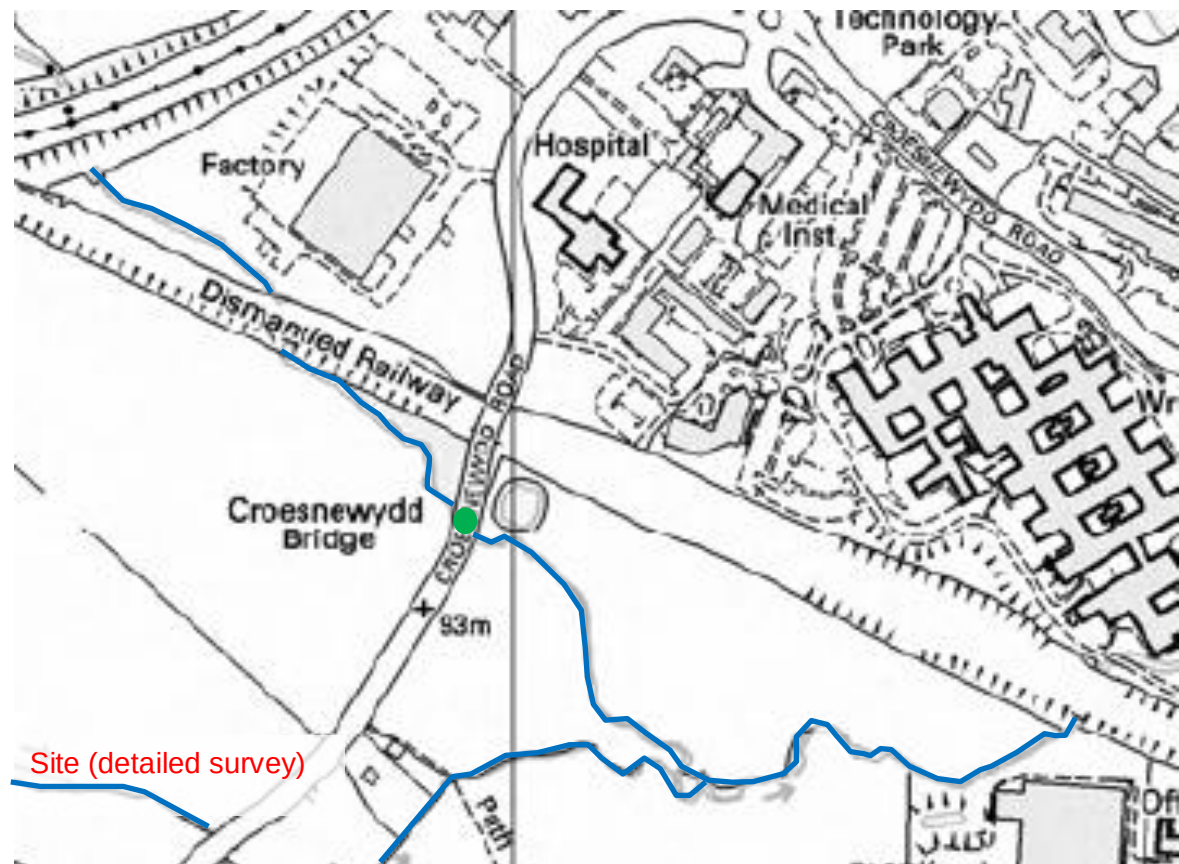
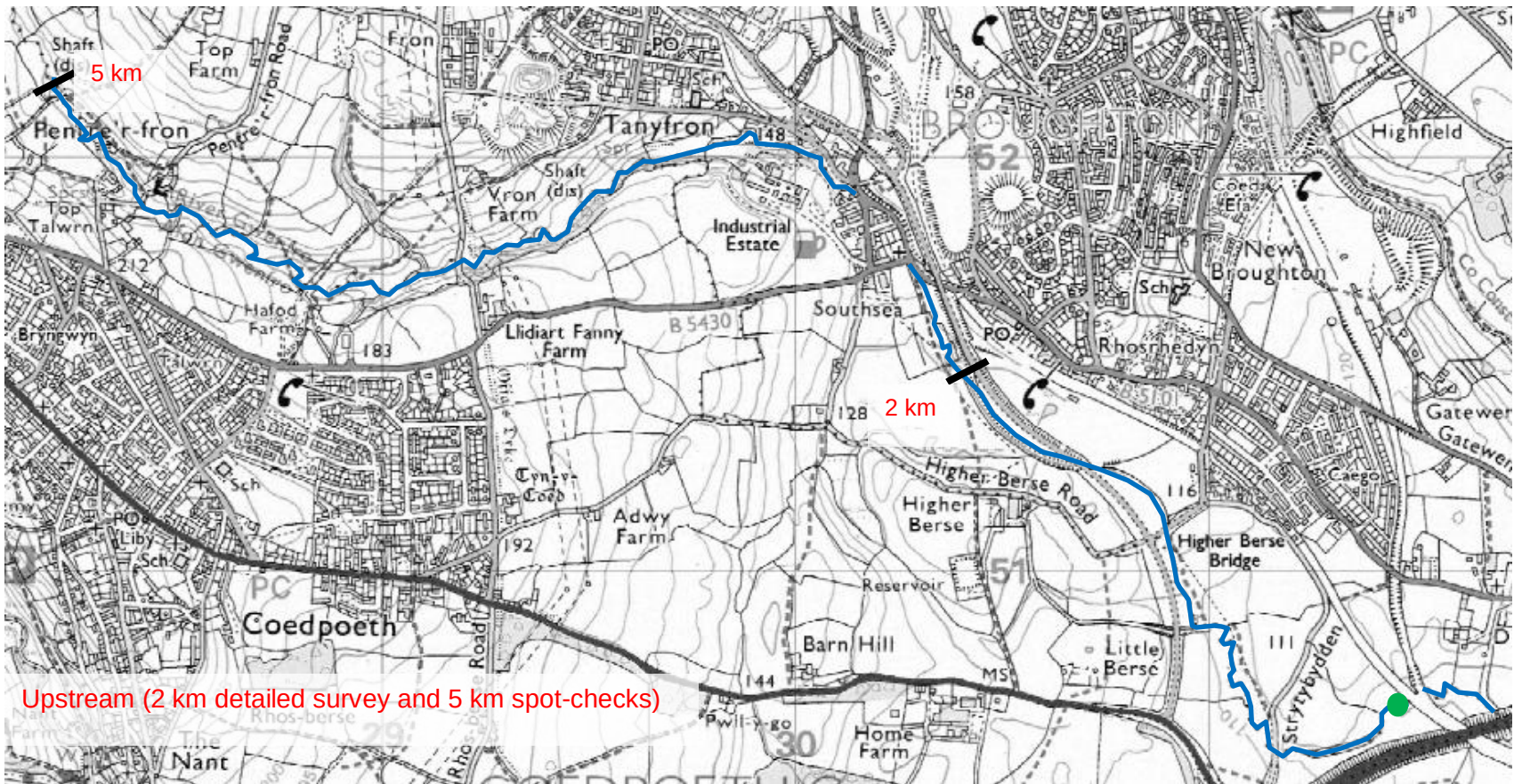
C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Impact Assessment

Figure 6 (Sheet 3 of 4) – Otter Survey (Visit 3, 26/05/09)

Drawn by: ME  
Checked by: TK  
Date: 03.09.09

### Key

- ≥ 5 sprints
- 1-4 sprints
- ✚ Footprint(s) only
- ✚ Probable lie-up site only



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N

Marches Ecology

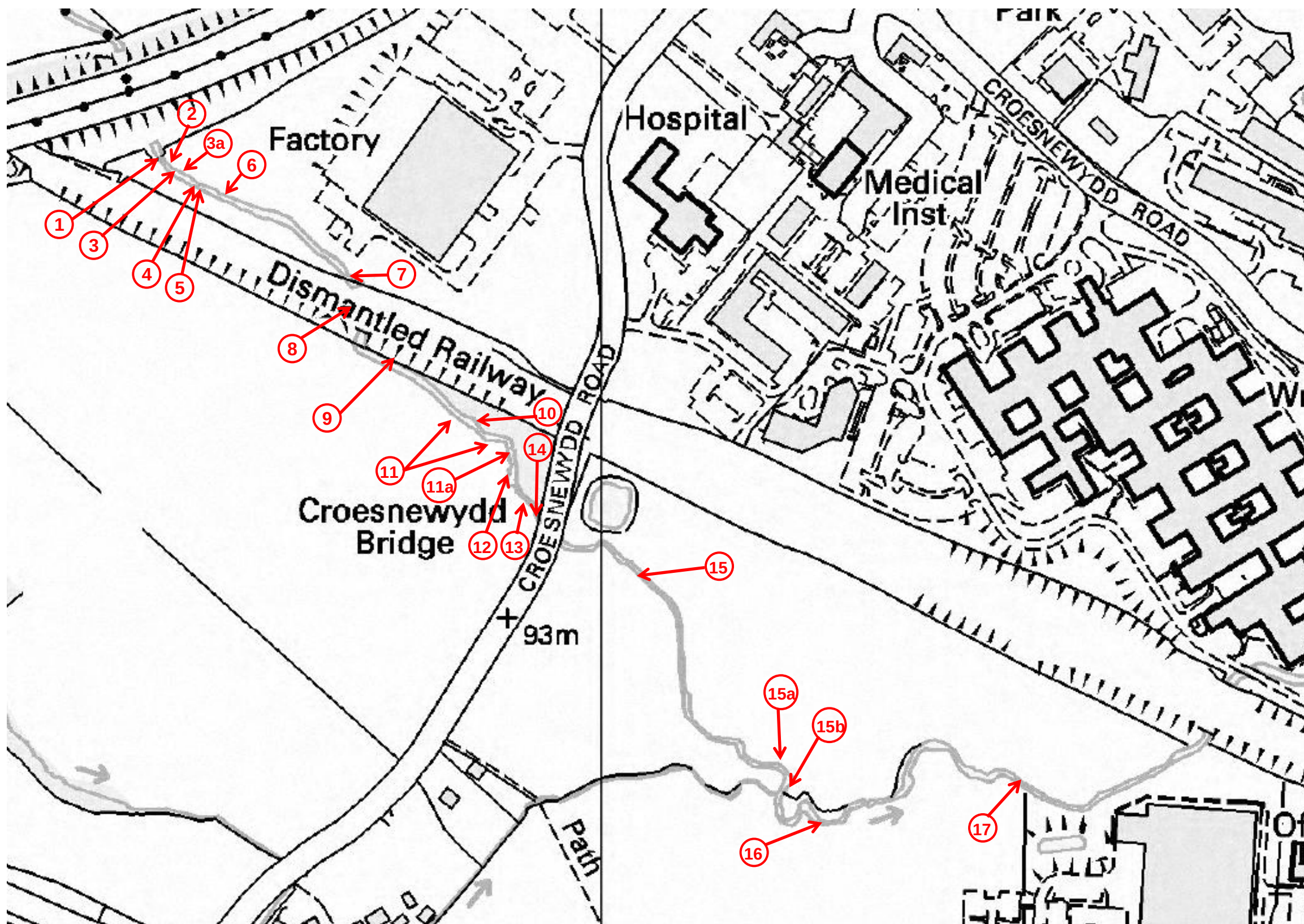
C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Impact Assessment

Figure 6 (Sheet 4 of 4) – Otter Survey (Visit 4, 31/07/09)

Drawn by: ME  
Checked by: TK  
Date: 06.08.09

Key

- ≥ 5 spraints
- 1-4 spraints
- ⊕ Footprint(s) only
- ⊕ Probable lie-up site only



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C076 Western Gateway, Wrexham Technology Park,  
Wrexham – Ecological Impact Assessment

Figure 7 – Otter Survey; Target Notes

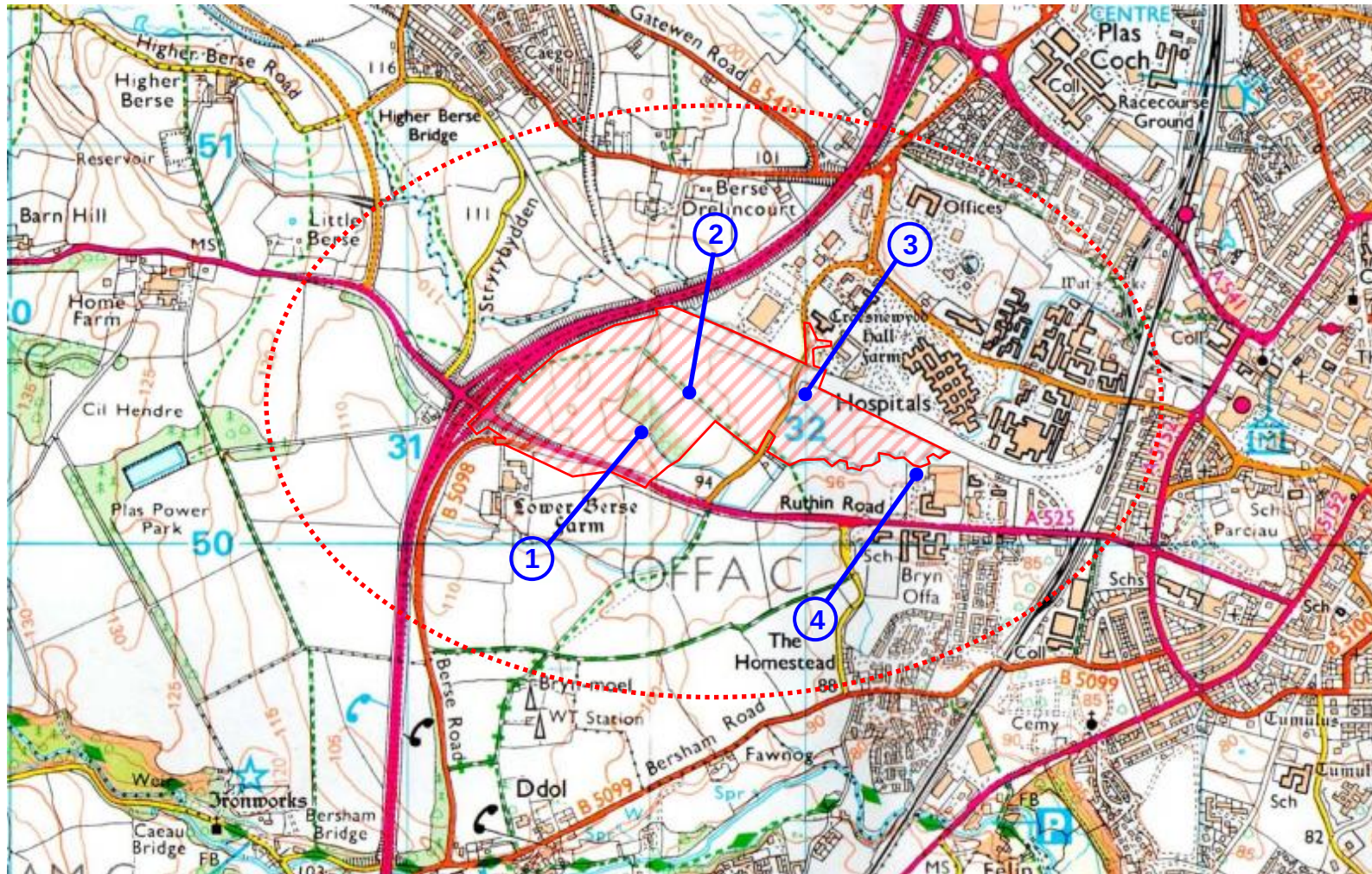
Drawn by: ME

Checked by: TK

Date: 03.09.09

Key

① Target Note



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Marches

Ecology

**C076 Western Gateway, Wrexham Technology Park, Wrexham – Ecological Impact Assessment**

**Figure 8 – Ponds within 500 m of the Proposed Development**

Drawn by: ME  
Checked by: TK  
Date: 03.09.09

#### Key

- Pond location
- ⋯ Approximate 500 m boundary
- Approximate proposed development site location

## Appendix C

# Relevant Protected Species Legislation

---

### Otter

Otter are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Habitats and Species Regulations 2010*. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Habitats Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill an otter;
- damage or destroy a breeding site or resting place of an otter; or
- deliberately disturb an otter in such a way as to be likely significantly to affect:
  - the ability of any significant group of otter to survive, breed, or rear or nurture their young; or
  - the local distribution or abundance of otter;
- intentionally or recklessly obstruct access to any place that an otter uses for shelter or protection; or
- intentionally or recklessly disturb an otter while it is occupying a structure or place that it uses for shelter or protection.

In addition, otter are listed on Annex II of the Habitats Directive. In certain circumstances where this species is found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status.

### Badger

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers Acts 1973 and 1991 Badgers (Further Protection) Act 1991*). It makes it a serious offence to:

- kill, injure or take a badger;
- attempt to kill, injure or take a badger; or
- to damage or interfere with a sett.

Badgers could be disturbed by work near a sett even if there is no direct interference or damage to the sett. Any works which may cause disturbance to badgers within a sett will require a licence from the Countryside Council for Wales.

### Bats (*Rhinolophidae* and *Vespertilionidae*)

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *Habitats and Species Regulations 2010*. They are afforded full

protection under Section 9(4) of the Act and Regulation 41 of the Habitats Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill a bat;
- damage or destroy a breeding site or resting place of any bat; or
- deliberately disturb a bat (this applies anywhere, not just at its roost) in such a way as to be likely significantly to affect:
- the ability of any significant group of bat species to survive, breed, or rear or nurture their young; or
- the local distribution or abundance of that bat species;
- intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not); or
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- greater horseshoe bat (*Rhinolophus ferrumequinum*);
- lesser horseshoe bat (*Rhinolophus hipposideros*);
- Bechstein's bat (*Myotis bechsteinii*);
- barbastelle (*Barbastella barbastellus*); and
- greater mouse-eared bat (*Myotis myotis*).

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

## **Birds**

With certain exceptions<sup>10</sup>, all wild birds, their nests and eggs are protected by section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls.

---

<sup>10</sup> Some species, such as game birds, are exempt in certain circumstances

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- intentionally or recklessly disturb the dependent young of any such bird.

**All wild mammals (including rabbits and foxes)**

Under the *Wild Mammals (Protection) Act 1996* it is an offence intentionally to cause unnecessary suffering to any wild mammal.

