Southern Parcel at Land off Whalley Road, Barrow BB7 9RB

ECOLOGICAL SURVEY AND ASSESSMENT (including a Licensed Bat Survey)

October 2018

[ERAP (Consultant Ecologists) Ltd ref: 2018-293]

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Document Control

Survey Type:	**Surveyors[1]**	**Survey Date(s)**
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Revised and issued by	Victoria Burrows	9th October 2018
Report issued to	David Wilson Homes	
Version Number	1	

[1] *Licence reference numbers*

Bats

Victoria Burrows, Natural England Class Survey Licence (bats, Level 2) Registration Number 2015-10390-CLS-CLS

Great crested newt

Victoria Burrows Natural England Class Survey Licence (Level 1) Registration Number 2015-16651-CLS-CLS

Barn owl

Victoria Burrows Natural England Class Survey Licence Registration Number CL29/00061

SUMMARY

Introduction and Scope

i. This Ecological Survey and Assessment presents the ecological, biodiversity and nature conservation status of the southern parcel at land off Whalley Road, Barrow. The appraisal was requested in connection with detailed proposals to develop the site to housing and implement the previously granted outline consent (Ribble Valley Borough Council ref 3/2012/0630/P).

ii. The report presents the results of an updated desktop study and extended Phase 1 Habitat Survey and assessment carried out in September 2018. The scope of survey carried out is appropriate to identify potential ecological considerations and opportunities for biodiversity associated with the development of the site.

iii. The approximately 7.76 hectare site comprises four fields of improved grassland located between Whalley Road to the east and the Barrow Brook Field Biological Heritage Site (BHS) to the west. The fields are bordered by timber post and wire fences, hedgerows and scattered mature trees.

Results of Survey and Assessment

iv. Adverse direct and indirect impacts on statutory designated sites for nature conservation are reasonably discounted.

v. Barrow Brook Field Biological Heritage Site (BHS), a non-statutory designated site for the presence of Lowland Hay Meadow Priority Habitat lies immediately adjacent to the western site boundary. Direct adverse effects on the adjacent BHS associated with habitat loss are avoided and the site layout accommodates an undeveloped buffer between the BHS and the built environment.

vi. Protection of the BHS to avoid indirect adverse effects during both the construction and operation of the site is essential to conserve the biodiversity interest at the site. Suitable protection measures are described in **Section 5.2**. In addition, as recognised in the 2012 ecology report submitted to support the outline planning application, the development provides an opportunity to secure the long-term management of the BHS in accordance with conservation objectives, refer to **Section 5.7**.

vii. The site contains only common and widespread plant species. The National Vegetation Classification (NVC) communities present are typical of the geographical area and agriculturally managed conditions present.

viii. Hedgerows 1, 4, 5 and 6 are Priority Habitat. Hedgerows 1 and 4 are 'important' in accordance with *The Hedgerows Regulations 1997* wildlife and landscape criteria. The hedgerows are assessed to be of local value owing to their Priority Habitat status, the habitat corridor function and opportunity for nesting birds and other fauna they provide. No other Priority Habitats are present at the site.

ix. Indian Balsam, an invasive species listed under Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended), is present at the western site margin. The proposals provide an opportunity to achieve the local control of this species as part of development to prevent further spread into the wild, refer to **Section 5.3**.

x. Appropriate survey effort and / or assessment in accordance with standard guidance has been carried out to reasonably discount adverse effects on relevant protected species namely badger, great crested newt and other amphibians and reptile species. No further survey is necessary to inform a planning decision.

xi. A licensed daylight bat survey and assessment and, where feasible, detailed inspections of the trees with the site and on the site boundaries have not detected any evidence of use by roosting bats. All on-site trees with moderate or low suitability for use by roosting bats will be retained. It is recognised that arboricultural works are recommended in the tree survey report (TBA Landscape Architects, September 2018) and the best practice guidance, in accordance with current guidelines, at **Section 5.4** is of relevance. If works at trees on the site boundary with high (19T) and moderate (26T) suitability for use by roosting bats are necessary further survey will be required to determine the status of roosting bats the tree.

xii. The hedgerows and scattered shrubs within the site are suitable for use by nesting birds including Priority Species. Mandatory actions to protect nesting birds during site clearance and measures to provide

compensatory opportunities for nesting birds are recommended at **Section 5.5**, and can be achieved by the proposals.

Recommendations and Conclusion

xiii. The recommendations in **Section 5.0** address all the mandatory measures and ecological recommendations to be applied to ensure compliance with wildlife legislation, the National Planning Policy Framework (NPPF) and best practice.

xiv. Residential development at the site can be achieved with no significant adverse effect on designated sites for nature conservation and ecologically valuable habitats. Appropriate mitigation namely retention of habitats and appropriate timing of works will avoid adverse effects on protected species.

xv. The proposals will secure an opportunity to implement beneficial measures such as habitat creation that will safeguard habitats for wildlife such as birds and bats, with the aim of providing a net gain in biodiversity in accordance with the principles of the NPPF.

1.0 INTRODUCTION

1.1 Background and Rationale

1.1.1 ERAP (Consultant Ecologists) Ltd was commissioned by David Wilson Homes to carry out an ecological appraisal of the southern parcel at land off Whalley Road, Barrow (hereafter referred to as the 'site'). The Ordnance Survey (OS) grid reference at the centre of the site is SD 7334 3791. An aerial image of the site and its surrounding habitats is appended at **Figure 8.1** (source image: Google Maps).

1.1.2 The appraisal was requested in connection with a planning application to submit a detailed planning application for the construction of houses with associated access and public open space at the site. The site forms part of a wider development site with outline planning permission (Ribble Valley Borough Council reference: 3/2012/0630/P) and an active construction site (i.e. the northern parcel) is present to the north.

1.1.3 This ecological survey and assessment provides an update of previous surveys carried out to inform the outline planning application in 2012 entitled *2009-089d Land off Whalley Road, Barrow, Lancashire Ecological Survey and Assessment*[1] (ERAP Ltd, 2012), hereafter the '2012 ecology report'.

1.2 Scope of Works

1.2.1 The scope of ecological works undertaken in September 2018 comprised:

a. A desktop study for known ecological information at the site and the local area;

b. An Extended Phase 1 Habitat Survey and assessment;

c. Assessment of the ecological value of the habitats within the site with the use of the National Vegetation Classification (NVC) and the Ratcliffe criteria, as presented in *A Nature Conservation Review* (Ratcliffe, 1977);

d. Survey and assessment of all habitats for relevant statutorily protected species and other wildlife including badger (*Meles meles*), great crested newt (*Triturus cristatus*), bird species and reptiles;

e. A licensed bat survey and assessment of the trees;

f. Identification of any potential ecological constraints on the proposals and the specification of the scope of mitigation and ecological enhancement required in accordance with wildlife legislation, planning policy guidance and other relevant guidance; and

g. The identification of any further surveys or precautionary actions that may be required prior to the commencement of site clearance and construction activities.

2.0 METHOD OF SURVEY

2.1 Desktop Study

2.1.1 The following sources of information and ecological records were consulted:

a. MAGiC: A web-based interactive map which brings together geographic information on key environmental schemes and designations, including details of statutory nature conservation sites;

b. The 2012 ecology report (ERAP Ltd, 2012);

c. The Lancashire Environment Record Network (LERN), the local records centre, was contacted and records of non-statutory designated sites, and protected and notable species were requested for the site and a radius of 2 kilometres; and

[1] The original ecology report was produced in May 2010 and was subsequently updated in May 2012.

d. Lancashire Biodiversity Action Plan (BAP).

2.2 Vegetation and Habitats

2.2.1 An Extended Phase 1 Habitat Survey of the site was carried out by Victoria Burrows on 19th September 2018. The weather was dry with sunny intervals, a moderate breeze (Beaufort scale 4) and 16°C at 9am. The conditions and time of year were favourable for the ecological survey.

2.2.2 A Phase 1 habitat and vegetation map was produced for the site and the immediate surrounding area at a scale of 1:3500 (refer to **Figure 8.2**). The mapping is based on the Joint Nature Conservation Committee Phase 1 Habitat Survey methodology (JNCC, 2010) with minor adjustments to illustrate and examine the habitats with greater precision.

2.2.3 The plant species within the site boundary were determined with estimates of the distribution, ground cover, abundance and constancy of individual species. The estimation of abundance was based on the DAFOR system, where D = Dominant, A = Abundant, F = Frequent, O = Occasional and R = Rare, this being a widely used and accepted system employed by ecological surveyors. The terms L = Locally and V = Very were additionally used to describe the plant species distributions with greater precision.

2.2.4 Stands of vegetation and habitats were described and evaluated using the National Vegetation Classification (NVC). The NVC provides a systematic and comprehensive analysis of British vegetation and is a reliable framework for nature conservation and land-use planning.

2.2.5 Hedgerows were assessed in accordance with *The Hedgerows Regulations 1997* wildlife and landscape criteria (H.M.S.O., 1997).

2.2.6 Searches were made for uncommon, rare and statutorily protected plant species, those species listed as protected in the *Wildlife and Countryside Act 1981* (as amended) and species which are indicators of important and uncommon plant communities. Plant nomenclature follows *New Flora of the British Isles 3rd Edition* (Stace, 2010).

2.2.7 Searches were carried out for the presence of invasive species, including those listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended), including Japanese Knotweed (*Fallopia japonica*), Indian Balsam (*Impatiens glandulifera*) and Giant Hogweed (*Heracleum mantegazzianum*).

2.3 Animal Life

Badger

2.3.1 A search for badger activity was carried out. The survey area covered the site (as annotated on **Figure 8.1**) and extended to accessible land within a radius of 50 metres from the site boundary. Private gardens / land were excluded from the survey.

2.3.2 The survey was conducted in accordance with guidance presented within *Badgers and Development* (Natural England, 2007) and *Badgers: surveys and mitigation for development projects* (Natural England, 2015).

2.3.3 The following signs of badger activity were searched for:

a. Sett entrances, e.g. entrances that are normally 25 to 35cm in diameter and shaped like a 'D' on its side;
b. Large spoil heaps outside sett entrances;
c. Bedding outside sett entrances;
d. Badger footprints;
e. Badger paths;

f. Latrines;

g. Badger hairs on fences or bushes;

h. Scratching posts; and

i. Signs of digging for food.

2.3.4 Habitats within and surrounding the site were assessed in terms of their suitability for use by foraging and sheltering badger in accordance with their known habitat preferences as detailed in current guidance and *Badger* (Roper, 2010).

Bat Species

Daylight Survey

Survey Personnel

2.3.5 The daylight licensed bat survey was carried out by Victoria Burrows (Natural England Class Survey Licence WML CL18 (Bat Survey Level 2), Registration Number 2015-10390-CLS-CLS).

2.3.6 The surveyor's qualifications and experience meet the criteria as defined in the *Technical Guidance Series Competencies for Species Survey: Bats* (CIEEM, 2013).

Trees

2.3.7 An updated assessment of the trees within the site was conducted to assess their suitability for use by roosting bats, and to inform whether further surveys or precautionary measures were required. The scope of survey was also informed by consultation of the Tree Survey Report prepared for the site (TBA Landscape Architects, September 2018), hereafter the 'tree survey report'[2].

2.3.8 Trees were assessed from the ground using binoculars and a high-powered torch. Each tree was searched for the presence of the following features:

Woodpecker holes, rot holes, hazard beams, other vertical or horizontal cracks or splits in stems and branches, partially decayed platey bark, knot holes, man-made holes, tear-outs, cankers in which cavities have developed, other hollows or cavities, including butt-rots, double-leaders forming compression forks with included bark, gaps between overlapping stems or branches, partially detached Ivy (Hedera helix) with stem diameters in excess of 50mm and bat, bird or dormouse (Muscardinus avellanarius) boxes.

2.3.9 Terms used to describe any features present follow (where possible) those outlined and described in *Bat Tree Habitat Key, 2nd* Edition (Andrews, H (ed), 2013). The suitability of each tree has been assessed in accordance with Table 4.1 of *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn),* (Collins, J. (ed), 2016).

2.3.10 Relevant features were examined by Victoria Burrows at height using (where suitable) ladders, a high-powered torch and an endoscope. The following signs of roosting bats were searched for:

Bats, bat droppings (in, around or below the feature), odours emanating from the feature, audible squeaking at dusk, staining below the feature, and the presence of smoothed surfaces within the feature, indicative of regular passage by small mammals.

2.3.11 The requirement for further presence / absence surveys at each tree was then considered.

2.3.12 A list of equipment used is detailed at **Table 2.1**, below:

[2] Off-site trees, including those in the Barrow Brook Field BHS, that are not identified in the tree survey report were not examined as part of this survey and assessment.

Table 2.1: Survey Equipment Used / Available for Use During Daylight Bat Survey

Ladders
LED Lenser P14 torch
Canon Ixus digital camera
8x20 binoculars
Ridgid Micro Inspection Camera Borescope CA-300

Habitat Assessment for Commuting / Foraging Bats

2.3.13 Habitats within and adjacent to the site were assessed for their value and suitability for commuting and foraging bats in accordance with Table 4.1 of *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn),* (Collins, J. (ed), 2016). Reference has been made using the following categories and descriptions / examples, presented at **Table 2.2**, below.

Table 2.2: Consideration of Suitability of Foraging and Commuting Habitat for Bats

Suitability	Commuting Habitat	Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.	
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated i.e. not very well connected to the surrounding landscape by other habitat.	Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.	Habitat that is linked to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous, high-quality habitat that is well connected to the wider landscape and is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. Habitats close to and connected to known roosts.	High-quality habitat that is well-connected to the wider landscape and is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Habitats close to and connected to known roosts.

Bird Species

2.3.14 Bird species observed and heard during the survey were recorded.

2.3.15 Habitats throughout the site and in the immediate surrounding area were assessed for their value to roosting, feeding and nesting birds, as indicated by the amount of shelter, feeding value, woody vegetation structure and species diversity of tree and shrub species in the site.

Great Crested Newt

2.3.16 In accordance with current Natural England guidance (Natural England, 2015) all ponds within an unobstructed 500 metres of a site should be considered for their suitability to support breeding great crested newts. The potential of the proposed development to impact upon any great crested newt population(s) whose breeding ponds are within 500 metres must be considered.

2.3.17 There are no field ponds within an unobstructed 500 metres radius from the site boundary; no further surveys for amphibian species are necessary. This assessment and conclusion was accepted during the consideration of the outline planning application.

Reptile Species

2.3.18 The site and its surroundings were assessed in terms of their suitability for use by reptile species using the important characteristics for reptiles outlined in the draft document '*Reptile Mitigation Guidelines*' (Natural

England, 2011), and the *Reptile Habitat Management Handbook* (Edgar, et al., 2010). These habitat characteristics are outlined below.

Table 2.3: Important Habitat Characteristics for Reptiles

1. Location (in relation to species range)	7. Connectivity to nearby good quality habitat
2. Vegetation Structure	8. Prey abundance
3. Insolation	9. Refuge opportunity
4. Aspect	10. Hibernation habitat potential
5. Topography	11. Disturbance regime
6. Surface geology	12. Egg-laying site potential

Water Vole and Otter

2.3.19 It is recognised that Ordnance Survey maps of the site identify the presence of drains along the southern site boundary and traversing the site in a north-south direction. However, the drains are not ditches or features with suitability for use by water vole (*Arvicola amphibius*) or otter (*Lutra lutra*). This assessment and conclusion was accepted during the consideration of the outline planning application.

2.3.20 No further survey or consideration of the possible presence of and adverse effects on these protected species is necessary to inform the planning application and decision.

2.4 Survey Limitations

2.4.1 No survey limitations were experienced.

2.5 Evaluation Methodology

2.5.1 The habitats, vegetation and animal life were evaluated with reference to standard nature conservation criteria as described in *A Nature Conservation Review* (Ratcliffe, 1977). These are size (extent), diversity, naturalness, rarity, fragility, typicality, recorded history, position in an ecological or geographical unit, potential value and intrinsic appeal.

2.5.2 Habitats have been assessed to determine whether they meet those described in *UK Biodiversity Action Plan: Priority Habitat Descriptions* (Maddock, A (ed), 2008); these lists are used to help draw up the statutory lists of Priority Habitats, as required under Section 41 of the *Natural Environment and Rural Communities* (NERC) *Act 2006*. Where suitable, the ecological value of the habitats present have been assessed using the terms outlined in *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition* (CIEEM, 2016).

2.5.3 Government advice on wildlife, as set out in the *National Planning Policy Framework* (Ministry of Housing, Communities and Local Government, 2018) and associated government circulars has been taken into consideration. Legislation relating to protected species, such as those listed under Schedules 1, 5, 6 and 8 of the *Wildlife and Countryside Act 1981* (as amended) and *The Conservation of Habitats and Species Regulations 2017*, is referenced where applicable, and any impacts to protected species are evaluated in accordance with current guidance.

2.5.4 The presence of any Priority Species, as listed under Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006* is noted, and habitats are assessed in terms of their suitability and value for these species. The presence of species listed by the Lancashire BAP Provisional Long List has been taken into account in the evaluation of the site.

3.0 SURVEY RESULTS

3.1 Desktop Study

Designated Sites for Nature Conservation: Statutory Sites

3.1.1 There are no statutory designated sites for nature conservation within the site or immediately adjacent to the site boundary.

3.1.2 The site lies within a Natural England Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ) for Light Clough SSSI located 1.5 kilometres to the east of the site. The SSSI Impact Risk Zone requires the Local Planning Authority to consult with Natural England on likely risks from the following development categories (Ordnance Survey, 2018):

"*Infrastructure:* *Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals.*

Minerals, Oil & Gas: *Planning applications for quarries, including: new proposals, Review of Minerals Permissions, extensions, variations to conditions etc. Oil and gas exploration / extraction.*

Waste: *Landfill. Including: inert landfill, non-hazardous landfill, hazardous landfill.*

Water Supply: *Large infrastructure such as warehousing / industry where total net additional gross internal floorspace following development is 1,000m² or more*."

3.1.3 None of the proposals at the site are identified as a category which triggers the need for the local planning authority to consult with Natural England in relation to potential impacts on the SSSI.

Designated Sites for Nature Conservation: Non-statutory Sites

3.1.4 Barrow Brook Field Biological Heritage Site (BHS), a non-statutory designated site for the presence of Lowland Hay Meadow Priority Habitat comprising damp, species-rich neutral grassland reported to be "*referable to the MG4 Alopecurus pratensis-Sanguisorba officinalis grassland of the NVC*" lies immediately adjacent to the western site boundary. This is discussed further in **Section 4.2**.

3.1.1 The site lies within 2 kilometre of eight other BHSs, as detailed at **Table 3.1**, below.

Table 3.1: Details of the Statutory and Non-statutory Designated Sites for Nature Conservation within a 2 kilometre Radius of the Site

Site Name and OS Grid Reference	Distance from Site	Reasons for Designation
Hard Hill Common BHS SD727383	140 metres to the west	The site is designated a BHS as it supports swamp and fen habitats which in Lancashire are highly fragmented and small in extent. The site supports small-localised areas of Purple Moor-grass (*Molinia caerulea*) / Rush Pasture and flushed habitats. Purple Moor Grass and Rush Pastures are Priority Habitat in the UK Biodiversity Action Plan.
Calderstones Hospital Woodland/Railway Line BHS SD722376	490 metres to the south	The site is designated a BHS as it supports artificial habitats such as a dismantled railway line with species rich grassland, swamp and an area of Alder-Willow carr woodland.
Spring Wood BHS SD741363	1295 metres to the south	The site is designated a BHS as it supports ancient semi-natural woodland which is not listed in the Lancashire Inventory of Ancient Woodland (Provisional).

Small Field BHS SD721389	1300 metres to the north west	The site is designated a BHS as it supports a small field of old established, semi-natural, neutral grassland and supports Green Figwort (*Scrophularia umbrosa*), a species categorised as 'sensitive' in the Provisional Lancashire Red Data List of Vascular Plants.
Mitton Wood BHS SD713377	1500 metres to the west	The site is designated a BHS on account of the following; 1. The site comprises a large, semi-natural woodland listed in the Lancashire Inventory of Ancient Woodland (Provisional). 2. Yellow Star-of-Bethlehem (*Gagea lutea*), a plant categorised as 'endangered' in the Provisional Lancashire Red Data List of Vascular Plants, occurs in the wood. 3. The site supports a population of the uncommon mollusc, the ash-grey slug (*Limax cinereonige*). The site adjoins the River Ribble BHS and Mitton Hall Wood BHS.
Mitton Hall Wood BHS SD714382	1530 metres to the west	The site is designated a BHS as it is an ancient semi-natural woodland which is not listed in the Lancashire Inventory of Ancient Woodland (Provisional).
River Ribble from London Road Bridge, Preston, in West, to County Boundary, in East BHS SD715383	1635 metres to the west	Collectively, the river and its associated habitats support a rich assemblage of plants and animals. Much of the land associated with the river comprises woodland, grassland with localised swamp and tall-herb communities. The river is important for salmon (*Salmo* sp.), sea trout (*Salmo trutta*), otter and water vole. Sandy cliffs provide nesting habitat for sand martin (*Riparia riparia*) and kingfisher (*Alcedo aatthis*). Where shingle banks develop, nesting waders include oystercatcher (*Haematopus ostralegus*), common sandpiper (*Actitis hypoleucos*), little ringed-plover (*Charadrius dubius*) and ringed plover (*Charadrius hiaticula*). Adjacent fields support breeding waders including lapwing (*Vanellus vanellus*) and curlew (*Numenius arquata*). Notable plant species include; Northern Spike-rush (*Eleocharis mamillata*) a nationally rare species, Slender Tufted-sedge (*Carex acuta*) a species categorised as 'vulnerable' in the Provisional Lancashire Red Data List of Vascular Plants and Green Figwort (*Scrophularia umbrosa*), a species categorised as 'sensitive' in the Provisional Lancashire Red Data List of Vascular Plants. The moss *Cinclidotus mucronatus* (rare in Lancashire) occurs on limestone river boulders in the Clitheroe area. UK BAP Priority Habitats & Species include Lowland Mixed Woodland, Wet Woodland, Lowland Meadow, Fen, water vole, otter and reed bunting (*Emberiza schoeniclus*).
Barrow Clough Wood BHS SD736399	1830 metres to the north	The site is designated a BHS as it supports ancient semi-natural woodland which is not listed in the Lancashire Inventory of Ancient Woodland (Provisional).

Protected and Notable Species

Table 3.2: Protected and Notable Species Recorded within a Two Kilometre Radius of the Site

Taxon Group	Name, Designations[1] and Notes
Amphibian	Great crested newt (*Triturus cristatus*): EPS, WCAs5, PS & LBAP. 37 records, dated between 1985 and 2011, the closest of which is 980m from the site.

Taxon Group	Name, Designations[1] and Notes
	Common toad (*Bufo bufo*): WCAs5 (sale only), PS & LBAP. 8 records, dated between 1985 and 2013, the closest of which is 320m from the site.
	Common frog (*Rana temporaria*): WCAs5 (sale only) & LBAP. 51 records, dated between 1985 and 2013, the closest of which is 320m from the site.
	Palmate newt (*Lissotriton helveticus*): WCAs5 (sale only). 32 records, dated between 1997 and 2011, the closest of which is 1090m from the site.
	Smooth newt (*Lissotriton vulgaris*): WCAs5 (sale only). 14 records, dated between 1997 and 2011, the closest of which is 1290m from the site.
Terrestrial Mammal	European otter (*Lutra lutra):* EPS, WCAs5, PS & LBAP. 2 records, dated 2015, the closest of which is 1880m from the site.
	Soprano pipistrelle (*Pipistrellus pygmaeus*): EPS, WCAs5, PS & LBAP. 1 record, dated 2010, 1160m from the site.
	Unknown bat species (*Chiroptera* sp.): EPS, WCAs5 & LBAP. 1 record, dated 2009, 1020m from the site.
	Pipistrelle bat species (*Pipistrellus* sp.): EPS, WCAs5 & LBAP. 1 record, dated 2009, 500m from the site.
	European water vole (*Arvicola amphibius*): WCAs5 & LBAP. 3 records, dated 1977, the closest of which is 1280m from the site.
	Brown hare (*Lepus europaeus*): PS & LBAP. 6 records, dated between 1977 and 2015, the closest of which is 250m from the site.
	West European hedgehog (*Erinaceus europaeus*): PS & LBAP. 4 records, dated between 1977 and 2015, the closest of which is 990m from the site.
	Eurasian badger (*Meles meles*): PBA. 2 records, dated between 2013 and 2014, the closest of which is 990m from the site.
Bird	*WCAs1* Greylag goose (*Anser anser*) *PS & LBAP* Cuckoo (*Cuculus canorus*), curlew (*Numenius arquata*), grey partridge (*Perdix perdix*), house sparrow (*Passer domesticus*), lapwing (*Vanellus vanellus*), reed bunting (*Emberiza schoeniclus*), spotted flycatcher (*Muscicapa striata*), tree sparrow (*Passer montanus*), skylark (*Alauda arvensis*), bullfinch (*Pyrrhula pyrrhula*), dunnock (*Prunella modularis*), herring gull (*Larus argentatus*), lesser spotted woodpecker (*Dendrocopos minor*), song thrush (*Turdus philomelos*), starling (*Sturnus vulgaris*) *PS* Lesser redpoll (*Acanthis cabaret*) and marsh tit (*Poecile palustris*) *LBAP* Common sandpiper (*Actitis hypoleucos*), grey heron (*Ardea cinerea*), kestrel (*Falco tinnunculus*), meadow pipit (*Anthus pratensis*), oystercatcher (*Haematopus ostralegus*), redshank (*Tringa totanus*), snipe (*Gallinago gallinago*), swift (*Apus apus*), willow warbler (*Phylloscopus trochilus*)
Bony Fish	*PS & LBAP* Atlantic salmon (*Salmo salar*), brown / sea trout (*Salmo trutta*) and European eel (*Anguilla anguilla*) *LBAP* Bullhead (*Cottus gobio*), brown trout (*Salmo trutta subsp. fario*) and grayling (*Thymallus thymallus)*
Flowering Plant	*PS* Lesser Butterfly-orchid (*Platanthera bifolia*) and Cornflower (*Centaurea cyanus*) *LBAP* Barberry (*Berberis vulgaris*), Bird's-eye Primrose (*Primula* farinosa), Black Poplar (*Populus nigra subsp. betulifolia*), Bladder-sedge (*Carex vesicaria*), Common Meadow-rue (*Thalictrum flavum*), Fragrant Orchid (*Gymnadenia conopsea*), Globeflower (*Trollius europaeus*), Greater Pond-sedge (*Carex riparia*), Green-winged Orchid (*Anacamptis morio*), Hairy Violet (*Viola hirta*), Mossy Saxifrage (*Saxifraga hypnoides*), Northern Yellow-cress (*Rorippa islandica*), Thin-spiked Wood-

Taxon Group	Name, Designations[1] and Notes
	sedge (*Carex strigosa*), White Bryony (*Bryonia dioica*) and Yellow Star-of-Bethlehem (*Gagea lutea*).
Horsetail	*LBAP* Horsetail (*Equisetum palustre x telmateia = E. x font-queri*)
Butterfly	*LBAP* Ringlet (*Aphantopus hyperantus*)
Moth	*PS* Cinnabar (*Tyria jacobaeae*), small phoenix (*Ecliptopera silaceata*), small square-spot (*Diarsia rubi*) *LBAP* Lunar hornet moth (*Sesia bembeciformis*)
[1]Key to designation codes EPS = European Protected Species under the *Conservation of Habitats and Species Regulations 2010* (as amended) WCAs1 = Listed on Schedule 1 of the *Wildlife and Countryside Act 1981* (as amended) WCAs5 = Listed on Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) PS = Priority Species listed under Section 41 of the *NERC Act* (2006) PBA = Protection of Badgers Act (1992) LBAP = Lancashire Biodiversity Action Plan	

3.1.2 The presence of these protected and notable species within the wider area has been taken into account throughout this report.

3.2 Vegetation and Habitats

General Description

3.2.1 The site (approximately 7.76 hectares) comprises four fields of improved grassland located between Whalley Road to the east and the Barrow Brook Field BHS to the west. The fields are bordered by timber post and wire fences and hedgerows with scattered standard mature trees.

3.2.2 Land to the north of the site is currently occupied by improved grassland and stockpiled mounds of topsoil associated with the construction site to the north. Land to the south comprises further fields of improved grassland with a row of existing residential properties associated with Whalley Road.

3.2.3 A Phase 1 Habitat Survey map is appended at **Figure 8.2**. Photographs are appended at **Table 8.7**.

Improved grassland

3.2.4 Refer to **Photos 1** to **3**.

3.2.5 The fields of improved grassland are all similar in species composition and are characterised by constant and abundant Perennial Rye-grass (*Lolium perenne*) with frequent Yorkshire-fog (*Holcus lanatus*), locally abundant White Clover (*Trifolium repens*), locally frequent Cock's-foot (*Dactylis glomerata*), Red Fescue (*Festuca rubra*) and Annual Meadow-grass (*Poa annua*).

3.2.6 Local areas of Crested Dog's-tail (*Cynosurus cristatus*) were recorded at the eastern end of the site.

3.2.7 The less frequently cut vegetation at the field margins supports stands of Common Nettle (*Urtica dioica*), Great Willowherb (*Epilobium hirsutum*) and very local Creeping Thistle (*Cirsium arvense*).

3.2.8 No livestock were present at the time of the survey but the relatively short sward is indicative of a grassland that has been cut for haylage in the late summer.

3.2.9 The grassland is the *MG7 Perennial Rye-grass* ley community of the NVC (Rodwell, 1992); this is comparable with conditions in 2012. A plant species list is appended at **Table 8.1**.

Hedgerows

3.2.10 Refer to **Tables 8.2** to **8.5** and **Photos 4** to **7**. For ease of reference hedgerow numbers used in the 2012 ecology report have been referred to.

3.2.11 Hedgerow 1 extends along the eastern boundary of the site and parallel to Whalley Road. The hedgerow is cut on the top and sides. Hawthorn (*Crataegus monogyna*) is constant and abundant with occasional Elder (*Sambucus nigra*), very local Ash (*Fraxinus excelsior*) and rare Wych Elm (*Ulmus glabra*). Woodland herbs in the herb layer comprise Dog's Mercury (*Mercurialis perennis*) and Herb-Robert (*Geranium robertianum*). Ivy (*Hedera helix*) is constant in the herb layer to form the *W21 Hawthorn - Ivy* community of the NVC (Rodwell, 1991).

3.2.12 The condition of Hedgerow 1 is similar to that reported in the 2012 ecology report.

3.2.13 Hedgerow 4 extends along the western site boundary and comprises a row of mature and semi-mature Pedunculate Oak (*Quercus robur*), Ash and Alder (*Alnus glutinosa*) trees with an understorey of Hawthorn, Elder and Dog-rose (*Rosa canina*). The herb layer supports very locally abundant Bramble (*Rubus fruticosus* agg.) with locally abundant Common Couch (*Elytrigia repens*) and frequent Yorkshire-fog (*Holcus lanatus*).

3.2.14 Hedgerow 5 extends through the northern section of the site. Hawthorn and Blackthorn (*Prunus spinosa*) are the dominant woody species with very locally frequent Hazel (*Corylus avellana*) and Elder. The herb layer is similar in species composition to Hedgerow 4; woodland herbs are limited to Male-fern (*Dryopteris filix-mas*) and Herb-Robert (*Geranium robertianum*).

3.2.15 Hedgerow 6 is present at the eastern part of the southern site boundary and comprises an unmanaged Hawthorn hedgerow with locally abundant sections of Hazel and Blackthorn. The herb layer species are similar to the surrounding field of improved grassland with the addition of Herb-Robert and species more indicative of waterlogged soil conditions such as Meadowsweet (*Filipendula ulmaria*), Floating Sweet-grass (*Glyceria fluitans*) and Silverweed (*Potentilla anserina*) at an area of lower lying ground.

3.2.16 Hedgerows 4 to 6 form the *W21 Hawthorn - Ivy* community of the NVC (Rodwell, 1991).

Invasive Plant Species

3.2.17 No Japanese Knotweed is present at the site.

3.2.18 As illustrated on **Figure 8.2**, Indian Balsam is extensive beyond the eastern site boundary (i.e. eastwards from Hedgerow 4 and into the Barrow Brook Field BHS). This species is listed on Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended); it is an offence to spread or cause it to spread in the wild. This is considered further at **Section 5.3** below.

Off-Site: Barrow Brook Field Biological Heritage Site (BHS)

3.2.19 Refer to **Photos 9** and **10**.

3.2.20 The BHS is triangular in shape and occupies an area of approximately 1.3ha. The BHS is designated for the presence of '*damp, species-rich, semi-natural neutral grassland referable to the MG4 Alopecurus pratensis-Sanguisorba officinalis grassland of the NVC*', refer to the BHS citation at **Appendix 2**.

3.2.21 The grassland is a mosaic of marshy grassland, rush pasture, stands of Reed Canary-grass (*Phalaris arundinacea*), Bramble and Floating Sweet-grass with sedges.

3.2.22 An updated plant species list was prepared in September 2018 and is appended at **Table 8.6**. Constant species consist of Creeping Buttercup (*Ranunculus repens*) and Yorkshire Fog with locally frequent Soft-

rush (*Juncus effusus*), Common Sorrel (*Rumex acetosa*), Marsh Thistle (*Cirsium palustre*), Greater Bird's-foot-trefoil (*Lotus pedunculatus*), Creeping Bent (*Agrostis stolonifera)* and Tufted Hair-grass (*Deschampsia cespitosa*).

3.2.23 The apparent absence of any recent management in the BHS has resulted in the presence of scattered self-seeded saplings of Alder and Goat Willow (*Salix caprea*).

3.2.24 A 13 metre wide section along a new drainage channel and extending parallel to the railway line has been disturbed and tracked over within the last 12 months (also evident on **Figure 8.1**). The bare soil is re-colonising from the seed bank with species comparable to the wider BHS and young plants and rosettes of Silverweed, Marsh Woundwort (*Stachys palustris*), Common Knapweed (*Centaurea nigra*) and Redshank (*Periscaria maculosa*) were observed. Plants of Indian Balsam, Creeping Thistle and Broad-leaved Dock are also present.

3.2.25 As concluded in the 2012 ecology report, it is suggested that the grassland does not currently represent the MG4 community of the NVC (Rodwell, 1992) owing to the low cover of Great Burnet (*Sanguisorba officinalis*) (refer to **Table 8.6**) and absence of other characteristically constant species of the MG4 community such as Meadowsweet and the low cover of Meadow Vetchling (*Lathyrus pratensis*). However, the mosaic is certainly of greater species diversity than the surrounding fields of improved grassland and is currently considered to represent a mosaic of the *MG9 Yorkshire-fog – Tufted Hair-grass, MG10 Yorkshire-fog – Soft-rush, MG13 Creeping Bent – Marsh Foxtail* (Rodwell, 1992)*, S28 Reed Canary-grass* (Rodwell, 1995) and *W24 Bramble – Yorkshire-fog* (Rodwell, 1991) communities. It is recognised that the habitats within the BHS represent the Lowland Meadows Priority Habitat.

3.3 Animal Life

Badger

3.3.1 No evidence of badger activity was detected at the site. Adverse effects on badger are reasonably discounted.

Bat Species

Trees

3.3.2 **Table 8.8**, appended presents a list of the trees within the site, an assessment of their suitability for use by roosting bats, the results of any further survey carried out and the recommendations detailed in the tree survey report. In summary:

a. No confirmed bat roosts or evidence of a bat roost has been detected at the site in 2018 (or in 2012);

b. One tree (19T (Ash)) at the western site boundary is assessed to be of high suitability;

c. One tree (26T (Ash)) at the western site boundary is assessed to be of moderate suitability;

d. Nineteen trees are assessed to be of low suitability and one further tree (51T (Ash)) is assessed to be of low suitability owing to the presence of dense Ivy; and

e. All other assessed trees are of negligible suitability owing to the absence of potential roost features.

Habitat Assessment for Commuting and Foraging Bats

3.3.3 Habitats, namely the intact hedgerows with trees, particularly Hedgerow 4, are suitable for the attraction of foraging bats, particularly *Pipistrelle* species. The site is assessed to be of moderate suitability in accordance with Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016).

Bird Species

3.3.4 Birds detected in the site on 19th September 2018 are listed in **Table 3.3**, below.

Table 3.3: Bird Species Detected on 19th September 2018

Scientific Name	Common Name (number seen)	Habitat	BOCC Status[1]	Priority Species?
Carduelis carduelis	Goldfinch (7)	Flock feeding on tall-herbs within the site	Green	No
Columba palumbus	Wood pigeon (4)	Associated with the trees at Hedgerow 4	Green	No
Erithacus rubecula	Robin (1)	Associated with the trees at Hedgerow 4	Green	No
Pica pica	Magpie (1)	In improved grassland	Green	No
[1]BOCC: Birds of Conservation Concern (Eaton, et al., 2015)				

3.3.5 As reported in the 2012 ecology report:

'*seven Priority Species were recorded within the site boundary between May and July 2009 (dunnock, song thrush, lapwing, bullfinch, spotted flycatcher, house sparrow and starling). Of the seven species, breeding dunnock and song thrush were recorded at the hedgerows and trees around the field margins. A maximum of four displaying lapwings (indicative of an active nest) were recorded on the fields in the southern half of the site on the 2nd June 2009.*

House Sparrow, Starling and Bullfinch were recorded feeding (not breeding) within the site. A single Spotted Flycatcher was recorded feeding amongst the trees, the semi-mature trees around the field margins are assessed to be favourable for use by breeding Spotted Flycatcher.'

3.3.6 The conditions and habitats at the site, namely the hedgerows and trees, remain suitable for nesting passerine bird Priority Species such as dunnock (*Prunella modularis*). The use of the grasslands by nesting lapwing is dependent on the condition of the grassland in early Spring. However, use of the fields by nesting lapwing is now considered to be less likely based on the presence of the Heras fencing along the southern edge of the current construction site, the proximity to the active construction site and the temporary diversion of the footpath link through this area which will cause disturbance. Precautionary actions to ensure the possibility of ground nesting birds at the site are described at **Section 5.5**.

Reptiles

3.3.7 Debris suitable for sheltering and basking reptiles was examined during the survey; no reptile species were detected. The previously heavily managed habitats at the fields of improved grassland provide poor quality habitat for sheltering, basking and hibernating reptiles.

3.3.8 The site is not adjacent to or linked to any areas of favourable habitat for reptile species. The presence of reptiles within the site is reasonably discounted.

Other Wildlife

3.3.9 Evidence of rabbit (*Oryctolagus cuniculus*) and deer (likely roe deer (*Capreolus capreolus*)) activity was recorded in the BHS; neither of these species has any statutory protection or Priority Species status.

3.3.10 Three speckled wood (*Pararge aegeria*) butterflies were observed at Hedgerow 4 on the survey date; this species is common and widespread.

4.0 EVALUATION AND ASSESSMENT

4.1 Description of Proposals

4.1.1 The principle of development at the site has previously been approved by the outline planning permission.

4.1.2 As detailed on the Proposed Site Layout (drawing DWH/WRB/SL/01 revision P12, prepared by David Wilson Homes and Baldwin Design) it is proposed to develop the site to housing with road access to be constructed off the existing new access road from Whalley Road (outside the site boundary), refer to **Figure 8.1**.

4.1.3 The Barrow Brook Field BHS will not be directly affected by the construction and development proposals and an undeveloped buffer is retained between the developed land and the BHS. As proposed in 2012, it is the intention that the development will secure the appropriate management of the habitats at the BHS in accordance with conservation objectives.

4.2 Designated Sites for Nature Conservation

4.2.1 Owing to the distance between the site and any statutory designated sites for nature conservation and the absence of any direct habitat connectivity between the site and the statutory designated sites in the wider area, any direct adverse effects on statutory designated sites and their features of special interest are reasonably discounted.

4.2.2 Direct adverse effects on the adjacent Barrow Brook Field BHS associated with habitat loss will be avoided and, in accordance with the recommendations made in the 2012 ecology report, the site layout accommodates an undeveloped buffer between the BHS and the built environment.

4.2.3 Protection of the BHS to avoid indirect adverse effects during both the construction and operation of the site as a result of pathways such as an altered hydrological regime (i.e. too frequent inundation or the source of water diverted away from the wet grassland), pollution incidents, inappropriate management (including the inability to access the field to carry out management) and inappropriate use of the BHS for recreation is essential to conserve the biodiversity interest at the site. Suitable protection measures to avoid these impacts and an adverse effect are described in **Section 5.2**.

4.2.4 As described in **Section 5.7** to facilitate the re-colonisation of the species of interest at the BHS and avoid the encroachment of competitive broadleaf herbs and self-seeded trees and shrubs it is essential that the area of re-colonisation is managed; this may involve hand pulling and / or spot treating herbs such as Indian Balsam, Creeping Thistle and Common Nettle, as appropriate.

4.2.5 In addition, as recognised in the 2012 ecology report the development provides an opportunity to secure the long-term management of the BHS in accordance with conservation objectives and this can be secured through a planning condition, refer to **Section 5.7**.

4.3 Vegetation and Habitats

4.3.1 None of the habitats within the proposed development site are representative of semi-natural habitat. The National Vegetation Classification (NVC) communities present are typical of the geographical area and management conditions present. The site contains only common and widespread plant species.

4.3.2 The habitat and structural diversity provided by the hedgerows and tree lines, particularly within the large fields of improved grassland and their ability to provide established wildlife corridor function within the developed site is recognised. In accordance with the ecological guidance, the hedgerows and tree lines have been accommodated into the site layout.

4.3.3 Hedgerows 1, 4, 5 and 6 are Priority Habitat. Hedgerows 1 and 4 are 'important' in accordance with *The Hedgerows Regulations 1997* wildlife and landscape criteria. The hedgerows are assessed to be of local

value owing to their Priority Habitat status, the habitat corridor function and opportunity for nesting birds and other fauna they provide.

4.3.4 No other Priority Habitats are present at the site.

4.3.5 Indian Balsam, an invasive species listed under Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended), is present at the western site margin. The proposals provide an opportunity to achieve the local control of this species as part of development to prevent further spread into the wild. Further guidance is presented at **Section 5.3**.

4.4 Protected Species and Other Wildlife

4.4.1 Appropriate survey effort and / or assessment in accordance with standard guidance has been carried out to reasonably discount adverse effects on relevant protected species namely badger, great crested newt and other amphibians and reptile species. No further survey is necessary to inform a planning decision.

4.4.2 A licensed daylight bat survey and assessment and, where feasible, detailed inspections of the trees with the site and on the site boundaries have not detected any evidence of use by roosting bats. All trees with moderate or low suitability for use by roosting bats will be retained. It is recognised that arboricultural works are recommended in the tree survey report (TBA Landscape Architects, September 2018) and the best practice guidance, in accordance with current guidelines, at **Section 5.4** is of relevance.

4.4.3 Tree 19T, the only tree assessed to be of high suitability and tree 26T the only tree to be assessed to be of moderate suitability for use by roosting bats, lie on the western site boundary and may be off-site. If felling or other works at these trees are proposed as part of the site preparation works the guidance at **Section 5.4** is of relevance.

4.4.4 The hedgerows and tree lines, particularly Hedgerow 4 and the associated adjacent grassland at the BHS are suitable for the attraction of foraging bats. The retention of these habitats with an appropriate buffer and the sensitive use of lighting at the developed site will avoid any adverse effect on opportunities for foraging bats. In addition the built development will secure the creation for roosting bats as part of good design, refer to **Section 5.4**.

4.4.5 The hedgerows and scattered shrubs within the site are suitable use by nesting birds including Priority Species. Mandatory actions to protect nesting birds during site clearance and measures to provide compensatory opportunities for nesting birds are recommended at **Section 5.5** and can be achieved by the proposals.

4.5 Assessment

4.5.1 Residential development at the site can be achieved with no significant adverse effect on designated sites for nature conservation and ecologically valuable habitats. Appropriate mitigation namely retention of habitats, appropriate timing of works and implementation of the method statements in relation to trees and bats, will avoid adverse effects on protected species.

4.5.2 Protection of the trees, hedgerows and shrubs is recommended. Where shrub and hedgerow removal (for example removal of Hedgerow 5) is necessary, compensatory planting composed of native species is proposed to ensure no long-term net loss in quantity of hedgerow, habitat connectivity function and opportunities for animal life within the site as recommended in **Sections 5.2** and **5.6**.

4.5.3 No further surveys for protected species are necessary to inform the planning decision.

4.5.4 Adverse impacts on nesting birds will be avoided by the appropriate timing of site clearance and retention of the boundary trees and shrubs. In addition, compensatory planting and additional opportunities for feeding and nesting passerine birds, including Priority Species is proposed, as detailed in **Section 5.5** and **5.6**.

4.5.5 In conclusion, provided the guidance in **Section 5.0** is implemented no ecological constraints on the development proposals have been identified.

5.0 RECOMMENDATIONS AND ECOLOGICAL ENHANCEMENT

5.1 Introduction

5.1.1 The recommendations in **Section 5.0** and those already accommodated into the site layout aim to ensure that the development is implemented in accordance with wildlife legislation, Natural England guidance, the principles of National Planning Policy Framework (NPPF), local planning policy and best practice.

5.1.2 The recommendations are appropriate to the geographical area, the habitats in the wider area, the wildlife present in the local area (and likely to use the site post-construction) and take into consideration the end use of the site as a residential development.

5.1.3 Where possible, opportunities to enhance the ecological interest and habitat connectivity and seek demonstrable biodiversity gain through appropriate landscape planting and habitat creation have been identified and recommended in **Section 5.0**, in accordance with the principles of the NPPF (Ministry of Housing, Communities and Local Government, 2018) and good practice.

5.2 Recommendations in Relation to Site Layout and Protection of Existing Vegetation and Habitats

5.2.1 The following guidance has been provided to the design team and accommodated into the Proposed Site Layout and landscape planting proposals:

a. Retention of the hedgerows and trees around the site boundaries and through the site with an appropriate undeveloped protective buffer to increase the longevity of the trees located closer to the built environment;

b. Conservation of tree lines and hedgerows and creation of green corridors through the site to maximise green infrastructure and opportunities for the movement of wildlife;

c. Conservation of an undeveloped buffer between the Barrow Brook Field BHS boundary and any houses and gardens;

d. Avoidance of properties backing on to the buffer along the Barrow Brook Field BHS and the boundary hedgerows (to avoid the risk of garden extensions and adverse effects as a result of fly tipping);

e. Retention of the roadside hedgerow (Hedgerow 1), if feasible;

f. Incorporation of sustainable urban drainage (SuDS) features such as swales and attenuation ponds with landscape planting as part of the surface water drainage scheme, rather than use of underground tanks and pipes;

g. Supplementary planting of the hedgerows and tree lines to maximise their habitat connectivity and biodiversity value, refer to **Section 5.6**;

h. Further enhanced permeability of the site for wildlife can be achieved by the installation of lifted plot boundary fences (0.10 to 0.15 metres from ground level) to permit movement of Priority Species such as hedgehog between gardens; and

i. Use of native species in the landscape planting schedule, refer to **Section 5.6.**

Tree and Habitat Protection

5.2.2 During the construction phase, temporary protective demarcation fencing must be used to protect the boundary with Barrow Brook Field BHS, all trees and sections of hedgerow to be retained. The fencing must extend outside the canopy of the retained trees and must remain in position until all areas have been developed to ensure protection is provided throughout the construction phase.

5.2.3 The fencing will be in accordance with BS5837:2012 *Trees in Relation to Design, Demolition and Construction: Recommendations* (BSI, 2012).

Protection of Barrow Brook Field BHS

5.2.4 As described above, temporary demarcation fencing will be necessary to protect the Barrow Brook Field BHS area during the construction period; construction operations and vehicular access will not be permitted into the BHS.

5.2.5 To minimise the risk of an adverse effect on the BHS habitats and the Barrow Brook in the wider area the implementation of works in accordance with the following Pollution Prevention Guidelines (PPG) is applicable:

a. PPG1: Basic good environmental practices (Environment Agency, 2013);

b. PPG5: Works in, near or over watercourses (Environment Agency, 2014);

c. PPG6: Construction and demolition sites (Environment Agency, 2012); and

d. PPG7: Operating refuelling sites (Environment Agency, 2011).

5.2.6 To conserve the habitats at the BHS it is essential that it can be demonstrated that the drainage at the developed site (including the source of water that currently enters the BHS) is not adversely affected. It is understood that the drainage regime to off-site watercourses and habitats will be controlled at agricultural run-off rates and an adverse effect on the BHS habitats as a result of an altered hydrological regime is not likely.

5.3 Invasive Plant Species

5.3.1 Indian Balsam, an invasive species listed under Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended), is present at Hedgerow 4 (western site boundary) and within the off-site BHS. The proposals provide an opportunity to achieve the local control of this species as part of development to prevent further spread into the wild. As these habitats are outside the construction area the actions to be applied to control invasive plant species will be detailed in the Habitat Management Plan for the BHS, refer to **Section 5.7**.

5.4 Protection and Enhancement of Opportunities for Bats

Trees

5.4.1 None of the trees at the site are scheduled for removal, however, best practice arboricultural works are recommended in the tree survey report, as summarised at **Table 8.8**.

5.4.2 The Method Statements outlined below have been prepared in accordance with best practice, practicable guidance, consultation of the approved development proposals and Chapter 6 of *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn),* (Collins, J. (ed), 2016).

Tree 19T with High Suitability and Tree 26T with Moderate Suitability for Use by Roosting Bats

5.4.3 Trees 19T (Ash) and 26T (Ash) are off-site and works at the tree are not necessary to facilitate the construction operations.

5.4.4 The tree survey report advises that a 50% re-preachment reduction is carried out at 19T and the canopy of 26T is reduced by 25% (note: this would not directly affect the cavity in the main stem). If these works are required a more detailed inspection of the trees PRFs will be necessary. Owing to the poor condition of tree 19T climbing is unlikely to be appropriate and the survey may comprise a dawn survey(s) for bat activity (and evidence of use by nesting birds) prior to works (i.e. May to September inclusive) and in accordance with the relevant survey guidelines (Collins, J. (ed), 2016).

5.4.5 Following the further survey the licensed ecologist will advise on the procedure to be applied for the protection of bats, as required.

Trees With Potential Roost Features and / or Moderate or Low Suitability for Use by Roosting Bats

5.4.6 Thorough examination of the potential roost features (PRFs) at relevant trees identified in the tree survey report to require works namely 6T, 8T, 18T, 37T and 46T did not detect a bat roost or any evidence or previous use by roosting bats on the survey date in September 2018.

5.4.7 The other trees with low suitability namely trees 20T, 30T, 41T, 42T and 47T where arboricultural works are recommended are assessed to be of low suitability on account of the presence of minor dead wood in the canopy and no specific PRFs have been identified.

5.4.8 It is recommended that the removal of deadwood, as needed, at these trees is carried out under the supervision of a licensed bat surveyor. The licensed bat surveyor will be present to supervise the following works:

- Careful removal of the deadwood in sections. The sectioning must avoid cutting through or close to any cavities/ lifted bark etc. this is likely to involve climbing the tree;
- Cut sections will be lowered to the ground with the use of ropes;
- Once on the ground the removed limb will be re-inspected by the licensed bat surveyor and guidance issued; and
- Where relevant, allow all felled sections to lie on the ground for 24 hours before snedding (removing side branches).

Other Trees

5.4.9 Essential arboricultural works at trees assessed to be of negligible suitability for use by roosting bats can be carried out in accordance with good arboricultural practice, taking into account the mandatory actions in relation to nesting birds (**Section 5.4**).

Timing

5.4.10 The optimum time for tree removal is between September and late February inclusive.

Discovery of a Bat

5.4.11 If at any time during the works a bat is discovered or suspected all contractors must withdraw from the area and ERAP (Consultant Ecologists) Ltd (01772 750502) or Natural England must be contacted for further guidance.

Lighting

5.4.12 Paragraph 180, bullet point 'c' in Chapter 15 (conserving and enhancing the natural environment) of the National Planning Policy Framework (NPPF) states that development should:

'limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.'

Development Lighting Design

5.4.13 The lighting scheme to be implemented at the developed site must involve the use of appropriate products and screening, where necessary, to ensure no excessive artificial lighting shines over the Barrow Brook Field BHS and associated hedgerow and tree line, the retained hedgerows and trees, areas of ecological enhancement including the SuDS and any landscape planting, as lighting overspill may deter use by wildlife such as foraging bats.

5.4.14 The lighting scheme will be designed with reference to current guidance, namely:

a. Guidance Note 08/18. *Bats and Artificial Lighting in the UK*. Bats and Built Environment series.(Bat Conservation Trust and Institution of Lighting Professionals, 2018); and

b. *Bats and lighting: Overview of current evidence and mitigation guidance* (Stone, 2014).

Enhancing Habitats for Roosting Bats

5.4.15 As the site and surrounds will remain suitable for the attraction of foraging bats, particularly pipistrelle species in the presence of the development, it is recommended that the new properties incorporate bat roosting opportunities in the form of bat access panels.

5.4.16 The bat access panels should be sited at least four metres above ground level, ideally facing or close to areas of landscape planting or existing linear features. The access panels should not be positioned over windows or doorways where bat droppings may become a nuisance. Once the development layout has been finalised, an ecologist will advise on an appropriate number and suitable positions for the bat access panels. Suitable bat access panels are available from NHBS Ecology (www.nhbs.com) or Wild Care Shop (www.wildcareshop.com) and are presented at **Insert 1**:

Insert 1: *Examples of commercially available bat access panels (left: IBStock products, right: Habibat products)*

5.5 Nesting Birds

Protection

5.5.1 All wild birds are protected under the *Wildlife and Countryside Act 1981* (as amended) while they are breeding. It is advised that any works such as vegetation clearance that will affect habitats suitable for use by nesting birds are scheduled to commence outside the bird nesting season. Commencement of works in the nesting season must be informed by a pre-works nesting bird survey, carried out by a suitably experienced ecologist. The bird breeding season typically extends between March to August inclusive.

5.5.2 If breeding birds are detected the ecologist will issue guidance in relation to the protection of the nesting birds in conjunction with the scheduled works. This may involve cordoning off an area of the site until the young birds have fledged.

Enhancing Habitats for Nesting Birds

5.5.3 The actions described at **Section 5.2** and accommodated into the Proposed Site Layout will retain and protect habitat for use by breeding and foraging birds at the site, and the landscape planting and habitat creation described at **Section 5.6** will provide compensation and further habitat enhancement for birds.

5.5.4 Further enhancement at the site for nesting birds, including Priority Species, to satisfy the requirements of the NPPF will be provided through installation of bird boxes.

5.5.5 The specification of the number, type and location of the nest boxes will be provided as part of a detailed plan as the site layout is finalised. The following range of products is suitable based on the habitats present, the bird species recorded at the site in 2009, 2012 and September 2018 and those known to occur in the local area.

Insert 2: *Nest boxes suitable for installation on appropriate buildings and trees to enhance the opportunities available for use by nesting birds, including Priority Species. Left to right: Schwegler 1B general bird box, Schwegler 1SP house sparrow terrace, Schwegler 2H open fronted nest box and 1MR Avianex box*

5.6 Landscape Planting

Landscape Planting Outside of Private Residential Ownership

5.6.1 To maximise opportunities for ecological enhancement the landscape planting schedule must incorporate native species and species known to be of value for the attraction of wildlife. Opportunities for landscape planting and habitat creation are available in the following locations:

a. At the surface water attenuation pond and surrounds

The creation of a pond provides an opportunity for wildflower seeding with a low maintenance grassland mix suitable for occasional inundation such as the EM8 Meadow Mixture for Wetlands.

b. Along the retained tree lines and hedgerows

It is recommended that sections of the retained hedgerows and tree lines through the site are supplementary planted with native woodland edge species such as Blackthorn (*Prunus spinosa*), Dog-rose, Hawthorn, Elder, Holly (*Ilex aquifolium*) and Hazel (*Corylus avellana*) to maximise their habitat connectivity function.

Landscape Planting in the Residential Area

5.6.2 It is recommended that any landscape planting to be provided within front gardens at the residential site is composed from native species and species known to be of value for the attraction of wildlife.

Trees and Shrubs

5.6.3 Planting of trees and shrubs can provide stepping stones and habitat connectivity through the site for use by wildlife such as bats and birds. Suitable tree and shrub species are presented at **Table 5.1**.

Table 5.1: Suitable Native Species for Tree and Shrub Planting

Scientific Name	Common Name	Scientific Name	Common Name
Acer campestre	Field Maple	*Prunus spinosa*	Blackthorn
Corylus avellana	Hazel	*Rosa arvensis*	Field Rose
Crataegus monogyna	Hawthorn	*Rosa canina*	Dog-rose
Ilex aquifolium	Holly	*Sambucus nigra*	Elder
Malus sylvestris	Crab Apple	*Sorbus aucuparia*	Rowan
Prunus avium	Wild Cherry	*Ulmus glabra*	Wych Elm
Prunus padus	Bird Cherry	*Viburnum opulus*	Guelder Rose

Understorey Planting

5.6.4 The understorey and ground cover planting design should be prepared to optimise the attraction of invertebrates such as feeding bumblebees and butterflies. Where possible the use of native species should be maximised but where necessary non-native species known to be attractive to invertebrates should be used.

5.6.5 Planting schemes that include flowering species such as *Viburnum, Ceanothus, Hebe*, *Lavandula*, *Lonicera, Potentilla, Rosmarinus* and *Vinca* can maximise opportunities for feeding invertebrates and for the attraction of foraging bats and birds.

5.6.6 To provide an early spring source of nectar to invertebrates such as bumblebees the introduction of spring flowering bulbs in the grassland verges is recommended.

5.7 Landscape and Habitat Management Plan

5.7.1 To ensure the long-term conservation of the retained, enhanced and created habitats a 'Long-term Landscape and Habitat Management Plan' can be prepared for the site and the surrounds.

5.7.2 Confirmation of the commitment to implement and fund the management will be required.

5.7.3 The scope of the 'Long-term Management, Monitoring and Maintenance Plan' will encompass:

a. Monitoring and assessment of the condition of the Barrow Brook Field BHS Lowland Meadows grassland including the monitoring of the recolonisation of the disturbed ground and specification of spot treatment of competitive broad-leaved herbs as appropriate;

b. Specification of an appropriate cutting / grazing management at the BHS;

c. The monitoring of the establishment of landscape planting;

b. Aftercare of landscape planting;

c. Monitoring and treatment of invasive species; and

d. Maintenance of a SuDS and associated wildflower habitats.

5.7.4 The Plan will be a reviewable document that will be informed by the site monitoring activities and amended as required.

6.0 CONCLUSION

6.1 Residential development at the site can be achieved with no significant adverse effect on designated sites for nature conservation and ecologically valuable habitats. Appropriate mitigation namely retention of habitats and appropriate timing of works will avoid adverse effects on protected species.

6.2 The proposals will secure an opportunity to implement beneficial measures such as habitat creation that will safeguard habitats for wildlife such as birds and bats, with the aim of providing a net gain in biodiversity in accordance with the principles of the NPPF.

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8.0 APPENDIX 1: TABLES AND FIGURES

Table 8.1: Plant Species List for Improved Grassland

Scientific Name	Common Name	DAFOR[1]	Cover
Agrostis capillaris	Common Bent	F	5%
Alopecurus pratensis	Meadow Foxtail	F	5%
Cerastium fontanum	Common Mouse-ear	VLF	<1%
Cirsium arvense	Creeping Thistle	VL	<1%
Cirsium vulgare	Spear Thistle	O	<1%
Dactylis glomerata	Cock's-foot	LF	5%
Elytrigia repens	Common Couch	VLF	1%
Festuca rubra	Red Fescue	LF	5%
Gnaphalium uliginosum	Marsh Cudweed	VLF	<1%
Holcus lanatus	Yorkshire-fog	F	5%
Juncus effusus	Soft-rush	VLF	<1%
Lolium perenne	Perennial Rye-grass	A*	60%
Persicaria maculosa	Redshank	VLF	<1%
Plantago lanceolata	Ribwort Plantain	O	<1%
Plantago major	Greater Plantain	O	<1%
Poa annua	Annual Meadow-grass	LF	5%
Polygonum aviculare	Knotgrass	VLF	<1%
Ranunculus acris	Meadow Buttercup	O	<1%
Ranunculus repens	Creeping Buttercup	VLA	1%
Rumex obtusifolius	Broad-leaved Dock	F	<1%
Senecio jacobaea	Common Ragwort	O	<1%
Sonchus asper	Prickly Sow-thistle	R	<1%
Sonchus oleraceus	Smooth Sow-thistle	R	<1%
Taraxacum officinale agg.	Dandelion	O	<1%
Trifolium repens	White Clover	LA	5%
Urtica dioica	Common Nettle	VLA	<1%

[1]Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species

Table 8.2: Plant Species List for Hedgerows 1 and 4

Scientific Name	Common Name	Hedgerow 1 DAFOR	Hedgerow 1 % Cover	Hedgerow 4 DAFOR	Hedgerow 4 % Cover
Woody Species					
Alder glutinosa	Alder	-	-	LF	10%
Crataegus monogyna	Hawthorn	LD/VA*	80%	A*	40%
Fraxinus excelsior	Ash	LVA	10%	F*	30%
Quercus robur	Pedunculate Oak	-	-	F*	30%
Rosa canina	Dog-rose	VL	<1%	VL	<1%
Sambucus nigra	Elder	LF	1%	R	<1%
Ulmus glabra	Wych Elm	R	<1%	-	-
Herb Layer					
Agrostis capillaris	Common Bent	-	-	F	15%
Alliaria petiolata	Garlic Mustard	F	5%	LF	1%
Anthoxanthum odoratum	Sweet Vernal-grass	-	-	VL	<1%
Anthriscus sylvestris	Cow Parsley	-	-	R	<1%
Arrhenatherum elatius	False Oat-grass	VLA	15%	LA	20%
Arum maculatum	Arum Lily	R	<1%		
Calystegia sepium	Hedge Bindweed	R	<1%	LA	5%
Carex hirta	Hairy Sedge	-	-	-	-
Cirsium arvense	Creeping Thistle	-	-	O	<1%
Dactylis glomerata	Cock's-foot	LF	10%	F*	5%
Deschampsia cespitosa	Tufted Hair-grass	-	-	F	15%
Dryopteris dilatata	Broad buckler-fern	-	-	VL	<1%
Dryopteris filix-mas	Male-fern	-	-	VL	<1%
Elytrigia repens	Common Couch	LF	5%	LA	10%
Epilobium hirsutum	Great Willowherb	VL	<1%	-	-
Festuca rubra	Red Fescue	LA	1%	VL	<1%
Galium aparine	Cleavers	VLF	<1%	LF	<1%
Geranium robertianum	Herb-Robert	VLF	<1%	LF	<1%
Geum urbanum	Wood Avens	-	-	VLA	<1%
Hedera helix	Ivy	A*	5%	VLA	<1%
Heracleum sphondylium	Common Hogweed	O	<1%	-	-
Holcus lanatus	Yorkshire-fog	-	-	F	10%
Impatiens glandulifera	Indian Balsam	-	-	LF	5%
Lapsana communis	Nipplewort	R	<1%	-	-
Lolium perenne	Perennial Rye-grass	LA	25%	-	-
Mercurialis perennis	Dog's Mercury	LF/VLA	5%	VLF	<1%
Plantago major	Greater Plantain	-	-	O	<1%
Poa annua	Annual Meadow-grass	VLA	<1%	-	-
Ranunculus repens	Creeping Buttercup	LF	3%	F	5%
Rubus fruticosus agg.	Bramble	F	5%	LA	10%
Rumex acetosa	Common Sorrel	VL	<1%	R	<1%
Rumex obtusifolius	Broad-leaved Dock	VL	<1%	-	-
Stachys sylvatica	Hedge Woundwort	VL	<1%	-	-
Sisymbrium officinale	Hedge Mustard	O	<1%	-	-
Taraxacum officinale agg.	Dandelion	R	<1%	-	-
Urtica dioica	Common Nettle	LF	1%	LF	<1%%

[1]Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species.
Species highlighted in grey are classed as either 'woody' or 'woodland' species contributing to *The Hedgerows Regulations 1997* wildlife and landscape criteria assessment.

Table 8.3: Description and Assessment of Hedgerows 1 and 4 in Accordance with The Hedgerows Regulations 1997

	Hedgerow Name	Hedgerow 1			Hedgerow 4		
Hedgerow dimensions and management	Height x width x length (metres)	1.5 to 2 x 1.5 x 125			2 to 8 x 2 x 215		
	Continuity	100%			100%		
	Management	Cut on top and sides			Unmanaged		
Average Number of Qualifying Woody Species:	Section number	1	2	3	1	2	3
	Qualifying woody species	5	4	-	4	4	-
	Average Number	***4.5 (rounded to 5)***			***4***		
Number of Features Present:	(a) Bank or wall along at least ½ length	Yes			No		
	(b) Gaps which in agg. do not exceed 10%	Yes			Yes		
	(c)-(e) 1 standard tree per 50m	No			Yes		
	(f) At least 3 woodland species within 1m	Yes			Yes		
	(g) Ditch along at least ½ its length	No			No		
	(h) Connections scoring 4 points or more	No			No		
	(i) Parallel hedge within 15m	No			Yes		
	Total Features	3			4		
Criteria for Hedgerow Importance 1: Hedgerow contains species listed as:	(1) Part 1 of Schedule 1, Schedule 5 or Schedule 8 of WCA 1981	No			No		
	(2) Declining breeders in 'Red Data Birds of Britain'	No			No		
	(3) Categorised as 'endangered', 'extinct' or 'vulnerable'	No			No		
Criteria for Hedgerow Importance 2: Hedgerow includes: (all woody species reduced by 1 as hedgerow is in Lancashire)	(i) At least 7 woody species (on average)	No			No		
	(ii) At least 6 woody species (on average) and at least 3 features	**Yes**			No		
	(iii) At least 6 woody species (on average), including one of: Black Poplar, Large-leaved Lime, Small-leaved Lime or Wild Service Tree	No			No		
	(iv) At least 5 woody species (on average), and has 4 features	No			**Yes**		
Criteria for Hedgerow Importance 3: Is adjacent to a bridleway, footpath or byway and includes at least 4 woody species on average and 2 features from (a) to (g):		No			No		
	Hedgerow Classed as Important?	***Yes***			***Yes***		

Table 8.4: Plant Species List for Hedgerows 5 and 6

Scientific Name	Common Name	Hedgerow 5 DAFOR	Hedgerow 5 % Cover	Hedgerow 6 DAFOR	Hedgerow 6 % Cover
Woody Species					
Alnus glutinosa	Alder	VL	<1%	-	-
Corylus avellana	Hazel	VLF	<1%	LA	5%
Crataegus monogyna	Hawthorn	LD*	40%	A*	80%
Fraxinus excelsior	Ash	VL	<1%	LF	2%
Ilex aquifolium	Holly	-	-	R	<1%
Prunus sp.	Cherry species	-	-	LF	1%
Prunus spinosa	Blackthorn	LD*	50%	LA	5%
Quercus robur	Pedunculate Oak	R	<1%	R	<1%
Rosa canina	Dog-rose	VL	<1%	VLA	<1%
Sambucus nigra	Elder	VLF	<1%	O	<1%
Ulmus sp.	Elm species	R	<1%	-	-
Herb Species					
Agrostis capillaris	Common Bent	LF	<1%	-	-
Arrhenatherum elatius	False Oat-grass	-	-	R	<1%
Brachypodium sylvaticum	Slender False-brome	-	-	LF	1%
Cardamine flexuosa	Wavy Bittercress	VL	<1%	-	-
Cirsium arvense	Creeping Thistle	VL	<1%	LA/F*	10%
Cynosurus cristatus	Crested Dog's-tail	-	-	VLA	<1%
Dactylis glomerata	Cock's-foot	VLA	5%	LA/F*	20%
Deschampsia cespitosa	Tufted Hair-grass	-	-	VLA	<1%
Dryopteris filix-mas	Male-fern	R	<1%	-	-
Elytrigia repens	Common Couch	LF	10%	-	-
Epilobium hirsutum	Great Willowherb	VLF	<1%	-	-
Equisetum arvense	Field Horsetail	VLF	<1%	R	<1%
Filipendula ulmaria	Meadowsweet	VLF	<1%	LA	10%
Galium aparine	Cleavers	VLA	<1%	VLF	<1%
Geranium robertianum	Herb-Robert	VLF	<1%	VLA	<1%
Glyceria fluitans	Floating Sweet-grass	-	-	LF	1%
Hedera helix	Ivy	LA	5%	-	-
Heracleum sphondylium	Hogweed	-	-	O	<1%
Holcus lanatus	Yorkshire-fog	LA	25%	LF	5%
Holcus mollis	Creeping Soft-grass	-	-	VLA	<1%
Lamium album	White Dead-nettle	-	-	O	<1%
Lolium perenne	Perennial Rye-grass	LF	35%	F*	10%
Phalaris arundinacea	Reed Canary-grass	-	-	VLA	1%
Phleum pratense	Timothy	-	-	LF	<1%
Potentilla anserina	Silverweed	-	-	VLA	<1%
Ranunculus repens	Creeping Buttercup	LF	5%	LA/F	5%
Rubus fruticosus agg.	Bramble	LA	10%	LF	5%
Urtica dioica	Common Nettle	VLA	5%	LA/F*	20%
Vicia cracca	Tufted Vetch	VL	<1%	-	-

[1]Key to DAFOR: D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species.
Species highlighted in grey are classed as either 'woody' or 'woodland' species contributing to *The Hedgerows Regulations 1997* wildlife and landscape criteria assessment.

Table 8.5: Description and Assessment of Hedgerows 5 and 6 in Accordance with The Hedgerows Regulations 1997

	Hedgerow Name	Hedgerow 5			Hedgerow 6		
Hedgerow dimensions and management	Height x width x length (metres)	1.5 to 7 x 1.5 x 180			2 to 8 x 2 x 345		
	Continuity	80%			80%		
	Management	Unmanaged			Unmanaged		
Average Number of Qualifying Woody Species:	Section number	1	2	3	1	2	3
	Qualifying woody species	4	5	-	5	5	2
	Average Number	***4.5 (rounded to 5)***			***3.3 (rounded to 3)***		
Number of Features Present:	(a) Bank or wall along at least ½ length	No			No		
	(b) Gaps which in agg. do not exceed 10%	No			No		
	(c)-(e) 1 standard tree per 50m	No			Yes		
	(f) At least 3 woodland species within 1m	No			No		
	(g) Ditch along at least ½ its length	No			No		
	(h) Connections scoring 4 points or more	No			No		
	(i) Parallel hedge within 15m	No			No		
	Total Features	0			1		
Criteria for Hedgerow Importance 1: Hedgerow contains species listed as:	(1) Part 1 of Schedule 1, Schedule 5 or Schedule 8 of WCA 1981	No			No		
	(2) Declining breeders in 'Red Data Birds of Britain'	No			No		
	(3) Categorised as 'endangered', 'extinct' or 'vulnerable'	No			No		
Criteria for Hedgerow Importance 2: Hedgerow includes: (all woody species reduced by 1 as hedgerow is in Lancashire)	(i) At least 7 woody species (on average)	No			No		
	(ii) At least 6 woody species (on average) and at least 3 features	No			No		
	(iii) At least 6 woody species (on average), including one of: Black Poplar, Large-leaved Lime, Small-leaved Lime or Wild Service Tree	No			No		
	(iv) At least 5 woody species (on average), and has 4 features	No			No		
Criteria for Hedgerow Importance 3: Is adjacent to a bridleway, footpath or byway and includes at least 4 woody species on average and 2 features from (a) to (g):		No			No		
	Hedgerow Classed as Important?	***No***			***No***		

Table 8.6: Plant Species List for Barrow Brook Field Biological Heritage Site

Scientific Name	Common Name	DAFOR[1]	% Cover
Woody Species			
Alnus glutinosa	Alder saplings	O	<1%
Salix caprea	Goat Willow saplings	O	<1%
Herb Species			
Achillea ptarmica	Sneezewort	VLA	<1%
Agrostis capillaris	Common Bent	LF	5%
Agrostis stolonifera	Creeping Bent	LF	5%
Alopecurus geniculatus	Marsh Foxtail	F	5%
Anthoxanthum odoratum	Sweet Vernal-grass	LF	1%
Arrhenatherum elatius	False Oat-grass	LF	5%
Carex hirta	Hairy Sedge	LF	5%
Centaurea nigra	Common Knapweed	VLA	<1%
Cirsium palustre	Marsh Thistle	LF	2%
Deschampsia cespitosa	Tufted Hair-grass	LF	5%
Epilobium palustre	Marsh Willowherb	O	<1%
Equisetum arvense	Field Horsetail	LF	1%
Galium palustre	Marsh-bedstraw	VLA	<1%
Glyceria fluitans	Floating Sweet-grass	LF	5%
Hieracium sp.	Hawkweed species	O	<1%
Holcus lanatus	Yorkshire-fog	F/LA*	20%
Hypochaeris radicata	Common Cat's-ear	O	<1%
Impatiens glandulifera	Indian Balsam	LA	5%
Juncus articulatus	Jointed Rush	VLF	<1%
Juncus effusus	Soft-rush	LF/VLA	5%
Juncus inflexus	Hard Rush	VL	<1%
Lathyrus pratensis	Meadow Vetchling	VLA	<1%
Lotus pedunculatus	Greater Bird's-foot-trefoil	LF	5%
Persicaria hydropiper	Water-pepper	VLA	<1%
Phalaris arundinacea	Reed Canary-grass	LA	5%
Phleum pratense	Timothy	LF	5%
Plantago lanceolata	Ribwort Plantain	O	<1%
Poa trivialis	Rough Meadow-grass	F	5%
Potentilla anserina	Silverweed	LF/VLA	2%
Ranunculus acris	Meadow Buttercup	O	<1%
Ranunculus repens	Creeping Buttercup	F/LA*	5%
Rumex acetosa	Common Sorrel	LF	<1%
Rumex obtusifolius	Broad-leaved Dock	O	<1%
Sanguisorba officinalis	Great Burnet	VL	<1%
Senecio aquaticus	Marsh Ragwort	F	1%
Solanum dulcamara	Bittersweet	O	<1%
Taraxacum officinale agg.	Dandelion	O	<1%
Trifolium repens	White Clover	VLF	<1%
Valeriana officinalis	Common Valerian	R	<1%
Vicia sepium	Bush Vetch	O	<1%

[1]**Key to DAFOR:** D=Dominant, A=Abundant, F=Frequent, O=Occasional, R=Rare, V=Very, L=Local and *denotes a constant species

Table 8.7: Table of Photographs

Photo 1: Improved grassland within site (facing west)

Photo 2: Improved grassland within site (facing east)

Photo 3: Improved grassland within site (facing north)

Photo 4: Hedgerow 1 (facing north)

Photo 5: Hedgerow 4 (facing north)

Photo 6: Hedgerow 5 (facing north-east)

Photo 7: Hedgerow 6 (facing south-east)

Photo 8: Barrow Brook field BHS (facing north)

Photo 9: New drainage channel along western boundary of Barrow Brook Field BHS (facing south)

Photo 10: Indian Balsam plants along new drainage channel at BHS (facing south) and recolonisation of disturbed ground to the east

Photo 11: Tree 6T showing deadwood

Photo 12: Knothole at 8T

Photo 13: Blind knothole at 15T

Photo 14: Lifted bark at 18T

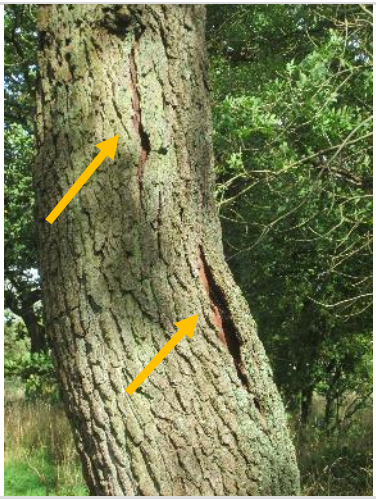


Photo 15: Lifted bark at 18T

Photo 16: Splits and decay whole length of 19T

Photo 17: Splits and decay whole length of 19T

Photo 18: Large knothole at 26T

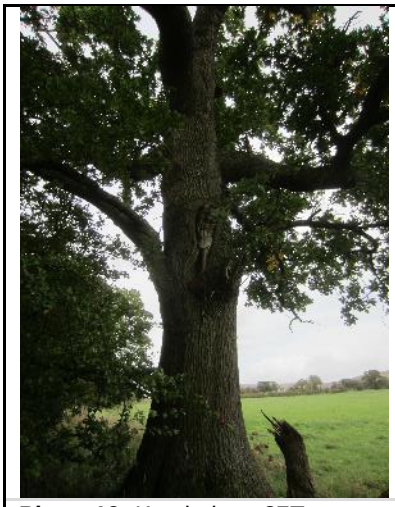


Photo 19: Knothole at 37T	**Photo 20:** Deadwood and lifted bark at 41T
	
Photo 21: Dense Ivy cover a t51T	

Table 8.8: Results of Licensed Bat Survey and Assessment with reference to the Tree Survey Report (TBA Landscape Architects, September 2018)

Tree Number (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Species**	**Description**	**Removal / Pruning Works Proposed** (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Presence of Potential Roost Features (PRF) and Results of Further Assessment (if applicable)**	**Assessment** (based on Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016)) and scope of works proposed
1T	Hawthorn	Mature	Reduce central stem by 40% retaining as much lower canopy as possible.	None	Negligible
2T	Ash	Mature	No action proposed	None	Negligible
3T	Ash	Mature	No action proposed	None	Negligible
4G	Hawthorn row	Mature	No action proposed	None	Negligible
5G	Hawthorn and Elder	Mature	No action proposed	None	Negligible
6T	Pedunculate Oak	Mature	20% canopy reduction to re-shape and restructure outer canopy.	Dead wood present in canopy and snagged branch wounds and lost bark but no definite PRFs present, refer to **Photo 11**.	Low
7T	Hawthorn	Mature	No action proposed	None	Negligible
8T	Pedunculate Oak	Mature	No action proposed	Knothole on approximately 1.5 metres from ground level on south side of main stem, refer to **Photo 12**. Inspection with endoscope confirmed that the knothole extends 0.50 metres upwards and 0.20 metres downwards. No bats, droppings or other fields signs present. Slugs present.	Low
9G	Hawthorn	Mature	No action proposed	None	Negligible

Tree Number (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Species**	**Description**	**Removal / Pruning Works Proposed** (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Presence of Potential Roost Features (PRF) and Results of Further Assessment (if applicable)**	**Assessment** (based on Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016)) and scope of works proposed
10T	Ash	Mature	No action proposed	Deadwood present within the canopy but no PRFs observed	Low
11G (Hedgerow 6)	Hawthorn, Elder, Blackthorn, Hazel and Elm species.	Mature	No action proposed	None	Negligible
12T	Pedunculate Oak	Mature	No action proposed	None	Negligible
13G	Hawthorn	Mature	No action proposed	None	Negligible
14T	Pedunculate Oak	Mature	No action proposed	Deadwood in the canopy	Low
15T	Pedunculate Oak	Mature	No action proposed	Knothole on lateral branch approximately 4 metres from the ground on the west side , refer to **Photo 13**. Further investigation confirmed the hole is blind.	Low
16T	Pedunculate Oak	Mature	No action proposed	Deadwood in the canopy	Low
17G	Hawthorn	Mature	No action proposed	None	Negligible
18T	Dead tree	Mature	Off-site but arrangements to fell or monolith tree are recommended	Lifted bark present at 2 metres and 3 metres from ground level, refer to **Photos 14** and **15**. Further inspection confirmed no current use by bats or evidence of previous use.	Low
19T	Ash	Mature	50% re-preachment reduction recommended	Deadwood in canopy. Splits and decay the whole length of the tree, refer to **Photos 16** and **17**.	High
20T	Ash	Mature	Reduce by 25% the lateral branch spread to the east	Deadwood present in canopy	Low
21T	Alder	Mature	None proposed	Deadwood present in canopy	Low

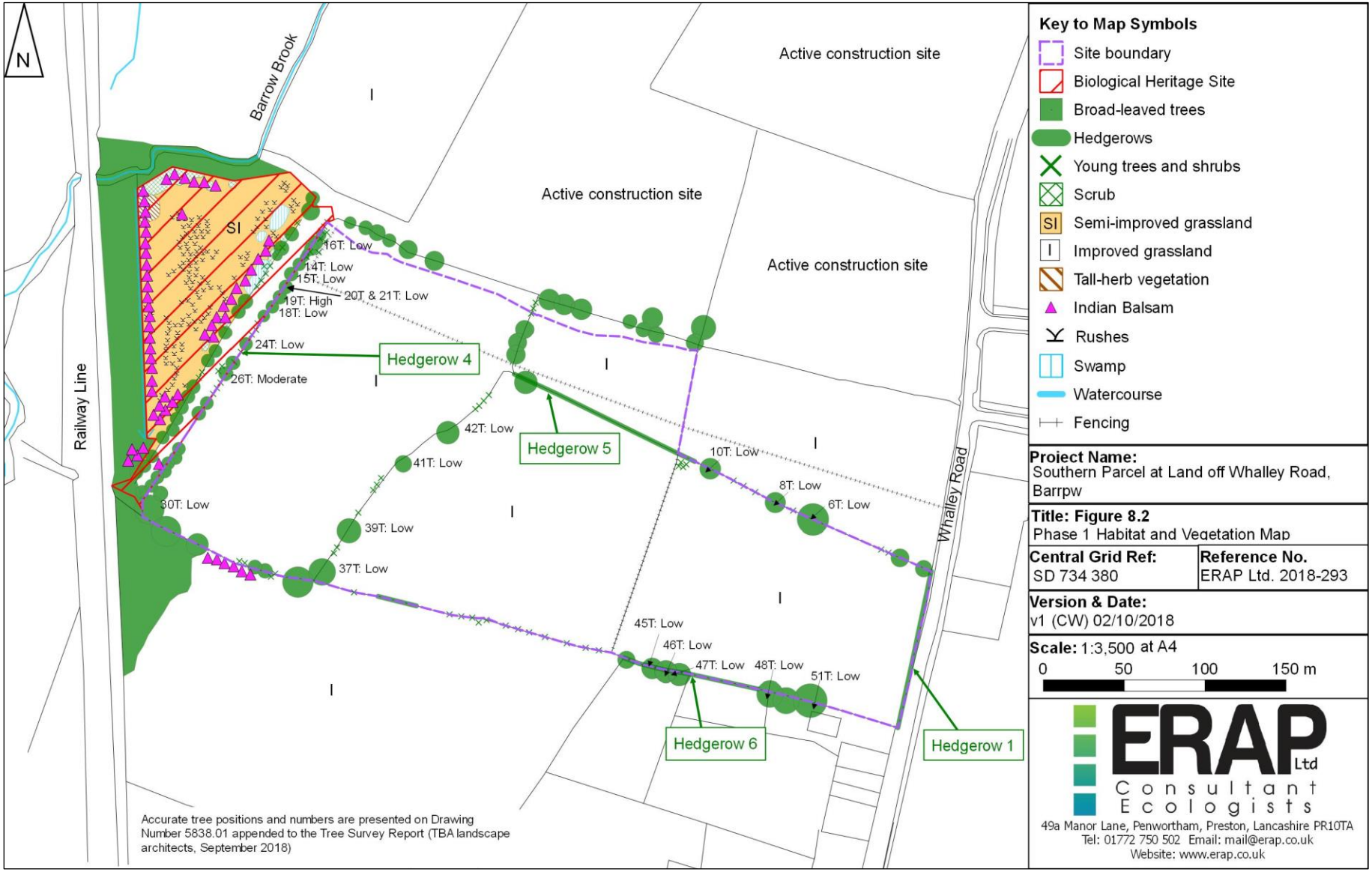
Tree Number (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Species**	**Description**	**Removal / Pruning Works Proposed** (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Presence of Potential Roost Features (PRF) and Results of Further Assessment (if applicable)**	**Assessment** (based on Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016)) and scope of works proposed
22T	Ash	Mature	None proposed	None	Negligible
23T	Pedunculate Oak	Mature	None proposed	None	Negligible
24T	Pedunculate Oak	Mature	None proposed	Deadwood present in canopy	Low
25T	Pedunculate Oak	Mature	None proposed	None	Negligible
26T	Ash	Mature	Reduce overall canopy by 25%	Large knothole approximately 6 metres from ground on the east side, refer to **Photo 18**. Suitable for use by roosting bats and / or nesting birds including owl	Moderate
27T	Pedunculate Oak	Mature	None proposed	None	Negligible
28G	Row of mature Oak and Ash	Mature	None proposed	Off site	-
29T	Pedunculate Oak	Mature	None proposed	None	Negligible
30T	Pedunculate Oak	Mature	Reduce lowers lateral branch extending east by 25%. Reduce northerly stem by 40%	Deadwood present in canopy	Low
31T	Ash	Early-mature	None proposed	None	Negligible
32G	Hawthorn	Mature	No action proposed	None	Negligible

Tree Number (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Species**	**Description**	**Removal / Pruning Works Proposed** (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Presence of Potential Roost Features (PRF) and Results of Further Assessment (if applicable)**	**Assessment** (based on Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016)) and scope of works proposed
33T	Pedunculate Oak	Mature	None proposed	Off site	-
34T	Ash	Semi-mature	No action proposed	None	Negligible
35T	Pedunculate Oak	Mature	None proposed	None	Negligible
36T	Pedunculate Oak	Mature	None proposed	Off-site	-
37T	Mature	No action proposed	Reduce overall canopy by approximately 30%	Branch ripped off southern side; tear wound present but no PRF, refer to **Photo 19**. Dead wood present in canopy.	Low
38G	Hawthorn	Mature	No action proposed	None	Negligible
39T	Pedunculate Oak	Mature	None proposed	Dead wood present in canopy	Low
40G	Elder	Mature	None proposed	None	Negligible
41T	Pedunculate Oak	Mature	Shorten deadwood	Dead wood present in canopy and local lifted bark, refer to **Photo 20**.	Low
42T	Pedunculate Oak	Mature	Shorten deadwood	Dead wood present in canopy	Low
43G	Hawthorn	Mature	No action proposed	None	Negligible
44G	Apple Hazel, Hawthorn	Mature	None proposed	None	Negligible
45T	Ash	Mature	Off-site	Knothole approximately 8 metres from ground on the southern side	Low
46T	Ash	Mature	Off-site. 30% canopy reduction recommended	Decay on main steam; does not appear to lead to a cavity or hollow stem.	Low

Tree Number (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Species**	**Description**	**Removal / Pruning Works Proposed** (in accordance with Tree Survey Report (TBA Landscape Architects, September 2018))	**Presence of Potential Roost Features (PRF) and Results of Further Assessment (if applicable)**	**Assessment** (based on Table 4.1 of the *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* (Collins, J. (ed), 2016)) and scope of works proposed
47T	Pedunculate Oak	Mature	Shorten / remove deadwood	Dead wood present in canopy	Low
48T	Pedunculate Oak	Mature	Not included in report	Minor dead wood in canopy. Developing knot hole on north side; further inspection confirmed the hole is blind	Low
49T	Ash	Mature	Not included in report	None	Negligible
50G	Hawthorn, Blackthorn, Hazel	Mature	Not included in report	None	Negligible
51T	Ash	Mature	Not included in report	Dense Ivy cover	Low
52H (Hedgerow 1)	Hawthorn	Mature	Not included in report	None	Negligible
53T	Pedunculate Oak	Mature	Not included in report	None	Negligible
54T	Pedunculate Oak	Mature	Not included in report	None	Negligible
55T	Ash	Mature	Not included in report	None	Negligible

Figure 8.1: Google Earth Image of Site and Surrounds

Figure 8.2: Phase 1 Habitat and Vegetation Map



9.0 APPENDIX 2: BARROW BROOK FIELD BIOLOGICAL HERITAGE SITE CITATION

Lancashire County Heritage Sites

Biological Heritage Site

Barrow Brook Field

Site Boundary

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This map shows only the boundary of the Biological Heritage Site named above. It does not show any other designated sites which may occur within the area covered by the map.

Ref No. 73NW17

Biological Heritage Sites Partnership

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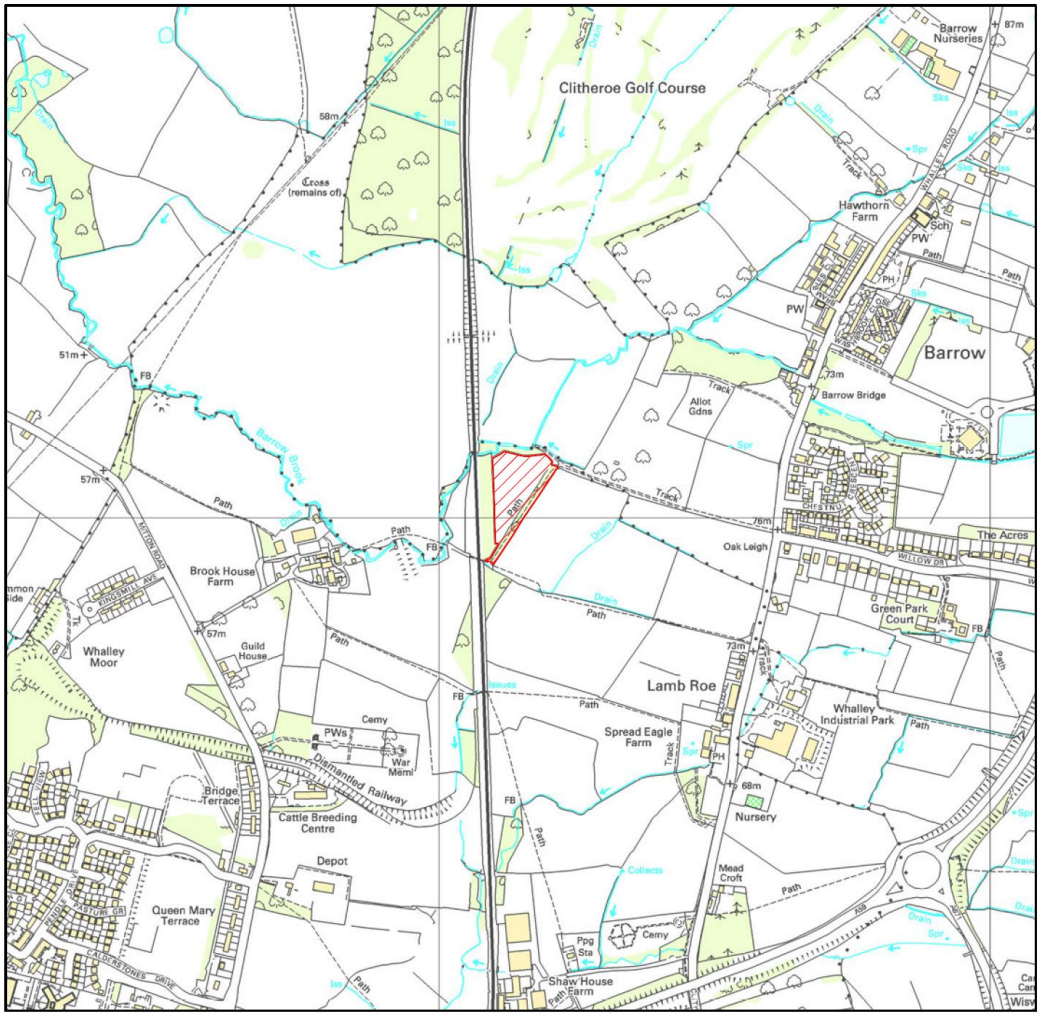
Natural England



Grid ref. SD731380	**Scale** 1:10,000	The Wildlife Trust Lancashire Manchester N. Merseyside	Lancashire County Council
Site approved	**Map** 1 of 1		
Boundary revised	**Date of Map** 29/09/14		

Lancashire County Heritage Sites

Biological Heritage Site

Biological Heritage Sites Partnership:

Site Name: Barrow Brook Field

Site Ref: 73NW17 **Approved:** 01 January 2006

Area (ha): 1.31 **Date written/last updated:** 01 May 2006

Grid Ref: SD731380 **Owner/Occupier:** Private

Districts: Ribble Valley

Parishes: Whalley

Description:

The site is located approximately 500 metres to the west of Barrow near Whalley and comprises a triangular field south of Barrow Brook and alongside the railway. It supports damp, species-rich, semi-natural, neutral grassland referable to the MG4 *Alopecurus pratensis-Sanguisorba* officinalis grassland of the National Vegetation Classification.

Grassland species comprise Meadow Foxtail, Sweet Vernal-grass, Marsh Foxtail, Creeping Bent, Tufted Hair-grass, Great Burnet, Brown Sedge, Hairy Sedge, Common Knapweed, Common Sorrel, Pignut, Meadow Vetchling, Greater Bird's-foot-trefoil, Cuckooflower, Bog Stitchwort, Selfheal, Silverweed, Amphibious Bistort, Common Spotted-orchid, Meadow Buttercup, Creeping Buttercup, Marsh Thistle, Jointed Rush, Hard Rush, Soft-rush and Compact Rush.

A belt of trees on a raised bank along the eastern boundary of the site supports Oak, Beech and Alder with Common Nettle, Lesser Celendine, Wood Dock, Hogweed, Broad Buckler-fern and Remote Sedge.

Guideline(s) for Site Selection:

Grassland (Gr1)

Other Information/Comments:

Lowland Hay Meadow is a priority habitat in the UK Biodiversity Action Plan.