Trevor Basin Public Realm, Step Access and River Walk

Preliminary Ecological Appraisal

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Contacts

RORY MURPHY
Consultant Ecologist

m +44 (0)7825 859553

e rory.mruphy@arcadis.com

Arcadis UK
80 Fenchurch Street
London EC3M 4BY
United Kingdom

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Preliminary Ecological Appraisal

Author	Rory Murphy
Checker	Keiron Young
Reviewer	Samantha Walters
Approver	Ed Cardwell
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Appendix A A Phase 1 habitat survey was carried out by Ewan Gibson (Consultant Ecologist, ACIEEM) and Rory Murphy (Consultant Ecologist, qualifying member of CIEEM), on 10 January 2024. The field survey comprised a walkover of the habitats within and adjacent to the site boundary (extending up to 30m where appropriate to search for badger (*Mele meles*) setts), with a classification with reference to the Phase 1 Habitat Survey methodology (JNCC, 2010). The survey followed the 'Preliminary Ecological Appraisal' methodology as set out in the 'Guidelines for Preliminary Ecological Appraisal' (CIEEM, 2017), which is compliant to the methodology described in the 'Handbook for Phase 1 Habitat Survey – a technique for environmental audit' from the Joint Nature Conservation Committee (JNCC, 2010). The survey identified actual or potential presence of legally protected or otherwise notable species/habitats. The main habitats within the site were mapped and are shown at an appropriate scale on a Phase 1 Habitat Map (Appendix A,

Appendix B

Figure 1 - Phase 1 Habitat Map of the Trevor Basin Public Realm, Step Access & River Walk Site

Site Target Notes (TN)

Site Photographs

Appendix B

Legislation, Guidance and Policy

Relevant Legislation To Assessment

Executive Summary

Arcadis Consulting (UK) Limited was commissioned by the Canal & River Trust ('the client') to undertake a Preliminary Ecological Appraisal (PEA) of the land for the proposed development to improve existing access from Trevor Basin to the River Dee riverside walk, an improvement of an approximately 30m length of path and the creation of a new viewpoint near the river ('hereafter, referred to as 'the site'). The site is located adjacent to the Pontcysyllte Aqueduct at Trevor, LL20 7TY (SJ 27068 42086).

The site comprised a stepped footpath on a steep slope, surrounded by broadleaved woodland with some scrub and grassland habitat. There was a native hedgerow (being restored through management) adjacent to part of the path. The site is below and adjacent to the Pontcysyllte Aqueduct (which carries the Llangollen Canal at height across the Dee Valley) and adjacent to the River Dee.

The objective of this report is to identify potential ecological constraints to the proposed development. The constraints have been assessed based on the findings of a desk study (conducted January 2024) and a field survey conducted on 10 January 2024.

Several ecological features were identified that may pose a constraint to the proposed development, namely:

- Statutory Designated Sites. The River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid Special Area of Conservation (SAC) and Afon Dyfrdwy (River Dee) Site of Special Scientific Interest (SSSI) are located within 10 m of the site boundary to the south.
- Non-statutory designated Sites. The site is located within the North East Wales Important Invertebrate Area (IIA).
- Ancient Woodland
- Habitats (Broadleaved Woodland including Restored Ancient Woodland and Ancient Semi-Natural Woodland, Native Hedgerow and marginal Scrub/Grassland)
- Notable / Protected Plants
- Invasive Non-native Plant Species (INNS)
- Invertebrates
- Bats
- Fish
- Common amphibians
- Reptiles
- Breeding Birds
- Otter
- Badger
- Dormouse
- Other Mammals (hedgehog, hare, stoat, weasel and polecat)

Mitigation and enhancement measures have been identified based upon the current understanding of the proposals in the form of:

- Demarcation of a works exclusion buffer from the boundaries of the SAC and SSSI. Where possible, hand tools should be used for the works to minimise any potential ecological disturbance, potential impacts to the valley's physical landscape and eliminate the risk of pollution and run off from vehicles. If vehicles or large machinery are required, appropriate control measures for pollution should be implemented and incorporated into the Method statement for the works.
- Where possible, avoid the removal of woodland, trees and scrub habitat and compensate for any habitat lost to ensure the integrity of the IIA is maintained and impacts to invertebrates are reduced.

- The lighting scheme, if required, should follow the guidance produced by the Bat Conservation Trust and the Institute of Lighting Professionals (ILP; BCT, 2023).
- Pre-construction checks for protected species identified as a potential constraint, including reptile, amphibian, otter, dormouse, protected plants and INNS by an Ecologist.
- Pre-construction nesting bird checks, should vegetation be removed during the core nesting bird season (March to August inclusive) by an Ecologist; and
- Supervision is recommended, including a toolbox talk and Ecological Clerks of Works (ECoW) for all works anticipated to have potential to impact wildlife.
- The proposed development should include a green infrastructure plan to ensure that it delivers a net benefit to biodiversity.

Mitigation and enhancements on site will be required to ensure that there are no legal infringements with regard to biodiversity and that policy requirements have been fulfilled.

1 Introduction

1.1 Background

1.1.1 Arcadis Consulting (UK) Limited was commissioned by the Canal & River Trust ('the client') to undertake a Preliminary Ecological Appraisal (PEA) of the land for the proposed development to improve existing access from Trevor Basin to the River Dee riverside walk, an improvement of an approximately 30m length of path and the creation of a new viewpoint near the river ('hereafter, referred to as 'the site'). The site is located adjacent to the Pontcysyllte Aqueduct at Trevor, LL20 7TY (SJ 27068 42086).

1.1.2 This report outlines the ecological constraints associated with the site regarding biodiversity, legislation and policy. It provides advice on mitigation and enhancement opportunities, including the requirement for any further assessment or licensing, where considered necessary and possible to define at this stage of the planning and design process.

1.2 Site Location and Setting

1.2.1 The site is located adjacent to the Pontcysyllte Aqueduct at Trevor, LL20 7TY (SJ 27068 42086).

1.2.2 The site comprised a stepped footpath on a steep slope, surrounded by broadleaved woodland with some scrub and grassland habitat. A native hedgerow (being restored through management) was located adjacent to the path for a short distance. The site is below and adjacent to the Pontcysyllte Aqueduct (which carries the Llangollen Canal at height across the Dee Valley) and adjacent to the River Dee. To the north of the site, is the village of Trevor. The site boundary is presented in Image 1.

Image 1: Trevor Basin Access redline boundary.



1.3 Scope of Work

1.3.1 Arcadis was commissioned to undertake a Preliminary Ecological Appraisal (PEA) of the site. The following objectives were set for the assessments and reporting:

- Establish the ecological baseline through field and desk-based assessment work.
- Identify important ecological features that may be affected.
- Consider the potential legal and policy implication of the development and refer to the latest biodiversity guidance.
- Assess the potential impacts on important ecological features and the significance of the residual effects of the proposed development, as currently understood.
- Advise on methods to avoid, reduce, and compensate negative ecological impacts and their effects and provide ecological enhancement measures.
- The methods, results and assessment are provided in this report.

1.4 Proposed Development

1.4.1 The proposed development aims to improve the existing access from Trevor Basin to the River Dee riverside walk. There will also be an improvement of an estimated 30m length of path and the creation of a new viewpoint near the river. The River Dee is designated as a Special Area of Conservation (SAC). Access to the steps for pedestrians will be improved by:

- Regularising the step height and depth
- Grouping the steps into flights
- Providing a single central handrail only at the flights of steps
- Realigning the steps away from the Pontcysyllte Aqueduct

The design follows the existing grade of the slope to minimise the need for earthworks and retaining structures.

2 Methodology

2.1 Overview

2.1.1 Within this section of the report, the ecological appraisal and assessment methodologies are outlined.

2.1.2 The baseline was established through a Preliminary Ecological Appraisal (PEA) conducted in January 2024, comprising a desk-based study and field survey. The latter was 'extended' to consider all protected and notable species relevant to the area.

2.2 Desk Study

2.2.1 A desk study was undertaken to identify any existing ecological information, collected within the last ten years, relating to the proposed development site and its surroundings. This included the following:

- The Multi-Agency Geographical Information for the Countryside (MAGIC) website (MAGIC, 2024) was used to search for statutory designated sites of nature conservation value, granted European Protected Species Mitigation (EPSM) license applications within the last 10 years, ancient woodland, and Habitats of Principal Importance (HPI) listed under Section 7 of the Environment (Wales) Act 2016 (HMSO, 2016). For sites with international designations (e.g., Ramsar sites, SACs, Special Protection Areas (SPA)) a 5 km buffer was considered for searching. For sites with national designations (e.g. Sites of Specific Scientific Interest (SSSIs)) 5 km buffer was considered for searching.
- Ordnance Survey (OS) mapping and aerial photography (Google mapping) were studied to place habitats within the study area in the wider context; identify potential ecological features that may not be evident on the ground during the field survey; and identify potential barriers to animal movements (such as road networks, built development and major watercourses).
- The Local Environmental Records Centre for North Wales (Cofnod) were approached by the Canal & River Trust to provide ecological records of protected and notable species, habitats and designated and non-statutory designated sites information within a 1 km radius of the site. Only species recorded within the last 10 years were included in this assessment.

2.2.2 The desk study area for the site comprised various search areas as listed in Table 1: Desk study search buffers applied to the site. below:

Table 1: Desk study search buffers applied to the site.

Site or Record Type	Distance From The Site
International or European statutory designated sites	5 km
Statutory designated sites	2 km
Non-statutory designated sites Protected and notable habitat (including ancient woodland) Protected and notable species Invasive, non-native species	1 km

2.2.3 Waterbodies located within 500m of the site, were searched for using OS mapping, to assess their connectivity to the site and their potential suitability for supporting a population of breeding great crested newt (*Triturus cristatus*).

2.3 Phase 1 Habitat Survey

2.3.1 A Phase 1 habitat survey was carried out by Ewan Gibson (Consultant Ecologist, ACIEEM) and Rory Murphy (Consultant Ecologist, qualifying member of CIEEM), on 10 January 2024. The field survey comprised a walkover of the habitats within and adjacent to the site boundary (extending up to 30m where appropriate to search for badger (Mele meles) setts), with a classification with reference to the Phase 1 Habitat Survey methodology (JNCC, 2010). The survey followed the 'Preliminary Ecological Appraisal' methodology as set out in the 'Guidelines for Preliminary Ecological Appraisal' (CIEEM, 2017), which is compliant to the methodology described in the 'Handbook for Phase 1 Habitat Survey – a technique for environmental audit' from the Joint Nature Conservation Committee (JNCC, 2010). The survey identified actual or potential presence of legally protected or otherwise notable species/habitats. The main habitats within the site were mapped and are shown at an appropriate scale on a Phase 1 Habitat Map (Appendix A,

2.3.2 Figure 1) Target Notes used to identify habitats or features on note (Appendix A, Table 8: Site Target Notes).

2.3.3 The survey does not provide a comprehensive list of all species present; however, a summary of the dominant plant species was noted, as were any uncommon species or species indicative of habitat types. The common and scientific name of each species is provided when first mentioned in the text, but only the common name is stated thereafter. This survey was also "extended" to assess the habitats potential to support protected or notable faunal species, for detail see below.

2.3.4 Ground-level tree assessments (GLTAs) of trees and Preliminary Roost Assessments (PRAs) of structures for bat roosts were carried out under the Bat Conservation Trust's (BCT) 'Good Practice Guidelines' (Collins, 2023).

2.4 Extended Assessment

2.4.1 During the survey, the Phase 1 habitat survey was extended to include an assessment of the potential for the site to support legally protected or notable species, based on field observations carried out during the walkover survey. Based on the habitats present within the site and within the wider surroundings, the potential for the presence of the following protected species were assessed:

- The presence of nesting habitat for breeding birds (such as mature trees, dense scrub, hedgerows and buildings, and/or field margins suitable for ground nesting birds) and evidence of bird nesting including bird song, old nests, faecal marks etc.

- The presence of features in and on trees indicating potential for roosting bats, such as fissures, holes, loose bark and ivy (*Hedera helix*) and those associated with buildings and structures such as cavities voids and cracks. The features were categorised according to their potential for roosting bats using the Bat Conservation Trust's (BCT) good practice guidelines (Collins, 2023). Direct evidence, such as the presence of bats, staining, droppings and feeding remains, was also looked for.
- Evidence of badger, including setts, runs, snuffle holes and hairs within the site.
- Woodland, scrub and grassland mosaic with potential for foraging, basking and hibernation for reptiles and amphibians.
- Suitable habitat for dormouse (*Muscardinus avellanarius*), such as woodland, scrub and dense / species-rich hedges, particularly when connected to suitable habitats across the wider landscape.
- Assessment of any on-site ponds if present. Pond assessments include applying the Habitat Suitability Index (HSI) following ARG UK (2010) guidance to determine their suitability for supporting great crested newt. Additionally, terrestrial habitats were assessed for their potential to support great crested newt and other amphibians; and
- Assessment of water bodies and watercourses, such as ditches and streams, for their potential to support water vole (*Arvicola amphibius*) and/or otter (*Lutra lutra*).

2.4.2 The presence or likelihood of occurrence of legally protected, notable and/or invasive species was assessed from the habitat type and condition, combined with the results of the desktop study. This was ranked as follows:

- **Negligible**: while presence cannot be absolutely discounted, the site included very limited or poor-quality habitat for a particular species or species group. There may be no local returns from a data search and the surrounding habitats are considered unlikely to support wider populations of a species / species group. The site may also be outside or peripheral to the known natural range of a species / species group.
- **Low**: habitats within the site are of poor to moderate quality for a given species / species group. There are few or no returns from the data search, but presence cannot be discounted on the basis of national distribution, the nature of surrounding habitats, habitat fragmentation or recent on-site disturbance, etc.
- **Medium**: habitats within the site are of moderate quality providing opportunities for a given species / species group. Desk study reveals local occurrence, or the site is within the national distribution and with suitable surrounding habitat. Factors limiting the likelihood of occurrence may include small habitat area, habitat isolation, and/or disturbance.
- **High**: habitats within the site are of high quality for a given species / species group. Desk study provides evidence of local occurrence. The site is within / peripheral to a national or regional stronghold and/or has good quality surrounding habitat and good connectivity; and
- **Confirmed Presence**: presence confirmed by the current survey or by recent, confirmed records.

2.5 Limitations and Expectations

2.5.1 This report has been prepared for the Canal & River Trust in accordance with the terms and conditions of appointment. Arcadis cannot accept any responsibility for any use of or reliance on the contents of this report by any third party. The copyright of this document, including the electronic format shall remain the property of Arcadis.

2.5.2 The extended Phase 1 survey provides a preliminary view of the likelihood of protected species occurring within the site. This is based on the suitability of the habitat, known distribution of the species in the local area and any direct evidence within the survey area. It should not be taken as providing a full and definitive survey of any protected species group.

2.5.3 Survey was conducted outside of the ideal survey period for many species, but especially for botany and many plant species will either not be in flower or will have died back completely over winter. This limitation indicates that some significant plant species that are present may not have been recorded. This is not expected to have an effect on the accuracy of overall habitat classification.

2.5.4 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no investigation can ensure the complete characterisation of the natural environment. The field survey does not constitute a full botanical survey. Plant species may have been under-recorded, unidentifiable or not visible due to the time of year the survey was carried out.

3 Results

3.1 Reporting Outline

3.1.1 The results of the desk study and field survey are described below, with sites or features of nature conservation interest detailed as appropriate. An assessment of potential impacts of the proposed development is presented in the subsequent discussion.

3.1.2 Supporting documents to be read in conjunction with the results and subsequent discussion are as follows:

- Appendix A: Figure 1 – Phase 1 Habitat Map of the Trevor Basin Public Realm, Step Access & River Walk Site and Site Target Notes (TN) and Photographs
- Appendix B: Legislation, Guidance and Policy

3.2 Desk Study

3.2.1 Desk study results that are potentially relevant to the site are presented within the report. Detailed status and protections conferred by the relevant designations below are presented in the Table 2, Table 3, and Table 4. Desk study results for protected and notable species are discussed in section 3.7 below.

3.2.2 Relevant legislation and policy are included in Appendix B. The relevant site information is summarised below.

3.3 Statutory Designated Sites

3.3.1 As shown in the table below, there are three statutory designations of international importance recorded within 5 km of the site and one national statutory designated site located within 2 km of the site.

3.3.2 Details of designations and relevant site information are summarised in Table 2, Table 3, and Table 4. Relevant legislation and policy are included within Appendix B of this report.

Table 2: International statutory designated sites within 5 km of the site.

Site Name	Reason for Designation	Distance and Direction from Site (km)
River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC	Designated for its abundance of water crowfoot (*Ranunculion fluitantis* and *Callitricho Batrachion*) floating vegetation communities, in addition to the presence of Atlantic salmon (*Salmo salar*) and floating water-plantain (*Luronium natans*). Additional qualifying features include the populations of otter, bullhead (*Cottus gobio*) and three species of lamprey.	<0.01 km south

Site Name	Reason for Designation	Distance and Direction from Site (km)
Berwyn a Mynyddoedd De Clwyd / Berwyn and South Clwyd Mountains SAC	Designated for the presence of blanket bog, base-rich scree, dry heaths, dry grasslands and scrublands on chalk or limestone, and very wet mires habitats, as well as the plant species that grow in crevices in base-rich rocks.	2.3 km northwest
Johnstown Newt Sites Special SAC	Composed of two post-industrial sites where coal and clay have been extracted. The population of great crested newt is one of the largest known in Great Britain. Terrestrial habitat varies from marshy grassland, grazed farmland and swamp through to scrub and broad-leaved woodland. Good populations of the widespread amphibian species are also present.	4.3 km northeast

Table 3: National statutory designated sites within 5 km of the site.

Site Name	Reason for Designation	Distance and Direction from Site (km)
Afon Dyfrdwy (River Dee) SSSI	Cited for its range of river habitat types, saltmarsh transition habitats, populations of floating water plantain, slender hare's-ear (*Bupleurum tenuissimum*), sea barley (*Hordeum marinum*), hard-grass (*Parapholis strigosa*), otter (*Lutra lutra*), Atlantic salmon, bullhead, and three species of lamprey, club-tailed dragonfly (*Gomphus vulgatissimus*) and other aquatic invertebrates.	<0.01 km south

3.4 Non-Statutory Designated Sites

3.4.1 There are four non-statutory designated sites within 1 km of the site. A summary of these sites is listed below in Table 4.

Table 4: Non-statutory designated for biodiversity sites within 2 km of the site.

Site Name	Reason for Designation	Distance and Direction from Site (km)
North East Wales Important Invertebrate Area (IIA)	The North East Wales IIA supports a nationally and internationally important population of the Globally Endangered freshwater pearl mussel (*Margaritifera margaritifera*). The IIA also supports a nationally important assemblage of invertebrates, with 46 species of conservation concern, including the Critically Endangered	0 km

Site Name	Reason for Designation	Distance and Direction from Site (km)
	Scarce yellow sally stonefly (*Isogenus nubecula*), and the caddisfly (*Adicella filicornis*), window winged sedge caddisfly (*Hagenella clathrata*), the ground beetle *Leistus montanus*, white-faced darter (*Leucorrhinia dubia*), and white-letter hairstreak (*Satyrium w-album*), all of which are classified as Endangered. These important invertebrate populations rely on the varied habitats found in the North Wales IIA, including rivers, streams, limestone grasslands, cliffs, brownfield sites, parklands, woodlands, and peat bogs.	
Froncysyllte Quarries Local Wildlife Site (LWS)	Several large disused limestone quarries with cliffs and spoil heaps, colonised by broad-leaved woodland and scrub. The canopy is dominated by ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) and there is willow (*Salis* spp.), birch (*Betula* spp.) and ash scrub. The ground flora is variable, the southern quarry has a large patches of moss (*Rhytidiadelphus loreus*) and yellow-wort (*Blackstonia perfoliata*), common centaury (*Centaurium erythraea*) and thyme-leaved speedwell (*Veronica serpyllifolia*) occur. A few crab apple trees (*Malus sylvestris*) are present on the tops of the cliffs. The species poor semi-improved coarse grassland is dominated by tall false oat-grass (*Arrhenatherum elatius*). It is potentially a good area for birds.	0.66 km south
Spring Wood LWS	Good condition broadleaved woodland	0.83 km west
Pisgah Quarry North Wales Wildlife Trust Nature Reserve	Former limestone quarry that has become woodland. The site is filled with lush, green ferns. Ash (*Fraxinus excelsior*), goat willow (*Salix caprea*) and sycamore (*Acer pseudoplatanus*) dominate the canopy, with lots of variety in the understory creating great conditions for woodland birds. The trees open up to reveal a sunny grassland glade, studded with yellow meadow anthills as well as cowslip (*Primula veris*), vetch (*Vicia* spp.) and knapweed (*Centaurea* spp.).	0.87 km south

3.5 Ancient Woodland and Priority Habitats

3.5.1 There are approximately 15 blocks of ancient woodland within 1 km of the site, consisting of eight blocks of Ancient Semi-Natural Woodland (ASNW) and seven blocks of Restored Ancient Woodland Sites (RAWS), as listed on the Ancient Woodland Inventory (AWI) for Wales. One block of RAWS is located within the site boundary and one block of ASNW is located immediately adjacent (less than 10m) to south of the site boundary; these blocks of woodland form part of a woodland known as 'Jeffrey's Wood'.

3.5.2 HPI identified within 1 km of the site include six small areas of traditional orchard and one area of lowland calcareous grassland. The lowland calcareous grassland was located approximately 0.47 km northwest of the site, while the closest area of traditional orchard was located 0.36 km northwest. These habitats were not linked to the site by vegetated or aquatic habitats.

3.6 Habitats

Habitats Overview

3.6.1 The site contains an existing earth footpath with patches of grassland and scrub on either side, progressing into mature woodland.

3.6.2 A native hedgerow, dominated by hazel (*Corylus avellana*) was located alongside the eastern side of the path for part of its length.

3.6.3 Mature trees and their roots along the eastern boundary of the site have the potential to be impacted by the proposed development. The potential impact to these trees and their root protection areas (RPAs) must be considered and measures may be required to ensure no harm to these trees.

Woodland

3.6.4 As illustrated on Figure 1 in Appendix A, most of the eastern, western and southern boundaries of the site supported mature semi-natural broadleaved woodland that is known as Jeffrey's Wood. The northeastern part of the woodland is mapped as RAWS in the Wales ancient woodland inventory while the portion to the south is mapped as ASNW. However, the woodland on site was of the same continuous character and so was assessed together are part of the same woodland block (Appendix A, Table 9, Image 5). Tree species recorded included pedunculate oak (*Quercus robur*), sessile oak (*Quercus petraea*), hazel, cherry (*Prunus*) spp., holly (*Ilex aquifolium*), ash, hawthorn (*Crataegus monogyna*), willow, elder (*Sambucus nigra*). A small line of cypress (*Cupressus* sp.) trees was also recorded along the northwest boundary of the woodland. Ground flora included rush (*Juncus* spp.), bramble (*Rubus fruticosus* agg.), hart's-tongue fern (*Asplenium scolopendrium*), pendulous sedge (*Carex pendula*), cherry laurel (*Prunus laurocerasus*), buttercup (*Ranunculus* sp.), butterfly-bush (*Buddleja davidii*), common nettle (*Urtica dioica*), rose (*Rosa*) sp., ivy , hard shield-fern (*Polystichum aculeatum*), fern (*Polypodiopsida* spp.), tutsan (*Hypericum androsaemum*), box honeysuckle (*Lonicera nitida*), dog's mercury (*Mercurialis perennis*), wood false-brome (*brachypodium sylvaticum*), willowherb (*Epilobium* sp.).

Grassland

3.6.5 Two strips of semi-improved neutral grassland were recorded along the eastern boundary of the existing footpath, overlapping with the site boundary (Appendix A, Table 9, Image 2). Prevalent or significant species growing here included wood false-brome, tufted hair-grass (*Deschampsia cespitosa*), bramble, common ivy, scattered bracken (*Pteridium aquilinum*), knapweed, fern spp., umbellifer (*Apiaceae* spp.), and willowherb sp.. Additionally, multiple hazel and rose sp. saplings were present.

3.6.6 A patch of bracken with bramble and hazel saplings was recorded between two of the aqueduct's columns on the western side of the of the site boundary and existing footpath. At the northern end of the site, three small patches of short mown amenity grassland were recorded.

Hedgerows

3.6.7 A short section of native intact species-poor hedgerow dominated by young hazel trees was recorded on the eastern side of the site boundary through the southern area of semi-improved neutral grassland (Appendix A, Table 9, Image 7). Rose spp. and bramble were growing throughout and along the ground. It was estimated that the hedgerow was planted approximately two years before the survey date.

Scrub

3.6.8 An area of continuous scrub was recorded in the southern central area of the site, along the western side of the existing footpath, spreading underneath the aqueduct (Appendix A, Table 9, Image 3). This was dominated by young hazel shrubs and saplings, and interspersed with bramble, ivy, ash, sycamore (*Acer pseudoplatanus*), hawthorn, and rose spp.

3.6.9 Further north, a small area of bramble scrub was recorded beneath the aqueduct on the eastern edge of a small section of the footpath. Near the top of the footpath was a dense small area of introduced snowberry (*Symphoricarpos albus*) scrub (Appendix A, Table 9, Image 4).

Bare Ground

3.6.10 The existing footpath comprised earth and gravel.

Protected Plants

3.6.11 The desk study returned four records of a bluebell (*Hyacinthoides non-scripta*) with 1 km of the site in the last 10 years. The nearest record was approximately 175m southeast of the site, within the same woodland. Bluebell is listed on Schedule 8 of the WCA 1981 (as amended) (HMSO, 1981), meaning it is against the law to offer them for sale without a licence.

Non-native Invasive Plant Species

3.6.12 Records of seven invasive non-native species (INNS) of plants listed under Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended) (HMSO, 1981) were returned by the desk study within 1 km of the site in the last 10 years. This included eight records of Japanese knotweed (*Reynoutria japonica*), seven records of Himalayan balsam (*Impatiens glandulifera*), one record of rhododendron (*Rhododendron ponticum*), one record of Canadian Waterweed (*Elodea canadensis*), six records of Montbretia (*Crocosmia pottsii x aurea = C. x crocosmiiflora*), five records of variegated

yellow archangel (*Lamiastrum galeobdolon subsp. argentatum*) and one record of Nuttall's Waterweed (*Elodea nuttallii*). The closest record was of Himalayan balsam approximately 70m southwest of the site. These species are listed on Schedule 9 of the Wildlife and Countryside Act (WCA) 1981 (as amended) and, as such, it is an offence to grow or to cause these species to grow in the wild. No INNS listed under Schedule 9 of the WCA were identified during the field survey, but snowberry and butterfly-bush are both non-native species that can be a threat to biodiversity, both species were recorded on site.

3.7 Protected and Notable Species

Overview

3.7.1 A full range of protected species was considered at an initial stage of assessment. Several species were discounted on the grounds that there was no likelihood of their occurrence on site (for example, due to an absence of suitable habitat). Only those species with ranges within the geographical area of the site and where suitable habitats were present within or adjacent to the site are included below. Where confirmed presence was established or a likelihood of presence was anticipated, the relevant legislation and policy are included in Appendix B.

3.7.2 It should be noted, the below includes records of protected or notable species recorded within 1 km of the site only in the last 10 years.

Bats

3.7.3 The desk study returned a small number of bat records within 1 km of the site in the last 10 years, including one record of common pipistrelle (*Pipistrellus pipistrellus*), one record of soprano pipistrelle (*Pipistrellus pygmaeus*), and one record noctule (*Nyctalus noctula*). The record for all three were located approximate 165m west of the site. While no records were returned indicating it, British Waterways (predecessor to the Canal & River Trust) publicly stated that the Pontcysyllte Aqueduct itself is home to pipistrelle spp. roosts (BBC; British Waterways, 2011), indicating that it is likely that there are bat roosts within or very close to the site boundary.

3.7.4 The woodland, hedgerow and River Dee bordering the site provide suitable linear corridors for commuting and foraging bats. In addition, the surrounding landscape provides suitable habitat for foraging bats.

3.7.5 Overall, the site was assessed as having high potential to support the presence of commuting / foraging bats within the site in all areas.

Potential Roosting Features

3.7.6 Two mature trees just outside the site boundary were identified as having potential to support roosting bats. A mature sycamore tree (Appendix A, TN6 and shown on Figure 1) located less than 5m to the east of the site boundary was recorded with one PRF-M (Potential Roosting Feature – Multiple/Maternity) and two PRF-I (Potential Roosting Feature – Individual), giving the tree an overall assessment as PRF-M. A mature sessile oak tree (Appendix A, TN14 and shown on Figure 1) located approximately 15m west of the site boundary was assessed as having two PRF-Ms and one PRF-I, giving an overall assessment of PRF-M.

3.7.7 Many PRFs on man-made structures were recorded on site. The majority of these were located on the columns of the aqueduct itself (Appendix A, TN7 to TN13, locations shown on Figure 1). Each column contained at least 5 PRFs, all of which seemed to lead to a large internal cavity within each column, each easily large enough for sizeable bat roosts (See Appendix A, Table 8: Site Target Notes (TN) for further details and full descriptions). Additionally, wall structures at the northern end of the aqueduct contained multiple large cracks and potential cavities for roosting bats (Appendix A, TN1 to TN4. Also displayed on Figure 1). These features were assessed as PRF-M.

The likelihood that the site or its immediate surroundings supports roosting bats was assessed as high.

Reptiles

The desk study returned five records of slow-worm (*Anguis fragilis*) and one record of grass snake (*Natrix helvetica*) within 1 km of the site in the last 10 years. The closest record was of slow-worm approximately 216m northwest of the site. Within and surrounding the site boundary there was foraging potential for reptiles in the woodland, scrub and grassland as well as a multitude of potential refugia and hibernacula in the form of the multiple piles of logs, deadwood (TN15) and stones (TN5).

Overall, the site was assessed as having medium potential to support foraging reptiles.

Amphibians

The desk study returned one notable amphibian record within 1 km of the site in the last 10 years; great crested newt located approximately 690m northeast of the site.

A review of aerial photography and OS mapping identified no ponds within 500m of the site. No waterbodies were identified on the site during the survey. The River Dee is too large and fast-flowing near to the site to be suitable for newt or other common amphibian species. The watercourse mapped to the northeast of the site is a fast flowing, man-made stone and brick drain, also unsuitable to support common amphibian populations.

The woodland (and pile of logs, deadwood (TN15) and stones (TN5) found within) connecting the wider landscape to the site, provide good terrestrial and over-wintering habitat for great crested newt and other amphibians, as well as provide connectivity across the wider landscape. However, due to the lack of suitable waterbodies or watercourse on or nearby the site, it is deemed unlikely that a significant number of amphibians would use the site.

Therefore, due to this, the lack of nearby species records and lack of ponds in the surrounding area, the site has been assessed as having low potential to support great crested newt and other common amphibians terrestrially. No breeding habitats are present on the site.

Breeding Birds

The desk study returned records of several records of protected bird species or birds of conservation concern (BoCC) within 1 km of the site in the last 10 years. Bird species included are those listed under the EU Birds Directive Annex I (BDir1); Schedule 1 of the WCA 1981, Section 7 of the Environment (Wales) Act 2016 as Species of Principal Importance (SPI); British Trust for Ornithology (BTO) UK bird red list (UKBR); BTO UK bird amber list (UKBA), BTO Wales bird red list (WBR); and the BTO Wales bird amber list (WBA). Table 5 below lists these species:

Table 5: Records of Protected Bird Species and Birds of Conservation Concern (BoCC) within 1 km of the site boundary in the last 10 years

Common Name	Scientific Name	Conservation List / Status	Number of Records
Black-headed gull	*Chroicocephalus ridibundus*	SPI, UKBA, WBR	3
Brambling	*Fringilla montifringilla*	WCA1.1	1
Bullfinch	*Pyrrhula pyrrhula*	SPI, UKBA, WBR	2
Coal tit	*Periparus ater*	WBA	1
Common gull	*Larus canus*	UKBA, WBR	2
Common sandpiper	*Actitis hypoleucos*	UKBA, WBA	1
Cormorant	*Phalacrocorax carbo*	WBA	2
Crossbill	*Loxia curvirostra*	WCA1.1	1
Curlew	*Numenius arquata*	SPI, UKBR, WBR	2
Dipper	*Cinclus cinclus*	UKBA, WBA	7
Dunnock	*Prunella modularis*	SPI, UKBA	3
Fieldfare	*Turdus pilaris*	UKBR, WBA, WCA1.1	3
Goldcrest	*Regulus regulus*	WBA	4
Great black-backed Gull	*Larus marinus*	UKBA, WBR	1
Green woodpecker	*Picus viridis*	WBA	4
Greenfinch	*Chloris chloris*	UKBR	1
Grey wagtail	*Motacilla cinerea*	UKBA	6

Common Name	Scientific Name	Conservation List / Status	Number of Records
Greylag goose	*Anser anser*	UKBA, WCA1.2	2
Herring gull	*Larus argentatus*	SPI, UKBR, WBR	4
Hobby	*Falco subbuteo*	WBA, WCA1.1	3
House Martin	*Delichon urbicum*	UKBR, WBA	5
House Sparrow	*Passer domesticus*	SPI, UKBR, WBA	2
Kestrel	*Falco tinnunculus*	SPI, UKBA, WBR	3
Kingfisher	*Alcedo atthis*	BDir1, WBA, WCA1.1	3
Lesser black-backed gull	*Larus fuscus*	UKBA, WBA	3
Lesser redpoll	*Acanthis cabaret*	SPI, WBR	1
Linnet	*Linaria cannabina*	SPI, UKBR, WBR	2
Little egret	*Egretta garzetta*	BDir1	1
Long-tailed duck	*Clangula hyemalis*	UKBR, WBA, WCA1.1	1
Long-tailed tit	*Aegithalos caudatus*	WBA	5
Mallard	*Anas platyrhynchos*	UKBA, WBA	5
Marsh tit	*Poecile palustris*	SPI, UKBR, WBR	3
Mistle thrush	*Turdus viscivorus*	UKBR	4
Moorhen	*Gallinula chloropus*	UKBA	2
Mute swan	*Cygnus olor*	WBA	1

Common Name	Scientific Name	Conservation List / Status	Number of Records
Osprey	*Pandion haliaetus*	BDir1, UKBA, WBA, WCA1.1	2
Peregrine	*Falco peregrinus*	BDir1, WCA1.1	3
Pink-footed goose	*Anser brachyrhynchus*	UKBA	1
Red Kite	*Milvus milvus*	BDir1, WBA, WCA1.1, WCA9	2
Redstart	*Phoenicurus phoenicurus*	UKBA, WBA	1
Redwing	*Turdus iliacus*	UKBA, WBA, WCA1.1	3
Rook	*Corvus frugilegus*	UKBA	4
Sand martin	*Riparia riparia*	WBA	1
Skylark	*Alauda arvensis*	SPI, UKBR, WBA	1
Song thrush	*Turdus philomelos*	LBAP-W, SPI, UKBA, WBA	3
Sparrowhawk	*Accipiter nisus*	UKBA	2
Starling	*Sturnus vulgaris*	SPI, UKBR, WBR	1
Stock dove	*Columba oenas*	UKBA	1
Swallow	*Hirundo rustica*	WBA	4
Swift	*Apus apus*	UKBR, WBA	13
Tawny owl	*Strix aluco*	UKBA	4
Teal	*Anas crecca*	UKBA, WBA	1
Tree sparrow	*Passer montanus*	SPI, UKBR, WBR	1

Common Name	Scientific Name	Conservation List / Status	Number of Records
Tufted duck	*Aythya fuligula*	WBA	1
Wheatear	*Oenanthe oenanthe*	UKBA, WBA	1
Whitethroat	*Curruca communis*	UKBA, WBA	1
Willow tit	*Poecile montanus*	SPI, UKBR, WBR	3
Willow warbler	*Phylloscopus trochilus*	UKBA, WBR	2
Woodpigeon	*Columba palumbus*	UKBA	5
Wren	*Troglodytes troglodytes*	UKBA	4
Yellowhammer	*Emberiza citrinella*	SPI, UKBR, WBR	3

The nearest record to site of a BDir1 listed bird species was of kingfisher along the River Dee approximately 200 m southeast. This, along with a record of greylag goose were also the nearest records of WCA Schedule 1 listed bird species. The closest record of a UKBR listed species were of house sparrow and swift which were approximately inside or adjacent to the site boundary. The nearest record of a WBR listed species was bullfinch approximately 70m east of the site boundary.

The habitats on site that surround the existing footpath provide nesting and foraging opportunities for breeding birds, especially the surrounding mature woodland, but also the scrub and hedgerow within the site boundary.

Therefore, the habitats on and adjacent site have been assessed as having high potential to support breeding birds.

Otter and Water Vole

The desk study returned two records of otter (*Lutra lutra*) within 1 km of the site in the last 10 years. The nearest record was located approximately 95 m north of the site. No records of water vole (*Arvicola amphibius*) were returned within 1 km of the site in the last 10 years.

The River Dee to the south of the site provides optimal habitat to support otter, however, the distance between the river and the site boundary and the regular human presence on the existing footpaths makes it unlikely for otter to use the site or its nearby surrounding for holts. However, the woodland surrounding the site may be used by otter for foraging and commuting. Nevertheless, no evidence of otter was found on or surrounding the site during the survey.

There was no habitat on site assessed as being suitable habitat for water vole. The watercourse mapped to the northeast of site was a man-made brick and stone drain, unsuitable for burrows.

Therefore, the site has been assessed as having low potential to support otter holts, medium for otter foraging and negligible for water vole.

Badger

The desk study returned two records of badger within 1 km of the site in the last 10 years. The nearest record was located approximately 530m west of the site.

The mature woodland, scrub, hedgerow and grassland on and surrounding the site provide suitable badger sett and foraging habitat within the site and wider landscape. However, no evidence of badger activity, such as setts, latrines, push-throughs and excavations were recorded during the survey.

Therefore, the site has been assessed as having medium potential to support badger.

Dormouse

The desk study returned no records of dormouse within 1 km of the site and no evidence of dormouse was recorded during the field survey. The hazel hedgerow, scrub and the surrounding woodland could however provide suitable habitat for dormouse. These habitats were well connected to the wider landscape. Dormouse is known to occur in north Wales and so it is possible that this species could be present in the local area but unrecorded.

Therefore, the site has been assessed as having medium potential to support dormouse.

Protected or Notable Invertebrates (Including Non-native Species)

The desk study returned single records of several species of notable butterfly, moth, mayfly, caddis fly and true fly species within 1 km of the site in the last 10 years. These and their designations are listed below in Table 6. Among the notable findings were the white-letter hairstreak, which is both protected under schedule 5 of the WCA 1981 and a SPI, as well as wall butterfly (*Lasiommata megera*), also a SPI. The nearest records for notable invertebrate species were of black-legged water-snipefly (*Ibisia marginata*) and yellow evening hawk mayfly (*Ephemerella notata*) either within the site boundary or more likely just to the south associated with the River Dee as both spend a significant portion of their lifecycle associated with aquatic habitats, both of which are listed as Nationally Scarce.

Table 6: Records of Protected or Notable Invertebrate within 1 km of the site boundary in the last 10 years

Common Name	Scientific Name	Conservation List / Status
Black-legged Water-snipefly	*Ibisia marginata*	Nationally Scarce
Rhithrogena germanica	*Rhithrogena germanica*	Nationally Scarce
Tinodes maclachlani	*Tinodes maclachlani*	Nationally Scarce
Wall	*Lasiommata megera*	SPI[2]
White-letter Hairstreak	*Satyrium w-album*	Schedule 5 WCA[1], SPI
Yellow Evening Hawk	*Ephemerella notata*	Nationally Scarce

1 As listed on Schedule 5 of the WCA 1981 (as amended) (HMSO, 1981).
2 SPI listed under Section 7 of the Environment (Wales) Act 2016 (HMSO, 2016).

The woodland on site is likely to support terrestrial invertebrates with its abundant deadwood and piles of logs (TN15). Additionally, the scrub, grassland, hedgerow within the site boundary, as well as the close by River Dee, make up a potentially very good quality area for a diverse assemblage of invertebrates. Furthermore, the desk study revealed that the site is within part of the North East Wales IIA that follows the River Dee and its valley across the site.

Considering the presence of the IIA and the suitable habitats on site, the site has been assessed as having high potential to support protected or a notable assemblage of invertebrates.

Fish

No records of protected fish species were returned within 1 km of the Site within the last 10 years. However, the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and Afon Dyfrdwy (River Dee) SSSI are designated for their populations of Atlantic salmon as primary reasons and bullhead, river lamprey (*Lampetra fluviatilis*), brook lamprey (*Lampetra planeri*) and sea lamprey (*Petromyzon marinus*) as qualifying features or species of interest. Therefore, it is possible these species are present within the River Dee close to the site.

Other Mammals

The desk study returned records of brown hare (*Lepus europaeus*), hedgehog (*Erinaceus europaeus*) and weasel (*Mustela nivalis*) within 1 km of the site in the last 10 years. The closest record was of hare, approximately 545 m north of the site.

A stoat (*Mustela erminea*) was seen on the riverbank just to the south of the site boundary during the survey. No signs of other mammals were recorded on or adjacent to the site during the survey. However, the mature good quality woodland, the nearby River Dee and the other habitats on site indicate that the area could support a range of mammal species such as hedgehog, brown hare, stoat, weasel and polecat (*Mustela putorius*), which are known to occur in the wider region. The site has been assessed as having high potential to support other mammals.

4 Potential Ecological Constraints, Mitigation and Enhancement

4.1 Overview

4.1.1 The sections below discuss constraints, likely mitigation, and potential enhancement opportunities for relevant ecological features, which include protected and notable species and habitats. Where this mitigation and enhancements are required to fulfil legal and policy constraints, these are discussed more fully in Section 5 and selected relevant legislation and policy related to biodiversity is presented in Appendix B.

4.2 Ecological Features

4.2.1 The following ecological features have been scoped out as not requiring further consideration (with regard to the proposed development on site - no potential impacts are anticipated).

- Water vole: No evidence of water vole activity was recorded within the site during the field survey and no suitable habitat was present. As such, the likelihood that such species is present on site is assessed as negligible.

4.3 Potential Ecological Constraints

4.3.1 The following ecological features have been scoped in, meaning that adverse impacts are possible, and they need at least some consideration as the scheme develops over time.

- Statutory Designated Sites: River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and Afon Dyfrdwy (River Dee) SSSI are located within 10m of the site boundary to the south.
- Non-Statutory Designated Sites: The site is located within the North East Wales Important Invertebrate Area (IIA).
- Ancient Woodland: Part of the site boundary crosses into Jeffrey's Wood RAWS and is less than 10m from Jeffrey's Wood ASNW.
- Priority habitat: While the mapped HPI found during the desk study are distant from the site, the woodland within and surrounding the site qualifies as lowland mixed deciduous woodland HPI, and the hedgerow on site also qualifies as a HPI.
- Invasive Non-native Plant Species: Himalayan balsam has been recorded within 70m of the site and the walkover survey took place in the Winter, and so some INNS may not have been visible.
- Bats: Two trees and the structures on site were recorded as having bat roosting potential. Additionally, the woodland, scrub, hedgerow within the site are suitable for foraging and/or commuting bats.
- Reptiles: Woodland, scrub, grassland and hedgerow within and surrounding the site provides suitable foraging, basking and hibernation opportunities for reptiles.
- Amphibians (including great crested newt): The woodland and scrub within the site provide suitable shelter and hibernation opportunities, and while there are no mapped ponds within 500m of site, the presence of nearby unidentified small waterbodies cannot be discounted.

- Breeding Birds: The woodland, scrub and hedgerow within and surrounding the site provide nesting habitat for birds.
- Otter: The River Dee to the south of the site provides optimal habitat to support otter and there is potential for otter to use the site for resting, foraging or commuting.
- Badger: The woodland and scrub within the site were suitable for badger for both foraging/commuting and sett construction.
- Dormouse: The hazel hedgerow, scrub and the surrounding woodland, which are well connected to the wider landscape, could provide suitable habitat for dormice.
- Notable / Protected Plants: The woodland on site has potential to support bluebell, which may not have been visible during the time of the survey.
- Invertebrates: The site being within the North East Wales IIA, as well as the woodland, scrub, grassland, hedgerow and proximity to the River Dee means the site may support a wide range of invertebrate species
- Fish: While no records were returned in the last 10 years, it is likely that Atlantic salmon (*Salmo salar*), Bullhead (*Cottus gobio*), River lamprey (*Lampetra fluviatilis*), Brook lamprey (*Lampetra planeri*) and eel (*Anguilla anguilla*), which are primary, qualifying or noted species for the SAC and SSSI.
- Other Mammals: The woodland, hedgerow, the nearby River Dee and the other habitats on site could support a range of mammal species such as hedgehog, hare, stoat, weasel and polecat.

4.4 Recommendations

4.4.1 The following recommendations are made on the understanding that no proposed development works have yet been fully confirmed, and that any habitats within the Site have the potential to be impacted or removed. The requirement for survey may reduce once the details of the development are known.

Designated Sites and Fish

4.4.2 As the works are limited to the improvement and upgrade the existing footpath with some slight adjustments to its route, avoidance of direct impacts to the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and Afon Dyfrdwy (River Dee) SSSI should be easily achievable through demarcating their boundaries and by enforcing an exclusion buffer during the works. It is understood that earthworks will be minimal and so they are unlikely to compromise the integrity of the sites or affect notable fish species populations. Where possible, hand tools should be used for the works to minimise any potential impacts to the valley's physical landscape and eliminate the risk of pollution and run off from vehicles. It is assumed that no vehicles or large machinery will be used during the works. If any vehicles or large machinery are required, appropriate control measures for pollution should be implemented and incorporated into the Method Statement for the works.

Non-Statutory Designated Sites and Terrestrial Invertebrates

4.4.3 As the works are within the North East Wales IIA, the removal of habitat of value to invertebrates should be avoided or minimised where possible. This includes the woodland, scrub and the hedgerow on site. Should any part of these habitats be removed during the works, they should be reinstated or compensated in an appropriate location. Due to the localised and minimally invasive nature of the works, they are unlikely to compromise the integrity if the wider IIA.

Ancient Woodland

4.4.4 Impacts to the part of ancient woodland that may cross into the northeastern part of the site boundary should be strictly avoided during the works. The upgraded footpath should be routed to avoid any trees and their roots associated with the ancient woodland and any impacts to the woodland's soils and landscape should also be avoided. During the works, a method statement should be implemented that details avoidance measures and pollution control measures to avoid impacts to the ancient woodland.

Habitats

4.4.5 The proposals should aim to limit habitat loss to that strictly necessary for the construction of the proposed development based on detailed plans. Any loss of woodland or trees within the site should be compensated by the creation of replacement habitats.

4.4.6 A green infrastructure plan should be implemented to ensure that the proposed development provides a net benefit to biodiversity in keeping with National Planning Policy.

Notable / Protected Plants

4.4.7 Due to the good quality ancient and deciduous woodland surrounding the site, there is a possibility of notable plant species being present on site. While none were recorded during the survey, they may have not been visible due to the walkover taking place over winter.

4.4.8 A pre-works commencement check by an Ecologist should therefore be undertaken to check for any protected plant species that may be impacted by the works and avoidances measure employed if necessary.

Non-native Invasive Plant Species

4.4.9 As the survey took place over winter, INNS may be present but were not visible at this time of year. Himalayan balsam has been recorded within 70m of the site and so there is a possibility that is also present on or adjacent to the site.

4.4.10 To avoid spread of invasive plant species it is recommended that works proceed under a method statement and an Ecologist be present to oversee the works. Works within 7m of invasive plant species should be avoided wherever possible. Where works within 7m of invasive plant species are unavoidable, the following measures should be taken to avoid causing the spread of these species;

- All footwear, tools, vehicles, equipment, and plant should be clean and contamination-free before starting works;
- Boards or matting should be used where possible to prevent contamination of footwear, tools, vehicles, equipment, or plant by soil containing seeds or rhizomes;
- All footwear, tools, vehicles, equipment, and plant which have been within 7 m of invasive plant species should be checked for contaminants and thoroughly cleaned before leaving site; and
- A designated wash-down area should be set-up at the site for cleaning, ensuring wastewater filters through the soil, to trap potential contaminants such as seeds on site rather than allowing contaminants to wash into the watercourse where they may spread.

Bats

4.4.11 The trees identified as possessing PRF-M bat roosting potential are outside the site boundary and so it is assumed that neither will be directly impacted by the works. It is anticipated that the works will not require the use of heavy machinery or generators that would cause noise impacts or generate fumes. Therefore, no further mitigation or surveys will be required. However, should it be realised at a future date that either tree will be directly impacted, further surveys would be necessary. If this is the case, at least one aerial inspection survey would be required to visually inspect each PRF, to confirm their suitability for use by bats. If they are deemed to be suitable for use by more than individual bats at least three further climbed inspections would be required to confirm the presence/absence of bats and classify any roosts. These visits should occur between May and September inclusive, with at least two of the visits occurring between May and August. Aerial inspections on these trees would require tree climbs due to the location of the potential roosting features. If this is not possible due to safety risks, general inaccessibility or for any other reason, three emergence surveys should be conducted instead within the same period as above utilising Night Vision Aids (NVAs) such as infrared cameras or thermal imaging cameras.

4.4.12 Based on current proposals, the structures on site identified as having roost potential are unlikely to be directly impacted by the works, and so no further mitigation or surveys are required. Additionally, based on the low-impact nature of the project, short timescale of the works and the fact that all works will take place during the day, no further bat activity surveys are likely to be required.

4.4.13 It should be noted that bats are nocturnal animals that are sensitive to lighting and therefore any lighting that is required during construction should be designed to minimise spill and be targeted to areas where lighting is considered essential and away from features that may be used by bats. Moreover, it is recommended that loss of habitats suitable for foraging bats is limited to that strictly necessary for the construction of the scheme based on detailed development plans.

Reptiles

4.4.14 The likelihood that the site supports reptiles was assessed as medium. The woodland, scrub and potential refugia within the site provided discrete areas of suitable shelter habitat for reptiles. The grassland areas also provide basking and foraging habitat. Measures should be taken to avoid harm to reptiles; specific recommendations vary dependent on the time of year the works are programmed and the type of activities to be undertaken, as described in Table 7, below.

Table 7: Recommended working methodologies to avoid harm to reptiles and amphibians

Activity	Summer (April - October inclusive)	Winter (November - March inclusive)
Removal of suitable refuges and potential hibernation sites	Removal of suitable refuges and potential hibernation sites (such as piles of rubble, brash, vegetation, deadwood, compost heaps, and root systems, including TN5 and TN15) should take place by hand under a Method Statement and be overseen by an Ecologist who will remove any amphibians or reptiles to safe undisturbed habitat.	Potential amphibian and reptile refuges and hibernation sites (including TN5 & and TN15) must remain undisturbed until the end of the hibernation season as amphibians and reptiles rarely survive if disturbed during hibernation.
Managed vegetation clearance	A two-stage clearance method for grass and scrub vegetation is recommended to encourage amphibians and reptiles to move out of the working area of their own accord, allowing works to proceed. This would involve the use of hand tools (brush cutters and strimmers) to reduce vegetation height in stages over several days, enabling amphibians and reptiles to disperse. The process should take place under a Method Statement and be overseen by an Ecologist.	Clearance of above-ground grass and scrub vegetation may take place to ground level without the risk of harming amphibians and reptiles as they will be hibernating below ground and beneath refugia. For this reason, potential amphibian and reptile refuges and hibernation sites must remain undisturbed until April.

Amphibians

4.4.15 Common amphibian species may be present on the site. Measures should be taken to avoid harm to common amphibian species, for example by ensuring that suitable refuges and potential hibernation sites (such as compost heaps/deadwood piles, including TN5 and TN15) are not disturbed or damaged during the winter months (November to February, inclusive); see Table 7 above.

Birds

4.4.16 If removal of any habitats identified as suitable for breeding birds is required, this should ideally be undertaken outside the nesting season (that is, not between 1 March and 31 August inclusive, weather dependent). If clearance works are required within the main nesting season, then a nesting bird check must be undertaken by a suitably qualified ecologist 24 hours prior to the clearance works. If an active nest is found during the inspection, then an exclusion cordon must be put in place around the nest and remain in-situ until the chicks within the nest have fledged.

Otter

4.4.17 As the River Dee to the south of the site provides optimal habitat to support otter, there is potential for otter to cross the site, or use the site for resting, foraging or commuting. The proposals should be reviewed to avoid any potential harm or disturbance to otters as follows:

- No night-time working should take place as this could impact on otter using the canal for commuting and foraging purposes;

- If an otter resting site or otter holt is discovered, activities in the vicinity of the feature should stop and an Ecologist contacted to confirm the appropriate course of action; and
- Any excavations should be covered overnight or a ramp provided for escape.

Badger

4.4.18 No badger setts were identified during the survey, but badgers are highly mobile and there is a risk of setts being established before the start of the proposed works. The existing badger survey is considered valid for 12 months from the walkover. An updated badger survey should be undertaken in suitable habitat located within 30m of the proposed works prior to works commencing. If badger setts are found, further monitoring of the badger setts should be undertaken. If any construction activities are required within 30m of any sett, it may be necessary to obtain a licence from Natural Resources Wales and/or carry out the works under a method statement and ecological supervision.

4.4.19 Additionally, any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.

Dormouse

4.4.20 While there are no local records of dormouse within 1 km of the site, the habitats on site, especially the woodland, hazel scrub and hazel hedgerow, have the potential to support dormouse. However, due to the localised and light, temporary nature of the works, any dormouse populations that are present in the surrounding landscape are unlikely to be affected by the works and so further surveys are deemed unnecessary. A precautionary approach is recommended as follows:

- Where possible, works should take place outside of the hibernation period for dormouse (approximately October to April) to avoid the risk of disturbing ground-hibernating individuals;
- A pre-works commencement check should be undertaken by an Ecologist to look for signs of dormouse; and
- Any scrub or tree clearance works should be carried out under a Method Statement, overseen by an Ecologist

Other Mammals

4.4.21 Development should seek to retain and enhance habitats suitable for hedgehog and brown hare (i.e. woodland and scrub) and maintain connectivity.

4.4.22 As above for badger, any excavations required for construction works should be covered at night or a soil ramp or wooden plank installed to ensure that any animals can escape.

4.4.23 It is also recommended that suitable refuges and potential hibernation sites for small mammals that need to be removed to facilitate the works are removed or dismantled prior to animals going into hibernation (November to March). These works would need to proceed under a method statement and an ecological watching brief.

5 Conclusion

5.1.1 The report assesses the potential impacts upon ecological features resulting from the proposed footpath upgrades and viewpoint creation development.

5.1.2 The site is located less than 10m from the River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SAC and Afon Dyfrdwy (River Dee) SSSI, and so there is the potential for them to be affected physically or by pollution from the works. A range of other protected species may be present or at least use the site.

5.1.3 Mitigation and enhancement measures have been identified based upon the current understanding of the proposals in the form of:

- Demarcation of a works exclusion buffer from the boundaries of the SAC and SSSI. Where possible, hand tools should be used for the works to minimise any potential impacts to the valley's physical landscape and eliminate the risk of pollution and run off from vehicles. If any vehicles or large machinery is required, appropriate control measures for pollution should be implemented and incorporated into the Method Statement for the works.
- Where possible, avoid the removal of woodland, trees and scrub habitat and compensate for any habitat lost to ensure the integrity of the IIA is maintained and impacts to invertebrates are reduced.
- The lighting scheme for any future proposed development on the site should follow the recommendations set by the BCT (2014) and the Institution of Lighting Professionals (2018).
- Pre-construction checks for protected species identified as a potential constraint, including reptile, amphibian, otter, dormouse, protected plants and INNS by an Ecologist.
- Pre-construction nesting bird checks, should vegetation be removed during the core nesting bird season (March to August inclusive) by an Ecologist; and
- Supervision by an Ecological Clerk of Works is recommended, including a toolbox talk, for all works anticipated to have potential to impact wildlife.

A green infrastructure plan should be developed to ensure that the proposed development delivers a net benefit to biodiversity as required by national planning policy. Mitigation and enhancements on site will be required ensure that there are no legal infringements with regards to biodiversity and that policy requirements can be fulfilled.

6 References

Amphibian and Reptile Groups of the United Kingdom (2010). *Advice note 5: Great Crested Newt Habitat Suitability Index*. Amphibian and Reptile Groups of the United Kingdom.

BBC; British Waterways (2011). [online] Available at: https://www.bbc.co.uk/news/uk-wales-mid-wales-13154763

Chartered Institute for Ecology and Environmental Management (2017). *Guidelines for Preliminary Ecological Appraisal (2nd edn)*. Chartered Institute for Ecology and Environmental Management, Winchester.

Collins, J. (ed.) (2023). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edn)*. The Bat Conservation Trust, London.

Council of the European Communities (1992). *Council Directive 92/43/EEC of the European Parliament and of the Council of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive).* Official Journal of the European Union. 1992. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043

HMSO (1981). *The Wildlife and Countryside Act* 1981 (as amended). [online] Available at: https://www.legislation.gov.uk/ukpga/1981/69

HMSO (1992). *Protection of Badgers Act 1992* (as amended). [online] Available at: https://www.legislation.gov.uk/ukpga/1992/51/contents

HMSO (1996). *Wild Mammals (Protection) Act 1996*. [online] Available at: https://www.legislation.gov.uk/ukpga/1996/3/contents

HMSO (2000). *Countryside and Rights of Way Act 2000* online] Available at: https://www.legislation.gov.uk/ukpga/2000/37/contents

HMSO (2006). *Natural Environment and Rural Communities Act 2006*. [online] Available at: https://www.legislation.gov.uk/ukpga/2006/16/contents

HMSO (2016). *Environment (Wales) Act 2016*. [online] Available at: https://www.legislation.gov.uk/anaw/2016/3/section/7

HMSO (2019). The Conservation of Habitats and Species (Amendment) (EU exit) Regulations. HMSO, London.

ILP (Institute of Lighting Professionals); BCT (Bat Conservation Trust) (2023). Guidance Note 08/23: Bats And Artificial Lighting At Night. [online] Available at: https://theilp.org.uk/publication/guidance-note-8-bats-and-artificial-lighting/

MAGIC (2024). Multi-Agency Geographical Information for the Countryside. [online] Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed January 2024].

NBN Atlas (2024). [online] Available at http://www.nbnatlas.org [Accessed online January 2024]

Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The Status of our Bird Populations: The Fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747. [online] Available at: https://britishbirds.co.uk/content/status-our-bird-populations

Welsh Government (2021). Planning Policy Wales, Edition 11. [online]. Available at: https://www.gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

Wrexham County Borough Council (2002). *Wrexham Biodiversity Action Plan*.

Wrexham Country Borough Council (2011). *Local Planning Guidance Note No. 32. Biodiversity & Development.* [online]. Available at: https://www.wrexham.gov.uk/sites/default/files/2023-04/lpg-32e.pdf

Appendix A

Figure 1 - Phase 1 Habitat Map of the Trevor Basin Public Realm, Step Access & River Walk Site



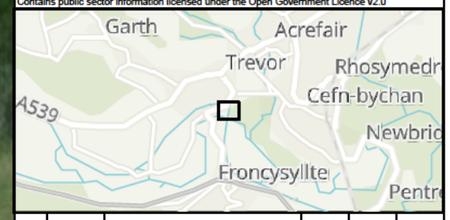
Legend

- Site Boundary

Phase 1 habitat type

- Running water
- Boundaries - Hedges - intact - species-poor
- Woodland broadleaved semi-natural
- Scrub dense / continuous
- SI Neutral grassland semi-improved
- SI Poor semi-improved
- A Cultivated / disturbed land - amenity grassland
- Cultivated / disturbed land - introduced shrub
- Bare ground
- Other habitat - hardstanding
- Aqueduct Pillar
- Overhead aqueduct
- bracken with bramble and Hazel
- Target Note

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World Imagery: Maxar, Microsoft
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Rev	Date	Description	Drawn	Check	Approv
01	06/06/24	INITIAL ISSUE	DP	RM	SJ

Client:

Canal & River Trust

PROJECT:
TREVOR BASIN
PUBLIC REALM

Site
Trevor,
Wrecsam - Wrexham
LL20 7YQ

Client
Canal & River Trust
National Waterways Museum Ellesmere Port
Ellesmere Port
Cheshire
CH65 4FW

ARCADIS

Registered office:
80 Fenchurch Street
London
EC3M 4BY

Coordinating Office:
1 Whitehall Riverside,
Leeds
LS1 4BN

www.arcadis.com

Title:

Figure 1
Phase 1 Habitat Map of the Trevor Basin Public Realm,
Step Access & River Walk Site

Designed	R. Murphy	Date 06 Jun 24	Signed
Drawn	D. Pakrasi	Date 06 Jun 24	Signed
Checked	R. Murphy	Date 06 Jun 24	Signed
Approved	S. Jones	Date 06 Jun 24	Signed
Scale:	1:750	Datum:	AOD
Original Size:	A3	Grid:	OS
Suitability Code:	S2	Project Number:	10058635

Suitability Description:
For Information

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P01

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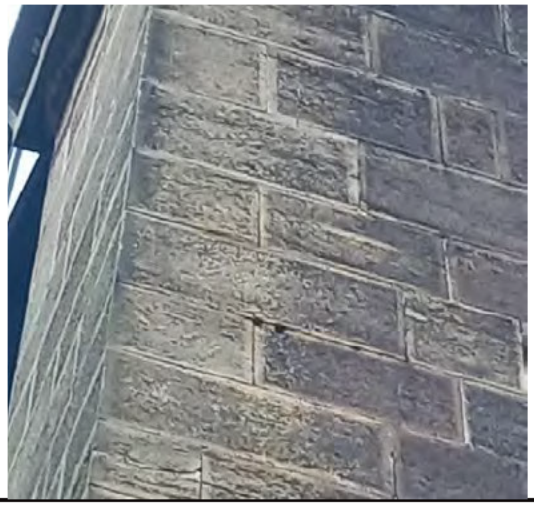
Site Target Notes (TN)

Table 8: Site Target Notes (TN)

Target Note	Description	Images
TN1	East side end aqueduct column, PRF-M, hole in brickwork leading to potential cavity, 1 m height, southeast facing.	
TN2	East side end aqueduct column. PRF-M, vertical crack in brickwork 2 m above ground level, east facing.	
TN3	East side end column of aqueduct. PRF-M hole in brickwork 1.5 m above ground level, east facing.	

Target Note	Description	Images
TN4	West side end viaduct column, PRF-M vertical crack in joint between stonework southwest facing, running from 0.5 m upward to approximately 3 m above ground level.	
TN5	Large broken up stones. Potential hibernacula for amphibians and reptiles.	
TN6	Mature sycamore approximately 25 m height. PRF-M knot hole facing ground on lower trunk, approximately 2.5 m above ground level, southwest facing. PRF-I knot hole south facing approximately 6 m above ground level. PRF-I knot hole south facing approximately 8 m above ground level.	

Target Note	Description	Images
TN7	Where metal bridge meets the stone, could be a number of potential bat roosting features. Applies throughout aqueduct.	
TN8	Sixth column from the river. At least 8 PRFs total. Features are present from approximately 10 m all the way to the top. LARGE cavity - structure appears hollow, with round hole 8cm diameter, 1.8 m from ground, approx. 40cm long tunnel provides access to inner space. likely previous occupation by nesting birds. cobweb on ceiling of this entrance.	
TN9	Fifth column from river. At least 2 potential PRFs on south facing side. Features are present from approximately 15 m to the way to the top. 1 potential PRF, east side approximately 15 m height. At least 6 potential PRFs on north facing side from approximately 10 m above ground level to all the way to the top.	

Target Note	Description	Images
TN10	Fourth column from the river. At least 8 potential PRFs total. Features are present from approximately 10 m above ground level to all the way to the top.	
TN11	Third column from the river. At least 8 potential PRFs total. Features are present from approximately 10 m above ground level to all the way to the top.	
TN12	Second column from the river. At least 7 potential PRFs on south facing side. Features are present from approximately 5 m all the way to the top. At least 6 potential PRFs on north facing side from approximately 20 m above ground level to all the way to the top.	

Target Note	Description	Images
TN13	Closest aqueduct column to river. At least 5 potential PRFs on north facing side. Features are present from approximately 10 m above ground level to all the way to the top.	
TN14	Mature sessile oak, approximate height 20 m, diameter at breast height (DBH) up to 1.5 m. PRF-M: Broken limb and potential cavity behind bark approximate 9 m above ground level, northwest facing. PRF-I: Broken limb feature approximate 8.5 m above ground level, west facing. Potential PRF-M cavity feature on broken limb approximate 8 m above ground level, southwest facing, cannot directly see whether a feature or not.	

Target Note	Description	Images
TN15	Deadwood on ground throughout woodland. Fallen trees, piles and scattered branches and twigs. Potential herptile refugia and of value to invertebrates.	 
TN16	Stoat sighted	*Not available*

Site Photographs

Table 9: Site Photographs

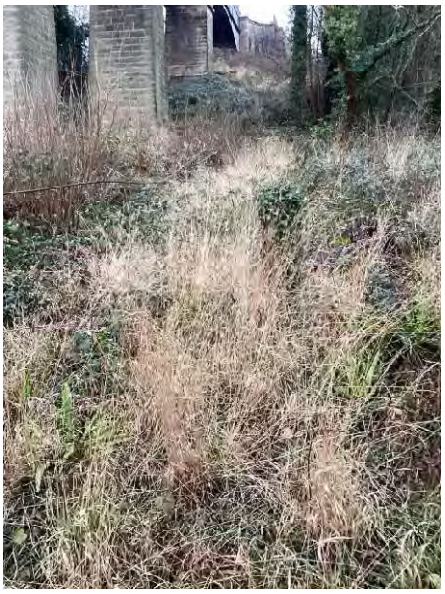
Site Photographs	
	
Image 2 Marginal grassland habitat within the site	**Image 3 Hazel and bramble scrub adjacent to the site**
	
Image 4 Snowberry scrub within the site.	**Image 5 Woodland habitat adjacent to the site**



Image 6 Woodland at the northeast of the site



Image 7 Hedgerow within the site

Appendix B

Legislation, Guidance and Policy

This assessment has been undertaken in accordance with current national legislation, national planning policy, local plans and policies relating to biodiversity in the context of the 'proposed development' including:

- Environment (Wales) Act (HMSO, 2016)
- Planning Policy Wales, Edition 11 (Welsh Government, 2021)
- Wrexham Biodiversity Action Plan (Wrexham County Borough Council, 2002)
- Local Planning Guidance Note No. 32. Biodiversity & Development. (Wrexham Country Borough Council, 2011)

Relevant Legislation To Assessment

The following legislation (Table 10) has been considered with regard to the methodology and assessment included in this report.

Table 10: Relevant legislation

Ecological Constraint	Rationale
European Designated sites (Special Areas of Conservation, Special Protection Areas and Ramsar Sites)	Under the Conservation of Habitats and Species Regulations 2017 (HMSO, 2019), an assessment is required where a plan or project may give rise to significant effects upon 'European Sites' including SACs, SPAs, and Ramsar sites. The process of assessing the implications of development on European Sites is known as Habitats Regulations Assessment (HRA). The initial stage of the HRA is Screening. This process initially identifies the likely impacts upon a European Site of a project or plan, either alone or in combination with other projects or plans and considers whether these impacts may be significant. Natural Resources Wales must be consulted in relation to the outcome of Screening. Unless the likelihood of a significant effect can be ruled out on the basis of objective information, then an Appropriate Assessment must be undertaken (this is the next stage of the HRA).
Wildlife and Countryside Act 1981 (as amended; Ref 7), primarily by the Countryside and Rights of Way Act 2000 (Ref 10)	It is a legal requirement to apply for 'assent' or 'consent' from Natural Resources Wales for any works which could potentially damage the flora, fauna or features for which a SSSI is designated (under the Wildlife and Countryside Act 1981 (as amended; HMSO, 1981)).

Ecological Constraint	Rationale
Non-native invasive Plants (Rhododendron, Giant Hogweed, Japanese Knotweed, certain species of Cotoneaster, Variegated Yellow Archangel, Canadian Waterweed, Japanese Rose, Montbretia, New Zealand Pigmyweed, Virginia Creeper, Water-fern etc.)	It is an offence under Section 14 of Wildlife and Countryside Act 1981 (as amended) to cause plants listed in Schedule 9 of this act to grow in the wild. Material contaminated with these species is classified as controlled waste under the Environmental Protection Act 1990 and should therefore be disposed of in an appropriately licensed landfill site.
European protected species (great crested newts, natterjack toad, sand lizard, smooth snake, bats, dormice, otters)	It is an offence under the Conservation of Habitats and Species Regulations 2017 to deliberately kill or injure a European protected species, to destroy breeding/ resting sites, or to deliberately disturb these species and affect their ability to survive, rear young, breed or hibernate.
Nationally protected species - those listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Allis shade, twaite shad, great crested newt, natterjack toad, bats, dormouse, otter)	It is an offence under the Wildlife and Countryside Act 1981 (as amended) to intentionally or recklessly disturb a species listed on Schedule 5 whilst it is in a place of shelter, or to obstruct access to a place of shelter.
Reptiles	It is an offence under the Wildlife and Countryside Act 1981 (as amended) to kill or injure common species of reptiles.
Nationally protected bird species- those listed under Schedule 1 of the Wildlife of the Wildlife and Countryside Act 1981 (as amended) (barn owl, peregrine falcon, red kite, kingfisher, firecrest etc.)	All nesting birds are protected whilst nesting as identified below. However, for those listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) it is also an offence to intentionally or recklessly disturb these birds at, on or near an active nest.
Nesting birds	It is an offence under the Wildlife and Countryside Act 1981 (as amended) to damage or destroy a bird's nest whilst it is in use, and to kill or injure a bird or destroy an egg.
Badgers	It is an offence under the Protection of Badgers Act (1992) to damage or destroy a badger sett; obstruct any entrance of a badger sett; and disturb a badger whilst it is occupying a badger sett.

+44 (0)1925 800 700