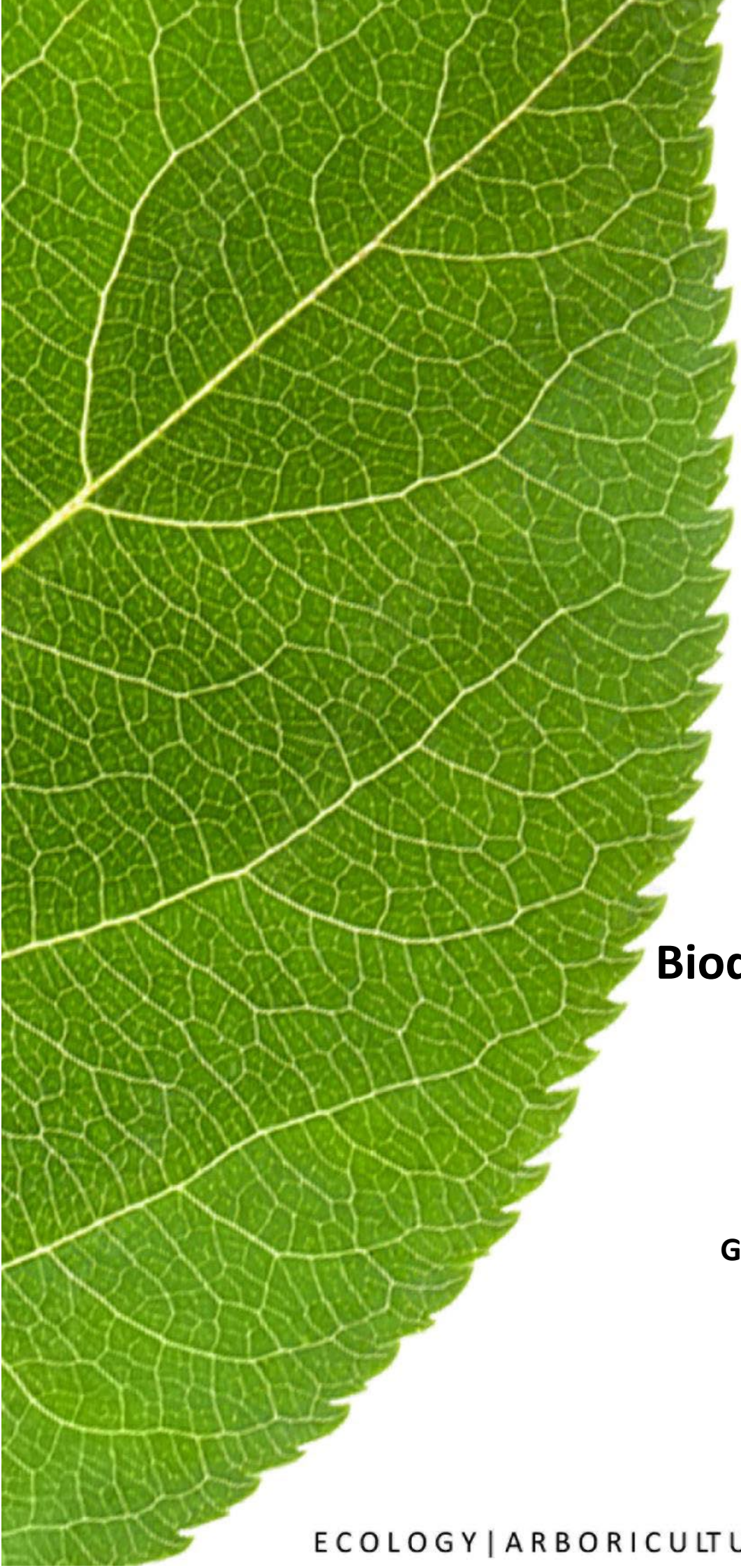


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Biodiversity Action Plan

Greetham Parish Council

September 2022

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1. INTRODUCTION

1.1 Ecology Resources were commissioned by Greetham Parish Council to produce a Biodiversity Action Plan ("BAP") for the village of Greetham, Rutland, Leicestershire.

1.2 This document sets out a strategy for the protection and enhancement of the local landscapes and the wider environment, with a strong focus on biodiversity.

PURPOSE OF THIS DOCUMENT

1.3 The aim of this document is to:

- Present the results of a comprehensive desk-based review of protected species records and of statutory and non-statutory designated sites within the Greetham Parish Council region.
- Identify, map, and describe all green spaces and other items of ecological significance (i.e., notable hedgerows) within Greetham settlement boundaries.
- Produce a comprehensive ecological baseline to assist land-use decision making, in the interest of preserving the local natural environment and biodiversity
- Set out prescriptions for the *management and enhancement* of existing habitats within the settlement boundaries
- Set out prescriptions for the *creation* of new habitats within the settlement boundaries.
- Propose medium-long term actions deliverable at a landscape-scale which would benefit ecological connectivity and diversity.

SITE DESCRIPTION AND CONTEXT

1.4 Greetham is a rural village situated in Rutland. For this study, the indicative postcode is LE15 7NG, corresponding to Grid Reference SK 927145.

1.5 The site is located 7.5km North-west of the market town of Oakham and ca. 6km from the north shore of Rutland Water, which is internationally recognised as a globally important wetland site.

BAP PRINCIPLES

1.6 Loosely inspired by Natural England's approach to Green Infrastructure, which is underpinned by the findings of the Lawton report[1], the principles underpinning this plan are the following:

- *AWARENESS*: generate awareness over the village's natural assets, through an evidence-based approach.
- *ENGAGEMENT*: actively engage with the local community, where required instigating a change in culture in the interest of a more ecologically oriented management of privately owned green spaces.
- *STRATEGIC APPROACH*: instigate and assist a strategic approach to the design of future infrastructure and development
- *PROTECTION*: promote the protection and enhancement of the natural environment, for the benefit of wildlife and people.
- *CREATION*: where possible, create new habitat to improve the character and diversity of the landscape.

[1] Lawton, J.H. et Al. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological networks*. Report to Defra.

- *FUNCTIONALITY*: increase ecological connectivity across the village and identify ways in which this can be achieved at a landscape-scale, through engagement with local landowners. Create a coherent ecological network across the settlement and the wider landscape.
- *ACCESSIBILITY*: improve accessibility to natural/semi-natural greenspaces for the wider population.
- *RESILIENCE*: improve climate-change resilience, namely flooding and drought, via nature-based solutions.

BAP OBJECTIVES

1.7 The objectives of this plan have been formulated having taken into consideration the resources available to the Parish Council (both financial and human) and the challenges presented by land use in the rural environment. Target habitats and species (outlined in Chapter 6) have been identified reviewing the regional plan (Leicester, Leicestershire, and Rutland BAP 2016-2026) and accounting for the locality's existing assets, opportunities, and constraints, as well as the aspirations of the community. In broad terms, this strategy seeks to:

1.8 TERRESTRIAL HABITATS:

- Deliver good quality habitats within the settlement boundaries, through management/enhancement/creation, for the benefit of wildlife and residents.
- Identify opportunities for Biodiversity Enhancement within the Parish Council's (PC) region
- Instigate a conversation with receptive landowners, with a view to extend the scope of the plan in the future

1.9 STREAM:

- Enhance the vegetation structure along the riparian zone, within and outside the settlement boundaries.
- engage with landowners to instigate a concerted effort to achieve this goal, at Parish Region scale where possible

1.10 MANAGEMENT AND MONITORING:

- Provide specifications for the ongoing management of habitats within public open spaces.
- Provide recommendations for an ecologically sympathetic management of private land (i.e., residential gardens).
- Specify a monitoring programme to evaluate the improvement of habitats' condition and distinctiveness within the village (i.e., trees, hedgerows, and stream) and to determine changes in abundance of selected target-species populations, following the implementation of the prescribed enhancements

TIMESCALES

1.11 It is anticipated that some of the prescriptions set out in this strategy will be deliverable during the 2022-23 planting season. Active management of existing habitats, with a view to improve their distinctiveness and condition, will commence in 2023. A detailed *implementation schedule* will be included in the Biodiversity Enhancement Strategy, which will be published later this year upon completion of evidence gathering and following consultation with the relevant stakeholders.

1.12 The initial emphasis will be on the delivery of enhancements within the village boundaries; the implementation of biodiversity enhancements within the wider PC region will depend on the degree to which landowners are receptive to the proposed initiatives, based on individual circumstances and priorities. To support this conversation, a review of the legislative context, including current grants and schemes, has been provided in Chapter 2.

2. LEGISLATIVE CONTEXT – OPPORTUNITIES AND CHALLENGES

2.1 This chapter aims to provide an overview of the grants and schemes currently available to landowners for the delivery of biodiversity objectives. This review has been provided considering the PC's aspiration to establish viable ecological networks across the whole Parish region.

2.2 Except for grass verges along public highways, all land beyond the settlement boundaries is in private ownership and therefore any habitat management/creation initiatives would have to be delivered with the consensus of local landowners.

THE CHALLENGES

2.3 Several external factors have been affecting land availability for the delivery of environmental land management schemes in recent years. Amongst those deemed to have had significant impact are:

- the changes induced by Brexit to agricultural policies and the actual/perceived impact that recent trade deals may have on the British food market, which have been the cause of deep uncertainty in the farming industry[2]. The transition from schemes governed by the EU's Common Agricultural Policy to the domestic version – Environmental Land Management Scheme – is still at definition stage and it is likely that a significant share of the farming community is not up to speed with the ongoing changes.
- the increasing demand for domestic food production, due to domestic and international events
- the increased demand for land use change associated with infrastructure and housing development

2.4 Another barrier to change in favour of more environmentally sustainable farming practices can be the perception of productivity loss associated with the implementation environmental led management schemes.

2.5 On this basis, even where incentives to deliver conservation objectives in farmland still exist, farmers may be reluctant to engage with them because of a greater focus on market pressure and decreasing margins.

2.6 The system of agricultural subsidies and grants is undergoing extensive changes and is currently in evolution; therefore, the information provided herewith should be reviewed in six months' time.

OPPORTUNITIES (GRANTS AND SCHEMES)

2.7 Reviewed below are a selection of environmental land management schemes that could be exploited for the delivery of biodiversity-led initiatives at a landscape scale, across the Parish region. The aim of this review is to instigate and support a conversation between the Parish Council and neighbouring landowners, for "stage 2" of the BAP plan. This review was carried out in February 2022 and should be updated every 6 months considering the continuously changing legislative environment.

2.8 Countryside Stewardship Schemes (CS) – These are schemes that provide financial incentives for farmers, woodland owners, foresters, and land managers to look after and improve the environment, with the aim to conserve and restore wildlife habitats, deliver flood mitigation, create, and manage woodland, reduce water pollution from agriculture and provide access to nature for the wider

[2] https://www.theguardian.com/environment/2022/feb/22/completely-contradictory-nfu-leader-attacks-uks-farming-policy

https://www.nfuonline.com/media-centre/releases/nfu-calls-for-government-plan-to-realise-potential-of-british-food-and-farming/

population. These schemes will remain available until 2024, with the last new applications being accepted in 2023. All new agreements starting after 2024 will be managed through the new Environmental Land Management schemes (ELMs). The CS schemes include, but are not limited to:

- Higher Tier Countryside Stewardship agreements
- Mid-Tier Countryside Stewardship agreements
- Several grants for the creation, restoration, and management of woodland

2.9 Environmental Land Management Schemes (ELMs) – These schemes are currently open to farmers who are already receiving or are eligible for Basic Payments issued under the umbrella of the European Common Agricultural Policy (CAP). They will eventually replace the Countryside Stewardship schemes from 2024. In broad terms, ELMs aim to:

- bring soil under sustainable management
- reduce agricultural emissions
- incentivise woodland creation
- halt biodiversity decline
- reduce the main agricultural pollutants entering watercourses, through a combination of changes in farming practices and the implementation of nature-based solutions
- support the restoration of rivers, lakes, and other freshwater habitats

2.10 Sustainable Farming Incentive – This initiative launched in 2022 as a pilot for recipients of Basic Payments only and will be accessible to all farmers from 2024. The incentive will be for farmers to manage their land in an environmentally sustainable way, in exchange for a payment. Habitats supported under this scheme that can drive biodiversity gain are hedgerows, woodland, unimproved/semi-natural grassland, rivers, ponds, and streams. For the incentive to be applicable, the land must not be under an existing agri-environment scheme.

2.11 Woodland protection, management and creation schemes including:

- *The Woodland Creation Planning Grant,* which provides funding up to £150 per hectare to help cover the costs of producing a UK Forestry Standard (UKFS) compliant woodland creation design plan. In addition, a 70% contribution can also be obtained for specialist surveys. The grant is capped at £30K per project.
- *England Woodland Creation Offer* – open to landowners, land managers and public bodies, offers a one-off payment of £10,000 per hectare to create new woodland on areas as small as one hectare. It can only be triggered on land not already classified as woodland and not subject to any existing legal requirement or obligation to create woodland. Furthermore, the land cannot be under an existing land management grant agreement.
- *Woodland Carbon Guarantee* - provides the option to sell the government carbon captured through woodland planting in the form of verified carbon credits, called Woodland Carbon Units (WCUs), for a guaranteed price. It is not a grant, or a fund and it does not contribute towards the cost of planning, establishment, or early maintenance.

2.12 Biodiversity Net Gain – Biodiversity Units market - Biodiversity Net Gain is a legal instrument introduced to the planning system through the Environment Act 2021, which requires developers to return the natural environment (post-development) in a measurably better state (+10%) than it was relative to pre-development condition. In many cases, compensation for habitat loss will not be possible within the site boundary and offsetting (offsite compensation) will be required. The Biodiversity Units market is currently developing, and Habitat Banks are being established for the sale of such units.

Under this scheme, landowners would receive annual payments for a period currently set to 30 years for the delivery and management of specific habitats which, upon fruition, would offset biodiversity losses incurred at the development site.

2.13 District Level Licensing (DLL) – For wildlife ponds creation - DLL is a type of strategic mitigation licence for great crested newts (GCN) granted in certain areas at a local authority or wider scale. Natural England (NE), either directly or via strategic partners, identifies areas suitable for the creation of ponds with a view to enhance connectivity between GCN breeding habitat across the landscape. Once the land is identified and secured, the costs associated with creation are fully covered by the scheme, which is funded by developers who are resorting to DLL to offset the impact of their development scheme(s) on existing GCN population. An enquiry made with NE's strategic partner in the Rutland region has revealed that most of the village of Greetham (except for areas at risk of flood) sits within an opportunity area.

LEICESTER, LEICESTERSHIRE, AND RUTLAND BIODIVERSITY ACTION PLAN 2016-26

2.14 The Leicester, Leicestershire, and Rutland Biodiversity Action Plan (LLRBAP) was developed to deliver the objectives set out in the Convention on Biological Diversity (CBD) at a local scale. The plan is modelled on the National plan but concentrates on species and habitats of local conservation concern. The plan was first published in 1998 and has since undergone several revisions.

2.15 The document was extensively reviewed in 2010 and its scope widened to include creation in the wider countryside, which is where most of the wildlife is found and where many common species are suffering decline as a result of agricultural intensification and change in land use (development).

2.16 Habitats and species listed in the current version of the LLRBAP (outlined in Tables 1 and 2, below) have been considered in the development of this action plan.

Table 1 – LLRBAP Priority Habitats

HABITAT TYPE	COMMENTS/JUSTIFICATIONS
Broadleaved Woodland (ASNW/PAWS only)	National Importance
Calcareous grassland	National Importance - The total area of Limestone Grassland in Leicestershire and Rutland has been estimated as less than 30 ha
Eutrophic standing water (draft)	National Importance
Field margins	National Importance - act as a buffer zone between an agricultural crop and adjacent land.
Heath-grassland (lowland acid grassland and heath)	National Importance -True heathland dominated by ericaceous shrubs (e.g., heather) is (as it would seem to have been historically) very rare in Leicestershire and Rutland. Heath grassland is to the Charnwood Forest and parts of Northwest Leicestershire
Hedgerows	National Importance – species rich
Lowland wood-pasture and parkland (list of historic parklands)	National Importance
Mesotrophic lakes	National Importance – 3 sites historically in Leicestershire but no longer (Cropston Reservoir, Blackbrook Reservoir and Thornton Reservoir)
Neutral grassland	National Importance

HABITAT TYPE	COMMENTS/JUSTIFICATIONS
Reedbed	National Importance - The UKBAP Reedbed Habitat Action Plan was conceived to benefit breeding bittern – the minimum size for a reedbed to support breeding bittern is 20 ha. There are no reedbeds of this size in Leicestershire and Rutland
Wet woodland (draft) In this context 'wet woodland' is defined as stands of ancient semi-natural woodland where Alder (*Alnus glutinosa)* is the dominant tree, or semi-natural woodland on floodplains with dominant willow, *Salix*, species, and where the water table is at or near the surface for much of the year.	National Importance - was cleared for agriculture long ago and it is now rare locally.
Rivers (in preparation)	National Importance
Fast-flowing streams	Local Importance
Floodplain wetland	Local Importance
Mature trees	Local Importance
Roadside verges	Local Importance
Rocks and built structures	Local Importance
Sphagnum ponds	Local Importance
Springs and flushes	Local Importance – partial inventory
Urban habitats	Local Importance

Table 2 – LLRBAP Priority Species

SCIENTIFIC NAME	COMMON NAME
Tyto alba	Barn Owl
Chiroptera	Bats
Satyrium pruni	Black Hairstreak
Populus nigra	Black polar
Erynnis tages	Dingy Skipper
Ursus arctos	Grizzled skipper
Muscardinus avellanarius	Dormouse
Luscinia megarhynchos	Nightingale
Lutra lutra	Otter
Calamagrostis canescens	Purple small-reed
Phoenicurus phoenicurus	Redstart
Riparia riparia	Sand martin
Epipactis purpurata	Violet Helleborine
Arvicola amphibius	Water vole
Austropotamobius pallipes	White-clawed crayfish
Vicia sylvatica	Wood vetch
Apus apus	Swift

SCIENTIFIC NAME	COMMON NAME
Hirundo rustica	Swallow
Delichon urbicum	House Martin

2.17 All the Action Plan species are listed in an Inventory of Key Species, published by Leicestershire Museums Arts and Records Service (LMARS) in 1997 as a supporting document to the LBAP. Nearly 1000 species are listed in this Inventory, so the Action Plan species therefore give an incomplete picture of species conservation priorities in Leicester, Leicestershire, and Rutland.

2.18 Therefore, the definition of 'Local BAP species' has been widened to include an additional core list of priority species, based on listing in Local Red Data Books (LRDB) or identified as 'rare' in a County or VC55 checklist. The Inventory is now considered to be out-of-date, being 20 years old. Currently, there are up to date LRDBs or checklists with status notes for Bryophytes, Vascular Plants, Bats, Amphibians, Reptiles and Fish, Lepidoptera, and Birds. Recent Checklists and Atlases are available for many other groups, including Spiders, Ground Beetles (Carabidae), Fungi, Bees, Caddisflies (Trichoptera), Dragonflies and Damselflies (Odonata) and Land Snails. These are available from the appropriate County Recorders, the Leicestershire Entomological society, or from the Leicestershire and Rutland Environmental Records Centre (LRERC), and references for these and other checklists are in Chapter 10.

2.19 Five areas of Leicestershire and Rutland are recognised as having high value for wildlife because of the quality of existing habitats, the concentration of important sites and the opportunities for habitat creation found within them. These areas form part of the Wildlife Trusts Living Landscapes and are:

- Charnwood Forest and the adjoining National Forest
- Soar and Wreake Floodplain
- Leighfield Forest
- Rutland Water
- (Lincolnshire and) Rutland Limestone

3. METHODOLOGIES

3.1 To produce this document, information was collected through a desk study, field survey and the review of technical drawings.

DESK-STUDY

3.2 To gain an understanding of the inform the objectives of the Biodiversity Action Plan, records held by Leicestershire & Rutland Environmental Records Centre were interrogated in line with the methodology set out in Table 3, below.

Table 3 – LERC Data review methodology

ITEM	DESCRIPTION	SCOPE OF REVIEW	REVIEWED DATA
Protected species records	Records of protected species observations, focusing on amphibian, reptile, bird, and mammal taxonomic groups.	PC Region	Latest sighting no older than 2011
Statutory designated sites	Designated sites of national importance (i.e., SSSI, SPA, SAC)	PC Region	All available on desk-based resources
Non-Statutory Designated sites	Designated sites of local importance (LWS)	PC Region	
Protected habitat features	Bat roosts, GCN breeding ponds	PC Settlement	

Sites Key	Non - Statutory Designated Sites Key
RIGS – Regional Important Geological and Geomorphological Sites	LWS – Local Wildlife Site (formerly known as SINC) CA - Conservation Area

3.3 In addition, the following desk-based resources were reviewed for further information and context:

- Multi Agency Geographic Information for the Countryside (MAGIC) website (https://magic.defra.gov.uk/)
- Historic Maps (National Library of Scotland, https://maps.nls.uk/)
- Ordnance Survey base maps
- Natural England Green Infrastructure Tool https://designatedsites.naturalengland.org.uk/
- Aerial imagery from ESRI and Bing Maps
- Historic aerial imagery via Google Earth

PRELIMINARY WALKOVER SURVEYS

3.4 Public open spaces within the village boundary and several plots of land put forward by private landowners underwent a ground-truthing survey, with the objective to map habitats and to gain an understanding of their enhancement potential. The methodology adopted during the surveys is summarised in Table 4, below.

Table 4 – Walkover Survey Methodology

Scope of survey	Habitat Classification for on-site habitat baseline assessment
Survey Date	11-12.04.2022
Surveyor	Martino Ginepro ACIEEM; Janine McMahon QCIEEM
Area(s) Surveyed	Several sites within the Parish boundaries (refer to Figure 4)
UK Hab Edition	UK Hab-P (Professional edition) V1.1
Minimum Mapping Unit (areas)	$25m^2$ (5m x 5m)
Minimum Mapping Unit (lines)	≤ 1m (refer to Hedgerow assessment)
Habitat Coding	Habitats are coded based on the area cover which is set to ≥ 70%; a change of habitat is recorded when there is a change of primary habitat or secondary code (but only when greater than MMU)
Level of UK Hab Primary Hierarchy	Level 4
Additional Attributes Recorded	Annotations made in the attribute table; Target Notes (TN1, TN2, etc.) recorded to identify suitable habitat features and other features of interest.
Map Projection and Units	OSGB1936/British National Grid, metres
Dataset Used (References)	Polylines and points collected at the time of survey on ESRI Satellite imagery.
Habitat Condition Assessment	A formal habitat condition assessment was not carried out as part of the initial baseline survey exercise. However, informal comments on the condition of some of the habitats observed during the walkover survey may have been made to identify instances of good/poor habitat management.

HEDGEROW SURVEY

3.5 Hedgerows within the village boundary were subject to an initial scoping exercise to determine which of those present were eligible for further survey. The site visit was carried out by Dom Bowyer, Senior ecologist at Ecology Resources, on the 1st July 2022. Selected hedgerows were subsequently surveyed on the 22nd and 23rd July 2022 applying the Hedgerow Evaluation and Grading System (HEGS).

3.6 This survey approach is designed to enable the rapid recording, ecological appraisal and grading of any given hedgerow in the UK, in order to identify those which are likely to be of greatest significance for wildlife. This method involves the assessment of canopy species composition, associated ground flora and climbers, structure of the hedgerow - including height, width and gaps - and associated features such as number and species of mature trees within it and the presence of banks, ditches and grass verges.

3.7 Using the HEGS methodology, each hedgerow is attributed a grade. These grades are used to assign a nature conservation value to each hedgerow as follows:

- Grade -1, 1, 1+ High to Very High Value
- Grade -2, 2, 2+ Moderately High to High Value
- Grade -3, 3, 3+ Moderate Value
- Grade -4, 4, 4+ Low Value

3.8 Hedgerows graded -2 or above are considered to be of priority for nature conservation.

3.9 The hedgerows were also assessed for their potential ecological value under the Hedgerow Regulations (1997) (Statutory Instrument No: 1160). Briefly, each hedgerow is evaluated by determining both the average number of woody native species present per 100m and the number of hedgerow-associated features. These results were compared against the nature conservation criteria of the Hedgerow Regulations to ascertain whether a hedgerow is classed as 'Important' under these regulations. An assessment of archaeological importance as defined under the Hedgerow Regulations 1997 was beyond the scope of this assessment.

3.10 All hedgerows were also assessed to determine whether they qualify as Habitats of Principal Importance (Priority Habitats) under the Natural Environment and Rural Communities (NERC) Act, i.e. if they consisted of 80% or more native woody species.

RIVER CONDITION ASSESSMENT

3.11 Rivers and streams were surveyed in line with the MoRPh (Modular River Physical) survey methodology.

3.12 The River Condition Assessment (RCA) method combines the modular river physical habitat field survey (MoRPh) with a desk study (River Type) to generate a final Condition Score, based on the evaluation of 32 Condition Indicators (CIs) which represent positive and negative attributes of the fluvial river reach under investigation.

3.13 The methodology involves:

- the identification of "the reach", defined as the section of watercourse comprised within the area within scope of survey;
- the sampling of 20% of the reach, in "modules". The length of a module is determined by the average width of the stream; for streams up to 5m-wide (such as that found within the site), the module length is set to 10m. At least 5 contiguous modules (which form a MoRPh5/Multi-MoRPh) must be surveyed to gain a representative sample.
- the determination of "river type", which is derived from the combination of field data and the outcome of a desktop study of the river's planform and hydrological regime.

3.14 The MoRPh survey reviews the range and extent of physical habitats, as well as the implications of human interference from a morphological and hydrological perspective. The river condition is assessed in relation to what is deemed achievable for the particular river type if it was functioning naturally. MoRPh surveys record information relating to the bank tops, bank faces, channel-water margin and riverbed.

3.15 Details of the MoRPh survey delivered as part of this assessment are outlined in Table 5, below. Geographical context can be found in Figure 7.

Table 5 – MoRPh survey methodology

Scope of survey	River Condition Assessment of the section of Northbrook stream flowing through Greetham village.
Survey Date	15.06.22 and 28.06.22
Surveyors	Dominic Bowyer
Weather conditions	Dry and warm, 25°C
Survey conditions*	Good to moderate
Sub-reaches within scope of survey (and extent)	1
Module 1-5 reach extent (NGR)	SK 92212 14635; SK 92226 14623
Module 6-10 reach extent (NGR)	SK 92274 14597; SK 92318 14591
Module 3 reach extent (NGR)	SK 93374 14223; SK 93419 14216
Module 4 reach extent (NGR)	SK 93625 14151; SK 93663 14127
Number of MoRPh5 delivered	4
Individual module length**	10m
Total length surveyed	200m
Module mid-point recording method	Garmin GLO GPS
Survey platform	Cartographer Android 0.8.8
*	MoRPh field surveys should be conducted at low flow and preferably during Spring or early summer to capture information on both vegetation and physical properties of the river and its margins.
**	Modules are short lengths of river that are approximately twice the river width (width < 5 m, length = 10 m

River Type

3.16 The River Type is the desk-top component of the assessment, which reviews sinuosity, gradient, braiding/anabranching, dominant and average sediment characteristics of the "*reach*" and utilises this data to assign a river type classification. The "*reach*" is defined as a section of a river that displays relatively consistent geomorphic characteristics such as width and planform along its length.

3.17 Its extent is not conventionally defined (although it can be several km long) and is generally delimited either by the confluence of significant tributaries or by abrupt changes in the channel's planform and width resulting from human interference (i.e. straightening or culverting).

Final Condition Class/Score

3.18 MoRPh survey and River Type, combined, deliver the final condition class and score required for the condition assessment of rivers.

3.19 As well as complementing the final condition class/score values, the preliminary condition score (obtained from the MoRPh 5 survey) and the 32 Condition Indicators are used to investigate options for habitat improvement/enhancement.

Survey Limitations

3.20 Several sections of the watercourse, as it flows through the village, are not accessible either because culverted or because located within private land.

3.21 Two of the four "MoRPh5" samples (Samples 1 and 2) were located outside the village, to the east. Whilst the original plan was to deliver all surveys within the settlement's boundaries, the assessment of a part of the watercourse as it flows through the open countryside was useful to determine its ecological functionality and identify actions that could have positive feedback at a regional level.

4. DESK-STUDY RESULTS AND FINDINGS

4.1 This desk-study has been carried out by Martino Ginepro, Technical Lead on Biodiversity at Ecology Resources. The study was completed between the months of February and March 2022.

4.2 The salient points of this review are that:

- Leicestershire and Rutland are a geographical area with more than 80% of its land farmed, with little wildlife habitat available. Important or BAP priority habitats comprise only a very small proportion of the area of Leicestershire and Rutland[3];
- Within Greetham Parish region, land is largely put towards productivity through a mixture of farming (arable/pastoral) and forestry, the few blocks of woodland (some classed as ancient) are exploited for the delivery of for commercial forestry (TBC).
- Greetham Valley golf course occupies a vast area (ca. 130ha) to the southeast of the Parish.

HISTORICAL CONTEXTUALISATION

4.3 Land-use change over time has been assessed comparing late 1800 - early 1900 OS Maps with recent aerial photography (Figure 5). This review has revealed how there has been little change in land use it the past 120 years, and how the rate of development within the Parish boundaries has been low in comparison with national average.

4.4 The most notable changes are the loss of Ash Wood, ca. 15ha of (presumably Ash) woodland to the Southeast of the Parish, and the development of Kendrew Barracks (immediately adjoining the Parish to the West) and associated airfield, a portion of which encroaches on the Parish region to the Northwest.

STATUTORY DESIGNATED SITES

4.5 The Warwickshire Biological Records Centre has revealed one Statutory designated site within the Parish region, detailed in Tables 4. The sites' location is refenced in Figure 1.

Table 4 – Nationally Designated Sites (Statutory)

Site Name	Designation	Location	Plan Ref.	Distance from settlement boundaries	Justification
Greetham Meadows (Merrys Meadows)	CA	SK938157		1km NE	Mesotrophic grassland

NON-STATUTORY DESIGNATED SITES

4.6 Non-statutory designated sites such found within the Parish region have been outlined in Table 5, below. Their location is referenced in Figure 1.

[3] Space for Wildlife: Leicester, Leicestershire and Rutland Biodiversity Action Plan 2016-2026, 2nd Edition

Table 5 – Locally Designated Sites (Non-statutory)

Site name	Designation	Location	Plan Ref.	Distance from settlement boundaries	Justification
Great Lane Hedgerow	LWS	SK927147		Within boundary (N)	Species-rich hedgerow
Verge NE of Greetham Wood (N side)	LWS	SK938145		540m E	Mesotrophic grassland
Greetham Verge	LWS	SK126156		550m N	Mesotrophic grassland
Greetham Roadside Verge Nature Reserve	LWS	SK922159		560m N	Calcareous grassland
Hedgerow (Exton/Greetham PC boundary, E and W)	LWS	SK935132		1.15km SE	Species-rich hedgerow
Hooby Lane roadside verge, Stretton/Greetham	LWS	SK926164		1.6 km N	Transitional mesotrophic/calcareous grassland
Hooby Lane verge, near Greetham	LWS	SK930164		1.5km N	Transitional calcareous/mesotrophic grassland

PROTECTED WILDLIFE SPECIES

4.7 The search commissioned to the Rutland Biological Records Centre has revealed the presence of numerous European and domestically protected wildlife species within the settlement boundary and Parish Region. Table 6, below, outlines sightings of birds, mammals, reptiles, and amphibians. Botanical species lists are referenced in Appendix 1.

4.8 The locations of recorded observations have been referenced in Figure 2 (within settlement boundary with 250m radius) and Figure 2a (within Parish region).

Table 6 – Protected Species List (Rutland LERC)

Species Group	Scientific Name	Common Name	Latest record	Total Records
Amphibians	*Bufo bufo*	Common Toad	2012	1
	Lissotriton vulgaris	Smooth Newt	2014	6
	Rana temporaria	Common Frog	2017	11
	Triturus cristatus	Great Crested Newt	2019	8
Birds	*Alauda arvensis*	Skylark	2019	14
	Aix galericulata	Mandarin Duck	2018	1
	Apus apus	Swift	2019	7
	Alopochen aegyptiaca	Egyptian Goose	2019	2

Species Group	Scientific Name	Common Name	Latest record	Total Records
	Cuculus canorus	Cuckoo	2019	22
	Delichon urbicum	House Martin	2019	4
	Emberiza citrinella	Yellowhammer	2019	18
	Emberiza schoeniclus	Reed Bunting	2019	8
	Hirundo rustica	Swallow	2019	15
	Larus argentatus	Herring Gull	2019	6
	Linaria cannabina	Linnet	2019	9
	Luscinia megarhynchos	Nightingale	2018	27
	Motacilla flava	Yellow Wagtail	2018	19
	Branta canadensis	Canada Goose	2018	4
	Numenius arquata	Curlew	2016	30
	Passer domesticus	House Sparrow	2018	4
	Muscicapa striata	Spotted Flycatcher	2011	1
	Perdix perdix	Grey Partridge	2019	15
	Poecile montanus	Willow Tit	2018	5
	Poecile palustris	Marsh Tit	2019	10
	Prunella modularis	Dunnock	2019	15
	Pyrrhula pyrrhula	Bullfinch	2018	9
	Riparia riparia	Sand Martin	2011	3
	Streptopelia turtur	Turtle Dove	2017	4
	Sturnus vulgaris	Starling	2019	11
	Troglodytes troglodytes	Wren	2019	18
	Turdus philomelos	Song Thrush	2019	11
	Vanellus vanellus	Lapwing	2019	6
	Passer montanus	Tree Sparrow	2014	2
	Alcedo atthis	Kingfisher	2018	4
	Anser anser	Greylag Goose	2019	10
	Charadrius dubius	Little Ringed Plover	2016	3
	Coturnix coturnix	Quail	2016	2
	Fringilla montifringilla	Brambling	2011	2
	Lanius collurio	Red-backed Shrike	2014	1
	Pandion haliaetus	Osprey	2018	2
	Tringa ochropus	Green Sandpiper	2019	3
	Tyto alba	Barn Owl	2019	7
	Circus aeruginosus	Marsh Harrier	2014	2
	Falco columbarius	Merlin	2012	2
	Falco peregrinus	Peregrine	2019	11
	Falco subbuteo	Hobby	2016	7

Species Group	Scientific Name	Common Name	Latest record	Total Records
	Loxia curvirostra	Crossbill	2015	4
	Milvus milvus	Red Kite	2019	40
	Turdus iliacus	Redwing	2018	7
	Turdus pilaris	Fieldfare	2019	10
Reptiles	*Natrix helvetica*	Grass Snake	2021	16
Terrestrial Mammals	*Erinaceus europaeus*	Hedgehog	2018	5
	Lepus europaeus	Hare	2020	28
	Muntiacus reevesi	Chinese Muntjac	2019	5
	Lutra lutra	Otter	2014	4
	Meles meles	Badger	2019	22
Mammals (bats)	*Barbastella barbastellus*	Western Barbastelle	2013	23
	Chiroptera	Bat	2019	37
	Eptesicus serotinus	Serotine	2013	6
	Myotis	Myotis Bat species	2013	45
	Myotis nattereri	Natterer's Bat	2016	2
	Nyctalus	Nyctalus Bat species	2013	23
	Nyctalus leisleri	Lesser Noctule	2013	13
	Nyctalus noctula	Noctule Bat	2016	41
	Pipistrellus	Pipistrelle Bat species	2015	27
	Pipistrellus nathusii	Nathusius's Pipistrelle	2013	11
	Pipistrellus pipistrellus	Pipistrelle	2016	70
	Pipistrellus pygmaeus	Soprano Pipistrelle	2016	58
	Plecotus auritus	Brown Long-eared Bat	2018	32

DESK-STUDY OBSERVATIONS

4.9 LERC records have revealed habitat suitable for, or known to support, the following protected species within the Parish region.

- Water vole
- Badger – several setts (location undisclosed)
- Great Crested Newt
- Bat roosts

4.10 The locations of GCN (probable and known) and water vole habitats have been referenced in Figure 3 (within settlement boundary with 250m radius) and 3a (within Parish region).

4.11 Species-rich grassland is extremely rare in the County: it is estimated that this habitat occupies only 500ha of land across the whole BAP region. Currently, all Local Wildlife Sites within the Parish region are notified for their botanical assemblage and are located on grassland verges along public highways. It is extremely important that they are correctly managed in order to be maintained in favourable condition.

4.12 The detrimental impact that development activities may have on such sites (i.e., dust, diffused nitrogen deposition, etc.), should be closely monitored and suitable control measures be implemented to mitigate any negative effects. Where development is deemed to result in negative residual impact, its viability should be reassessed and, where no effective mitigation can be implemented, planning permission should be refused.

5. FIELD SURVEY FINDINGS

5.1 This section discusses the results of the field surveys carried out between April and August 2022 to gather the baseline data required to inform the delivery of this Biodiversity Action Plan (BAP).

PRELIMINARY WALKOVER SURVEYS

5.2 Seven sites - 6 of which are located within the village boundary and 1 one which is located to the east of the village, within the Parish region - were subject to a walkover assessment in early April 2022 (refer to Table 4). A plan showing the location of the sites within scope of survey is referenced in Figure 4.

5.3 The sites are a mixture of public open space and privately owned land identified as the possible receptors for the delivery of habitat creation and/or enhancement, feeding into the objectives of this Biodiversity Action Plan.

5.4 A detailed account of the field survey findings is provided in the dedicated survey summary sheets submitted alongside this report (reference document).

5.5 One of the conclusions following the walkover surveys is that open spaces would benefit from a transition to more relaxed management regimes. Simple actions such as the retention of swathes of tall grass would give the vegetation more structural diversity and support a wide range of wildlife.

5.6 Opportunities for native shrubs and tree planting have also been identified, although it is appreciated that consultation with the relevant stakeholders is undertaken prior to the delivery of habitat creation to avoid conflicts with current or future land use.

5.7 Opportunities for habitat creation and enhancement have also been identified within private land and will be discussed with the relevant landowners to determine suitability.

HEDGEROW SURVEY FINDINGS

5.8 Following a preliminary scoping survey, 17 hedgerows (see Figure 6) were identified as requiring assessment in line with the criteria set out in the Hedgerow Regulations Assessment[4], described in paragraphs 3.5 – 3.10. These habitats are deemed of particular importance within the village for their relevance to ecological connectivity across the settlement and with the wider countryside.

5.9 The survey results are listed in Table 7.

Table 7 – Results of HEGS and REGS hedgerow surveys

Reference	Canopy Species	Length (m)	Sp. per Av. 30m	Associated Features	HEGS Grade	Import. HR
H1	*Field Maple, Dogwood, Hawthorn, Ash, Blackthorn, Elder*	122	5	3 connections <10% gaps 1 standard per 50m A parallel hedge within 15m	2	Yes
H2	*Field Maple, Dogwood, Hawthorn, Ash, Blackthorn, Elder*	100	3	1 connection 1 standard per 50m A parallel hedge within 15m	2	No
H3	*Field Maple, Hawthorn, Ash*	123	1	2 connections	-3	No

[4] Defra. Hedgerow Survey Handbook. A standard procedure for local surveys in the UK. 2nd Edition (2007)

Reference	Canopy Species	Length (m)	Sp. per Av. 30m	Associated Features	HEGS Grade	Import. HR
H4	*Hawthorn*	26	1	0 Connections	2	Yes
H5	*Field Maple, Hawthorn, Ash, Elder*	120	3	1 connection 1 standard per 50m	-3	No
H6	*Field Maple, Alder, Hawthorn, Apple sp., Ash, Blackthorn, Elder*	144	4	4 Connections <10% gaps 1 standard per 50m	2+	No
H7	*Not Assessed*	592	2	2 Connections	n/a	n/a
H8	*Not Assessed*	736	2	4 Connections Ditch	n/a	n/a
H9	*Field Maple, Dogwood, Hazel, Hawthorn, Ash, Wild privet, Blackthorn, Elder, Elm sp.*	126	6	4 Connections <10% gaps 1 standard per 50m A parallel hedge within 15m	-1	No
H10	*Field Maple, Dogwood, Hawthorn, Ash, Crab apple, Blackthorn, Elder*	145	4	3 Connections <10% gaps 1 standard per 50m	3	Yes
H11	*Field Maple, Hawthorn, Ash, Crab apple, Blackthorn, Elder*	49	4	5 Connections <10% gaps 1 standard per 50m	-2	Yes
H12	*Field Maple, Dogwood, Hazel, Hawthorn, Blackthorn, Elder.*	72	4	3 Connections <10% gaps	-3	No
H13	*Field Maple, Hazel, Hawthorn, Spindle, Ash, Blackthorn, Elder.*	107	6	1 connection <10% gaps	-3	No
H14	*Hawthorn, Ash, Blackthorn, Elder.*	30	4	1 connection <10% gaps 1 standard per 50m	3	Yes
H15	*Field Maple, Hawthorn, Ash, Blackthorn, Elder*	67	5	2 connections <10% gaps 1 standard per 50m	2	Yes

5.10 H7 and H8 were identified as important but were not surveyed as they were either entirely, or largely outside of the village boundary.

5.11 H16 and H18 (referenced in Figure 6) were subsequently scoped out as they are field boundary hedgerows adjacent to the main road which would be subject to a standard health-and-safety management approach (i.e. kept low for safety reasons being close to the road) and therefore the opportunities for enhancement under the scope of this Biodiversity Action Plan are deemed to be limited.

5.12 Four hedgerows were identified as potentially being notable but could not be assessed because located on private land. These have been identified with an '*X*' in Figure 6.

5.13 H1, H4, H10, H11, H14 and H15 qualify as 'Important' under the Hedgerow regulations 1997 and as such should be protected and retained.

5.14 According to the Hedgerow Evaluation and Grading System, hedgerows H1, H2, H4, H6, H11 and H15 are considered to be of 'moderately high to high' conservation value and H9 is considered to be of 'high' conservation value.

5.15 All hedgerows comprised at least 80% woody native species cover and as such they qualify as habitats of principal importance under S41 of the NERC Act 2006.

RIVER SURVEY FINDINGS

5.16 Originally, the MoRPh survey (Figure 7) was meant to focus on the section of Greetham Brook comprised within the village boundaries. However, due to access limitations (the majority of the stream was either culverted or flowing through private residential gardens), half of the sampling (MoRPh5 samples 1 and 2) was conducted outside the village's eastern boundary. The portion of the brook flowing through open countryside has greater potential for habitat enhancements due to ease of access (being adjacent to a public footpath) and less fragmented landownership.

5.17 The survey identified the river type as unconfined/partly confined, straight/sinuous (River Type H), with a bed material characterised by sand (dominant), gravel and cobble.

5.18 The River Condition attributed to the modules sampled within the village boundary (Modules 1 to 10) was determined to be 'Fairly poor'. The MoRPh5 modules outside of the village boundary (Modules 11 to 20) were determined to be in 'Moderate' condition.

5.19 Indicators that negatively affect the condition score are:

- The presence of non-native invasive species in modules 1 to 10 (Bamboo and Cherry laurel).
- Bank top management across all the sampled modules generally not beneficial for the ecology of the site (i.e. arable fields or amenity grassland).
- Presence of artificial reinforcement and siltation across MoRPh5 modules 1, 2 and 3.

5.20 Positive indicators include the following:

- Bank face natural profile extent scored well across each MoRPh5/ sub reach.
- The bank face bare sediment extent scored high in MoRPh 5 / sub reach 3 and 4.
- Channel bed material richness scored high across all modules / sub reaches.

6. BAP - TARGET HABITATS AND SPECIES

6.1 The selection of target habitats and species has been based on those listed in the RRLBAP document and on the results of the surveys conducted on site over the 2022 season.

TARGET HABITATS

6.2 Within the *settlement boundaries*, target habitats may include:

- Stream
- Grassland
- Roadside verges
- Hedgerows
- Mature trees
- Woodland
- Scrub
- Standing water (Ponds)

6.3 Within the wider *Parish region*, target habitats may include:

- Wetland (nutrient filtration and flood attenuation)
- Hedgerows (enhancement and creation)
- Woodland
- Streams

TARGET WILDLIFE SPECIES

6.4 Table 9 outlines a list of target species which are expected to benefit from the delivery of the habitat enhancements proposed in this plan. The criteria of selection are their listing in the biological records obtained from Leicestershire and Rutland Environmental Record Centre and/or their inclusion in the overarching LLRBAP.

Table 8 – Greetham BAP Species

GROUP	SPECIES	LLRBAP	HABITAT REQUIREMENT
Bird	Barn owl, swift, house martin, sand martin, swallow, nightingale, redstart, cuckoo, house sparrow	YES (except cuckoo & house sparrow)	Hedgerow, dense scrub, woodland, open grassland, arable and built environment.
Mammals	Brown long eared bat, common pipistrelle, soprano pipistrelle, noctule bat	YES	Hedgerow, line of trees, woodland, open grassland
	European hedgehog	YES	Hedgerows, scrub, open grassland
	Water Vole	NO	Slow-flowing watercourses with abundant marginal and aquatic vegetation

Amphibians	Great Crested Newt	YES	Standing water, open grassland, scrub, woodland (hibernation); connectivity between breeding sites
Reptiles	Grass snake	YES	Standing water, open grassland, opportunities for hibernation and shelter (habitat piles, hibernacula)
	Slow worm	NO	

6.5 Whilst the successful establishment of the proposed habitats can be assessed through periodical monitoring visits, baseline surveys would be required to determine the population size of the selected target species and their relative abundance should be monitored thereafter over a period of at least 5 years.

6.6 This proposal does not provide bespoke recommendations for habitat enhancement, creation and management outside the areas referenced in Figure 4. However, most of the suggestions set out in section 7 could be delivered at scale across the Parish region with a view to improve/reinstate connectivity between existing pockets of habitat and, where possible, instigate the creation of new habitats. Guidance on the schemes currently available to landowners for the funding of environmental land-based initiatives is provided in Chapter 2.

7. RECOMMENDATIONS FOR HABITAT ENHANCEMENT AND CREATION

7.1 This section outlines a selection of actions that can be taken to enhance biodiversity in a manner which is believed to be practical, achievable and in keeping with the cultural character of the setting.

WATERCOURSES (GREETHAM BROOK STREAM)

7.2 Scope for the implementation of enhancements along the section of Greetham Brook stretching across the village is deemed limited because the watercourse width is very narrow and spans mostly across private residences, either culverted or in close proximity to dwellings. As a result, the creation of in channel features such as side bars, the establishment of marginal and riparian vegetation and the creation of "bank-top" features such as ponds connected to the watercourse – all typical ingredients of a river restoration programme – would be difficult to accomplish or impractical.

7.3 For example, the culverted section of the Brook runs through the rear garden of a local property; restoring the watercourse to its natural state would involve a significant amount of disturbance and potentially result in increased flood risk.

7.4 However, the removal of non-native invasive species such as bamboo and cherry laurel from the Brook's banks, coupled with the native species planting, could be considered as it would benefit the condition of the water course.

7.5 The most viable opportunities for enhancing the Greetham Brook exist within the wider Parish region, in the section comprised between the Wheatsheaf pub and Greetham Valley golf course (to the east of the village). Possible restoration/enhancement options would include:

- improving the bank-top species richness, for instance by converting a 10m strip from the edge of the stream from arable to species-rich grassland or woodland;
- creating bank-top water-related features within 10m of the stream, such as connected ponds, side channels and other wetland habitats;
- the installation of in-channel features, to enhance the variety of water flow types. For example, a 'leaky dam' could be installed to mimic fallen debris.

7.6 The delivery of the measures listed in 7.5 would require consultation with the relevant governing body (Environment Agency) and would involve extensive habitat manipulation, the delivery of which can be costly. However, financial support can be sought from grants and schemes specifically designed for waterways restoration and water pollution offsetting (i.e. Phosphate Offsetting).

GRASSLAND MANAGEMENT

7.7 A more biodiverse grassland can be achieved in the context of parks and green spaces simply by allowing grasses and herbs to grow to maturity across areas not required for sports and recreation. Specifications for the cutting regimes applicable to the wider site are provided below.

7.8 <u>Amenity Grassland</u>

- It is accepted that a large part of the recreation grounds (P1), parts of the church (P2) and the cemetery (P3) experience regular footfall and therefore need grassland to be maintained intensively.
- Amenity grassland should be cut to a height no less than 80mm, to maintain a uniform ground cover and reduce the risk of erosion.

- The frequency of cuts may vary depending on abiotic factors such as precipitation and heat, however during the typical British summer grass will need cutting 10-12 times during the course of the growing season. It is believed that clippings are left in situ.

7.9 Bio-diverse Grassland

- The areas identified as suitable for a more relaxed cutting regime are P1, P2, P3, P4 and P7.
- Grassland at P4 and P7 is already managed for biodiversity and at P5 is subject to grazing throughout the year.
- A plan showing the areas eligible for this management approach at the aforementioned locations is available in the relevant Site Survey Summaries submitted alongside this document.
- When managed for biodiversity, grassland should only be subject to 2 cuts/year (i.e. late-June/mid-September) except during exceptional growing seasons, where an additional cut in mid-late July might be required.
- The cut shall be applied to a height of 100mm, directionally, and at a time of the day when temperatures have risen to a minimum of 15°C, to allow reptiles to disperse.
- Cuttings shall be removed, to control the nutrient cycle and prevent enrichment. The sites shortlisted for this management approach are accessible by machinery, which would speed up the cut and collection process. Where the use of machinery is either impractical or financially unviable, grass could be cut using scythes or a reciprocating mower; cuttings would then need raking and staking in situ into compost heaps, which would deliver valuable wildlife habitat. This approach would likely require the recruitment of a party of volunteers.
- A 500mm strip of uncut grass should be maintained overwinter along the site's boundaries, to provide hibernation habitat for invertebrates.

7.10 Roadside verges

- The charity Plantlife has a produced a best practice guidance document on how best to manage roadside verges[5], which can be consulted to gain further insight on best-practice for the management of roadside verges within the village and of those designated as Local Wildlife Sites, located outside of the village boundary.
- For wildflowers to flourish, it is important that they are allowed to complete their full life cycle (grow, flower and set seed). Cutting too early and too regularly can result in loss of species diversity, as grasses end up outcompeting forbs.
- Roadside verges should only be cut twice over a 12-month period – once in February/ March (to knock back any weedy growth) and once in September/ October, after the wildflowers have gone to and set their seed.
- All cuttings should be collected and removed from the verge to prevent them from rotting down and cause nutrient enrichment. Roadside verges that are adjacent to public roads should have a 1m strip in from the road regularly mown and maintained, to keep the road clear and maintain visibility for drivers.
- Reducing the mowing frequency can not only benefit wildlife but can also save money: "*Adoption of cut-and-collect by Dorset Council on some of their urban verges has reduced cutting frequency by 30%, is providing five-year management savings of £36,000 and £11,000/yr staff savings and is covering the cost of the new cut-and-collect machinery. Whereas conventional flail cutting*

[5] https://www.wildlifetrusts.org/sites/default/files/2019-09/Managing%20grassland%20road%20verges.pdf

produced no cost recovery, decreased wildlife value and resulted in ever-increasing amounts of grass to cut."[6]

WILDFLOWER MEADOW CREATION

7.11 Initially, grassland habitat enhancement will be pursued through the relaxation of cutting regimes; the sowing of seeds can be considered once a better understanding of the sward is gained.

7.12 The most successful way to establish wildflowers and grasses from seed is to sow into a clean seedbed that has been first cleared of all weeds and other vegetation. This can be achieved through repeated, shallow cultivation or herbicide application, although the latter should be regarded as a last-resort option. Seed sowing could be delivered in strip or circular patterns.

7.13 Ground preparation should be carried out ahead of seed sowing, taking extreme care not to damage tree roots. If delivered by machinery, it is best to do it at the end of summer, when the ground is firmer and less liable to rutting/damage.

7.14 The application of seed will be through manual sowing. Seeds shall be sown either in early spring (March/April) or in early autumn (mid-late September).

7.15 The application of seed will be through manual sowing. The prescribed g/m² sowing density (as specified by the supplier) shall be adhered to for optimal establishment

7.16 Suitable seed mix can sourced from specialist suppliers. Seed mixes deemed suitable for the receptor sites identified so far are outlined in Table 9.

7.17 In addition, yellow rattle *Rhinanthus minor*, an annual root-hemiparasite, could be sowed in the prescribed quantities as a natural means to control vigorous grasses. By drawing nutrients from surrounding vegetation, it impedes growth and helps maintain an open sward structure.

Table 9 – MoRPh Module summary

LOCATION	MIX REF.	DESIGNED FOR
P1, P2, P3	EM1	Suitable for a wide range of soil types. The wildflowers are robust and showy, and the grasses are fine and slow growing. https://wildseed.co.uk/product/mixtures/complete-mixtures/general-purpose-meadow-mixtures/basic-general-purpose-meadow-mixture/
P1, P2, P3	EM2	This meadow mixture contains species that are characteristic of traditional meadows across a wide range of soil types. https://wildseed.co.uk/product/mixtures/complete-mixtures/general-purpose-meadow-mixtures/standard-general-purpose-meadow-mixture/
P1, P2, P3	EM3	It may be used to create a very diverse sward where conditions vary across a site. It is also useful in situations where precise soil and site characteristics have not been established before sowing. https://wildseed.co.uk/product/mixtures/complete-mixtures/general-purpose-meadow-mixtures/special-general-purpose-meadow-mixture/
P4, P6	EP1	Pond edge mixture EP1 contains wild flowers and grasses suitable for sowing at the wet margins of ponds, streams and ditches. https://wildseed.co.uk/product/mixtures/complete-mixtures/special-habitat-mixtures/pond-edge-mixture/

7.18 Seed supply is subject to stock fluctuation; if those recommended are out of stock, comparable mixes can be sourced from alternative suppliers such as https://www.naturescape.co.uk/ or https://britishwildflowermeadowseeds.co.uk/.

[6] Plantlife. Managing grassland road verges. A best practice guide. 2020

HEDGEROWS

7.19 Hedgerows perform a number of important ecological and cultural functions; they are the motorways of the countryside and are used by wildlife as 'corridors' to move through the landscape, they provide shelter and cover for animals to rest, nest, and roost, they are a source of food for wildlife, they support native flora and they help conserve natural resources such as soil and water. All hedgerows surveyed are considered to offer ecological value to wildlife e.g. as nesting, foraging and commuting habitat for birds, small mammals and bats and should be retained.

7.20 Hedgerows that have scored 3+ and above, would benefit from increasing the woody species diversity e.g. by planting traditional native hedgerow species such as hawthorn, blackthorn, hazel, wych elm, field maple, crab apple, guelder rose, spindle and cherry species.

7.21 Hedgerows H2, H3, H4 and H5, those with extensive gapping could be filled with additional species as listed above or the hedgerow could be 'laid' to thicken it up. Hedge laying is a traditional country craft and involves partially severing the stems of the hedgerow, then laying them down at roughly 45 degrees. This was originally to create a stock proof boundary but has the added benefit of thickening up the hedgerow from the base to the canopy and encouraging new, vigorous shoots.

7.22 Where possible/ appropriate, 1-2m grassland buffers should be created either side of the hedgerows and these sown with native species (ideally some of those listed in Schedule 2 of the Hedgerow Regs, 1997 and found within woodlands). Where grassland margins already exist, such as H6, a management regime should be implemented that provides habitat enhancement such as leaving 1-2 m of the playing field, next to the hedge on either side unmown. This can be left to grow 'wild' and cut and collected once at the end of the summer. It could be easily implemented with hugely beneficial results for insects, butterflies, birds and mammals. And where possible the grassland margin should have a wavy edge, rather than a straight one to increase the surface are of the 'edge' habitat. For H9, (if safe to do so and as mentioned above) the roadside margin could be left uncut and sown with native wildflowers, similar to how H7 and H8 are currently being managed. If sightlines are needed along the road for cars leaving the car park, then a 1m strip from the road can be kept short by regular mowing.

7.23 Some hedgerows are dominated by tall mature standard trees. Although these are generally a positive addition to a hedgerow, in some cases they may cast excessive shading and hinder the growth of shrubs and wildflowers (this observation is particularly relevant to H2). The reduction or target pruning of selected mature trees could be considered to benefit the growth and establishment of other species. That said, the scope and extent of remedial tree works should be carefully assessed and discussed with a suitably qualified arboricultural consultant.

MATURE TREES

7.24 The Parish Council is, to all effects and purposes, the manager of trees found within PC-owned land and therefore has a Duty of Care towards people and property insofar as trees are concerned. To this end, it is advised that an inventory and condition assessment survey of all trees found within the village boundaries is instructed, to gain a clearer understanding of the tree stock on site and inform remedial work, where appropriate. The survey would also be an opportunity to identify ecological features such as cavities, crevices, woodpecker holes, etc., which could be monitored for activity/occupancy of protected species such as bats and birds.

7.25 In the context of grounds maintenance, several actions can be taken to benefit tree health and prevent damage. For example, it is considered good practice to avoid mowing/strimming the area immediately adjacent to the tree's stem, as that can result in bark damage. Ideally, the "drip zone" (defined as the area of ground beneath the tree which coincides with the extent of the canopy) should be mow-free

and either laid with mulch or cut at the end of the growing season to a height no lower than 100mm. Besides the tree care implications, this practice is also an effective way to dissuade people from stationing under trees, thereby reducing risk of harm.

7.26 Any trees earmarked for removal because deemed unsafe should be retained as standing deadwood where practicable. Standing deadwood provides valuable habitat for saproxylic invertebrates and other wildlife that may exploit it for roosting, nesting and foraging (such as birds, bats and small terrestrial mammals).

7.27 In areas of low occupancy, deadwood in canopy (typically removed on health and safety grounds) should be retained where possible, as it provides valuable habitat.

7.28 When installing man-made habitat features such as bird, bat and invertebrate boxes, care must be taken not to damage trees in the process. Nails and screws should be avoided, in favour of non-intrusive solutions such as straps. More information about habitat boxes is provided in sections 7.56 and 7.57. It is advised that the selection of box type and location is made in consultation with a suitably qualified ecologist/arborist.

7.29 When the removal of a tree is deemed necessary on health and safety grounds, to offset any associated arboricultural and ecological losses it is recommended that at least 2 trees are planted for every tree lost. Species selection should be done carefully, taking into account rooting space, geology, soil chemistry and hydrology ("the right tree in the right place"). A selection of trees suitable for a variety or applications is provided in Appendix 3.

WOODLAND CREATION

7.30 This BAP does not incorporate woodland creation, as none of the receptor sites appear to be suitable for the establishment of such habitat. However, there is ample scope for delivering woodland creation within the Parish region, which is currently heavily characterised by intensively farmed land.

7.31 Woodland design and species selection would need to be informed by a thorough assessment of the site, taking into consideration baseline habitats, soil characteristics. The overarching principles of woodland creation are as follows:

- conduct a soil survey to help determine soil chemistry and nutrient requirements;
- assess the soil hydrology, through observation and the review of anecdotal evidence;
- select species compatible with local ground conditions that would occur naturally in the area and that, together, create a diverse, multi-layered forest community. Native species generally fare better together and deliver greater biodiversity gain.
- determine planting density. Typically, woodland is planted to a density of 1000 trees/hectare (ca. 3m spacing between rows and plants); however, the "*Miyawaki*" method[7], which is deemed very effective when creating forest on degraded land that has been used for agriculture or construction, prescribes a much higher density of 20000 to 30000 per hectare (ca. 0.5m spacing between rows and plants), as competition between seedlings speeds up the rate at which trees and shrub establish and delivers of a more biodiverse assemblage.
- establish a main canopy layer with trees reaching large size at maturity, such as English oak *Quercus robur*, wild cherry *Prunus avium*, sycamore *Acer pseudoplatanus*, wild service tree *Sorbus torminalis;*

[7] https://www.creatingtomorrowsforests.co.uk/blog/the-miyawaki-method-for-creating-forests

- taking into account shade tolerance, select suitable shrub-layer companion species (i.e. field maple *Acer campestre*, hazel *Corylus avellana*, spindle *Euonymus europaeus,* wayfaring tree *Viburnum lantana*, guelder rose *Viburnum opulus*).

7.32 Trees should be staked and guarded, to prevent browsing damage. For the first 2 years after planting, the ground should be maintained weed-free to the extent that it is practicable; the application of coir matting would help suppress weed growth. It is accepted that watering during establishment may not be possible, hence the imperative to carry out a proper assessment pre-planting to identify species that are most tolerant to local conditions and which, in the event of water scarcity, are deemed more likely to withstand drought.

7.33 Finally, as the impact of climate change on biodiversity begins to unveil at scale, species selection shall be adaptive and, if deemed necessary, allow for the inclusion of non-native species that are drought resilient and resistant to pest and diseases. The selection of non-native species shall always be underpinned by a clear understanding of their ecology and reproductive strategies, to avoid unintended negative effects on biodiversity.

WOODLAND ENHANCEMENT

7.34 Woodland habitat delivers a range of ecosystem services including carbon sequestration, flood attenuation, ground stabilisation and cooling. From a biodiversity perspective, however, young woodland tends to be of relatively low value, primarily because of the poor vegetation structure and the very limited assemblage of ground flora due to shading. Existing young to semi-mature woodland that has not been designed for biodiversity (as it is often the case) can be enhanced through the delivery of the actions discussed below.

7.35 *Thinning* is the removal of selected trees to create glades. Thinning allows more light to reach the woodland floor, benefiting understory shrubs as well as enabling the establishment of ground flora. This in turn creates a more diverse woodland structure. Thinning can consist of creating small circular clearings (glades), of removing selected trees throughout the woodland (looking to retain the more vigorous specimens whilst maintaining species diversity) or of clearing a ring around a mature tree (halo pruning). Grass seeds and log piles can be introduced within glades to promote species diversity and provide habitat for reptiles (hibernation, refuge and basking), amphibians, invertebrates, etc.

7.36 *Ground flora enhancement* - is the process of introducing a more diverse assemblage of ground flora into the woodland. This can be delivered through the introduction of native bulbs (list species) and of other perennial woodland species such as bluebell *Endymion non-scripta*, wild garlic *Allium ursinum*, lesser celandine *Ranunculus ficaria*, snowdrop *Galanthus nivalis*, wood anemone *Anemone nemorosa*.

7.37 *Enhancement of the canopy structure* – this action involves the establishment of a shrub layer in the woodland understory. Shrubs deemed suitable for growing in part or full shade are listed in Appendix 3.

7.38 *Invasive species management* - Where possible, and when doing so does not result in a detrimental impact on wildlife, invasive species should be removed from site or at least contained. Invasive plant species such as rhododendron can be removed mechanically or through the use of herbicides. Where invasive plant species cover large areas, intervention that would result in extensive clearance should be informed by an ecological assessment of the site as it may have detrimental effects on wildlife due to habitat loss.

7.39 *Habitat boxes* – selected bat or bird boxes can be installed throughout woodlands to mimic the habitat found in mature, undisturbed woodland and increase the overall availability of nesting/roosting opportunities, to support a more diverse fauna assemblage. A selection of bird and bat boxes is

provided in Table 11 (section 7.56) and Table 12 (section 7.56); it is important that boxes are selected for their suitability to support woodland species.

7.40 *Habitat log piles* - Habitat piles made of brash, logs and other naturally occurring material can be built within the woodland to provide habitat for amphibians, reptiles, mammals and invertebrates. These features provide shelter and hibernation opportunities for a range of species. Log piles also provide a food source for invertebrates and fungi associated with dead and rotting wood, mimicking the habitats found in older/ancient woodland. These features are reviewed in greater detail in Table 13 (section 7.58).

7.41 All or some of the above recommendations can be applied at locations P4 and P5 as well as to other woodland within the Parish region. Prior to undertaking any felling works (i.e. to create glades), it is important that the baseline ecological value of the site is properly captured and that potential roosting features are identified and excluded from the scope of works.

STANDING WATER (PONDS)

7.42 There is an opportunity to create ponds through Natural England's District Level Licensing scheme (DLL) described in chapter 2.13, as the village of Greetham is situated within the scheme's Opportunity Area (see Figure 7).

7.43 Specifications for pond creation would be determined by the scheme's appointed consultant (AMEC Ecology) following a site assessment. Following the preliminary walkover surveys, it was concluded that locations P4 and P6 (private land) could be suitable receptors for pond creation. An indicative location and profile of the proposed ponds (dumbbell shaped, with deep and shallow areas) is provided in the relevant Survey Summary Sheets provided alongside this document. These are indicative only as the pond's design and area would be determined with Natural England's appointed consultant based on a thorough assessment of constraints and opportunities.

MARGINAL AQUATIC VEGETATION

7.44 The scope of DLL pond creation is limited to the design of the feature and the delivery of earthworks and does not make provision for the establishment of vegetation.

7.45 Whilst ephemeral species tolerant to dump and partially inundated ground would naturally establish, the planting of selected marginal vegetation is recommended as it is functional to establishing roosting, nesting and foraging habitat for aquatic invertebrates and amphibians. Pond margins can be sowed with a suitable seed mix (i.e. EP1, referenced in Table 8) and plugs (plants already grown in very small containers), which should be planted in late winter/early spring to a density of ca. 8 plants per m2.

7.46 Species mix may include (but not be limited to) yellow iris *Iris pseudacorus*, common rush *Juncus effusus*, common arrowhead *Sagittaria sagittifolia*, hard rush *Juncus inflexus* and reed sweet grass *Glyceria maxima*.

7.47 Where the pond is situated on land also used for grazing, stockproof fencing is recommended to prevent intrusion/damage.

ORCHARD CREATION

7.48 Orchards were historically a common feature in the rural landscape; however, a staggering rate of loss has been recorded since the 1950s (ca. 90%) due to change in land use, development, lack of

maintenance or conversion to intensive orchard. Orchards, if sensitively managed, contribute positively to biodiversity by supporting a range of species including birds, butterflies, bats and beetles.

7.49 The creation of a traditional orchard has been proposed at location P6, in an area of ca. 0.1ha between the existing hedgerow and the proposed pond which is deemed relatively sheltered from the prevailing winds.

7.50 Planted in a roughly hexagonal pattern, a minimum of 8m apart, the allocated area would accommodate 15 trees. The proposed planting pattern and density is consistent with what prescribed in Natural England's TIN013 and TIN014[8] (Site and tree selection; Planting and establishment). The selected trees should be grafted on vigorous rootstock (for apples, MM111 or M25; for other species, suitable rootstocks may be advised by the supplier), which would deliver a plant up to 5m hight when managed.

7.51 Trees should be sourced from a local supplier and certified as pest and disease free. Table 10 outlines a species mix that would deliver flowering and fruits at different times of the season.

Table 10 – Orchard proposed species mix

Species	Variety	No. of trees	Rootstock
Apple *Malus domestica*	Annie Elizabeth, Barnack Beauty	2	M25
Pear *Pirus communis*	Williams Bon Chretien	2	PYC
Greengage *Prunus domestica var. Italica*	Old Green Gage	1	SJA
Plum *Prunus domestica*	Czar	2	SJA
Damson *Prunus domestica*	Aylesbury Prune	1	SJA
Quince *Cydonia oblonga*	Portugal	1	QA
Wild cherry *Prunus avium*	n.a.	2	n/a
Hazel *Corylus spp.*	Kentish cob	2	OWN
Walnut *Juglans nigra*	Broadview	2	n/a

INTERPRETATION BOARDS

7.52 It is important that the community is made aware of any biodiversity-led initiatives, to create a sense of collective engagement and anticipate possible complaints relating to the relaxation of vegetation management regimes, which without context are often seen as "messy" and attributed to cost-cutting.

7.53 Interpretation boards are a suitable tool to deliver the message and should include a succinct description of the reasons that instigated the initiatives, high-level specifications (where applicable), objectives, expected outcomes and be supplemented with photos and plans.

7.54 Subject to budget and stakeholders' agreement, interpretation boards could be installed at locations P1 (recreation grounds), P2 (Church) and P3 (cemetery).

[8] Natural England. Traditional orchards: "*site and tree selection*" (TIN013) and "*planting and establishing fruit trees*" (TIN014)

7.55 Interpretation boards could also be placed in proximity to important hedgerows to illustrate the importance of such habitat in the rural environment, list the woody species identified and the wildlife likely to rely on it for foraging, roosting and commuting.

MAN-MADE HABITAT FEATURES

7.56 In broad terms, man-made habitat features mimic the outcome of a natural process which would result in the provision of roosting, breeding or foraging habitat. In a heavily modified landscape, such features are generally scarce and their artificial alternatives, if suitably selected and located, can partly offset the habitat deficit. A review of achievable options is provided to follow.

7.57 Bird Boxes

- Table 10 outlines a selection of bird boxes designed to attract *Red*, *Amber* and *Schedule 1* bird species that are either known or expected to occur in the area. As a general rule, bird boxes shall always be installed so that they are not exposed to the prevailing winds and to prolonged hours of sunshine, with a clear flight path to and from their entrance. Generally, an East/North-East facing aspect is deemed suitable for most bird species; however, when installed in woodland, the box's aspect becomes a secondary consideration. Species-specific requirements (i.e. clear fly path to/out of the box) shall always be assessed prior to installation, which should be delivered under the coordination of a suitably competent ornithologist. Boxes should be placed at a suitable height (i.e. 3 to 5m) to reduce the risk of predation. If active monitoring is anticipated, this should be taken into account when determining the height of the box.

Table 11 – Bird boxes

PHOTO	DESCRIPTION AND SUITABLITY
	*Bark boxes - House Sparrow/Great Tit bird box 32mm entrance* Nest box and roost site with 32mm entrance suitable for house sparrow, nuthatch etc. When using to attract house sparrow, multiple boxes should be placed close together above head heigh, particularly close to thick hedges. https://www.barkboxes.co.uk/product

PHOTO	DESCRIPTION AND SUITABLITY
	*Woodstone® Barcelona Open Nest Box* Constructed from a mix of concrete and wood fibres. Designed to safeguard against attacks from predators including woodpeckers, cats and squirrels. The high insulating properties of the construction material ensures that young birds have a greater chance of survival. This design is deemed suitable for robins and wrens (if well hidden), spotted flycatchers, redstarts, pied and grey wagtails, song thrushes and blackbirds. https://www.nhbs.com/vivara-pro-barcelona-woodstone-open-nest-box
	*Branch Stub varying sizes* Replicating a rotting branch stub with void. Available in small (25mm entrance - suitable for wrens), medium (28mm – suitable for tree sparrows) and large (32mm – suitable for house sparrow). Simple and effective design. https://www.barkboxes.co.uk/product
	*Tawny Owl Box* This type of box provides a perfect nesting site for Tawny Owls, which generally nest in tree cavities or buildings. As such sites are becoming increasingly rare, providing an artificial nesting site can be hugely beneficial for these species. This nest box should be sited a minimum of 3m above ground and should be in a quiet, secluded area with a clear flight path to the entrance. If the box is to be located in areas with human activity, then it should be sited more than 5m above ground to help encourage occupation. Tawny owl chicks will leave the nest before they are able to fly so it is vital that an element of screening in proximity of the box is available (i.e. ivy covered tree).

PHOTO	DESCRIPTION AND SUITABLITY
	https://www.nhbs.com/tawny-owl-nestbox
	*Vivara Pro WoodStone® Build-in Swift Nest Box* This box can either be built into walls during construction or mounted to the outside of existing buildings. It is aimed specifically at swifts which require small crevices in open rock faces or buildings. This box is made from a mix of concrete and wood fibers and safeguards against predators. Swift boxes should be mounted at around 5m high with an unobstructed flight path. Ideally these would be situated under eaves and on North to East facing walls to avoid direct sunlight. https://www.birdfood.co.uk/woodstone-build-in-swift-nest-box
	*ArkWildlife Swallow Nest Box Bowl* This nest bowl is designed specifically for swallows and should be placed under a roof in old buildings, stables, porches, outbuildings, or garages. Where mud and soft edged puddles are in short supply due to human development these nest bowls act as an alternative for swallows. This product comes attached to a mounting board for easy fitting and replicates the shape of a natural swallow nest https://www.arkwildlife.co.uk/product/swallow-nest-box-bowl

PHOTO	DESCRIPTION AND SUITABLITY
	*House Martin Nest Box Bowl* These nest bowls act in a similar principle to the swallow nest bowls. They are made from wood fiber and concrete and have a wooden mounting frame which can be removed for cleaning. They can be purchased in single or double options as house martins nest socially. Unlike the swallow bowls these should be situated on outside walls under eaves. https://www.arkwildlife.co.uk/product/house-martin-nest-box-bowl
	*Bark boxes – Sparrow Terrace* Can be used in conjunction with the house sparrow/great tit box as well as the tree sparrow/pied flycatcher box. Sparrows are communal nesters and this box with multiple entrances and nest compartments will encourage house and tree sparrows to nest. Tree sparrows require multiple boxes on one try with others in proximity. They should be above head height. To encourage tree sparrows nearby hedges should be maintained and thick and pollard trees should be managed with any neglected trees being re-pollarded https://www.barkboxes.co.uk/product/house-sparrow/
	*Bark boxes – Tree sparrow/pied flycatcher 28mm entrance* Like the house sparrow/great tit box but with smaller entrance hole more suited to tree sparrow and pied flycatcher. If using for tree sparrow, they should be placed near other boxes. https://www.barkboxes.co.uk/product/tree-sparrow-pied-fly-catcher-28mm/

PHOTO	DESCRIPTION AND SUITABLITY
	*Bark boxes – Starling box* Larger box aimed at encouraging starlings to nest. The box's larger diameter hole may also appeal to thrush species, great tits, robins and even redstarts. https://www.barkboxes.co.uk/product/starling-box/
	*Bark boxes – Willow tit/tree creeper* Box designed for fitting to smaller willow and birch trees. To encourage willow tit they should be fitted closer to the ground than most bird boxes. These boxes are filled with a wood shaving substrate as willow tit like to excavate their own holes (available without to encourage tree creeper) The box is contains a crevice in the top suitable for roosting bats. https://www.barkboxes.co.uk/product/willow-tit/
	*Eco Barn Owl Nest Box* This can be fixed to the inside barns as well as on the outside of buildings, trees, and posts. The box is made from recycled plastic and FSC timber and has an exercise platform for owlets. The platform also has a raised lip, and the entrance hole is raised, both these features encourage chick survival by preventing owlets from leaving the nest box too early or by falling from the nest Indoor boxes can be fitted high up with no blockage of flight paths within barns and old open buildings. Outdoor boxes should be fitted facing open land and visible from a distance. Ideally on a large sturdy tree with a clean trunk, wall, or post. Boxes should be at least 4m from the ground

PHOTO	DESCRIPTION AND SUITABLITY
	https://www.nhbs.com/eco-barn-owl-nest-box
	*Woodstone® Kingfisher Tunnel* Kingfisher nest boxes made from wood fiber and concrete. These boxes should be placed in a vertical bank beside a river/lake at least 1 meter above the maximum water level. The box should be completely buried with only the entrance visible and should slope downward at a 10-20° angle. For kingfishers, the box should be placed near a natural or artificial perch. There should be 2 of these boxes nearby (>2m apart) as the female will start a second nest whilst the male cares for the first brood. Artificial banks can be created where no natural ones exist. These boxes can also benefit sand martins although sand martins typically will not nest in colonies smaller than 12 so ideally 12 or more of these should be installed to encourage sand martin nesting. https://www.birdfood.co.uk/woodstone-kingfisher-tunnel

7.58 Bat Boxes

- Table 11 outlines a selection of tree and wall-mounted boxes that are designed to provide either hibernation, maternity, or transient roosting space for species known to occur in the area. In general terms, bats prefer warm spaces in the summer for rearing young and consistently cool and humid spaces in the winter for hibernation. The boxes recommended are draught proof and made from a thermally stable, resilient ecostyrocrete or woodcrete material.
- Bat boxes should always be located close to/within unlit linear features, such as lines of trees or woodland edge. Several bat species are highly susceptible to light pollution and a box placed in proximity to a source of artificial light is likely to remain vacant. When fitted on trees, the approach to the box must not be impeded by overhanging branches. Bat boxes should be placed at a suitable height (3-5m) to reduce the risk of predation.
- Opportunities for the installation of bat boxes have been identified at P1, P2, P3, P5. Their proposed location has been referenced in the relevant Survey Summary Sheets provided alongside this document.

Table 12 – Bat boxes

PHOTO	DESCRIPTION AND SUITABLITY NB: all *Bark boxes* provide a hole for endoscope inspection and light internal finish to easily detect usage
	*Bark boxes – Bark rot hole* This box creates a crevice against the bark of the tree and mimics a natural rot hole. This box can be used by individual roosting bats but may also be used by small birds. https://www.barkboxes.co.uk/product/bark-rot-hole/
	*Bark boxes – Hibernation bat box* This large, enclosed bat box allows for group or individual hibernation. https://www.barkboxes.co.uk/product/large-bat-box/
	*Bat boxes – Kent Type Twin Crevice* This box type offers opportunities for a small communal roost which can be used by a variety of species. It features two parallel crevices with an internal connection allowing for temperature variation between the sections. https://www.barkboxes.co.uk/product/kent-type-twin-crevice/

PHOTO	DESCRIPTION AND SUITABLITY NB: all *Bark boxes* provide a hole for endoscope inspection and light internal finish to easily detect usage
	*Bark boxes – Maternity bat box* This design is aimed at accommodating larger numbers of bats from a range of species. It can be used on trees or in indoor roosts to provide extra roosting features. It is ideal for a maternity roost as it offers multiple compartments https://www.barkboxes.co.uk/product/maternity-bat-box/
	*Bark boxes – Large bat box* Suitable for larger bats such as noctule, serontine and Daubenton's or for larger groups of smaller bat species such as pipistrelles or myotis. https://www.barkboxes.co.uk/product/large-bat-box-2/
	*Bark boxes – Small crevice bat box* Ideal for placement on smaller trees. This box attracts small numbers or individual pipistrelles and smaller bat species https://www.barkboxes.co.uk/product/contract-demo/

PHOTO	DESCRIPTION AND SUITABLITY NB: all *Bark boxes* provide a hole for endoscope inspection and light internal finish to easily detect usage
	*Bark boxes – Standard bat box* Standard bat box design with wedge top. Primarily suitable for use as a mating/autumn roost for a range of species. https://www.barkboxes.co.uk/product/standard-bat-box/

7.59 Habitat Log Piles

- The creation of habitat log piles and standing loggeries benefit a range of species, from reptiles and amphibians to saproxylic invertebrates (invertebrates that depend on deadwood either for feeding, reproducing, roosting or a combination of these), decay fungi, micro-organisms and soil bacteria.
- Habitat piles should be created in shaded areas within scrub and woodland, using site-won logs arising from the pruning/removal of trees. Examples of suitable design are reviewed in table 12.

Table 13 – Habitat log piles

PHOTO	DESCRIPTION AND SUITABILITY
	Habitat log piles can be created stacking ca. 1m length of wood arising from tree works on the ground, in piles of up to 1m high. Where possible, wood from different species (broadleaf preferrable) should be utilised. Partly decomposed deadwood lying on the woodland floor can also be added to the pile. These features are optimal refugia for reptiles and amphibians, as well as providing habitat for invertebrates, decay fungi and other microorganisms.

PHOTO	DESCRIPTION AND SUITABILITY
	Upright piles of deadwood are generally known as “stag-beetle loggeries” because of their habitat suitability for the species. However, standing deadwood suits a wide array of invertebrates, fungi and other microorganisms that are critical to the functioning of woodland ecosystems. The logs should be at least 200mm in diameter and sourced from broadleaved species. Partially bury the logs in the soil so that they do not dry out and they remain upright. Allow plants to grow over the log pyramid to retain moisture and provide shade. The loggery should be sited in partial shade to prevent them drying out.

7.60 Invertebrate hotels

- An invertebrate hotel (also known as “bug hotel”) is designed to provide shelter for a range of insect species both during the active season and the hibernation period. Mainstream designs heavily rely on the use of recycled material such as wooden pallets, bricks and roof tiles, logs and twigs, grass and hay.
- Invertebrates are extremely important players in the ecosystem as they key contributors to pollination (of crops as well as wildflowers, trees and shrubs), biological pest control and decomposition of organic matter (thus returning nutrients to the soil); furthermore, they provide an extremely valuable food source upon which many species depend (i.e. bats, birds, amphibians, reptiles, etc.). Providing suitable habitat is highly likely to result in enhanced biodiversity.
- These features should be placed in a location sheltered from rain and prevailing winds, preferably south-facing, in sunlight or light shade.

Table 14 – Invertebrate hotels

PHOTO	DESCRIPTION AND SUITABILITY
	This type of invertebrate hotel is constructed stacking pallets and filling the gaps with reclaimed man-made, as well as naturally available material such as bricks, rocks, twigs, logs, straw, moss, carboard. The application of rabbit mesh around it prevents mammals such as rats from colonizing the installation and helps keeping the structure together. The structure must be fitted with a roof (felt or rubber) to remain dry; this can be covered with *Sedum spp.* to provide further habitat and prolong the lifespan of the substrate.

PHOTO	DESCRIPTION AND SUITABILITY
	"Bee-post" is a freestanding bee tower designed to provide a nesting site for solitary bees. A comparable outcome can be achieved with a 6 x 6 timber post, applying holes of different diameter in the pattern as shown to the left. The timber selected for the creation of artificial habitat features must be untreated. Application of a water-based preservative suitable for bee-hives should be considered to prolong the feature's lifespan. (https://www.greenandblue.co.uk/products/bee post)

INVASIVE SPECIES

7.61 Invasive non-native plant species find their way in the wild through a number of pathways; typically, colonisation occurs via natural seed dispersal (garden escapes) and/or green waste disposal. A large number of species introduced by the horticultural sector are native of other countries and their impact upon ecosystems and biodiversity is rarely assessed and only becomes apparent once the plant's spread is no longer controllable.

7.62 The Local record data search has revealed the presence of Pirri-pirri bur *Acaena novae-zelandiae* and Japanese knotweed *Fallopia japonica* in Greetham Quarry, located in the eastern fringes of the village. Pirri-pirri bur spreads by ball-like hooked seeds which attach to animals' fur (epizoochory) and clothing, potentially transporting seed over long distances. Japanese knotweed spreads through rhizomes, underground stems which can extend underground up to several metres from the nearest visible aerial part of the plant. New infestations typically occur through disturbance of contaminated sites and/or the uncontrolled transfer and disposal of plant waste. These are both listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

7.63 Variegated yellow archangel *Lamiastrum galeobdolon subsp. Argentatum* has also been reported and observed within the village boundaries. This plant has been introduced in the 1970s and spreads by seeds and by long runners which root at the nodes. It establishes in big clumps and can outcompete native species, forming dense mats of growth.

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7.65 Prescriptions for the eradication of invasive species is beyond the scope of this document; however, it is recommended that stands of invasive species located within public open spaces are clearly identified with signage, effectively excluded to prevent encroachment and, where possible, controlled

and removed. It must be noted that any waste originating from Schedule 9 species must be treated as "controlled" and as such, can only be handled and transported by a licensed waste carrier.

7.66 The most important measure to prevent spread is biosecurity, which is effectively summed up as "*Check – Clean – Dry*". Keeping away from invasive species is generally the most effective way of preventing further spread

COMMUNITY ENGAGEMENT

7.67 This BAP has focused on the ecological enhancement of areas of land within public ownership; however, local residents can also effectively support biological diversity by gardening for wildlife.

7.68 If suitably managed, gardens can become "*mini nature reserves*". A *biodiversity-friendly* approach to gardening, besides delivering tangible ecological benefits, involves a lesser expense of energy for its maintenance (thus reducing the household's overall footprint) and contributes to delivering additional ecosystem services such as carbon sequestration, flood attenuation, shading and cooling. Below is a list of measures that residents can consider to support local flora and fauna.

- Bird and bat boxes can be installed on trees (if present) or on the side of a shed or building, following the guidance set out in chapter 7.47. Bat boxes should be selected with an open-bottom design to avoid the need for cleaning, as a special licence is needed to disturb the species and their place of rest and protection (roost);
- An 'invertebrate hotel' or a solitary bee home can be built if a suitable location is available, following the guidance provided in chapter 7.50.
- A section of the garden can be put to wildflowers and be subject to reduced management regimes. This action would be particularly beneficial for invertebrates (including pollinators) and the species that depend on them for their existence/sustenance. Structural variation of ground-covering vegetation provides shelter and foraging opportunity for a range of species including amphibians, reptiles, voles, etc.
- Native shrubs can be introduced along the garden boundaries, to a density that varies depending on the sought outcome. Canopy size and spread at maturity should be carefully considered at design stage, to avoid unintended shading of small-growing shrubs and ground flora. A list of native shrubs is provided in Appendix 3.
- Where space is available, the planting of trees should be considered. Trees should be selected based on their tolerance to local conditions (soil chemistry and moisture) and on their projected size at maturity. Planting trees in close proximity to the house is generally discouraged as they tend to be implicated in subsidence cases and their removal is required. A list of tree species suitable for planting in gardens is provided in Appendix 3.
- Where absent, hedgerows should be introduced along selected boundaries to promote connectivity with the wider landscape and allow ground-dwelling species into the garden. Close-board fencing should be avoided where possible, as it effectively constitutes a barrier to dispersal for wildlife that is used to visit rural gardens, such as hedgehogs. If the garden is already contained by a fence or wall the removal of which is unviable, a small opening can be made at the base to allow connectivity.
- Slugs, snails and bugs should not be deterred as they play a key role in the ecosystem. Where their presence conflicts with horticulture (i.e. the growth of vegetables), exclusion should always be pursued through the installation of physical barriers (thick net mounted on a frame) instead of resorting to poisoning pellets, which can impact on non-target species feeding of the target species (for example, the decline of song thrush is partly attributed to slug pellets).

- In a nature-deprived environment, the provision of supplementary food and water for wildlife can be considered during periods of drought or in the winter months, when natural food sources are scarcely available. Small water features can also be installed for drinking and bathing.
- Habitat log piles can be created in suitable areas of the garden (in a corner, in amongst scrub), following the guidance set out in section 7.58.
- Where space and budget allows, a small pond can be created to support the local amphibian population. Ponds have been added to the UK list of BAP Priority Habitats in 2007 and are highly valuable habitats for a range of wildlife species (not just amphibians). When dug on clay-heavy substrates, ponds can and should be left unlined; when lining is required to maintain a permanently inundated area, this should be done using either clay or bentonite and polythene lining avoided. Wildlife ponds should be fed by rainwater only and not by the outlet of drainage from the surrounding land, to preserve water quality and prevent nutrient enrichment. Further guidance on pond design can be sourced from the Amphibian and Reptile Conservation Trust[9].
- The installation of green roofs should also be considered on flat-roof extensions, porches, bin and log stores and garden sheds. Besides providing wildlife habitat, green roofs can also sequester carbon (1m² absorbs approx. 5kg of C02/year), improve air quality (1m² can remove approx. 0.2kg of airborne particles/year), reduce temperatures as well as the rate of surface water runoff (by between 70 and 90%, relative to a bare roof surface) and extend significantly the roof life (by up to 3 times). Green roofs can be of 3 types: extensive, biodiverse, intensive. The extensive green roof is a blanket of *Sedum sp*. which requires minimal maintenance. Biodiverse green roofs are by definition more diverse and require an element of active management such as grass cutting and watering during extensive dry and hot spells. Intensive green roofs rely on a deep substrate and can incorporate grassland, shrubs and even small trees. This type of green roof comes with specific structural requirements and relatively intensive maintenance.

7.69 Additional guidance on the actions that can be taken to deliver gardening for wildlife has been jointly produced by The RHS and Wildlife Trust through the '*Wild About Gardens Campaign*'[10].

[9] https://www.arc-trust.org/

[10] https://www.wildaboutgardens.org.uk/

8. ACKNOWLEDGEMENTS

A special thanks goes to Greetham Parish Council, which has commissioned the production of this document as part of a concerted strategy to safeguard the natural environment and halt biodiversity decline within the Parish boundaries, and to a number of local residents who have enthusiastically endorsed the initiative by making their own land available for the creation and enhancement of habitats which will benefit nature and the local community.

FIGURE 1 – DESIGNATED SITES

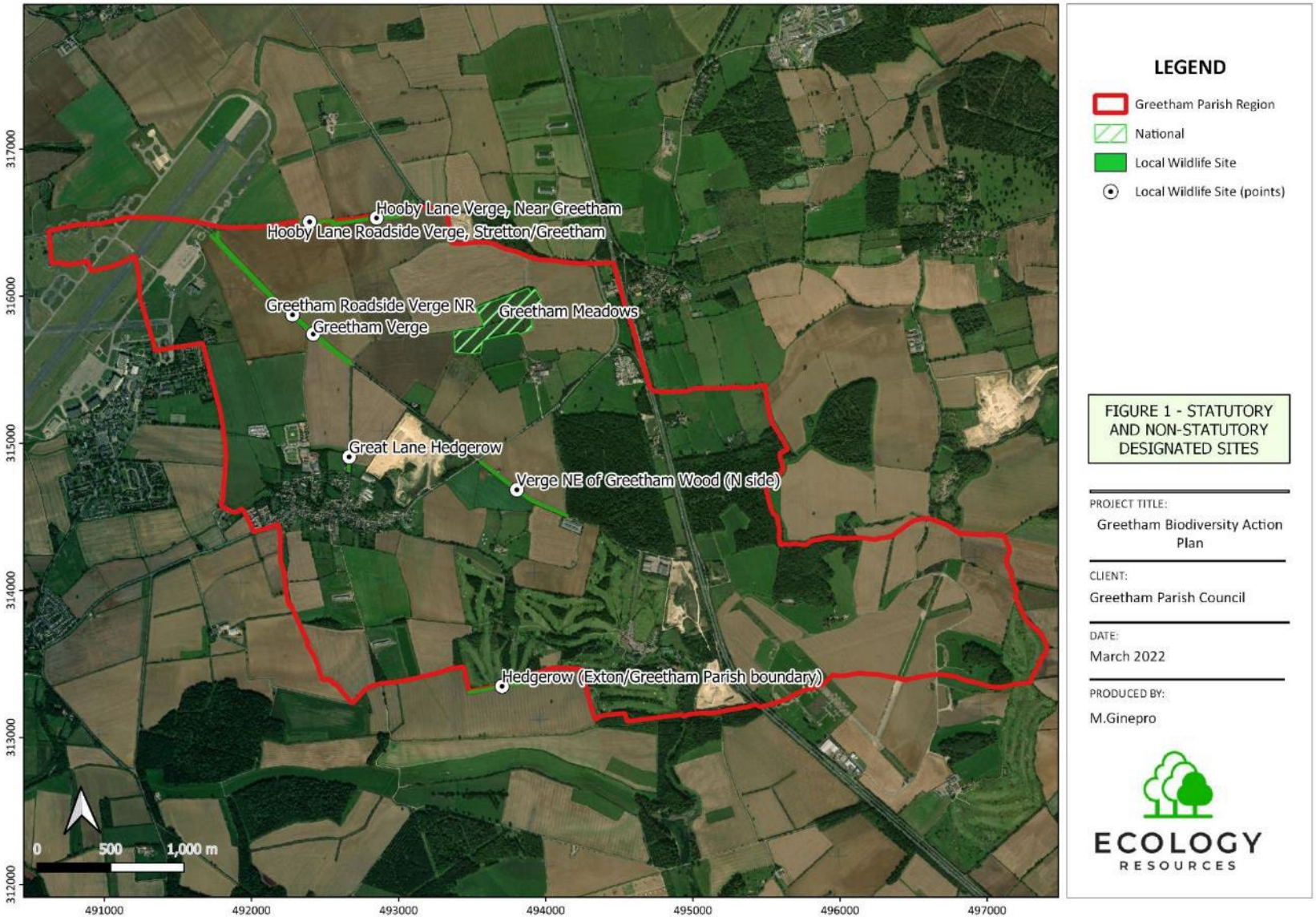


FIGURE 2 - EPS SPECIES WITHIN SETTLEMENT BOUNDARY



FIGURE 2A – EPS SPECIES WITHIN PARISH REGION



FIGURE 3 – GCN AND WATER VOLE HABITAT WITHIN SETTLEMENT BOUNDARIES



FIGURE 3A – GCN AND WATER VOLE HABITAT WITHIN PARISH REGION



FIGURE 4 – LAND ELIGIBLE FOR BIODIVERSITY ENHANCEMENT



FIGURE 5 – HISTORICAL MAPPING AND AERIAL IMAGERY OVERLAY



FIGURE 6 – HEDGEROW SURVEY PLAN

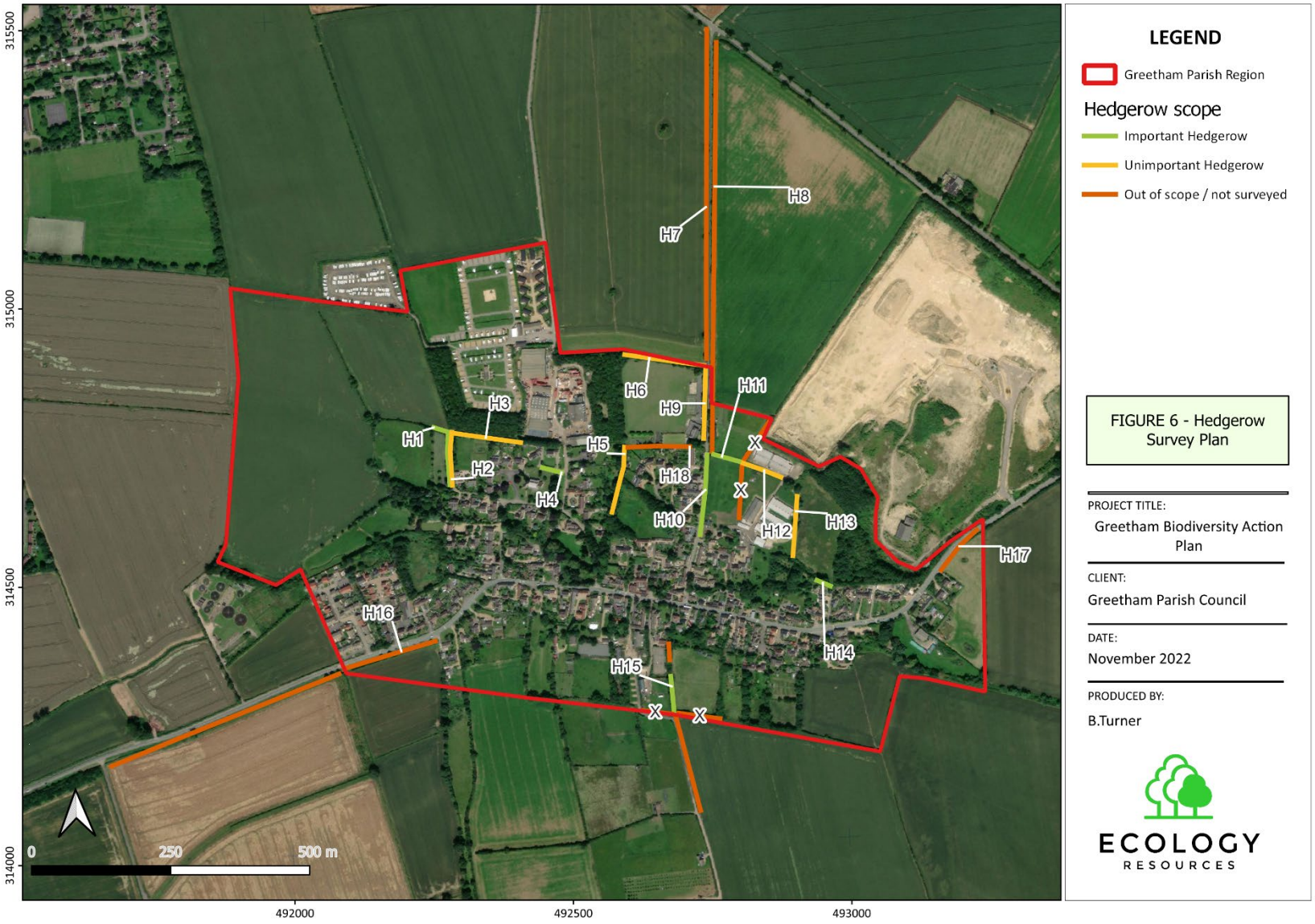


FIGURE 7 – EXTENT OF MORPH SURVEY

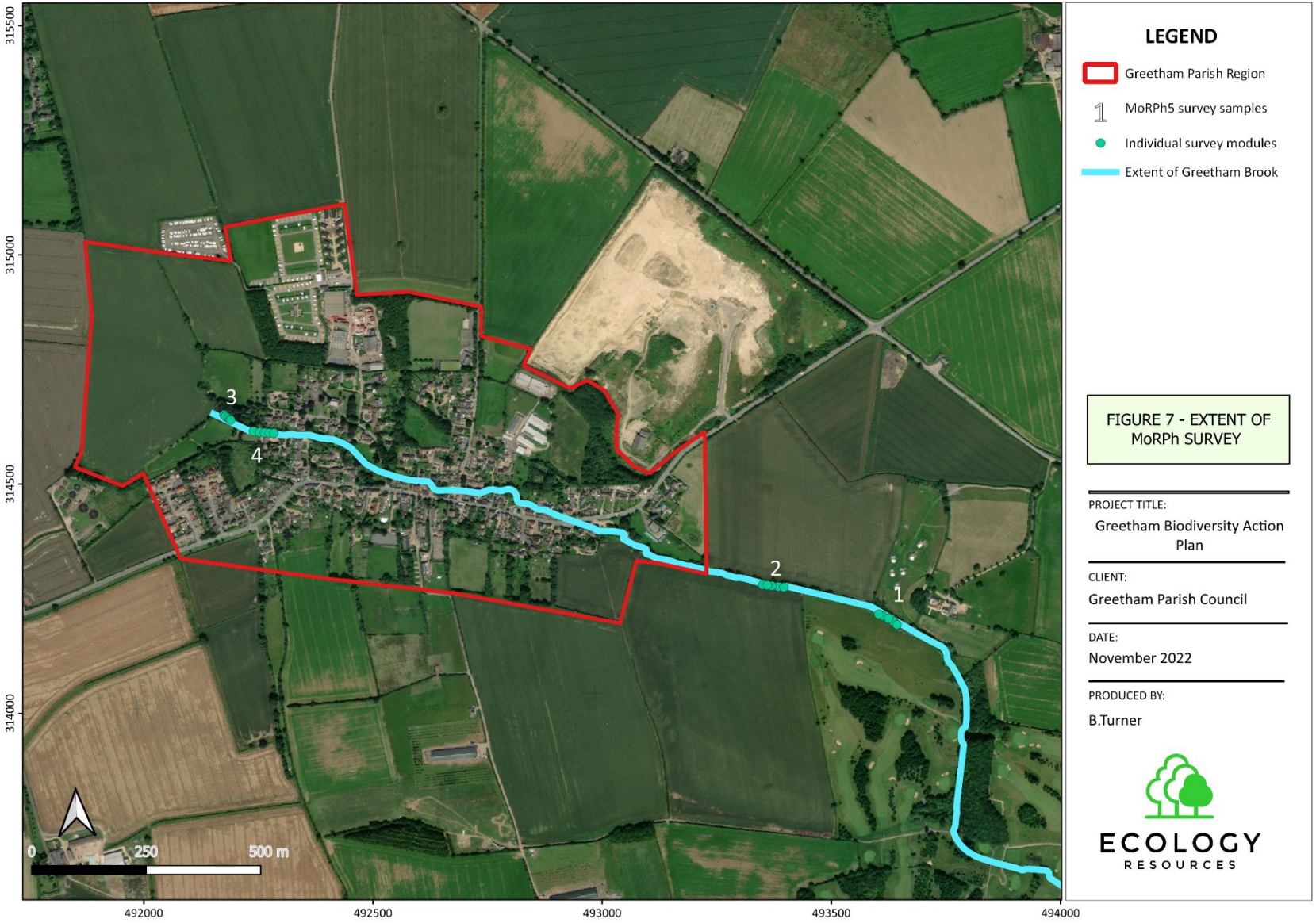
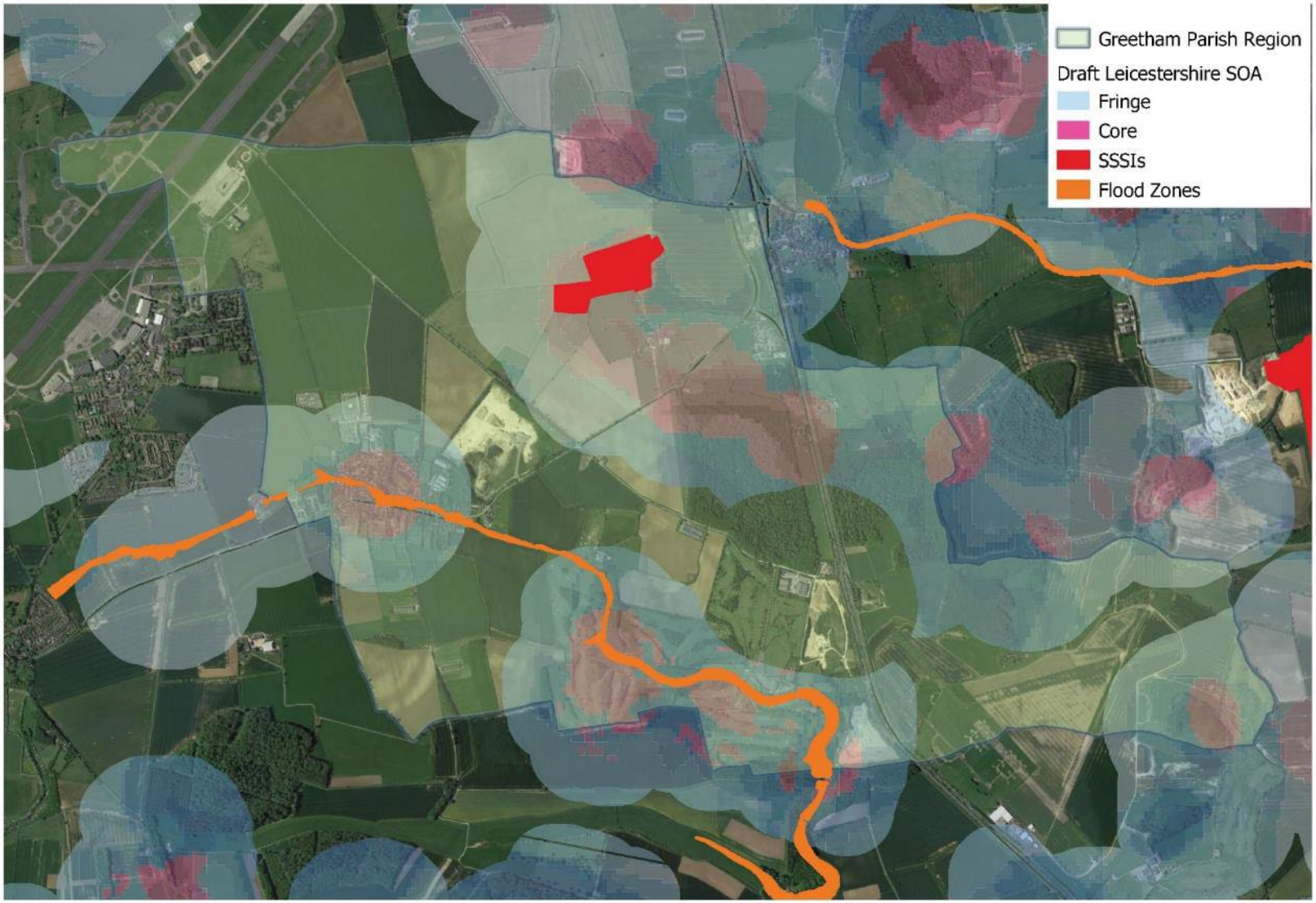


FIGURE 8 – DLL OPPORTUNITY AREA



APPENDIX 1 – BOTANICAL SPECIES LIST (LERC DATA)

Species (Latin name)	Species (Common name)	Last recorded	Number of Records
Anacamptis morio	Green-winged Orchid	2020	78
Bromus racemosus	Smooth Brome	2019	19
Bromus secalinus	Rye Brome	2012	5
Cerastium fontanum	Common Mouse-ear	2019	27
Coeloglossum viride	Frog Orchid	2019	35
Fallopia japonica	Japanese Knotweed	2019	3
Gymnadenia conopsea	Common Fragrant orchid	2014	17
Acaena novae-zelandiae	Pirri-pirri-bur	2019	2
Agrostis canina	Velvet Bent	2019	1
Anthriscus caucalis	Bur Chervil	2019	1
Aquilegia vulgaris	Columbine	2019	1
Calamagrostis canescens	Purple Small reed	2017	1
Cerastium semidecandrum	Little Mouse-ear	2014	1
Chaenorhinum minus	Small Toadflax	2014	2
Sedum album	White Stonecrop	2014	6
Serratula tinctoria	Saw-wort	2019	33
Cichorium intybus	Chicory	2019	1
Cotoneaster horizontalis	Wall Cotoneaster	2019	1
Euphorbia lathyris	Caper Spurge	2019	1
Hippuris vulgaris	Mare's-tail	2019	1
Hyacinthoides non-scripta x hispanica = H. x massartiana	Bluebell	2018	2
Hypericum humifusum	Trailing St John's-wort	2019	3
Lamiastrum galeobdolon subsp. argentatum	Variegated Yellow Archangel	2018	1
Ophrys apifera	Bee Orchid	2018	2
Prunus laurocerasus	Cherry Laurel	2018	1
Rosa rugosa	Japanese Rose	2019	1
Tilia cordata	Small-leaved Lime	2019	1
Hyacinthoides non-scripta	Bluebell	2019	3

APPENDIX 2 – BOTANICAL SPECIES LIST (SURVEY DATA)

Species (Latin name)	Species (Common name)	Last recorded	Number of Records
Plantago media	Hoary plantain	Apr 2022	
Anthriscus sylvestris	Cow parsley	Apr 2022	
Bellis perennis	Common daisy	Apr 2022	
Veronica sp.	Speedwell	Apr 2022	
Taraxacum officinale agg.	Dandelion	Apr 2022	
Stellaria media	Chickweed	Apr 2022	
Glechoma hederacea	Ground-ivy	Apr 2022	
Ficaria verna	Lesser celandine	Apr 2022	
Viola odorata	Sweet violet	Apr 2022	
Viola riviniana	Dog violet	Apr 2022	
Digitalis purpurea	Foxglove	Apr 2022	
Lolium perenne	Perennial ryegrass	Apr 2022	
Myosotis decumbens	Forget-me-not	Apr 2022	
Narcissus bicolor	Daffodil	Apr 2022	
Festuca sp.	Fescue	Apr 2022	
Senecio jacobaea	Ragwort	Apr 2022	
Ranunculus sp.	Buttercups	Apr 2022	
Pilosella officinarum	Mouse-ear-hawkweed	Apr 2022	
Galanthus nivalis	Snowdrops	Apr 2022	
Urtica dioica	Common nettle	Apr 2022	
Lamium purpureum	Red dead-nettle	Apr 2022	
Hedera helix	Ivy	Apr 2022	
Achillea millefolium	Yarrow	Apr 2022	
Alliaria petiolata	Garlic mustard	Apr 2022	
Heracleum sphondylium	Hogweed	Apr 2022	
Ilex aquifolium	Holly	Apr 2022	
Cirsium vulgare	Spear thistle	Apr 2022	
Galium aparine	Cleavers	Apr 2022	
Rosmarinus officinalis	Rosemary	Apr 2022	
Pentaglottis sempervirens	Green alkanet	Apr 2022	
Muscari sp.	Grape hyacinth	Apr 2022	
Ranunculus repens	Creeping buttercup	Apr 2022	
Rumex sp.	Dock	Apr 2022	
Lolium perenne	Perennial rye grass	Apr 2022	
Plantago sp.	Plantain	Apr 2022	

Arum maculatum	Lords and ladies	Apr 2022	
Achillea millefolium	Yarrow	Apr 2022	
Glechoma hederacea	Ground ivy	Apr 2022	
Rubus fruticosus	Bramble	Apr 2022	

APPENDIX 3 – LIST OF NATIVE SHRUBS AND TREES

TREES					
NAME	NATIVE? (Y/N)	HEIGHT AT MATURITY (m)	TOLERANCE		SUITABILITY
			DROUGHT	SHADE	
Plum cherry *Prunus cerasifera*	N	8	HIGH	MODERATE	Landscape/urban/ garden
Black mulberry *Morus nigra*	N	10-15 (typically 10)	MODERATE	MODERATE	Landscape/urban
Common pear *Pyrus communis*	N	10-15	MODERATE	MODERATE	Landscape/urban/ garden
Judas tree *Cercis siliquastrum*	N	10	HIGH	MODERATE	Landscape/urban
Woodland hawthorn *Crataegus laevigata*	Y	5 - 8	HIGH	MODERATE	Landscape/urban/ garden
Himalayan birch *Betula utilis subsp. Jacquemontii*	N	Typically up to 15	MODERATE	MODERATE	Landscape/urban
River birch *Betula nigra*	N	Typically up to 15	MODERATE	LOW	Landscape/urban
Bird cherry *Prunus padus*	Y	15	MODERATE/LOW	MODERATE	Landscape/urban
Three-flowered maple *Acer triflorum*	N	12	MODERATE	MODERATE	Landscape
Whitebeam *Sorbus aria*	Y	10-15	HIGH	MODERATE	Landscape/urban/garden
Rowan *Sorbus aucuparia*	Y	10-15	MODERATE	MODERATE	Woodland/hedgerow/ landscape/garden
Wild cherry Prunus avium	Y	15	MODERATE	LOW	Woodland/landscape
English oak *Quercus robur*	Y	15-20	MODERATE	MODERATE	Woodland/landscape
Sycamore *Acer pseudoplatanus*	N	20	LOW	MODERATE	Woodland/hedgerow
Wild service tree *Sorbus torminalis*	Y	15	HIGH/MODERATE	MODERATE	Woodland/hedgerow
Field maple *Acer campestre*	Y	15-20	HIGH	MODERATE	Woodland/ hedgerow
Crab apple Malus sylvestris	Y	8-12	MODERATE	MODERATE	Woodland/hedgerow/ garden
Small-leaved lime *Tilia cordata*	Y	Up to 30m	MODERATE	HIGH	Woodland/hedgerow/ landscape
Large-leaved lime *Tilia platyphyllos*	Y	20+	LOW	HIGH	Urban/ landscape
London Plane *Platanus x hispanica*	N	20+	HIGH	MODERATE	Urban/ landscape

Aspen *Populus tremula*	Y	Up to 25	MODERATE	LOW	Landscape
Sweet chestnut *Castanea sativa*	N	Up to 35	HIGH	MODERATE	Landscape/ woodland

SHRUBS					
NAME	NATIVE? (Y/N)	HEIGHT AT MATURITY (m)	TOLERANCE		SUITABILITY
			DROUGHT	SHADE	
Hazel *Corylus avellana*	Y	Up to 12	LOW	MODERRATE	Landscape/ woodland/ hedgerow
Spindle *Euonymus europaeus*	Y	3-6	MODERATE	MODERATE	Landscape/ garden/ woodland/ hedgerow
Wayfaring tree *Viburnum lantana*	Y	Up to 5	MODERATE	MODERATE	Landscape/ garden/ woodland
Guelder rose *Viburnum opulus*	Y	2-5	MODERATE	MODERATE	Landscape/ garden woodland
Hawthorn *Crataegus monogyna*	Y	Up to 15	HIGH	MODERATE	Landscape/ hedgerow
Broom *Cytisus scoparius*	Y	1-4	HIGH	LOW	Landscape/scrub
Gorse *Ulex europaeus*	Y	2-3	HIGH	LOW	Scrub
Alder Buckthorn *Rhamnus frangula*	Y	6	LOW	MODERATE	Landscape/ hedgerow/garden/scrub
Dogwood *Cornus sanguinea*	Y	5-10	LOW	MODERATE	Landscape/ hedgerow/ garden/scrub
Holly *Ilex aquifolium*	Y	10-15	HIGH	HIGH	Landscape/ woodland
Wild privet *Ligustrum vulgaris*	Y	1-3	HIGH	HIGH	Woodland/ landscaping/ garden