



GREENGATES EAST, ST. ASAPH: PRELIMINARY ECOLOGICAL APPRAISAL

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02/07/2018	Matt Moss	Rhian Hughes	V1	Original
20/09/2018	Rhian Hughes	Tim Yardley	V2	Updates following further surveys (addition of section 6 and updated conclusions and recommendations in red)

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1.0 Introduction

- 1.1 Enfys Ecology Limited were commissioned by Denbighshire County Council to conduct a Preliminary Ecological Appraisal (PEA) of a set of fields, east of Greengates Farm, St. Asaph. At present it is unknown what the development plans are for the site.
- 1.2 The area surveyed covers four large fields currently used for agricultural purposes, immediately south of the A55. Grid references for the approximate centre point of each field are given for reference. Boundary features were also surveyed and any issues were recorded, if relevant.
- 1.3 This survey was commissioned to gain baseline ecological data on the species and habitats present on the site(s) and therefore identify any possible ecological constraints (or opportunities) on the works arising from the site or surrounding area, and recommend suitable general mitigation and/or compensation strategies for these issues, as appropriate.
- 1.4 The survey work to inform this report was carried out on the 19th June 2018. This report is valid for a period of two years from this date in accordance with best practice.
- 1.5 The PEA included an extended Phase 1 Habitat survey of the site, incorporating a protected species survey. A desk study examining local ecological records provided by Cofnod was also carried out, using records held for the specific catchment areas. The report includes a habitat map of the site and part of the surroundings. Recommendations for further surveys are made as appropriate.

2.0 Site Description

2.1 *Survey area*

- 2.1.1 The site consists of four large fields divided by mature hedgerows with scattered broadleaved trees, east of Greengates Farm, St. Asaph. Currently the site is used for grazing pasture, with horses in the northern field and sheep grazing across the rest of the site. Much of the fields were similar in sward structure and species diversity, especially where sheep were present. The northern field, and half of the southern-most field were more diverse as a result of reduced sheep grazing.
 - 2.1.2 Three dry ditches with culverts and gates ran across the site denoting main field boundaries; and livestock fencing divided the fields into smaller compartments. Livestock had free movement within each field as the fencing was damaged in places. Along the western most boundary is a line of scattered broadleaved trees and tall ruderal vegetation. Several telephone and overhead lines crossed the site, and five waterworks access pads are located towards the south of the site.
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FIGURE 1. THE APPROXIMATE SURVEY AREA IS OUTLINED IN RED.
IMAGE © GOOGLE 2018.

2.1.3 The approximate survey boundary used is shown on figure 1, above.

2.1.4 The surveyed area is at approximate OS grid reference SJ 0239 7442.

2.2 *Surrounding Areas*

2.2.1 The immediate surrounding area is predominantly improved grassland used for pasture and associated farm dwellings. This habitat is near continuous, only being divided by hedgerows and rural roads, and extends well over 1km from the site boundary to the north and south-east. There is limited connectivity across the wider landscape aside from stretches of hedgerows and scattered trees. There are small ponds on the adjacent land to the south however there was no access at the time of the survey and so no further information is known.

2.2.2 Further east is St. Asaph, a small town of dense urban development and amenity which extends approximately 1.5 kilometres east. Between the site boundary and St. Asaph runs the River Elwy, a tributary of the River Conwy and important site for otter and salmon. West of the site is St. Asaph Business Park, a mix of industrial units, scattered bands of broadleaved trees, and numerous ponds. The entire Business Park is an important breeding site for amphibians and supports all five native species, including a large population of great crested newt (GCN).

2.2.3 The surrounding area is shown on figure 2, below.



FIGURE 2. THE SURROUNDING AREAS WITH THE SURVEY AREA OUTLINED IN RED.
IMAGE © GOOGLE 2018.

3.0 Methodology

3.1 *Desk study*

3.1.1 The desk study was carried out using data supplied from Cofnod, the local environmental record centre for North Wales. A 1km search radius, (or buffer) was used. The records include information on the presence of statutory and non-statutory sites for nature conservation, and records of protected, notable, or (formerly) Biodiversity Action Plan (BAP) species and habitats from within and around the proposed works. The records are used to inform the survey and recommendations, and to provide context for evaluating the species and habitats found during the survey.

3.1.2 Most of the reviewed data was from the Cofnod search obtained by Enfys Ecology, and includes all protected species records within 1km of the site. The MAGIC map application (accessed online through Natural England: (<http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx>) but covering all of the UK) was used to cross reference protected sites. At the time of writing no data has yet been received from any other group.

3.2 *Extended Phase 1 Habitat Survey and Protected Species Survey*

A survey of the site was conducted by an experienced ecologist, walking over the site. The habitats present were classified into a series of categories according to the standard phase 1 habitat survey methodology (JNCC 2010). Notes were taken on the habitats and their suitability for protected species, and target notes were used to record any habitats or features of particular note. A list of floral species was recorded, and where relevant a measure of frequency and abundance of such species was given using the DAFOR scale¹. A

¹ DAFOR scale – abundance and frequency categories.

GPS enabled iPad with mapping software was used to roughly map habitat types (later refined in the office using QGIS software) and to pinpoint locations including target notes. A search for evidence of protected species was carried out (GCN, bats and reptiles). Evidence of badgers including setts, dung pits, hairs, footprints, and scratching posts or trees was searched for. Trees with suitable features for roosting bats, including knot holes and other crevices, hollow trunks and dense ivy coverage were identified.

3.3 *Survey Details*

The extended Phase 1 habitat survey was carried out on the 19th June 2018 by ecologist Matt Moss.

3.4 *Limitations*

The survey was conducted in optimal weather conditions and during a time when most flowering plants are in flower and can therefore be correctly identified.

3.5 The results consist only of those species encountered in a single visit during June 2018. Species that use the site infrequently or at different times may not have been recorded, and the absence of a species from the results does not mean that it is definitely not present. Descriptions of plant species concentrate on the most obvious and abundant species as determinants of habitats present, however the species present have been listed where possible and any rare or notable, protected or invasive species were identified (if present).

4.0 Desk Study

4.1 *Designated nature conservation sites*

Note: Survey area here means the area surveyed on the ground by the ecologist. Search area is the wider radius for which data was obtained for the desk study.

4.1.1 *Statutory sites*

There are no statutory sites within 1km of the site.

4.1.2 *Non-statutory Sites*

One local wildlife sites is located within 1 km of the proposed works; Coed Cord / Coed y Saeson located 981m south. Covering 6.6 hectares, this site consists of three blocks of ancient broadleaved woodland that support alder, ash, oak, and birch communities.

Abbreviation	Frequency	Cover
D	Throughout	>50%
A	Throughout	10-50%
F	50 – 100%	<10%
O	<50%	<10%
R	A few plants or clumps	<<10%

4.1.3 There are nine ancient woodland sites within 1km of the site. Two semi-natural ancient woodlands, six plantations on ancient woodland sites, and one ancient woodland of unknown category.

4.2 *Protected and notable species; overview*

4.2.1 In total, records of 79 species are held within a 1km radius of the proposed scheme. Of these 34 are considered priority species (Legally protected, European protected species, UK BAP species), and 21 of significant conservation concern. Of the remainder eleven are considered locally important. The most important species for the proposed works (species with significant protection, rarity, and interest, and likelihood of being affected by the works based on the location of the records and the habitat of the species in question) are listed below in Table 4.2.

Table 4.2: Summary of protected species within 1km of the survey area.

Species	Designation	Details
Amphibians		
Common frog (<i>Rana temporaria</i>)	Bern, HDir, WCA5	48 records (1999 – 2017). All from St. Asaph business park and the closest record is 437m west (2005).
Common toad (<i>Bufo bufo</i>)	Bern, LBAP[DEN], S7, WCA5	63 records (1999 – 2017). Most from St. Asaph business park, the closest is 432m east (2009). Two record are north of the A55, 785m away (2009).
Great crested newt (<i>Triturus cristatus</i>)	BAP, Bern, CHSR, EPS, HDir LBAP[DEN], RD2(UK), S7, WCA5	538 records (1999 – 2018). All as part of GCN monitoring in the area. Most are from St. Asaph business park with several recorded north of the A55. The closest record is from within the site boundary, 141m east of the site centre point in 2004 – However, this record was labelled as “St Asaph business park” – the recorder was contacted and had not surveyed this far east, therefore this is thought to be an incorrect grid reference. Because of this, there are not thought to be any accurate GCN records within the site area. The next closest are five records 432m west of site in a pond (1997 – 2017).
Palmate newt (<i>Lissotriton helveticus</i>)	Bern, LBAP[DEN], WCA5	21 records (2002 – 2015). The closest record is 476m west of the site (2005).
Smooth newt (<i>Lissotriton vulgaris</i>)	Bern, LBAP[DEN], WCA5	398 records (1999 – 2018). The closest two records are 432m west of the site (2009 – 2016).
Birds		
Barn owl (<i>Tyto alba</i>)	BDir1, BDir2.2, S7, UKBA, WBR, WCA1.1	One bird recorded 212m east of site, though still within the site boundary (2015). Recorded at 1km grid square

Species	Designation	Details
		level so the exact distance may be different than that provided.
Goshawk (<i>Accipiter gentilis</i>)	CITES, CMS, WCA1.1, WCA9	One bird recorded 863m west of the site in St. Asaph business park (2015). Recorded at 1km grid square level.
Hobby (<i>Falco subbuteo</i>)	BDir1, Bern, CITES, CMS, WBA, WCA1.1	One bird recorded 863m west of the site in St. Asaph business park (2015). Recorded at 1km grid square level.
Little ringed plover (<i>Charadrius dubius</i>)	Bern, CMS, WCA1.1	One bird recorded 863m west of the site in St. Asaph business park (2011). Recorded at 1km grid square level.
Peregrine (<i>Falco peregrinus</i>)	BDir1, Bern, CITES, CMS, WCA1.1	Three records of three birds, 863m west of site in St. Asaph business park. One in 2011 and two in 2016. All recorded at 1km grid square level
Redwing (<i>Turdus iliacus</i>)	BDir2.2, UKBR, WBA, WCA1.1	16 records (2010 – 2016), all recorded at 1km grid square level. The closest is of seven birds 212m east, within the site boundary (2016). The other two records are both 863m away; one record of 50 birds to the south (2016) and 14 records of over 500 birds to the west (2010 – 2016).
16 species	Various	81 records of 16 species (2003 – 2016), all recorded at 1km grid square level. The closest is of 13 species recorded 212m east, within the site boundary. Species records also exist from 863m west and south of the site.
Butterflies and Moths		
Small Heath (<i>Coenonympha pamphilus</i>)	RD1(UK)NT, S7	One adult butterfly recorded 539m west of site (2012).
Mammals		
Badger (<i>Meles meles</i>)	Bern, LBAP[DEN], PBA	14 records (latrines, foraging activity, dead on the road animals, and four sett records (2001 – 2015)). The closest record falls within the site boundary, though is taken at 1km grid square level (1995 – 2002). Nine records are from St. Asaph business park. There are 15 badger sett records over 1km from the site (1971 – 2007), all at 1km grid square level.
<i>Myotis</i> bat species	Bern, CMS(2), CMS(EB), EPS, HDir, LBAP[DEN], WCA5	One record of four <i>Myotis</i> bats in a chimney, 979m east of site (1999).
<i>Pipistrellus</i> bat species	Bern, CHSR, CMS(2), CMS(EB), EPS, HDir, RD2(UK), S7, WCA5	One record of a Pipistrelle roost under the eaves of a property, 967m north-east of the site (1998).
Polecat (<i>Mustela putorius</i>)	Bern, HDir, RD2(UK), S7	Two records of dead animals along the A55, one 500m west (2017) and one 721m east (2018).

Species	Designation	Details
Unknown bat (Chiroptera)	EPS, LBAP[DEN], S7, WCA5	One record of a bat in a loft, 962m east of the site (1999).
Reptiles		
Grass snake (<i>Natrix natrix</i>)	Bern, LBAP[DEN], S7, WCA5	Six records (2013 – 2017) all located west of the site. The closest record is of one juvenile snake approximately 163m west along the site boundary (Enfys Ecology, 2016a). The next closest is 417m west, based on Cofnod records.

BAP: UK Biodiversity Action Plan

BDir1: EU Birds Directive Annexe 1

BDir2.2: EU Birds Directive Annexe 2.2

Bern: Bern Convention on the Conservation of European Wildlife and Natural Habitats

CHSR: Conservation of Habitats and Species Regulations 2010

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora

CMS: Convention on Migratory Species – Appendix 2 (2); EUROBATS (EB)

EPS: European Protected Species

HDir: EU Habitats Directive

LBAP[DEN]: Local Biodiversity Action Plan Species[Denbighshire]

PBA: Protection of Badgers Act 1992

RD1(UK): Red Data Book listing for the UK based on IUCN guidelines: NT – Near Threatened

RD2(UK): Red Data Book listing for the UK not based on IUCN guidelines

S7: Environment (Wales) Act 2016 (Section 7)

UKBA: RSPB UK Birds Amber list (not based on IUCN criteria)

UKBR: RSPB UK Birds Red List (not based on IUCN criteria)

WBA: RSPB Welsh Birds Amber List (not based on IUCN criteria)

WBR: RSPB Welsh Birds Red List (not based on IUCN criteria)

WCA: Wildlife & Countryside Act 1981: Schedules 1.1, 5, 9

4.2.2 *Protected and notable fauna*

The majority of the faunal records are amphibians with 1068 records existing for the five native, common frog, common toad, great crested newt, palmate newt, and smooth newt. More than half of these are GCN records taken from long-term population monitoring across St. Asaph Business Park. Smooth newt makes up the second most recorded amphibian species totalling 398 records over a 19 year period.

4.2.3 The second most recorded fauna species group is birds with 104 records existing for 22 species. Most of these have been recorded at 1km grid square level either within the site boundary, 212m east of the centre; or 863m west and south respectively. As records have been made at 1km grid square level it is unknown how close to the site the record actually is. Of the species with the highest level of protection (both European and UK legislation), 15 have been recorded within the site boundary and there is a possibility that they are using the site or surrounding buildings for breeding purposes.

4.2.4 The 14 badger records are a combination of setts, latrines, snuffle holes, and dead animals; and indicate badgers are well-established and active within the area. Ten records are from around St. Asaph Business Park. The closest record is within the site boundary, though taken at 1km grid square level.

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- 4.2.5 Three bat records exist all over 900m to the east from bat surveys of buildings in St. Asaph. These are of a *Myotis* bat roost containing four bats, 979m away, one *Pipistrellus* bat species, 967m north-east, and one unknown bat species in a loft space, 962m south-east. There are two polecat records from roadside specimens, 500m north-west and 721m north-east.
- 4.2.6 There are six grass snake records within 1km of the site, all from around St. Asaph Business Park, and are of live sightings, dead on the road specimens, and a shed skin. During a reptile survey conducted by Enfys Ecology (2016), one juvenile grass snake was recorded in the hedgerow along the west site boundary. The closest record from the Cofnod data search is of an adult snake, 417m to the west.
- 4.2.7 *Protected and notable flora*
No protected, rare, or notable plant species have been recorded within 1km of the proposed works.
- 4.3 *Invasive or non-native flora*
There are seven records of five invasive or non-native flora species within 1km of the site; giant hogweed, Japanese knotweed, Japanese rose, monbretia, and water fern. Only one has been recorded within the site boundary, monbretia, though again, it is at 1km grid square level and so the actual distance may be different than the one provided.
- 4.3.1 Japanese rose and the highly-invasive Japanese knotweed has been recorded from one locality, 608m east along Heol Esgob. Three giant hogweed plants have been recorded 700m away, north of the A55. Water fern is known from two ponds in St. Asaph Business Park, 632m and 1000m west of site.

5.0 Habitat Survey

5.1 Overview

5.1.1 Habitat Types

A Phase 1 Habitat map of the area is provided below. A description of the habitats and details of target notes follows the map. Photographs of the site are included with the text. Species common names are used in the text. A plant species list including Latin names can be found in Appendix B.

5.1.2 The following standard phase 1 habitat and feature types were recorded within and adjacent to the sites, (with their alphanumeric codes):

- A3.1 – Scattered trees – broadleaved
 - B2.2 – Neutral grassland - semi-improved
 - B4 – Improved grassland
 - C3.1 – Other tall herb and fern – ruderal
 - J2.1.2 – Intact hedge – species poor
 - J2.3.2 – Hedge with trees - species poor
 - J2.6 – Dry ditch
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- J3.6 – Buildings
- J5 – Hard standing

5.2 *Habitat Areas*

The table below (5.1) contains the approximate areas of habitat types found during the survey, derived from the GIS mapping files. These should be considered approximate, as the areas are mapped boundaries between habitat types are not always absolute, and the mapped area is by nature arbitrary, in any case. Some of the habitat is also outside the red-bordered survey area (see map).

Table 5.1. Approximate habitat areas as shown on the Habitat maps (Overleaf).

Linear features are not included.

Habitat	Code	Area (M ²)	Area (Ha)	% of Total
Scattered trees - broadleaved	A3.1	10896.95	1.09	3.90
Neutral grassland – semi-improved	B2.2	32125.17	3.21	11.49
Improved grassland	B4	166537.8	16.7	59.79
Other tall herb and fern – ruderal	C3.1	2921.16	0.3	1.074
Intact hedge – species poor	J2.1.2	5449.94	0.5	1.790
Hedge with trees - species poor	J2.3.2	13312.75	1.33	4.76
Dry ditch	J2.6	800.91	0.08	0.29
Buildings	J3.6	37043.51	3.7	13.25
Hard standing	J5	10223.03	1.02	3.65

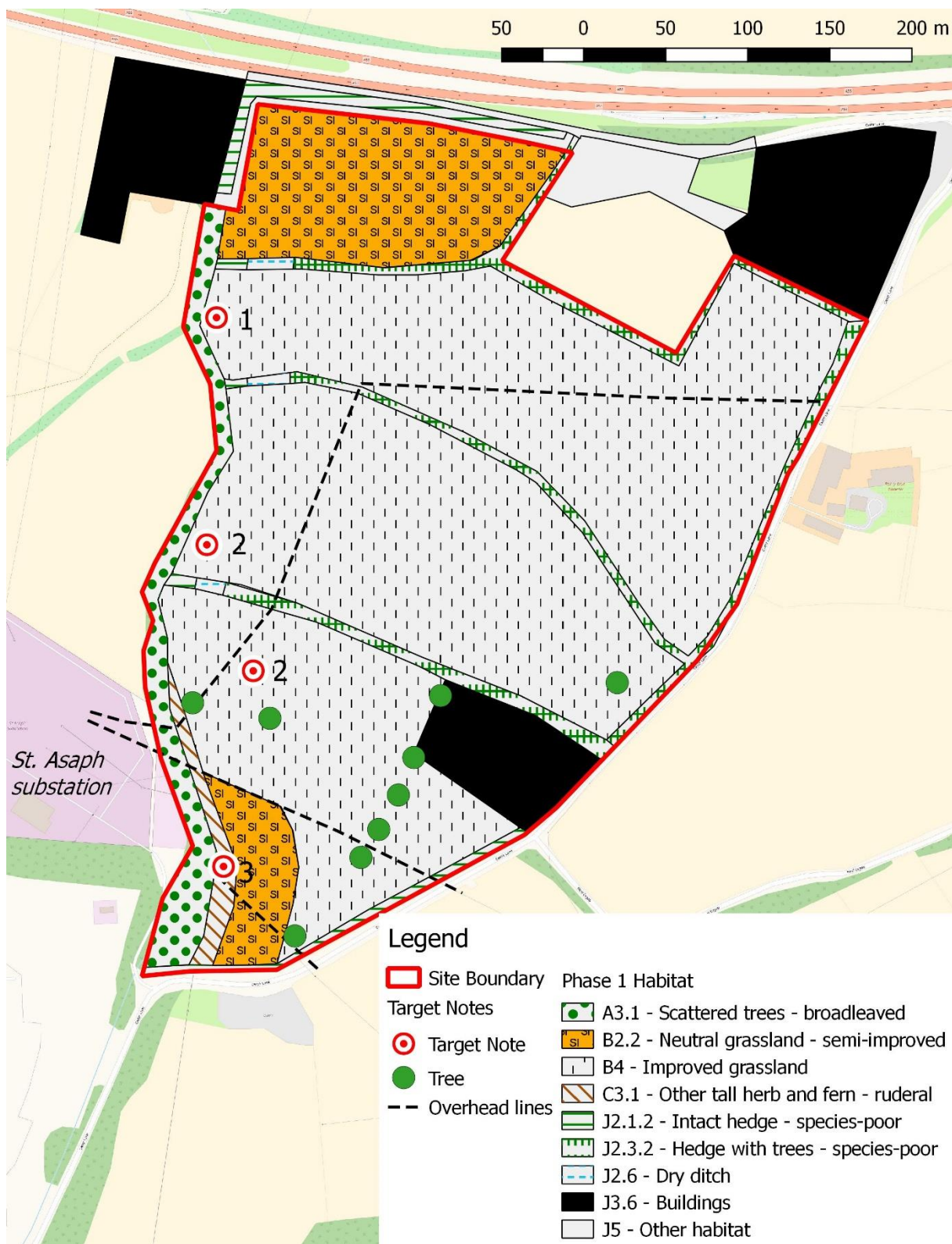


FIGURE 3: PHASE 1 HABITAT MAP OF THE SURVEY AREA. TARGET NOTES AND DESCRIPTIONS OF THE HABITATS FOLLOW IN THE SUBSEQUENT SECTIONS ©OSM MAPS, 2018

5.3 Target notes. (TN)

Table 5.2. Target Notes form the Phase 1 Habitat Map.

Photographs are below the table (as indicated by the numbers in the pictures column).

Target Number	Description	Picture(s)
1	Dense stand of thistles Along the western edge of the upper central pasture is a dense stand of common thistle with occasional common sorrel. This area is indicative of nutrient enrichment.	TN1
2	Water works access pads Two rectangular concrete access pads are located in the south-west corner of the north pasture, and a further two are in the upper part of the southern semi-improved grassland.	TN2
3	Overhead power lines and pylons Two large pylons and several smaller overhead powerlines are located at the south-western corner of the site. These originate from the St. Asaph substation and cross the southern field. A series of small power lines cross the northern pasture field in an east/west direction.	TN3 and Picture 2

5.3.1 Target note (TN) pictures.



PICTURE TN.1. COMMON THISTLES (NORTH PASTURE)



PICTURE TN.2. WATER WORKS ACCESS PADS

5.4 *Habitat descriptions*

Species common names are used in the text. A plant species list including Latin names can be found in Appendix B.

5.4.1 Pasture grassland

The four fields on site are used as pasture grassland; at the time of the survey the northern pasture was used for horses, and the centre two fields for sheep. The southern pasture appeared to have been partially grazed with the east-half used for sheep pasture, and reduced grazing on the west-half. For the purposes of this report and fields are referred to by the geographic location and OS grid reference are provided.

5.4.2 *Northern pasture: neutral grassland – semi-improved (SJ 0231 7459)*

A large field with wooden post and rail fencing along the north boundary and a hedgerow along the south (Picture 5.1). Species diversity here is higher due to lack of sheep grazing. Grasses in the sward are present in approximately equal abundances and include cock's foot, common bent, crested dog's tail, creeping soft grass, perennial rye-grass, sweet vernal grass, and Yorkshire fog. Herb species include bristly ox-tongue, broad-leaved dock, common nettle, common sorrel, common thistle, creeping buttercup, cow parsley, greater willow herb, meadow buttercup, ragwort, and white clover. Along the north fence line common nettle, greater willow-herb, and ash saplings are growing in abundance.

5.4.3 *Centre pastures: north (SJ 0240 7449) and south (SJ 0237 7437)*

Two pasture fields at the centre of the site that are identical in sward structure and overall species diversity (Picture 5.2). Common bent, perennial rye-grass, and sweet vernal grass make up the sward; with common daisy, creeping buttercup, and creeping thistle. Common sorrel, ragwort, thyme-leaved speedwell, and white clover are found on occasion. A line of overhead powerlines crosses the centre pasture (north). Along the west-edge of the north pasture is an area dominated by creeping thistles and occasional common sorrel (Target Note 1).

5.4.4 *Southern pasture: neutral grassland – semi-improved and improved grassland (SJ 0229 7422)*

The pasture to the south is mostly improved grassland with a small area of semi-improved grassland to the west. Species diversity in the improved compartment is identical to the centre pastures. A line of mature common oak trees run up the centre of the field, and are located in the improved grassland compartment to the east (Picture 5.3).

5.4.5 In the semi-improved compartment, the sward consisted of common bent, crested dog's tail, perennial rye-grass, and sweet vernal grass. Forb species included common daisy, common nettle, common sorrel, creeping thistle, hop trefoil, thyme-leaved speedwell, and white clover. Common mouse-ear, lesser stitchwort and self-heal were present along the boundaries.



PICTURE 5.1. NORTHERN PASTURE



PICTURE 5.2. CENTRE PASTURE (NORTH)



**PICTURE 5.3. LINE OF MATURE TREES
(SOUTHERN PASTURE)**



PICTURE 5.4. INTACT HEDGEROW WITH TREES

5.4.6 Hedge with trees – species poor

The fields on site are divided by species-poor hedgerows with scattered broadleaved trees. Blackthorn and hawthorn are the dominant hedgerow species with occasional gorse, hazel, and dog rose throughout. Scattered patches of bramble, cleavers, and cow parsley occur beneath the hedgerows. Mature ash, oak and aspen trees are found within the hedgerows (Picture 5.4).

5.4.7 Scattered broadleaved trees and other tall herb and fern – ruderal (SJ 0221 7420)

A narrow stretch of broadleaved trees follows the western site boundary. The canopy consists of ash, English elm, grey willow, and pedunculate oak; with an understorey of blackthorn, dog rose, elder, and hawthorn (Picture 5.6). A small stream follows the tree line, flowing in a north/south direction. This was overgrown at the time of the survey and access was restricted by vegetation and existing trees.

5.4.8 Between the band of trees and pasture is a strip of tall ruderal. The ground flora is similar to the areas of semi-improved grassland with cock's-foot, creeping soft grass, meadow foxtail, perennial rye-grass, and sweet vernal grass comprising the sward. Herb species include bramble, broadleaved dock, cleavers, common nettle, lesser stitchwort, and an unknown Umbellifer (Picture 5.6).

5.4.9 Dry ditch

Between each of the main fields runs a dry ditch and associated culvert. Vegetation was fairly sparse in the ditches with tussocks of hard rush and soft rush dominating, and patches of cock's foot, creeping thistle, and crested dog's-tail (Pictures 5.6 and 5.7).



PICTURE 5.5. SCATTERED BROADLEAVED TREES AND TALL RUDERAL



PICTURE 5.6. DRY DITCH – CENTRE PASTURE (NORTH)



PICTURE 5.7. DRY DITCH – CENTRE PASTURE (SOUTH)

5.5 Fauna

5.5.1 Amphibians

There is little suitable foraging or breeding habitat on site for amphibians across the site. Along the west site boundary the tall ruderal and small stream may provide limited foraging habitat for amphibians. However, the site is surrounded by improved grassland and pasture, isolating it from the nearest suitable amphibians habitat. In addition, while ditches and hedgerows provide a network of microhabitats for foraging, those on site were dry at the time of the survey and are unsuitable for regular use by amphibians. These may have held water over winter and in spring and so may be used by some species.

5.5.2 A large network of ponds with excellent foraging and breeding habitat is found further west at St. Asaph Business Park. Records of all five native amphibian species exist from this site with regular population monitoring carried out year on year. In previous years GCN have been recorded in smaller ponds on the adjacent land to the south. However, no land access has been granted as part of this PEA survey meaning no current habitat suitability information for amphibians is known for these ponds.

5.5.3 Bats

Overall the site has a low roosting potential but a moderate foraging potential for bats. The mature oak trees found across the site may be used by roosting bats, especially the trees in the southern pasture. However, there were no obvious holes or cavities that may be used by bats for roosting purposes. The farm houses at Greengates Farm and along the east site boundary may provide roosting opportunities for bats. However these are not part of the site survey area and a preliminary roost assessment was not carried out on any of these buildings.

5.5.4 The site contains a mixture of habitats including open grassland, taller vegetation, hedgerows and tree-lines. This provides a variety of foraging habitat and niches for bat species that have different prey preferences and foraging types. Linear features are also used by bats to commute across the wider landscape. The hedgerows and tree lines on site enable bats to commute to more suitable foraging or roosting habitat in the wider landscape.

5.5.5 Badgers

There is no evidence of badger or badger setts within the site boundary, and most of the habitat on site sub-optimal for badgers. The vegetation and terrain across the site is too uniform for sett building or foraging, and the hedgerows that cross the site are too narrow to provide substantial areas for sett building. The broadleaved trees and taller ruderal vegetation along the west boundary provides some foraging habitat; however given the narrow width and lack of dense cover badgers are more likely to use this for commuting purposes rather than long-term sett building or foraging.

5.5.6 Records from Cofnod indicate that two badger setts have been recorded within the site boundary, however these have been made at 1km grid square level and so the actual distance from site may vary. It is possible that any works on site will have an impact on badgers in the near vicinity, either by reducing foraging habitat or disrupting commuting routes.

5.5.7 Butterflies and Moths

No protected butterfly or moth species, or associated larvae were observed on site. The habitats on site were of low suitability for butterflies and moths with very few available food plants across much of the site. Any food plants on site are common and found across much of the county.

5.5.8 Nesting birds

The site contains good habitat for nesting birds with a stretch of broadleaved trees, and dense hedgerows and scattered mature trees. Five species of bird were seen on site during the survey; goldfinch, greenfinch, wood pigeon, swallow, and herring gull. Two greenfinch were observed making return trips to the dense hedgerows crossing the central pasture fields indicating a nesting pair or potential breeding territory in the area. Swallows were seen flying low over the pasture fields feeding on invertebrates.

5.5.9 No other signs of breeding behaviour was observed during the survey though some sections of the scattered trees were unable to be accessed.

5.5.10 Otter and Water vole

The site is unlikely to support populations of otter given the lack of suitable habitat, and no records exist in the area. All the ditches on site were dry at the time of the survey. The shallow stream following the west site boundary was heavily vegetated at the time of the survey and is therefore unlikely to be used by otter or water vole for excavating holts or burrows. However, water vole may use this water course to commute across the landscape.

5.5.11 No signs of otter or water vole (feeding signs, burrows, holts, spraints, or latrines) were recorded along the northern half of the stream. A full assessment of the stream was unable to be carried out due to overgrown vegetation, and health and safety issues (overhead powerlines and pylons) along the southern half of the stream.

5.5.12 Reptiles

Dense hedgerows and the taller ruderal vegetation on site provide reptiles with foraging opportunities and commuting routes across the landscape. Grass snakes have been recorded to the west along the hedgerow lining the site and at St. Asaph Business Park on six occasions. The closest record is from approximately 163m west and found during a reptile survey at Greengates Farm (Enfys Ecology, 2016a). Following this the next nearest is 417m west at St. Asaph. The shallow stream along the west may be used by grass snakes for foraging purposes, though with a large population of amphibians existing at St. Asaph Business Park it is unlikely that grass snake would occupy the site for any given period.

5.6 *Flora*

No rare or protected flora species were seen on site at the time of the survey.

5.7 *Invasive species*

No invasive species were recorded on or near the site.

6.0 Further surveys

6.1 As a result of the survey work undertaken and the initial recommendations of the PEA report, DCC commissioned Enfys to carry out bat transect and static detector surveys, reptile surveys and a further badger walkover.

This section reports the initial results from these surveys (still underway) and the conclusions and recommendations have been updated with red text following the surveys so far.

6.2 Bat transect and static surveys

Two transect surveys have now been undertaken, the first was carried out on 26th July 2018, sunset was at 21:15, the survey commenced at sunset and continued until 23:30. The temperature was 17°C. The second survey was carried out on 28th August 2018, sunset was at 20:13, the survey commenced at 20:13 and continued until 22:22 with a temperature again of 17°C. Both surveys were undertaken by Rhian Hughes, licence number 77581c:OTH:SCAB:2018. Two Further surveys are scheduled for end September and October 2018.

Figure 3a, below illustrates the route undertaken and the stop points. There were six stop points and then the transect was repeated in the opposite direction. The map also illustrates the location of the static detectors.

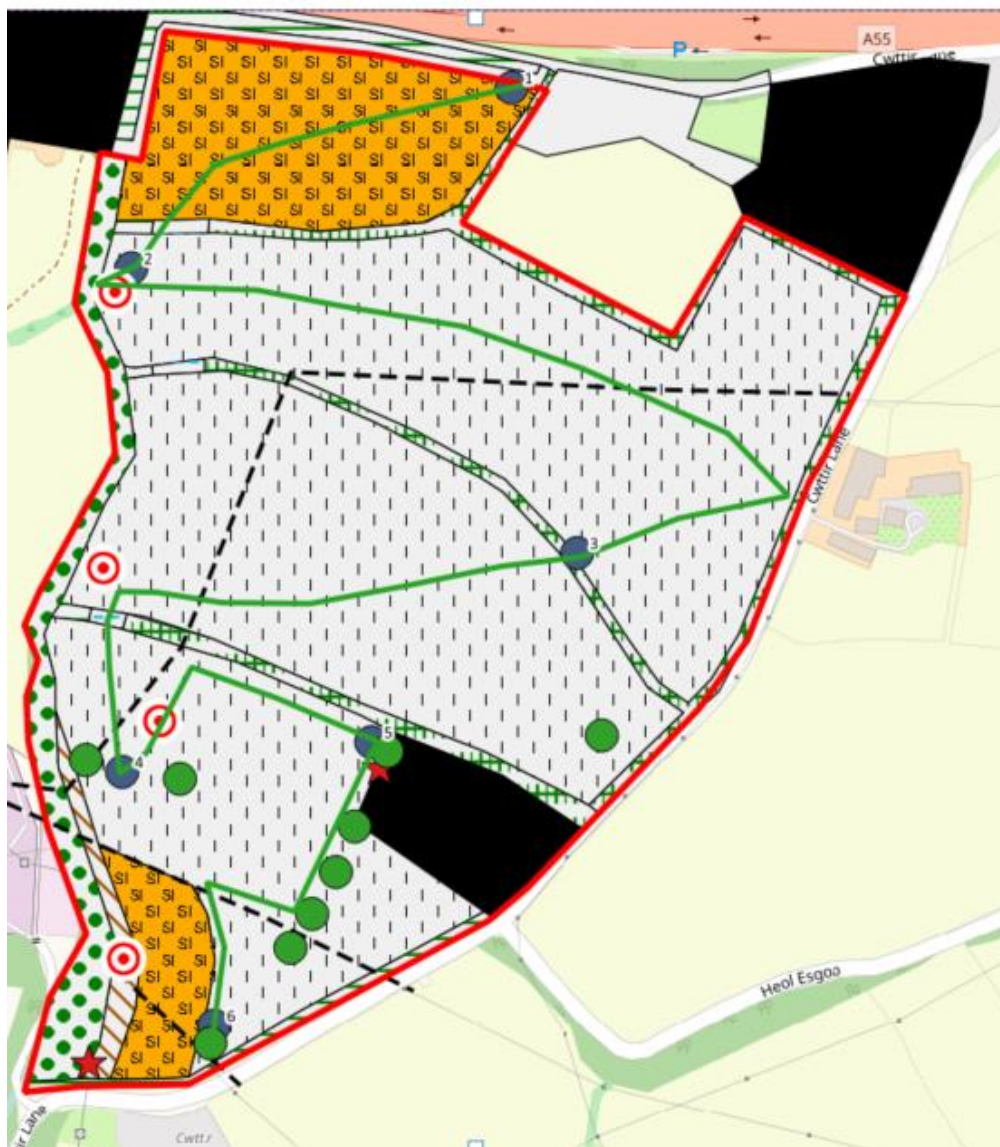


FIGURE 3A: PHASE 1 MAP WITH TRANSECT LINE (GREEN LINE), STOP POINTS (BLUE NUMBERED CIRCLES) AND LOCATION OF STATIC DETECTORS (RED STARS)

6.2.1 Transects

During the first transect there bat activity was detected, albeit sporadically, throughout the evening. This included noctule passes early in the evening, the rest of the activity recorded was largely common and soprano pipistrelle activity with the highest amount of calls at stop 5 (along the line of mature oak trees). Occasional passes by *Myotis* were also recorded.

During the second transect there was much less activity throughout the whole evening with only 15 passes during the whole evening, of which all of these were extremely brief. Only six of these were actually picked up by the anabat. Some of the passes were too quiet to determine the species. The majority of the activity was recorded to the south of the site.

During July and August two static detectors were left set up on site for five days. One was set up on the north eastern oak of the row of oaks (northern static on figure 3a) and the other set up in the southern corner of the site (static 2). The statics were set up from 26th July – 30th July and 23rd August – 27th August,

6.2.2 Static

July

Static 1 – Frequent bat activity was recorded at this location throughout the recording period. The majority of the activity was pipistrelles, both common and soprano with social calls. There were occasional noctule calls on 27th, 29th and 31st, these were mainly early on in the evening, however on 31st this was at approximately 3am. Brief *Myotis* calls were detected on 27th and 30th.

Static 2 – A low amount of activity was recorded during this period with many of the calls recorded at a distance and only identifiable as the species approached the detector. The species recorded were largely soprano and common pipistrelles with more activity earlier in the evening (before 23:00). During three of the nights a noctule was recorded, and a *Myotis* on four of the nights. The *Myotis* calls were all between 03:00 – 04:30.

August

Static 1 – activity similar to that recorded in July, however the first two nights had less activity, probably due to weather conditions. Noctules and *Myotis* were recorded on two of the nights. *Myotis* activity was between 22:00 – 23:00 on 25th but frequent activity was recorded on the 27th with periodic activity from 22:00 – 02:00. Both soprano and common pipistrelles were recorded with social calls.

Static 2 – The activity was similar to that of the activity recorded in July, with a combination of common and soprano pipistrelles, noctules during three of the nights and *Myotis* calls also recorded on three of the nights. These call were brief. More pipistrelle calls were recorded however these were extremely faint for a longer duration than in the July survey.

6.3 Reptile surveys

80 reptile refugia mats were set out on site along the western side of the site in suitable habitat during late August to allow the mats to bed in. Surveys for reptiles commenced on 12th September and have been carried out regularly in suitable conditions. To date six of the seven surveys have been undertaken but no reptiles have been observed.

Full details of the surveys will be provided following the final survey.

6.4 Badger surveys

A further walkover has taken place on the land to the west of the site, no further evidence of badgers has been found.

7.0 Discussion and Evaluation

7.1 *Nature Conservation Sites*

The proposed works will have no direct impact on any statutory protected nature sites within 1km of the site. Additionally no parts of the proposed work will affect any non-statutory sites within 1km of the site.

7.2 *Habitats*

7.2.1 Most of the site is pasture grassland, and consists of large areas of improved grassland with small areas of neutral semi-improved grassland. These habitat types constitute the surrounding area and the county as a whole meaning the proposed works will not contribute to a significant loss of pasture grassland in the area. Areas of semi-improved grassland in the northern pasture and southern-most pasture are the most species diverse habitats on site with 27 species in total, though only three species are unique. Neither of these grassland types are considered Priority Habitats on Section 7 of the Environment (Wales) Act 2016.

7.2.2 As the mature hedgerows with scattered trees crossing the site are relatively species poor and are the least diverse habitat site, consisting almost entirely of blackthorn with occasional hawthorn, hazel, rose, and gorse throughout. As much of the surrounding non-urban landscape is farmland separated by hedgerows it is unlikely that the removal of hedgerows will have a significant impact. At present it is unknown how much of the hedgerows are to be removed as part of the works.

7.2.3 The greatest loss of biodiversity associated with any hedgerow removal will be the felling of mature oak and ash trees within the hedgerows, as mature broadleaved trees provide an abundance of habitats for invertebrates, fungi, birds and bats. No bat roost potential was observed on any of the mature trees on site. **Many bats were both observed and detected using the line of mature oaks to the south east of the site. From the plans seen these trees**

are to be retained and protected during development. Any lighting required for the development must avoid having an impact on these trees.

- 7.2.4 The stretch of scattered broadleaved trees along the western site boundary provides excellent nesting, foraging and commuting habitat for a variety of species. Eight species of tree were recorded along this stretch, many of which were mature trees, though only three were unique to this woodland line. Between the woodland edge and the pasture fields the vegetation height increases and shows signs of scrub development; increasing nesting and foraging opportunities for bird species and other wildlife. This habitat should be retained wherever possible to preserve the biodiversity value of the site. From the bat surveys carried out on the site it appears that bats do use this western boundary for foraging and commuting, with Pipistrelles (common and soprano), *Myotis* and noctule recorded by the anabat during static surveys. During the transect bats were observed using this treeline at stop 2 on several occasions.
- 7.2.5 The small stream following the west tree line may provide foraging or commuting routes for amphibians, grass snake, and water vole. An assessment of the entire length was unable to be carried out due to existing trees, overgrown vegetation, and pylons. It is currently unknown whether any of the trees along the west boundary are to be removed as part of future works. Any future development plans should avoid accessing this area as part of the scheme, and access should be restricted throughout the duration of the works.
- 7.2.6 The nearest block of woodland is 160m south of the site and forms part of a garden. A larger block of woodland is approximate 400m north-west, across the A55. Several narrow tree lines follow field boundaries and roads around the site that provide limited habitat connectivity across the area.

7.3 *Species*

7.3.1 *Flora*

In total 41 species were recorded during the survey. The neutral semi-improved grassland was the most species-rich habitat on site with 27 species present, ten of which were unique to the habitat. Despite being the most species-rich habitat on the site, many of the species present are ubiquitous amongst neutral semi-improved grasslands and are likely to be present in greater numbers elsewhere in the county.

- 7.3.2 The hedgerows on site contained the fewest number of species and had the lowest species diversity, with nine and two species recorded respectively. Much of the hedgerow ground-flora is present either in the adjacent tall ruderal and woodland, or along hedgerows in the surrounding area, and will not contribute to a loss of species diversity in the area.
- 7.3.3 All of the native species recorded are commonly found throughout the county, and none of the species recorded during the survey are protected by the Wildlife and Countryside Act 1981 (as amended) or considered rare nationally or locally.

7.4 *Fauna*

7.4.1 Amphibians

The site contains very little foraging habitat for amphibians including GCN. The pasture fields are all uniform with a short sward to provide any substantial habitat for invertebrate prey, in addition the ditches and ground beneath the hedgerows are currently too dry for amphibians to make regular use of. The tall ruderal vegetation along the west boundary and small stream provide more suitable foraging habitat, with potential breeding habitat for some amphibians in the stream.

7.4.2 St. Asaph Business Park supports high populations of all five native amphibian species, and one GCN record exists from within the site boundary. A survey of the pond to the immediate south in 2016 did not find any GCN after six survey visits (Phil Fermor, *pers comms.*, 2018). Regular monitoring of the ponds to the west (approx. 260m away) and also surveys in a pond to the south west in 2016 (over 350m away) both found medium populations of GCN present (maximum counts between 11 to 100 individuals). Despite this, as there are no breeding ponds within 250m, from the information currently known about the project, newt exclusion fencing is not required as part of the works given the habitats present on site, especially if the development areas are limited to the improved grassland areas. **In the data search there was one record of GCN from within the site boundary, however upon further investigation the grid reference for this sighting was incorrect and it should have been located on the Business Park.**

7.4.3 To minimise possible impact on GCN it is recommended that the tall ruderal area on the south east of the scheme is maintained and not proposed for development. Reasonable avoidance measures must be followed with regards to GCN including the storage of materials and providing ramps in any excavations. **As part of the plans areas of hedgerows will need to be removed, to avoid possible harm to GCN the roots must only be removed between April – October in case GCN are hibernating within the roost structure. It is recommended that the hedge is cut to stump level over winter when birds will not be using the hedgerow for nesting. Full RAMS should be produced following final plans.** In the unlikely event that GCN are discovered during the works, all works must stop and the project ecologist contacted who can then advise on how to proceed.

7.4.5 Bats

The site contains a mixture of open and linear habitats that provide good foraging and commuting habitat for bats, and the loss of this is likely to have a moderate impact on any bats in the area. The hedgerows, pasture, tall ruderal vegetation and tree lines offer a combination of foraging areas that enable different bat species with different feeding preferences to utilise the site. The linear features, hedgerows and trees that cross the site allow bats to commute into the wider landscape, accessing other feeding grounds in the area. Hedgerows that cross the adjacent grasslands provide increased connectivity to woodlands found to the north and south of the site (Figure 4).

- 7.4.6 There is little suitable roosting habitat for bats on site, and no obvious roost features were noted on the mature trees. There may be temporary roosting opportunities beneath bark and large branches for individual bats, but it is unlikely that the site would support large populations of bats. The surrounding farm and residential buildings may provide roosting opportunities, but no preliminary roost assessments were carried out on these buildings as these are not included within the survey area.
- 7.4.7 Overall the site is of moderate suitability for bats based on the foraging and commuting habitat present. It is therefore recommended that bat transect surveys are carried out to assess how bats make regular use of the site (Figure 5). One transect survey will be carried out per month in appropriate conditions for bat surveys, and at least one of the transect surveys should comprise a dusk and pre-dawn survey. A static bat detector survey is also recommended and will be conducted in conjunction with the transect surveys. Static surveys will be set up in two different locations per transect survey to increase survey efforts across the site. The optimal timing for these surveys is between April and October, though given the time frame this can be conducted in July – October. **From the results of the surveys so far, and as from the plans the main connectivity features (tree and scrub on the western side of the site, and mature trees to the south east of the site) no further surveys will be needed next year.**

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions^a and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation^b).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.^c</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ^a and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions ^a and surrounding habitat.	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

^a For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

^b Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

^c This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

**FIGURE 4: GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF A DEVELOPMENT SITE FOR BATS
© COLLINS, J (2016)**

Table 8.3 Guidelines on the number of bat activity surveys recommended to achieve a reasonable survey effort in relation to habitat suitability.			
Survey type	Low suitability habitat for bats ^a	Moderate suitability habitat for bats	High suitability habitat for bats
Transect/spot count/timed search surveys	One survey visit ^b per season (spring – April/May, summer – June/July/August, autumn – September/October) ^c in appropriate weather conditions for bats Further surveys may be required if these survey visits reveal higher levels of bat activity than predicted by habitat alone	One survey visit ^b per month (April to October) ^c in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two survey visits ^b per month (April to October) ^c in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.
AND			
Automated/static bat detector surveys ^d	One location per transect, data to be collected on five consecutive nights per season (spring – April/May, summer – June/July/August, autumn – September/October) ^c in appropriate weather conditions for bats	Two locations per transect, data to be collected on five consecutive nights per month (April to October) ^c in appropriate weather conditions for bats	Three locations per transect, data to be collected on five consecutive nights per month (April to October) ^c in appropriate weather conditions for bats

FIGURE 5: GUIDELINES FOR THE NUMBER OF BAT ACTIVITY SURVEYS REQUIRED BASED ON SITE SUITABILITY
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7.4.8 Badgers

Two badger sett records exist from the area, both located within 300m of the site, and fall within the site boundary. These are from 1995 and 2002, and are taken at 1km grid square level meaning the actual distance from site may vary. No signs of badger or setts were identified on the pasture fields or in the tall ruderal during the survey. The broadleaved trees surrounding the pylons were not accessed due to health and safety reasons and it is unknown whether badger are present in the area.

7.4.9 The pasture grassland is unsuitable for foraging and setts as it is an open area of level terrain with no structural diversity. The hedgerows, tall ruderal, and broadleaved trees may provide foraging areas for badgers, and the proposed works may have an impact on badger by reducing foraging areas or disrupting commuting routes. As such reasonable avoidance measures should be in place prevent badgers accessing the site during the works and to reduce overall disturbance to badger in the area.

7.4.10 It is likely that badgers would only use the site for foraging for short periods of time, or as a commuting route. It is recommended that an observational badger sett survey be carried out to confirm the presence or absence of badger on site. This should be carried out during autumn or early spring when badgers are active but much of the vegetation has died away. If the proposed works turn out to be within 30m of a sett then a license from NRW may be required and works timed to avoid having an impact on badgers during their breeding season (works under licence should be timed between July – 30th November).

7.4.11 Butterflies and Moths

At the time of the survey the site contained relatively few flowering plant species, and no flowering plants specific to any rare or protect butterfly or moth species. The few flowering plant species present on site are found frequently across the county and so the loss of habitat on site is unlikely to have an impact on butterfly and moth populations in the area.

7.4.12 Additional planting of flowering plants can be done following completion of any development works, focusing on any public or communal areas such as site entrances and amenity grounds. This will increase the aesthetic appeal of any future development and ensure that any flowering plants that were previously used by butterflies and moths are not lost. These plants will also support other pollinators and invertebrate species.

7.4.13 Nesting birds

The hedgerows and scattered broadleaved trees on site are likely to be in use by nesting bird species and five were recorded on site during the survey, one being a potential breeding species. The potential loss of broadleaved trees and hedgerows will result in a loss of nesting bird habitat on site, however, as similar habitat is found in the near vicinity it is unlikely that the works will have a significant impact on nesting bird populations in the area.

7.4.14 If the hedgerow broadleaved trees on site are to be removed this should take place outside the bird breeding season (March to September inclusive). If this is not possible a thorough search for nesting birds should be conducted prior to any clearance (including tree climbing if required). If any nests are found, or the area cannot be adequately searched, all activity must stop until the birds have fledged or outside the nesting period.

7.4.15 Otter and Water vole

It is unlikely that the proposed works will have a direct impact on otter as the stream along the west boundary is too small and isolated to provide sufficient foraging or excavating holts. The stream may be used by water vole for commuting purposes meaning any animals present are unlikely to remain on site for an extended period.

7.4.16 It is recommended that surveys are carried out along the watercourses should they stand to be directly affected by, or within 30m of any proposed development. These should be carried out in areas where it is deemed safe to do so, avoiding any existing pylons or overhead powerlines. Significant disruption to the ditches should be avoided as far as possible, and the existing field boundaries should be maintained as site boundaries. The watercourses can be fenced off during construction and left undisturbed during the works. If this is not possible further surveys and mitigation will be required.

7.4.17 Reptiles

The tall ruderal and shallow stream along the west boundary may provide foraging habitat for reptiles. No reptiles were recorded on site though a grass snake was recorded along the west boundary during previous surveys (Enfys Ecology, 2016a). The hedgerows may provide additional commuting habitat for reptiles. It is recommended that reptile surveys be carried

out to assess whether reptiles are present on site. A reptile survey is currently being carried out (September 2018) and after six visits no reptiles have been observed.

7.4.18 As no reptiles have been found during the surveys to date, it is not thought that a significant population is present, therefore no further surveys/translocation is required. As it is possible that a small number of grass snakes RAMs should be followed during development to prevent injury to any reptiles.

7.4.19 Other protected species

Desk studies for ecology survey work in the near area has also returned dormouse records north of the A55 (Enfys Ecology 2016b). However as the A55 presents a significant barrier it is unlikely that dormouse surveys are required.

7.5 *Invasive non-native species.*

No invasive or non-native species were recorded on site. Biosecurity measures should be in place for vehicles and plant on site regardless. This is to ensure no invasive species are introduced onto the site during the proposed works. Additional care should be taken when working near the stream as any invasive species brought on to site can be carried downstream and spread into the wider area.

7.6 *Summary of the Main Potential Ecological Issues*

- The proposed works will result in the loss of improved and neutral semi-improved grassland (currently used as pasture), hedgerows, mature trees, and linear broadleaved trees. These are highly likely to be used by bats for foraging purposes and breeding birds. There is possibility for disturbance to badgers that may use the site for foraging or commuting purposes.
- Any large trees that are set to be removed as part of the works may be in use by nesting bird species. As such any removal should be done outside of the nesting bird season. If this is not an option then further survey work will be required to ensure no nesting birds are using the trees prior to removal.
- The site is of moderate potential for bats and contains suitable commuting habitat and small areas of foraging habitat for bats. It is recommended that one transect survey be carried out per month to evaluate how bats make use of the site (NB this work is currently ongoing at the time of writing). The mature trees on site have low potential for roosting bats, though any removal of mature trees should take place outside of the bat activity season. This is also in line with the requirements for nesting birds. The treeline of mature oaks should be retained.
- As badgers are known to be active in the area they may be active on site as there is suitable foraging habitat and commuting routes across the site. It is recommended that an observational badger survey be carried out in the autumn when vegetation has died back to see if any setts are present in the dense vegetation – no evidence of badgers have been seen on site.
- Records of great crested newts exist from the centre of site, however after investigation the grid reference was incorrect. Ponds are located to the east, south-

east, and west (with medium populations recorded to the south-west and west, and large populations on St. Asaph Business Park). Reasonable avoidance measures will be followed to minimise disturbance to GCN.

- The small stream along the west boundary may be used by water vole for commuting purposes. A survey for water vole is recommended, focusing on the north end of the stream away from the pylons and overhead lines towards the south.
- As the site contain suitable reptile habitat, mostly along the west boundary in the tall ruderal and shallow stream. During previous reptile surveys grass snake was recorded along the west boundary (Enfys Ecology, 2016a). It is recommended that reptile surveys be carried out to assess whether the site supports any reptile populations.

7.7 *Conclusions*

7.7.1 The proposed works will have no impact on any statutory protected sites in the area.

7.7.2 Overall, the combination of habitats gives the site a relatively low ecological value, however it may still be used by protected species for foraging or commuting purposes. The broadleaved trees, hedgerows, and tall ruderal on site provide badgers and bats with foraging and commuting opportunities. Similarly, the broadleaved trees and hedgerows provide nesting habitat for a number of small bird species. The areas of semi-improved grassland also provide bats and nesting birds with open spaces for foraging.

7.7.3 The small stream on site may provide commuting routes for amphibian and water vole, and however given the size and overgrown vegetation it is unlikely to support populations of animals for any given period. It may also provide foraging opportunities for grass snake, and one juvenile grass snake was recorded further west in previous surveys (Enfys Ecology, 2016a). This habitat should be retained as part of the development to preserve biodiversity value of the site.

7.7.4 Any development work near a water course poses a risk of pollution and silt run-off. Measures should be put in place before work commences to prevent this.

8.0 Recommendations

8.1 *Bats and Nesting Birds*

8.1.1 Any tree or shrub removal should be timed to avoid the bird breeding season which runs from March to September (inclusive) to avoid damaging/disturbing any nests present. If it proves necessary to work during this season then a survey must be carried out immediately prior to works starting to ensure that no active nests will be affected. If active nests are found then work must be delayed until all chicks had fledged.

8.1.2 The mature trees on site have a low potential to be used by individual bats for roosting purposes, though no potential roosting features were identified. Following further surveys if individual bats are observed to be roosting on the site then roost sites will be noted and tree removal will take place outside of the bat activity season. If this is not possible then trees will be soft-felled and left in-situ for 24 hours before being removed from site.

8.2 *Badgers*

8.2.1 As no signs of badger were recorded in the hedgerows or tall ruderal it is unlikely that badgers are using the site on a long term basis. However badgers have been recorded in high numbers in the area with records made within the site boundary. The dense vegetation surrounding the pylons meant a full survey of the south-west corner was not able to be carried out for health and safety reasons. It is recommended that an observational badger sett survey be carried out during autumn or early spring when the vegetation on site has died away and any badger setts can be observed. **This has since been carried out and no evidence of badgers was observed.**

8.2.2 If badger setts are found within the site boundary then a license will be required from NRW. Tunnels in badger setts can extend up to 20m from the sett entrance, and between 0.2m and several metres underground. As a result any excavation works and heavy plant must be kept away from known setts and any work within 10m of the known sett must be done using hand tools. Works should be carried out between July and November when badger are not breeding and disturbance will have the least impact.

8.3 *Great Crested Newts*

8.3.1 Though there are no ponds on site, a GCN record exists from within the site boundary, this is likely to be a record from one of the ponds discussed previously (over 250m from the site boundary but recorded to the closest 1km). Medium populations have been recorded in ponds under 500m from the site boundary. There are also high numbers of GCN within 500m of the site (from St. Asaph Business Park). Despite this, due to the distance from the ponds, and the limited habitat present on site, the works can take place without a licence in place, however reasonable avoidance measures will be followed.

8.3.2 In the unlikely event that GCN are discovered during the works, work must stop and a licence from NRW obtained.

8.3.3 Development should exclude the tall ruderal and stream area which provides more suitable habitat for GCN, plus reptiles, badgers and foraging bats.

8.3.4 From the initial plans which have now been seen there are large areas of hedgerow which require removal as part of the development to provide an adequate visibility splay. As the work is to be undertaken under RAMS with regards to GCN, the hedgerow should be cut down outside the nesting bird season (October – end March), however the roots should be retained until April in case GCN are hibernating within the roots. These should then be excavated under the supervision of a GCN licenced ecologist. Full RAMS will be produced following the finalisation of plans.

8.4 *Reptiles*

8.4.1 As records of grass snake exist from within the site boundary it is recommended that reptile surveys be carried out on site. These should be carried out during the spring and late summer months during the main breeding season and when reptiles are most active. Reptile survey mats will be placed around the site and left in situ for two weeks. Following this the mats will be checked on seven visits under suitable reptile survey conditions. These surveys should be carried out between March and June, and in September. **Reptile surveys are currently being undertaken (during September 2018).**

8.5 *Water Vole and Otter*

If the development plans are scheduled to be within 30m of the water course then a water vole survey must be carried out. Survey efforts should concentrate on the north section of the stream as there are overhead powerlines and pylons crossing the southern end of the scheme. This should be done between April and October. A survey for signs of otter can also be done as part of this.

8.6 *Site General*

8.6.1 Suitable Reasonable Avoidance Measures (RAMS) will be implemented to reduce the potential to impact on amphibians, bats, nesting birds or other species that may be found on site. Examples of such measures are set out in section 8.5.4. All the measures in this section should be implemented as appropriate.

8.6.2 A biosecurity risk assessment must be carried out and the recommendations implemented for the duration of the works. No invasive species identified on site should be taken from site, and all invasive species must be kept away from the watercourses.

8.6.3 It is recommended that action is taken to protect all large mature native trees on site that are not being felled as part of the works. If any works involving breaking ground are proposed within 10m of the wooded areas, then suitable root protection zones should be identified by an arboriculturalist (if this has not already been done) and heras fencing should be used to create a tree protection zone around the trees, as far as possible during the works. This area should be out of bounds for site workers, and especially machinery.

8.6.4 There will be no access to any active water course throughout the duration of the works. Silt netting will be in place to prevent any run off contaminating the water course.

8.6.5 *Reasonable avoidance measures,*

The following measures should be implemented at all times during the works:

- Working areas should be kept to the minimum required.
- Root zones may require fencing off to ensure the roots are not damaged.
- Should it be necessary to have any excavation left open these excavations should ideally be covered with plywood boards (or similar). The boards are to be bedded on sand to prevent small animals from taking shelter under exposed edges. If this is not possible, then these trenches must be thoroughly checked prior to back filling, or if leaving pits or trenches open is unavoidable, a suitable ramp (such as a plank or branch) must be provided to allow badgers, otters and other animals to escape the pit. Ramps could be created by grading the slope at the edges or using scaffold boards.
- Trenches must be checked each morning (by site operatives) prior to works commencing to ensure that amphibians/reptiles etc. are not present.
- Materials must be stored off the ground to prevent suitable habitat being provided for GCN or other small mammals and amphibians.
- Storage of fuel must be properly bunded, and machinery provided with drip trays especially when refuelling. Refuelling and storage of potential pollutants should be restricted to site compounds and hardstanding areas well away from the water where runoff can be prevented from entering the watercourse.
- At the end of works each day, the site should be inspected by a responsible individual to ensure that the above protocols are being complied with.
- Works should be avoided within 1 hour of dawn and dusk where possible. If works outside this time are needed, all lighting should be directional and be directed away from the woodland area to the west, the stream along the southern boundary, and the houses to the east, i.e. onto the site from the perimeter.
- If at any point in the works an amphibian, bat or nesting bird is found all works in the vicinity of the sighting must immediately cease, and an ecologist must be called. The ecologist will review the situation and advise on further action.

- Any terrestrial mammals, for example badgers, seen must be allowed to leave the area on their own. If this is not possible e.g. the animal is injured or trapped then an ecologist must be called.

8.7 *Enhancements*

- 8.7.1 At the time of writing it is unknown what the proposed development plans are meaning it is difficult to provide any specific enhancement plans. As a general recommendation, for any new developments with garden space it is recommended that any amenity planting should focus on using local wild flower seed mixes and native tree species. These provide an attractive food source for pollinating insects including bees, hoverflies and butterflies.
- 8.7.2 Bat and bird boxes should also be inbuilt on the new houses to mitigate for suitable nesting or roosting habitat lost as part of the works.
- 8.7.3 Once development plans have been seen a more detailed management plan can be produced outlining appropriate wildlife enhancements that take into account the function of the site, habitats lost, and species known to be in the area.

8.8 *Summary of Further Survey Recommendations*

- Badgers
The tall ruderal and broadleaved trees along the south west boundary may be used by badgers for sett creation. As such, an observational sett survey should be carried out during the autumn or spring months when badgers or active but vegetation coverage is at its lowest. Further liaison with the Clwyd Badger Group can be carried out in order to determine any additional setts within the area.
- Bats
The site is of moderate suitability for bats and contains habitats and features that can be used by bats for foraging and commuting. It is recommended that one bat transect survey be carried out per month to assess how bats make use of the site. At least one of these should be a dawn survey. These should be done between April and October using a route that covers the entire site, focusing on linear features and areas with bat foraging potential, such as species rich grasslands, mature trees, and tall ruderal vegetation. A static detector survey will be done in conjunction focusing on the tall ruderal habitat and mature trees.
- Great Crested Newt
GCN records exist from within the site boundary (this is likely to be from one of the other ponds but was recorded to 1km grid square level) and medium populations have been recorded in ponds to the south and west. Due to the habitat present on site, and distance from breeding ponds, works a GCN licence is not required, however RAMS must be adhered to. In the unlikely event that three or more GCN are discovered during the works then works must stop and the ecologist informed.

- Nesting birds

All hedgerows and mature trees are to be cleared outside of the breeding bird season (March – August inclusive) to ensure no birds are present. If this is not possible then a nesting bird search is to be carried out 24 hours prior to clearance. Any nests identified during the survey will be clearly identified and the hedge or tree must not be removed until the chicks have fledged.

- Reptiles

A reptile survey should be carried out between May and June, and later in September to identify any reptiles present on site. Reptile mats will be laid down and left in-situ for two weeks before the survey starts. Survey mats will then be checked during seven visits under suitable reptile survey conditions with at least two days between each visit. Records of any reptiles found will be taken noting the habitat type and grid reference.

- Water Vole

A water vole survey should be carried out between April and October to identify whether water voles use the site. Evidence includes faeces and latrines, feeding signs, burrows, footprints, or path ways. The banks should also be surveyed up to 2m from the water's edge.

Species	Timing constraints
Badgers	If badgers present works can only be carried out under licence between July and November
Bats	Surveys can only be carried out between May and end of September, under suitable conditions (transects into October).
GCN	Habitat search and translocation between March and October (under licence).
Nesting birds	Surveys and nest checks only required during the breeding season (March – August inclusive)
Reptiles	Survey work limited to spring/ early summer, and later summer/early autumn
Water Vole	Survey work must be conducted between April and October.

Table 8.1: Timings for protected species surveys

Species survey	Period
Badgers	Autumn 2018
Bats	Transects April – October (potential further surveys based on results)
Nesting birds	March – August
Reptiles	September 2018, May-June 2019
Water vole	April – October

Table 8.2: Timing constraints for protected species surveys

9.0 References and useful Information Sources

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London

Enfys Ecology (2016a) *Land at Greengates Farm, St. Asaph. Reptile Survey*. EE.148.12.16/LB

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JNCC (2010) *Handbook for Phase 1 Habitat Survey: a technique for environmental audit*. JNCC, Peterborough.

Magic Map Application. Natural England web application. Accessed October 2017. Available online at: <http://www.natureonthemap.naturalengland.org.uk/MagicMap.aspx>

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10.0 Appendices

Appendix a. Plant Species List, including Latin names. (This list is Not Exhaustive).

No protected or notably rare species were found.

Site Name	English Name	Scientific Name
Improved grassland	Broad-leaved dock	<i>Rumex obtusifolius</i>
	Common bent	<i>Agrostis capillaris</i>
	Common sorrel	<i>Rumex acetosa</i>
	Creeping buttercup	<i>Ranunculus repens</i>
	Creeping thistle	<i>Cirsium arvense</i>
	Daisy	<i>Bellis perennis</i>
	Pedunculate oak	<i>Quercus robur</i>
	Perennial rye-grass	<i>Lolium perenne</i>
	Sweet vernal grass	<i>Anthoxanthum odoratum</i>
	Thyme-leaved speedwell	<i>Veronica serpyllifolia</i>
	White clover	<i>Trifolium repens</i>
Neutral grassland – semi-improved	Ash	<i>Fraxinus excelsior</i>
	Bristly oxtongue	<i>Picris echioides</i>
	Broad-leaved dock	<i>Rumex obtusifolius</i>
	Cock's-foot	<i>Dactylis glomerata</i>
	Common bent	<i>Agrostis capillaris</i>
	Common mouse-ear	<i>Cerastium fontanum</i>
	Common nettle	<i>Urtica dioica</i>
	Common sorrel	<i>Rumex acetosa</i>
	Cow parsley	<i>Anthriscus sylvestris</i>
	Creeping buttercup	<i>Ranunculus repens</i>
	Creeping soft grass	<i>Holcus mollis</i>
	Creeping thistle	<i>Cirsium arvense</i>
	Crested dog's-tail	<i>Cynosurus cristatus</i>
	Daisy	<i>Bellis perennis</i>
	Greater willowherb	<i>Epilobium hirsuta</i>
	Hop trefoil	<i>Trifolium campestre</i>
	Lesser stitchwort	<i>Stellaria graminea</i>
	Meadow buttercup	<i>Ranunculus acris</i>
	Meadow foxtail	<i>Alopecurus pratensis</i>
	Perennial rye-grass	<i>Lolium perenne</i>
	Ragwort	<i>Senecio jacobaea</i>
	Self-heal	<i>Prunella vulgaris</i>
	Spear thistle	<i>Cirsium vulgare</i>
	Sweet vernal grass	<i>Anthoxanthum odoratum</i>
	Thyme-leaved speedwell	<i>Veronica serpyllifolia</i>
	White clover	<i>Trifolium repens</i>

	Yorkshire fog	<i>Holcus lanatus</i>
Hedgerows	Blackthorn	<i>Prunus spinosa</i>
	Bramble	<i>Rubus fruticosus agg.</i>
	Cleavers	<i>Galium aparine</i>
	Cow parsley	<i>Anthriscus sylvestris</i>
	Dog rose	<i>Rosa canina</i>
	Gorse	<i>Ulex sp.</i>
	Hawthorn	<i>Crataegus monogyna</i>
	Hazel	<i>Coryllus avallena</i>
	Pedunculate oak	<i>Quercus robur</i>
Scattered broadleaved trees/tall ruderal	Ash	<i>Fraxinus excelsior</i>
	Blackthorn	<i>Prunus spinosa</i>
	Bramble	<i>Rubus fruticosus agg.</i>
	Broad-leaved dock	<i>Rumex obtusifolius</i>
	Cleavers	<i>Galium aparine</i>
	Cleavers	<i>Galium aparine</i>
	Cock's-foot	<i>Dactylis glomerata</i>
	Common nettle	<i>Urtica dioica</i>
	Cow parsley	<i>Anthriscus sylvestris</i>
	Creeping soft grass	<i>Holcus mollis</i>
	Dog rose	<i>Rosa canina</i>
	Elder	<i>Sambucus nigra</i>
	English elm	<i>Ulmus minor</i>
	Grey willow	<i>Salix cinerea</i>
	Hawthorn	<i>Crataegus monogyna</i>
	Honeysuckle	<i>Lonicera periclymenum</i>
	Meadow foxtail	<i>Alopecurus pratensis</i>
	Pedunculate oak	<i>Quercus robur</i>
	Perennial rye-grass	<i>Lolium perenne</i>
	Sweet vernal grass	<i>Anthoxanthum odoratum</i>
	Umbellifer sp.	<i>Apiaceae</i>