PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

ECOLOGICAL REPORTS

2012 – 2016 including all updates

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ECOLOGICAL SURVEY REPORT

FEBRUARY 2016 UPDATE

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CONTENTS:

1.0 INTRODUCTION

REASONS FOR SURVEY

1.1 Appletons have been commissioned to undertake an updated survey and evaluation of land at Peel Hall, Warrington. The survey follows a comprehensive study undertaken in 2013, which was re-evaluated to determine if any of the surveys required updating in 2015.

SURVEY OBJECTIVES AND RE-EVALUATION OF EXISTING DATA

1.2 As stated above the 2013 study was re-evaluated to identify where surveys needed to be updated or repeated. The evaluation revealed the following information.

- The Phase 1 Habitat Survey - updated evaluation required.
- Breeding bird survey - updated evaluation required.
- Great crested newt survey - updated evaluation required.
- Badger survey - updated survey required.
- Water vole - updated survey required.
- Ecological data search - new search required.

A bat survey has been undertaken as part of this study, the findings are presented in a separate bat survey report. The basic objective of the survey is to obtain information on sensitive wildlife habitats or species that may be affected by the development of the site. To achieve this objective the survey will identify/implement any of the following:

- The presence of any statutory wildlife sites.(SSSI/LNR etc)
- The presence of any non-statutory sites. (SBIs)
- The presence/potential presence of species with statutory protection.
- The presence of species with non-statutory protection e.g. County Red Data Book/Section 41 Species.
- Identify any species or habitats that require special consideration during the development.

LOCATION

1.3 The survey focused on a large area of abandoned farmland and adjacent woodlands next to the M62 on the north-eastern edge of Warrington, Cheshire. The site is known as Peel Hall and is located immediately west of Houghton Green.

CONSTRAINTS

Vegetation

1.4 The site was surveyed in June 2013 an optimum time to undertake vegetation surveys. There were no constraints. The habitats were re-evaluated in July 2015 when some of the grasslands had been recently cut, however there was sufficient vegetative material present to effectively re-evaluate the habitats without constraint.

Birds

1.5 The bird survey was undertaken on 21st June and 7th July 2013, which is at the end of the survey season. However birds that have bred on site earlier in the season would still expected to be resident and a moderate constraint to survey applied.

Badger

1.6 The badger survey was undertaken in August 2015 which is an optimum time to search for signs of badger above ground therefore no constraints applied. However, locally dense vegetation prevented effective searches for badger setts in specific areas. Given the absence of any badger activity elsewhere on the site the constraint here is considered to be minor-moderate.

Water Vole

1.7 The water vole survey was undertaken on the 13th and 14th August 2015 an optimum time for water vole survey, however major constraints to survey applied to the whole of Spa Brook, where dense bankside and in-channel vegetation prevented visual access.

1.8 No constraints applied to the ponds.

2.0 SURVEY RESULTS

DESK BASED STUDY

2.1 A request for ecological data from RECORD the Biodiversity Information System for Cheshire, Halton, Warrington and Wirral was submitted in August 2015. The extent of the data search area was based on the area of red overlay (the site) as shown on Fig. 1 below. The search was also extended to include all areas within 500m of the site.

Fig. 1 The Site.

Results of Data Search:

2.1 The data search returned an extensive list of species from the search area specified. However, out of all the species records returned, a total of three species were attributable to the site. Another seventeen species records related to the 1km square SJ6191 which covers most of the site but also includes extensive areas of land outside of the site boundary.

2.2 The species records returned from the study are listed on Table 1 below.

Table 1: Data Search Species Records:				
Species:	**Grid Ref:**	**Year:**	**Source:**	**Designation:**
Kestrel	SJ615918	2011	RECORD	
Kestrel	SJ61639189	2013	RECORD	
Kestrel	SJ6191	2014	RECORD	
Lapwing	SJ61729199	2011	RECORD	Section 41 NERC Act
Lesser black-backed gull	SJ6191	2014	RECORD	
Meadow pipit	SJ6191	2014	RECORD	
Dunnock	SJ6191	2014	RECORD	Section 41 NERC Act
Mistle thrush	SJ6191	2014	RECORD	
House sparrow	SJ6191	2014	RECORD	Section 41 NERC Act
Bullfinch	SJ6191	2014	RECORD	
Corn bunting	SJ6191	2014	RECORD	Section 41 NERC Act
Crane	SJ6191	2012	RECORD	
Starling	SJ6191	2014	RECORD	Section 41 NERC Act
Swallow	SJ6191	2014	RECORD	
Swift	SJ6191	2014	RECORD	
Skylark	SJ6191	2014	RECORD	Section 41 NERC Act
Whitethroat	SJ6191	2014	RECORD	
Song thrush	SJ6191	2014	RECORD	Section 41 NERC Act
Willow warbler	SJ6191	2014	RECORD	
Hedgehog	SJ6191	2012	NBN	Section 41 NERC Act

2.3 Several records of water vole were returned, however these were at considerable distance from the site boundary and the species would be unable to travel from those sites to the Peel Hall site due to major barrier effects.

Evaluation of Data

2.4 Most of the species recorded are common throughout the county and beyond, however the record of crane is incidental and of a transitory rather than resident bird.

The following designations apply.

Section 41 Species (NERC Act):

Lapwing
Dunnock
House sparrow
Corn bunting
Starling
Skylark
Song thrush
Hedgehog

Wildlife & Countryside Act 1981 (as amended):

All bird species are offered varying levels of protection under the Wildlife & Countryside Act.

Hedgehog is listed under Schedule 6 of the Act in England

EXTENDED PHASE ONE HABITAT SURVEY:

Methodology

2.5 The survey has been adapted from the standard Phase 1 Habitat Survey methodology, the aim of this survey is to record all habitats that occur on the site together with a full list of higher plant species that occur within each habitat. Each plant recorded is given an abundance score i.e. Dominant, Abundant, Frequent, Occasional or Rare. **These values can be prefixed by Very or Locally, to provide more subtle biogeographical data.** Full species lists and abundance scores are given in the form of Target Note descriptions. Detailed habitat maps have been produced and should be used in conjunction with the Target Notes. The maps are included as an appendix (See Maps 1a and 1b).

Nomenclature follows *Stace. C.* New Flora of the British Isles 2nd Edition.

The general description below provides and updated broad profile of the vegetative characteristics of the site. The Target Notes provided are largely unchanged since 2013 except where notable changes were recognised during the 2015 survey.

General Description

2.6 The study area is approximately 64ha in extent and is composed of large abandoned improved/arable fields sub-divided by ditches and largely fragmented hedgerows. Other habitats present include a small stand of mature broad-leaved plantation woodland and several small ponds. Substantial linear stands of immature broad-leaved plantation woodland occur on the

southern boundary of the site. The open fields have been ploughed and left to grow rank and are now composed of a mixture of coarse grasses and tall ruderal herbs. The lack of management is also allowing scrub saplings to establish here and in certain areas the cessation of management has also allowed the development of dry stands of common reed to occur. In areas outside of the normal cultivation zone, complex/dense mosaics of coarse grassland, tall ruderal herb and scrub of varying maturity and density occur. Reference to online aerial images indicate that non-agricultural habitats were present in 2009. The presence of regenerating scrub and semi-improved poor grasslands reflect the past status of these areas prior to clearance. In contrast to the rest of the site, the easternmost part of the site includes a recreational area with playing fields and formal footpaths. This area has been landscaped by the provision of immature broad-leaved woodland and stands of broad-leaved shrubs. The northern boundary is largely formed by the M62 while to the south, west and east the land is predominantly residential housing, the exception being Radley Wood and the grounds and houses at the end of Radley Lane. The survey in August 2015 revealed that most of the open grassland area had been recently mown. However examination of the cut stems indicates that the grassland had been uncut since before the survey in 2013. This is due to the high levels of rankness in the sward and the localised predominance of tall ruderal herb and colonising scrub saplings. The grasslands were visually assessed at several points across the site, and it can be reasonably determined that significantly higher levels of rankness prevail on site since the survey in 2013. There is a clear natural successional trend towards the development of tall ruderal herb and scrub communities generated by a lack of regular management on the site. In addition there is a likelihood that the stands of common reed might have increased, however as the site had been cut this was very difficult to determine from the remaining vegetation. A series of photographs showing the general characteristics of the habitats on the site are provided in Appendix 2.

Phase 1 Target Notes

KEY NOTES FOR ABUNDANCE

D = DOMINANT
A = ABUNDANT
F = FREQUENT
O = OCCASIONAL
R = RARE

These values can be prefixed by V (Very) or (L) Locally, to provide more subtle biogeographical data.

Target Note 1:

2.7 An area of semi-improved poor grassland within a mosaic of habitats indicative of the early stages of seral succession including coarse improved grassland, tall ruderal herb, dense/scattered scrub, bracken and a dry stand of common reed. The semi-improved grassland has a short grass-dominated sward and low floristic diversity. Seral succession towards tall ruderal herb ongoing in 2015.

Species	Abundance
Yorkshire-fog	D
Creeping bent	LD
Smooth meadow-grass	LD
Red clover	VLD
Red fescue	A
False oat-grass	F
Field horsetail	LF
Meadow vetchling	VLF
Hoary willowherb	VLF
Bitter vetchling	O
Soft-rush	O
Compact rush	O
White clover	O
Ribwort plantain	O
Rosebay willowherb	VO
Ash (sapling)	VO

Target Note 2:

2.8 A small area of tall/coarse improved grassland within the same mosaic of habitats described above. Seral succession was ongoing in 2015.

Species	Abundance
False oat-grass	D
Yorkshire-fog	D
Common reed	VLD
Common ragwort	A
Cock's-foot	LA
Great willowherb	F
Dandelion agg.	F
Compact rush	O
Curled dock	O
Tall fescue	R

Target Note 3:

2.9 An extensive field that has been disturbed by ploughing and subsequently abandoned from further management. The field is an improved grassland that has grown coarse and stands of scrub, tall ruderal herb and common reed are encroaching the field from the margins.

Numerous scattered grey willow saplings are also becoming established. Seral succession was ongoing in 2015, although more regular management appears to be applied at the westernmost end of this field.

Species	Abundance
False oat-grass	D
Yorkshire-fog	D
Perennial rye-grass	A
Dandelion agg.	A
Oilseed rape	LA
Field horsetail	LA
Cock's-foot	LA
Creeping thistle	F
Common orache	F
Curled dock	F
Rough meadow-grass	F
Mayweed sp.	F
Field speedwell	F
Grey willow (sapling)	VLF

Target Note 4:

2.10 This is a boundary feature comprising a short section of double hedgerow dominated by hawthorn dense stands of bramble scrub and a linear dry reed bed. These habitats occur either side of the dry section of ditch. No obvious change in 2015.

Target Note 5:

2.11 A small patch of relic semi-improved grassland adjacent to the northern boundary of the site that is possibly indicative of an earlier grassland habitat prior to improvement.

Species	Abundance
Yorkshire-fog	D
Creeping buttercup	A
Rough meadow-grass	A
Meadow vetchling	LA
Creeping bent	LA
Ribwort plantain	F
Silverweed	F
Common fleabane	LF
Southern marsh-orchid	O
Hogweed	O
Compact rush	

Target Note 6:

2.12 A linear boundary feature that comprises an extensive narrow stand of common reed and small stands of dense scrub. These habitats enclose what appears to be a very locally wet ditch.
No obvious change in 2015.

Target Note 7:

2.13 A field depression that contains a dense stand of reed canary-grass surrounding a small stand of bulrush. Occasional grey willow are also present. The feature was dry at the time of survey but the area is subject to ephemeral flooding.
No obvious change in 2015.

Target Note 8:

2.14 An extensive linear stand of common reed adjacent to the western boundary of the site.
Some clearance works have occurred along the length of this boundary in 2015.

Target Note 9:

2.15 A complex impenetrable mosaic of common reed and dense/scattered grey willow, bramble and hawthorn scrub. Numerous immature/semi-mature trees also occur and include ash, pedunculate oak, sycamore, silver birch and cherry sp. Other species include false oat-grass, hogweed, red clover, hairy sedge, common nettle, mugwort, cleavers, common ragwort and Yorkshire-fog.
No obvious change in 2015.

Target Note 10:

2.16 A linear stand of mature grey and goat willow scrub adjacent to the northern section of Spa Brook. Occasional pedunculate oak and hawthorn also occur. The field layer is dominated by common nettle with abundant bramble, frequent red campion and cow parsley and occasional male-fern.
No obvious change in 2015.

Target Note 11:

2.17 The northernmost section of Spa Brook that contains very slow running water with a localised surface cover of common duckweed. The bankings are coarse and dominated by a mixture of reed canary-grass and false oat-grass. Other species recorded include abundant rough meadow-grass, frequent hogweed and Yorkshire-fog, and occasional wild angelica, red campion, soft-rush, rosebay willowherb and bramble.

Significantly more overgrown in 2015 than in 2013, with the stream banks now very coarse and open water substantially reduced.

Target Note 12:

2.18 A middle section of Spa Brook where the channel choked by locally dominant stands of bulrush and reed canary grass. Brooklime is occasional. The banks are composed of coarse vegetation dominated by false oat-grass and bramble with abundant common nettle and great willowherb and locally frequent tufted vetch. The channel on this section appears to be largely dry/seasonally wet.

No obvious change in 2015 other than seral succession towards scrub. Channel appears totally dry.

Target Note 13:

2.19 The southernmost section the Spa Brook where the channel is dry/seasonally wet and choked by a mixture of reed canary-grass and common reed which has also colonised the edge of an adjacent field. Great willowherb is also locally abundant in the channel. Bankside vegetation is composed of coarse false oat-grass dominated communities with abundant common nettle and great willowherb, locally frequent meadow vetchling, cow parsley and hogweed. Scrub is developing along the reach and includes locally abundant bramble, locally frequent grey willow and dog rose, and occasional hawthorn.

No obvious change in 2015 other than seral succession towards scrub. Channel appears totally dry.

Target Note 14:

2.20 A collective target note that covers several arable fields with shared vegetative characteristics. The fields area coarsely vegetated, abandoned and have been ploughed which has given rise to a species-poor improved grassland community. Succession towards tall ruderal herb communities is present locally as are stands of common reed which are colonising the area predominantly from former boundaries. Grey willow saplings are locally frequent and a defunct hedgerows composed of grey willow is present.

The fields were partially cut in 2015 and there is a noticeable increase in rankness indicated by tall ruderal herb species.

Species	**Abundance**
Yorkshire-fog	D
Common reed	VLD
Timothy	A
Meadow foxtail	LA

Rough meadow-grass	LA
False oat-grass	LA
Creeping bent	LA
Rosebay willowherb	LA
Silverweed	LA
Creeping buttercup	LA
Ribwort plantain	VLA
White clover	VLA
Tall fescue	LF
Creeping thistle	LF
Common ragwort	LF
Curled dock	LF
Grey willow (saplings)	LF
Oilseed rape	O
Cow parsley	O
Hogweed	O
Common fleabane	O
Cut-leaved crane's-bill	O
Hairy tare	O

Target Note 15:

2.21 A defunct hedge adjacent to a dry ditch containing very occasional bulrush. The hedgerow is dominated by overgrown hawthorn with occasional elder, while a mixture of common nettle and false oat-grass form the ground flora. The hedgerow gives way to a line of scattered grey and crack willow to the east before reforming as a hedgerow of osier, grey willow and goat willow.

No obvious change in 2015.

Target Note 16:

2.22 An extensive area of open abandoned improved grassland that has been disturbed through ploughing. The grassland is rank and supports a range of grasses and common tall herbs as well as species associated with ground disturbance and lack of management. In addition there are several large piles of brash in this area that indicate that substantial stands of scrub have been cleared from the area. The brash piles have now succeeded to stands of tall ruderal herb and/or regenerated as willow/bramble scrub. The species list below is for the grassland areas only not the scrub or tall herb communities.

The fields were partially cut in 2015 and there is a very noticeable increase in rankness indicated by tall ruderal herb species.

Species	**Abundance**
False oat-grass	D
Yorkshire-fog	D
Pale persicaria	VLD
Creeping thistle	VLD
Oilseed rape	VLD
Common reed	VLD
Rough meadow-grass	A

Redshank	A
Common hemp-nettle	A
White clover	LA
Curled dock	LA
Perennial rye-grass	VLA
Spear thistle	VLA
Soft-rush	VLA
Rosebay willowherb	VLA
Common nettle	VLA
Prickly sow-thistle	VLA
Creeping buttercup	VLA
Ribwort plantain	VLA
Common bent	F
Mugwort	LF
Hogweed	LF
Creeping bent	VLF
Cow parsley	O
Cut-leaved crane's-bill	O
Hairy tare	O
Common fleabane	VO

Target Note 17:

2.23 A substantial block of uniform immature broad-leaved plantation woodland on the southern boundary of the site. The canopy is dominated by a mixture of goat willow and silver birch with locally abundant hawthorn. The understorey is largely dominated by bramble with locally frequent hawthorn, rowan, ash, pedunculate oak, as and cherry sp. Dog rose is occasional. The ground flora is poor and dominated by common nettle with abundant wood meadow-grass and locally abundant wood avens.

A several giant hogweed plants were recorded at the western end of this woodland in 2015, their approximate location is shown on the Phase 1 habitat map.

Target Note 18:

2.24 A dense impenetrable mosaic of tall ruderal herb, dense/scattered scrub and trees and an extensive stand of common reed that extends along the western edge of Radley Plantation. Common nettle is the dominant tall herb with abundant large bindweed. The scrub is largely composed of dense bramble with more scattered hawthorn, dog rose, blackthorn and grey willow. Several scattered silver birch, small ash, cherry and apple species also occur. An open glade of semi-improved grassland occurs at the eastern end and is described in Target Note 19. This area have become more overgrown since the 2013 survey, otherwise no obvious change in 2015.

Target Note 19:

2.25 A small glade of semi-improved poor grassland that is being progressively colonised by encroaching scrub. No access possible in 2015 due to dense scrub, grassland probably lost to natural succession.

Species	Abundance
Yorkshire-fog	D
Common bent	D
Cock's-foot	A
Common ragwort	A
White clover	A
Common couch	F
Field horsetail	F
Creeping buttercup	LF
Male-fern	O
Compact rush	O
Great willowherb	O
Mugwort	O
Cat's-ear	R
Lily (exotic)	R

Target Note 20:

2.26 A mature broad-leaved plantation woodland dominated by sycamore. The woodland has a well developed and diverse understorey that has probably been supplemented by additional planting, however the woodland is experiencing negative pressures from vandalism including camp fires and tree damage. A typical ground flora is present and includes bluebell sp, although a lack of vegetative material prevented identification to species level.

No obvious change in 2015.

Species	Abundance
<u>Canopy:</u>	
Sycamore	D
Ash	LF
Pedunculate oak	O
Horse chestnut	VO
Lime	VO
Downy birch	VO

Understorey:	
Beech	A
Hazel	LA
Lime	F
Elder	F
Hawthorn	F
Ash	F
Rowan	LF
Wild cherry	O
Yew	R
Holly	R

Ground flora:	
Ivy	VLD
Bistort	VLD
Red campion	LA
Bluebell sp.	VLA
Common nettle	VLF
Male-fern	O

Target Note 21:

2.27 An open area of improved grassland forming a small glade between stands of scrub and woodland. The grassland is composed of a typical tall false oat-grass community in transition to bramble scrub.

The transition to scrub described in 2013 was advanced in 2015.

Species	**Abundance**
False oat-grass	D
Yorkshire-fog	LD
Rosebay willowherb	VLD
Hogweed	A
Great willowherb	A
Hedge woundwort	A
Rough meadow-grass	A
Creeping thistle	A
Reed canary-grass	A
Creeping buttercup	F
Cow parsley	F
Red campion	LF
Marsh-orchid (hybrid)	VO

Target Note 22:

2.28 A linear stand of semi-mature planted woodland dominated by sycamore with a sparse understorey of occasional elder and cherry sp. The ground flora is poor and dominated by common nettle with occasional male-fern and very occasional garden Solomon's-seal. The remains of a demolished pre-fabricated building are present here.

No obvious change in 2015.

Target Note 23:

2.29 A small glade of improved grassland undergoing succession to tall ruderal herb on the site of a former building. The grassland is dominated by Yorkshire-fog with locally abundant rosebay willowherb, frequent common bent, common ragwort and common nettle. Red campion, male-fern, prickly sow thistle and cat's-ear are occasional.

The successional trend described in 2013 prevails in 2015.

Target Note 24:

2.30 A complex and inseparable mosaic of dense scrub and tall ruderal herb containing numerous scattered juvenile trees and shrubs including ash, sycamore, elder and willow sp. This is a rosebay willowherb tall herb habitat in the advanced stages of transition to a bramble scrub community.

The successional trend described in 2013 prevails in 2015.

Target Note 25:

2.31 A tall overgrown hedgerow dominated by hawthorn with locally frequent grey willow, goat willow and mature sycamore.

No obvious change in 2015.

Target Note 26:

2.32 A small disturbed improved field disturbed by ploughing.

No obvious change in 2015.

Species	Abundance
Yorkshire-fog	D
Groundsel	A
Common bent	A
Ribwort plantain	A
False oat-grass	LA
Mayweed sp.	LA
Corn spurrey	LA
Creeping buttercup	VLA
Curled dock	F
Red dead-nettle	LF
Hogweed	O
Common ragwort	O
Oilseed rape	O

Target Note 27:

2.33 This is a small linear pond located on the edge of an abandoned arable field. The pond is heavily shaded by immature willow scrub and stands of bulrush are established on the margin and in its centre. Common duckweed covers most of the pond's surface.

In 2015 the pond was entirely shaded by willow scrub and there was no longer any emergent vegetation. Pond undergoing natural succession.

Target Note 28:

2.34 An extensive and complex mosaic of semi-improved poor grassland and scattered grey willow scrub of varying density. Stands of reed canary-grass also occur in this area that are very localised. The ground has been heavily disturbed in the past and the vegetation currently present appears to be the result of the partial regeneration of a pre-existing non-agricultural habitat, albeit in a 'modified' form. There is impeded drainage locally.

The field was partially cut in 2015 and there is a very noticeable increase in rankness indicated by tall ruderal herb species.

Species	Abundance
Yorkshire-fog	LD
Grey willow	VLD-A
Reed canary-grass	VLD
Creeping buttercup	A
Compact rush	LA
Soft-rush	LA
Bramble	LA
Great willowherb	VLA
Common fleabane	VLA
Toad rush	VLA
Ribwort plantain	F
Common ragwort	F
Hogweed	F
Silverweed	LF

Mayweed sp.	LF
Marsh thistle	LF
Creeping bent	LF
Hairy tare	VLF
Selfheal	VLF
Red campion	VLF
Alder (saplings)	VLF
Marsh willowherb	O

Target Note 29:

2.35 A seasonally wet shaded ditch with locally abundant stands of soft-rush and great willowherb. Bulrush is locally frequent. The ditch was dry during the survey.

No obvious change in 2015.

Target Note 30:

2.36 A heavily disturbed improved grassland dominated by a mixture of common grasses and containing locally dominant stands of common nettle and scattered willow scrub.

The fields were partially cut in 2015 and there is a very noticeable increase in rankness indicated by tall ruderal herb species.

Species	**Abundance**
Yorkshire-fog	D
False oat-grass	D
Common nettle	VLD
Rough meadow-grass	A
Curled dock	LA
Broad-leaved dock	LA
Prickly sow-thistle	VLA
White clover	VLA
Common bent	F
Hogweed	F
Bramble	LF
Common couch	LF
Grey willow	VLF
Marsh foxtail	VLF
Creeping bent	VLF
Silverweed	VLF
Creeping thistle	O

Target Note 31:

2.37 A heavily-shaded and very shallow pond surrounded by alder and dense stands of grey willow and bramble scrub. Aquatic vegetation is absent and marginal species are restricted to locally frequent bittersweet and occasional common water-plantain, soft-rush, remote sedge, creeping buttercup and Indian balsam.

This pond was entirely dry in 2015.

Target Note 32:

2.38 A seasonally wet pond that was completely dry at the time of survey. Reed canary-grass dominates the area with very locally dominant creeping bent and locally abundant common bent. Bulrush and redshank are occasional and a few grey willow are beginning to colonise.

The area was very dry in 2015 with no evidence of seasonal inundation.

Target Note 33:

2.39 An extensive area of disturbed but arable land that has been classified as a regenerated improved grassland. The sward is coarse although a few meadow herbs occur but generally at low frequency.

The field was partially cut in 2015 and there is a very noticeable increase in rankness indicated by tall ruderal herb species.

Species	**Abundance**
Yorkshire-fog	D
Oilseed rape	VLD
Mayweed sp.	VLD
False oat-grass	A
Creeping thistle	A
White clover	A
Filed horsetail	A
Creeping buttercup	LA
Wild radish	LA
Common bent	LA
Common ragwort	LA
Silverweed	LA
Common sorrel	VLA
Corn spurrey	VLA
Rosebay willowherb	VLA
Curled dock	VLA
Creeping bent	VLA
Rough meadow-grass	F
Hairy tare	LF
Cock’s-foot	LF
Smooth hawk’s-beard	VLF
Jointed rush	VLF
Common fleabane	VLF
Compact rush	VLF
Common hemp-nettle	VLF
Soft-rush	O
Hard rush	O
Common figwort	VO
Greater bird’s-foot-trefoil	VO
Selfheal	VO

Target Note 334:

2.40 A semi-shaded pond that lies partially within the site on the southern boundary. The pond has a virtually complete surface cover of fringed water-lily, common duckweed and ivy-leaved duckweed. Outside of the site emergent bulrush and branched bur-reed are localised. The pond has a well developed marginal/emergent flora including creeping bent, floating sweet-grass, yellow iris, soft-rush and creeping buttercup. Great willowherb and Indian balsam are present on the banks and in the marginal zone. The pond has a population of coarse fish.

The 2015 reported no obvious change since 2013 except for a possibly increase in emergent vegetation and silting.

Target Note 35:

2.41 An immature broad-leaved plantation woodland co-dominated by even-aged spindly alder and goat willow. The woodland has a developing understorey and poor ground flora. Dense vegetation prevented access to parts of the woodland.

No obvious change in 2015.

Species	**Abundance**
<u>Canopy:</u>	
Alder	LD
Goat willow	LD
Grey willow	A
<u>Understorey:</u>	
Hawthorn	LA
Grey willow	LA
Sycamore	LF
Oak sp.	O
<u>Ground flora:</u>	
Common nettle	A
Hogweed	A
Wood meadow-grass	A

Target Note 36:

2.42 A roadside verge composed of mixed tall ruderal herb, tall grasses and dense/scattered scrub adjacent to a dry ditch. The habitat's small size and micro-variation prevented accurate mapping of this area. Species recorded include bramble, great willowherb, hogweed, false oat-grass, common nettle, hedge bindweed, Yorkshire-fog, cock's-foot and rosebay willowherb. The opposite verge has a similar tall herb/grassland mixture but also has male-fern and extensive dominant stands of bracken. Again the habitats are too small and complex to accurately map.

No obvious change in 2015.

Target Note 37:

2.43 A semi-mature 'amenity' broad-leaved plantation woodland on the northern boundary of a recreation ground/playing field. The woodland is co-dominated by ash and silver birch and there is a well developed mixed (planted) understorey of common broad-leaved trees and shrubs. There is no significant ground flora.

No obvious change in 2015.

Species	**Abundance**
Canopy:	
Ash	LD
Silver birch	LD
Understorey:	
Blackthorn	LD
Dogwood	A
Dog rose sp.	A
Hazel	A
Hawthorn	F
Elder	LF
Guelder rose	LF
Rowan	LF
Grey willow	LF
Bramble	LF
Oak sp.	O
Buckthorn	O
Osier	O
Ground flora:	
Ivy	LA

Target Note 38:

2.44 An immature 'amenity' broad-leaved plantation woodland on the southern edge of a recreation ground/playing field. The woodland is locally dominated by silver birch and structurally resembles a scrub community except the species cannot be classified as scrub under the Phase 1 classification due to the species present. There is no significant ground flora. Due to the range of species and homogenous structure of the woodland there has been no attempt to separate canopy and understorey features.

No obvious change in 2015.

Species	**Abundance**
Silver birch	LD
Blackthorn	VLD
Hazel	VLA
Dogwood	VLA

Cherry sp.	VLA
Ash	VLF
Dog rose sp.	VLF
Hawthorn	VLF
Holly	VLF
Elder	VLF
Guelder rose	O
Rowan	O
Sycamore	O
Field maple	VO
Ground flora:	
Common nettle	LA

Target Note 39:

2.44 A mixed stand of 'amenity' planted woodland composed of guelder rose, hawthorn, hazel, ash, blackthorn, grey willow, cherry sp. and dog rose sp. Honeysuckle occurs in the ground flora which is otherwise floristically poor.

Target Note 40:

2.45 A stand of planted dense scrub dominated by a mixture of hawthorn and blackthorn with very locally frequent dog rose. Several silver birch and semi-mature poplar and white willow also occur.

No obvious change in 2015.

Target Note 41:

2.46 An extensive arable field that has been ploughed but left fallow. Subsequently short ephemeral communities are beginning to establish and the field has an abandoned appearance. Several large piles of brash accompanied by stands of tall ruderal herb also occur in this field. Blackthorn 'suckers' are encroaching from the north-west motorway boundary, and small patches of scattered hawthorn and bramble occur very occasionally on the other site boundaries.

2.47 A re-check of this part of the site in 2016 confirms that the area is now a tall, coarse grassland, with a high frequency of tall ruderal herb, particularly dock species.

Species	**Abundance**
Wavy bitter-cress	LA
Wild radish	LA
Mayweed sp.	LA
Ribwort plantain	LA
Yorkshire-fog	LA
Groundsel	LA
Meadow-grass spp.	LA

Dock spp.	LA
Willowherb sp.	LA
Rosebay willowherb	VLA
Common nettle	VLA
Blackthorn	VLF

Target Note 42:

2.48 A small, linear marshy area on the south-west boundary of the site. The area is dominated by rushes, and bramble, silver birch saplings and willow sp. have also colonised. An unidentified species of the Composite family was locally abundant here. There was little vegetative material available to definitively identify this species, however the species is considered most likely to be common fleabane.

Species	**Abundance**
Soft-rush	D
Rosebay willowherb	LD
Bramble	LD
Moss sp. (not Sphagnum)	A
Great willowherb	A
Common fleabane?	A
Willow sp.	LA
Common nettle	LF
Yellow iris	LF
Creeping buttercup	LF
Reed canary-grass	O
Silver birch	O

Target Note 43:

2.49 A hedgerow forming the boundary with Mill Lane. The hedge is not stock proof and is dominated by hawthorn. A single elder is growing in the field adjacent to this feature. The ground flora is poor and composed of patches of common nettle and garlic mustard. A narrow swathe of uncultivated land dominated by coarse grasses and bramble occurs on the field-side adjacent to this hedge.

Target Note 44:

2.50 An expansive area of amenity grassland composed of a mixture of perennial rye-grass, red fescue, meadow-grass sp. and creeping buttercup.

Target Note 45:

2.51 The habitats in the area surrounding the club house are composed of a coarse mix of neglected improved grassland, small patches of amenity grassland and areas of dense bramble/hawthorn scrub with scattered semi-mature oak trees.

Target Note 46:

2.52 A linear strip of coarse improved grassland dominated by cocks-foot, Yorkshire-fog and common couch. The area is punctuated by dense/scattered secondary stands of blackthorn and bramble and occasional stands of common nettle. Immature ash and birch species have also been planted here. Occasional juvenile oak occur here which might also have been planted or are possibly self-seeded.

Target Note 47:

2.53 An immature hedgerow (approx. <30 years) has been planted along the edge of the boundary stream. Hawthorn is dominant throughout and immature ash are occasional. There is no significant ground flora due to the dominance of coarse species.

Target Note 48:

2.54 A shallow stream on the northern boundary of the site. The stream is impounded slightly due to leaf litter and rubbish and is approximately 1.2m wide by 5-20cm deep. The stream is largely devoid of vegetation due to heavy shade cast by adjacent trees and shrubs, consequently fool's water-cress is only very locally abundant.

Target Note 49:

2.55 An immature broad-leaved plantation woodland with a canopy composed of a mixture of species including silver birch, oak sp., field maple and poplar sp. The understorey includes hawthorn and dog rose and the ground flora ivy and cow parsley.
The woodland is approximately 15-20 years old.

Target Note 50:

2.56 A stand of Japanese knotweed.

Target Note 51:

2.57 A formal area fenced from the surrounding field and composed of a small children's playground, ball court and a community centre building with associated areas of hard-standing. Areas of amenity grassland occur with formally planted stands of introduced shrubs and several immature-mature trees including ash, London plane, hornbeam, oak and whitebeam species.

HEDGEROW REGULATIONS SURVEY

Survey Details and Results

2.58 The hedgerows on the site were surveyed using The Hedgerow Regulations (1997) methodology. The full survey methodology is explained at length in document *The Hedgerow Regulations 1997 – A Guide to the Law and Good Practice (Department of the Environment, Transport and the Regions),* further information is provided in the 1997 Act No. 1160 The Hedgerow Regulations 1997, Schedules 1 - 3. The survey data presented here only relates to the Wildlife and Landscape criteria as detailed in (Part II Criteria of Schedule 1) of the above act.

2.59 All of the native hedgerows, excluding those defining the boundaries of adjacent domestic properties were surveyed. It should be noted that there are certain features on the site that appear to be hedgerows, in that they are linear stands of immature willow species that may or may not mark the line of a former field boundaries. However based on field survey, these features are not hedgerows in the traditional sense and are therefore not included in this study, although some are mapped as hedgerows on the Phase 1 habitat maps.

2.60 Five hedgerows in total were subject to survey, each are briefly described below. Whilst the hedgerows were examined during the Phase 1 Survey, most were not target-noted due to their innate lack of 'quality'. The locations of the hedgerows surveyed are shown on the Phase 1 Habitat Maps in Appendix 1. In addition, photographs showing the general conditions in each hedgerow are provided in Appendix 2.

Hedgerow 1:

2.61 A hawthorn dominated hedge on the eastern side of Radley Lane that is defunct and species poor.

Hedgerow 2:

2.62 A defunct/gappy and species-poor hawthorn-dominated hedge south-east of Peel Hall Kennels. The hedge has an associated ditch.

Hedgerow 3:

2.63 An overgrown and highly fragmented hedgerow on the western boundary of woodland south of the kennels. The hedgerow is species-poor and has an associated ditch. (See Target Note 25)

Hedgerow 4:

2.64 The Phase 1 recorded this as two separate defunct hedgerows at opposing ends of a field ditch boundary. However for Hedgerow Survey purposes the whole feature is treated as a single hedgerow. (See Target Note 15)

2.65 It should be noted that surveying each opposing portion of the hedge individually doesn't significantly affect the results of the survey.

Hedgerow 5:

2.66 This is a defunct species-poor hedgerow with an associated ditch. A very short (<10m) opposing hedge composed entirely of hawthorn occurs next to it which was not surveyed as it was obvious that it could not qualify as important in respect of the Regulations. (See Target Note 4)

2.67 The findings of the survey are presented on the standard hedgerow survey forms below.

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 1	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 100m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 1

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Hawthorn, holly, hazel.

Average Woody Sp. = 3

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: N/A

Other species recorded; Common nettle, cleavers, bramble, red campion, cow parsley.

Total Woodland Ground Flora Species = 0

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	0
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	0
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	2m
Bank or Wall ≥ ½ Length		N	Average Width:	1.2m
Ditch ≥ ½ Length		N	Laid (Past or recent):	Yes (past)
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	70%
Adjacent to significant ROW	Y		Additional Fencing:	No

OTHER COMMENTS:

Very poor hedgerow in woody and floristic composition. Poor structure and adjacent to gardens locally.

It should be noted that only a small section of this hedge forms a boundary with the site. The whole hedge was surveyed to comply with the methodology.

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 2	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:**140m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 2

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Hawthorn, elder, ash.

Sample 1: Hawthorn.

			Average Woody Sp. = 2
0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Male-fern, Hart's-tongue.

Other species recorded: Creeping soft-grass, red campion, ivy.

Total Woodland Ground Flora Species = 2

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	0
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	2
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	4m
Bank or Wall ≥ ½ Length		N	Average Width:	1.5m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	70%
Adjacent to significant ROW		N	Additional Fencing:	Yes

OTHER COMMENTS:

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 3	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 136m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 2

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Hawthorn, (sycamore), goat willow.

Sample 2: Hawthorn, goat willow.

Average Woody Sp. = 2

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler-fern.

Other species recorded: Common nettle, red campion.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	6m
Bank or Wall ≥ ½ Length		N	Average Width:	3m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	80%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

HEDGEROW BASELINE DATA:

Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 4	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 267m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 3

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Sample 1: Osier, grey willow, goat willow

Sample 2: Crack willow, grey willow, goat willow

Sample 3: Osier, grey willow, hawthorn

Average Woody Sp. = 3

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler-fern

Other species recorded; Reed canary-grass, bramble, common nettle.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	2
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	4m
Bank or Wall ≥ ½ Length		N	Average Width:	2.5
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m		N	Gaps in Bottom (Approx %) :	90%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

HEDGEROW BASELINE DATA:			
Project: Peel Hall		**Surveyor:** I. Ryding (PENNINE *Ecological)*	**Date:** 27.8.15 & 16.02.16
Hedge No: 5	**Grid Ref (centre):** See map	**Local Authority:** Warrington	**Total Hedge Length:** 40m

WILDLIFE / LANDSCAPE:

Scheduled Protected or RDB Species: none

Woody Species (Sample/s Only):

No. of samples = 1

(Nb. Species in brackets are not included in Schedule 3 of the regulations as 'woody species')

Hawthorn, holly.

Average Woody Sp. = 2

0- 30m count all	>30 - <100m count in control 30m	100 - < 200m treat as 2x 100m	>200m treat as 3x100m

Woodland Ground Flora: Species within 1m of hedge canopy (whole hedge)

Woodland ground flora species recorded: Broad buckler fern.

Other species recorded: Ivy, bramble, common nettle, dock sp.

Total Woodland Ground Flora Species = 1

ASSOCIATED FEATURES:

Standard Trees (Whole Hedge):	**Y**	**N**	**Connections ≤ 10m: ( ) = Score**	**Score**
≤ 50m = average 1		N	Other Hedges (1 per hedge)	1
> 50 ≤ 100m = average ≥ 2		N	Broadleaved Woodland (2 per wood)	0
> 100m = average ≥ 1 per 50m		N	Pond (2 per pond)	0
Other Criteria:	**Y**	**N**	**Additional Information:**	
Total of Gaps < 10%		N	Average Height:	3.5m
Bank or Wall ≥ ½ Length		N	Average Width:	3m
Ditch ≥ ½ Length	Y		Laid (Past or recent):	No
Parallel Hedge ≤ 15m	Y		Gaps in Bottom (Approx %) :	90%
Adjacent to significant ROW		N	Additional Fencing:	No

OTHER COMMENTS:

The holly recorded in the sample is a single sapling only.

Survey Conclusions

2.68 The following section considers the hedgerow in respect of the Hedgerow Regulations 1997, the qualifying criteria for important hedgerows in respect of Schedule 1 are not included here. The five hedgerows where the survey was applied to are in poor condition, being fragmented and open in structure. To qualify, the hedgerows must have at least 4 woody species and also have several other qualifying criteria as defined by Schedule 1 of the Regulations. The hedgerows surveyed only have an average between 1 and 3 species and have few other 'qualifying' associated features.

2.69 Based on the survey undertaken, the hedgerows on the site are very poor and fail to meet the qualifying criteria for important hedgerows under the Hedgerow Regulations 1997.

BADGER SURVEY

Survey Details and Results:

2.70 The badger survey was undertaken August 2015 and employed standard techniques to establish if badgers are present on site, or use the site for foraging/commuting. See Map 2 in the appendix for extent of survey.

2.71 The following searches were undertaken.

- Searches for setts on site.
- Searches for foraging signs and pathways.
- Boundary searches for runs, pathways and latrines.

The survey results are outlined below.

Sett Search:

2.72 The survey found no setts on site and while most of the land was accessible and composed of open grassland, several small areas of dense scrub and woodland are present, which prevented an effective search of those areas due to restricted physical and visual access. Therefore whilst it can be concluded that there are no badger setts on most of the site, searches of small densely vegetated areas of the site proved inconclusive.

Search for Foraging Signs and Pathways:

2.73 The site was thoroughly searched for badger pathways or signs of foraging. No obvious sign of badger activity was found therefore it can be concluded that the species is not using this area for foraging or commuting.

Boundary Search:

2.74 All of the boundaries of the site, where accessible, were walked and examined for potential runs, pathways and latrines. The search found no evidence to suggest badger activity along any of the site boundaries. The absence of any obvious means of ingress indicates that badgers are not entering the site. The absence of latrines indicates a lack of territorial activity in the near vicinity of the site.

Survey Conclusions:

2.75 In common with the 2013 study, the survey found no evidence of historic, recent or current use of the site by badgers for foraging, commuting or occupation, and whilst it is likely that the species is absent, dense vegetation prevented a full sett search locally. This constraint is the same as that which applied during the 2013 study. Areas where sett searches were constrained are shown on Map 2 in the appendix.

WATER VOLE

Survey Details and Results:

2.76 The water vole surveys were undertaken following the methodology outlined in the *Water Vole Conservation Handbook 2nd Edition.* Strachan & Moorhouse (2006), and included examination of all ditches and ponds for the presence of burrows, feeding stations, latrines and runs. The survey was undertaken in August 2015 during the optimum period for water vole survey, however serious constraints applied to the survey of Spa Brook where dense bankside and in-channel vegetation prevented visual and physical access to the channel. No constraints to survey applied to the survey of any of the ponds. With the exception of the areas where constraints apply, the survey revealed no evidence of current or historical occupation by water vole. A description of each waterbody surveyed is provided below and the locations shown on Map 3 in the appendix. Photographs of each water body are provided in Appendix 2.

Pond 1:

2.77 This is a small linear pond located on the edge of an abandoned arable field.

The pond has degraded significantly since 2013 and is now completely shaded by immature willow scrub that has closed the canopy above the pond. The stands of bulrush previously

present have now died back, and common duckweed covers the whole of the pond's surface. In 2013 the pond was considered to be moderately suitable for water vole although the species was found to be absent. However in 2015 the conditions have deteriorated to such an extent that water vole suitability is very poor and the species was found to be absent.

Pond 2:

2.78 A heavily-shaded and very shallow pond surrounded by alder and dense stands of grey willow and bramble scrub. Aquatic vegetation is absent and marginal species are restricted to locally frequent bittersweet and occasional common water-plantain, soft-rush, creeping buttercup and Indian balsam. No evidence of water vole occupation was found and the habitats are considered poor for the species. The 2015 survey found no overall change in vegetative cover, however the pond was completely dry and appeared to have been so for some time, and no sign of water vole occupation was found. Therefore based on the conditions observed the pond is now considered incapable of sustaining a viable population of water vole.

Pond 3:

2.79 A semi-shaded pond that lies partially within the site on the southern boundary. The pond has a virtually complete surface cover of fringed water-lily, common duckweed and ivy-leaved duckweed. Outside of the site emergent bulrush and branched bur-reed are localised. The pond has a well developed marginal/emergent flora including creeping bent, floating sweet-grass, yellow iris, soft-rush and creeping buttercup. Great willowherb and Indian balsam are present on the banks and in the marginal zone. No evidence of water vole occupation was found in 2013, although the habitats are considered good for water vole. Disturbance by dogs (potential predators) could be a limiting factor. The 2015 survey revealed no significant change in the general conditions at the pond, except that its depth appears to have reduced and silt increased. No evidence of water vole occupation was found. Evidence of current disturbance by dogs was present during the 2015 survey.

Spa Brook:

2.80 The brook is approximately 500m long and the survey in 2013 revealed that the brook had only localised areas of open water in its northernmost section where very slow running water with a localised surface cover of common duckweed is present. The central and southern sections of the brook were dry/seasonally wet in 2013 and the channel choked with a dense mixture of bulrush, common reed and reed canary-grass, whilst the banks were dominated by tall coarse grasses, tall herbs and developing scrub communities. The 2015 survey revealed that conditions in the brook have deteriorated with a marked increase in emergent vegetation in areas of former open water, and a distinct reduction in the area of open water and consequent

reduction in depth. The bankside vegetation has increased significantly and all of the banks and channel throughout the reach are now overgrown. On the northernmost section, the channel is completely overgrown with bankside vegetation, however localised patches of fool's water-cress were noted occasionally. There is some shallow standing water on this section which is approximately 0.2m deep. There is no discernible flow. The bankside vegetation is dominated by a mixture of coarse grasses and tall herbs including false oat-grass, cock's-foot, reed canary-grass, great willowherb, common nettle, creeping thistle, rosebay willowherb and wild angelica. The lack of management is allowing transition to scrub communities characterised by a localised abundance of bramble with more occasional willow sp. The central and southernmost sections are in a more advanced successional stage than was observed in 2013. These sections were dry during the survey and at most are only ever seasonally wet. The channel is dominated by a complex mixture of common reed, bulrush, great willowherb and reed canary grass. The lack of water also allows easier access for predatory terrestrial mammals such as mink, foxes and stoats which readily prey on water voles. The banking are very coarse and composed of a mixture of creeping thistle, false oat-grass, common nettle and great willowherb and other common forbs including occasional meadowsweet. There is an established successional trend towards scrub here with locally high occurrence of bramble with grey willow, dog rose and hawthorn. No evidence of water vole occupation was found, although survey was very difficult and serious constraints applied to virtually the whole of the brook. In 2013 the brook was evaluated as having moderate – poor potential for water voles. However the reach surveyed is now considered to have poor - negligible potential only due a combination of the prevailing on-site conditions and lack of connectivity to areas outside of the site.

BREEDING BIRD SURVEY

Survey Details and Results

2.81 The breeding bird survey was not repeated in 2015 as the species recorded were considered representative of the type of habitats found on the site. However the site has been subject to revised evaluation in 2015 based on the changes to the site since 2013. The survey method was adapted from the British Trust for Ornithology (BTO) Common Bird Census and Breeding Bird Survey methodologies. Two visits were undertaken on the morning of 21st June and the 7th July 2013. The site was surveyed on foot with transect routes designed to allow full survey coverage of the site in order to detect all bird activity on the site.

2.82 On each visit the site was surveyed using the same predetermined transects and listening points, from which all bird activity was recorded. This information was plotted on to a site map, a separate map was produced for each of the site visits. See Map 5a and 5b in the Appendix.

Criteria to determine whether birds were breeding or not follows 'The New Atlas of Breeding Birds in Britain and Ireland: 1988-1991.

2.83 The criteria are as follows:

- Present: Birds observed, or heard, but with no evidence of breeding.
- Recorded in potential breeding habitat in the breeding season.
- Male bird singing.
- Breeding: Birds proved to be breeding and those likely to be breeding although proof was lacking.
- A bird or pair of birds apparently holding territory.
- Courtship display.
- Visiting possible nest site.
- Nest building.
- Adults agitated suggesting probably presence of nest or young.
- Used nest or shells found.
- Distraction display.
- Recently fledged young.
- Adults indicating occupied nest.
- Adults carrying food, young or faecal sac.
- Nest with eggs or young seen or heard.
- Bird sitting.

Survey Results

2.84 A brief account of each site visit detailing survey conditions and comments is provided below.

Summary of Bird Survey Visits

2.85 The following section outlines each site visit, recording time and date of survey,general weather conditions and general comments on birds recorded.

2.86 Visit 1: 21.06.2013 – 6.00am-9.30am:

Survey Conditions: Clear with low wind (2-3 mph).

Bird activity largely centred around potential passerine nesting habitats in scrub, hedgerow and woodland areas. Open grasslands have only two pairs of skylark and one meadow pipit. Woodpigeon and magpie very common and foraging in both grassland and woodland/scrub areas. Foraging hirundines also present but possibly under-recorded during the survey. Reed bunting and blackcap singing on territory in scrub/grass mosaics and single song thrush and common whitethroat nests were found. Bullfinch and kestrel also observed foraging.

2.87 Visit 2: 02.07.2013 – 6.00am-9.00am:

Survey Conditions: Clear with low wind (2-3 mph).

Skylark still present in areas previously recorded and nesting is very likely although no other supporting evidence was observed. Common songbirds present in suitable nesting habitat as before but at lower density. Continued presence of woodpigeon, magpie and hirundines as previously recorded. New species recorded include a foraging goldcrest.

Summary of Survey Results

2.88 The bird survey provided records for a number of breeding species. Tables 2 and 3 on the following pages list all birds recorded during the survey. Those found to be breeding are also indicated.

Table 2: Bird Species Recorded During the Survey:

Species	Visit 1	Visit 2	Species Accounts
Skylark	*	*	Two singing males observed on territories during both visits.
Meadow pipit	*		A singe meadow pipit foraging in suitable nesting habitat on Visit 1 only. 1 pair estimated breeding.
Blackbird	*	*	Birds observed in and around habitat mosaics particularly close to housing including the playing field, Peel Hall Farm and at the end of Birch Avenue where a nest site was found.
Song thrush	*		A single nest site was located in immature woodland next to the recreation area/playing field.
Robin	*	*	Birds singing in the woodland/scrub at Peel Hall Farm and scrub mosaic south of Radley Plantation. Likely to be breeding but nothing to indicate such other than in suitable habitat during the breeding season.
Dunnock	*		Single bird singing in scrub at Peel Hall Farm and foraging along the boundary of Radley Lane. Possibly breeding but nothing to indicate such other than in suitable habitat during the breeding season.
Wren	*	*	Birds singing in suitable habitat on all visits. Possibly breeding but nothing to indicate such other than in suitable habitat during the breeding season.
Goldcrest		*	Single foraging bird recorded on the boundary between the playing field and Radley Lane.
Blue tit	*	*	Birds, including family groups observed in and around habitat mosaics particularly close to housing including the playing field, Peel Hall Farm and to the north of Poplars Avenue. Breeding status not known.
Great tit	*	*	Birds singing and foraging in habitats surrounding the playing field. Breeding status not known.
House sparrow	*	*	Birds foraging in groups in habitats surrounding the playing field. Breeding status not known.
Chiffchaff	*	*	Birds singing in woodland and scrub habitats adjacent to Peel Hall Farm and to the north of Poplars Avenue. Probably breeding.
Blackcap	*	*	Male birds singing in woodland and scrub habitats adjacent to Peel Hall Farm on both visits. Probably breeding.
Whitethroat	*		Male bird observed carrying food in scrub mosaic at the end of Birch Avenue. Nest located and breeding confirmed.
Woodpigeon	*	*	Ubiquitous species foraging frequently observed throughout site. Breeding.
Reed bunting	*	*	Singing males present on all visits in same area of grass/scrub mosaic. Simultaneous singing of 2 males registered. Breeding very likely.
Chaffinch	*	*	Singing males observed in habitat mosaic north of Poplars Avenue only. Probably breeding.
Bullfinch	*		Pair observed foraging in scrub mosaic south-east of Peel Hall Farm. Breeding status not known.
Goldfinch	*		Foraging birds present in tall herb habitat. No evidence of breeding.
Magpie	*	*	Foraging birds observed only. Probably breeds on site.
Carrion crow	*		Single birds flew over the site. Not breeding.
Jackdaw	*		Six birds foraging occasionally. Not breeding.
Buzzard		*	Single bird flow over the site. Not breeding.
Kestrel	*		Foraging bird recorded on site. Not breeding.
Moorhen	*	*	Single bird observed on pond on southern boundary. Breeding.
Swift, Swallow and House martin	*	*	These birds were observed in varying numbers foraging over the site. No attempt was made to record registrations due to the highly mobile nature of the species and the fact that they are not breeding on site.
Black-headed gull	*	*	Transitory birds observed flying over the site on both visits. No attempt was made to record registrations as the species have no association with the site.
Herring gull	*	*	Transitory birds observed flying over the site on both visits. No attempt was made to record registrations as the species have no association with the site.

Key to Table 2: * = Recorded on visit.

2.89 Thirty one bird species were recorded during the survey, Table 3 below shows those considered to be breeding, those present in suitable habitat but with no evidence of breeding, and those not breeding.

Table 3: Breeding Status of Birds Recorded:

Birds Recorded as Breeding	Birds Present **(no evidence of breeding)**	**Birds not Breeding (no suitable habitat, foraging/flying over or passage migrant)**
Skylark S41* Meadow pipit Reed bunting S41* Blackbird Song thrush S41* Robin Chiffchaff Blackcap Whitethroat Woodpigeon Chaffinch Moorhen	Dunnock S41 Magpie Wren Blue tit Great tit Bullfinch S41* Magpie	Carrion crow Jackdaw Kestrel Buzzard Swallow House Martin Swift Black-headed gull Herring gull S41 Goldcrest Goldfinch House sparrow S41*
Total: 12	Total: 7	**Total: 12**

Key to Table 3:

S41 = Section 41: Species of Principal Importance in England NERC Act 2006.
*Local Biodiversity Action Plan (LBAP) Species.

Estimated Number of Pairs of Breeding Species in 2013

2.90 The following figures are based on the number of nest sites located and an estimation of breeding pairs based on observations made in the field. It should be noted that the 'actual' number of breeding pairs might differ from the figure given, in addition other species recorded in column two of Table 2 might also possibly breed on site although activity to indicate/suggest breeding may have been absent or not observed during the survey.

Skylark	-	2 estimate
Meadow pipit	-	1 estimate
Reed bunting	-	2 estimate
Blackbird	-	1 confirmed
Song thrush	-	1 confirmed
Robin	-	1 estimate
Chiffchaff	-	1 estimate
Blackcap	-	1 estimate
Whitethroat	-	1 confirmed
Woodpigeon	-	3 confirmed
Chaffinch	-	2 estimate
Moorhen	-	1 confirmed

Observations Undertaken in 2015

2.91 The study undertaken in 2015 indicates that the site has become increasingly rank/coarse, thus reducing breeding potential for ground-nesting species skylark and possibly meadow pipit. As natural succession advances towards tall herb and scrub communities, the less suitable it

becomes for these species which require shorter open grassland habitats for nesting. Tall swards with a high instance of tall herb/scrub habitats are avoided due to the birds inability to see ground predators. Foraging potential is also adversely affected. For the other species recorded on site in 2013, the site remains as suitable as it was in 2013. The only additional species recorded incidentally during 2015, was of a pair of grey partridge. As the pair didn't form part of a 'covey', it is possible that the birds were either barren or a brood had been attempted but predated or lost to adverse weather conditions. The site is potentially suitable for grey partridge to nest in, but the current overall successional trends towards tall rank vegetation and scrub, will ultimately reduce the breeding potential for this species. Grey partridge is a Section 41 and Local Biodiversity Action Plan Species.

Observations Undertaken in 2016

2.92 The survey was extended in 2016 to include a triangular piece of abandoned arable land between Mill Lane and the M62, and the amenity/play area adjacent to Grasmere Avenue. The sites were visited on the morning of 24th June, and a survey undertaken to determine if those sites had any ornithological value above that identified by surveys undertaken in 2013 and 2015 as outlined in Section 6.7.3 above.

2.93 The survey confirmed the presence of very low numbers of common bird species on the land adjacent to Grasmere Drive, these include blackbird, magpie and woodpigeon. Breeding habitat here is very restricted and the site overall has negligible nesting bird interest.

2.94 The survey of the land north of Mill Lane returned a record of reed bunting only, which was present in suitable breeding habitat during the nesting season. The land at this site has degraded considerably since the previous survey and the tall grasslands now have a very high proportion of tall ruderal herb species. Consequently, this habitat has very limited value to nesting birds overall.

2.95 Based on the site visit undertaken and the very limited number of birds observed, it can be confirmed that the inclusion of the two sites surveyed, has not had a measurable effect on the sites value to breeding birds at the Peel Hall site. No increase in ornithological value has been identified as the number of species recorded (4) was low, and all were recorded during surveys in 2013 and 2015.

BARN OWL AND BAT EVALUATION

Methodology

2.96 An evaluation of barn owl activity/potential was undertaken using a combination of a survey for potential on-site nesting locations, the findings of the 2013 bird survey and the dusk bat surveys undertaken in 2015. The timing of these two surveys coincides when barn owls, if present and/or using the site, would expected to be active and observable.

2.97 The breeding bird survey in 2013 was undertaken in June and July, with two early morning site visits by two surveyors between 06.00 and 09.30 on each visit. Conditions were good on each visit.

2.98 The bat survey was undertaken at dusk, where four dusk visits were employed on the 28th July, 24th August, 17th September and 23rd September 2015. Survey time for each visit was 1.5hrs, 3hrs, 2.5hrs and 1.75hrs respectively. A team of four surveyors was deployed relative to the location, size and nature of the site. Surveyors initially adopted static strategic positions across the site (See Fig. 2 in the bat survey report). The positions varied over the four surveys in accordance with the prescribed transect routes (See Fig. 3 in the bat survey report) and amounted to a total of 9 static observations posts. Observations continued for approximately 20 minutes after sunset to allow for the identification of any bat commuting route into the site following roost emergence. Walked transects were then conducted that, collectively between the surveyors over the four surveys, covered the entire study area.

Results

Bird Survey (Note: Bat Survey results are within a separate report)

2.99 No barn owls were observed or heard on site in the two early morning visits during the bird survey in 2013. In addition, the extensive bat survey undertaken at dusk during the barn owl breeding season, returned no aural or visual records of barn owl activity on the site throughout 8.75 hours of dusk observation. The timing, level and extent of survey applied at the site are considered sufficient to be able to identify barn owl activity, if the species was present on the site.

Foraging Areas

2.100 The site potentially provides good foraging habitat for barn owls in the form of open coarse grasslands with good small mammal populations. The site had been mown in 2015, which increased the area of foraging by reducing the level of dense ruderal herb vegetation and bramble scrub on the site.

Nest Site Search On-Site

2.101 The whole of the site was walked over to identify any feature that might possibly be used as a nest site by barn owls. The survey revealed that there are no potential nest sites on the site.

Nest Site Search Off-Site

2.102 Whilst the search for potential nest sites in the study area revealed an absence of any building that barn owl might use for nesting, the presence of potentially suitable habitat on the site means that properties off site also need to be considered in respect of their value to barn owls.

2.103 Examination of online aerial images and a site visit revealed a derelict and roofless building at a property at the end of Radley Lane. The building is on private land, therefore could not be inspected internally, however the building could be viewed from the adjacent land and was evaluated as having negligible potential due to an absence of a roof. (See Photograph A below)

2.104 In addition to this structure, the house located to the east of it has a kestrel nest box fitted to the northern elevation next to the chimney breast. The nest box had some faecal splashing next to it, however this building also couldn't be accessed, therefore closer examination wasn't possible. The box has limited potential for barn owl being very exposed and closely overlooking the formal gardens of the property. Human disturbance in this location would be expected to moderate-high. (See Photograph B below)

Photograph A: Roofless building.

Photograph B: Kestrel nest box on gable end of house.

2.105 The land to the south, west and east of the site is extensively urban/residential and therefore it was not feasible to inspect all of those properties. Therefore a general evaluation was made from the roadsides locally, combined with the examination of online aerial images. Based on the evaluation outlined above, these residential areas to the south, east and west of the site, provide no features traditionally used by breeding barn owl.

2.106 The land to the north is largely agricultural and composed of arable land and grass leys with associated occasional farmsteads. The farms were not visited but it is assumed that at least some of the buildings are potentially suitable to some degree for nesting barn owl.

2.107 It should be noted that the desk based study returned a single record of barn owl approximately 1km north-west of the site at Winwick Hospital in 2011. The exact location is not known as only a 1km² grid reference (SJ6092) was provided.

2.108 In addition a photographic record that appears to be of a barn owl roosting in a garden tree on Mill Lane was provided by a local resident.

Barrier and Hazard Effects

2.109 The M62 forms the entire northern boundary of the site, with extensive residential areas present east, west and south of the site, apart from a linear golf course beyond which lies the M6/M62 interchange. Therefore the site is isolated from any barn owl population that might occur off site.

2.110 The M62 represents a very serious hazard to barn owls attempting to cross it due to the high risk of collision. The adverse effect of such features on barn owls through collision with vehicles is well documented, with the Barn Owl Trust the leading organisation issuing advice in respect of development and the species.

2.111 The 15-year research project undertaken by David J Ramsden for the Barn Owl Trust* provides the following statement.

'*Major roads cause the complete absence of breeding Barn Owls within 0.5 km either side of the road, severe depletion of their population within 0.5 - 2.5 km of the road and some depletion within 2.5 - 8 km of the road. It is not until 25 km from a road that no effect of its presence on Barn Owl populations can be detected. Since, almost the entire area of lowland Britain lies within 25 km of a major road it is highly probable that almost the entire British Barn Owl population is to some extent suppressed by the presence of major roads.*'*

**Barn Owls and Major Roads*. David J Ramsden - Barn Owl Trust.

2.112 Based on the above research, the current advice provided by the Barn Owl Trust is as follows.

- *Do not* encourage Barn Owls to live near unscreened major roads.
- *Do not* erect a Barn Owl nest box within 1 km of a major road, unless the road has continuous screens on both sides.

2.113 The M62 section adjacent to Peel Hall doesn't have a continuous screen along both sides of the road, and much of the road is more or less at the same level as the surrounding land. (See Photograph C below) Therefore for any barn owl population present in the farms north of the road to use the Peel Hall site, a very hazardous barrier would have to be crossed.

Photograph C: Showing one of the extensive and hazardous crossing points imposed by the M62.

2.114 The more dependant owls are on the site, the more times they would have to cross the road to forage due to an absence of potential nest sites south of the M62. Therefore the risk of collision rises to such a degree that sustainability of any barn owl population locally is considered to be remote.

Conclusions

2.115 Whilst the foraging habitat on the site is potentially suitable for barn owl, surveys undertaken on the site returned no record of the species despite being undertaken at the optimum time for barn owl activity during the main breeding period.

2.116 There are no potential nesting sites on the site.

2.117 Nest sites adjacent to the site south of the M62 are limited to a single kestrel nest box attached to the side of an occupied house. Potential is limited due to the box's exposed position in relation to the garden where moderate-high disturbance levels are predicted. Potential nest sites might exist in farmsteads north of the M62.

2.118 Research undertaken by the Barn Owl Trust show localised extinctions of barn owls within 0.5km of major roads, and severe depletion of populations at a distance between 0.5 -2.5 km.

2.119 Based on the above, the combined presence of the M62 and the absence of appropriate nest sites south of the motorway, has effectively removed any reasonable possibility that a resident population of barn owls on the site is sustainable, despite the presence of potentially suitable foraging habitat.

GREAT CRESTED NEWT EVALUATION

Survey Details and Results:

2.120 A Habitat Suitability Index (HSI) survey was undertaken on the 13th and 14th August 2015, to assess general suitability for the species in the ponds on and adjacent to the site. HSI cannot be used instead of standard 'Presence/Absence' survey, however it is a useful tool for assessing the likelihood of GCN being present in a pond and whether or not further surveys are required. It should be noted that the ponds were surveyed to full presence/absence level in 2012 which revealed an absence of GCN. A desk-base study of the site and surrounding area revealed that the site is isolated from all other waterbodies by major barrier effects, therefore the survey has not been repeated. Instead, the HSI has been used to assess pond suitability and to determine if there has been any notable change in the pond environment since 2012. The pond has been evaluated by a licensed (WML-CL08) amphibian surveyor*, using a combination of ecological skill in evaluating GCN issues and the application of the Habitat Suitability Index (HSI) Survey. *28 years experience in ecological survey and great crested newt mitigation and licensing.

Habitat Suitability Index (HSI) Survey

2.121 A HSI Survey was undertaken in the ponds on and adjacent to the site and the results presented in the table below.

Pond ref	Pond 1	Pond 2	Pond 4	Pond 5	Pond 6
SI1 - Location	1	1	1	1	1
SI2 - Pond area	0.1	1	1	0.7	0.7
SI3 - Pond drying	0.9	0.1	0.1	0.9	0.1
SI4 - Water quality	0.33	0.01	0.33	0.67	0.01
SI4 - Shade	0.2	0.2	0.2	0.8	0.2
SI6 - Fowl	1	1	1	1	1
SI7 - Fish	1	1	1	0.33	1
SI8 - Ponds	1	1	1	1	1
SI9 - Terr'l habitat	1	1	1	1	1
SI10 - Macrophytes	0.1	0.1	0.1	0.9	0.1
HSI	**0.48**	**0.34**	**0.48**	**0.79**	**0.33**

The HSI categorisation of scores is shown below.

Categorisation of HSI scores

HSI Pond suitability

<0.5 = poor
0.5 – 0.59 = below average
0.6 – 0.69 = average
0.7 – 0.79 = good
> 0.8 = excellent

2.122 The HSI score for Ponds 1, 2, 3 and 6 are 0.48, 0.34, 0.48 and 0.33 respectively, all of which rate as 'poor' in the HSI. Pond 5 scores 0.79 which is at the higher end of 'good'. Pond 3 wasn't subject to survey as the feature is considered to be no longer viable as potential GCN breeding habitat. Since 2012 there has been a notable reduction in quality of all of the ponds except for Pond 5 which has remained consistent. Pond 1 is now completely over-shaded by dense willow scrub to the extent that it has resulted in the loss of all emergent vegetation. Water quality and invertebrate values have also reduced due to the combined effects of cold/dark shaded conditions and eutrophication. Ponds 2, 4 and 5 were completely dry during the survey and the conditions observed indicate that these features had been dry for some time. Drying in the mid-late summer period can have a very adverse effect on developing GCN larvae, which at that time are dependent on the pond holding water. Based on conditions observed in 2015, those ponds would not be capable of supporting a successful breeding population in 2015.

Barrier Effects

2.123 The spatial relationship between the ponds on and adjacent to the site, and those off-site was studied by reference to Ordnance Survey maps and online aerial images. The study revealed the following information.

- The M62 forms the northern boundary to the site.
- There are three off-site ponds north of the M62 located approximately 120m, 330m and 410m from the site.
- Extensive residential areas occur on the western, southern and eastern boundaries.
- There is a single pond on Poulton Park Golf Course approximately 430m east of the site.
- There are no other known ponds within 500m of the site.

2.124 There are obvious barrier to amphibian movement generated by the presence of the motorway and the residential areas. The barrier effects have been evaluated thus.

- Barrier effects generated by the M62 are of major magnitude.
- Barrier effects generated by extensive residential/developed areas to the west and south are of major magnitude.
- Barrier effects generated by extensive residential areas and Delph Lane to the east are of moderate-major magnitude.

2.125 Based on the above the 'lowest' barrier effect is on the eastern side of the site where linear greenspace links to the site. There is a pond on the golf course in this area which is approximately 430m from the site. However there is extensive good supporting terrestrial habitat in close proximity to this pond, therefore due to the combined presence of this terrestrial habitat and the barrier effects, the possibility of GCN (if present) travelling to the site is considered to be remote. The M62 to the north is a complete barrier to GCN movement from those ponds present in the farmland to the north. It should also be noted that the county data search returned no records of GCN within 500m of the study area. Consequently, taking all of the above issues into consideration, the likelihood of GCN colonising the site since the 2012 survey is considered to be highly remote. Therefore adverse effects on GCN or its habitats are not predicted, and further survey is not advised.

Other Survey Information

2.126 A GCN survey and evaluation of waterbodies on the site was also undertaken by Mott Macdonald on behalf of the Highways Agency in relation to off-site engineering works. The survey was undertaken between April and May 2015 and covered several waterbodies in the north of the site.

2.127 The scoping survey identified six waterbodies for survey including ponds and seasonally wet ditches, where a HSI survey was carried out. However presence/absence survey was only applied to two waterbodies as the HSI indicated that conditions in the others were unsuitable for GCN.

2.128 The survey returned no record of GCN, however very low numbers of smooth newt and common frog were recorded in one pond only. Smooth newt was recorded in low numbers in the same pond during the 2012 survey.

3.0 ECOLOGICAL EVALUATION

EVALUATION OF SURVEY FINDINGS

3.1 The following section evaluates the two sites in relation to statutory/non-statutory sites, protected species and species/habitats listed in Section 41 Species/Habitats of Principal Importance in England (NERC) Act 2006, and the Cheshire Local Action Plan.

Statutory Sites

3.2 Risley Moss and Woolston Eyes SSSIs are located approximately 4km to the east and south of the site respectively.*
*(*Source – Magic)*

Sites of Biological Importance (SBI)

3.3 It is understood that the site is not designated as a Site of Biological Importance in Cheshire. Radley Plantation and Pond (off-site) is a Local Wildlife Site (LWS).

Protected Species

3.4 Formal surveys for great crested newt (GCN) were undertaken by the Appleton Group in all ponds within 250m of the site in 2012. The survey found GCN to be absent. Another potential pond feature was evaluated as part of the 2013 survey (See Target Note 7) which found the feature to be dry and subject to occasional flooding only. Conditions present indicated that the feature was unsuitable for breeding GCN. The re-visit and evaluation in 2015 revealed only negative changes in respect of GCN suitability in the ponds. In addition, a desk-based study considering all barrier effects and the location of off-site ponds in relation to the site was also undertaken. This concluded that the likelihood of GCN colonising the site since the 2012 survey is considered to be highly remote, and that adverse effects on GCN or its habitats are not predicted. No badger setts were found on the site and there is no evidence of badger foraging or runs entering the site through boundaries. However small localised constraints to survey applied locally due to dense vegetation preventing physical/visual access. Water vole surveys in 2013 didn't return any evidence of the species but constraints applied to a large section of Spa Brook due to dense bankside and in-channel vegetation. The survey was repeated in 2015 which experienced significantly increased constraints. In 2013 the brook was evaluated as having moderate – poor potential for water voles. However the reach surveyed is now considered to have poor - negligible potential only, due a combination of the prevailing on-site conditions and lack of connectivity to areas outside of the site. The site supports a range of common nesting birds, in addition several other species also use the site for foraging but nest

off site. These birds include several species listed in Section 41 (NERC Act 2006) and several Local BAP species. The bird fauna of the site is considered to be of local-district value. The re-evaluation of the site undertaken in 2015 concurs with the statement above.

3.5 The breeding bird survey and bat surveys undertaken in 2015 returned no record of barn owl activity on the site. There is also no nesting potential on the site and highly hazardous barrier effects are imposed by the M62 along the entire northern boundary. The extensive residential development on the south, east and west of the site provide no obvious nesting or foraging potential for barn owl.

3.6 A kestrel nest box is located on a detached property on Radley Lane on the southern boundary of the site which offers limited potential for barn owl. Despite this and the presence of potentially good foraging habitat, risk of collision with vehicles on the M62 is so high that the sustainability of any barn owl population locally is considered to be remote.

Section 41 (S41) Habitats and Species of Principal Importance in England Natural Environment and Rural Communities (NERC) Act 2006

3.7 The site contains ponds, hedgerows and lowland mixed deciduous woodland which are Section 41 Habitats. The site also supports reedbeds however these features are not considered representative of the reedbed habitats targeted by the Act, as they are dry with the water table below ground level for all of the year. Basically they are areas where common reed had colonised from existing ditches/boundaries though the abandonment of the adjacent land. Seven S41 bird species were recorded during the 2013 survey, an additional species (grey partridge) was recorded during the site surveys in 2015.

Cheshire Biodiversity Action Plan Habitats & Species

3.8 Ponds, hedgerows and woodlands are Cheshire Local Biodiversity Action Plan Habitats (LBAP). The site also supports several LBAP bird species.

SUMMARY EVALUATION

Vegetation – Habitats and Species

3.9 The survey found no individual habitats of obvious high biodiversity value. The habitats on site are common on a local-national basis and are predominantly composed of disturbed/abandoned arable and improved land. However three ponds, hedgerows and areas of woodland occur that are considered to be S41 habitats and Cheshire Local Biodiversity Action Plan Habitat (LBAP). Whilst the habitats are common nationally, the site is large and is therefore considered to be of

local-district value in terms of its vegetation. The re-survey in 2015 revealed no positive changes to the site and the evaluation as provide above is considered to be unchanged.

Badgers

3.10 No evidence of badger occupation/use was found on the site, however very localised constraints to survey applied in small areas of very dense vegetation that could not be physically/visually accessed.

Water Vole

3.11 No evidence of water vole was found on any of the ponds on the site and the species is considered to be absent in these features. No evidence of water vole occupation was found on Spa Brook in 2015, although survey was very difficult and serious constraints applied to virtually the whole of the brook. In 2013 the brook was evaluated as having moderate – poor potential for water voles. However the reach surveyed is now considered to have poor - negligible potential only, due a combination of the prevailing on-site conditions and lack of connectivity to areas outside of the site.

Birds

3.12 The site supports a range of common nesting birds, in addition several other species also use the site for foraging but nest off site. These birds include species listed in Section 41, and also include LBAP species. The bird fauna of the site is considered to be of local-district value. The site was re-evaluated during site visits in July 2015, which found that the grasslands were subject to steady successional change towards tall herb and open scrub communities due to a lack of management. An increase in the extent of dry stands of common reed is also predicted. There was no detectable change in the woodland habitats on the site. Based on the above it is considered reasonably unlikely that the bird fauna would exceed the original evaluation in 2015 which was of local-district value.

3.13 In regard to barn owl, the surveys in 2013 and dusk bat surveys in 2015 returned no record of barn owl activity. There is potentially foraging habitat suitable on site, but no potential nest sites. The kestrel nest box on the property on Radley lane offers limited potential and there are no other potential nest sites on land adjacent to the site that are not separated by continuous urban development or hazardous motorways barriers.

3.14 Therefore the combined presence of the M62 and the general absence of nest sites south of the motorway, has effectively removed any reasonable possibility that a resident population of barn owls on the site is sustainable, despite the presence of potentially suitable foraging habitat.

Great Crested Newt

3.15 Presence/absence surveys undertaken by the Appleton Group in 2012 showed an absence of GCN in the ponds surveyed. There are no other ponds within 500m of the site that are not separated by major barrier effects including the M62, busy roads and major blocks of residential housing. The survey was not repeated in 2015 as those major barrier effects prevail, thus preventing migration of GCN on to the site. However the ponds were re-evaluated using the HSI which shows that with the exception of Pond 5, all of the ponds are all rated as 'poor'. Effects on individual GCN or its habitat are not predicted.

4.0 RECOMMENDATIONS

4.1 The following section considers any measures or future survey required in light of the findings of this survey, these are outlined below.

Habitats

4.2 The survey was undertaken at an optimum time and was subject to no constraints. No further surveys are required.

Badger

4.3 Surveys undertaken during two separate years returned no evidence of badger activity, and whilst constraints applied locally due to dense vegetation, the likelihood of badger being present is considered to be reasonably unlikely. However as a precaution, it is recommended that the areas where constraints apply (see Map 2) should be checked for badger activity during the winter months when there is no leaf cover present. If evidence is found then further consideration of how the species will be affected by the proposals will be required. If the species is found to be absent then no further surveys are recommended.

Water Vole

4.4 Given the prevailing conditions on Spa Brook the likelihood of water vole being present is considered to be reasonably unlikely. However as a precautionary measure, it is recommended that the sections of Spa Brook where constraints applied (See Map 3) are re-surveyed in March – early April when vegetative cover is low. This will enable the identification of any burrows that might be used by water voles. Evidence of foraging and latrine sites and other activity might also be seen at this time. If evidence is found then further consideration of how the species will be affected by the proposals will be required. If the species is found to be absent then no further surveys are recommended.

Birds

4.5 Whilst the surveys were undertaken in the latter part of the main breeding season, the surveys are considered to be representative of the range of breeding birds present during 2013. No further formal surveys are recommended. As precautionary measures the following actions are recommended.

- All trees and shrubs scheduled for removal must be felled outside of the breeding season i.e. within the period September-February inclusive.

- All brash must be chipped on site or removed before the onset of the breeding season to prevent secondary colonisation by breeding birds.

- If it is not possible to remove the trees and shrubs outside of the breeding season, then the trees must be inspected by an ecologist prior to their removal.

- If breeding birds are found then a buffer zone of 5m around the nest site must be implemented to prevent disturbance until the young have fledged and left the nest. The buffer zone must be fenced off temporarily until the nest is unoccupied. The trees/shrubs containing the nest site can only be felled once the ecologist has declared the site clear of nesting birds.

- Pre-construction checks for ground-nesting birds are also required if works are proposed in the March-August breeding period.

4.6 In regard to barn owl, the observations made during the bat survey and subsequent evaluation are sufficient to inform any recommendations for the site. Therefore no further surveys are recommended.

4.7 In regard to barn owl, the observations made during the bat survey and subsequent evaluation are sufficient to inform any recommendations for the site. Therefore no further surveys are recommended.

4.8 In line with the Barn Owl Trust's guidance, **no** provision for barn owls must be made due to the close proximity of the M62 a serious hazard to barn owl survival.

Great Crested Newt

4.9 Great Crested Newt Surveys were undertaken in 2012 by the Appleton Group, and in 2015 by Mott Macdonald which found the species to be absent. Potential for colonisation of these ponds from external waterbodies is considered to be remote due to significant major barrier effects. No further surveys are recommended.

5.0 REFERENCES

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Cheshire Region Biodiversity Partnership website.
Google Earth.
DEFRA – Magic.

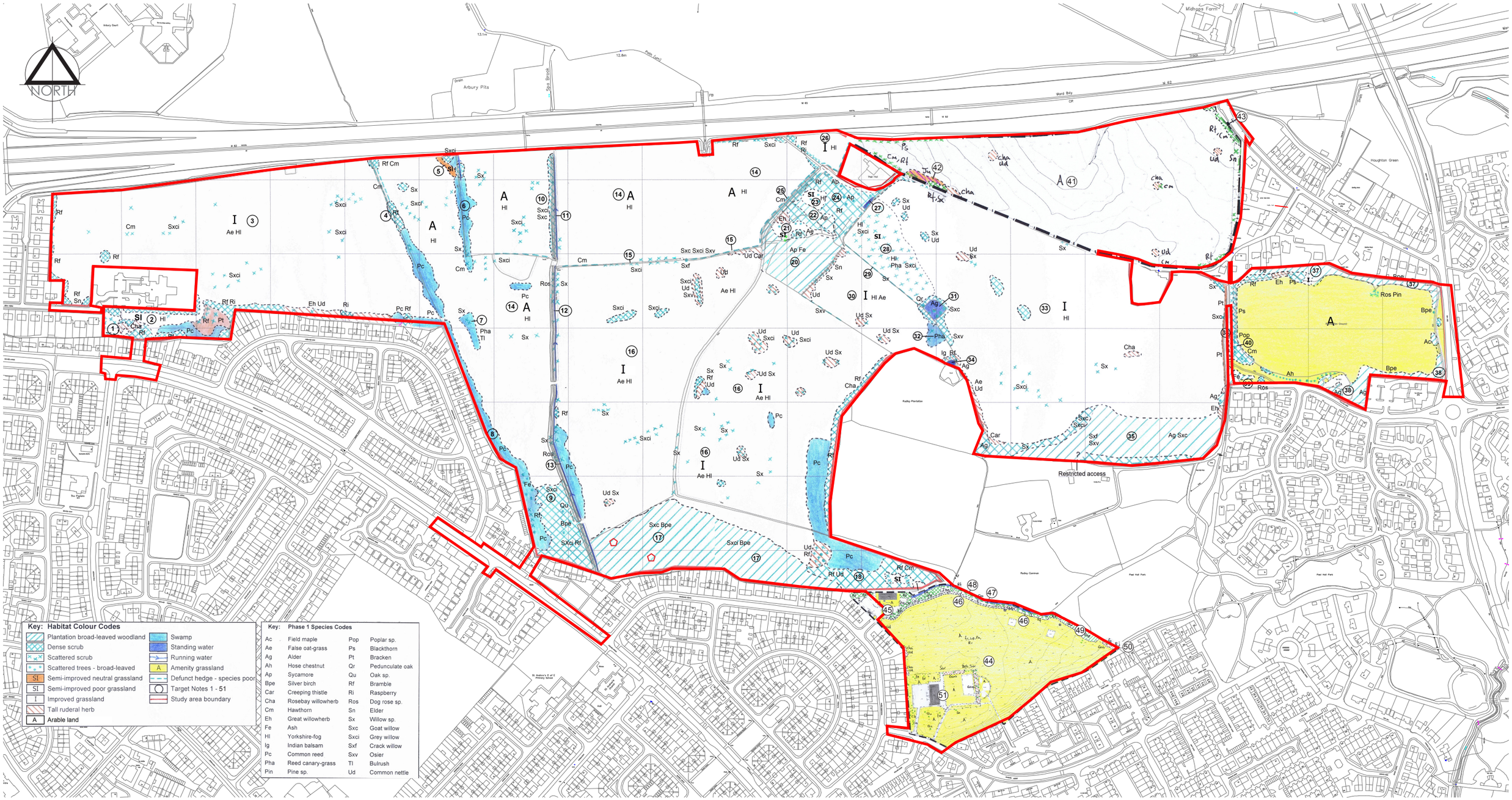
APPENDIX 1:

Phase 1 Habitat Survey Map

Badger Survey Map

Water Vole Survey Map

Bird Survey Map 5a
Bird Survey Map 5b



PEEL HALL FARM, WARRINGTON

FIG 1
Phase 1 Habitat Map
Scale: See scale bar

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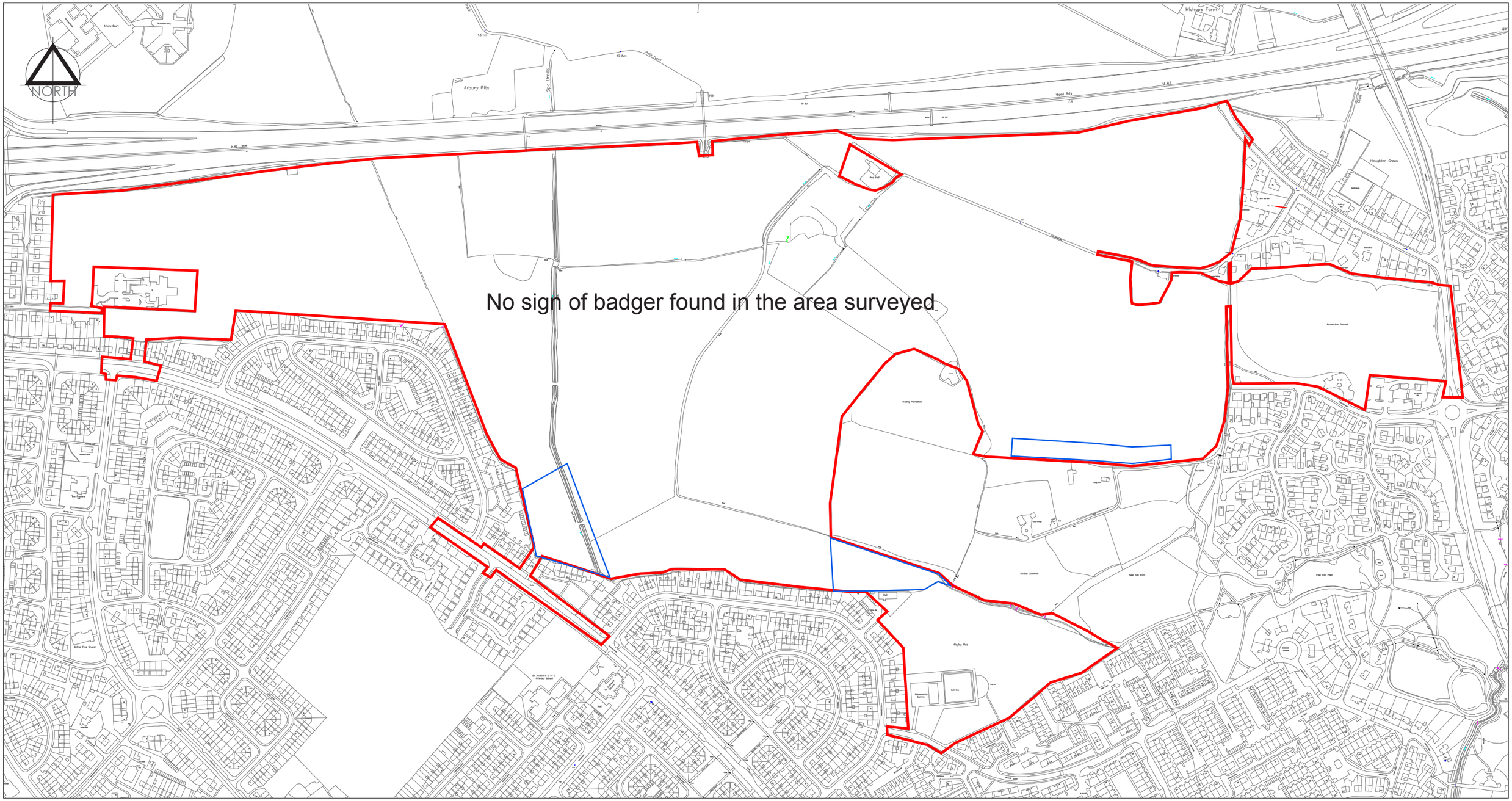

Key:

Badger survey constrained due to dense vegetation*

Study Area Boundary

*It should be noed that the badger survey was not constrained in the rest of the site.

0 50m 100m 200m 300m

PEEL HALL FARM, WARRINGTON

FIG 2
Badger Survey Map
Scale: See scale bar

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NORTH

Pond 1

Pond 2

Pond 3

Spa Brook

Spa Brook

Key:

Water vole survey with no constraints - water vole absent

Water voles survey constrained

Study Area Boundary

0 50m 100m 200m 300m

PEEL HALL FARM, WARRINGTON

FIG 3
Water Vole Survey Map
Scale: See scale bar

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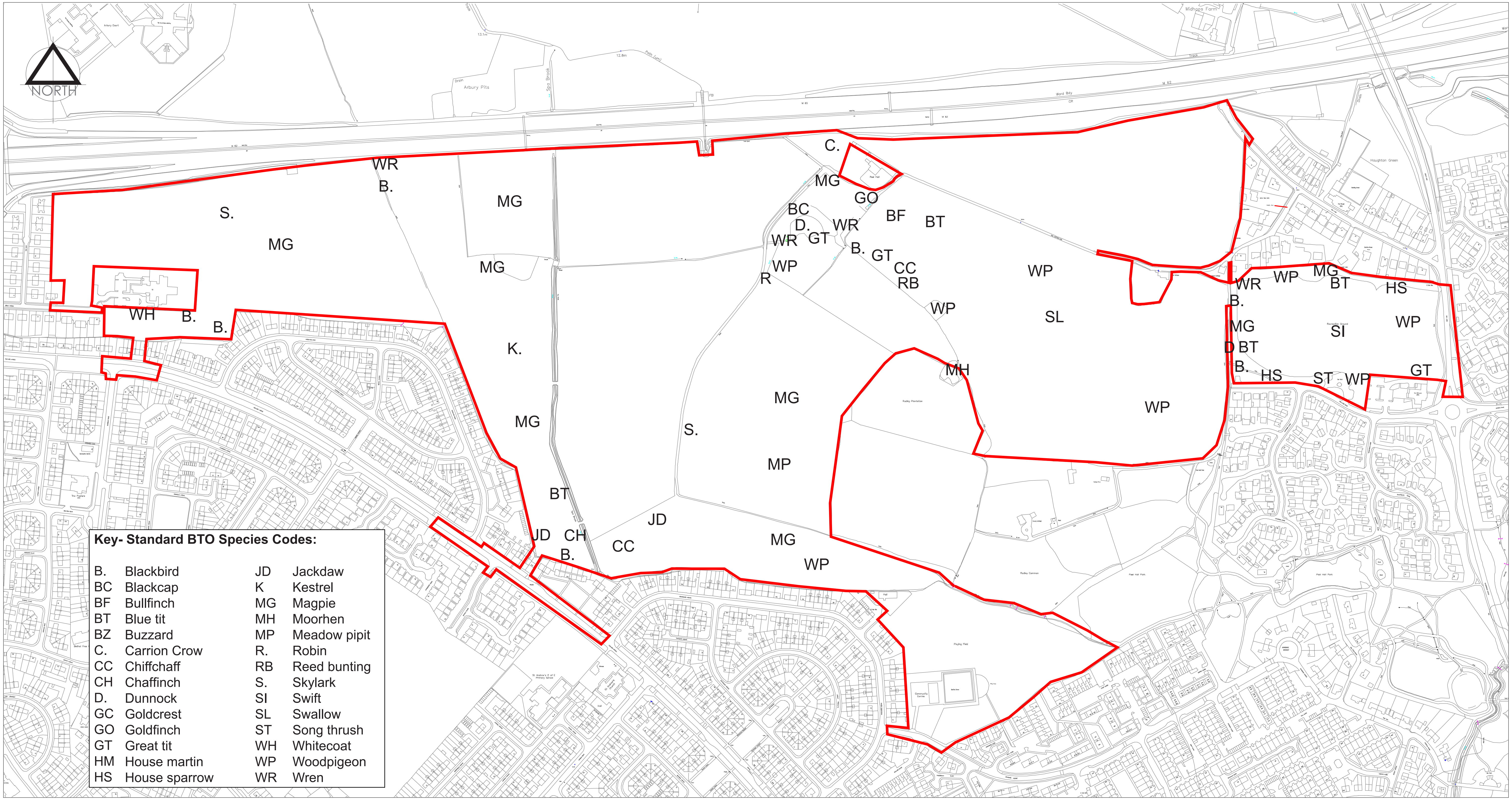

Key- Standard BTO Species Codes:

B.	Blackbird	JD	Jackdaw
BC	Blackcap	K	Kestrel
BF	Bullfinch	MG	Magpie
BT	Blue tit	MH	Moorhen
BZ	Buzzard	MP	Meadow pipit
C.	Carrion Crow	R.	Robin
CC	Chiffchaff	RB	Reed bunting
CH	Chaffinch	S.	Skylark
D.	Dunnock	SI	Swift
GC	Goldcrest	SL	Swallow
GO	Goldfinch	ST	Song thrush
GT	Great tit	WH	Whitecoat
HM	House martin	WP	Woodpigeon
HS	House sparrow	WR	Wren

Key:

Study Area Boundary

0 50m 100m 200m 300m

PEEL HALL FARM, WARRINGTON

FIG 4
Bird Survey Map 5a (Visit 1- 21.06.13)
Scale: See scale bar

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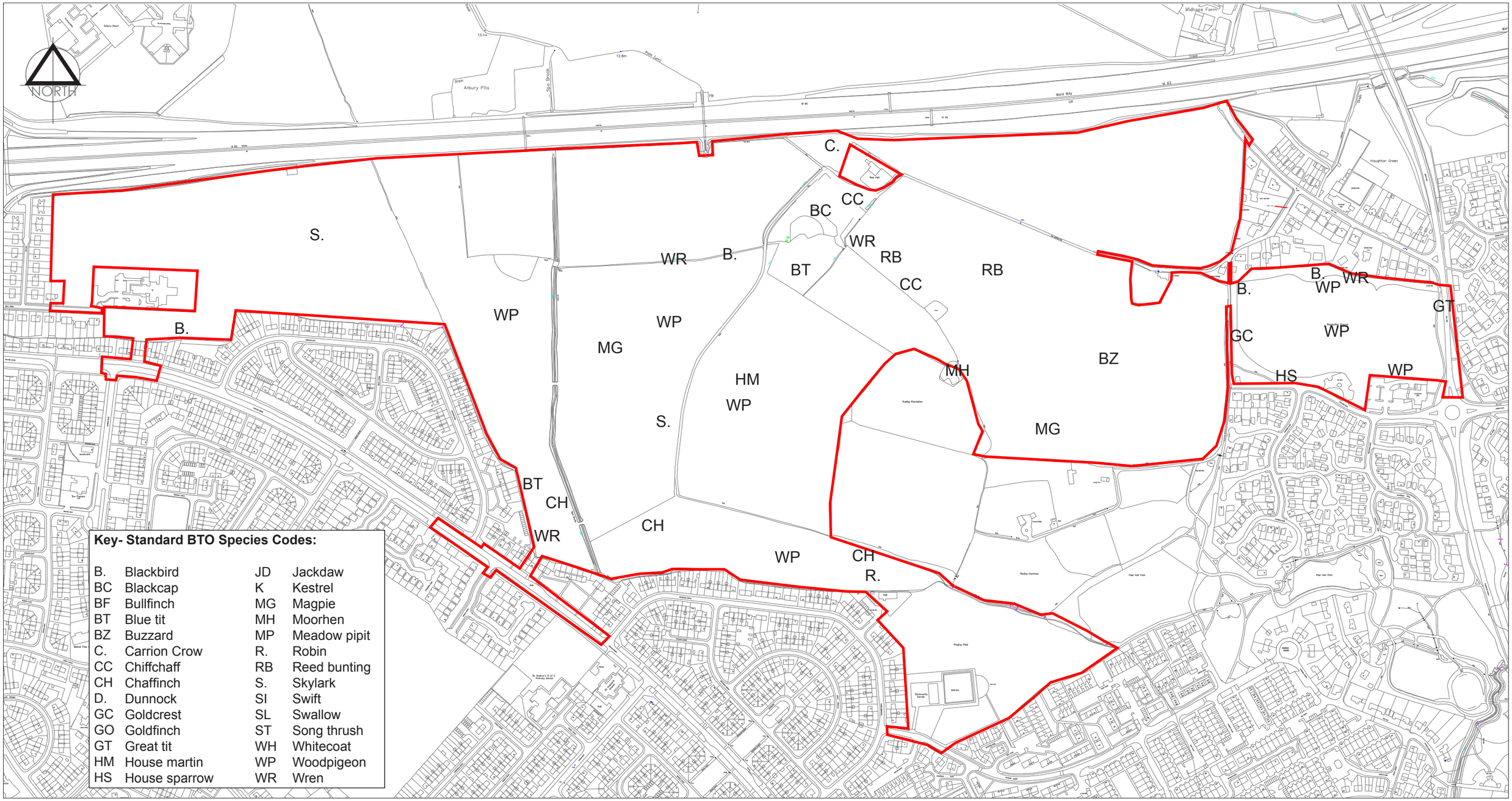

PEEL HALL FARM, WARRINGTON

FIG 5
Bird Survey Map 5b (Visit 2 - 07.07.13)
Scale: See scale bar

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APPENDIX 2:

Site Photographs

Site Photographs 2013:

Photograph 1: Habitat mosaic as described in Target Notes 1 and 2.

Photograph 2: Abandoned farmland with coarse grassland disturbed by ploughing (See Target Note 3)

Photograph 3: Disturbed arable land with encroaching dry stands of common reed. (See Target Note 14)

Photograph 4: Dense impenetrable scrub mosaic as described in Target Note 9.

Photograph 5: Dense impenetrable scrub mosaic as described in Target Note 18.

Photograph 6: Planted woodland on the southern boundary. Structure typical of woodlands described in Target Notes 17 and 35.

Photograph 7: The northernmost (open) section of Spa Brook. (See Target Note 11)

Photograph 8: Central section of Spa Brook choked by vegetation. (See Target Note 12)

Photograph 9: Southern section of Spa Brook choked by vegetation. (See Target Note 13)

Photograph 10: Potential pond feature described in Target Note 7.

Photograph 11: Coarse *Arrhenatherum* grassland with bramble described in Target Note 23.

Photograph 12: Mature planted woodland described in Target Note 20.

Photograph 13: Small planted sycamore woodland described in Target Note 22.

Photograph 14: Glade area with demolished building described in Target Note 21.

Photograph 15: Typical view of the expansive disturbed grasslands described in Target Note 16. Brash piles with regenerating scrub and ruderal herbs are visible in the distance.

Photograph 16: Typical view of the glade undergoing seral succession described in Target Note 19.

Photograph 17: Pond 3 as described in Target Note 34.

Photograph 18: Pond 2 as described in Target Note 31.

Photograph 19: Grassland scrub mosaic as described in Target Note 28.

Photograph 20: Pond 1 as described in Target Note 27.

Photograph 21: Typical view of the grassland described in Target Note 33.

Photograph 22: Typical view of the planted woodland as described in Target Note 35.

Photograph 23: Roadside verge habitats along Radley Lane. (See Target Note 36)

Photograph 24: Marginal woodlands on the northern side of the playing field as described in Target Note 37.

Photograph 25: Marginal woodlands on the southern side of the playing field as described in Target Note 38.

Site Photographs 2015:

Photograph 26: The northernmost (open) wet section of Spa Brook. (See Photo. 7 from 2013)

Photograph 27: Central dry section of Spa Brook choked by vegetation. (See Photo. 8 from 2013)

Photograph 29: Southern dry section of Spa Brook choked by vegetation. (See Photo. 9 from 2013)

Photograph 30: Current view of Pond 1. (See Photo. 20 from 2013)

Photograph 31: Current view of Pond 2. (See Photo. 18 from 2013)

Photograph 32: Current view of Pond 3. (See Photo. 17 from 2013)

Photograph 33: Current view of Pond 5.

Photograph 34: Current view of Pond 6.

Photograph 35: Current view of grassland described in Target Note 16. Uncut areas are partly indicative of current sward conditions.

Photograph 36: Current view of grassland described in Target Note 33.

Photograph 37: Current view of grassland described in Target Note 14. Uncut areas are partly indicative of current sward conditions.

Hedgerow Photographs

Photograph 38: Hedgerow 1.

Photograph 39: Hedgerow 2.

Photograph 40: Hedgerow 3.

Photograph 41: Hedgerow 4.

Photograph 42: Hedgerow 5.

APPENDIX 3

Additional Criteria for Determining ‘Important’ Hedgerows Part 1

SCHEDULE 1

Regulations 2(3) and 4

ADDITIONAL CRITERIA FOR DETERMINING "IMPORTANT" HEDGEROWS

PART I

INTERPRETATION

In this Schedule -

"building" includes structure;
"Record Office" means -
(a) a place appointed under section 4 of the Public Records Act 1958[29] (place of deposit of public records),

(b) a place at which documents are held pursuant to a transfer under section 144A(4) of the Law of Property Act 1922[30] or under section 36(2) of the Tithe Act 1936[31], including each of those provisions as applied by section 7(1) of the Local Government (Records) Act 1962[32], or

(c) a place at which documents are made available for inspection by a local authority pursuant to section 1 of the Local Government (Records) Act 1962;

"relevant date" means the date on which these Regulations are made;
"Sites and Monuments Record" means a record of archaeological features and sites adopted -
(a) by resolution of a local authority within the meaning of the Local Government Act 1972[33], or

(b) in Greater London, by the Historic Buildings and Monuments Commission[34];

"standard tree" -
(a) in the case of a multi-stemmed tree, means a tree which, when measured at a point 1.3 metres from natural ground level, has at least two stems whose diameters are at least 15 centimetres;

(b) in the case of a single-stemmed tree, means a tree which, when measured at a point 1.3 metres from natural ground level, has a stem whose diameter is at least 20 centimetres;

"woodland species" means the species listed in Schedule 2; and
"woody species" means the species and sub-species listed in Schedule 3, and any hybrid, that is to say, any individual plant resulting from a cross between parents of any species or sub-species so listed, but does not include any cultivar; and

references to the documents in paragraph 6(3)(b) and (4) are to those documents as at the relevant date, without taking account of any subsequent revisions, supplements or modifications.

PART II

CRITERIA

Archaeology and history

1. The hedgerow marks the boundary, or part of the boundary, of at least one historic parish or township; and for this purpose "historic" means existing before 1850.

2. The hedgerow incorporates an archaeological feature which is -

(a) included in the schedule of monuments compiled by the Secretary of State under section 1 (schedule of monuments) of the Ancient Monuments and Archaeological Areas Act 1979[35]; or

(b) recorded at the relevant date in a Sites and Monuments Record.

3. The hedgerow -

(a) is situated wholly or partly within an archaeological site included or recorded as mentioned in paragraph 2 or on land adjacent to and associated with such a site; and

(b) is associated with any monument or feature on that site.

4. The hedgerow -

(a) marks the boundary of a pre-1600 AD estate or manor recorded at the relevant date in a Sites and Monuments Record or in a document held at that date at a Record Office; or

(b) is visibly related to any building or other feature of such an estate or manor.

5. The hedgerow -

(a) is recorded in a document held at the relevant date at a Record Office as an integral part of a field system pre-dating the Inclosure Acts[36]; or

(b) is part of, or visibly related to, any building or other feature associated with such a system, and that system -

(i) is substantially complete; or

(ii) is of a pattern which is recorded in a document prepared before the relevant date by a local planning authority, within the meaning of the 1990 Act[37], for the purposes of development control within the authority's area, as a key landscape characteristic.

Wildlife and landscape

6. - (1) The hedgerow -

(a) contains species listed or categorised as mentioned in sub-paragraph (3); or

(b) is referred to in a record held immediately before the relevant date by a biological record centre maintained by, or on behalf of, a local authority within the meaning of the Local Government Act 1972[38], and in a form recognised by the Nature Conservancy Council for England, the Countryside Council for Wales[39] or the Joint Nature Conservation Committee[40], as having contained any such species -

(i) in the case of animals and birds, subject to sub-paragraph (2), within the period of five years immediately before the relevant date.

(ii) in the case of plants, subject to sub-paragraph (2), within the period of ten years immediately before the relevant date;

(2) Where more than one record referable to the period of five or, as the case may be, ten years before the relevant date is held by a particular biological record centre, and the more (or most) recent record does not satisfy the criterion specified in sub-paragraph (1)(b), the criterion is not satisfied (notwithstanding that an earlier record satisfies it).

(3) The species referred to in sub-paragraph (1) are those -

(a) listed in Part I (protection at all times) of Schedule 1 (birds which are protected by special penalties), Schedule 5 (animals which are protected) or Schedule 8 (plants which are protected) to the Wildlife and Countryside Act 1981[41];

(b) categorised as a declining breeder (category 3) in "Red Data Birds in Britain" Batten LA, Bibby CJ, Clement P, Elliott GD and Porter RF (Eds.), published in 1990 for the Nature Conservancy Council and the Royal Society for the Protection of Birds (ISBN 0 85661 056 9); or

(c) categorised as "endangered", "extinct", "rare" or "vulnerable" in Britain in a document mentioned in sub-paragraph (4).

(4) The documents referred to in sub-paragraph (3)(c) are -

(a) of the books known as the British Red Data Books:

1. "Vascular Plants" Perring FH and Farrell L, 2nd Edition, published in 1983 for the Royal Society for Nature Conservation (ISBN 0 902484 04 4);

2. "Insects" Shirt DB (Ed.), published in 1987 for the Nature Conservancy Council (ISBN 0 86139 380 5); and

3. "Invertebrates other than insects" Bratton JH (Ed.), published in 1991 for the Joint Nature Conservation Committee (ISBN 1 873701 00 4); and

(b) of the books known as the Red Data Books of Britain and Ireland:

"Stoneworts" Stewart NF and Church JM, published in 1992 for the Joint Nature Conservation Committee (ISBN 1 873701 24 1).

7. - (1) Subject to sub-paragraph (2), the hedgerow includes -

(a) at least 7 woody species;

(b) at least 6 woody species, and has associated with it at least 3 of the features specified in sub-paragraph (4);

(c) at least 6 woody species, including one of the following -

black-poplar tree *(Populus nigra* ssp *betulifolia)*;

large-leaved lime *(Tilia platyphyllos)*;

small-leaved lime *(Tilia cordata)*;

wild service-tree *(Sorbus torminalis)*; or

(d) at least 5 woody species, and has associated with it at least 4 of the features specified in sub-paragraph (4),

and the number of woody species in a hedgerow shall be ascertained in accordance with sub-paragraph (3).

(2) Where the hedgerow in question is situated wholly or partly in the county (as constituted on 1st April 1997) of the City of Kingston upon Hull, Cumbria, Darlington, Durham, East Riding of Yorkshire, Hartlepool, Lancashire, Middlesbrough, North East Lincolnshire, North Lincolnshire, Northumberland, North Yorkshire, Redcar and Cleveland, Stockton-on-Tees, Tyne and Wear, West Yorkshire or York[42], the number of woody species mentioned in paragraphs (a) to (d) of sub-paragraph (1) is to be treated as reduced by one.

(3) For the purposes of sub-paragraph (1) (and those of paragraph 8(b)) -

(a) where the length of the hedgerow does not exceed 30 metres, count the number of woody species present in the hedgerow;

(b) where the length of the hedgerow exceeds 30 metres, but does not exceed 100 metres, count the number of woody species present in the central stretch of 30 metres;

(c) where the length of the hedgerow exceeds 100 metres, but does not exceed 200 metres, count the number of woody species present in the central stretch of 30 metres within each half of the hedgerow and divide the aggregate by two;

(d) where the length of the hedgerow exceeds 200 metres, count the number of woody species present in the central stretch of 30 metres within each third of the hedgerow and divide the aggregate by three.

(4) The features referred to in sub-paragraph (1)(b) and (d) (which include those referred to in paragraph 8(b)) are -

(a) a bank or wall which supports the hedgerow along at least one half of its length;

(b) gaps which in aggregate do not exceed 10% of the length of the hedgerow;

(c) where the length of the hedgerow does not exceed 50 metres, at least one standard tree;

(d) where the length of the hedgerow exceeds 50 metres but does not exceed 100 metres, at least 2 standard trees;

(e) where the length of the hedgerow exceeds 100 metres, such number of standard trees (within any part of its length) as would when averaged over its total length amount to at least one for each 50 metres;

(f) at least 3 woodland species within one metre, in any direction, of the outermost edges of the hedgerow;

(g) a ditch along at least one half of the length of the hedgerow;

(h) connections scoring 4 points or more in accordance with sub-paragraph (5);

(i) a parallel hedge within 15 metres of the hedgerow.

(5) For the purposes of sub-paragraph (4)(h) a connection with another hedgerow scores one point and a connection with a pond or a woodland in which the majority of trees are broad-leaved trees scores 2 points; and a hedgerow is connected with something not only if it meets it but also if it has a point within 10 metres of it and would meet it if the line of the hedgerow continued.

8. The hedgerow -

(a) is adjacent to a bridleway or footpath, within the meaning of the Highways Act 1980[43], a road used as a public path, within the meaning of section 54 (duty to reclassify roads used as public paths) of the Wildlife and Countryside Act 1981[44], or a byway open to all traffic, within the meaning of Part III of the Wildlife and Countryside Act 1981[45], and

(b) includes at least 4 woody species, ascertained in accordance with paragraph 7(3) and at least 2 of the features specified in paragraph 7(4)(a) to (g).

SCHEDULE 2

Regulation 2(3) and Schedule 1, Part I

WOODLAND SPECIES

Barren strawberry *(Potentilla sterilis)*

Bluebell *(Hyacinthoides non-scriptus)*

Broad buckler fern *(Dryopteris dilatata)*

Broad-leaved helleborine *(Epipactis helleborine)*

Bugle *(Ajuga reptans)*

Common cow-wheat *(Melampyrum pratense)*

Common dog violet *(Viola riviniana)*

Common polypody *(Polypodium vulgare)*

Dog's mercury *(Mercurialis perennis)*

Early dog violet *(Viola reichenbachiana)*

Early purple orchid *(Orchis mascula)*

Enchanter's nightshade *(Circaea lutetiana)*

Giant fescue *(Festuca gigantea)*

Goldilocks buttercup *(Ranunculus auricomus)*

Great bell-flower *(Campanula latifolia)*

Greater wood-rush *(Luzula sylvatica)*

Hairy brome *(Bromus ramosus)*

Hairy woodrush *(Luzula pilosa)*

Hard fern *(Blechnum spicant)*

Hard shield fern *(Polystichum aculeatum)*

Hart's tongue *(Asplenium scolopendrium)*

Heath bedstraw *(Galium saxatile)*
Herb paris *(Paris quadrifolia)*

Herb-robert *(Geranium robertianum)*

Lady fern *(Athyrium filix-femina)*

Lords-and-ladies *(Arum maculatum)*

Male fern *(Dryopteris filix-mas)*

Moschatel *(Adoxa moschatellina)*

Narrow buckler-fern *(Dryopteris carthusiana)*

Nettle-leaved bell-flower *(Campanula trachelium)*

Oxlip *(Primula elatior)*

Pignut *(Conopodium majus)*

Primrose *(Primula vulgaris)*

Ramsons *(Allium ursinum)*

Sanicle *(Sanicula europaea)*

Scaly male-fern *(Dryopteris affinis)*

Small cow-wheat *(Melampyrum sylvaticum)*

Soft shield fern *(Polystichum setiferum)*

Sweet violet *(Viola odorata)*

Toothwort *(Lathraea squamaria)*

Tormentil *(Potentilla erecta)*

Wild strawberry *(Fragaria vesca)*

Wood anemone *(Anemone nemorosa)*

Wood avens/Herb bennet *(Geum urbanum)*

Wood false-brome *(Brachypodium sylvaticum)*

Wood horsetail *(Equisetum sylvaticum)*

Wood meadow-grass *(Poa nemoralis)*

Wood melick *(Melica uniflora)*

Wood millet *(Millium effusum)*

Wood sage *(Teucrium scorodonia)*

Wood sedge *(Carex sylvatica)*

Wood sorrel *(Oxalis acetosella)*

Wood speedwell *(Veronica montana)*

Wood spurge *(Euphorbia amygdaloides)*

Woodruff *(Galium odoratum)*

Yellow archangel *(Lamiastrum galeobdolon)*

Yellow pimpernel *(Lysimachia nemorum)*

SCHEDULE 3

Regulation 2(3) and Schedule 1, Part I

WOODY SPECIES

Alder *(Alnus glutinosa)*

Apple, crab *(Malus sylvestris)*

Ash *(Fraxinus excelsior)*

Aspen *(Populus tremula)*

Beech *(Fagus sylvatica)*

Birch, downy *(Betula pubescens)*

Birch, silver *(Betula pendula)*

Black-poplar *(Populus nigra sub-species betulifolia)*

Blackthorn *(Prunus spinosa)*

Box *(Buxus sempervirens)*

Broom *(Cytisus scoparius)*

Buckthorn *(Rhamnus cathartica)*

Buckthorn, alder *(Frangula alnus)*

Butcher's-broom *(Ruscus aculeatus)*

Cherry, bird *(Prunus padus)*

Cherry, wild *(Prunus avium)*

Cotoneaster, wild *(Cotoneaster integerrimus)*

Currant, downy *(Ribes spicatum)*

Currant, mountain *(Ribes alpinum)*

Dogwood *(Cornus sanguinea)*

Elder *(Sambucus nigra)*

Elm *(Ulmus species)*

Gooseberry *(Ribes uva-crispa)*

Gorse *(Ulex europaeus)*

Gorse, dwarf *(Ulex minor)*

Gorse, western *(Ulex gallii)*

Guelder rose *(Viburnum opulus)*

Hawthorn *(Crataegus monogyna)*

Hawthorn, midland *(Crataegus laevigata)*

Hazel *(Corylus avellana)*

Holly *(Ilex aquilfolium)*

Hornbeam *(Carpinus betulus)*

Juniper, common *(Juniperus communis)*

Lime, large-leaved *(Tilia platyphyllos)*

Lime, small-leaved *(Tilia cordata)*

Maple, field *(Acer campestre)*

Mezereon *(Daphne mezereum)*

Oak, pedunculate *(Quercus robur)*

Oak, sessile *(Quercus petraea)*

Osier *(Salix viminalis)*

Pear, Plymouth *(Pyrus cordata)*

Pear, wild *(Pyrus pyraster)*

Poplar, grey *(Populus x canescens)*

Poplar, white *(Populus alba)*

Privet, wild *(Ligustrum vulgare)*

Rose *(Rosa species)*

Rowan *(Sorbus aucuparia)*

Sea-buckthorn *(Hippophae rhamnoides)*

Service-tree, wild *(Sorbus torminalis)*

Spindle *(Euonymus europaeus)*

Spurge-laurel *(Daphne laureola)*

Walnut *(Juglans regia)*

Wayfaring-tree *(Viburnum lantana)*

Whitebeam *(Sorbus species)*

Willow *(Salix species)*

Yew *(Taxus baccata)*

PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

GREAT CRESTED NEWT PRESENCE AND ABSENCE SURVEY

MAY 2012

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DOCUMENT CONTROL

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PROJECT: PEEL HALL, WARRINGTON

JOB NO: 1820

CLIENT: SATNAM MILLENNIUM LTD

Prepared by: Ian Ryding	**Date: 18.05.12**
Surveyor: Ian Ryding	**Date: 18.05.12**
Checked by: Dave Starkie	**Date: 21.05.12**
Approved for distribution by: Lorna Cruice	**Date: July 2016**

Document

Status	Description	Rev date	By	Approved by	Issued To	Issue date	Comments
FINAL	**GCN Phase 1 Survey**		**IR**	**CW**	**Satnam**	**18.05.12**	
FINAL	**GCN Phase 1 Survey**		**IR**	**LAC**	**Satnam**	**06.07.16**	

Revisions to Final Document

Rev	Description	Rev date	By	Approved by	Issued to	Issue date	Comments

CONTENTS:

1.0 INTRODUCTION

Reasons for study

1.1 Appletons have been commissioned by the Satnam Group, to undertake a Great Crested Newt Presence and Absence Survey, database search and evaluation of the further surveys that may be required on two areas of land at Peel Hall, Warrington. The report has been prepared by Ian Ryding, Consultant Ecologist to the Appleton Group.

1.2 The surveys were requested to provide up to date baseline data on the presence/absence of great crested newt (GCN) in ponds within 250m of the Peel Hall site.

1.3 The great crested newt is comprehensively protected under both British and European law. The species is protected/listed under the following statutory instruments;

- Appendix II of Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats).
- Annex II of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora.
- Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora.
- Schedule 5 of Wildlife and Countryside Act 1981 (and later amendments).
- Species of Principle Importance under Section 74 of the CROW Act 2000.

1.4 The study includes an evaluation of the ecological significance of the survey findings.

Location

1.5 The survey covered all ponds within a 290m radius of the proposed development. Their location is shown on Map 1 in the appendix.

Constraints

Pond 1:

1.6 Dense bramble along most of the banking restricted torch therefore searches were undertaken within the water. Whilst this allowed a search of 100% of the pond surface, it also increased turbidity significantly. Aquatic and emergent vegetation combined with decaying leaves and stems floating on the surface further constrained the torch survey. The constraint in respect of torch survey is considered to be moderate-high. There were no constraints to bottle trapping.

Pond 2:

1.7 Areas of the western margins were very deep, making access impossible, whilst the remainder of the pond was shallower. Dense patches of aquatic vegetation at the north and south of the pond limited torch search visibility, and an increase in turbidity was noticed toward the end of the survey period following heavy rainfall. Dense willow growth to the north east of the pond further hampered access to that area. The constraint associated with torch survey is considered to be low-moderate and very locally high. Traps could not be set in inaccessible sections of the north east and a deep section of the western margin and the constraint to trapping is considered to be moderate.

Pond 3:

1.8 Seasonal drying had undertaken by the time of the first visit and only a small section of water was deep enough to sink 5 traps. After heavy rain the surface area and depth increased considerably allowing a greater number of traps to be set. No other constraints were noted.

Pond 4:

1.9 A large but very poor pond where a targeted approach to trapping was taken whereby traps were set around areas of vegetation likely to be populated by amphibians. Areas of the margins were inaccessible due to dense tree growth making them unsearchable by torch. The overall constraint is considered to be low-moderate.

Pond 5:

1.10 Dense aquatic vegetation generated high constraints to torch survey locally. An increase in turbidity occurred towards the end of the survey period which further reduced visibility in the open water. Constraint to torch survey was moderate-high. There were no constraints to bottle trapping.

Pond 6:

1.11 Dense tree growth along the western bank prevented access to parts of the area for torch searches. Locally dense patches of aquatic vegetation on the eastern margins reduced visibility in these areas, and an increase in turbidity towards the end of the survey period slightly reduced visibility. Constraint to torch survey is considered to be moderate and there were no significant constraints to bottle trapping.

2.0 SURVEY RESULTS

AMPHIBIAN SURVEY

Pond Descriptions

2.1 The locations of the ponds surveyed are shown on the location plan in the Appendix. All ponds within 290m of the site were surveyed.

Pond 1:

2.2 This is a small linear pond located on the edge of an abandoned arable field approximately 60m from the proposal site. The pond is heavily shaded by immature willow scrub during summer and stands of bulrush are established on the margin and in its centre. Common duckweed covers most of the pond's surface.

Pond 2:

2.3 This pond is shallow and shaded and is probably a marl pit. The pond is likely to dry out in certain years but not annually. Plant material for egg deposition is restricted to several square metres of floating sweet-grass, creeping buttercup and water forget-me-not where the pond isn't too shaded. The pond is approximately 150m from the site.

Pond 3:

2.4 This is a shallow seasonal pond that is expected to dry out annually. The pond has formed possibly as a result of impeded drainage in a shallow hollow and is dominated by reed canary grass, creeping bent and floating sweet-grass. The pond is approximately 190m from the site.

Pond 4:

2.5 This is a shallow shaded pond that has formed in an area of low-lying land within a broad-leaved plantation woodland. Several trees have fallen over in this pond and there may also be alder that have died as a result of *Phytophthora* infection. The

pond has no significant emergent/marginal vegetation. The pond is approximately 216m from the site.

Pond 5:

2.6 This pond is deep and appears to be a former marl pit. The pond has a well developed marginal/emergent flora including creeping bent, floating sweet-grass and creeping buttercup and has a population of coarse fish.The pond is moderately shaded and is located on the northern edge of a broad-leaved plantation woodland. The pond is approximately 213m from the site.

Pond 6:

2.7 A deep shaded pond on the northern edge of a broad-leaved plantation woodland. There is a limited emergent flora of creeping bent, floating sweet-grass and yellow iris. The pond is approximately 289m from the site.

Habitat Suitability Index Survey

2.8 All of the ponds surveyed were subject to a Habitat Suitability Survey (HSI). The table below shows the scores generated by the survey.

Pond ref	Pond 1	Pond 2	Pond 3	Pond 4	Pond 5	Pond 6
SI1 - Location	1	1	1	1	1	1
SI2 - Pond area	0.1	1	0.7	1	0.7	0.7
SI3 - Pond drying	0.9	1	0.1	1	0.9	0.9
SI4 - Water quality	0.67	0.33	0.33	0.33	0.67	0.67
SI4 - Shade	1	0.4	1	0.2	0.8	0.6
SI6 - Fowl	1	1	1	1	1	1
SI7 - Fish	1	1	1	1	0.33	0.33
SI8 - Ponds	1	1	1	1	1	1
SI9 - Terr'l habitat	1	0.67	1	1	1	1
SI10 - Macrophytes	1	0.4	0.8	0.4	0.9	0.5
HSI	0.76	0.72	0.67	0.70	0.79	0.73

2.9 Categorisation of HSI scores

HSI Pond suitability

<0.5	= poor
0.5 – 0.59	= below average
0.6 – 0.69	= average
0.7 – 0.79	= good
> 0.8	= excellent

2.10 The findings of the HSI survey show that all of the ponds except Pond 3 have above 'average' scores in respect of potential suitability for GCN and that Pond 3 is at the upper end of 'average'. It should be noted that scoping surveys undertaken before the HSI and based on extensive survey experience and knowledge of GCN indicated the following.

Pond 1:Moderate-high GCN potential.	Pond 2: Low-moderate GCN potential.
Pond 3:Low-moderate GCN potential.	Pond 4:Low-moderate GCN potential.
Pond 5:Moderate-high GCN potential.	Pond 6:Moderate-high GCN potential.

2.11 Based on the above there is obviously a broad correlation between the HSI and the scoping survey that preceded it.

Pond Photographs

Pond 1

Pond 2

Pond 3

Pond 4

Pond 5

Pond 6

Survey Methodology

2.12 The amphibian surveys comply with all requirements of English Nature (2001) guidelines as set out in the publication *'Great Crested Newt Mitigation Guidelines', English Nature (August 2001).* The survey method employed was 'Presence/absence Survey' as detailed on page 26, section 5.7.2.1 of the above guidelines. The survey requires that three survey methods (torch survey, egg search and bottle trapping) are completed for each visit.

2.13 There should be four visits in suitable weather conditions, between mid-March and mid-June, with at least two of these visits during mid-April to mid May.

2.14 The methods are briefly described as follows;

Egg search:

Egg searches (but not egg counts) of all suitable vegetation in each pond were undertaken to determine breeding presence or absence of newt species.

Total number of visits 4.

Bottle trapping:

Two litre sized plastic bottle traps were set with fixing canes in the evening. The traps were set at 2 metre intervals around the pond margins where possible, when minimum overnight temperatures were at least 7 ºC. *(Minimum temperature requirement 5ºC)* The traps were then checked early the following morning and all trapped animals released immediately.

Total number of visits 4

Night-time torch counts:

Night-time torch counts were undertaken when weather conditions were suitable *(i.e. Minimum temperature of 5* ºC, *relatively calm with little wind affecting the pond surface and no rain)*. The night-time air temperature was at least 7ºC during each

survey. The climatic and environmental conditions were recorded during each survey, together with amphibian sightings.

It should be noted that high powered ‘Clulite’ torches of 1 million candle power, were used for this survey.

Total number of visits 4

Survey Results

2.15 Great crested newt surveys were undertaken in Ponds 1, 2, 3, 4, 5 and 6. The results of the survey are presented on the tables on the following pages.

Pond 1:

Egg search:

Survey date: **Results:**

19/04/12	No records
21/04/12	No records
04/05/12	No records
11/05/12	No records

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	40%	70%	3 SN
20/04/12	8ºC	0 mph	Overcast	40%	70%	6 SN
03/05/12	10ºC	0 mph	Overcast	40%	80%	8 SN
10/05/12	15ºC	1-3 mph	Light rain	70%	80%	Negative

Bottle trapping:

Number of Traps: 15

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	2♀ SN
20/04/12 21/04/12	9ºC	7ºC	5ºC	1 ♀ SN
03/05/12 04/05/12	12ºC	9ºC	8ºC	3 ♀ SN, 2 ♂ SN
10/05/12 11/05/12	16ºC	11ºC	8ºC	1 ♂ SN

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; CT = Common toad.

Pond 2:

Egg search:

Survey date: **Results:**

19/04/12	No records
21/04/12	No records
04/05/12	No records
11/05/12	No records

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	50%	30%	3 SN
20/04/12	8ºC	0 mph	Overcast	50%	30%	4 SN
03/05/12	10ºC	0 mph	Overcast	60%	30%	1 SN
10/05/12	15ºC	1-3 mph	Light rain	70%	30%	Negative

Bottle trapping:

Number of Traps: 30

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	Negative
20/04/12 21/04/12	9ºC	7ºC	5ºC	Negative
03/05/12 04/05/12	12ºC	9ºC	8ºC	1 ♀ SN
10/05/12 11/05/12	16ºC	11ºC	8ºC	Negative

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; CT = Common toad.

Pond 3:

Egg search:

Survey date: **Results:**

19/04/12	No records
21/04/12	No records
04/05/12	No records
11/05/12	No records

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	60%	70%	1 SN, 3CF larvae
20/04/12	8ºC	0 mph	Overcast	70%	70%	7 SN, 5 CF larvae
03/05/12	10ºC	0 mph	Overcast	80%	70%	Negative
10/05/12	15ºC	1-3 mph	Light rain	80%	70%	Negative

Bottle trapping:

Number of Traps: 5 - 20

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	1 ♂ SN, >30 CF larvae
20/04/12 21/04/12	9ºC	7ºC	5ºC	1 ♀ SN
03/05/12 04/05/12	12ºC	9ºC	8ºC	5 CF larvae
10/05/12 11/05/12	16ºC	11ºC	8ºC	Negative

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; CT = Common toad.

Pond 4:

Egg search:

Survey date: **Results:**

19/04/12	No records
21/04/12	No records
04/05/12	No records
11/05/12	No records

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	20%	20%	2 SN
20/04/12	8ºC	0 mph	Overcast	20%	20%	4 SN
03/05/12	10ºC	0 mph	Overcast	40%	20%	Negative
10/05/12	15ºC	1-3 mph	Light rain	60%	20%	Negative

Bottle trapping:

Number of Traps: 30

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	2♀ SN, 2 ♂ SN
20/04/12 21/04/12	9ºC	7ºC	5ºC	2 ♀ SN, 1 ♂ SN
03/05/12 04/05/12	12ºC	9ºC	8ºC	Negative
10/05/12 11/05/12	16ºC	11ºC	8ºC	Negative

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; CT = Common toad.

Pond 5:

Egg search:

Survey date:	**Results:**
19/04/12	SN eggs present
21/04/12	SN eggs present
04/05/12	SN eggs present
11/05/12	SN eggs present

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	40%	50%	3 SN, 1 Sb
20/04/12	8ºC	0 mph	Overcast	40%	50%	3 SN
03/05/12	10ºC	0 mph	Overcast	40%	50%	9 SN, 1 Sb
10/05/12	15ºC	1-3 mph	Light rain	60%	50%	14 SN

Bottle trapping:

Number of Traps: 30

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	2 ♀ SN, 6 ♂ SN
20/04/12 21/04/12	9ºC	7ºC	5ºC	2 ♀ SN, 1 Sb
03/05/12 04/05/12	12ºC	9ºC	8ºC	3 ♀ SN, 1 ♂ SN, 1 Sb
10/05/12 11/05/12	16ºC	11ºC	8ºC	5 ♀ SN, 6 ♂ SN, 3 CF larvae

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; Sb= Stickleback

Pond 6:

Egg search:

Survey date: **Results:**

19/04/12 SN eggs present
21/04/12 SN eggs present
04/05/12 SN eggs present
11/05/12 SN eggs present

Night-time torch counts:

Date of Survey	Air Temp	Wind Strength	Weather Conditions	Water Turbidity	Aquatic Macrophyte Cover (%)	Results
18/04/12	7ºC	0mph	Overcast	40%	30%	1 SN
20/04/12	8ºC	0 mph	Overcast	40%	30%	5 SN
03/05/12	10ºC	0 mph	Overcast	60%	40%	2 SN, 2CF larvae
10/05/12	15ºC	1-3 mph	Light rain	80%	40%	3 SN

Bottle trapping:

Number of Traps: 25

Date of Survey	Setting Air Temp. (PM)	Checking Air Temp. (AM)	Overnight Minimum Air Temp	Results
18/04/12 19/04/12	9ºC	8ºC	6ºC	Negative
20/04/12 21/04/12	9ºC	7ºC	5ºC	Negative
03/05/12 04/05/12	12ºC	9ºC	8ºC	2 ♀ SN
10/05/12 11/05/12	16ºC	11ºC	8ºC	2 ♀ SN, 1 ♂ SN, 1CF larva

Key: GCN = Great crested newt; SN = Smooth newt; CF = Common frog; CT = Common toad.

3.0 EVALUATION

EVALUATION OF SURVEY RESULTS:

3.1 Amphibian surveys have been completed on the site in compliance with all requirements as set out in the publication 'Great Crested Newt Mitigation Guidelines', English Nature (August 2001).

3.2 The survey revealed an absence of great crested newt in the ponds surveyed.

3.3 Smooth newt were found in all of the ponds and are considered to be possibly breeding, however this was only confirmed by the presence of eggs in Ponds 5 and 6.

3.4 Common frog was found to be breeding in Ponds 3, 5 and 6.

3.5 Pond 5 contains coarse fish including sticklebacks which are a negative feature.

3.6 There were constraints generated by turbidity, macrophyte cover and localised limited access for bottle trapping in some of the ponds. However the constraints are not considered to have reduced the effectiveness of the survey significantly.

4.0 REFERENCES

English Nature (2004) *An Evaluation of the Effectiveness of Great Crested Newt (Triturus cristatus) Mitigation Projects in England, 1990 –2001.* English Nature Research Report 575

English Nature (2004) *An Assessment of the Efficiency of Capture Techniques and the Value of Different Habitats for the Great Crested Newt (Triturus cristatus).* English Nature Research Report 576

English Nature, (2001) *Great Crested Newt Mitigation Guidelines.* English Nature.

Joint Nature Conservation Committee, (1998) *Herpetofauna Workers' Manual.* JNCC, Peterborough.

Langton, T., Beckett, C., & Foster, J. (2001) *Great Crested Newt Conservation Handbook.* Froglife.

APPENDIX

Pond Survey Location Plan

KEY

Pond Locations

Peel Hall Farm, Warrington

THE Appleton GROUP

PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

DUSK BAT SURVEYS

DECEMBER 2015

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DOCUMENT CONTROL

TITLE: DUSK BAT SURVEYS

PROJECT: PEEL HALL, WARRINGTON

JOB NO: 1820

CLIENT: SATNAM MILLENNIUM LTD

Prepared by: Ian Ryding	**Date: Dec 2015**
Surveyor: Ian Ryding	**Date: Dec 2015**
Checked by: Dave Starkie	**Date: Dec 2015**
Approved for distribution by: Lorna Cruice	**Date: July 2016**

Document

Status	Description	Rev date	By	Approved by	Issued To	Issue date	Comments
FINAL	**Bat Dusk Surveys**		**SI**	**LAC**	**Satnam**	**07.07.16**	

Revisions to Final Document

Rev	Description	Rev date	By	Approved by	Issued to	Issue date	Comments

CONTENTS:

1.0 INTRODUCTION

1.1 As part of a proposed development at Peel Hall Farm, Warrington, a comprehensive ecological evaluation was undertaken of the site (Fig. 1) in June 2013. Due the time lapse since 2013 the study site was re-evaluated to determine in any of the species-specific surveys would require updating in 2015. As part of the ecological update bat dusk activity surveys, relative to bats, was undertaken during the 2015 bat activity season.

Figure 1: Extent of site

1.2 Bat Conservation Good Practice Survey Guidelines include reference to activity surveys in relation to the level of survey effort that is required relative to the size, nature and projected development costs of a given site. From the daytime site visit the site habitat is classified as Medium (Page 5, Table 1) notwithstanding this guidance the extract below is relevant when decisions are made regarding the formulating of survey effort.

The guidance should be interpreted and adapted on a case-by-case basis, according to the expert judgement of those involved. There is no substitute for knowledge and experience in survey planning, methodology and interpretation of findings, and these guidelines are intended to support these. Where examples are given they are descriptive rather than prescriptive.

2.0 BATS AND THHRIR REQUIREMENTS

2.1 All British bats and their **roosts are afforded protection under the 1981 Wildlife & Countryside Act (as amended) and are listed in Schedule 2 of the Conservation of Habitats & Species Regulations 2010 (as amended). When dealing with cases where a European Protected Species (all UK bats) may be affected, a planning authority is a competent authority within the meaning of the Regulation 7 of the 2010 Regulations and therefore has a statutory duty to have due regard to the provisions of the Regulations in the exercise of its functions.

2.2 The National Planning Policy Framework (NPPF) has replaced the existing Planning Policy Guidelines. (PPG's) In relation to wildlife PPG 9 was one of the documents to which Planning Authorities referred to, particularly where a specially protected species is or may be present and will be affected by a development for which a Planning application seeks consent. The aims of the NPPF in relation to species and habitats are that it places a clear responsibility on Local Planning Authorities to conserve and enhance biodiversity and to encourage on the consideration that should be given to Protected Species where they may be affected by development. The Office of the Deputy Prime Minister (ODPM) Circular 06/2005 provides administrative guidance on the application of the law in relation to planning and nature conservation.

2.3 This is supported by a guide to good practice entitled 'Planning for Biodiversity and Geological Conservation: Building in Biodiversity' in which paragraphs 5.34 and 5.35 identify that species such as bats are highly dependent upon built structures for survival and that roosts can be easily incorporated into existing and new developments/conversions to benefit these species.

2.4 When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

2.5 Use of Buildings/Trees by Bats

a) Summer breeding roost.
b) Hibernation.
c) Transitional or temporary roost.

***Roost selection is often closely correlated to suitable foraging habitat within a reasonable commuting distance from the roost and different sites are used depending upon insect densities and abundance, climatic conditions can also affect their ability to successfully forage. All British bats are insectivorous.*

*** The term roost is generically referred to as a place that bat/s use for the any of the above reasons, however it should be noted that under the Conservation of Habitats & Species Regulations 2010 (Regulation 41) the term roost is not used but refers to "a breeding site or resting place of such an animal" and is afforded legal protection. The roost, breeding site or resting place of bats, which ever terminology is used is legally protected whether or not bats are in occupation.*

3.0 HABITATS USED BY BATS

3.1 The frequency that bats are encountered during habitat surveys will depend upon several factors:

- Number of roosts within or in close proximity to the survey area and the number of individuals in the roost.
- The availability of quality foraging habitat and the distance to which it is located from a roost.
- The quantity and diversity of invertebrates.

3.2 Where an abundance of quality or similar habitat is present then the distribution of bats tends to be greater, which will avoid competition for food and the frequency that bats are encountered may be reduced, which can give the impression that bat populations are low.

3.3 Furthermore, although there is often an overlap of species at some feeding sites there can be a slight variation in actual foraging by each species, which is often subtle and the peak feeding time is generally up to two hours post emergence and approximately an hour before dawn.

3.4 Use of foraging places will vary at different times of the year and will depend upon insect densities which in turn can be affected by climatic conditions both within the general and localized area; for example, around ponds which receive partial or no shelter at all or around woodland edge. Therefore, the optimum time to undertake habitat surveys for bats is May – August which covers the main activity period.

3.5 Many small-medium bat species rely upon linear features, such as hedgerow, for commuting from roosts to favoured foraging areas, but Pipistrelle (*Pipistrellus*) bats, which is the most frequently occurring species in the UK and in Merseyside, will regularly fly over open spaces, some of which appear to be quite hostile for a small mammal.

4.0 DAYTIME/ DUSK SURVEY METHODOLOGY

4.1 The re-evaluation of the study site was conducted in July 2015. During the re-evaluation the site was assessed relative to its value in supporting foraging bats and if any obvious commuting features exist. Also assessed was the possible presence tree roost potential. Although built structures exist within the site boundaries, the survey commission did not include these features per se, but a general reference is made of buildings within and outside of the site boundaries in context with roost potential and use of the site by bats.

4.2 As part of the re-evaluation a data search was obtained from RECORD, which included bat records; the extent of the data search covered the study site (i.e. red overlaid area in Fig.1) and also extended to include all areas within 500m of the site boundaries.

4.3 Based on the collective experience, knowledge and judgement within the survey team and the nature/size of the site, i.e. the most favourable habitat is by and large concentrated in specific locations of the site. Four dusk habitat surveys were undertaken within four distinct but connected compartments, which were considered to be an adequate level of survey effort relative to the classification of the site. Surveys were conducted by a team of four highly experienced bat ecologists. Each survey was completed by two or three of that team depending on the nature of the devised transects, of which 6 in total were completed.

4.4 The undertaking of dawn surveys was not considered to be relevant for the purpose of the survey for the following reasons:-

- By and large foraging activity post dusk emergence tends to be greater than dawn
- Commuting activity into a site can adequately be determined during dusk emergence surveys
- The high value habitat relative to bats is localised and does not cover the whole site
- Dawn surveys are more useful relative to locating roosts by “back tracking” bats to a roost rather than assessing use of habitat for foraging & commuting purposes
- Some species return unseen to roosts whilst conditions prior to dawn are still dark

Table 1

	Bat habitat quality		
	Low habitat quality	Medium habitat quality	High habitat quality
Large sites, proposed for major infrastructure developments • **Site area[4] >15ha (or 5ha for brownfield sites)** • **Project value >£20M**	**Transect surveys**		
	One visit per transect each season (spring, summer and autumn)	One visit per transect each month (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two visits per transect each month may be requested (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.

4.5 The dusk habitat surveys were undertaken on 28th July, 24th August, 17th September and 23rd September 2015 respectively to cover a broad range of the bat active season. The team of surveyors who undertook the surveys comprised the following:

- Mr S Irwin (Class 2 Natural England Bat license: 13604)
- Ms K Wilding (Class 2 Natural England Bat license: 14227)
- Mr J Thomson (Class 2 Natural England Bat license: 14226)
- Mr H Green (Class 2 Natural England Bat license: 03290)

The number of surveys/ surveyors was adequate relative to the location, size and nature of the site and the level of survey effort was established by the judgement of the lead surveyor Mr S Irwin who has over thirty years' experience of bat surveying.

4.6 Surveyors initially adopted static positions (Fig. 2), which varied over the four surveys in accordance with the prescribed transect routes (Fig. 3) and amounted to a total of 9 static observations posts (SP) to locate commuting activity/routes into the site; static positions were selected relative to their proximity to buildings that may offer roost potential. Observations continued for approximately 20 minutes after sunset to allow for the identification of any bat commuting route into the site following roost emergence. Walked transects were then conducted that, collectively between the surveyors over the four surveys, covered the entire study site with particular focus on areas considered most valuable to foraging/commuting bat (e.g. woodland edge and field margin habitats).

4.7 In addition and for survey variation "stopping" points over a 3 minute time period were incorporated into some transects. Surveyors were aided with hand held Anabat electronic bat

detectors, to locate and record the high frequency calls that are emitted by bats. Recorded echolocation calls were then analysed with computer software to verify field results.

5.0 CONSTRAINTS

5.1 Due to the presence of foliage a detailed inspection of trees for bat roost potential that may include woodpecker, natural holes, splits, loose bark or cavities for such features was not achievable. No constraints relative to access or weather were experienced during the dusk habitat surveys that would prevent the gathering if information on which to base conclusions in relation to how bats are using the site.

6.0 SURVEY RESULTS

6.1 The site is located within the northern limits of Warrington, Cheshire, at approximately 3.2 kilometres north from Warrington town centre (SJ 61601 91689), and is surrounded by a mix of urban residential dwellings, industrial estate, road infrastructure (major and minor), arable land, and other open green space (e.g. golf course). Broadly, the study area comprises large abandoned improved grass/arable fields, which are subdivided by hedgerow and ditches. Other habitats include mature and immature broad-leaved woodland and a number of small ponds.

6.2 The site covers a total approximate area of 64 hectares and possesses an irregularly shaped boundary; it extends from northern residential areas of Warrington (i.e. Hulme and Padgate) to the M62 motorway in the north; the eastern boundary is framed by housing and public green space along Mill Lane, whereas the western extent is also delineated by residential development along Winwick Road.

6.3 When assessing the site in its entirety, it is considered to provide potentially high value foraging resource for bat species that typically inhabit such rural areas with direct connectivity to urban-residential environments – i.e. the Pipistrelle bat – as it provides ample foraging/commuting resource within range of varied and numerous roost potential. The broad habitats described in section 6.1 support other more subtle sub-elements that will undoubtedly attract a range of invertebrate prey species for foraging bats. Such elements would include dense/scattered scrub and other ruderal vegetation, and damp areas including swamp.

6.4 During the ecology survey undertaken in June 2015 trees were broadly assessed for bat roost potential that may include woodpecker, natural holes, splits, loose bark or cavities. However, due to the presence of foliage a detailed inspection for such features was not

achievable although one tree was identified as containing roost potential. Most of the woodland/linear tree is represented by young and early-mature trees with an understory of scrub and common flowering plant species; whilst early-mature trees can often contain roost potential, they are not as productive relative to tree roosts as mature–over mature specimens.

6.5 Within the urban connotations surrounding the site it is anticipated that ample opportunity for roosting Pipistrelle bats will be present, which is supported by a data search within 500m radius of, and including, the site provided by RECORD. The data search resulted a record for Common pipistrelle (*Pipistrellus pipistrellus*) at approximately 148 metres north-west of the site (i.e. at Dundee Close). This record concurs with the commuting activity that was identified during the static observations at SP1.

6.6 As a result of the static observations, C. pipistrelle bats were identified commuting from nearby roosts into the site at four locations. Commuting was from the east and from the south (Fig. 4) although numbers were not notably greater for any one observation point. No activity was recorded that would suggest the presence of tree dwelling species typically the Noctule bat. (*Nyctalus noctula*)

6.7 Throughout the transect surveys, including the “stopping points”, C. pipistrelle bats were found to forage predominantly in central and southern areas of the study site, specifically where woodland edge/linear tree and scrub/hedgerow is present. Other areas where such habitats are absent or sparse, i.e. the east and north-west, did not feature the same level of foraging activity; deviation into these areas was occasionally noted (Fig. 5). Other than C. pipistrelle, no other bat species were recorded during static observations or transects.

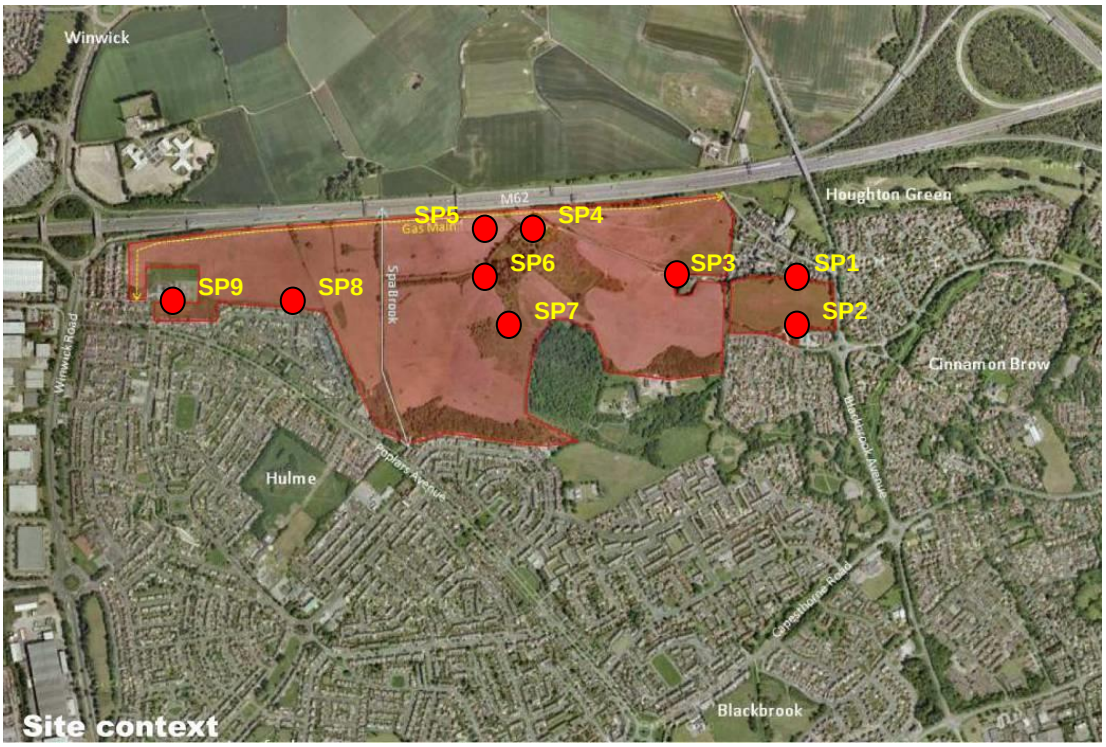


Figure 2: Static observation points (SP)

Figure 3: Combined transect route (yellow).

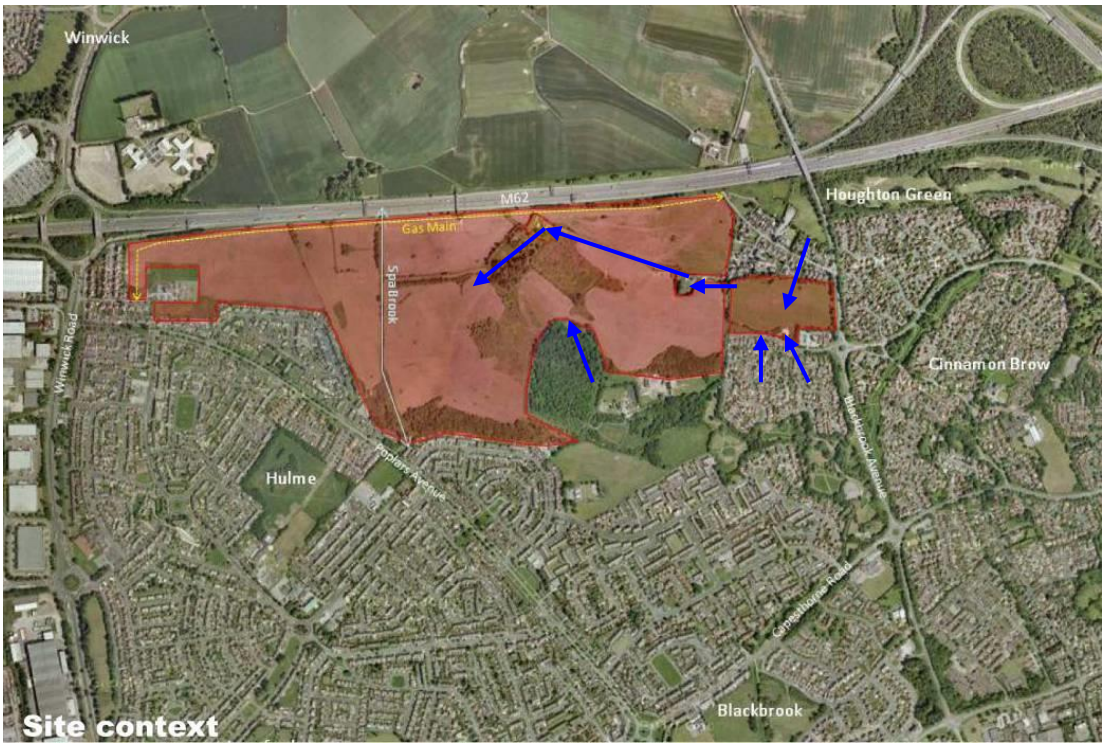


Figure 4: Commuting activity (Common pipistrelle)

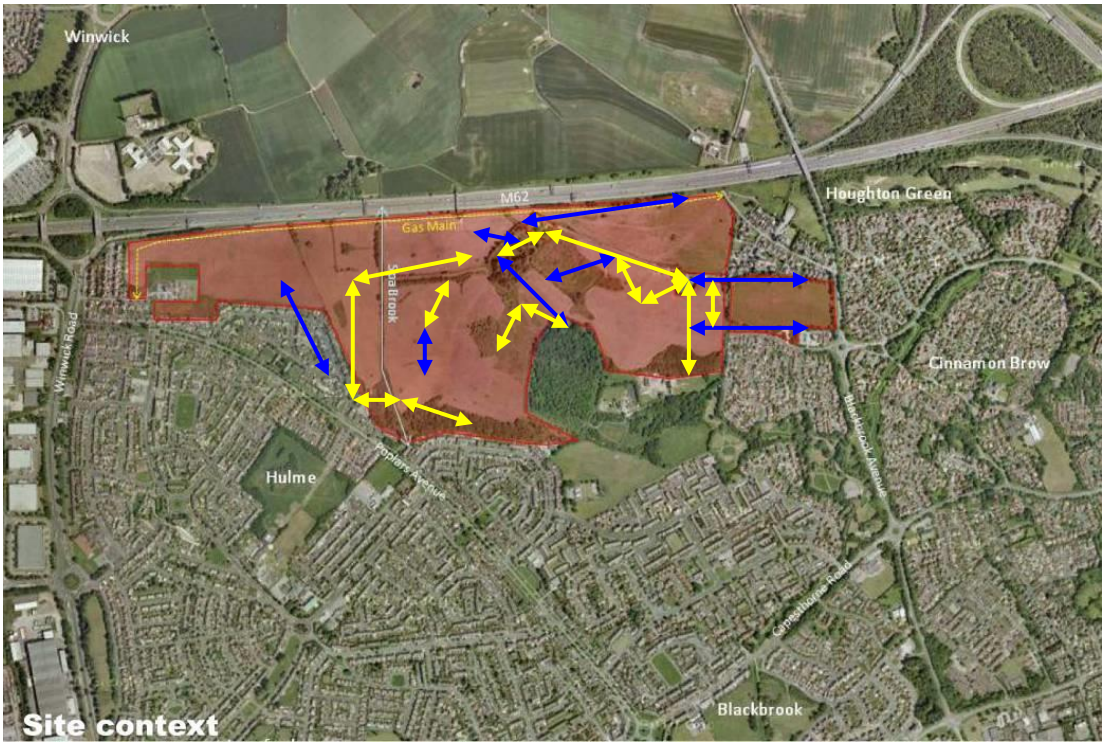


Figure 5: Foraging activity of Common pipistrelle bats

General foraging

Higher levels of foraging activity

Times of Survey	Date	Weather Conditions
Dusk survey 2100 - 2230	28.07.2015	**Sunset: 2113:** Dry (but rain prior to survey), light wind, 100% cloud cover Start temp: 13 º C End temp: 11 º C
Dusk survey 2000 – 2300	24.08.2015	**Sunset: 2020:** Dry, light wind, 60% cloud cover Start temp: 16 º C End temp: 13 º C
Dusk survey 1900 – 2130	17.09.2015	**Sunset: 1922:** Dry, still, clear sky Start temp: 15 º C End temp: 11 º C
Dusk survey 1900 – 2046	23.09.2015	**Sunset: 1917:** Dry, light wind, 100% cloud cover Start temp: 14 º C End temp: 13 º C

Date	Static point observations where bats were identified	Summary of activity during transects
28.07.15	**SP1:** 1 x C. pipistrelle commuted on to the site over Mill Lane from the direction of Dundee Close. **SP2:** 2 x C. pipistrelle bat commuted on to the site from over Mill lane.	**Summary: Consistent activity** C. pipistrelle bats foraging/commuting around peripheral areas of the parcel of amenity grass in the eastern area of the site, particularly where broadleaved linear tree is present. C. pipistrelle bats were also observed consistently foraging/commuting along Radley Lane up to and including the vicinity of Peel Hall; deviation was observed from the lane when bats foraged over contiguous areas of grass/scrub mosaic.
24.08.2015	**SP3:** 2 x C. pipistrelle appeared in the vicinity, but were not seen to commute onto the site; these bats are most likely to have been roosting at Peel Cottage as they were first observed foraging in the garden of this property. **SP4:** 1 x C. pipistrelle commuted along the lane which encircles Peel Hall.	**Summary: Consistent activity** Consistent foraging/commuting by C. pipistrelle bats within around the grounds of Peel Hall, and central and southern areas where woodland and grass/scrub mosaic is features; deviation to more open areas was noted in central western areas. C. pipistrelle bats were also observed foraging/commuting close to a section of the east boundary between Spa brook and Newhaven Road.

	SP5: 2 x C. pipistrelle came from the direction of Peel Hall; therefore, a small pipistrelle roost may be present at Peel Hall.	
17.09.2015	**SP6:** 1 x C. pipistrelle commuted from the direction of Peel Hall in a westerly direction. **SP7:** 1 x C. pipistrelle commuting along woodland edge at the southern boundary; 2 x C. pipistrelle foraging in open areas over tall ruderal vegetation; 1 x C. pipistrelle commuting along hedgerow from the direction of Peel Hall.	**Summary: Consistent activity** C. pipistrelle bats foraging/commuting around central and eastern areas; in particular around Peel Hall and along Radley Lane; bats were also observed foraging to the south and west of Peel Hall along, and with minor deviation from, hedgerow/lane. C. pipistrelle bats were also observed foraging in more open areas, i.e. in the north and south sections contiguous to Radley Lane.
23.09.2015	**SP8 & SP9:** Commuting activity on to the site not recorded at either static point	**Summary: Some consistent activity, although some areas with sporadic activity or complete absence** C. pipistrelle bats foraging/commuting within the grounds of Peel Hall and the adjoining/extending habitats, i.e. woodland and hedgerow/scrub to the south and west. This activity also extended in a southerly direction along Spa Brook and towards Newhaven Road; however, activity was absent in the sites western extent.

7.0 DUSK SURVEY CONCLUSION

7.1 From the four dusk surveys it can be concluded that parts of the study area are considered as being of high value for Common pipistrelle bats within the localised environment, i.e. Pipistrelle bats roosting in structures within the sites boundaries, and those roosting within nearby buildings in adjacent areas of residential settlement. Those parts of the study site that are concluded to be of high value for bats collectively form a favourable mosaic comprising woodland/woodland edge, scrub, tall grass/ruderal, hedgerow, sheltered lanes/paths, freshwater habitats such as running water (i.e. Spa Brook) and areas swamp. Although only one species (C. pipistrelle) has been identified as using the site for foraging/commuting purposes, it should be noted that use of the site by other species e.g. Noctule at different times of the year should not be ruled out; such is its size and suitability for bats. Throughout the site lighting is largely absent within which mosaic of habitats provides a non-illuminated environment for bats.

7.2 Common pipistrelle bats were not observed commuting into the site in relatively large numbers from any of the static observation points, either generally or from one direction. This is not to say that a maternity roost is not present locally, as when considering the number of C. pipistrelle bats observed during the transect surveys, it is highly likely that the site does support a local maternity colony through provision of ample and relatively diverse foraging resource; maternity colonies often alternate between roosts over the course of a breeding season, as result numbers of bats, commuting activity and dispersal into and over large tracts of habitat will alternate accordingly.

7.3 Instances of individual or small numbers of C. pipistrelle bats commuting into the site or from the direction of buildings within the site boundaries (i.e. Peel Hall and Peel Cottage) demonstrates that bats from a number of separate roosts in the locality are using the site for foraging purposes; the survey results suggest that bats commute into the study site from possibly four roosts.

7.4 Foraging activity by C. pipistrelle bats occurs predominantly in the central area extending from Peel Hall in the north to the woodland along the southern boundary; Radley Lane is also used consistently by C. pipistrelle bats, although not exclusively for foraging as it acts as an important avenue of dispersal for commuting bats. Collectively the aforementioned areas and their comprising semi-natural elements form a valuable local resource for Pipistrelle bats. Other areas where such habitats are absent or sparse, i.e. the east and west of the study

area where the environment becomes more open and homogenous, hold considerably less value, although deviation in foraging activity was observed into these areas over the course of the four surveys; no activity was observed in the extreme west of the study site.

7.4 Certain sections of site boundaries, notably the south and east, feature woodland and/or linear tree that not only provide foraging/commuting areas around the study site, but also connectivity to properties that exist outside its boundaries where, as no doubt, a percentage of those properties will have the capability of supporting bat roosts; the combination of high value foraging habitat in close proximity to roosts is a fundamental factor in roost selection and population survival. Fragmentation or loss of valuable foraging/commuting habitat is one of the key factors in relation to the decline of bat species. Furthermore the aforementioned habitat can be degraded by the implementation of lighting schemes that have the affect of altering the illumination levels and in doing so can lead to a disproportionate impact upon invertebrates; i.e. some species will reduce whilst others that attracted to light will increase and as result the species diversity will be lost.

7.5 The 2015 habitat surveys demonstrate that the highest level of activity is consistent with the peak time of the breeding season; whereby female bats generally forage in close proximity to the roost as they often return to tend dependant young; high activity during later times of the year usually diminishes as maternity roosts disperse, which along with a reduction of invertebrates can result in a reduction of bat numbers, which was identified during the fourth and final survey during late September.

7.6 Whilst the buildings, i.e. Peel Hall and Peel Cottage, within the site boundaries were not included within the survey remit, and it is understood that they will remain intact, no categorical evidence of emerging bats was recorded during the static observations that were undertaken in close proximity to these structures. However, the presence of bats foraging within immediate proximity to these structures during the emergence period (i.e. sunset to 20 minutes after), suggests the likelihood that each of these buildings supports roosting C. pipistrelle bats.

8.0 INDICATIVE IMPACT

8.1 **Construction/Development Period:** If those habitats identified as being of high value to commuting and foraging Pipistrelle bats, particularly those which form the central area (see section 7 for full details), are to be lost as part of the proposed scheme, then the proposed construction/development has the potential to remove foraging habitat and fragment commuting routes. The survey results demonstrate that any future construction/development has the potential to impact upon bats from up to four roosts distributed both within the site boundaries and the nearby locality. Impact would be at a local level only, although the site can be considered as being locally important.

8.2 **Operational Period:** Apart from minor light spillage into the site from contiguous infrastructure/settlement, the study site is mainly unaffected by artificial illumination; the area most affected by light spillage is at the north motorway boundary. Any future development at the site will inevitably feature a lighting scheme; without mitigation impact could occur at what foraging habitat and commuting routes that may remain or any landscape features that are included as part of the development could be affected by way of an inappropriate lighting scheme. See Appendix 1 & 2.

9.0 INDICATIVE RECOMMENDATIONS

9.1 At the time of report writing the details of site proposals is not known therefore indicative recommendation can only be produced.

9.2 Due to the identified use of the site by C. pipistrelle bats it will be productive relative to the conservation of the species if any development at Peel Hall farm is designed around existing semi-natural features – particularity those in the central area and in places where connectivity across the site is apparent by way of features such as linear tree lines and drainage ditches, all of which have been described in this document as being of high value to bats; retention of such habitats would help to preserve a foraging resource and continuity of commuting features relative to nearby roosts.

9.3 In addition to habitat retention/continuity and functionality for foraging/commuting bats across the site can be achieved through provision of access between newly erected units/housing, which could be formed by elements such as residential garden with associated tree/shrub,

tree lined roads/pedestrian pathways. If required, low level lighting could be implemented where habitat is retained and/or created; lighting should be avoided or only installed when absolutely necessary and avoid woodland/linear tree that currently forms site boundaries. Moreover, at woodland edges a degree of retained rough grassland/tall ruderal and/or scrub/shrub will be beneficial in as much as it will provide a combined and suitable habitat for invertebrates, which in turn will provide a food resource for bats.

9.4 An assessment of trees for bat roost potential should be undertaken at a time when foliage is absent; the information gathered will be used to inform whether or not any additional surveys are required if tree roost potential is identified and will also be used to inform decision making relative to any tree removal/pruning or lighting in close proximity to such potential.

9.5 As part of Cheshire Biodiversity Action Plan opportunities for bats could be incorporated into the development.

APPENDIX 1

Bats and Lighting (Bat Conservation Trust)

Bat Conservation Trust 

BATS AND LIGHTING IN THE UK
Bats and the Built Environment Series

This document is aimed at lighting engineers, lighting designers, planning officers, developers, bat workers and anyone specifying lighting. It is intended to raise awareness of the impacts of lighting on bats and mitigation is suggested for various scenarios. It also offers an explanation of the facts associated with the lighting industry for the benefit of bat workers.

This is a working document and as such the information contained will be updated in line with advances in our knowledge both into the impact on bats and also to reflect the advances in technology available in the lighting industry.

ABOUT BATS – FOR THE LIGHTING INDUSTRY

General Ecology

Bats are the only true flying mammals. Like us, they are warm-blooded, give birth and suckle their young. They are also long-lived, intelligent and have a complex social life. In Britain there are 17 species, all of which are small (most weigh less than a £1 coin) and eat insects.

Bats have evolved a number of unusual features, mainly connected with their ability to fly. Their wings are formed from a web of highly elastic skin stretched over greatly elongated finger bones, the legs and tail, though their thumbs remain free to help them cling on when roosting. Bats have also developed a highly sophisticated echolocation system that allows them to avoid obstacles and catch tiny insects, which they seize in flight or pick off water, the ground or foliage, even in complete darkness. When they're flying, bats produce a stream of high-pitched calls and listen to the echoes to produce a sound picture of their surroundings.

Some bats specialise in catching large insects such as beetles or moths but others eat large numbers of very small insects, such as gnats, midges and mosquitoes. Bats gather to feed wherever there are lots of insects, so the best places for them include traditional pasture, woodland, marshes, ponds and slow moving rivers.

During the winter there are relatively few insects available, so bats hibernate. In September and October they put on weight and then, as the weather gets colder, they seek out appropriate sheltered roosts, let their body temperature drop to close to that of their surroundings and slow their heart rate to only a few beats per minute. This greatly reduces their energy requirements so that their food reserves last as long as possible. Bats don't hibernate right through the winter but may wake up and go out to feed on mild evenings when insects are active.

During the spring and summer period female bats gather together into maternity colonies for a few weeks to give birth and rear their young (called pups). Usually only one pup is born each year. This is looked after carefully and suckled for between four and six weeks until it is old enough to fly out and hunt for itself. Bats don’t build nests and don't bring food back to the roost to feed their young, so the baby lives only on its mother's milk until it is old enough to fly. Once the baby is independent, the colony breaks up and the bats generally move to other roosts. Bats may gather together from a large area to form these maternity roosts, so any disaster at the summer breeding site can affect the whole colony of bats from a wide surrounding area. Many of these maternity sites are used every summer as bats have a strong tradition of returning to the same site year after year.

Legal Protection of bats

Due to the decline in bat numbers, all species of bat are protected by the Wildlife & Countryside Act (1981) (as amended) and the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). This makes it illegal to: kill, injure, capture or disturb bats, obstruct access to bat roosts or damage/destroy bat roosts. Lighting in the vicinity of a bat roost causing disturbance could constitute an offence, so it is important that Natural England, Countryside Council for Wales, Scottish Natural Heritage or Environment and Heritage Service, Northern Ireland is consulted and allowed time to provide advice on lighting proposals in the vicinity of bats and roosts.

Impacts on bats

Roosts

Illuminating a bat roost creates disturbance and may cause the bats to desert the roost. Light falling on a roost access point will at least delay bats from emerging and this shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed.

Insects and foraging

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats. There are two aspects to this. One is the attraction that light from certain types of lamps has to a range of insects; the other is the presence of lit conditions.

Many night flying species of insect are attracted to light, especially those lamps that emit an ultra-violet component and particularly if it is a single light source in a dark area. As well as moths a range of other insects can be attracted to light such as craneflies, midges and lacewings. Studies have shown that, although noctules, Leisler's, serotine and pipistrelle bats swarm around white mercury street lights (this would also apply to metal halide) feeding on the insects attracted to the light, this behaviour is not true for all bat species. The slower flying broad winged species such as long-eared bats, *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's), Barbastelle and greater and lesser horseshoe bats generally avoid street lights. In addition it is also thought that insects are attracted to lit areas from further afield. This is thought to result in adjacent habitats supporting reduced numbers of insects. This is a further impact on the ability of the light avoiding bats to be able to feed. It is noticeable that most of Britain's rarest bats are among those species listed as avoiding light. Clearly, effective mitigation where there is potential for impact on bats has importance in the conservation of these species.

Artificial lighting is thought to increase the chances of bats being preyed upon. Many avian predators will hunt bats which may be one reason why bats avoid flying in the day. Observations have been made of kestrels (diurnal raptors) hunting at night under the artificial light along motorways.

Lighting can be particularly harmful if used along river corridors, near woodland edges and near hedgerows used by bats. In mainland Europe, in areas where there are foraging or 'commuting' bats, stretches of road are left unlit or lighting is designed in such a way as to avoid isolation of bat colonies.

Other behaviours
Artificial lighting disrupts the normal 24-hour pattern of light and dark which is likely to affect the natural behaviour of bats. Bright light may reduce social flight activity and cause bats to move away from the light area. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross. For example, Daubenton's bats move their flight paths to avoid street lamps. The following images indicate possible scenarios where bats' commuting routes may cross a road. They are linear features such as tree lines, river corridors, hedgerows or where tree canopies form a link over the road.

ABOUT THE LIGHTING – FOR BAT WORKERS

Types of lights in use
A range of lighting equipment is available:

1) **Low pressure sodium lamps (SOX)** (typical orange lamps seen along roadsides). Light is emitted predominantly at one wavelength, contains minimal ultraviolet (UV) light and has a low attraction to insects. The lamps tend to be large which makes it more difficult to focus the light from these lamps. These are in the gradual process of being removed or replaced.
2) **High pressure sodium lamps (SON) (**brighter pinkish-yellow lamps). Commonly used as road lighting. Light is emitted over a moderate band of long wavelengths including a small UV component. Insects are attracted to the brighter light. The lamp is of medium size and the light can be more easily directed than low pressure sodium. This is the predominant lamp now in use.
3) **Mercury lamps (MBF)** (bluish-white lamps). These emit light over a moderate spectrum including a larger component of UV light to which insects are particularly sensitive. Insects are attracted in large numbers along with high densities of bat species. (Rydell & Racey 1993). They are rare now and are not used in new developments.
4) **White SON.** This is whiter than High Pressure Sodium and has a larger component of UV light.
5) **Metal Halide**. A small lamp and therefore more easy to focus light and make directional. Emits less UV light than mercury but more than high pressure sodium. It comes in three forms a) Quartz arc tube (HQI); b) Ceramic arc tube (CDM-T) and c) Cosmo which is a new ceramic form.

6) **Light Emitting Diodes** (LEDs). Predicted to compete with metal halide and high pressure sodium as a widely used light source within the next few years. The light emitted is more directional. The light is produced in a narrow beam. It is instant light.
7) **Tungsten Halogen** (more directional). It is not used in new lighting schemes but may be encountered as security light on a private household.
8) **Compact Fluorescent** Mostly in use in residential street lighting. It produces a white light; variants are available with minimal UV output. It can be used at a low wattage and therefore on a low output to achieve low lux.

Legal requirements for lighting

There is no legislation requiring an area or road to be lit.
The Building Regulations specify that 150 W is the maximum for exterior lighting of buildings but this does not apply to private individuals.
There are a number of British Standards that relate to various components of lighting and there are also guidelines that relate to crime prevention, prevention of vehicular accidents and amenity use.
Many County councils and less often District and Borough councils set out standards in local guidance policy documents. These are sometimes based on the advice given by the Highways Authority 'TA49 – Approval of new and replacement lighting on trunk roads and trunk road motorways'.
In assessing the need for lighting it would be beneficial to ask the local authority for their lighting policy document as this should incorporate all of the above.

The installation of lighting and the planning system

Domestic lighting needs no planning permission and depends on direct advice being given to the householder. Lighting associated with new development or a listed building does require planning permission. Planning officers or developers when dealing with applications for lighting in an area of suitable bat habitat eg. woodland, old pasture, linking hedgerows and water habitats) should seek information on bat roosts in the area.

If assistance is needed they can contact the BCT Bat Helpline 0845 1300 228 who may be able to suggest how best to access information on bat roosts known in the area. If bat

roosts are suspected, it may be necessary to conduct a bat survey. A survey may need to determine the species of bat affected, their population levels, the likely impact of the lighting on the bats and possible mitigation.
The need to install lighting should be questioned. Where lighting is permitted, as may be necessary for public safety, conditions should be imposed to ensure the impact of the lighting on the bats is kept to a minimum. The use of a lighting design computer program that predicts where light will fall should be used to predict the potential impact and to plan mitigation.
The consultation on the addition to PPS23 on Pollution Control of Annex 3 on lighting is on hold at the present time (July 2007) until the outcome of the Baker review is known.

MITIGATION OF LIGHTING IMPACTS ON BATS

1. BAT ROOSTS

No bat roost (including access points) should be directly illuminated. If it is considered necessary to illuminate a building known to be used by roosting bats, the lights should be positioned to avoid the sensitive areas. Close offset accent lighting causes less light pollution; it is more specific and can be designed to avoid bat sensitive areas, and better highlights the features of the subject of the illumination.

2. FORAGING AND COMMUTING

Type of lamp (light source)

The impact on bats can be minimised by the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics.

Luminaire and light spill accessories

Lighting should be directed to where it is needed and light spillage avoided. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier.

Lighting column

The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. The acceptable level of lighting may vary dependent upon the surroundings and on the species of bat affected.

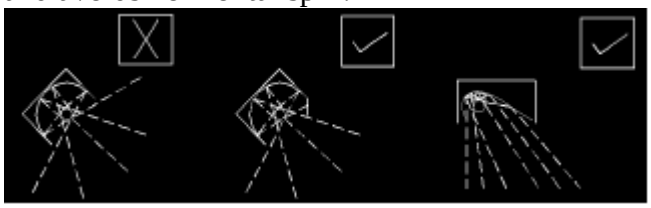
Predicting where the light cone and light spill will occur

There are lighting design computer programs that are widely in use which produce an image of the site in question, showing how the area will be affected by light spill when all the factors of the lighting components listed above are taken into consideration. This should be a useful tool to inform the mitigation process.

Light levels
The light should be as low as guidelines permit. If lighting is not needed, don't light.
Timing of lighting
The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route.

3. FLOODLIGHTING OF SPORTS OR EVENTS

The use of asymmetric beam floodlights (as opposed to symmetric) orientated so that the glass is parallel to the ground will ensure that the light is cast in a downward direction and avoids horizontal spill.



See the National Trust guide to 'Events, concerts and bats' at http://www.nationaltrust.org.uk/main/w-bat05_events.pdf for further advice on ways to reduce the impact of event lighting.

4. SECURITY LIGHTING

Power It is rarely necessary to use a lamp of greater than 2000 lumens (150 W) in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats.
Movement sensors Many security lights are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed.
Timers If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'.
Aim of light The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. This lit area must avoid being directed at, or close to, any bats' roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.
Alternatives
It may be a better solution for security lighting on domestic properties to use a porch light.

Ongoing areas of research

- The impact of light on commuting corridors used by lesser horseshoe bats. Emma Stone, University of Bristol
- The effects of lighting on prime bat foraging areas within London, concentrating on riparian habitats and open spaces. Alison Fure.
- The effect of light and noise on British bat species. Frank Greenaway.

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Glossary of terms
(used in this article or that may be used by the lighting industry)

Arc tube	A tube normally ceramic or quartz enclosed by the outer glass envelope of a HID lamp that contains the arc stream.
Asymmetric beams	Lamp is off-centre in a reflector more steeply curved at one end.
Candela	The intensity of a light source in a specific direction. Unit of Luminous intensity
Contrast	The relationship between the luminance of an object and its background. The higher

	the contrast the more likely it is an object can be seen.
Cowl	Physical light spill control accessory.
Diffuse	Term describing dispersed light distribution referring to the scattering of light.
Efficacy	A measure of light output against energy consumption measured in lumens per watt.
HID	High Intensity Discharge. Describes mercury vapour, metal halide and high pressure sodium lamps.
High Pressure Sodium Lamp	A HID lamp whose light is produced by radiation from high pressure sodium vapour which usually includes a small amount of UV light.
Hood	Physical light spill control accessory.
Illuminance	Illuminance is the quantity of light, or luminous flux, falling on a unit area of a surface. It is designated by the symbol E. The unit is the lux (lx).
Lamp	Light source.
Light cone	The angle at which the beam falls off to 50% of peak intensity.
Light Pollution	The spillage of light into areas where it is not required. Also known as obtrusive light.
Light spill	The light that falls outside the light cone.
Light Trespass (nuisance)	Light that impacts on a surface outside of the area designed to be lit by a lighting installation. The correct legal term is nuisance.
Louvres	Physical light spill control accessory.
Low Pressure Sodium	A discharge lamp in which light is produced by radiation from low pressure sodium vapour. Emits light predominantly at 589nm.
Lumen	The unit of light output from a lamp.
Luminaire	Light fitting or unit designed to distribute light from a lamp or lamps.
Luminance	The physical measure of the stimulus that produces the sensation of brightness measured by the luminous intensity reflected in a given direction. The unit is the candela per square metre (cd/m^2).
Lux (LX)	Illuminance is the quantity of light or

	luminous flux, falling on a unit area of a surface in the environment. It is designated by the symbol E. The unit is lux (lx).
Metal Halide (includes CDM-T)	A type of HID lamp in which most of the light us produced by radiation of metal halide and mercury vapours in the arc tube. Emits UV light. UV poor variants are available. It comes in three forms a) Quartz arc tube (HQI); b) Ceramic arc tube (CDM-T) and c) Cosmo which is a new ceramic form
Mercury	High pressure white light lamp that emits significant UV light.
Optic	The components of a luminaire such as reflectors, refractors, protectors which make up the directional light control section.
Photocell	A unit which senses light to control luminaires.
Reflector	A device used to reflect light in a given direction.
Refractor	A device used to redirect the light output from a lamp when the light passes through it. It is usually made from prismatic glass or plastic.
Shield	Physical light spill control accessory.
Sky glow	The brightening of the night sky caused by artificial lighting.
Symmetric beams	Lamp mounted in the centre of the reflector.
Ultra violet (UV)	Radiation that is shorter in wavelength and higher in frequency than visible violet light.
Voltage	The difference in electrical potential between two points of an electrical circuit.
Watt (W)	The unit for measuring electrical power.

APPENDIX 2

Impact upon bats by artificial lighting

Reduced foraging opportunities

Illumination of foraging areas can potentially prevent or reduce foraging activity, causing bats to pass quickly through the lit area or avoid it completely (Polak et al., 2011). Lighting can disrupt the composition and abundance of insect prey (Davies et al., 2012). Acoustic tracking demonstrated that *Eptesicus bottae* failed to forage under lit conditions (Polak et al., 2011). Artificial illumination in foraging habitats can effectively cause a loss of foraging areas for some bat species. Experiments with both captive and free-flying bats showed reduced foraging success of frugivorous bats (*Carollia sowelli*) under lit conditions. Bats harvested fewer fruits, which could have negative impacts on seed dispersal (Lewanzik and Voigt, 2014). Currently there is a lack of empirical evidence on the impact of lighting on foraging success of insectivorous bat species

Variable lighting regimes

In some cases the impacts of lighting on bats may be minimised by changing the duration and timing of lighting regimes, to suit both human and wildlife use of the site. Such strategies are termed variable lighting regimes (VLRs) and involve switching off or dimming lights for part or all of the night and could be an effective strategy to minimise effects on bats. The majority of UK local authorities and councils have commenced lighting reduction strategies and are adopting VLRs with Central Monitoring Systems (CMS) which allow for remote switching off/dimming lights when human activity is low e.g. between 00.30 and 05.30 am. Lights are being switched off between midnight and 05.00 am, using remote dimming technology, on several sections of the motorway network in England, resulting in 30% reductions of carbon and electricity consumption in each section and lower numbers of road traffic accidents after VLRs were installed (Highways Agency, 2011).

CMS technology can be used to switch lights off during periods of high bat activity, such as commuting or emergence to minimise impacts, though the peak times of bat activity may occur in the early evening when lighting is necessary because traffic and human activity levels are also high then. Lights can also be dimmed e.g. to 30% power, for periods of the night to reduce illumination and spill. CMS LED lamps have been installed along a canal used by bats in London as part of the Arcadia Project. The CMS allow bespoke dimming regimes to reduce the light levels to 1 lux at times of low human activity (Fure, 2012). The appropriate lighting regime for an area will be site-specific and dependent on the nature of public use and type and amount of bat activity.

Lights can also be fitted with movement sensors that switch lights on as people approach and switch them off after people pass. Movement sensors can reduce the overall lit time for the environment, allowing for longer periods of darkness than lamps that are lit all night, potentially reducing the impact on bats and insects. However, the effectiveness of VLRs is reliant upon a good understanding of the timing and nature of bat activity in an area. Currently the impacts of VLRs on bats, both in terms of dimming and timing of lighting, are not known and further research is required.

Reducing the intensity of light

Reducing light intensity will reduce the overall amount and spread of illumination (Gaston et al., 2012). For some bat and insect species this may be sufficient to minimise disturbance or the magnitude of any negative impacts and disruption to circadian rhythms. However, some species may require very low light levels to have little/no impact on behaviour and circadian rhythms. Stone et al. (2012) tested the effect of LED lights on bats along commuting routes at three light intensities: mean 3.6 lux, mean 6.6 lux, and mean 49.8 lux. Activity of *Rhinolophus hipposideros* and *Myotis* spp. was reduced at all light intensities, even at 3.6 lux.

Average light levels recorded along preferred commuting routes of *Rhinolophus hipposideros* under natural unlit conditions were 0.04 lux across eight sites (Stone, 2011).

When mitigating the impacts of lighting for such species, very low lux levels may not be suitable for human requirements. In such cases reducing intensity may not be appropriate and alternative strategies, such as dark corridors or physical barriers, may be preferable. Currently there is a lack of evidence regarding the light intensities below which there are no/reduced impacts on bats, and responses are likely to vary between species and behaviours. A "light threshold" below which there is little impact on bats may not exist for those species that may be light averse regardless of light intensity e.g. possibly *Rhinolophus hipposideros*.

Light intensity can be reduced by dimming lights (e.g. using CMS technology), changing the light source (e.g. new technologies such as ceramic MH often have a lower wattage compared to old lamp types such as HPS) or creating physical barriers such as walls, or hedgerows to reduce the total amount of light reaching an area. HPS lights have been fitted with louvres to reduce light spill on the Grand Canal in Dublin, reducing light intensity on the river, allowing bats to fly in darkness (Fure, 2012). However, there is a trade-off between reduced intensity and the pattern of light distribution. Some older light types such as HPS, produce a heterogeneous light environment whereby light intensity declines steeply away from the light source. However, some new technologies such as LEDs produce a uniform light distribution resulting in a loss of dark refuges between the lamps (Gaston et al., 2012). In such cases it may be preferable to increase the spacing between the units to create dark refuges to facilitate the movement of light-averse bats.

Changing the light type

Light technology is developing rapidly and there is a general trend towards white light due to the increased colour rendering and perceived brightness for the human eye compared to HPS or LPS lights (Knight, 2010 and Lockwood, 2011). Emerging light types increasing in popularity include white LED, warm-white LED, and MH. Warm white (600 nm) LED street lights are being tested in the Netherlands for their potential to reduce negative impacts on bats (Fure, 2012). There is increasing concern that the shift to broad spectrum lighting could alter the balance of species interactions (Davies et al., 2013a). Few studies have compared the effects of impacts of different light types on bats across species and behaviours, although there was no difference in the nature and magnitude of the effect of LED and HPS lights on commuting *Rhinolophus hipposideros* (Stone et al., 2012). Lights emitting blue, green or UV wavelengths, such as MH or mercury light sources, attract large numbers of insects and increase insect mortality (Bruce-White and Shardlow, 2011, Frank, 2006 and Somers-Yeates et al., 2013). Some LED lamps attract fewer insects than MH and MV (Eisenbeis and Eick, 2011). Different light types are likely to have different effects on bats, and these effects will be species- and behaviour-specific. Choice of light type, and hence its spectral distribution will inevitably be a compromise between wildlife and public requirements. However, potential negative impacts on light-averse bats and insects can be minimised by avoiding short wavelength "blue" lights (Falchi et al., 2011).

PEEL HALL, WARRINGTON

For

SATNAM MILLENNIUM LTD

ECOLOGICAL IMPACT ASSESSMENT

JULY 2016

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A. IMPACT ASSESSMENT: DETERMINING THE VALUE OF ECOLOGICAL FEATURES:

Determining the Ecological Receptors:

A1 The ecological surveys undertaken on the site have identified several ecological features on the site. These are known as the 'Ecological Receptors' and include all habitats and species that could potentially be adversely affected by the proposals. Once identified, it is important to determine how the effects of the development on the 'receptors' will be assessed. The methodology used is outlined below.

Methodology for Assessment of Effects:

A2 A means of assessing the 'quality' of the ecological receptors and determining the predicted level of impact on the receptors was required for this study.

A3 Therefore the assessment is based standard guidance from the following sources, the Institute of Ecology and Environmental Management's (IEEM) Guidelines for Ecological Impact Assessment, the *Environment Impact Assessment; guide to procedures* (DCLG 2000) and Biodiversity and Environmental Impact Assessment: A Good Practice Guide for Road Schemes (RSPB et al 2000).

A4 The above sources were consulted in order to provide the Planning Authority and the developer with clear and concise information about the likely significant ecological effects associated with the project. The methodology applied in respect of the assessment of the predicted effects on the ecological receptors is provided in **Environmental Statement Appendices at ECO 15.**

A5 A detailed assessment has been undertaken which collates the existing baseline information through field surveys that will reasonably predict the significant effects of the proposals on the Ecological Receptors.

A6 Where significant adverse effects are predicted, then wherever possible mitigation measures are provided to reduce the effect of the development to a sustainable level.

Geographic Frame of Reference:

A7 The value or potential value of an ecological receptor should be determined within a defined geographical context. The geographic frame of reference used to determine the predicted value of the ecological receptors is as follows.

International	
UK	
National	(England)
County	(Cheshire)
District	(Unitary Authority or Borough)
Local	(Parish)
Site	(Within confines of the site)

A8 It should be noted that at Peel Hall the receptor values range only between 'District' and 'Site'. The value of habitats and species has been measured against published selection criteria which for example include the following.

- Guidelines for the selection of biological SSSIs.
- Local Wildlife Site Selection Criteria for the Cheshire Region.
- UK Biodiversity Action Plans and Section 41 Species and Habitats of Principle Importance in the UK. (NERC Act).
- Countryside and Rights of Way (CROW) Act 2000.
- Any relevant Red Data List/Book species and Nationally Scarce species not covered by the above, or any other lists / schedules of species rarity or importance.

A9 The legislative requirements of key species and habitats are also considered in this assessment and include the following:

- Wildlife and Countryside Act 1981 (as amended).
- Conservation of Habitats and Species Regulations 2010.
- Protection of Badgers Act 1992.

Evaluation of the Ecological Receptors:

A10 All of the habitats recorded on the site are evaluated below using the Geographic Frame of Reference as outlined above.

A11 The site is large, therefore the evaluation also considers the 'collective value' of the habitats on the site. A statement of overall value is provided in **Table 1**.

Habitats - Woodland:

A12 The woodlands on the site are predominantly immature and less than 30 years old. A small, single stand of mature plantation approximately dating from the latter half of the 19th century is also present. The woodlands are of **Local** value and have no attributable NVC affiliation.

A13 Radley Plantation is located directly adjacent to the site and whilst outside of the proposal area, it is notable as it is a Cheshire Local Wildlife Site (LWS) and is therefore of County importance. (See Radley Plantation & Pond WA047)

Habitats - Hedgerows:

A14 Native Hedgerows are restricted to five sections of species-poor hedge. None display any great age and none of the hedgerows are 'important' as defined by the Hedgerow Regulations, but are S41 habitats. With the exception of a willow dominated hedge, the native hedgerows broadly conform to the **W21** *Crataegus monogyna - Hedera helix* scrub community of the NVC. The willow hedge has no NVC affiliation.

A15 The native hedgerows are S41 habitats and Cheshire Local Biodiversity Action Plan Habitats (LBAP) and are of **Site - Local** value only.

Habitats - Streams/ditches.

A16 Spa Brook and the other ditches on the site are significantly modified and lack typical geomorphological features. There are no notable associated plant communities and no affiliation with the S41 category 'Rivers', on account of the prevailing poor/modified conditions. The streams/ditches are considered to be of **Site - Local** value.

Habitats - Grassland (including derelict arable land):

A17 The grasslands are predominantly rank, abandoned/disturbed arable and improved land. Other grasslands include formal amenity grasslands used as sports pitches and for informal public recreation. The coarse grasslands have some broad affinity with the **MG1** *Arrhenatherum* elatius community of the NVC, however due to the level of disturbance atypical communities also occur.

A18 The playing fields/amenity grasslands are composed of a sown mix of robust grass species and have no NVC association.

A19 Surveys undertaken on site indicate that the grasslands fail to meet the appropriate guidelines for selection as Local Wildlife Sites (LWS). Therefore the grasslands are considered to be of **Site - Local** value only.

A20 Small areas of semi-improved grassland and a small area of marsh with low floristic significance also occur and are of **Site** value only.

Habitats - Ponds:

A21 There are two ponds located on the site. The ponds are S41 habitats and Cheshire Local Biodiversity Action Plan Habitats (LBAP), however they fail to meet the qualifying criteria for LWS and are of **Site - Local** value only.

A22 Three other ponds are located adjacent to the site boundary but off-site within Radley Plantation, and form part of the LWS. (See Radley Plantation & Pond WA047). The LWS is of **County** importance.

Other Habitats:

A23 Other habitats of the site include secondary scrub, tall ruderal herb and bracken. Several small secondary dry reed beds have developed due to the cessation of farming activity. The habitats are not typical of those associated with S41, being permanently dry.

A24 The other habitats are of **Site - Local** value only.

Species - Birds:

A25 The site supports a range of common nesting birds, in addition several other species also use the site for foraging but nest off-site. These birds include species listed in Section 41, and also include LBAP species. The bird fauna of the site is considered to be of **Local-District** value.

A26 The bird populations fail to meet any of the Local Wildlife Site Selection Criteria for the Cheshire Region.

Species - Bats:

A27 The areas affected by the proposal contain no buildings or trees with bat roost potential. Foraging potential is of high value for common pipistrelle along woodland edges and linear features. Foraging is largely restricted to land east of Spa Brook.

A28 The foraging areas on the site are considered to be of **District** value for common pipistrelle bats.

Species - Badger:

A29 N/A. No evidence of badger occupation on site and very low possibility of colonisation due to major barrier effects imposed by the M62 and extensive residential areas.

Species: Water Vole:

A30 N/A. No evidence of water vole occupation on site and very low possibility of colonisation due to negligible-poor habitat conditions, and lack of connectivity beyond the site boundary.

Species - Great Crested Newt:

A31 N/A. Formal surveys indicate 'absence' in all waterbodies on site. Extensive/major barrier effects prevent colonisation of the species.

Summary Evaluation of the Ecological Receptors:

A summary of the nature conservation value of each of the ecological receptors is provided in **Table 1** below.

Table 1: Ecological Receptors - Nature Conservation Value.

Ecological Receptor	Associated Species and Habitats	Nature Conservation Value
Habitats:		
Radley Plantation & Pond LWS	Woodland and Ponds. Off-site feature located immediately adjacent to the proposal site.	County
Woodland	Mature plantation woodland >100 years old. Immature plantation woodland <30 years old.	Local
Hedgerows	Native hedgerows. (Low diversity)	Site-Local
Stream	Modified channel in Spa Brook and ditches with no significant plant communities.	Site-Local
Grassland	Coarse improved/semi-improved grassland communities and amenity grassland.	Site-Local
Arable	Derelict, abandoned arable fields with low-diversity coarse grassland.	Site-Local
Ponds	Two on-site ponds with no significant plant communities.	Site-Local
Other Habitats	Secondary scrub Tall ruderal herb and bracken Dry reed beds (secondary)	Site Site Site-Local
Collective Evaluation of Habitats	Extensive mosaic of all of the semi-natural habitats listed above. (Excluding Radley Plantation & Pond LWS)	Local-District
Species:		
Birds	Assemblages of common birds that are typical of the area.	Local-District
Bats	Woodland-edge foraging areas only. No roosts affected.	District
Badger	No evidence of occupation and very low possibility of colonisation due to major barrier effects.	Not applicable.
Water Vole	No evidence of occupation and very low possibility of colonisation due to negligible-poor habitat conditions.	Not known.
Great crested newt	Formal surveys indicate 'absence' in all waterbodies on site. Extensive/major barrier effects prevent colonisation of the species.	Not applicable.

Assessment of Potential Impacts:

A32 The evaluation of the Ecological Receptors has shown that the effects of the development will affect areas of immature woodland, coarse-low-diversity grassland, amenity grassland, hedgerows, tall ruderal herb, secondary scrub and secondary stands of dry reed bed. The individual habitats affected within the application boundary are at most of **Site - Local value** only. However the site is large and when evaluated collectively the habitats are considered to be of **Local - District** value.

A33 In addition, the collective faunal interest of the site is of **Local - District** value.

A34 The habitats within Radley Plantation and Pond LWS (off-site) are of **County value** and will not be directly affected by the proposals.

A35 The predicted effects of construction are summarised on **Table 2**, and predicted impacts of operation on **Table 3** below.

Table 2: Assessment of Potential Impacts - Construction			
Ecological Receptor	**Nature Conservation Value**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Habitats:			
Radley Plantation & Pond LWS	County	The LWS is located off-site and there are no proposals that will affect the site. Therefore the essential qualifying features and integrity of the LWS will be maintained.	No Effect.
Woodland	Site-Local	Loss of approx 2.74ha of immature woodland <30 years old during construction. Impact is reversible through provision of approx. 5.06ha of new woodland habitat buffering the M62 to the north.	Negligible Medium term effect
Hedgerows	Site-Local	The hedgerows will be retained with very limited sections directly affected.	Negligible Medium term effect
Stream	Site-Local	No effect	No effect
Grassland	Site-Local	Loss of approx. 33.7ha of low diversity grassland during construction. Partially reversible impact by provision of approx. 8.89ha of amenity grassland.	Negligible Medium term effect
Arable	Site-Local	Loss of 17.16ha of abandoned arable land with coarse low diversity plant communities	Negligible Medium term effect
Tall ruderal herb & bracken	Site	Area insignificant & un-measurable. Poor habitat - reversibility not applicable.	Negligible
Dry/secondary reed beds	Site-Local	Loss of approx. 0.8ha of secondary reed bed on abandoned farmland. Partial reversibility possible through provision of four attenuation ponds.	Negligible Medium term effect
Collective evaluation of all habitats	Local-District	Very high impacts on a large area of semi-natural habitat. Partial reversibility possible.	Moderate Adverse Medium term effect

Table 2: Assessment of Potential Impacts - Construction *Continued*			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Species:			
Birds	Local-District	Loss of extensive areas of nesting/foraging habitat for a range of common birds of Local-District value. Partially reversible impact.	Moderate adverse Medium term effect
Bats	Local-District	Loss/modification of bat foraging routes only. There are no roosts affected by the proposal. There is a reversible impact of any possible effect through the provision of new foraging areas within the landscape plan.	Moderate adverse Medium term effect
Badger	Not applicable	No effect	No effect
Water vole	Not known	No effect predicted as watercourses and buffer zones will be maintained.	No effect
Great crested newt	Not applicable	No effect	No effect

Table 3: Assessment of Potential Impacts - Operation			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Habitats:			
Radley Plantation & Pond LWS	County	The LWS is located off-site and there are no predicted adverse operational effect on the site.	No effect.
Woodland	Site-Local	Any losses of woodland will have occurred during the construction phase. No operational effects are predicted.	No effect
Hedgerows	Site-Local	Any losses of hedgerow will have occurred during the construction phase. No operational effects are predicted.	No effect
Stream	Site-Local	No effect	No effect
Grassland	Site-Local	Any losses of grassland will have occurred during the construction phase. No operational effects are predicted.	No effect
Arable	Site-Local	Any losses of arable land will have occurred during the construction phase. No operational effects are predicted.	No effect
Tall ruderal herb & bracken	Site	Area insignificant & un-measurable. No operational effects predicted.	No effect
Dry/secondary reed beds	Site-Local	Any losses of reed bed will have occurred during the construction phase. No operational effects are predicted.	No effect
Collective evaluation of all habitats	Local-District	The collective loss of habitat will have occurred during the construction phase. No operational effects are predicted.	No effect

Table 3: Assessment of Potential Impacts - Operation *Continued*			
Ecological Receptor	**Nature Conservation Value (Pre-construction)**	**Predicted Effect & Reversibility**	**Overall Effect (Without mitigation)**
Species:			
Birds	Local-District	Disturbance to nesting birds due to increased pedestrian use and general development. Partially reversible though provision of barriers and buffer zones.	Negligible - Low. Medium term effect
Bats	Local-District	Impact on bat foraging areas through site lighting. There is a reversible impact of any possible effect through the provision of an appropriate lighting plan.	Negligible - Low. Medium term effect
Badger	Not applicable	No effect	No effect
Water vole	Not known	No effect predicted as watercourses and buffer zones will be maintained.	No effect
Great crested newt	Not applicable	No effect	No effect

A34 The evaluation of the predicted effects has shown that a **Moderate Adverse** effect is predicted on the site as a whole through the loss of common but extensive semi-natural habitats during construction. These effects are short-term and partially reversible through restoration and provision of new habitats. There will be **No Effect** on the adjacent LWS Radley Plantation and Pond.

A35 Critical to a moderate adverse effect being predicted, is the overall low diversity and rankness of the plant communities on the site, and artificial nature of the woodlands affected by the proposal. Whilst the site is large and losses extensive and of a very high magnitude, the individual habitats affected are essentially poor.

A36 With the exception of bats, and possibly breeding birds, a general lack of substantial faunal interest on the site was also observed.

A37 Impacts of operation are **Negligible-Low** and are partially reversible through appropriate mitigation.

B. Criteria for the Assessment of Impacts

Impact Assessment Consultation References:

B1 The *Guidelines for Ecological Impact Assessment in the United Kingdom* (IEEM 2006), the *Environment Impact Assessment; guide to procedures* (DCLG 2000) and Biodiversity and Environmental Impact Assessment: A Good Practice Guide for Road Schemes (RSPB et al 2000) were consulted in the formulation of this assessment.

B2 The significance of the potential impacts on any given group and/or species is based on recognised criteria, these include; National and County Red Data Lists, Local Biodiversity Action Plans, The Wildlife and Countryside Act 1981 *(as amended)* and Section 41 NERC Act 2006 et al.

B3 The significance of any impact is a measure of the magnitude of the impact and the nature conservation value of the site. There are five levels of impact magnitude.

Impact Magnitude Definitions:

Very High:

B4 Loss of most of the site (i.e. at least 50% of the site area). Loss or severe depletion of a population of a nationally rare or protected species (i.e. equal to or more than 50% of the population), caused by loss of habitat, severance or disturbance.

High:

B5 Loss affecting more than 30%, but less than 50% of the site area, or indirect adverse impacts (disturbance, pollution) affecting more than 50% of the site. Loss of depletion of protected or nationally rare species through habitat loss, severance or disturbance.

Medium:

B6 Loss affecting less than 30% but more than 10% of the site area, or indirect adverse impacts affecting more than 30% of the site. Significant reduction of populations of protected or nationally rare species, but not enough to affect viability, or severe reduction of populations of a regionally uncommon species through habitat loss, severance or disturbance.

Low:

B7 Loss affecting less than 10% or less of the site area, or indirect adverse impacts affecting less than 30% of the site. Potential for slight reduction of a population of a protected species or nationally rare or regionally uncommon species, of minimal significance to viability.

Negligible:

B8 Site and / or rare and uncommon species not perceptibly affected.

No effect:

B9 No effect on any wildlife species or habitat.

Definition of Duration of Effect:

B10 Short term (less than duration/operational life of the project)
B11 Medium term (duration/operational life of the project)
B12 Long term (continuing beyond the project)

Nature Conservation Value & Geographical Sensitivity/Policy Context:

B13 The final significance of any potential impact is a measure of **both** the magnitude of the impact, and the nature conservation value of the site. Following the definition of the impact, it is important to consider the relative nature conservation value of the site in terms of both the geographical and policy context of the sites ecological attributes or features.

Table A: Nature Conservation Value & Geographical Sensitivity / Policy Context:	
Nature Conservation Value:	**Table C: Geographical Sensitivity / Policy Context of Nature Conservation Features:**
International ***(Very High Value)***	For example Ramsar, World Heritage Site, Special Area of Conservation, Special Protection Area or supporting nationally significant habitats or species of defined international community interest.
National ***(High Value)***	For example Sites of Special Scientific Interest or supporting nationally significant habitats or species of defined national rarity or interest. Nationally significant sites are those including significant areas of UK BAP Priority Habitats/Section 41 (S41) NERC Act 2006 habitats of principal importance in England, and sites which support significant and viable populations of UK Red Data Book species or nationally significant populations or communities of Nationally scarce protected species (other than badger) or UK BAP Priority/S41 species and habitats of principal importance in England.
County ***(Medium Value)***	For example Wildlife Sites at county level or supporting examples of nationally threatened habitats or good populations of nationally scarce of protected species. County level sites are those supporting nationally threatened habitats including smaller areas of UK BAP Priority/S41 Habitats or extensive areas of habitats which are rare or unique in the county, including LBAP key habitats and supporting good populations of Nationally scarce or protected species, smaller populations of UK BAP Priority/Section 41 Species or species which are rare in the county and uncommon or local nationally, including LBAP key species which are not also UK BAP/S41Species.
District ***(Low - Medium Value)***	Sites failing to meet County Value criteria but supporting habitats or species which appreciably enrich the ecological resource of the county. District level sites are those supporting habitats uncommon in the county, small but unmodified fragments of nationally threatened habitats or comprising extensive areas or systems of semi-natural habitats. They are also sites supporting nationally scarce / protected species or strong populations or communities of regionally uncommon species, which would not otherwise be present.
Local / Site ***(Lower Value)***	Habitats which fail to meet District Value Criteria, but which appreciably enrich the ecological resource of the immediate locality.

Estimating the Overall Impact Significance:

B13 The combination of the impact magnitude criteria and the nature conservation value of the site, results in degrees of impact significance. For example Very High and High impact magnitudes on sites of International and National Nature Conservation *(High)* Value would result in a Very Substantial significance of impact. These could either be beneficial or adverse depending upon the type of change resulting from the scheme.

B14 **Table B** below summarises the relationship between value, magnitude and significance that has been used for this assessment.

Table B: **Relationship Between Receptor Value, Impact Magnitude & Significance:**

	Nature Conservation Value of Site / Feature:				
Magnitude of Potential Impact	**International *(Very High)***	**National *(High)***	**County (Medium)**	**District (Low / Medium)**	**Local (Lower)**
Very High	Very substantial adverse	Very substantial adverse	Substantial adverse	Moderate adverse	Negligible
High	Very substantial adverse	Very substantial adverse	Moderate adverse	Slight adverse	Negligible
Medium	Substantial adverse	Substantial adverse	Moderate adverse	Slight adverse	Negligible
Low	Slight adverse	Slight adverse	Slight adverse	Slight adverse	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
No effect	Neutral	Neutral	Neutral	Neutral	Neutral
Positive	Substantial beneficial	Substantial beneficial	Moderate beneficial	Slight beneficial	Negligible

B15 It should be noted that IEEM* have identified that this type of matrix tends to place negative impacts on a feature of local value into a 'low' significance category which can downplay local values for biodiversity. This issue has been noted by the report authors and the evaluation of impact magnitude has been adjusted where required to reflect a more accurate level of impact.

* *Guidelines for Ecological Impact Assessment in the United Kingdom* (IEEM 2006).

Other Criteria:

B16 In addition, the Assessment of Potential Impacts in **Tables 2 and 3** assess the duration and reversibility of the impact and whether it is capable of mitigation.