



Llangollen Road,
Acrefair
Ecology Assessment

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1 Introduction

1.1 Background

Kingdom Ecology have carried out an ecological assessment of the Former Air Products Car Park Site, Llangollen Road, Acrefair, Wrexham, LL14 3HN (National Grid Reference SJ 2812 4324). The assessment has been carried out to identify any ecological constraints which should be considered during any future development of the site. Proposals are to construct 21 new residential houses with associated road infrastructure.

The assessment has comprised of a desk study and habitat survey and further bat dawn surveys. Surveys were 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 twenty years' experience.

1.2 Purpose of Report

This report provides and outlines the findings of an ecological survey carried out in June and July 2021.

The desk study and field survey 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.

Species considered during the assessment included breeding birds, bats, reptiles and badgers.

The report evaluates the conservation importance of the habitats and species recorded and goes on to make recommendations for further survey, mitigation and ecological enhancement measures where relevant.

1.3 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 Badgers

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 wilfully 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.

1.3.4 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 2016¹). 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.

1.3.5 Non-native plant species

The Wildlife and Countryside Act 1981 provides the primary control on the release of non-native species into the wild in Great Britain. It is an offence under section 14(2) of the Act to ‘plant or otherwise cause to grow in the wild’ any plant listed in Schedule 9, Part II. Schedule 9 of the act includes Japanese Knotweed, Virginia creeper, Himalayan Balsam, Japanese rose and Giant Hogweed.

¹ Bat Conservation Trust (2016) ‘Bat Surveys: Good Practice Guidelines 3rd Edition’

2 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 and bat activity surveys which included an assessment of habitats at the site in terms of its suitability to support protected species including breeding birds, bats, reptiles and badger.

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

Survey aimed to identify opportunities for ecological enhancement and to inform potential mitigation measures if required to ameliorate any negative impacts attributable to the proposed works.

2.2 Extended Phase 1 Habitat Survey

An initial walkover survey of the site was carried out on the 12th February 2021 with an Extended Phase 1 Habitat Survey of the development area undertaken on the 6th June 2021.

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 each 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.

2.2.1 Bat Dawn and Activity Survey

Two bat dawn surveys were carried out of a 19th century stone structure located within woodland on the site's south-eastern boundary.

Parts of the structure are beginning to decay and would require some remediation works to prevent their collapse and so may be affected by works.

The stone structure is currently inaccessible for detailed inspection and so it was considered to be appropriate to assess the structure through 2 x dawn re-entry surveys.

The dawn surveys were carried out on the 7th June and the 3rd July 2021. A single surveyor was used equipped with Heterodyne and Time Expansion Bat Detectors (Anabat Walkabout). The Bat surveyor was supported with an infrared, night vision camera (Canon XA20) fitted with an infrared flood light (iRedzilla IR lamp).

The dawn surveys were commenced 90 minutes before sunrise and lasted until fifteen minutes after sunrise.

In addition, to provide a sample of bat activity levels and bat species using the woodland boundary on the site's south-eastern edge, an Anabat Express static bat detector was deployed overnight from the 6th to the 7th June 2021.

3 Desktop Study

3.1 Sources of Information

Ecological information on habitats, species and designated nature conservation sites was obtained for the site in 2019 as part of an earlier ecology scoping exercise (produced by Amenity Tree Care). Given the relatively recent age of this data search, it was considered likely that the data and species records would remain valid.

The 2019 data search sought data from COFNOD who are the local biological records centre for the North Wales Region.

3.2 COFNOD Data

3.2.1 Species

COFNOD holds no records of any protected species at the site itself however it holds several records of protected species and notable species within 500m of the site including the following:

- Barn owl
- Hen harrier
- Common pipistrelle
- Myotis bat species
- Daubenton's bat
- Peregrine falcon

There are no records of great crested newt within 1km of the site.

3.2.2 Designated Sites

There are two Local Wildlife Sites located within 1km of the site. These comprise of Plas Bennion Wildlife site which is located 400m from the site and Acrefair railway cutting which is located 450m from the site.

The River Dee SSSI and SAC is located approximately 1.4km southeast of the site.

The River qualifies as a SAC principally on account of Annex II species present but the River also supports Annex I habitats.

Qualifying features of the SAC are:-

- Annex II Species (primary reason): Atlantic salmon, Floating water-plantain.
- Annex II Species (qualifying reason): Sea lamprey, Brook lamprey, River Lamprey, Bullhead, Otter.

- Annex I Habitat: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation.

The Natural Resources Wales citation for the River Dee SSSI citation describes the reasons for the SSSI notification of the Dee as follows.

- 'The River Dee is notified for its nationally important transition through a range of river types from mesotrophic to eutrophic. It is also notified for Atlantic salmon *Salmo salar*, otter *Lutra lutra*, club-tailed dragonfly *Gomphus vulgatissimus* and fluvial geomorphology.
- The River Dee lies within both England and Wales, and is notified as separate SSSIs - the River Dee (England) and the Afon Dyfrdwy-River Dee SSSI in Wales. The features for which the SSSIs are notified, in particular migratory fish, depend upon the whole river ecosystem. Salmon, otter, club-tailed dragonfly, and fluvial geomorphology are of special interest in both Wales and England.

Given the nature of the development proposals, the distance of the site from the River Dee and the qualifying features of the River Dee itself, it is considered to be unlikely that the development would have any significant impact on the river.

4 Results

4.1 Site Description and Habitats

The study site comprises of a former car park site located on Llangollen Road, Acrefair. The study site measures approximately 1.3ha. The car park formed part of the adjacent Air Products factory which closed down approximately 10 years ago. The main Air Products site has since been cleared and now comprises of a habitat mosaic of neutral grassland, scrub and tall herb vegetation.

Surrounding landuses include further post-industrial brown field land with the main former Air Products site located immediately to the southwest of the study site. The adjacent site was cleared approximately 10 years ago and now comprises of a habitat mosaic of neutral grassland, scrub and tall herb vegetation.

The A539 runs along the site's north western boundary; whilst habitats to the east and north comprise of residential housing.

Wider habitats include further areas of residential housing, post-industrial land, plus woodland, unmanaged and managed grassland habitats. The study site location is shown on Figure 1 in the Appendix.

In summary the study site comprises of an area of hardstanding carpark which is largely sealed and intact but with some patches of young trees/scattered scrub which have begun to colonise the hardstanding including willow, silver birch and buddleia.

The south eastern boundary of the site supports a band of broadleaved woodland located on a steep embankment. The woodland principally comprises of mature sycamore. There are further scattered broadleaved trees on the north eastern boundary of the site.

The site was formerly a steelworks. There is a 19th century stone structure located within woodland on the site's south-eastern boundary. The structure is constructed of sandstone and brick, parts of which are beginning to decay and would require some remediation works to prevent their collapse.

The block of woodland located on the site's eastern boundary links with further areas of woodland habitat located to the east of site providing a potentially valuable habitat corridor and representing an important part of this wider block of semi-natural habitat.

Some areas of Invasive non-native plant species were recorded at the site. This includes a small stand of Japanese rose plus an area of Virginia creeper near the northeast corner of the site.

Habitats at the study area are Target Noted and shown on Figure 2 in the Appendix. Target Notes descriptions are provided in Table 1 below. Photographs of the habitats are provided in the Appendix.

Table 1- Habitat Target Notes

Target Note	Description
1	The majority of the site comprises of the former hardstanding car park. The car park surface is mostly intact and bare however there are areas where the tarmac has broken up and pioneer vegetation has colonised the site. This mainly comprises of bands of scrubby vegetation running through the car park. The scrub comprises of young birch, willow, broom and buddleia which have in turn produced thin soils and sheltered areas of moss. These small patches have been colonised by patches of grasses and herbs including occasional red fescue, false oat-grass, Yorkshire fog, rosebay willowherb, meadow buttercup, black meddick, common ragwort, bird's foot-trefoil and white clover. These habitats are of relatively recent origin with the car park becoming disused approximately 10 years ago.
2	There is a sandstone block retaining wall running along the north east boundary of the site. The wall is approximately 12m in height and supports some shallow crevices which could offer roosting habitat to individual or small numbers of non-breeding bats. The wall has some ivy growth along with Virginia creeper which extend the full height of the wall. There is a short earth embankment between the base of the retaining wall and the edge of the carpark. The embankment supports tall woody scrub and some scattered semi-mature and young trees comprising of willow, rowan, sycamore, elder, ash and birch. The scrub is overgrown with traveller's joy and Virginia creeper. Virginia creeper is a Schedule 9 non-native plant species. At the base of the embankment and continuing along the north east boundary of the site, there is a band of bramble scrub with tall herb comprising of abundant Virginia creeper and bramble with occasional rosebay willow herb, cleavers, wood avens, dandelion and herb Robert with some grasses present including occasional rough meadow grass, false oat-grass, Yorkshire fog and red fescue. The wooded boundary would be retained as part of the final development.
3	A wide, steep, wooded embankment runs along the southeast boundary of the site. The trees present include semi mature and mature sycamore, with willow, elder, birch, hawthorn and ash. The woodland has an understorey of bramble and ivy with occasional rosebay willowherb, cleavers, dog rose, snowberry and male fern. A length of palisade fencing extends along part of the boundary of this area. The embankment lead up to the rear gardens of the neighbouring residential properties. This woodland continues beyond the site boundary to link with a larger block of woodland located to the east of the site. This provides a potentially valuable habitat corridor and represents an important part of this wider block of semi-natural habitat. The wooded embankment would be retained as part of the final development.

Target Note	Description
4	There is a stone structure built into the embankment within the woodland. the structure is likely of 19 th century origin and was associated with the previous steel works. The structure is constructed of sandstone blocks but also has two brick lined archways at its base which are approximately 2.5m in height. There are various crevices in the structure including between the stone blocks and between the brickwork. These features could offer suitable roosting habitat for individual or low numbers of non-breeding bats.
5	There is an area of crushed rubble located at the southeast corner of the site. The area comprises of a mixture of crushed brick and concrete blocks and is located on the site of a former building. The area has been recently colonised by young birch saplings along with patches of buddleia and further pioneer vegetation including patches of common ragwort and bird's-foot trefoil.
6	There are some more established bands of woody scrub in this location with two dense bands of vegetation comprising of buddleia, birch, dog rose, willow and bramble with some ornamental shrubbery present including guelder rose, <i>Hypericum</i> , box honeysuckle and a young spruce tree. Historically, there was a building and patch of amenity grassland here which was cleared from the site approximately 10 years ago.
7	The north western boundary of the site runs along Llangollen Road. The boundary is marked by palisade fencing. There are scattered trees along the fence along with patches of ornamental shrubbery. Young trees present include birch, pine and cherry. The patches of ornamental shrubbery include cherry, Japanese rose, dog rose, dogwood, creeping juniper, lavender and <i>Hypericum</i> with young cherry, birch and elder. Japanese rose is a Schedule 9 non-native plant species.
8	The southwest boundary of the site bounds the remainder of the Air Products Site. This part of the site is under a different ownership and so boundary fencing has been installed comprising of a row of Heras fencing.

4.2 Protected Species

4.2.1 Great Crested Newt

There are no ponds located within 500m of the proposed development site.

Therefore, it is considered to be very unlikely that great crested newt would be affected by development proposals.

4.2.2 Badgers

No evidence of badger activity was identified within the study site. The site itself mostly comprises of sealed surface hardstanding with scattered patches of scrub so the proposed development area is of limited value for badgers.

The wooded embankments at the boundaries of the site offer more suitable habitat. These were originally walked in February before the bramble scrub vegetation could develop. No badger setts or badger field signs were found.

A badger main sett is known to be present within woodland habitats at the adjacent main Air Products Site. The badger sett is located approximately 70m to the south of the study site.

It is reasonably likely that badgers would visit the study site and travel along the southeast wooded embankment.

4.2.3 Breeding Birds

A full breeding bird survey was not undertaken as works will largely affect the areas of hardstanding and scrub within the site interior. However incidental records were made of birds encountered/calling during the walkover survey and dawn survey carried out on the 6th and 7th June and the 3rd July.

Bird species recorded included song thrush, blackbird, robin, jay, wren, dunnock, blackcap, wood pigeon and great tit. Buzzard, raven, carrion crow and jackdaw were also recorded passing over the site.

The majority of bird species were recorded within the more mature woodland habitats located along the site boundaries. Fewer birds were encountered within the site itself. Suitable nesting habitat is generally offered within the more mature woodland vegetation around the site perimeter (Target Notes 3 and 4) and within the more mature patches of mixed scrub (Target Note 6) with the areas younger birch scrub within the site itself (Target Notes 1 and 3) offering nesting habitat of limited value.

4.2.4 Reptiles

The site itself mostly comprises of sealed surface hardstanding with scattered patches of scrub. Therefore, the site is considered to be of limited value for reptiles owing to a lack of cover and limited foraging opportunities within the areas of carpark hardstanding.

Much more suitable reptile habitat is offered within the adjacent main Air Products site to the west which supports a mosaic of grasslands, bare ground, scrub and tall herb habitats.

The embankment on the eastern boundary of the site offers suitable habitat for slow worm however this would not be affected by development proposals.

It is considered to be unlikely that the proposed development area would support any reptiles.

4.2.5 Bats

Bat Foraging Habitat

The main development site is considered to be of limited value for bats comprising of areas of hardstanding and young scrub.

Much more suitable bat foraging, commuting and potential roosting habitat is offered within the area of mature woodland located along the eastern boundary embankment of the site. An Anabat Express Static bat detector was deployed on the woodland edge habitat over night on the 6th June 2021.

The bat detector recorded intermittent bat activity along the woodland edge throughout the night (67 separate bat events recorded). This activity principally comprised of common pipistrelle passes with occasional soprano pipistrelle and noctule. However, two lesser horseshoe bat registrations were also recorded at 22.57 and 00.16.

The block of woodland links with further areas of woodland and semi-natural grassland habitats located to the east. These contiguous areas of habitat within and beyond the site boundaries provide areas of good bat habitat (including for lesser horseshoe bats) with suitable foraging opportunities and well linked habitats with limited barriers to dispersal.

The woodland embankment would be retained as part of the development proposals.

Bat Roosting Habitat

The site was formerly a steelworks. There is a 19th century sandstone structure (possibly an old blast furnace) located within woodland on the site's south-eastern boundary.

The structure is approximately 8m in height and 10m in length. The structure is built into the embankment and comprises of a single stone face. The structure has two large recesses that extend back approximately 2m and are 2.5m in height. The internal faces of the arches are lined with brick.

A close-up inspection of the potential bat roosting features was not possible as the area is sealed off behind palisade fencing and many of the crevices are also located high up on the structure's face. However, the structure could be inspected from near the base using binoculars and high-powered torch.

The stone structure is beginning to decay with cavities and recesses developing where mortar has decayed between the sandstone blockwork and where cracks have developed within the brick arches themselves. The cracks between the sandstone blocks are relatively open and exposed whilst the gaps between the brickwork appears to extend back approximately one course of brickwork. Photographs of the structure are provided in the Appendix.

Taking this into account, it was considered unlikely that the structure would support a breeding colony of bats however the features could support individual or low numbers of non-breeding bats. No bat droppings or other bat field signs were identified during the inspection.

The structure is not considered to support suitable features for hibernating bats as the crevices and gaps would be susceptible to temperature fluctuations and frosts.

Proposals are to retain the structures but to carry out some works to support the structures to prevent their collapse.

To further assess the structure, two dawn bat surveys were undertaken. Dawn surveys were considered to be the most appropriate survey technique given the features present and the site's location within a block of woodland.

The first survey was undertaken on the 7th June 2021. The weather was recorded as calm, dry and overcast with a temperature of 11°C. Sunrise was recorded at 04.48.

In summary no bats were identified roosting within the structure. Bat activity was found to be very low with only three common pipistrelle bat passes recorded. The final bat was recorded at 04.16.

The second survey was undertaken on the 3rd July 2021. The weather was recorded as calm, dry and overcast with a temperature of 15°C. Sunrise was recorded at 04.52.

Again, no bats were identified roosting within the structure. Bat activity was found to be low with only five common pipistrelle bat passes recorded. The final bat was recorded at 04.29.

Taking account of the above, it is considered to be very unlikely that the structure supports a significant bat roost such as a breeding site. It is considered unlikely that the site supports any other low-value, non-breeding roosts however infrequent usage by individual or low-numbers of bats cannot be completely ruled out.

4.2.6 Other Protected Species

No other protected species are considered likely to be present within the proposed development areas.

5 Evaluation and Recommendations

5.1 Habitat Summary

5.1.1 Overview

Field survey has assessed the ecological value of an approximate 1.3ha former car park site located on Llangollen Road, Acrefair. Proposals are to construct 21 new residential houses with associated road infrastructure.

Habitats principally comprises of hardstanding carpark which is largely sealed and intact but with some patches of young trees/scattered scrub which have begun to colonise the hardstanding including goat willow, silver birch and buddleia. These habitats are considered to be of low conservation value.

The south eastern boundary of the site supports a band of broadleaved woodland located on a steep embankment. The woodland principally comprises of mature sycamore. There are further scattered broadleaved trees on the north eastern boundary of the site.

The woodland habitat, as well as being of value in its own right, is likely to provide valuable foraging and refuge habitat to various local wildlife. The woodland also forms part of a wider block of woodland habitat that extends to the east of the site and so may form an important wildlife corridor.

5.1.2 Non-native Invasive Species

A small patch of Japanese rose is present at the site within ornamental planting on the western boundary (Target Note 2). there is also an area of Virginia creeper present at the northeast corner of the site (Target Note 7).

Both of these plant species are listed under Schedule 9 of the Wildlife and Countryside Act as non-native invasive species.

It is an offence under section 14(2) of the Wildlife and Countryside Act to plant or otherwise cause these plants to grow in the wild.

5.2 Protected Species

5.2.1 Birds

Bird species were generally recorded within the more mature woodland habitats located along the site boundaries. Fewer birds were encountered within the site itself.

Suitable nesting habitat is generally offered within the more mature woodland vegetation around site perimeter and within the more mature patches of mixed scrub with the areas younger birch scrub within the site itself offering nesting habitat of limited value.

5.2.2 Bats

The main development site is considered to be of limited value for bats comprising of areas of hardstanding carpark and young scrub. No trees offering suitable bat roosting habitat would be affected by proposals

Much more suitable bat foraging, commuting and potential roosting habitat is offered within the area of mature woodland located along the eastern boundary embankments of the site.

Bat detector surveys recorded moderate levels of bat activity along this band of woodland including occasional lesser horseshoe bat passes.

The block of woodland links with further areas of woodland and semi-natural grassland habitats located to the east. These contiguous areas of habitat within and beyond the site boundaries provide areas of good bat habitat (including for lesser horseshoe bats).

5.2.3 Badgers

No evidence of badger activity was identified within the study site. The site itself mostly comprises of sealed surface hardstanding with scattered patches of scrub so the proposed development area is of limited value for badgers.

However, badger are known to be present in the wider landscape with a badger main sett present within woodland habitats approximately 70m to the south of the study site boundary.

It is therefore reasonably likely that badgers would visit the study site and travel along the southeast wooded embankment.

5.2.4 Other Protected Species

No other protected species are considered likely to be present at, or affected by the proposed development.

5.3 Development Proposals

The Proposal is to construct a residential development comprising of 21 new units with associated road infrastructure.

The development will largely affect areas of sealed surface hardstanding plus some areas of young scrub habitat that has recently colonised the site.

The areas of woodland and mature trees located around the site boundaries would be retained as part of the development proposals.

5.4 Design and Landscaping Recommendations

5.4.1 Landscaping

Any areas of landscape planting offer opportunities to enhance the biodiversity value of the development proposals. It is therefore recommended that an appropriate Landscape and Habitat Management Plan is produced for the site. Outline recommendations to be considered for the plan are provided below.

Where practicable, the proposed development should seek to retain the areas of existing trees and scrub habitats along the site's eastern and northern boundary with new housing and gardens set as far back from the woodland edge as is feasible. It is recommended that new boundary features, including along the woodland edge habitat include lengths of native hedgerow. Any new tree and shrub planting should also include native species. Hedgerow species should comprise principally of hawthorn with blackthorn, hazel, holly, elder and oak included within the species mix.

New tree and scrub planting should include oak, silver birch, holly, hazel, hawthorn and blackthorn.

Any additional ornamental shrubbery and flower borders located around the site should seek to provide foraging opportunities for invertebrates. The Royal Horticultural Society (RHS) provides a list of suitable plants for pollinating insects (rhs.org.uk/plantsforpollinators). It is recommended that this list is consulted when drawing up the detailed planting plan for the site.

5.4.2 Non-native Invasive Species

A small patch of Japanese rose and Virginia creeper were recorded at the site. Both of these plant species are listed under Schedule 9 of the Wildlife and Countryside Act as non-native invasive species.

Virginia creeper is a vigorous, perennial, woody climber. The berries are poisonous and contact with the sap can cause rashes and blister. The plant can spread from cut stems and produces a short-lived seedbank.

Japanese rose is a suckering, deciduous, spiny, long-lived shrub. The plants spread and persist via underground rhizomes and produce a short-lived seedbank.

It is recommended that an appropriate Method Statement for the removal of these species is produced and that an appropriate Biosecurity Method Statement is produced to limit the risk of spread of non-native invasive species to other habitats in the wider landscape during construction.

5.4.3 Bat and Bird Boxes

The new development should include provision for roosting bats and breeding house sparrow and swifts. Bat and bird boxes can be built into the new structures at the site.

The precise location and specification of any bat or bird boxes should be determined by an appropriately qualified ecologist.

Bat boxes should be located on buildings located near the eastern boundary of the site. They should be positioned at a height of at least 4m, face a more-or-less southerly aspect and be positioned with a clear flight path to the bat box entrance. A suitable model of bat box would be the Habibat 003 bat box.

Bird boxes should also be located near the eastern boundary, be located at a height of at least 3m, be positioned in a sheltered location and be positioned with a clear flight path to the bird box entrance.

Further bat and bird boxes should be installed on retained trees within the woodland habitats located on the site's boundaries.

5.4.4 Bats and Lighting

Where possible, additional street lighting should be avoided. If additional street lighting is required, then a bat friendly lighting plan would need to be produced by a lighting designer and ecologist to limit any increased light spill onto the adjacent woodland habitats.

The lighting plan should be based upon recommendations provided within The Institution of Lighting Professional's Guidance Note 8 'Bats and Artificial Lighting' which provides recommendations for limiting the negative effects of lighting on bats.

The lighting plan would need to ensure that dark corridors are retained along the site's eastern boundaries and that light-spill into the wider countryside is limited. The woodland is clearly used by foraging and commuting lesser horseshoe bats- this species is particularly sensitive to increases in light levels.

As part of the lighting plan, a lighting contour/impact plan should be produced for the site to demonstrate limited light spill on to these surrounding features.

Any other artificial lighting at the site should be kept to a minimum. Where it is required, any artificial lighting will need to ensure that the bat and bird boxes are not illuminated of any evening.

Likewise, measures will need to be implemented to prevent light trespass on to the adjacent woodland habitats. Light impacts can be limited by having no lighting to the rear of the housing and through the provision of suitable vegetative screening to prevent light trespass through rear facing windows from the building interiors.

5.5 Protected Species Recommendations

5.5.1 Breeding 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.

It is therefore recommended that future development of the site including any scrub or tree management/removal avoid taking place during the breeding bird season (March-September inclusive).

Where this is not possible, a check for breeding birds should be carried out immediately prior to the start of works by an appropriately qualified ecologist.

If during works any nesting birds are found, works should immediately stop and further advice should be sought from an appropriately qualified ecologist. The ecologist would mark out a buffer zone around the nest, the size of the buffer zone would be determined depending upon the species encountered and the nest site location. No works would be allowed to take place within the buffer area until all young birds had fledged. Fledging of young birds would need to be confirmed by the appropriately qualified ecologist.

5.5.2 Badgers

There is a risk that badgers could access the site during construction and could be harmed if works are carried out in an insensitive manner. It is therefore recommended that during construction:-

- Where any trenches or other excavations are to be left open overnight, these should be fitted with mammal ramps or should have the sides battered to form a slope to allow any trapped wildlife to escape.
- A tidy works area should be maintained during construction and any hazardous substances would be fenced off to remove any mammal hazards from the site.

Following the implementation of these measures, it is considered to be unlikely that the proposed development will have a significant negative impact upon the local badger population.

5.5.3 Works to the Stone Furnace.

There is a 19th century stone structure (possibly an old blast furnace) located within woodland on the site's south-eastern boundary. The structure is constructed of sandstone and brick, parts of which are beginning to decay and would require some remediation works to prevent their collapse.

The structure was visually inspected (although not fully accessible) and was assessed via two dawn bat surveys.

The surveys concluded it to be very unlikely that the structure supports a significant bat roost such as a breeding site. It is considered unlikely that the site supports any other low-value, non-breeding roosts however infrequent usage by individual or low-numbers of bats cannot be completely ruled out.

Works to the stone arches will seek to retain and stabilise these structures. These may require the construction of supports within the open arch structures, however it is proposed that this is done in such a way as to create new bat roosting habitat within the archways themselves.

This can be achieved by the retention of large open cavities within the arch structure with suitable bat access points. These openings can be designed to create suitable bat hibernation habitat and to also provide suitable roosting habitat for horseshoe bats and for crevice dwelling species. In addition, some superficial crevice features should be retained within the structure exterior where this can be done without comprising the stability of the structure.

When the detail of the remediation proposals are known, it is recommended that a Bat Method Statement is produced by an ecologist including a design for the new and retained bat roosting features, and also providing methods by which the works can be carried out to limit the risk of harm to any potentially roosting bats. This would likely include pre-works inspections by an appropriately qualified bat ecologist.

6 Appendix

Photographs

Photograph 1- Typical habitats at Site (Target Note 1)



Photograph 2- Typical habitats at Site (Target Note 1)



Photograph 3- Woodland habitats on southeast boundary (Target Note 3)



Photograph 4- Woodland habitats on northwest boundary (Target Note 2)



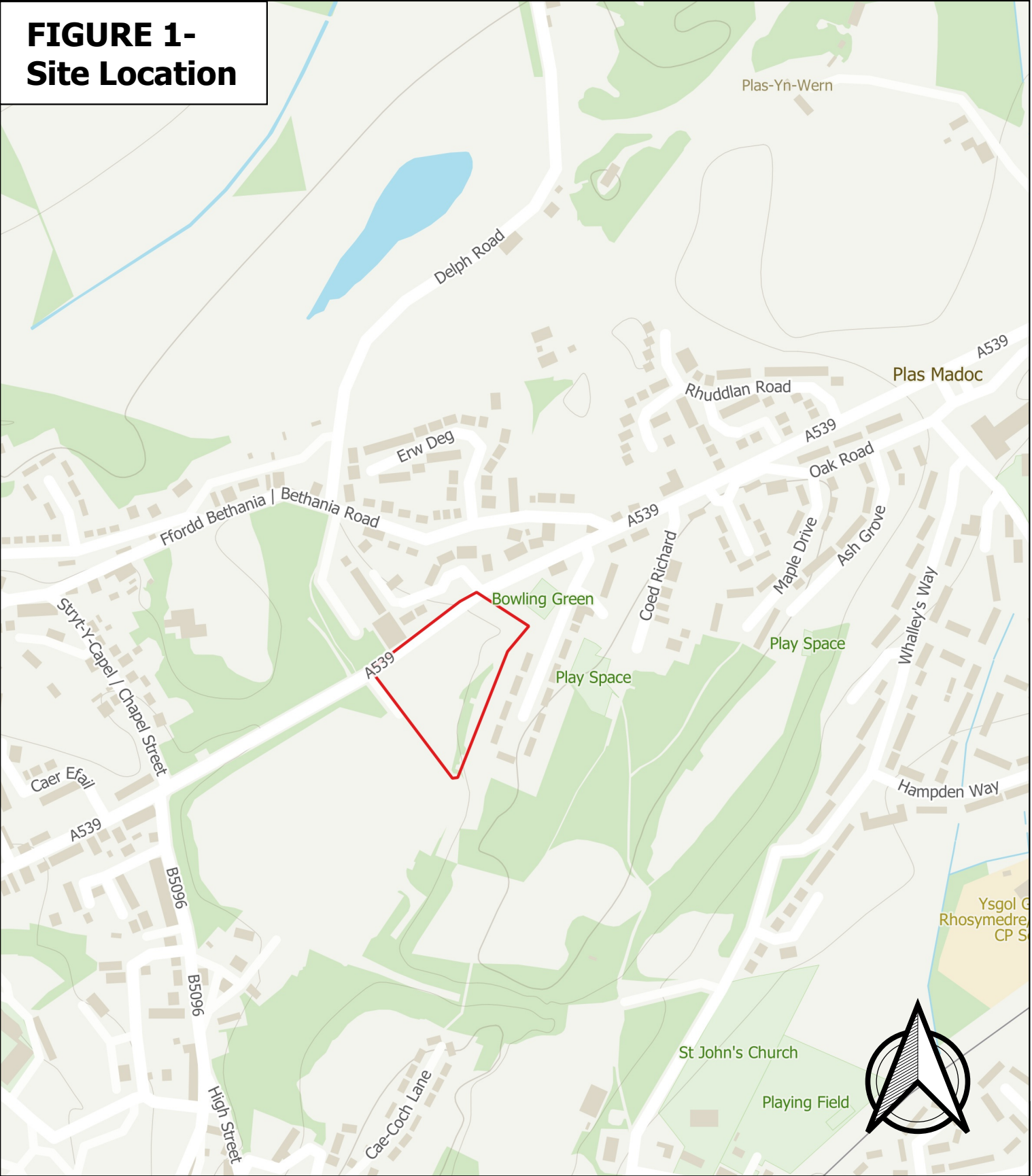
Photograph 5- Crushed rubble and scrub habitats at Target Note 5



Photograph 6- Stone structure at Target Note 4



**FIGURE 1-
Site Location**



KEY

 Study Site

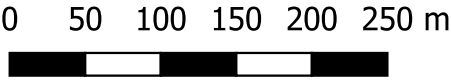
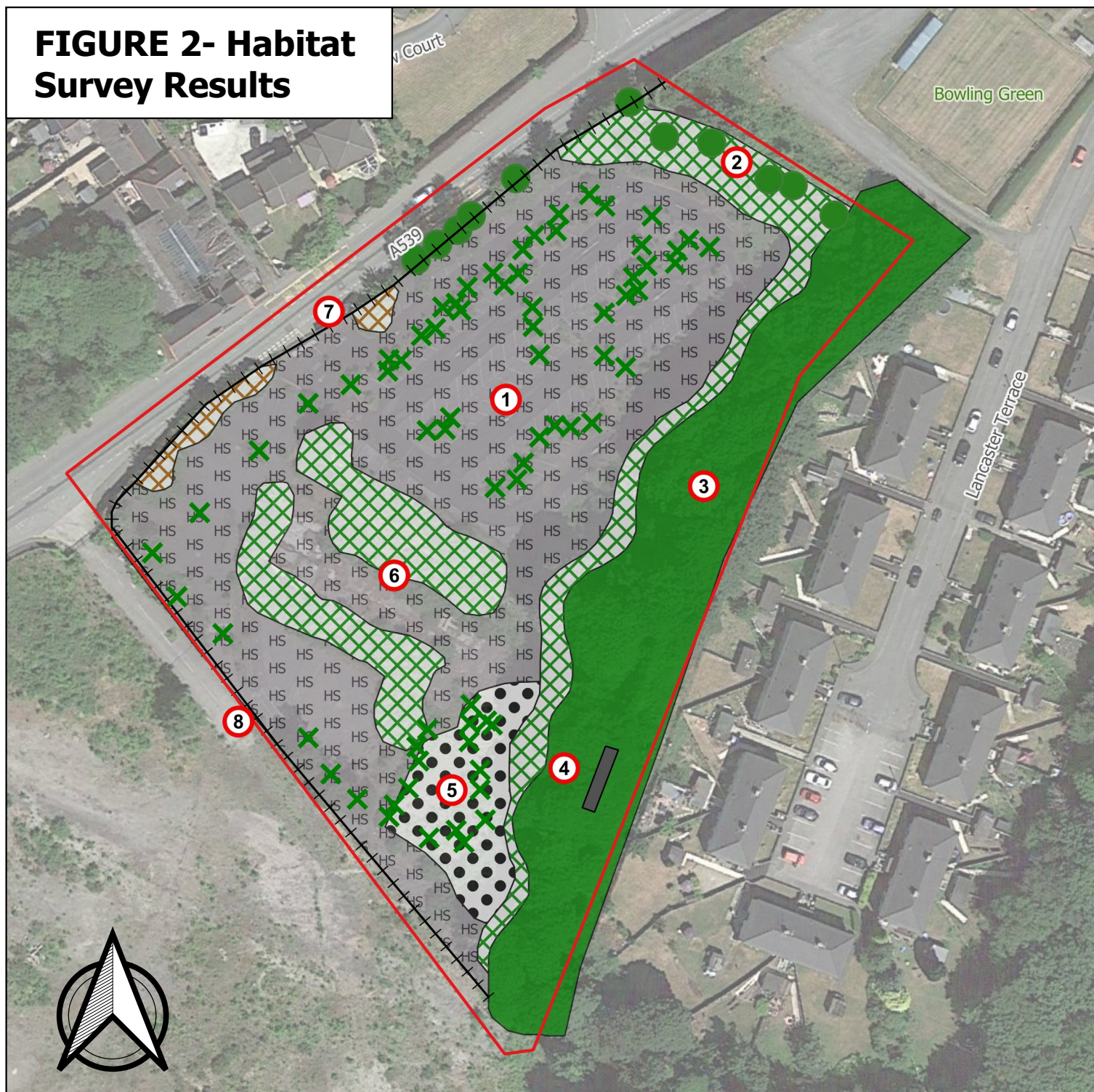


FIGURE 2- Habitat Survey Results



KEY

-  Study Site
-  Target Note
-  Scattered tree
-  Fence
-  Scattered scrub
-  Broadleaved woodland
-  Continuous scrub
-  Introduced shrub
-  Bare ground
-  Hardstanding
-  Building

0 10 20 30 40 50 m



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