Cardiff Parkway Developments Ltd

# Cardiff Hendre Lakes

## 2019 Extended Phase 1 Habitat Update Survey Report

Environmental Statement Appendix 7.2

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# 1 Introduction

## 1.1 Project Background

Ove Arup & Partners Ltd. (Arup) has been commissioned by Cardiff Parkway Developments Ltd (CPDL) to undertake baseline ecological surveys to inform the design and environmental assessment of a proposed new train station and expansion of the business park at St. Mellons, Cardiff. The site is centred on National Grid Reference (NGR) ST251808 and the planning boundary is shown on Figure 1. CPDL is proposing to develop a scheme that is an employment led development including a new railway station and park & ride facility.

The site currently consists of predominantly arable and pastoral farming on the western edge of St. Mellons. The site's field boundaries are formed by hedge and tree lines with reens[1] throughout. There is a lake, recreational grassland and woodland to the west of the site. The wider landscape comprises residential and commercial properties, and broad-leaved woodland to the north and west. To the south the land is bisected by the railway line with further neighbouring agricultural land. To the east there is agricultural land.

An extended Phase 1 Habitat Survey was undertaken in January 2017[2] to establish the habitats present on site and to assess the potential for legally protected species to be present. This survey informed the requirement for detailed flora and fauna surveys within the site and surrounding areas, including protected species surveys.

In 2019, the Phase 1 Habitat Survey was updated within the optimum survey period for habitats, with the aim to verify the findings of the 2017 Phase 1 survey and to include a survey of additional fields to the south-west and north-east of the 2017 survey extent. The revised study area for 2019 is shown in Figure 2.

This report details the findings of the 2019 update survey. No major changes were identified between the 2017 and 2019 surveys, with the exception of the appearance and disappearance of a few hedgerows. However, this was shown to be a mapping error.

This report identifies the presence of important habitat areas for protected species within the site, to inform the assessment of impacts on habitats from the proposed development as part of the Environmental Impact Assessment (EIA) in the Environmental Statement (ES).

## 1.2 Survey Objectives

The survey objectives were to:

- establish the baseline ecological conditions on site and within the immediate vicinity;

[1] Major man-made drainage channel or canalised stream which stays wet for the majority of the year and is managed by the internal drainage board (IDB) or Natural Resources Wales (NRW)
[2] Arup (2017) Cardiff Hendre Lakes | 2017 Extended Phase 1 Habitat Survey Report

- establish the potential of the site to support important habitats and notable/protected species;
- determine the need for further detailed survey requirements for flora and fauna (including protected species); and
- to provide sufficient information to inform the assessment of impacts on habitats from the proposed development as part of the EIA in the ES.

## 1.3 Legislative Context

A framework of international (European), national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. The following legislation exists to protect habitats and species of nature conservation importance:

- The Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitat Regulations) which transposes Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) into UK law;
- Birds Directive (Council Directive 2009/147/EC on the conservation of wild birds) (the Wild Birds Directive);
- Wildlife and Countryside Act 1981 (as amended) (WCA);
- Environment (Wales) Act 2016;
- The Countryside and Rights of Way Act 2000;
- The Hedgerow Regulations 1997; and,
- Protection of Badgers Act 1992.

These pieces of legislation include a number of offences relating to protected species and requirements for licences to allow works to proceed. In addition, the Habitats Regulations set out the requirement for the consideration of the potential effects of a project on European designated sites.

Actions which are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural Resources Wales (NRW), subject to conditions.

Full details of relevant legislation are provided in Appendix A.

# 2 Methodology

## 2.1 Desk Study

Records of protected and/or notable species, Schedule 9 invasive non-native species (INNS)[3] and non-statutory sites within 2km of the site centre point were obtained in 2017 from the South East Wales Biodiversity Records Centre (SEWBReC)[4]. The search was extended to 5km for records of bats.

A desk study was carried out in 2019 to identify statutory designated international sites and national sites within 5km and 2km of the planning boundary, respectively. Online searches were carried out using the Multi Agency Geographic Information for the Countryside (MAGIC)[5], the Joint Nature Conservation Committee (JNCC)[6] website, and NRW's website[7].

## 2.2 Field Survey

### 2.2.1 Habitats

The initial extended Phase 1 Habitat Survey was carried out on the 26th January 2017, with a survey specifically to identify INNS being carried out on the 14th and 23rd August, and 1st September 2017. Further details of this are given in the 2017 baseline survey report[2].

The update of the Phase 1 Habitat Survey was then conducted on the 8th and 16th July, and 22nd August 2019, to verify the results of the 2017 survey, and to survey additional fields to the south-west and north-east of the 2017 survey extent. This update was carried out within the optimal survey period (late March/early April to mid-October), to ensure a greater accuracy when compared to the 2017 survey, which was undertaken outside of the optimal survey period.

Surveys were carried out in accordance with standard JNCC Phase 1 Habitat Survey methodology[8]. Areas greater than 0.1ha were mapped and Target Notes (TN) were used to highlight any features/habitats of interest and/or provide suitable habitat for protected species. Details of the 2019 Target Notes are provided in Appendix B. Surveys were undertaken by pairs of surveyors, with at least one being an experienced and suitably qualified ecologist (SQE) from Arup.

[3] Invasive non-native species (INNS) as listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)
[4] http://www.sewbrec.org.uk/home.page with data received on the 31st January 2017
[5] http://magic.defra.gov.uk/ Accessed online 19th December 2019
[6] http://jncc.defra.gov.uk Accessed online 19th December 2019
[7] https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en Accessed online 19th December 2019
[8] Joint Nature Conservation Committee, 2010. Handbook for Phase 1 habitat survey – a technique for environmental audit. http://jncc.defra.gov.uk/page-2468

In 2019, Arup ecologists were assisted on occasion by Matt Levan of Levan Ecology Ltd[9].

As described above, this report details the findings of the 2019 update survey, with no major changes being identified between the 2017 and 2019 surveys.

### 2.2.2 Species

In conjunction with the habitat survey, the potential for the site to support any legally protected species and/or other species of nature conservation importance were recorded.

Relevant species included all those protected by European or UK legislation, and notable species including those listed in response to the requirements of Section 7 of the Environment (Wales) Act 2016 (see Appendix A for protected species and relevant legislation).

The potential for the site to support each species/species group was assessed based on the known range of each species/species group and the suitability of the habitats within the site. Any field evidence or sightings of such species was recorded as seen. The following species were considered:

**Invasive Plants**

The site was searched for evidence of plant INNS, such as Japanese knotweed *Reynoutria japonica*, Himalayan balsam *Impatiens glandulifera* and giant hogweed *Heracleum mantegazzianum*.

**Amphibians**

The site was appraised for its suitability to support amphibians, both protected species and species of conservation concern. Where permanent ponds or reens were present on the site they were subjected to a Habitat Suitability Appraisal[10] to assess their potential to support great crested newt *Triturus cristatus*.

**Reptiles**

The site was appraised for its suitability to support reptiles. The assessment was based on guidance outlined in the Joint Nature Conservation Committees' published Herpetofauna Workers' Manual[11].

**Birds**

The site was surveyed for habitat suitable to support bird species of conservation significance. Any bird species seen at the site were recorded and any further evidence of species such as old nests or owl pellets was noted.

**Bats**

[9] http://www.levanecology.co.uk/
[10] Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M., 2000. Evaluating the suitability for the Great Crested Newt (*Triturus cristatus*). Herptological Journal 10(4), 143-155.
[11] Gent, T. and Gibson, S. (2003). *Herpetofauna Workers Manual.* JNCC, Peterborough

Any buildings/trees within the boundary were appraised for their suitability to support breeding, resting and hibernating bats using survey methods based on those outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines[12].

### Badger

Any evidence of badger *Meles meles* setts or other badger activity such as paths, latrines or signs of foraging found during the walk over was target noted and mapped. Survey methodology used and any setts recorded were classified according to published criteria[13].

### Otter

Water bodies on the site were assessed for their suitability to support otter *Lutra lutra*. This assessment was based on guidance outlined from English Nature[14].

### Water Vole

Water bodies on the site were assessed for the suitability for water vole *Arvicola amphibius* using published guidance[15].

### Other Species

The site was also appraised for its suitability to support other protected or notable flora and fauna including aquatic and terrestrial plants and invertebrates.

The extended Phase 1 Habitat Survey methodology enables an experienced ecologist to obtain a sufficient understanding of the ecology of a site in order to either confirm the conservation importance of the site and assess the potential for impacts on habitats/species likely to represent a material consideration in planning terms, or to ascertain that further surveys will be required before such confirmation can be made.

## 2.3 Limitations and Assumptions

The initial field survey in 2017 was carried out in January, which is outside of the optimal survey period (considered to be late March/early April to mid-October). However, this is not considered to significantly affect the results obtained, as the update survey in 2019 was carried out in July and August, within the optimal survey period, and no major changes were identified between the 2017 and 2019 surveys.

Some areas of the survey area were inaccessible due to dense vegetation and health and safety concerns, e.g. cattle, railway line and waterbodies. In these areas where surveying was not possible the detectability of some species may decrease, e.g. badgers. However, the sizes of these areas were relatively small when

[12] Hundt, L. 2012. Bat Surveys: Good Practice Guidelines, 2nd Edition. Bat Conservation Trust.
[13] Harris, S., Cresswell, P. and Jefferies, D., 1989. Surveying Badgers. Mammal Society.
[14] Chanin, P., 2003. Monitoring the Otter, *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10., English Nature, Peterborough.
[15] Strachan, R. and Moorhouse, T., 2006. Water Vole Conservation Handbook, 2nd Edition. Wildlife Conservation Research Unit (WildCRU), Oxford University.

compared to the total size of the site (<10%) and a representative assessment of the land was able to be undertaken in order to fulfil this report's objectives. If there was the potential for protected and notable species to be present within the study area, further detailed surveys were advised.

It should be stressed that the findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of species, such as temporal weather conditions, migration patterns and behaviour.

The weather is not considered to be a limitation, as all surveys were undertaken during optimal weather conditions. Every effort has been made to ensure that the findings of the study present as accurate an interpretation as possible of the species and habitats within the study area.

# 3 Results

## 3.1 Desk Study

### 3.1.1 Statutory Sites

The search in 2019 using MAGIC highlighted three international sites and three national statutory designated sites within 5km and 2km of the site boundary, respectively. These comprised one Special Area of Conservation (SAC), one Special Protection Area (SPA), one Ramsar site, and three Sites of Special Scientific Interest (SSSI). All statutory designated sites are detailed in Table 1 below and displayed on Figure 1.

Table 1. Statutory international and national designated sites within 5km and 2km of the site boundary, respectively. Distances are approximate.

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| **International sites** | | |
| Severn Estuary SAC | Annex I habitats that are a primary reason for selection of this site:<br>Estuaries<br>Mudflats and sandflats not covered by seawater at low tide<br>Atlantic salt meadows *Glauco-Puccinellietalia maritimae*<br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:<br>Sandbanks which are slightly covered by sea water all the time<br>Reefs<br>Annex II species that are a primary reason for selection of this site:<br>Sea lamprey *Petromyzon marinus*<br>River lamprey *Lampetra fluviatilis*<br>Twaite shad *Alosa fallax* | 1.1km south |
| Severn Estuary SPA | This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:<br>Overwintering Bewick's swan *Cygnus columbianus bewickii*<br>This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:<br>On passage ringed plover *Charadrius hiaticula*<br>Overwintering curlew *Numenius arquata*<br>Overwintering dunlin *Calidris alpina alpina*<br>Overwintering pintail *Anas acuta*<br>Overwintering redshank *Tringa totanus* | 1.1km south |

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| | Overwintering shelduck *Tadorna tadorna*<br>The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting an assemblage of at least 20,000 waterfowl. | |
| Severn Estuary Ramsar Site | Designated for the following Ramsar Criteria:<br>Ramsar criterion 1: Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities.<br>Ramsar criterion 3: Due to unusual estuarine communities, reduced diversity and high productivity.<br>Ramsar criterion 4: This site is important for the run of migratory fish between sea and river via estuary. Species include Atlantic salmon *Salmo salar*, sea trout *Salmo trutta*, sea lamprey, river lamprey, allis shad *Alosa alosa*, twaite shad, and European eel *Anguilla anguilla*. It is also of particular importance for migratory birds during spring and autumn.<br>Ramsar criterion 8: The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. The fish described above use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad and twaite shad which feed on mysid shrimps in the salt wedge.<br>Ramsar criterion 5: Supporting an overwintering assemblage of up to 70919 waterfowl.<br>Ramsar criterion 6: Species / populations occurring at levels of international importance, including those mentioned in the SPA designation and greater white-fronted goose *Anser albifrons* and gadwall *Anas strepera*. | 1.1km south |
| **National sites** | | |
| Gwent Levels – Rumney and Peterstone SSSI | The Gwent Levels constitute the lowlands between Cardiff and Chepstow and are drained by an ordered network of drainage ditches. They are an example of one of the most extensive areas of reclaimed wet pasture in Great Britain.<br>The Gwent Levels reens are rich in plant species and communities, many of which are rare or absent in other Levels systems. This is due to the variety of reen types and their management regimes and the timing of the management which results in a staggered programme across the Levels. The regular maintenance of some reens provides conditions for submerged plant species such as hairlike pondweed *Potamogeton trichoides* and openwater emergents such as arrowhead *Sagittaria sagittifolia* an opportunity to flourish. Others are less intensively managed, and some have become completely overgrown by weeds and hedges.<br>The aquatic invertebrate fauna is very diverse, and the Gwent Levels compares well with similar areas in Britain. Many nationally rare or notable species are present such as *Haliplus mucronatus* and *Hydrophilus piceus*. The area is | Within site boundary |

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| | important in the Welsh context for its snails and dragonflies and includes the species *Physa heterostropha* and *Brachytron pratense* respectively. The larger number of hedgerows add to the diversity of the area and, together with the main reen banks, provide a habitat for nationally important assemblages of terrestrial invertebrates such as *Pipunculus fonsecai* and *Tomosvaryella minima*.<br>The Rumney and Peterstone area supports a number of important plant species including the nationally rare brackish water-crowfoot *Ranunculus baudotii* and several regional rarities including blunt-leaved pondweed *Potamogeton obtusifolius* and small pondweed *Potamogeton berchtoldii*. The northern section of this SSSI is a stronghold on the Gwent Levels for the flowering rush *Butomus umbellatus*.<br>The area also supports a rich and important invertebrate fauna with a number of nationally notable species largely confined to this sub-unit including the marsh-flies *Pherbellia brunnipes* and *Lamprochromus elegans*, the water-beetle *Plateumaris braccata* and the variable damselfly *Coenagrion pulchellum*. | |
| Severn Estuary SSSI | The Severn Estuary lies on the south west coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk and Avon) and many lesser rivers. The immense tidal range (the second highest in the world) and classic funnel shape make the Severn Estuary unique in Britain and very rare worldwide. The intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain. The estuarine fauna includes: internationally important populations of waterfowl; invertebrate populations of considerable interest; and large populations of migratory fish, including the nationally rare and endangered allis shad. The SSSI forms the major part of a larger area of estuarine habitat, which includes the Upper Severn Estuary, the Taf/Ely Estuary and Bridgwater Bay. | 1.1km south |
| Gwent Levels – St. Brides SSSI | The information above (for the Gwent Levels – Rumney and Peterstone SSSI) is applicable here with regards to the general ecology of the Gwent Levels SSSI. In addition, the following information is specific to the St Brides area:<br>The reens in the St Brides area support a number of interesting plant species most notably thread-leaved water-crowfoot *Ranunculus trichophyllus* and small pondweed. Reen bank and green lane habitats in this area are also important for relict meadow plant species such as the regionally notable grass vetchling *Lathyrus nissolia* and common meadow-rue *Thalictrum flavum*. The St Brides area also supports rich invertebrate communities with a number of nationally rare and notable marshland species, e.g. the true fly *Chrysogaster macquarti* and the beetle *Hydaticus transversalis*. It is the only area on the Gwent Levels where the rare fly *Stenomicra cogani* has been recorded. | 1.3km east |

### 3.1.2 Non-Statutory Sites

SEWBReC provided details of non-statutory sites on the 31st January 2017. Within 2km of the site boundary there are 13 non-statutory Sites of Importance for Nature Conservation (SINCs) and one Wildlife Trust Reserve. These are detailed in Table 2 and displayed on Figure 1.

Table 2. Locally designated non-statutory sites within 2km of the site boundary. Distances are approximate.

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| Marshfield SINC | This is an area of damp semi-improved neutral grassland, divided by ditches and hedges. The main plant species are creeping bent *Agrostis stolonifera* and Timothy-grass *Phleum pratense* with rushes *Juncus spp.*, e.g. soft rush *Juncus effusus*, and a moderate diversity of flowering herbs. | Lies within planning boundary |
| Hendre Lake SINC | Hendre Lake SINC is an artificial fishing lake with a small central island. In 2010 0.3ha of reedbeds were present, although they are grazed on by coot *Fulica atra* and Canada geese *Branta canadensis.* The site is used by wintering bittern *Botaurus stellaris*, little egret *Egretta garzetta* and Cetti's warbler *Cettia cetti*. Otter and water vole have the potential to use the site. | Immediately west |
| Hendre Lake West SINC | This site is designated for its grassland habitat, which is distinct from the reen features of the Gwent Levels SSSIs. The eastern area encompasses a mix of damp semi-improved grassland, dominated by creeping bent, hairy sedge *Carex hirta* and greater bird's foot trefoil *Lotus pedunculatus* with a number of herb species. More westwards the habitat is dominated by grasses, e.g. Yorkshire fog *Holcus lanatus*, creeping bent, Timothy-grass, false oat-grass *Arrhenatherum elatius* and perennial rye-grass *Lolium perenne*, including a greater diversity of flowers, e.g. yellow rattle *Rhinanthus minor*. Redshank and bittern have both been recorded here. Priority habitats include lowland meadow and purple moor grass and rush pasture priority habitats. | 350m west |
| Hendre Road SINC | Hendre Road SINC is important for semi-improved neutral grassland dominated by coarse grasses, with localised rushes and stands of tall herbs, and marshy grassland, with soft rush, hard rush *Juncus inflexus*, floating sweet-grass *Glyceria fluitans*, sneezewort *Achillea ptarmica* and water purslane *Lythrum portula*. The mosaic of habitats is completed by reens, hedgerows and small patches of scrub. | 980m west |
| Tyla Farm Wood SINC | This site is an ancient semi-natural woodland split into two by the A48 (M). Streams with otter records are present within the site. Species indicative of the ancient semi-natural woodland have been recorded here including: scaly male fern *Dryopteris affinis*, wood-sorrel *Oxalis spp*. and yellow pimpernel *Lysimachia nemorum*. Green woodpecker *Picus viridis* has also been recorded here. | 980m north |
| The Homestead SINC | This site is an area of unimproved neutral grassland. | 990m north |

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| Rumney Great Wharf SINC | Rumney Great Wharf SINC is an important site for birds, with species such as short-eared owl *Asio flammeus*, great egret *Ardea alba*, garganey *Anas querquedula*, spotted redshank *Tringa erythropus*, water pipit *Anthus spinoletta*, and northern wheatear *Oenanthe oenanthe*. | 1km south-west |
| Cath Cobb Wood SINC | Cath Cobb Wood SINC is a secondary oak/ash woodland with a good shrub and ground layer, with many ancient semi-natural woodland indicator species including dog's mercury *Mercurialis perennis*, pendulous sedge *Carex pendula* and yellow archangel *Lamium galeobdolon*. A pond with characteristic aquatic and emergent plant species adds botanical and amphibian interest. The Faendre Reen passes through the woodland into Hendre Lake and the Wentloog Levels, creating damper areas adding to the variety of botanical interest. | 1.1km west |
| Sandy Lane Farm Field SINC | The Sandy Land Farm Field SINC is a semi-improved pasture, important for birds, neutral grassland, and invertebrates. | 1.1km north-east |
| Peterstone Wentlooge Wildlife Trust Reserve | This reserve comprises rippling pools, marshy islands and mudflats stretching far out across the Severn Estuary. The site supports specialist coastal plants, like sea aster *Tripolium pannonicum*, marsh mallow *Althaea officinalis* and sea milkwort *Glaux maritima*. The site is important for wading birds that use it to feed and rest during migration, including dunlin, turnstones *Arenaria spp.*, redshank, curlew, oystercatcher *Haematopus ostralegus*, teal *Anas crecca*, wigeon *Mareca penelope* and shelduck. | 1.6km south-east |
| Druidstone Road SINC | Druidstone Road SINC comprises predominantly un-grazed fields of semi-improved neutral grassland, bordered on most of its sides by dense scrub woodland. There is a mix of tall ruderal herb vegetation and scrub along its south-eastern side. The grassland is relatively tall, with a high proportion of cock's-foot *Dactylis glomerata* and common bent *Agrostis capillaris*. It includes a moderate diversity of plant species, and these include several usually associated with damp conditions, such as marsh thistle *Cirsium palustre*, square-stalked St. John's-wort *Hypericum tetrapterum*, greater bird's-foot trefoil and amphibious bistort *Persicaria amphibia*. | 1.6km north-west |
| Pant-Rhiw-Goch Wood SINC | This site is an ancient semi-natural woodland. | 1.8km north |
| Coal Pit Lane Pond SINC | Coal Pit Lane Pond SINC is a mature pond with emergent vegetation, supporting reed beds, birds, amphibians, mammals and invertebrates. | 1.9km north |
| Wentloog Industrial Park SINC | This site lies within the Gwent Levels: Rumney and Peterstone SSSI, though the grassland habitats of this SINC are distinct from the reen features of the SSSI. The site supports grazed semi-improved neutral grassland on a damp | 1.9km south-west |

| Site Name | Features | Distance and direction from site boundary |
|---|---|---|
| | clay soil, bordered by ditches, hedges and scrub, and young planted trees atop an earth bund. | |

### 3.1.3 Species

SEWBReC provided details of protected and notable species on the 31st January 2017. The search was carried out up to 2km from the site centre point and was extended to 5km for records of bats. Data was obtained for the 10-year period between 2007 and 2016. Records of reptiles, amphibians and mammals are detailed in Table 3. Records of birds, Section 7 invertebrates and plants, and Schedule 9 invasive non-native species are summarised in subsequent sections.

Table 3. Summary of protected reptile, amphibian and mammal records within 2km of the site boundary. Data are from within the last 10 years (post-2007). Distances are approximate.

| Species / Group | Scientific Name | Status[16] | Summary of Records | Year of nearest record |
|---|---|---|---|---|
| **Reptiles and Amphibians** | | | | |
| Great crested newt | *Triturus cristatus* | EPS, WCA | One record from 950m away north-east. | 2008 |
| Palmate newt | *Lissotriton helveticus* | WCA | Ten records from Cath Cobb Woodlands, Marshfield and Trowbirdge, Cardiff. The closest record is 1100m north-east. | 2009 |
| Smooth newt | *Lissotriton vulgaris* | WCA | One record from Trowbridge, Cardiff (1370m west). | 2009 |
| Common frog | *Rana temporaria* | WCA | 16 records, with one record on site. | 2009 |
| Common toad | *Bufo bufo* | WCA | 19 records with two on site, both from Hendre Lake. | 2016 |
| Slow worm | *Anguis fragilis* | WCA | 12 records with the closest record from 750m north-east. Records area also from 2014 950m west. | 2008 |
| Common lizard | *Zootoca vivipara* | WCA | Five records with the closest from 750m away. | 2008 |
| Grass snake | *Natrix helvetica* | WCA | Six records with the closest from 500m away. | 2016 |
| **Bats** | | | | |
| Unidentified bat | *Chiroptera* | EPS, WCA | 43 records with the closest from 115m away. | 2008 |

[16] EPS = European Protected Species as listed under Schedule 2 of the Conservation of Habitats and Species Regulations (2010)
WCA = Species protected under Schedule 5 (animals) or Schedule 8 (plants) of the Wildlife and Countryside Act (1981) as amended

| Species / Group | Scientific Name | Status[16] | Summary of Records | Year of nearest record |
|---|---|---|---|---|
| Myotis bat | *Myotis* spp. | EPS, WCA | 12 records with the closest from 880m north-west. | 2013 |
| Natterer's bat | *Myotis nattereri* | EPS, WCA | Two records with the closest from 1km away. | 2014 |
| Whiskered bat | *Myotis mystacinus* | EPS, WCA | Three records, including roosts; closest roost is approximately 650m away. | 2015 |
| Brown long-eared bat | *Plecotus auritus* | EPS, WCA | 10 records including roosts; closest roost is approximately 930m away. | 2015 |
| Common pipistrelle | *Pipistrellus pipistrellus* | EPS, WCA | 87 records with the closest from 170m away. Records include roosts from within 1km; confidential. | 2015 |
| Nathusius' pipistrelle | *Pipistrellus nathusii* | EPS, WCA | Three records with the closest from 900m away | 2014 |
| Greater horseshoe bat | *Rhinolophus ferrumequinum* | EPS, WCA | 7 records with the closest from 4.1km away; confidential. | 2015 |
| Lesser horseshoe bat | *Rhinolophus hipposideros* | EPS, WCA | Three records with the closest from 5.8km away; confidential. | 2010 |
| Pipistrelle species | *Pipistrellus* spp. | EPS, WCA | 113 records, including roosts. Closest known roost is approximately 750m away from the site. | 2009 |
| Serotine | *Eptesicus serotinus* | EPS, WCA | Six records with the closest from 1km. | 2014 |
| Soprano pipistrelle | *Pipistrellus pygmaeus* | EPS, WCA | 36 records with the closest from 170m away. Closest known roost is approximately 1km away from the site. | 2015 |
| Daubenton's bat | *Myotis daubentonii* | EPS, WCA | Eight records with the closest from 900m away. | 2014 |
| Leisler's bat | *Nyctalus leisleri* | EPS, WCA | One record from 1.8km away. | 2010 |
| **Riparian Mammals** | | | | |
| Otter | *Lutra lutra* | EPS, WCA | Four records of otter with the closest on site of a spraint. | 2010 |
| Water vole | *Arvicola amphibius* | WCA | One record on site from Hendre Lake. | 2010 |
| **Other mammals** | | | | |
| Badger[17] | *Meles meles* | BA | Five records with the closest from 1km away north. | 2014 |

[17] BA = Protection of Badgers Act (1992)

| Species / Group | Scientific Name | Status[16] | Summary of Records | Year of nearest record |
|---|---|---|---|---|
| Brown hare | *Lepus europaeus* | WCA | One record from 1.7km away. | 2008 |
| Hedgehog | *Erinaceus europaeus* | WCA | 22 records with the closest on site near Hendre Lake. | 2013 |
| Hazel dormouse | *Muscardinus avellanarius* | EPS, WCA | 11 records with the closest from 880m away. | 2015 |

#### 3.1.3.1 Birds

A total of 31 bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 have been recorded within the 2km search area since 2006. Of these 31 species (listed in Appendix C in full), three species have the potential to have nested at the site. These species are the barn owl *Tyto alba*, kingfisher *Alcedo atthis* and Cetti's warbler, which could nest in old trees on site, bankside habitat or reedbeds/scrub at Hendre Lake, respectively. The other 28 species are unlikely to nest on site given a lack of suitable breeding habitat or that they are winter/passage bird species, e.g. redwing *Turdus iliacus*.

SEWBReC also provided numerous records of Section 7[18] birds. These are listed in full in Appendix C.

#### 3.1.3.2 Section 7 Invertebrates and Plants

SEWBReC returned data on Section 7 species within the 2km search area. These included brown-banded carder-bee *Bombus humilis* (three records; two on site from 2016), shrill carder-bee *Bombus slyvarum* (10 records with two on site from 2016), dingy skipper *Erynnis tages* (six records from approximately 20m off site in 2011), large wainscot *Rhizedra lutosa* (one record from 600m off site in 2011), tubular water-dropwort *Oenanthe fistulosa* (three records from >1km off site from 2009 - 2014), sea barley *Hordeum marinum* (seven records from approximately 1.4km and beyond from 2010 to 2015). All the above species are also listed on the UK Biodiversity Action Plan.

#### 3.1.3.3 Invasive Species

SEWBReC provided data on invasive species within 2km of the site boundary. Species recorded on site included the American mink *Neovison vison* (two records on site in 2009), Canada goose (99 records from 2008 - present), zebra mussel *Dreissena polymorpha* (one record from 2015) and red-eared terrapin *Trachemys scripta* (one record from 2016 in Hendre Lake). Cherry laurel *Prunus laurocerasus* (two records in 2016) and harlequin ladybird *Harmonia axyridis* (two records from 2013 and 2016) were recorded from within 150m of the site boundary. Of the invasive species recorded within the search area only American mink and Canada goose are recorded on Schedule 9 of the Wildlife and

[18] Species listed on Section 7 of the Environment (Wales) Act 2016.

Countryside Act 1981, where these species are illegal to release or allow to escape into the wild.

## 3.2 Field Survey

### 3.2.1 Habitats

A total of 23 JNCC habitat types and anthropogenic features were identified within the site boundary. These are as follows (shown in Figure 2):

1. Semi-natural broadleaved woodland (A1.1.1)
2. Dense scrub (A2.1)
3. Scattered broadleaved trees (A3.1)
4. Scattered coniferous trees (A3.2)
5. Semi-improved neutral grassland (B2.2)
6. Improved grassland (B4)
7. Marshy grassland (B5)
8. Poor semi-improved grassland (B6)
9. Tall ruderal (C3.1)
10. Swamp (F1)
11. Standing water (G1)
12. Eutrophic running water (G2.1)
13. Arable land (J1.1)
14. Native species-rich intact hedge (J2.1.1)
15. Native species-poor intact hedge (J2.1.2)
16. Native species-poor defunct hedge (J2.2.2)
17. Native species-poor hedge with trees (J2.3.2)
18. Fence (J2.4)
19. Dry ditch (J2.6)
20. Earth bank (J2.8)
21. Buildings (J3.6)
22. Bare ground (J4)
23. Tarmac (J5)

#### 3.2.1.1 Hendre Lake and Surrounding Land

Hendre Lake is located to the west of the site and is the largest body of standing water (G1) within the project boundary. The lake supports fish and was identified as having potential for both otter and water vole. Recreational fishing is common at designated spots around the lake, whilst some areas are designated for

conservation and fishing is prohibited. Some submerged aquatic vegetation was recorded within the lake, including likely hornwort species *Ceratophyllum spp*.

The banks of the lake comprise a mosaic of particularly diverse mown/unmanaged poor semi-improved grassland (B6) verges (where the fishing stands are located), tall ruderal (C3.1) and dense scrub (A2.1). The grassland verges included Yorkshire fog, perennial rye grass, cock's-foot, meadow foxtail *Alopecurus pratensis*, cut-leaved crane's-bill *Geranium dissectum*, white clover *Trifolium repens*, red clover *Trifolium pratense*, common vetch *Vicia sativa*, docks *Rumex spp.*, rushes, and ragwort *Jacobaea vulgaris*. The tall ruderal included common reed *Phragmites australis*, bur reed *Sparganium erectum*, bulrush *Typha latifolia*, sedges *Carex spp.* and soft rush. The dense scrub included bramble *Rubus fruticosa*, hawthorn *Crataegus monogyna*, immature oaks *Quercus robur*, and elder *Sambucus nigra*, with ivy *Hedera helix* encompassing some of the trees.

Semi-natural broadleaved woodland (A1.1.1) dominated by ash *Fraxinus excelsior* was identified on the island in the centre of the lake and to the south of the lake. To the east of the lake Scots pine *Pinus sylvestris* was noted amongst willow *Salix spp.* and oak, with a bramble understory.

A large reen, known as Faendre reen enters the eastern side of the lake and runs to the north east. One dry ditch (J2.6) was identified on site to the south of Hendre Lake, which supported some sedge species. This is likely to flood with varying water levels.

#### 3.2.1.2 Woodland and Grassland (Western Habitats between Faendre Reen and Cypress Drive)

To the west of the site, between Faendre Reen and Cypress Drive were areas of semi-natural broadleaved woodland, comprising mature oaks, alder *Alnus glutinosa*, ash, and hawthorn, as well as multiple stands of Japanese knotweed (shown on Figure 2). The woodland surrounded areas of marshy grassland (B5), poor semi-improved grassland, semi-improved neutral grassland (B2.2) and dense scrub.

The semi-improved neutral grassland was open with scattered willow and oak saplings. Other species present included Yorkshire fog, hairy willowherb *Epilobium hirsutum*, cleavers *Galium aparine*, rosebay willowherb *Chamaenerion angustifolium*, cock's-foot, wavy hair-grass *Deschampsia flexuosa*, common vetch, and cut-leaved crane's-bill. The marshy grassland was dominated by grasses, including Yorkshire fog and Timothy-grass, with extensive areas of rushes and reed, with creeping buttercup *Ranunculus repens*, marsh thistle, and broadleaved dock *Rumex obtusifolius*. Willows were scattered (A3.1) across the area.

#### 3.2.1.3 North of Railway (North of Ty Ffynnon Reen and East of Faendre Reen)

The fields across the north of the site were a combination of managed arable land (J1.1) and grazed improved (B4) and poor semi-improved grassland. The

improved grassland fields had been heavily grazed and thus had little botanical diversity, besides grass, e.g. bentgrass *Agrostis spp.*.

The poor semi-improved grassland fields had slightly more botanical diversity than the improved grassland and arable fields, despite being heavily grazed and/or poached in some places. Species recorded in these fields included Yorkshire fog, wall barley *Hordeum murinum*, perennial rye grass, cock's-foot, bluegrass *Poa spp.*, soft rush, Timothy grass, sweet vernal grass *Anthoxanthum odoratum*, bird's-foot trefoil, and creeping cinquefoil *Potentilla repens*.

Some buildings (J3.6) were also recorded across the north of the site, atop tarmac/concrete hardstanding (J5). These were residential buildings, buildings associated with the Ty-Ffynnon Forge car body shop east of Heol Las, utilities structures south-west of Cobol road, and farm buildings north of St. Mellons Road.

#### 3.2.1.4 North of Railway (South of Ty Ffynnon Reen and East of Faendre Reen)

The fields in the centre of the site were generally more diverse than those recorded elsewhere and were identified as semi-improved neutral grassland accordingly. The north-eastern section of these fields forms the Marshfield SINC. Again, some fields were heavily grazed and/or poached but remained diverse despite this.

Species recorded included pineappleweed *Matricaria discoidea*, silverweed *Argentina anserina*, perennial rye grass, broadleaf plantain *Plantago major*, black knapweed *Centaura nigra*, bird's-foot trefoil, crested dog's-tail *Cynosurus cristatus*, Timothy grass, bluegrass and Yorkshire fog. Some of the marginal wetter areas adjacent to the reens supported rushes, reeds, iris' *Iris spp.*, and sedges. Yellow rattle was also recorded along the hedgerow running parallel to the railway.

Adjacent to these fields to the east were a few structures forming an electrical sub-station.

#### 3.2.1.5 South of Railway

The semi-natural broadleaved woodland south of the railway was predominantly willow, forming a wet woodland of willow carr. Most of the fields south of the railway were managed arable fields or heavily grazed improved grassland fields with limited botanical diversity. There were however, some poor semi-improved grassland fields supporting species including crested dog's-tail, perennial rye grass, bird's-foot trefoil, cock's-foot, Yorkshire fog, *Poa spp.*, rushes, docks and red clover.

There were also two small semi-improved neutral grassland fields adjacent to the railway, with more species diversity, reflecting the fields to the north of the railway and supporting some rushes and reeds.

There was one area of swamp (F1) in the corner of the southernmost arable field, which consisted of a large stand of common reed.

#### 3.2.1.6 Field Boundaries

Most fields were encompassed by a network of reens which were present across the site. Ty Ffynnon reen, Greenlane reen and Faendre reen are primary reens that are managed by NRW (see Figure 2). Other reens are unmanaged and tend to dry up seasonally. These reens had a variable extent of aquatic macrophyte cover, in particular common reed, bindweed *Convolvulus spp.*, sedges and rushes, with duckweeds *Lemnoideae* spp. and pondweeds *Potamogeton* spp. frequently recorded on the water's surface.

Minnows *Phoxinus phoxinus* and aquatic snails of the genus *Physa* (not identified to species level) were recorded within one of the reens in the north of the site (TN1). Minnows are relatively common in the UK, whilst the aquatic snail *Physa heterostropha* is one of the features of the Gwent Levels – Rumney and Peterstone SSSI, which the proposed development lies within. INNS waterweeds (likely *Elodea* spp. or *Lagarosiphon* spp.) were recorded within multiple reens in the survey area (locations shown on Figure 2). Eutrophic running water (G2.1) was recorded on one occasion, enclosing the northern and western edges of the north-eastern most field.

These reens were occasionally shaded by or enclosed within a hedgerow. The most frequently recorded hedgerow type was native species-poor hedge with trees (J2.3.2). These were recorded predominantly towards the centre and north of the site. Species identified within these hedgerows included willow and hawthorn.

Native species-poor intact hedge (J2.1.2) and defunct hedge (J2.2.2) were also recorded relatively frequently, predominantly within the centre and southern parts of the site. Species identified within these hedgerows included willow and bramble.

Native species-rich intact hedge (J2.1.1) was relatively rare, recorded only within the northern half of the site, running perpendicular to Faendre reen, and intersecting poor semi-improved grassland fields in the north east. Species identified within this hedgerow type were hawthorn, blackthorn *Prunus spinosa*, crack willow *Salix fragilis*, oak, bramble, and rosebay willowherb.

One of the field boundaries to the south of the site was a small grass margin (TN2) between an arable field and an access track with couch grass *Elymus spp.*, cock's-foot, thistles *Cirsium spp.*, bindweed, pineappleweed, bristly oxtongue *Helminthotheca echioides*, fat hen *Chenopodium album* and bramble. Other JNCC field boundaries that were recorded on occasion included fences (J2.4) and earth banks (J2.8). A line of mature planted coniferous trees (A3.2) on one occasion around a residential building to the north-east of the site.

### 3.2.2 Species

#### 3.2.2.1 Invasive Plants

During both the 2017 and 2019 field surveys, Japanese knotweed was identified within the site boundary, generally located within woodland or along field boundaries. A waterweed (likely *Elodea* spp. or *Lagarosiphon* spp.) was also recorded at different locations within the reen system, and the floating aquatic water fern *Azolla filiculoides* was observed. The locations of these are shown on Figure 2.

#### 3.2.2.2 Invertebrates

In 2017, a variety of freshwater molluscs were found in dredged material from reens, detailed in Appendix D. This included aquatic snails from the genus *Physa* (not identified to species level). One species of aquatic snail (*Physa heterostropha*) is a feature of the Gwent Levels – Rumney and Peterstone SSSI, which the proposed development site lies within.

In 2017 and 2019, the site was found to support a mosaic of habitats important to both terrestrial and aquatic notable invertebrate species. However, due to the relatively poor botanical diversity across the site as a whole, it is not expected that many invertebrates listed as features of the SSSI would be present on the site.

#### 3.2.2.3 Fish

In both the 2017 and 2019 survey, the site was considered likely to be capable of supporting fish populations, due to the extent of water habitats within the site. Minnows were identified within one of the reens to the north of the site (TN1). Hendre Lake supports a high level of recreational fishing and is re-stocked regularly with species such as carp *Cyprinus carpio* and bream *Abramis brama*.

Further to this, European eel were recorded to be present within the reen network in the study area during the 2017 great crested newt presence/absence survey.

#### 3.2.2.4 Amphibians

Hendre Lake and the associated reens across the site provide suitable habitat for amphibians, e.g. common frog and common toad. There is also potential for all three of the UK-native newt species (palmate, smooth and great crested) to be on site.

Habitat Suitability Indices (HSI) were created for each waterbody on site. The details of the 2019 HSI scores are reported in Table 4. The results show that 11 have poor suitability, 9 have below average, 10 have average and 9 have good habitat suitability for great crested newts. On the basis of these results, all waterbodies with a HSI score of 0.5 and above were advised for further surveys for great crested newt.

Table 4. Habitat Suitability Indices for waterbodies on site.

| Waterbody Number | HSI score | HSI Category |
|---|---|---|
| 1 | 0.66 | Average |
| 2 | 0.66 | Average |
| 3 | 0.46 | Poor |
| 4 | 0.41 | Poor |
| 5 | 0.74 | Good |
| 6 | 0.79 | Good |
| 7 | 0.74 | Good |
| 8 | 0.74 | Good |
| 9 | 0.57 | Below Average |
| 10 | 0.53 | Below Average |
| 11 | 0.55 | Below Average |
| 12 | 0.52 | Below Average |
| 13 | 0.58 | Below Average |
| 14 | 0.45 | Poor |
| 15 | 0.47 | Poor |
| 16 | 0.45 | Poor |
| 17 | 0.40 | Poor |
| 18 | 0.76 | Good |
| 19 | 0.63 | Average |
| 20 | 0.45 | Poor |
| 21 | 0.46 | Poor |
| 22 | 0.42 | Poor |
| 23 | 0.42 | Poor |
| 24 | 0.62 | Average |
| 25 | 0.55 | Below Average |
| 26 | 0.70 | Good |
| 27 | 0.61 | Average |
| 28 | 0.65 | Average |
| 29 | 0.44 | Poor |
| 30 | 0.74 | Good |
| 31 | 0.69 | Average |
| 32 | 0.71 | Good |
| 33 | 0.74 | Good |
| 34 | 0.65 | Average |
| 35 | 0.62 | Average |
| 36 | 0.62 | Average |

| Waterbody Number | HSI score | HSI Category |
|---|---|---|
| 37 | 0.50 | Below Average |
| 38 | 0.59 | Below Average |
| 39 | 0.55 | Below Average |

### 3.2.2.5 Reptiles

The 2017 and 2019 surveys both identified suitable habitat for reptiles comprising a mosaic of dense scrub, hedgerows and open areas of semi-improved grassland, along with wetter areas, such as reens, marshy grassland and a lake.

During the 2019 field survey, multiple signs of reptiles were identified: a male common lizard was identified resting within a fence post (TN3) and a grass snake was observed basking within the vicinity of multiple grass snake skins (TN4) both just outside of the site boundary to the east of the site. Furthermore, suitable reptile refugium were identified in two areas: a wood pile just outside the site boundary to the west (TN5) and a vegetated earth and rubble mound to the south of the site (TN2).

### 3.2.2.6 Birds

The Extended Phase 1 Survey in 2017 details that 23 different bird species were observed on site, with one Schedule 1 species (kingfisher) observed, which has the potential to breed on site. During the updated survey in 2019, birds heard and/or seen included reed warbler *Acrocephalus scirpaceus* (TN6 and TN7), cuckoo *Cuculus canorus* (TN8), Cetti's warbler (TN9), mallard *Anas platyrhynchos* (TN7) and kingfisher (TN10).

It should be noted that there were regular sightings of barn owls during the 2019 bat surveys. At least three oak trees are considered to be potential nesting and/or roosting locations for barn owl. A veteran oak tree (TN11) was suspected as a barn owl roosting location due to regular sightings of barn owl during bat surveys. Two owl pellets were found, and two barn owls were observed flying out of an oak tree (TN12), which is therefore considered likely to be a barn owl breeding location. A further owl pellet was found at the base of another oak tree (TN13).

An unidentified birds nest was recorded in a reen to the south of the railway (TN14). There is a variety of habitat on site to support a range of breeding birds, including ground nesting birds in more unmanaged grasslands to woodland species in trees within woodland and hedgerows.

### 3.2.2.7 Bats

The 2017 and 2019 surveys both identified suitable habitat for foraging, commuting and roosting bats comprising a mosaic of habitats including buildings, marshy grassland, treelines, railway lines, hedges, woodland, and waterbodies.

A number of mature oaks identified in 2019 provide potential roost features across the site along field boundaries (TN15-18). The presence of these habitats provides a moderate/high quality habitat for bats, according to the Bat Conservation Trust

(BCT) guidelines[19]. As the site is bordered to the west by residential developments, there is an increased likelihood that bats such as pipistrelle species that roost in surrounding houses utilise the site to forage, as the habitats on site could support a large population of invertebrates.

#### 3.2.2.8 Dormouse

Both the 2017 and 2019 found the site to provide suitable habitat for dormice. The network of brambles, scrub, woodland and hedgerows on site provide suitable foraging and nesting habitats for dormice. In particular, an area of scrub to the south west (TN6) and a hedgerow to the north east (TN19) were highlighted during the 2019 survey as having particularly high suitability for dormouse. However, due to potential barriers such as roads, reens and rail, connectivity to other habitats such as woodland and hedgerow may have some level of fragmentation.

#### 3.2.2.9 Water Vole

No sign of water vole was observed during the 2019 survey, though suitable habitat for water vole was identified in both 2017 and 2019. This comprised the network of reens throughout the site, some with well vegetated banks, which provide connecting foraging habitat for water vole. Two reens (one in the south west (TN6) and one in the north east (TN20) in particular were identified during the field survey as having particular suitability for water vole.

#### 3.2.2.10 Otter

Suitable habitat for otter was identified in both the 2017 and 2019 Extended Phase 1 habitat surveys. This comprised the network of reens throughout the site adjacent to hedgerows, woodland and/or scrub which provide commuting and foraging habitat for otter, connecting to suitable areas for rest.

#### 3.2.2.11 Badgers

No signs of badger were observed on site during the 2017 or 2019 surveys and the fields were considered to offer little habitat for sett creation, given the relatively high-water table. There is suitable habitat on site, such as the woodland to the west, where badger setts may be present. The site offers the potential for foraging opportunities for badgers.

#### 3.2.2.12 Other Mammals

In 2019, deer prints were identified in an area of mud close to water in the east of the site (TN21). Due to the open fields, hedgerow and woodland habitats on site, other notable species including foxes *Vulpes vulpes*, rabbit *Oryctolagus cuniculus* and hedgehogs may also be present.

[19] Hundt, L., 2012. Good Practice Guidelines, 2nd Edition. London: Bat Conservation Trust.

# 4 Conclusions

The desk study highlighted one SAC, one SPA and one Ramsar site within 5km, and three SSSIs, 13 SINCs and one Wildlife Trust Reserve within 2km of the site boundary. One SSSI and one SINC lie within the site boundary. SEWBReC provided details of numerous protected and notable species within 2km of the site centre point.

The field survey identified a range of habitats which are of value to both flora and fauna. This included woodland and scattered trees, scrub, semi-improved grasslands, tall ruderal, reens, and species-rich and species-poor hedgerows. The field survey also identified several terrestrial and aquatic Schedule 9 invasive non-native species within the site boundary.

As a result of the 2017 Phase 1 habitat Survey, a number of detailed ecological (Phase 2) surveys were carried out across 2017, 2018 and 2019 and the methodology and results of these are given in the relevant species-specific survey reports, as follows:

- Terrestrial National Vegetation Classification (NVC) and reen flora surveys in 2018[20] and 2019[21];
- Targeted Schedule 9 INNS survey in 2017[22];
- Terrestrial invertebrate survey in 2019[23];
- Aquatic invertebrate survey in 2018[24];
- Great crested newt surveys in 2017[25] and 2019[26];
- Reptile survey in 2017[25];
- Breeding birds survey in 2017[27];
- Wintering birds survey 2017[28];
- Bat roost and activity surveys in 2017, 2018[29] and 2019[30];
- Dormouse surveys in 2017[31], 2018[32] and 2019[33];
- Riparian mammal surveys in 2017[34] and 2019[35]; and
- Badger survey in 2017[36].

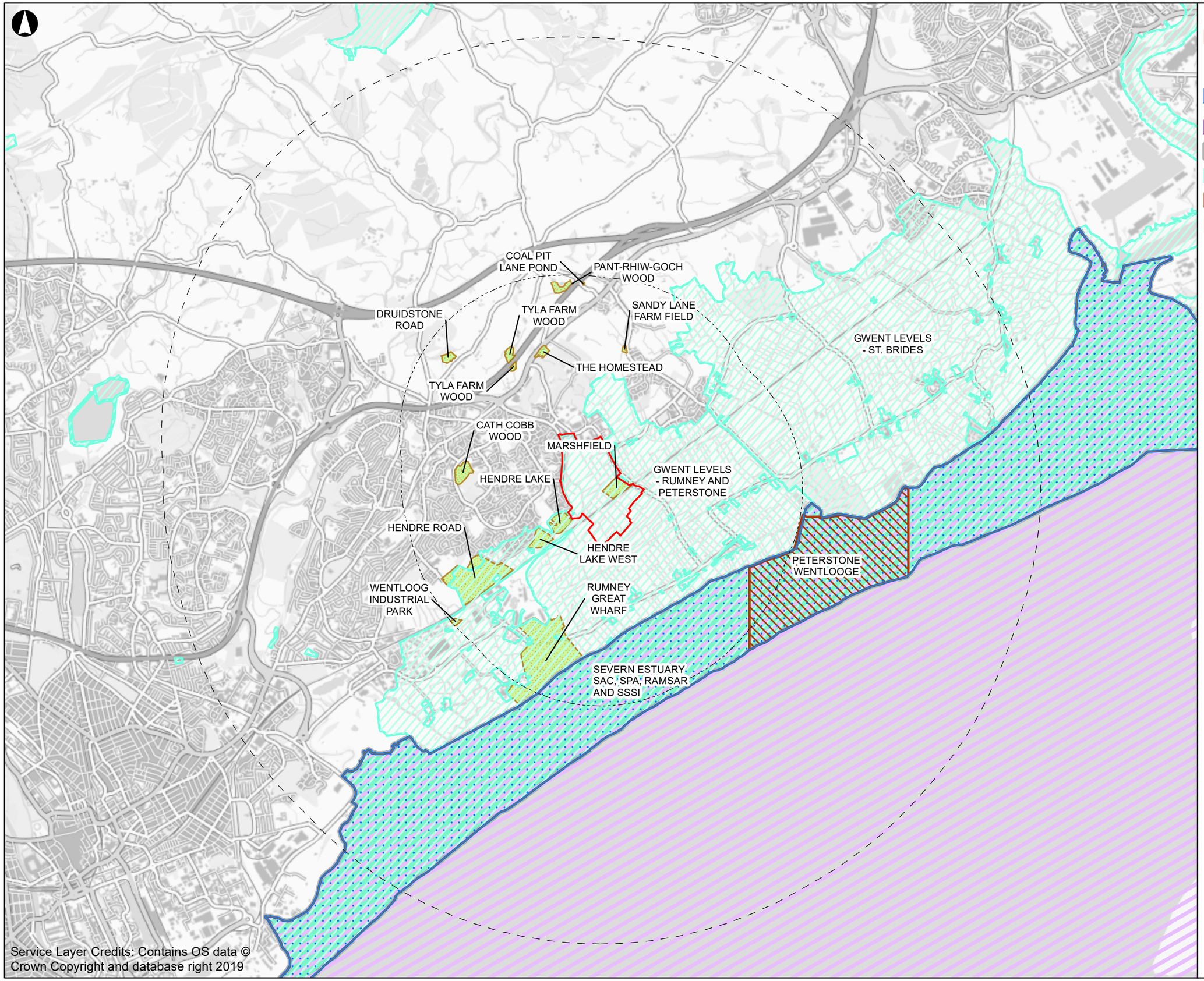
[20] Sturgess Ecology Ltd (2018) Vegetation Survey Report
[21] Sturgess Ecology Ltd (2019) Vegetation Survey Addendum 2019
[22] Arup (2019) 2017 Schedule 9 Plant Survey Report
[23] Hacking Ecology Ltd. (2019) Terrestrial Invertebrate Survey for Cardiff Parkway, St Mellons, Cardiff 2019
[24] David Clements Ecology Ltd. (2019) Cardiff Parkway Site, St Mellons, Cardiff | Invertebrate Surveys
[25] Arup (2018) 2017 Amphibian and Reptile Survey Report
[26] Arup (2020) 2019 Great Crested Newt Survey Report
[27] Arup (2018) 2017 Breeding Birds Survey Report
[28] Arup (2018) 2017/2018 Wintering Birds Survey Report
[29] Arup (2020) 2017/2018 Bat Survey Report
[30] Just Mammals (2019) An Ecological Survey Report - Bats
[31] Arup (2018) 2017 Dormouse Survey Report
[32] Arup (2019) 2018 Dormouse Survey Report (Cypress Drive)
[33] Arup (2020) 2019 Dormouse Survey Report
[34] Arup (2018) 2017 Riparian Mammal Survey Report
[35] Arup (2019) 2019 Riparian Mammal Survey Report
[36] Arup (2018) 2017 Badger Survey Report

# Figures

Figure 1. Statutory and Non-Statutory Designated Sites

Figure 2. Extended Phase 1 Habitat Survey Results

A3

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## Legend

- Planning boundary
- 2km buffer
- 5km buffer
- Special Protection Areas (SPAs)
- Special Areas of Conservation (SACs)
- Ramsar sites
- Sites of Special Scientific Interest (SSSIs)
- Wildlife Trust Reserves
- Sites of Importance for Nature Conservation (SINCs)

| Issue | Date | By | Chkd | Appd |
|---|---|---|---|---|
| F1 | 2020-03-17 | RC | SC | PW |

Metres

0 600 1,200 2,400

ARUP

Client

**Cardiff Parkway Developments Ltd**

Job Title

**Cardiff Hendre Lakes**

**Statutory sites within 5km and non-statutory sites within 2km of the planning boundary**

Scale at A3

**1:45,000**

| Job No | Drawing Status |
|---|---|
| **252199** | **For Issue** |

| Drawing No | Issue |
|---|---|
| **001** | **F1** |

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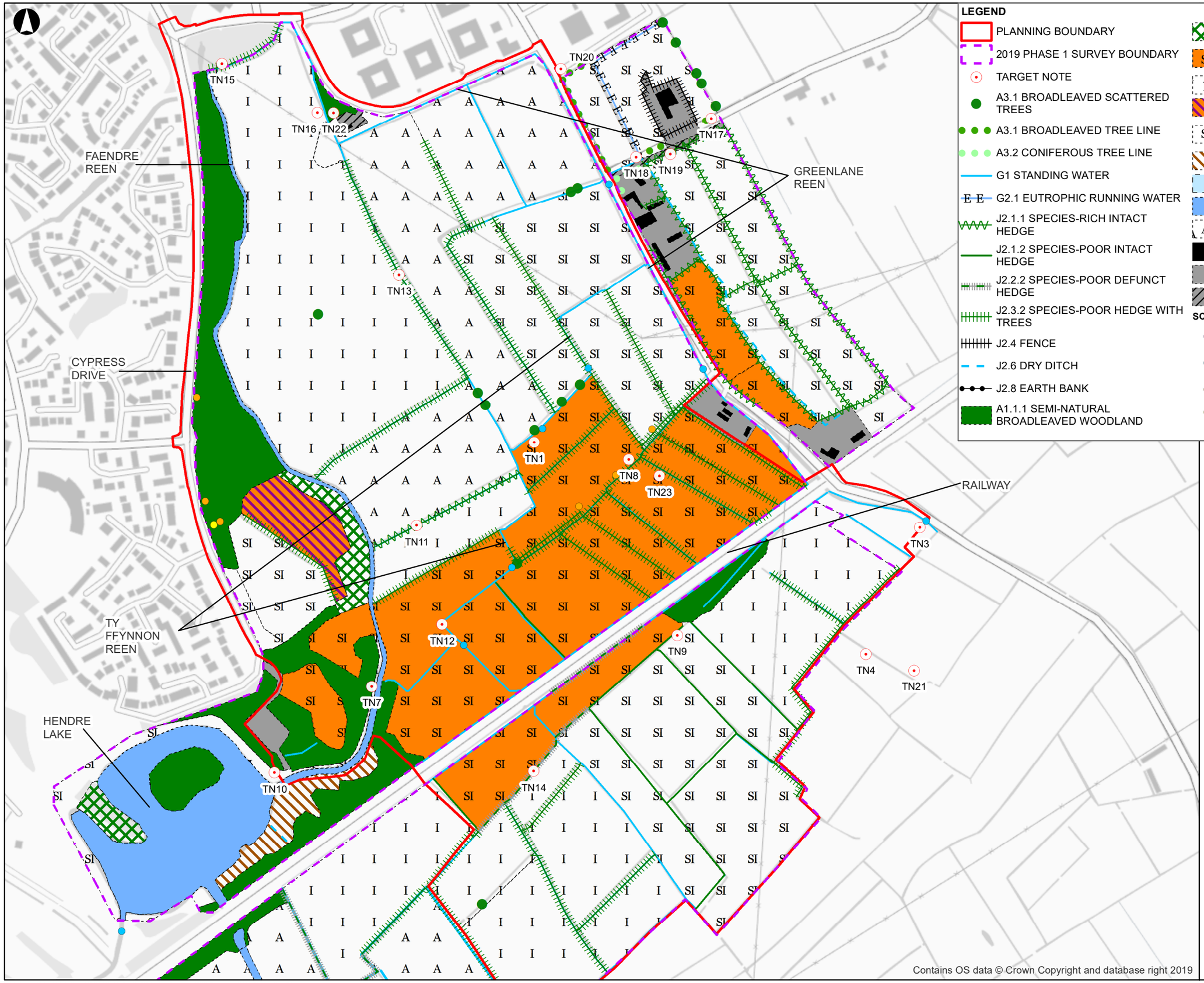
A3




**LEGEND**

- PLANNING BOUNDARY
- 2019 PHASE 1 SURVEY BOUNDARY
- TARGET NOTE
- A3.1 BROADLEAVED SCATTERED TREES
- A3.1 BROADLEAVED TREE LINE
- A3.2 CONIFEROUS TREE LINE
- G1 STANDING WATER
- G2.1 EUTROPHIC RUNNING WATER
- J2.1.1 SPECIES-RICH INTACT HEDGE
- J2.1.2 SPECIES-POOR INTACT HEDGE
- J2.2.2 SPECIES-POOR DEFUNCT HEDGE
- J2.3.2 SPECIES-POOR HEDGE WITH TREES
- J2.4 FENCE
- J2.6 DRY DITCH
- J2.8 EARTH BANK
- A1.1.1 SEMI-NATURAL BROADLEAVED WOODLAND
- A2.1 DENSE SCRUB
- B2.2 SEMI-IMPROVED NEUTRAL GRASSLAND
- B4 IMPROVED GRASSLAND
- B5 MARSHY GRASSLAND
- B6 POOR SEMI-IMPROVED GRASSLAND
- C3.1 TALL RUDERAL
- F1 SWAMP
- G1 STANDING WATER
- J1.1 ARABLE LAND
- J3.6 BUILDINGS
- J5 GRAVEL/CONCRETE
- J5 TARMAC

**SCHEDULE 9 INVASIVE NON-NATIVE SPECIES**

- WATER FERN
- WATERWEED (LIKELY *ELODEA SPP.* OR *LAGAROSIPHON SPP.* )
- JAPANESE KNOTWEED
- JAPANESE KNOTWEED HYBRID

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|---|---|---|---|---|
| F1 | 2020-03-06 | EA | SC | PW |

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0 65 130 260

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Client
**Cardiff Parkway Developments Ltd**

Job Title
**Cardiff Hendre Lakes**

**2019 Extended Phase 1 Habitat Survey Results Sheet 1 of 2**

Scale at A3
**1:5,000**

| Job No | Drawing Status |
|---|---|
| **252199** | **For Issue** |

| Drawing No | Issue |
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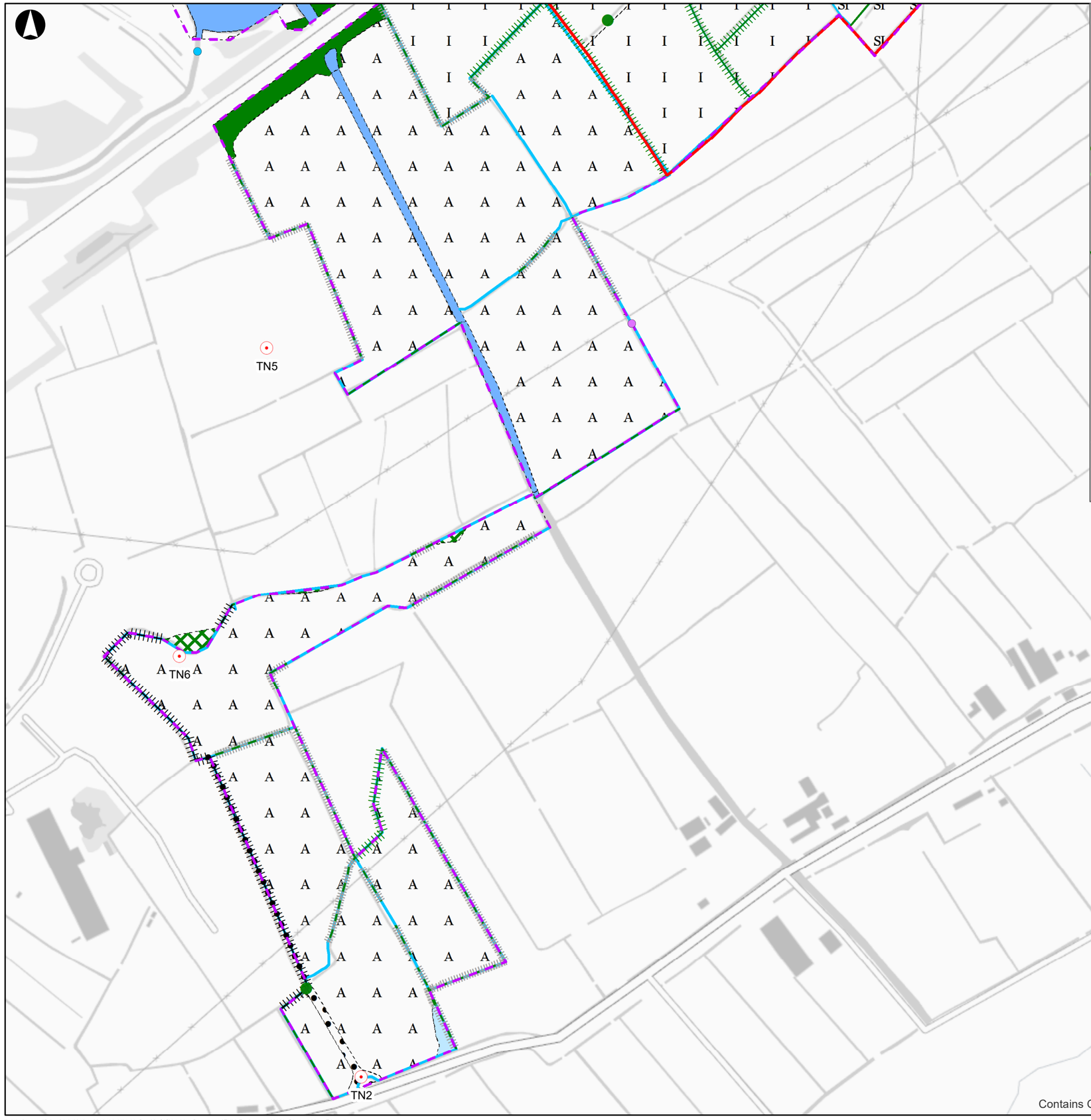


**LEGEND**

- PLANNING BOUNDARY
- 2019 PHASE 1 SURVEY BOUNDARY
- TARGET NOTE
- A3.1 BROADLEAVED SCATTERED TREES
- A3.1 BROADLEAVED TREE LINE
- A3.2 CONIFEROUS TREE LINE
- G1 STANDING WATER
- G2.1 EUTROPHIC RUNNING WATER
- J2.1.1 SPECIES-RICH INTACT HEDGE
- J2.1.2 SPECIES-POOR INTACT HEDGE
- J2.2.2 SPECIES-POOR DEFUNCT HEDGE
- J2.3.2 SPECIES-POOR HEDGE WITH TREES
- J2.4 FENCE
- J2.6 DRY DITCH
- J2.8 EARTH BANK
- A1.1.1 SEMI-NATURAL BROADLEAVED WOODLAND
- A2.1 DENSE SCRUB
- B2.2 SEMI-IMPROVED NEUTRAL GRASSLAND
- B4 IMPROVED GRASSLAND
- B5 MARSHY GRASSLAND
- B6 POOR SEMI-IMPROVED GRASSLAND
- C3.1 TALL RUDERAL
- F1 SWAMP
- G1 STANDING WATER
- J1.1 ARABLE LAND
- J3.6 BUILDINGS
- J5 GRAVEL/CONCRETE
- J5 TARMAC

**SCHEDULE 9 INVASIVE NON-NATIVE SPECIES**

- WATER FERN
- WATERWEED (LIKELY *ELODEA SPP.* OR *LAGAROSIPHON SPP.*)
- JAPANESE KNOTWEED
- JAPANESE KNOTWEED HYBRID

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| Issue | Date | By | Chkd | Appd |
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| F1 | 2020-03-13 | EA | SC | PW |

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Client
**Cardiff Parkway Developments Ltd**

Job Title
**Cardiff Hendre Lakes**

**2019 Extended Phase 1 Habitat Survey Results Sheet 2 of 2**

Scale at A3
**1:5,000**

| Job No | Drawing Status |
|---|---|
| **252199** | **For Issue** |

| Drawing No | Issue |
|---|---|
| **002** | **F1** |



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# Appendix A

Legislative and Policy Context

# A1 Legislative and Policy Context

A framework of international, European, national and local legislation and planning policy guidance exists to protect and conserve wildlife and habitats. This is described in the following sections. The reader should refer to the original legislation for the definitive interpretation.

## A1.1 Statutory Designated Sites

A network of nationally designated sites has been established through the designation of Sites of Species Scientific Interest (SSSI) under the Wildlife and Countryside Act 1981 (as amended). The protection afforded by the Act means it is an offence to carry out or permit to be carried out any operation listed within the notification without the consent of the Statutory Nature Conservation Organisation[37] (NRW).

The protection afforded to SSSIs is used to underpin the designation of areas at a European Level. European Sites comprise:

- Special Areas of Conservation (SAC) designated under the Conservation of Habitats and Species Regulations 2010 (as amended) (known as the Habitats Regulations);
- Special Protection Areas (SPA) designated under the Wildlife and Countryside Act.

Wetlands of International Importance (Ramsar Sites) declared under the Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971 are normally also notified as SSSIs but are only considered European Sites as a matter of UK and Local Government Policy.

The Habitats Regulations transpose the requirements of Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive) in to law within England and Wales, while the Wildlife and Countryside Act transposes Directive 79/409/EEC on the Conservation of Wild Birds (the Birds Directive) in the law within England and Wales. Equivalent legislation exists to transpose these directives in the law within Scotland and Northern Ireland.

The Habitats Regulations require that consideration is given to the implications of plans and projects (developments) on European Sites are considered. Specifically Regulation 61(1) states:

"*A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –*

> *(a) is likely to have a significant effect on a European site or European marine site (either alone or in combination with other plans or projects), and*

[37] Section 28 of the Wildlife and Countryside Act 1981 (as substituted by Schedule 9 of the Countryside and Rights of Way Act 2000).

*(b) is not directly connected with or necessary to the management of that site, must make an appropriate assessment of the implications for that site in view of that site's conservation objectives.*"

The formal consideration of effects on European Sites is therefore undertaken by the determining authority such as the Local Planning Authority.

Local Nature Reserves can be given protection against damaging operations through powers within the National Parks and Access to the Countryside Act 1949 (as amended). However this protection is usually conveyed through inclusion of protection within local planning policy relating to these sites and other non-statutory sites such as Sites of Importance for Nature Conservation.

## A1.2 European Protected Species

The Habitats Regulations convey special protection to a number of species which are listed in schedule 2 of the Regulations and are referred to a European Protected Species (EPS):

- All UK resident bat species;
- All whale and dolphin species;
- Large blue butterfly *Maculinea arion*;
- Common dormouse *Muscardinus avellanarius*;
- Pool frog *Rana lessonae*;
- Sand lizard *Lacerta agilis*;
- Fisher's estuarine moth *Gortyna borelii lunata*;
- great crested newt *Triturus cristatus*;
- common otter *Lutra lutra*;
- wild cat *Felis silvestris*;
- Lesser Whirlpool Ram's-horn Snail *Anisus vorticulus*;
- Smooth snake *Coronella austriaca*;
- Sturgeon *Acipenser sturio*;
- Natterjack toad *Bufo calamita*; and
- All marine turtles.

Regulation 41 makes it an offence to:

a) Deliberately capture, injure or kill any wild animal of a EPS;

b) Deliberately disturb wild animals of such a species;

c) Deliberately takes or destroys the eggs of such a species;

d) Damages or destroys a breeding site or resting place of such an animal.

Disturbance in the context of the offences above is disturbance which is likely to impair the ability of the animals to survive, to breed or reproduce, to nurture their young, to hibernate, to migrate; or to affect significantly the local distribution of the species.

Licences can be granted by the relevant SNCO for developments (sometime referred to as EPS Licences or Derogation Licences) providing the purposes of the licence is for "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment".

## A1.3 UK Protected Species

The Wildlife and Countryside Act 1981 provide protection to both EPSs and other species including wild birds, water voles and reptiles.

All wild birds, their nests and eggs are protected with some rare species afforded extra protection from disturbance during the breeding season (these species are listed in Schedule 1 of the Act). It is illegal to take any wild bird or damage or destroy the nests and eggs of breeding birds. There are certain exceptions to this in respect of wildfowl, game birds and certain species that may cause damage.

Water vole receive protection under the Wildlife and Countryside Act 1981 which prohibits the killing, injuring or taking by any method.

All native reptile species in the UK are subject to partial protection from intentional or reckless killing or injury only.

Badger and their setts are protected under the Protection of Badgers Act 1992 which makes it an offence to kill, injure or take a badger, or interfere with a sett.

## A1.4 Biodiversity Framework

Section 6 of the Environment (Wales) Act 2016 includes a duty on all public authorities to "seek to maintain and enhance biodiversity" so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to "promote the resilience of ecosystems". This duty applies to government bodies, local authorities and statutory undertakers.

To assist in complying with this duty, public authorities must have regard to relevant evidence provided in the State of Natural Resources Report and any relevant area statement for an area in which the authority exercises functions, as well as having regard to the list of living organisms and habitats published under Section 7 of the Act. Species and habitats listed on Section 7 are considered to be of Principle Importance for the conservation of biological diversity.

The Environment (Wales) Act 2016 replaces the NERC Act 2006; Section 6 replaces Section 40 of the NERC Act and Section 7 replaces the Section 42 lists.

Local Biodiversity Action Plans (LBAPs) continue to provide a list of habitats and species of conservation significance for their relevant area. Particular attention has been given to the Cardiff LBAP[38].

[38] Available online at: https://www.outdoorcardiff.com/wp-content/uploads/Cardiff-LBAP-2008.pdf [Accessed: 24/12/19].

# Appendix B

2019 Target Notes

# B1 2019 Target Notes

| Ref. | 2019 Target Notes |
|---|---|
| TN1 | Reen with minnows, aquatic snails and waterweed (likely *Elodea* sp. or *Lagarosiphon* sp.). |
| TN2 | Vegetated earth and rubble mounds suitable for reptiles present on entrance track to fields. Grass margin between entrance track and field comprising couch grass, cock's-foot, thistle, bindweed, pineappleweed, bristly oxtongue, fat hen and bramble |
| TN3 | Male common lizard resting in fence post. |
| TN4 | Grass snake observed basking, along with multiple grass snake skins in the area. |
| TN5 | Wood pile suitable for reptile refugium. |
| TN6 | Water vole potential in reen and dormouse potential in adjacent scrub. Calling reed warbler also heard. |
| TN7 | Mallard present and calling reed warbler heard. |
| TN8 | Cuckoo heard |
| TN9 | Cetti's warbler heard overhead. |
| TN10 | Kingfisher flying across Hendre Lake. |
| TN11 | Regular sightings of barn owl during bat surveys and suspect veteran oak tree (T21[39]) is a barn owl roost |
| TN12 | Two owl pellets and two barn owls observed flying out from oak tree (T114[39]) on 22/08/2019 |
| TN13 | Owl pellet found on the ground by oak tree (T5[39]) on 12/7/2019 |
| TN14 | Old bird's nest in reeds. |
| TN15 | Mature oak tree with BRP. Fissure in limb approximately 10m high on south facing side of tree. |
| TN16 | Large oak tree with BRP. Large crack with great tit nesting inside. |
| TN17 | Large oak with wounds on main leader at 6m and 8m above ground level. |
| TN18 | Oak with knot hole. BRP. |
| TN19 | Large unmanaged hedges with hawthorn, blackthorn, crack willow and oak. Bramble scrub encroaching from hedges into fields. High dormouse suitability. |
| TN20 | Unshaded reen, considered suitable for water vole. |
| TN21 | Deer prints in mud. |
| TN22 | Area of cleared vegetation to east of reen. |
| TN23 | Large piles of fly tipping along hedgerow. |

[39] Barton Hyett (2018) Arboricultural Survey Report

# Appendix C

# SEWBReC Desk Study Birds Records

# C1 SEWBReC Desk Study Bird Records

| Common Name | Scientific Name | Status[40] |
|---|---|---|
| Lesser Redpoll | *Acanthis cabaret* | S7 |
| Skylark | *Alauda arvensis* | S7 |
| Bittern | *Botaurus stellaris* | Sch1, BDir1, S7 |
| Cetti's Warbler | *Cettia cetti* | Sch1, S7 |
| Black-headed Gull | *Chroicocephalus ridibundus* | S7 |
| Merlin | *Falco columbarius* | Sch1, BDir1, S7 |
| Hobby | *Falco subbuteo* | Sch1, S7 |
| Kestrel | *Falco tinnunculus* | Sch1, S7 |
| Mediterranean Gull | *Larus melanocephalus* | Sch1, BDir1, S7 |
| Grasshopper Warbler | *Locustella naevia* | S7 |
| Red Kite | *Milvus milvus* | Sch1, BDir1, S7 |
| Yellow Wagtail | *Motacilla flava* | S7 |
| House Sparrow | *Passer domesticus* | S7 |
| Bullfinch | *Pyrrhula pyrrhula* | S7 |
| Green Sandpiper | *Tringa ochropus* | Sch1 |
| Redwing | *Turdus iliacus* | Sch1, S7 |
| Song Thrush | *Turdus philomelos* | S7 |
| Starling | *Sturnus vulgaris* | S7 |
| Kingfisher | *Alcedo atthis* | Sch1, BDir1, S7 |
| Dunnock | *Prunella modularis* | S7 |
| Cuckoo | *Cuculus canorus* | S7 |
| Reed Bunting | *Emberiza schoeniclus* | |
| Peregrine | *Falco peregrinus* | Sch1, BDir1, S7 |
| Linnet | *Linaria cannabina* | S7 |
| Fieldfare | *Turdus pilaris* | Sch1, S7 |
| Barn Owl | *Tyto alba* | Sch1 |
| Marsh Harrier | *Circus aeruginosus* | Sch1, BDir1, S7 |
| Lapwing | *Vanellus vanellus* | S7 |
| Corncrake | *Crex crex* | Sch1, BDir1, S7 |
| Hen Harrier | *Circus cyaneus* | Sch1, BDir1, S7 |
| Lesser Spotted Woodpecker | *Dendrocopos minor* | |
| Pintail | *Anas acuta* | S7 |

[40] Sch1 = Designated under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended).
BDir1 = Birds listed on Annex I of the EC Birds Directive.
S7 = Birds listed on Section 7 of the Environment (Wales) Act 2016.

| Common Name | Scientific Name | Status[40] |
|---|---|---|
| Scaup | *Aythya marila* | Sch1 |
| Little Ringed Plover | *Charadrius dubius* | Sch1 |
| Ringed Plover | *Charadrius hiaticula* | S7 |
| Brambling | *Fringilla montifringilla* | Sch1, S7 |
| Bar-tailed Godwit | *Limosa lapponica* | BDir1 |
| Black-tailed Godwit | *Limosa limosa* | Sch1 |
| Common Scoter | *Melanitta nigra* | S7 |
| Curlew | *Numenius arquata* | S7 |
| Whimbrel | *Numenius phaeopus* | Sch1, S7 |
| Black Redstart | *Phoenicurus ochruros* | Sch1, S7 |
| Golden Plover | *Pluvialis apricaria* | BDir1, S7 |
| Turtle Dove | *Streptopelia turtur* | |
| Greenshank | *Tringa nebularia* | Sch1, S7 |
| Garganey | *Anas querquedula* | Sch1, S7 |
| Lapland Bunting | *Calcarius lapponicus* | Sch1, S7 |
| Black Tern | *Chlidonias niger* | Sch1, BDir1, S7 |
| Bewick's Swan | *Cygnus columbianus* subsp. *bewickii* | Sch1, BDir1, S7 |
| Little Gull | *Hydrocoloeus minutus* | Sch1, BDir1, S7 |
| Snow Bunting | *Plectrophenax nivalis* | Sch1, S7 |
| Avocet | *Recurvirostra avosetta* | Sch1, BDir1 |
| Firecrest | *Regulus ignicapilla* | Sch1, S7 |
| Arctic Skua | *Stercorarius parasiticus* | S7 |
| Ring Ouzel | *Turdus torquatus* | S7 |
| Twite | *Linaria flavirostris* | S7 |
| Ruff | *Calidris pugnax* | Sch1, BDir1, S7 |
| Tree Pipit | *Anthus trivialis* | S7 |
| Dark-bellied Brent Goose | *Branta bernicla* subsp. *bernicla* | S7 |
| Hawfinch | *Coccothraustes coccothraustes* | S7 |
| Yellowhammer | *Emberiza citrinella* | |
| Woodlark | *Lullula arborea* | Sch1, BDir1, S7 |
| Spotted Flycatcher | *Muscicapa striata* | S7 |
| Grey Partridge | *Perdix perdix* | S7 |
| Honey-buzzard | *Pernis apivorus* | Sch1, BDir1, S7 |
| Whooper Swan | *Cygnus cygnus* | Sch1, BDir1 |
| Yellow Wagtail | *Motacilla flava* subsp. *flavissima* | |
| Osprey | *Pandion haliaetus* | Sch1, BDir1, S7 |
| Nightjar | *Caprimulgus europaeus* | BDir1, S7 |

# Appendix D

## Species Observed

# D1 Species Observed in 2017

| Ref. | Common name | Scientific Name | Notes |
|---|---|---|---|
| **Birds** | | | |
| 1 | Kingfisher | *Alcedo atthis* | Schedule 1 under WCA 1981. Observed on the lake. |
| 2 | Little egret | *Egretta garzetta* | Five observed flying over the lake. |
| 3 | Song thrush | *Turdus iliacus* | Observed around the lake and across the site. |
| 4 | Bullfinch | *Pyrrhula pyrrhula* | Three observed around the lake. |
| 5 | Black-headed gull | *Chroicocephalus ridibundus* | Numerous on the lake. |
| 6 | Mute swan | *Cygnus olor* | Observed on lake and on the connecting reen. |
| 7 | Great crested grebe | *Podiceps cristatus* | Single individual on the lake. |
| 8 | Wren | *Troglodytes troglodytes* | Observed across the site. |
| 9 | Canada goose | *Branta canadensis* | Observed on the lake. |
| 10 | Mallard | *Anas platyrhynchos* | Observed on the lake. |
| 11 | Magpie | *Pica pica* | Observed across the site. |
| 12 | Reed bunting | *Emberiza schoeniclus* | Observed on grassland within woodland near to the lake's car park. |
| 13 | Moorhen | *Gallinula chloropus* | Observed on the lake. |
| 14 | Rook | *Corvus frugilegus* | Observed across the site. |
| 15 | Carrion crow | *Corvus corone* | Observed across the site. |
| 16 | Starling | *Sturnus vulgaris* | Observed across the site. |
| 17 | House sparrow | *Passer domesticus* | Heard in adjacent residential properties to lake. |
| 18 | Great spotted woodpecker | *Dendrocopus major* | Heard on site. |
| 19 | Blue tit | *Cyanistes caeruleus* | Heard on site. |
| 20 | Great tit | *Parus major* | Heard on site. |
| 21 | Herring gull | *Larus argentatus* | Two individuals flying across the lake. |
| 22 | Teal | *Anas crecca* | Two observed on reens in centre of site. |
| 23 | Snipe | *Gallinago gallinago* | Two observed on wet grassland to south of site, adjacent to railway. |
| **Molluscs** | | | |
| 24 | Great ramshorn | *Planorbarius corneus* | Numerous individuals of varying size found in dredged mud on bankside of reen. |
| *25* | *Physa* spp. | *Physa* spp. | Numerous individuals found in dredged mud on bankside of reen. |
| 26 | Great pond snail | *Lymnaea stagnalis* | Numerous individuals of varying size found in dredged mud on bankside of reen. |

| Ref. | Common name | Scientific Name | Notes |
|---|---|---|---|
| 27 | Ear pond snail | *Lymnea auricularia* | Numerous individuals of varying size found in dredged mud on bankside of reen. |
| 28 | Hairy orb mussel | *Sphaerium corneum* | Two individuals found in dredged mud on bankside of reen. |

# D2 Species Observed in 2019

| Ref. | Common name | Scientific Name | Notes |
|---|---|---|---|
| **Birds** | | | |
| 29 | Barn Owl | *Tyto alba* | Two barn owls observed flying overhead during bat surveys, and potential/confirmed barn owl resting sites in T5, T21 and T114**Error! Bookmark not defined.** |
| 30 | Reed warbler | *Acrocephalus scirpaceus* | Calling reed warbler heard in scrub in south and adjacent to Faendre reen |
| 31 | Mallard | *Anas platyrhynchos* | Mallard present on Faendre reen |
| 32 | Cuckoo | *Cuculus canorus* | Cuckoo heard in area of Marshfield SINC |
| 33 | Cetti's warbler | *Cettia cetti* | Cetti's warbler heard overhead south of railway |
| 34 | Kingfisher | *Alcedo atthis* | Kingfisher flying across Hendre Lake |
| **Reptiles** | | | |
| 35 | Common lizard | *Zootoca vivipara* | Male common lizard resting in fence post |
| 36 | Grass snake | *Natrix helvetica* | Grass snake observed basking, along with multiple grass snake skins in the area. |
| **Mammals** | | | |
| 37 | Deer | Cervidae | Deer prints in mud to south of survey area |