



Land at Clywedog Road East Wrexham Industrial Estate

Ecological Survey Report

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1 Introduction

1.1 Background

Kingdom Ecology have carried out an ecological assessment of an approximate 3.2 ha area of land located at Clywedog Road East at Wrexham Industrial Estate, LL13 9PU (National Grid Reference- SJ 374 491). The assessment has been carried out to identify any ecological constraints which should be considered during any future development of the site.

A desk study and an Extended Phase 1 Habitat Survey of the site was carried out on the 18th September 2017. Survey was carried out by Richard Roe (BSc, MSc, MIEEM, CEnv). Richard has extensive experience of undertaking habitat and protected species surveys as a professional ecological consultant with over fifteen years' experience.

1.2 Purpose of Report

This report provides and outlines the findings of the field survey and desk study undertaken in September 2017.

Surveys aimed to identify habitats and species which are either of importance in terms of their conservation value or are afforded statutory legal protection. The presence of such habitats or species would form a material consideration during the planning process and could pose a constraint to the redevelopment of the site.

The field surveys comprised of an Extended Phase 1 Habitat assessment with a search for habitats that could support any protected species.

Following a description of the desk study results, survey findings and an overall evaluation of habitats at the site, the report goes on to make recommendations for further works, mitigation and ecological enhancement measures where relevant.

1.3 Relevant Protected Species Legislation

1.3.1 Environment (Wales) Act 2016

Section 6 of the Environment (Wales) Act 2016 places a legal obligation on public bodies in Wales to 'maintain and enhance biodiversity' whilst carrying out their functions.

Section 7 of that Act requires Welsh Ministers to publish and maintain lists of species and types of habitats in Wales that are regarded as of 'principal importance' for the purpose of maintaining and enhancing that biodiversity.

This section of the Act replaces the biodiversity duty originally outlined in Section 42 of the NERC Act 2006.

The presence at any proposed development site, of any priority habitat or priority species identified on these lists is of importance within the local authority planning process.

1.3.2 Birds

All wild birds in England and Wales are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to intentionally kill, injure or take any wild bird, or take, damage or destroy the nest (whilst being built or in use) or its eggs.

1.3.3 Bats

All British bat species are fully protected under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("EC Habitats Directive") which defines European protected species of animals.

British bats species are afforded further protection by the Countryside and Rights of Way Act 2000; and the Natural Environment and Rural Communities Act 2006.

Taken together, this legislation makes it an offence to:

- Intentionally or deliberately kill, injure or capture bats.
- Deliberately disturb bats, whether at roost or not.
- Damage, destroy or obstruct access to bat roosts.
- Possess or transport bats, unless acquired legally.
- Sell, barter or exchange bats.

A bat roost is interpreted as “any structure or place, which any wild bat uses for shelter or protection.” (Bat Conservation Trust 2012¹). A bat roost is protected whether or not bats are present at the time.

All species of British bat are considered a European Protected Species (EPS). The Conservation of Habitat and Species Regulations (2010) provide derogation against certain offences which could potentially affect an EPS through the EPS Licensing system.

1.3.4 Badger

Badgers are afforded protection under the Protection of Badgers Act (PBA) 1992; this act was introduced on welfare grounds. The Act is based primarily on the need to protect badgers from baiting and deliberate harm or injury. Badgers are not considered to be a species of any conservation concern. However the Act contains restrictions that apply more widely and can have implications where badgers and development come into conflict. All the following are considered criminal offences:

- to willfully kill, injure, take, possess or cruelly ill-treat a badger;
- to attempt to do so; or
- to intentionally or recklessly interfere with a sett.

Sett interference includes damaging or destroying a sett, obstructing access to a sett, and disturbing a badger whilst it is occupying a sett. It is not illegal, and therefore a licence is not required, to carry out disturbing activities in the vicinity of a sett if no badger is disturbed and the sett is not damaged or obstructed.

1.3.5 Reptiles

All native reptiles are protected in the UK under the Wildlife and Countryside Act 1981 (as amended). The law makes it an offence to intentionally kill, injure, sell or advertise to sell any of the six native species.

The smooth snake and the sand lizard are afforded further protection under the 1981 Act, by making it an offence, to possess, handle, capture or disturb them.

¹ Bat Conservation Trust (2012) 'Bat Surveys: Good Practice Guidelines 2nd Edition'

1.3.6 Invertebrates

Approximately 400 invertebrate species are listed under Section 7 of the Environment (Wales) Act 2016. Section 6 of the same Act requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. The presence at any proposed development site, of any priority species identified on these lists is of importance within the local authority planning process.

Further protection is afforded to sixty-nine species of British invertebrates which are also protected under the Wildlife and Countryside Act (1981) (as amended). Species listed under Schedule 5 may be protected under one, some or all of the following parts of Section 9:

- Section 9, Part 1 – intentional killing, injuring, taking
- Section 9, Part 2 – possession or control (live or dead animal, part or derivative)
- Section 9, Part 4 (a) – damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection
- Section 9, Part 4 (b) – disturbance of animal occupying such a structure or place
- Section 9, Part 5 (a) – selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative)
- Section 9, Part 5 (b) – advertising for buying or selling live or dead animal, part or derivative

1.3.7 Great Crested Newt

The great crested newt (*Triturus cristatus*) receives full protection under the Wildlife and Countryside Act 1981 (as amended) and through their inclusion in Schedule II of the Habitats Regulations 2010. This legislation makes it an offence to:

- intentionally kill, injure or take a great crested newt;
- disturb a great crested newt;
- intentionally or recklessly damage, destroy, obstruct access to a breeding site or resting place of a great crested newt;
- sell, offer for sale, possess or transport a great crested newt for the purpose of sale.

The great crested newt is listed as a priority species under Section 7 of the Environment (Wales) Act 2016.

2 Field Survey Methods

2.1 Survey Aims and Objectives

The survey aim was to assess the site as to its ecological importance by assessing the value of habitats and their suitability to support any protected or notable species. The purpose of this was to highlight any ecological constraints associated with future development proposals.

Field survey comprised of an Extended Phase 1 Habitat survey, this included an assessment of habitats at the site in terms of their suitability to support any other protected species including breeding birds, badgers, bats, great crested newt, reptiles and notable invertebrates.

Species that are considered unlikely to be significantly affected by the proposed development, even if known to be present in the general vicinity, were 'scoped out' of the assessment.

2.2 Extended Phase 1 Habitat Survey

2.2.1 Methods

An Extended Phase 1 Habitat Survey of the study site was undertaken on the 18th September 2017. Survey was carried out following standard methodologies as described in the '*Handbook for Phase 1 Habitat Survey - a technique for environmental audit*' (JNCC, 2004²).

The aims of the Extended Phase 1 Habitat Survey were to:

- identify and map all areas of semi-natural habitat within the study area;
- provide a botanical description of the semi-natural habitats surveyed;
- identify areas or habitats that are of particular ecological interest for nature conservation and which require more detailed investigation;
- provide additional information regarding incidental observations of protected species and the potential of habitats to support such species.

² JNCC (2004) '*Handbook for Phase 1 Habitat Survey - a technique for environmental audit*'

A habitat map was produced and lists of dominant or notable vascular plant species were recorded in each of the major habitat types where relevant.

3 Desktop Study

3.1 Sources of Information

Ecological information on habitats, species and designated nature conservation sites has been sought from COFNOD who are the local biological records centre for the North Wales Region.

3.2 COFNOD Data

3.2.1 Species

COFNOD holds several records of protected species within 2km of the site including the following:

- Barn owl
- Goshawk
- Common pipistrelle
- Whiskered bat
- Polecat
- Badger
- Otter
- Great crested newt
- Adder
- Slow-worm

COFNOD hold no records of any protected species within the study site itself.

COFNOD holds various records of protected species for the Prison Site immediately to the south of the Site. Records include dingy skipper, grizzled skipper, small heath, adder, slow-worm and great crested newt.

A full ecological assessment of the Prison Site was carried out as part of the supporting Environmental Statement (Ministry of Justice, North Wales Prison Project, Wrexham 2012). In summary the Environmental Statement found the following at the Prison Site:

- **Terrestrial Invertebrates**- Survey noted six species of principal importance and a number of Red Data Book status. The assemblage as a whole is considered to be of County Importance.
- **Grizzled Skipper**- The Site is noted as potentially being one of the most important locations for grizzled skipper in Wales
- **Reptiles**- population likely to be limited to a small number of individuals
- **Great Crested Newt**- a low population of great crested newt recorded in two ponds. Individuals likely to be present within terrestrial habitats at the site.
- **Breeding Birds**- diversity of breeding birds listed as BAP Priority species and/ or Red and Amber listed.
- **Bats**- Low level of bat activity on site.

The prison proposals include the retention of an approximate 18.7ha area of scrub and grassland to be managed for its conservation benefit around the southern and eastern edges of the Prison Site.

The habitats are being managed to provide suitable habitats for great crested newt, notable butterflies and for its botanical interest.

The closest great crested newt breeding pond to the study site is located within the prison mitigation area and is located approximately 150m to the southwest of the site.

COFNOD holds no other records of protected species within 250m of the study site.

3.2.2 Designated Sites

No statutory designated sites are located within 1km of the study area itself.

Three Local Wildlife Sites (LWS) are located within 2km of the study site comprising of the Wrexham Industrial Estate LWS (comprising of Bryn Road Grassland, Erlas Black Wood and the Oaks), Peter's Dingle LWS and Cefn Park LWS.

4 Survey Results

4.1 Site Description

The study site measures approximate 3.2ha in area. It comprises of an area of grassland habitat that has remained unmanaged for several years. A range of successional habitats have developed including areas of coarse, unimproved, neutral grassland which grades into areas of tall herb community, bramble scrub and thorny scrub.

There is a band of broadleaved oak woodland which runs around the western and northern edge of the site.

The two woodland blocks are linked to a larger, more-or-less unbroken corridor of semi-natural, woodland vegetation which runs from the southwestern edge of the Industrial Estate, through the estate itself, before joining Redwither Brook approximately 650m to the east of the site. Redwither Brook eventually flows into the River Clywedog at the south-eastern edge of the Industrial Estate.

The woodland is likely to function as a wildlife corridor through the Industrial Estate.

The site is bounded to the east by Clywedog Road East, to the south by Bridge Road, to the west by the gardens of an adjacent housing estate and to the north by commercial units associated with the Industrial Estate. Habitats at the site are linked at the northwest corner to a similar area of derelict land also comprising of grassland/scrub/woodland mosaic.

The new HMP Berwyn Prison Site is located immediately to the south of the site on the opposite side of Bridge Road. The Prison Site principally comprises of hardstanding and buildings but, as described in Section 3.2.1, the Prison Site development has retained an approximate 18.7ha area of scrub and grassland to be managed for its ecology value.

Wider habitats comprise of residential housing, industrial units, occasional areas of amenity grassland and further areas of unmanaged rough grassland and scrub. As described above, there is a ribbon of broadleaved woodland running through the Wrexham Industrial Estate site and which joins with the woodland located at the site's northern and western boundaries.

The site location is shown on Figure 1 in the Appendix.

A habitat map of the site is shown on Figure 2 in the Appendix. Photographs showing typical habitats at the site are also given in the Appendix.

4.2 Habitats

As described above, the site principally comprises of a range of successional habitats that have developed on an area of unmanged grassland and from an expansion of woodland habitats around the western and northern fringes of the site.

The site comprises of a mosaic of unimproved, neutral grassland, tall herb, scrub and woodland communities.

The grassland habitats are mostly representative of a typical MG1 community ((false oat-grass grassland community) as defined by the National Vegetation Classification system (Rodwell 1992³)). The site principally comprises of patches of herb-rich grassland with frequent umbellifers, creeping thistle and common knapweed amongst the grasses. There are some with some areas of wetter grassland dominated by meadow sweet, and several areas of more trampled grassland where footpaths and off-road vehicle tracks pass through the site. The grassland grades into areas of bramble underscrub plus areas dominated by hawthorn and blackthorn scrub. The woodland areas comprise predominantly of oak trees of varying ages with other woody species also present.

It is likely that if left unmanaged, the site would ultimately develop into continuous hawthorn scrub and ultimately further broadleaved woodland.

The grassland and scrub habitats present are of relatively low botanical interest and are commonly occurring throughout the UK within similar neglected agricultural and industrial sites.

Habitats encountered are Target Noted on Figure 2 and described in full within Table 1 below. Habitats are evaluated and discussed in Section 5.1.

³ Rodwell, J.S. (ed) 1992. *British Plant Communities. Volume 3. Grassland and Montane Communities*. Cambridge University Press.

Table 1- Habitat Descriptions

Target Note	Habitat	Description
1	Roadside verge (unimproved, neutral grassland)	This comprises of a small triangle of rough grassland located between a paved footpath and Bridge Road. The grassland comprises of frequent perennial rye-grass, cock's-foot, Yorkshire fog and false oat-grass with herbs present including occasional red clover, ribwort plantain, common knapweed, cow parsley, common ragwort, red bartsia, broadleaved dock, hogweed, meadow buttercup, creeping buttercup, ox-eye daisy, yarrow, great willow-herb, bush vetch and meadow vetchling.
2	Dense scrub	This comprises of a band of dense scrub with frequent hawthorn, blackthorn and bramble with occasional ash saplings.
3	Grassland/Tall herb (unimproved, neutral grassland)	This comprises of unmanaged, unimproved, neutral grassland. The sward supports coarse grass species with frequent tall herbs. Grasses comprise of frequent perennial rye-grass, cock's-foot, Yorkshire fog and false oat-grass with occasional tufted hair-grass and soft rush. The tall herb species present include frequent common knapweed, creeping thistle, broadleaved willow-herb and nettle with occasional common fleabane, wild carrot, bird's-foot trefoil, red clover, ribwort plantain, cow parsley, common ragwort, broadleaved dock, hogweed, meadow buttercup, creeping buttercup, ox-eye daisy, yarrow, bush vetch and meadow vetchling The grassland is interspersed with patches of scattered young hawthorn scrub. Footpaths and off-road vehicle tracks pass through the grassland. These areas comprise of a shorter, grass dominated sward with patches of bare ground.
4	Broadleaved woodland	This forms part of the more-or-less, continuous block of woodland that runs along the western edge of the site. The woodland comprises of mature and young oak trees with dense hawthorn and blackthorn underscrub along the field edge. The woodland is unmanaged and consequently dense and scrubby.
5	Broadleaved woodland	This forms part of the more-or-less, continuous block of woodland that runs along the western edge of the site.

Target Note	Habitat	Description
		The woodland in this area is open in parts with scattered oak trees plus occasional willow, hawthorn, blackthorn, young ash and garden escapes such as apple. There are some mature crack willow in this area. Footpaths and off-road vehicle tracks pass through the woodland. The woodland understorey grades between grass dominated areas around the tracks with patches of dense bramble scrub with tall herb (umbellifers and nettle) at their edges.
6	Broadleaved woodland and scrub	This forms part of the more-or-less, continuous block of woodland that runs along the western edge of the site. The woodland comprises of mature and young oak trees with a large stand of dense hawthorn and blackthorn along the field edge.
7	Grassland/Tall herb (unimproved neutral grassland)	Habitats in this area are similar to those described for Target Note 3, comprising of unmanaged, unimproved, neutral grassland with frequent tall herb. Grasses comprise of frequent perennial rye-grass, cock's-foot, Yorkshire fog and false oat-grass with occasional tufted hair-grass and soft rush. Tall herb species present include frequent common knapweed and creeping thistle with occasional great willow-herb, nettle, wild carrot, bird's-foot trefoil, red clover, ribwort plantain, cow parsley, common ragwort, broadleaved dock, hogweed, meadow buttercup, creeping buttercup, ox-eye daisy, yarrow, bush vetch and meadow vetchling Footpaths and off-road vehicle tracks pass through the grassland. These areas comprise of a shorter, grass dominated sward with patches of bare ground. There is an area of wetter, marshy grassland at the western end of this grassland. The marsh supports frequent soft rush and Yorkshire fog with broadleaved willow-herb, meadow sweet, common valerian and common fleabane.
8	Broadleaved woodland	This forms part of the more-or-less, continuous block of woodland that runs along the western edge of the site. The woodland comprises of young oak and ash trees with hawthorn and willow. The woodland has a bramble and dog rose underscrub with a nettle and ivy field layer.

Target Note	Habitat	Description
9	Broadleaved woodland	This area comprises of a band of broadleaved woodland which runs along the northern edge of the site. There is a dry ditch present within the woodland. The woodland comprises of mature oak, and silver birch with hawthorn, holly, elm, ash and willow. The woodland has a field layer of ivy. There is a dense thicket of hawthorn, willow and blackthorn scrub along the southern edge of the woodland where it joins the adjacent grassland habitats.

4.3 Protected Species

The Extended Phase 1 Habitat Survey also considered the site's suitability to support protected species. Species considered during the assessment included bats, badgers, invertebrates, reptiles, breeding birds and great crested newt.

The likely presence of each of these species groups is considered below.

4.3.1 Bats

A full assessment of the suitability of all trees for roosting bats within the woodland habitats present was not undertaken given the number of trees present and that the extent of development proposals is not yet known.

However, an initial characterisation of the woodland habitats was completed during the Extended Phase 1 Habitat Survey. The woodland along the western edge of the site may offer some limited bat roosting opportunities within mature oak trees present however, many of the trees are of a relatively young age and have not yet developed any large cavities, splits or other features suitable for roosting bats.

The woodland along the northern edge of the site supports older oak trees and so may offer more suitable bat roosting habitat.

The woodland edge habitats are likely to offer bat foraging and commuting opportunities. Although the eastern edge of the site is likely to be partially illuminated of an evening by the adjacent street lighting along Clywedog Road East.

There are likely to be bat roosts within the residential properties located to the west of the site.

The site is considered likely to be of moderate value for bats.

4.3.2 Badgers

No field signs indicative of badger activity were found within the grassland habitats of the proposed development area however it is likely that badgers occasionally forage within this habitat.

A full badger survey of the dense areas of scrub and woodland was not carried out. However, badgers are known to be present at the Industrial Estate and consequently there is considered to be a reasonable likelihood that badger setts could be present within woodland and scrub habitats at the site.

However, the site is likely to suffer frequent disturbance from dog walkers from the adjacent housing estate and it is unlikely that the site support a main badger sett.

4.3.3 Reptiles

The study site supports suitable reptile foraging habitat in areas of grassland and scrub. However, given the relatively tall height of vegetation present, suitable basking sites are restricted to the more open areas of footpath and off-road tracks. These areas are likely to suffer frequent disturbance from dog walkers and pedestrians from the adjacent housing estate.

Nevertheless, the site is partly linked to other areas of suitable reptile habitat at the Prison Site Ecology Mitigation Area to the south and to a further area of neglected grassland to the northwest. However, the intervening Bridge Road is likely to act as a partial barrier to any movement of reptiles between the Prison Site and the study site.

Common reptile species are known to be present within suitable habitats at the Industrial Estate albeit, in relatively low numbers (small numbers of adder, slow-worm and grass snake were recorded at the Prison Site during site clearance).

Taking this into consideration, there is considered to be a reasonable likelihood that common reptile species could be present in low numbers at the study site.

4.3.4 Breeding Birds

The woodland and scrub habitats are likely to be used as nesting and foraging habitat by common woodland/garden bird species.

The grassland is unlikely to be used by ground nesting birds owing to frequent human disturbance and the likely presence of domestic cats from the adjacent housing estate.

4.3.5 Great Crested Newt

The study site does not support any suitable aquatic habitats for great crested newt.

However, the site offers high quality terrestrial habitats within scrub, woodland, rough grassland and tall herb habitats.

The closest great crested newt breeding pond to the site is located within the Prison Mitigation Area and is located approximately 150m to the southwest of the study site. However, the intervening Bridge Road is likely to act as a partial barrier to any dispersal of newts from the Prison Site to the study site.

Taking this into account there is considered to be a low risk that great crested newts associated with the pond within the HMP Berwyn site could use habitats within the study site in low numbers.

4.3.6 Invertebrates

The grassland and scrub habitats were found to be relatively flower rich supporting suitable plant species for larva and adult grizzled and dingy skipper and small heath butterflies (bramble, dog rose, creeping cinquefoil, yarrow, ragwort, fleabane, bird's foot-trefoil, buttercups and vetches). These three butterflies are listed as priority species under Section 7 of the Environment (Wales) Act 2016.

All three of these species of notable butterfly have been recorded in good numbers within similar habitats located at the HMP Berwyn site immediately to the south.

The ecology mitigation area for this site is being actively managed to promote habitats for these species and so it is reasonably likely that notable butterfly species could be present within the study site.

5 Evaluation

5.1 Habitats

The site principally comprises of a range of successional habitats that have developed on an area of unmanaged grassland.

These habitats comprise of a mosaic of unimproved, neutral grassland, tall herb, woodland and scrub communities which have developed through neglect of the grassland.

The grassland and scrub habitats present are of relatively low botanical interest and are commonly occurring throughout the UK within similar neglected agricultural and industrial sites.

If left unmanaged, it is likely that the grassland habitats would ultimately develop into continuous hawthorn scrub and ultimately further broadleaved woodland.

There is a more-or-less continuous band of broadleaved woodland which runs along the northern and western boundaries of the site.

Mixed broadleaved woodland is listed under Section 7 of the Environment (Wales) Act 2016 as a habitat of 'principal importance' in Wales.

The woodland forms part of a more-or-less unbroken corridor of semi-natural vegetation which runs from the southwestern edge of the Industrial Estate, through the estate itself, before joining Redwither Brook approximately 650m to the east of the site.

The woodland is also considered to be of relatively low botanical interest, however owing to its likely function as one of the main wildlife corridors through the Industrial Estate, the woodland is considered to be a feature of locally important biodiversity value.

5.2 Protected Species

No field signs indicative of any protected species were found during the Extended Phase 1 Habitat Survey.

However, the woodland and scrub habitats are considered to offer suitable habitat for roosting and foraging bats, suitable sett habitat for badgers and suitable nesting and foraging habitat for breeding birds.

The grassland/tall herb habitat is considered to offer some suitable habitat for common reptiles and for notable butterfly species.

The study site does not support any suitable aquatic habitats for great crested newt. However, the site offers high quality suitable terrestrial habitats within scrub, woodland, rough grassland and tall herb habitats.

There is considered to be a low risk that great crested newt associated with ponds within the adjacent HMP Berwyn site could use terrestrial habitats within the study site in low numbers.

6 Recommendations

6.1 Further Survey

It is recommended that further protected species surveys are carried out at the site. These surveys will allow an assessment of the value of the site to particular species of importance, further assess development impacts and will allow appropriate, targeted mitigation proposals to be devised.

Further surveys recommended include:

- Badger surveys of scrub and woodland habitat;
- Breeding bird surveys of woodland and scrub habitats;
- Invertebrate surveys of open grassland habitats targeting the potential presence of S7 butterfly species including dingy skipper, grizzled skipper and small heath;
- Reptile surveys;
- Bat activity surveys; and
- Bat tree surveys where any mature trees will be felled

Great crested newt are known to be present within aquatic habitats at the adjacent HMP Berwyn site. The ponds present are likely to be undergoing monitoring as part of the on-going management of the Prison's Ecology Mitigation area.

It is recommended that this monitoring information is obtained to inform likely great crested newt presence/absence at the study site as opposed to conducting further field surveys of the nearby ponds, potential causing additional disturbance to the newt population.

6.2 Habitats

It is recommended that any future development of the site avoids negative impacts upon the bands of woodland along the site's western and northern boundaries.

Where possible an appropriate buffer area should be retained between the edge of the developed area and this feature.

New bird nesting and bat roosting habitat can be provided through the implementation of a bat and bird box scheme. Bat and bird boxes can be installed on suitable trees within the woodland blocks themselves.

It is recommended that the woodland is enhanced through the implementation of a woodland management plan. Parts of the existing woodland is very dense and scrubby. To increase the value of this woodland it is recommended that denser sections are thinned out and that any higher value trees are encouraged to come through. This can be achieved through 'haloing' (haloing involves the felling and pruning back of surrounding low-value trees and scrub so that they do not shade out and stunt the development of the more valuable adjoining trees). The thinning out of the woodland should allow more light through to the field layer potentially enhancing conditions for woodland ground flora.

Lighting proposals will need to ensure that additional light spill on to the woodland areas is kept to a minimum, with dark corridors retained along both the northern and western site boundaries.

A lighting designer would likely be appointed during the detailed design stage of the project. The lighting designer should consult the 'Bats and Lighting Research Project' (Stone 2013) which provides recommendations for limiting the negative effects of lighting on bats.

Where possible the use of artificial lighting should be avoided. Lighting should be directed away from the site's northern and western boundaries and should be designed to avoid light trespass into surrounding areas by the fitting of hoods and cowls.

Lighting sources should be 'bat friendly' using LEDs or low wattage lamps.

Where possible, other opportunities to enhance the biodiversity of the site should be taken such as the creation of wildlife ponds and areas of managed wildflower meadows within any amenity areas. It is recommended that such areas are sited alongside the existing blocks of woodland where they can be connected to the wider woodland wildlife corridor.

It is recommended that any loss of grassland/scrub habitats at the site is compensated through off-site habitat management and/or habitat creation where possible.

Further habitat mitigation proposals and species-specific mitigation plans may be required pending the findings of further protected species surveys of the site.

6.3 Enhancements

It is recommended that the overall ecological value of the wider Industrial Estate is enhanced where possible either through the implementation of a bat and bird box scheme or by taking opportunities to offer off-site habitat management and/or habitat creation.

7 Appendix

FIGURE 1- Site Location



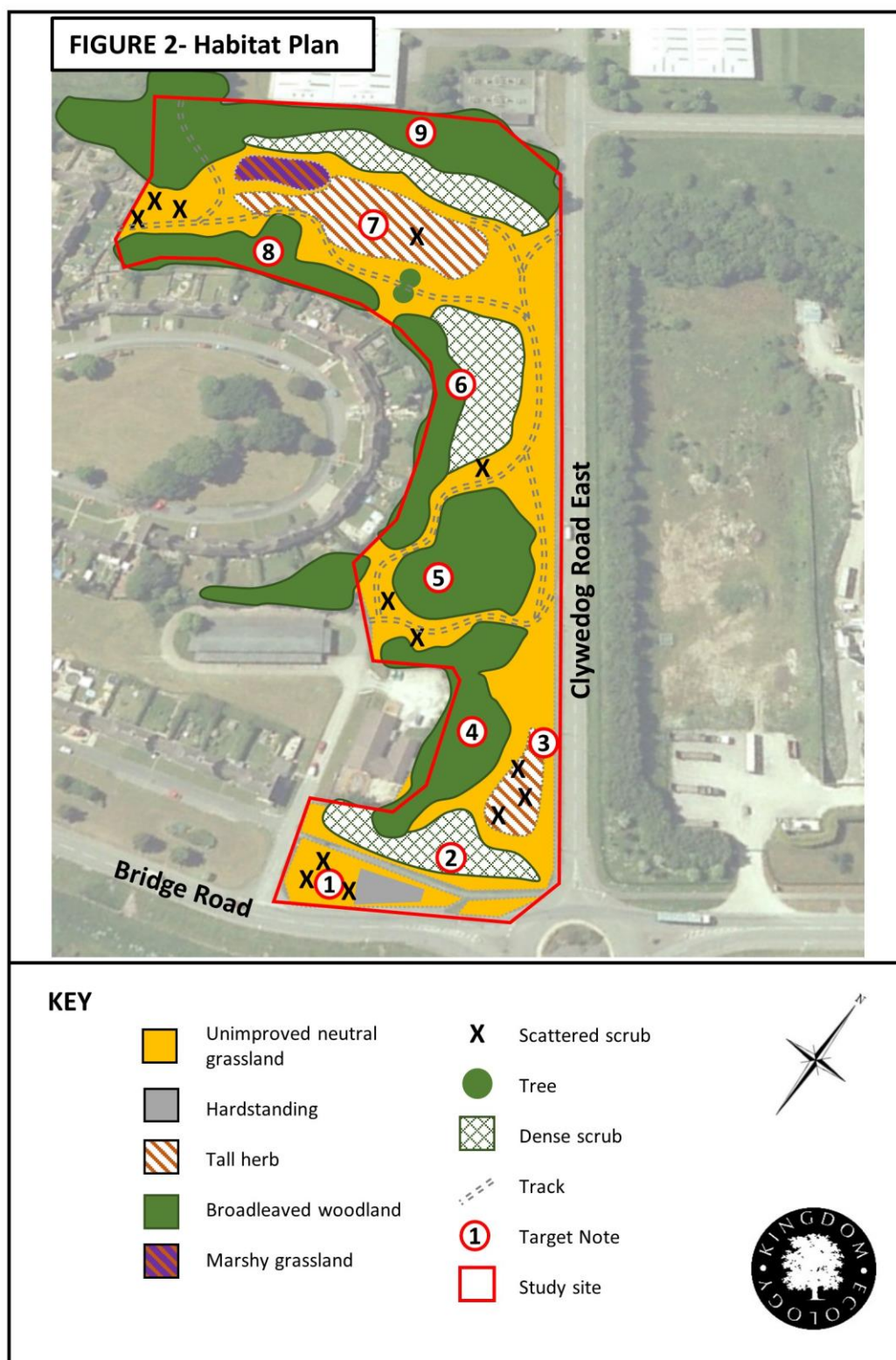
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Ordnance Survey 100054686



Study Area





PHOTOGRAPHS

Photograph 1- Grassland/tall herb habitat at Target Note 3



Photograph 2- Woodland/scrub habitat at Target Note 4



Photograph 3- Woodland habitat at Target Note 5



Photograph 4- Grassland habitats along Clywedog Road East



Photograph 5- Grassland/tall herb habitat at Target Note 7



Photograph 6- Woodland habitat at Target Note 9

