

# Ecological Assessment

BE752.1

Sowerby Neighborhood Plan



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<b>Report title</b>	Ecological Assessment
<b>Report reference</b>	BE752.1
<b>Revision</b>	A
<b>Site address</b>	Sowerby district, Halifax, West Yorkshire HX6
<b>Grid reference</b>	SE 04232 23207
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<b>Client</b>	Sowerby Neighbourhood Plan
<b>Date</b>	18 <sup>th</sup> October 2018

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## Executive Summary

Bagshaw Ecology Ltd have been instructed by Sowerby Neighbourhood Plan to undertake an Ecological Assessment of the Sowerby area, Halifax, West Yorkshire HX6. The purpose of the report was to identify the habitats and species present, the ecological value of the site and to make recommendations for potential ecological enhancements.

The desk-based study found no designated sites within the Sowerby area but did find several deciduous woodland habitats with good links to the surrounding areas. The land use within Sowerby was rural agricultural farmland and suburban residential areas. Tree cover was intermediate with the majority of woodland situated in the north and south valleys.

The survey found the site to consist predominantly of poor semi-improved grassland, modified grassland, suburban mosaics and built linear features, with areas of upland acid grassland, broadleaved woodland, lowland beech woodland, developed land and lines of trees. Other habitats noted included heathland, scrub, hedgerows, upland flushes, ponds and rivers. The majority of habitats present were of local/district ecological importance with upland acid grassland, upland flushes and rivers having regional importance.

In-bye grassland which includes the majority of the grassland habitat within Sowerby was identified as having importance to several BAP upland bird species: with records present of linnet *Linaria cannabina*, golden plover *Pluvialis apricaria*, curlew *Numenius arquata*, meadow pipit *Anthus pratensis* and skylark *Alauda arvensis*. The majority of grasslands were in poor condition due to agricultural improvement and therefore, to enhance their value to wildlife including upland birds and reptiles, several restoration and management recommendations are made.

Several areas of woodland were observed within Sowerby which are of value to a number of species within Calderdale including numerous bird species, bats, badgers *Meles meles* and otter *Lutra lutra*. The woodlands were largely in unfavourable condition with beech wood plantations in Dodge Royd Wood to the southwest and other woodland areas being composed of even aged stands lacking structural diversity. The most diverse woodland area was observed around Belmont Recycling plant. It is recommended that some areas of the woodland are resurveyed in spring to identify flowering species which may not have been present during the survey; this may result in certain woodland being considered of higher ecological value. In addition to this management recommendations are made to improve the woodland at Dodge Royd Wood.

A number of further surveys are recommended within target areas to establish the species utilising habitats within Sowerby, these included breeding bird surveys (on both woodland and upland areas), bat transects, badger camera trapping, reptile surveys, otter surveys and pond sampling. Optimal survey periods and the target areas within Sowerby are provided.

As suburban areas comprise a large proportion of the area of Sowerby and important habitats for species such as barn swallow *Hirundo rustica*, common pipistrelle *Pipistrellus pipistrellus* and European hedgehog *Erinaceus europaeus*; several recommendations are made to enhance these habitats. Recommendations include maintaining habitat corridors, such as hedgerows, and enhancing the biodiversity of street trees.

# 1. Introduction

## 1.1. Background

Bagshaw Ecology Ltd have been instructed by Sowerby Neighbourhood Plan to undertake an Ecological Assessment of the Sowerby area, Halifax, West Yorkshire HX6, hereafter referred to as 'the site'.

The purpose of the report is to identify the habitat types on the site, along with the presence or absence of any protected or notable species. The ecological value of habitats present is assessed, and the value to potential notable species reported. Recommendations for potential ecological enhancement within the site are made.

## 1.2. Site Details

The site encompasses the Sowerby area in Halifax, West Yorkshire. The area is approximately 304 hectares in size and is situated to the west of Sowerby Bridge, between Luddenden Foot, Sowerby Bridge and Triangle.

The area consists of a mixture of agricultural farmland, suburban residential areas, rivers and woodland.



Figure 1.1 Plan showing the extent of the Sowerby area

## 2. Legislative Context

### 2.1. Legislation

The Wildlife and Countryside Act 1981 (as amended), makes it an offence to:

- Deliberately or recklessly injure, kill or capture any animal species protected under Schedule 5 of the act.
- Deliberately or recklessly kill, injure or take any wild bird; to take, damage or destroy the nest of any wild bird while occupied or being built, or to take or destroy the egg of a wild bird. Additional protection is afforded to bird species listed under Schedule 1 of the Act.
- Intentionally pick, uproot or destroy any wild plant included in Schedule 8 of the act.

The Conservation of Habitats and Species Regulations 2017 makes it an offence to deliberately capture, kill or disturb any animal protected under Schedule 2 of the regulations. It is also an offence to damage or destroy a breeding site or resting place of an animal, even if the animal is not present at the time.

### 2.2. Policy

The UK Biodiversity Action Plan (UKBAP) includes a list of 943 national priority species and 56 habitats of principal importance, with all species and habitats having specific action plans defining the measures required to ensure their conservation. Although the UKBAP has since been superseded by County Biodiversity Plans, it remains a useful point of reference.

The Calderdale Biodiversity Action Plan (Firman, 2003) includes a list of 16 priority habitats of local importance which are identified as most in need of conservation action. There are also 381 priority species identified within Calderdale, many of these are locally vulnerable and should be considered within land management and development plans.

Priority species identified in the Biodiversity Action Plan include brown long-eared bat, Daubenton's bat, whiskered bat, Leisler's bat, Natterer's bat, noctule and soprano pipistrelle bat.

Section 41 of the Natural Environment and Rural Communities Act (NERC) 2006 requires that any public bodies take into consideration any species and habitats listed in the UKBAP when implementing their duty and exercising any normal functions.

## 3. Methods

### 3.1. Data Search

Aerial imagery and other online sources were consulted in order to give an appraisal of the surrounding landscape.

The Department of Rural and Agricultural Affairs' (DEFRA) Magic Maps website and the Natural England website were consulted as to any land-based designations and protected/notable species within the site.

A data search with the local ecological record centre, West Yorkshire Joint Services (WYJS), was undertaken.

### 3.2. Phase 1 Habitat Survey

The habitat survey and mapping exercise was carried out over three days, the 1<sup>st</sup> of July, 22<sup>nd</sup> August and 24<sup>th</sup> of August.

The survey was undertaken by Amy Reddick BSc (Hons) MSc Grad CIEEM and David Watts BSc (Hons) MCIEEM, both ecologists experienced in carrying out habitat surveys.

The study area was surveyed in accordance with UK Habitat Classification (UKHab) (2018) guidelines. Habitats types were assigned a primary code to a hierarchical level of at least two and secondary codes to further clarify the habitat. Notes were made identifying important species, along with the presence of potential habitats for any protected or notable species.

Habitats and species present on or adjacent to the site were assessed using CIEEM's (2018) guidelines. Ecological features were classed as being of either international, national, regional, district, local or of low importance (see table 3.1).

**Table 3.1 Importance of Ecological Features**

Value of feature	Key examples
International	Internationally designated sites (SPA, pSPA, SAC, cSAC, pSAC, Ramsar site, Biogenetic Reserve, or an area which meets designation for such sites. Internationally significant and viable areas of a habitat type listed in Annexe 1 of the Habitats Directive. Any regularly occurring, globally threatened species. A regularly occurring population of an internationally important species, which is threatened or rare in the UK.
National	A nationally designated site (SSSI, NNR), or an area which has met the published selection criteria. A regularly occurring significant number/population of a nationally important species (e.g. listed on the Wildlife and Countryside Act 1981 (as amended)). A feature identified as being of critical importance in the UK BAP.
Regional/County	Viable areas of key habitat identified in the regional or county BAP. A regularly occurring significant population/number of any important species important at regional/county level. Sites of conservation importance which exceed the district selection criteria but which fall short of SSSI selection guidelines.



Value of feature	Key examples
District	Areas of habitat identified in District/City/Borough BAP. Sites that the designating authority has determined meet the published ecological selection criteria for designation. Sites/features which are scarce within the District/City/Borough. A regularly occurring significant population/number of any important species important at District/City/Borough level.
Local	Areas identified in a Local BAP. Sites/features which are scarce in the locality or which are considered to appreciably enrich the habitat resource within the local context (e.g. species-rich hedgerows). Local Nature Reserves. Any populations, species or habitats of local importance.
Low/Site	Habitats of moderate to low diversity which support a range of locally and nationally common species, the loss of which can be easily mitigated.

### 3.2.1. Constraints

Although the survey was undertaken in the optimal time for habitat surveys, some species may not have been present at the time of the survey.

Due to the extremely dry summer during 2018 many ephemeral wet areas may not have been present during the survey.

Several large areas were unable to be accessed during the surveys. These areas may contain habitats of importance to Sowerby and are not included within this report. Areas which were not surveyed include:

- Residential gardens at Field house and Mill Pond house.
- The quarry on Bowood Lane.

## 4. Results

### 4.1. Desk based study

#### 4.1.1. Designated Sites

Magic Maps (DEFRA, 2018) and WYJS identified no designated areas within the study area. WYJS identified three designated sites within 1km of the study area, including;

- Norland Moor/Northdean Wood, a Local Wildlife Site (LWS), Site of Geological or Ecological Interest (SEGI) and Local Nature Reserve (LNR) consisting of a semi-natural woodland and an extensive area of dry heathland and acid grassland which is located 860m to the southeast of the site boundary.
- Rochdale Canal, an LWS comprising a stretch of the Rochdale Canal located 50m to the north of the site boundary.
- Rough Hey Wood, an LWS consisting of ancient woodland and beech plantation located 250m south of site boundary.

#### 4.1.2. Habitats

The land use within the study area is predominantly rural agricultural farmland and suburban residential with some woodlands located towards the north and southeast on the valley slopes. Tree cover in the area is intermediate, with several patches of woodland, linear areas of trees and hedgerows throughout the area.

Magic Maps (DEFRA, 2018) hold records of several notable habitats within the study area and within 1km of the study area, including:

- One upland heath, which is located 860m to the southeast of the study area.
- One Ancient Woodland habitat, which is located 250m south of the study area.
- Fifty deciduous woodland habitats, of which nineteen are located within the study area.

#### 4.1.3. Bats

Ten species of bat have been recorded in West Yorkshire, including Brandt's bat *Myotis brandtii*, Daubenton's bat *Myotis daubentonii*, whiskered bat *Myotis mystacinus*, Natterer's bat *Myotis nattereri*, Leisler's bat *Nyctalus leisleri*, noctule *Nyctalus noctula*, Nathusius' pipistrelle *Pipistrellus nathusii*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared bat *Plecotus auritus* (Harris and Yalden, 2008; personal observations).

**Table 4.2 Conservation Status of Bats in West Yorkshire**

SPECIES	UK BAP	IUCN RED LIST	UK POPULATION ESTIMATE (BCT 2010)	UK STATUS (BCT 2014)
Brandt's bat <i>Myotis brandtii</i>	N	Lower risk – least concern	15,000	Uncommon
Daubenton's bat <i>Myotis daubentonii</i>	N	Lower risk – least concern	560,000	Common
Whiskered bat <i>Myotis mystacinus</i>	N	Lower risk – least concern	64,000	Uncommon
Natterer's bat <i>Myotis nattereri</i>	N	Lower risk – least concern	148,000	Common
Leisler's bat <i>Nyctalus leisleri</i>	N	Lower risk – least concern	28,000	Uncommon
Noctule <i>Nyctalus noctula</i>	Y	Lower risk – least concern	50,000	Uncommon
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	Y	Lower risk – least concern	16,000	Uncommon
Common pipistrelle <i>Pipistrellus pipistrellus</i>	N	Lower risk – least concern	2,430,000	Common
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	Y	Lower risk – least concern	1,300,000	Common
Brown long-eared bat <i>Plecotus auritus</i>	Y	Lower risk – least concern	245,000	Common

Magic Maps (DEFRA, 2018) hold records of one granted European Protected Species Licences (EPSLs) for bats within 1km of the study area. The licence number is EPSM2012-5095, and allowed destruction of a resting place of common pipistrelle and soprano pipistrelle. The licence start date was the 11<sup>th</sup> December 2012 and the licence was valid until 1<sup>st</sup> February 2013.

#### 4.2. Phase 1 habitat survey

The site is composed of predominantly semi-improved neutral grassland used for agricultural purposes to the northwest and southwest of the site. The central and eastern sections were predominantly suburban residential with some recreational greenspace descending into woodland towards the valley to the south. General descriptions, approximate areas, ecological importance and notable species recorded are summarised below.

#### 4.2.1. Grassland

Three types of grassland habitats were identified within the study area. These include g1b upland acid grassland; g3c poor Semi-improved neutral grassland; and g4 modified grassland.

g1b Upland acid grassland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Regional	5.9	1.9%
Typical species observed		
<p>Crested dog's-tail <i>Cynosurus cristatus</i>, wavy hair grass <i>Deschampsia flexuosa</i>, cock's foot <i>Dactylis glomerata</i>, sweet vernal <i>Anthoxanthum odoratum</i>, common bent <i>Agrostis capillaris</i>, Yorkshire fog <i>Holcus lanatus</i>, meadow foxtail <i>Alopecurus pratensis</i>, soft rush <i>Juncus effusus</i>, sheep's sorrel <i>Rumex acetosella</i>, common vetch <i>Vicia sativa</i>, harebell <i>Campanula rotundifolia</i>, creeping thistle <i>Cirsium arvense</i>, meadow vetchling <i>Lathyrus pratensis</i>, tormentil <i>Potentilla erecta</i>, common knapweed <i>Centaurea nigra</i> and gorse <i>Ulex gallii</i>.</p>		
Summary		
<p>Several small areas of upland acid grassland were observed at centre of the western area of Sowerby on south facing slopes. These were predominantly fenced agricultural fields left unmown, ungrazed or lightly grazed by cattle. Wet flushes characterised by scattered rushes were common throughout. It is likely these fields were previously agriculturally improved via the applications of fertiliser but have naturally regenerated to acid grassland due to a lack of intensive management. Alternatively, they may be degraded areas of heathland which have been intensively grazed in the past. This habitat typically occurs on the edge of moorland habitats such as those found at nearby Soyland Moor, Rishworth Moor and Norland Moor.</p> <p>Fauna species recorded in these habitats by WYJS included linnet <i>Linaria cannabina</i>, curlew <i>Numenius arquata</i>, meadow pipit <i>Anthus pratensis</i> and skylark <i>Alauda arvensis</i> which are all Calderdale BAP species.</p>		

g3c Poor semi-improved neutral grassland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	132	43%
Typical species observed		
<p>Perennial ryegrass <i>Lolium perrene</i>, common bent, Yorkshire fog, cock's foot, false oat grass , meadow foxtail, sweet vernal, crested dog's-tail, hogweed <i>Heracleum sphondylium</i>, common yarrow <i>Achillea millefolium</i>, creeping buttercup <i>Ranunculus repens</i>, meadow buttercup <i>Ranunculus acris</i>, red campion <i>Melandrium dioicum</i>, red clover <i>Trifolium pratense</i>, white clover <i>Trifolium repens</i>, ribwort plantain <i>Plantago</i> , broadleaf plantain <i>Plantago major</i>, common dock <i>Rumex obtusifolius</i>, sheep's sorrel, common vetch, creeping thistle, common nettle <i>Urtica dioica</i>, lesser stitchwort <i>Stellaria graminea</i>, common dandelion <i>Taraxacum officinale</i>, common daisy <i>Bellis perennis</i> and ragwort <i>Jacobaea vulgaris</i>.</p> <p>Scattered trees included sessile oak <i>Quercus petraea</i>, Turkey oak <i>Quercus cerris</i>, ash <i>Fraxinus excelsior</i>, beech <i>Fagus sylvatica</i> and sycamore <i>Acer pseudoplatanus</i>.</p>		
Summary		
<p>The majority of the agricultural farmland to the northwest and southwest of Sowerby consisted of species poor semi-improved neutral grassland, frequently grazed by sheep, cattle or horses. This is grassland which may previously have consisted of either acid grassland or upland hay meadows which have been agriculturally improved via the application of fertilisers and intensive grazing or mowing regimes. This results in a higher soil fertility and a lower diversity of species, particularly of wildflowers, with more perennial weeds such as clovers, docks and nettle. Several fields close to The Breck towards the southwest of Sowerby had numerous mature scattered trees typical of wood pasture. Many of these individuals were either dead and decaying or had veteran tree features such as decay holes, dead wood and trunk cavities. These trees were comparatively older than most trees in the area.</p> <p>Species recorded in these habitats by WYJS included starling <i>Sturnus vulgaris</i>, meadow pipit, rook <i>Corvus frugilegus</i>, house sparrow <i>Passer domesticus</i>, stock dove <i>Columba oenas</i>, linnet, skylark, golden plover and curlew. Species observed during the survey in these habitats included black headed gull <i>Chroicocephalus ridibundus</i> and small tortoiseshell <i>Aglais urticae</i> butterfly.</p>		

g4 Modified grassland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Low	32	10.6%
Typical species observed		
<p>Perennial ryegrass, cock's foot, common bent, Yorkshire fog, ribwort plantain, common dandelion, common daisy, common dock, creeping buttercup, white clover, red clover and shepherd's purse <i>Capsella bursa-pastoris</i>.</p> <p>Scattered trees included: sycamore, common lime <i>Tilia × europaea</i>, beech, cherry <i>Prunus sp.</i> and ash.</p>		
Summary		
<p>Areas of modified grassland varied depending on location. To the west and north of Sowerby was highly improved agricultural farmland within areas of semi-improved grassland. These were enclosed fields which consisted predominantly of perennial ryegrass and were intensively managed usually via mowing regimes. Other modified grasslands were situated within the central suburban areas which consisted of suburban green spaces adjacent to houses, recreational parks and playing fields. Consistent features were a short well-maintained mown sward and low species diversity. Parklands and green spaces often included scattered trees, often planted mature sycamores or self-seeded saplings.</p> <p>Starlings were recorded in these habitats by WYJS. Rooks and barn swallows <i>Hirundo rustica</i> were observed utilising areas of modified grassland during the survey.</p>		

#### 4.2.2. Woodland

Three woodland habitats were identified within the study areal, including w1c Lowland beech woodland; w1g Other broadleaved woodland; and w1gc line of trees.

w1c Lowland beech woodland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	5.6	1.8%
Typical species observed		
Beech, sessile oak, ash, sycamore, holly <i>Ilex aquifolium</i> , bramble <i>Rubus fruticosus</i> , wood avens <i>Geum urbanum</i> , common bistort <i>Persicaria bistorta</i> and Himalayan balsam <i>Impatiens glandulifera</i> .		
Summary		
<p>Dodge Royd Wood, located to the southwest of Sowerby and adjacent to the River Ryburn, was predominantly composed of beech plantation woodland. Due to the dense shade cast by the beech trees, understorey vegetation was sparse. A disused railway line ran through the centre of the woodland parallel to the River Ryburn, although the railway tracks had been removed, steep railway bankings and bare ground were still present.</p> <p>Evidence of deer, badger <i>Meles meles</i> and fox <i>Vulpes vulpes</i> utilising the disused railway line were observed. A badger latrine was observed close to the centre of the woodland. Grey squirrels <i>Sciurus carolinensis</i> were observed utilising the beech trees.</p>		

w1g Other broadleaved woodland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local/Regional	19.5	6.4%
Typical species observed		
<p>Sessile oak, ash, sycamore, silver birch <i>Betula pendula</i>, beech, rowan <i>Sorbus acuparia</i>, grey willow <i>Salix cinerea</i>, goat willow <i>Salix caprea</i>, alder <i>Alnus glutinosa</i>, holly, hawthorn <i>Crataegus monogyna</i>, hazel <i>Corylus avellana</i>, elder <i>Sambucus nigra</i>, wych elm <i>Ulmus glabra</i>, black poplar <i>Populus nigra</i>, horse chestnut <i>Aesculus hippocastanum</i>, wayfaring tree <i>Viburnum lantana</i>, wild privet <i>Ligustrum vulgare</i>, bramble, wood sorrel <i>Oxalis acetosella</i>, common ivy <i>Hedera helix</i>, herb Robert <i>Geranium robertianum</i>, wood avens, hogweed, common bistort, common bracken <i>Pteridium aquilinum</i>, common vetch, nipplewort <i>Lapsana communis</i>, common nettle, rosebay willowherb <i>Chamaenerion angustifolium</i>, Japanese knotweed <i>Fallopia japonica</i> and Himalayan balsam.</p>		
Summary		
<p>Linear woodlands were present to the north of Sowerby near the active railway line and to the south towards the valley bottom. Other small areas of woodland were present in private gardens around large residential houses including Hough End House, Field House, and White Windows. Most of these were composed of secondary growth of immature and mature trees with no distinct dominant species. Introduced species such as beech and sycamore were common. Invasive species such as Himalayan balsam and Japanese knotweed were also frequent, particularly in woodlands close to the River Calder, the River Ryburn and the active railway line.</p> <p>East of Dodge Royd Wood, towards the southeast of Sowerby adjacent to the River Ryburn and Belmont Waste Recycling Centre, the species diversity was higher. Upland oak woodlands were located to the southwest of Sowerby and it is likely this area was also previously upland oak woodland which has degraded due to a lack of correct management. Unmanaged areas of woodland close to suburban areas had developed dense scrub and substantial deadwood.</p> <p>Species recorded in the woodlands by WYJS included badger, otter <i>Lutra lutra</i>, water vole <i>Arvicola amphibius</i>, chiffchaff <i>Phylloscopus collybita</i>, common frog <i>Rana temporaria</i> and small white <i>Pieris rapae</i> butterfly.</p> <p>Fauna species observed during the survey included black bird <i>Turdus merula</i>, robin <i>Erithacus rubecula</i>, tree creeper <i>Certhia familiaris</i> and evidence of badgers.</p>		



w1g6 Line of trees		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	5.1	1.6%
Typical species observed		
Sycamore, beech, sessile oak, horse chestnut and ash.		
Summary		
<p>Lines of tree were present in several of the meadows either planted as windbreaks or self-seeded. Notable lines of tree were those around Nether Ends Beck and the adjacent meadows. Several of these trees, particularly several large mature sessile oaks, had veteran features. Other lines of planted trees were located throughout the suburban areas particularly close to Ryburn Valley High School, where numerous large sycamores created a dense canopy.</p> <p>Goldfinch <i>Carduelis carduelis</i> were observed utilising a line of trees during the survey.</p>		

#### 4.2.3. Heath, scrub and wetland

Heath, scrub and wetland comprises significantly varied habitat types, four of which are present within the study area, including h1B5 Dry heaths and upland; h2 Hedgerows; h3d Bramble scrub; and fc2 upland flushes.

H1b5 Dry heaths and upland		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
District	0.3	<1%
Typical species observed		
Bilberry <i>Vaccinium myrtillus</i> , heather <i>Calluna vulgaris</i> , bramble, common bracken, raspberry <i>Rubus idaeus</i> , gorse, ash and sycamore.		
Summary		
<p>The heaths located in Sowerby were small and fragmented, predominantly located adjacent to the quarry on Bowood lane. The majority of heathland had likely been degraded into acid or neutral grassland due to agricultural improvement over the last century. The closest large areas of heathland were located at Norland Moor, 860m to the east of the Sowerby border.</p>		

h2 hedgerows		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	1.1	<1%
Typical species observed		
<p>Hawthorn, common bramble, field maple <i>Acer campestre</i>, blackthorn <i>Prunus spinosa</i>, hazel, sycamore, dog rose <i>Rosa canina</i>, elder, pedunculate oak, sessile oak, guelder rose <i>Viburnum opulus</i>, beech, cherry laurel <i>Prunus laurocerasus</i>, rhododendron <i>Rhododendron ponticum</i>, Leyland cypress <i>Cupressus × leylandii</i>, hedge bindweed <i>Calystegia sepium</i>, bittersweet <i>Solanum dulcamara</i>, broadleaved willowherb <i>Epilobium montanum</i>, butterbur <i>Petasites albus</i>, common nettle, cow parsley <i>Anthriscus sylvestris</i>.</p>		
Summary		
<p>Hedgerows were frequent throughout Sowerby, ranging from a mixture of ornamental and native species bordering residential gardens and streets to species diverse hedgerows bordering farmland. Most hedgerows within Sowerby contained either low diversity of native wood species or were composed of ornamental species. There were some good examples with over five woody native species present, the most notable being located on Well Head Lane to the west of Sowerby which contained eight native woody species. It is likely many of the lines of trees bordering farmland would previously have been maintained as hedgerows but had lapsed into rows of trees with gaps between due to a lack of management and penchant for containing livestock with wire fencing.</p> <p>Species recorded in the hedgerows by WYJS included small white and peacock <i>Inachis io</i> butterfly. Small white, gatekeeper <i>Pyronia tithonus</i> and speckled wood <i>Pararge aegeria</i> butterflies were observed utilising hedgerows during the survey.</p>		

hd3 Bramble scrub		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	2.7	<1%
Typical species observed		
<p>Common bramble, hedge bindweed, rosebay willowherb, Himalayan balsam, goat willow,</p>		
Summary		
<p>Scrub is the natural succession of grassland to woodland, and if left unmanaged most open habitats will become colonised by a mixture of shrubs, bushes and young trees. In Sowerby scrub habitats were relatively rare due to the regular maintenance of farmland and suburban green spaces. The largest area of scrub observed was to the south of Ryburn Valley High School towards Rochdale Road. Dense bramble, interspersed with sessile oak, turkey oak and goat willow had formed over the pre-existing grassland. Other areas of scrub in areas of wasteland and abandoned gardens were small and often interspersed with tall ruderal vegetation.</p> <p>Extensive evidence of badgers including tracks, latrines and foraging were observed within the scrub north of Rochdale Road.</p>		

f2c Upland flushes		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Regional	0.72	<1%
Typical species observed		
Soft rush, hard rush <i>Juncus inflexus</i> , sweet vernal grass, Yorkshire fog, sphagnum mosses and other bryophytes.		
Summary		
Small wet areas within grassland which are waterlogged for the majority of the year due to springs or groundwater. Species diversity was low and short as flushes were generally present in well grazed pasture.		

#### 4.2.4. Urban

Urban areas, comprising u1b Developed land, u1d Suburban mosaic of developed and natural surface and u1e built linear features.

u1b Developed land		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Low	5.3	1.7%
Typical species observed		
Invasive species such as Himalayan balsam and Japanese knotweed.		
Summary		
Commercial developed land was primarily present adjacent to the River Ryburn to the south of Sowerby. These areas were composed of a variety of industrial warehouses including Mill House Works and Belmont Recycling plant. Invasive plants were common throughout both adjacent to buildings and to the River Ryburn.		

u1d Suburban mosaic of developed and natural surface		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local	54	17.8%
Typical species observed		
Cherry laurel, Leyland cypress, buddleia, cherry, sycamore, common lime, apple, pear, plum, ornamental garden species.		
Summary		
<p>Suburban areas consisting of residential buildings, schools, churches and associated gardens, cemeteries and sports fields. Building styles varied from isolated old farm houses and barns of stone construction with traditional old-style tiled roofs to more modern red brick housing estates. A mosaic of sealed surfaces such as driveways, patios and car parks along with natural surfaces including gardens, communal green spaces, areas of wasteland and street trees. Street trees were almost exclusively sycamore with some common lime, cherry and ash. Mature trees were entirely absent from some areas of tightly built residential housing. There were several spaces within residential areas dedicated to producing crops including communal allotments and private gardens.</p> <p>Species recorded in developed areas by WYJS included hedgehog <i>Erinaceus europaeus</i>, red fox, common pipistrelle <i>Pipistrellus pipistrellus</i> and house sparrow.</p>		

u1e Built linear features		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Low	32.8	10.7%
Typical species observed		
Sessile oak, ash, sycamore, beech, silver birch, Himalayan balsam, Japanese knotweed, perennial ryegrass, cock's foot, Yorkshire fog, common bent, dandelion, common daisy, red clover and white clover.		
Summary		
<p>The Calder Valley train line connecting Leeds to Manchester runs along the north section of Sowerby, below the River Calder. The area around the railway was predominantly woodland growing on the steep railway embankments. Numerous roads also run throughout Sowerby, these are predominantly small rural lanes or suburban streets, the largest being the A58 Rochdale Road to the south. Ornamental hedgerows and grass verges commonly bordered roads with drystone walls bordering the majority of rural lanes.</p>		

#### 4.2.5. Rivers and lakes

Included r1 Ponds and r2a Rivers.

r1 Ponds		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Local/District	0.2	<1%
Typical species observed		
Ornamental species, yellow flag <i>Iris pseudacorus</i> , soft rushes, duckweed <i>Lemna minuta</i> , lily pad <i>Nymphaea sp</i> , common nettle, rose-bay willowherb.		
Summary		
<p>Several ornamental ponds were identified in residential gardens. These were predominantly small (Under 400m<sup>2</sup>) and several contained fish such as goldfish and koi carp. A number of ponds were identified on os maps within agricultural farmland and in the area of scrub above Rochdale Road however these were not identified during the survey. It is likely many of the ponds had infilled due to natural succession in response to a lack of management.</p> <p>A habitat suitability index (HSI) was undertaken to assess the level of suitable habitat available to great crested newts at two of the ponds (Pond 3 and Pond 4). The HSI indicated that these provided average to good habitat for great crested newts. There were several ponds indicated on OS maps which could not be assessed due to being located in private residential gardens.</p>		

Table 4.2 HSI Calculation for the ponds on the site

HSI Indices	Pond 3	Pond 4
SI <sub>1</sub> Location	Optimal (1)	Optimal (1)
SI <sub>2</sub> Pond area	400m <sup>2</sup> (1)	16m <sup>2</sup> (0.8)
SI <sub>3</sub> Pond drying	Rarely dries (1)	Never dries (0.9)
SI <sub>4</sub> Water quality	Moderate (0.67)	Good (1)
SI <sub>5</sub> Shade	10% (1)	0% (1)
SI <sub>6</sub> Fowl	None (1)	Minor (0.67)
SI <sub>7</sub> Fish	Absent (1)	Absent (1)
SI <sub>8</sub> Pond count	1.0/km <sup>2</sup> (0.6)	1.0/km <sup>2</sup> (1)
SI <sub>9</sub> Terrestrial habitat	Moderate (0.67)	Poor (0.33)
SI <sub>10</sub> Macrophytes	0% (0.3)	3% (0.7)
<b>HSI Score</b>	<b>0.78 (Good)</b>	<b>0.62 (Average)</b>

r2a Rivers

r2a Rivers		
Ecological value	Approximate area within site (ha)	Approximate percentage of site
Regional	1.77	<1%
Typical species observed		
Sessile oak, ash, sycamore, alder, Japanese Knotweed and Himalayan balsam.		
Summary		
<p>There are two rivers, the River Ryburn and the River Calder, and one beck, Nether Ends Beck, which pass through Sowerby. The surrounding habitats around all of the rivers and streams within Sowerby were woodland or lines of trees with only the River Ryburn having areas of development adjacent to its banks. Himalayan balsam was commonly found along stretches of all water courses and several large patches of Japanese knotweed were also observed particularly adjacent to the River Calder.</p> <p>Species recorded near to watercourses by WYJS included otter, water vole, American mink <i>Mustela vison</i>, dipper <i>Cinclus cinclus</i>, kingfisher <i>Alcedo atthis</i>, goosander <i>Mergus merganser</i> and grey heron <i>Ardea cinerea</i>.</p>		

## 5. Discussion

### 5.1. Birds

There have been nineteen bird species recorded within Sowerby since 2004 with thirteen records held by WYJS and six recorded during this survey. Of these, eleven were considered BAP species within Calderdale. Bird species present could be divided into three main groups: upland birds, woodland birds and riverine birds, with several other species considered generalists of a variety of habitats.

#### *Upland*

In-bye grassland is associated with upland birds and is an important feeding and nesting habitat for species such as curlew, meadow pipit, golden plover, linnet, skylark, twite *Linaria flavirostris*, hobby *Falco subbuteo*, snipe *Gallinago gallinago*, redshank *Tringa totanus* and lapwing *Vanellus vanellus*, all of which occur within Calderdale (Duke & Firman, 2015). In-bye grassland commonly refers to areas of agricultural farmland on the fringes of upland moor and heathland which includes upland acid grassland and much of the semi-improved neutral grassland within the Sowerby area. Within these habitats, different sward lengths are favoured by different species, with shorter grazed sward with tussocks favoured as a nesting habitat by curlew and lapwing. Hay meadows with a longer sward which have been left to seed for are important sites for linnet, skylark and golden plover (Winspear & Davies, 2005). Many of these species are only present in upland habitats over the summer breeding months, moving to the warmer lowlands over the winter period. The majority of grassland habitats within Sowerby were found to be in relatively poor condition with a very short even sward caused by agricultural intensification. Farmland 'mosaics' previously maintained by traditional rotational cropping, grazing and fallow years are often no longer necessary due to the applications of fertilisers (Marchant *et al.*, 1990). Nationally this has resulted in huge declines in upland species over the last 17 years including lapwing (-42%), curlew (-48%) and starling (-51%) (BTO, 2017).

#### *Woodland*

Woodlands provide a variety of nesting and foraging opportunities for birds. In Calderdale woodland birds of priority status include woodcock *Scolopax rusticola*, stock dove, turtle dove, long-eared owl *Asio otus*, green woodpecker *Picus viridis*, lesser spotted woodpecker *Dendrocopus minor*, tree pipit *Anthus trivialis*, song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, wood warbler *Phylloscopus sibilatrix*, willow warbler *Phylloscopus trochilus*, spotted flycatcher *Ficedula hypoleuca*, pied flycatcher *Ficedula hypoleuca*, raven *Corvus corax*, tree sparrow *Passer montanus*, lesser redpoll *Carduelis caberet* and bullfinch *Pyrrhula pyrrhula* (Duke & Firman, 2015). Of these only the stock dove has been recorded within Sowerby, reflecting perhaps both a lack of recording effort in the past and unfavourable woodland habitats. Changes in forest structure are common due to a lack of management and this was reflected in the lack of traditional upland oak woodland within Sowerby, in contrast the majority of woodland consisted of even-aged, dense canopy woodland with a lack of complex understorey vegetation. Generally, increased heterogeneity within woodlands is associated with higher abundances of bird species (Fuller *et al.*, 2014) with complex understorey vegetation and scrub providing nesting sites, cover and foraging opportunities (Gill & Fuller, 2007).

#### *Urban*

Other opportunities for breeding birds were found in urban areas with mature street trees offering good wildlife corridors throughout suburban areas. Common garden birds include black birds, robins, blue tits, great tits and goldfinches which will readily take advantage of fruiting street trees and bird

feeders in gardens. Other species such as the house sparrow and barn swallow rely on buildings to provide suitable nesting sites. These are often older properties with cracks in the walls and access into the roof, but any style of building will be readily utilised provided it has suitable features. Hedgerows are also an important resource both in urban areas and through agricultural farmland, allowing woodland birds such as song thrush *Turdus philomelos* and mistle thrush *Turdus viscivorus* to forage in open areas whilst remaining close to cover.

## **5.2. Bats**

Two main habitats were available to bats within Sowerby: woodlands and suburban areas. Although only common pipistrelle bats have been recorded within Sowerby, both brown long eared bat and Daubenton's bat have been recorded within 1km of the boundary. It is also likely that other generalist species of bats found in the wider surrounding area such as noctule and soprano pipistrelle are within Sowerby.

Woodland is utilised by all bat species found in West Yorkshire with some species such as noctule exclusively roosting within trees. In particular trees with veteran features are important roosting sites to bats where large suitable cavities can provide space for maternity colonies and small crevices, roosts for individual bats (Andrews, 2018). Within Sowerby, trees with veteran features were restricted to trees around Nether Ends Beck and the wood pastures around The Breck. Both of these areas also had good terrestrial links to the woodlands to the south of Sowerby allowing bats to access a wider area of suitable foraging habitat in the surrounding area.

Numerous common pipistrelle roost records were held by WYJS throughout Sowerby, both within rural farmstead buildings and houses in dense suburban areas. Pipistrelles will use almost any small cavity within a building with larger colonies clustering in open roof voids (Altringham, 2003). Other species are also likely to use the types of buildings present in Sowerby with brown long eared bats in particular often selecting large barns or farm houses with large voids in which they can fly in before emerging to forage. Bats within the suburban areas are likely to utilise wildlife corridors such as hedgerows and lines of street trees to commute from roosting sites to semi-natural foraging grounds such as woodlands.

## **5.3. Badgers**

Badgers are associated with woodland and scrub, but they will utilise a wide variety of habitats within their territory including agricultural farmland and urban areas. Badgers typically live in groups of four to eight adults and occupy a territory of between 20-100ha (Roper, 2010). Most badger territories contain more with one sett, with a main sett used for breeding and outliers used intermittently. Setts are usually constructed on sloping ground either within or close to woodland and scrub habitats on soft well drained soils. In Sowerby there are numerous suitable locations for badger setts (see Appendix 11) although none were identified during the survey, mainly due to the presence of obstructive dense scrub. Of all locations, the highest occurrence of badger activity was identified in a meadow which had overgrown with scrub above Rochdale Road.



#### **5.4. Otters**

WYJS hold records of otters on the River Calder and River Ryburn from the River Calder Otter Survey in 2008 (Marsheder *et al.*, 2008). Although no records are held in Sowerby since this, there have been recent sightings of otter on nearby stretches of the River Calder (personal observations). Both sections of the rivers within Sowerby are extensively wooded providing suitable habitat for otter and during the survey numerous bankside trees with extensive root systems suitable for holt creation were observed.

#### **5.5. Other mammals**

There is historical record of water vole in Sowerby dated 1997 close to the River Calder, however none have been recorded since. It is likely the local population is extremely small, if still extant, due to predation by American mink and a loss of natural wetland habitat.

Six records of hedgehogs were recorded within Sowerby, all within suburban areas. Suburban areas often offer a diverse habitat mosaic including gardens, allotments, sheds and outbuildings often with important features such as compost heaps, piles of twigs and garden cuttings. A single garden is not large enough to support a hedgehog, as individuals can roam up to 3km in a single night, therefore hedgehogs rely on links between foraging areas such as hedgerows.

#### **5.6. Reptiles**

Small areas of heathland which could provide suitable habitat for adder were present within Sowerby however these were small and fragmented, and it is not anticipated they could support a population. There are records of grass snake and slow worm within 1km of Sowerby and it is likely these are both present throughout Sowerby within suitable structurally diverse grasslands. Deadwood present within unmanaged woodland and wood pasture also offers good hibernation refugia for reptiles over winter (Gent & Gibson, 1998).

#### **5.7. Amphibians**

There are records of common frog within Sowerby and it is likely other common amphibians such as common toad, palmate newt and smooth newt also utilise the area. The presence of woodland and scrub habitats with deadwood offer suitable terrestrial habitat however, there were limited ponds identified within Sowerby which could provide breeding habitat for amphibians. Pond density within Sowerby is around 1.5 per km<sup>2</sup>, with the majority being well-maintained garden ponds with limited benefit to wildlife and limited terrestrial connectivity. As frogs are the most mobile amphibian, they are likely to be the most successful amphibian within the Sowerby area, able to colonise the widely spaced ponds available. Two ponds (Pond 3 and Pond 4) were assessed as providing above average habitat for great crested newts. Two large private gardens which may contain valuable ponds, Mill Pond House and Field House, were not surveyed due to access issues.

#### **5.8. Invertebrates**

Invertebrates were relatively under recorded within Sowerby with some records of butterfly species utilising the woodlands and hedgerows. There are numerous pollination opportunities for species including bees, butterflies and moths within Sowerby including woodland, hedgerows, and a mosaic of suburban gardens. Aquatic habitats are also present in the form of rivers and ponds.

The survey was not carried out by invertebrate specialists and therefore habitats for specific invertebrates were not noted.

## **5.9. Threats to habitats and wildlife**

### **5.9.1. Agricultural intensification**

With more pressure placed on agriculture in the UK due to increasing human populations, agricultural intensification is one of the biggest threats to grassland habitats and their faunal assemblages including birds, reptiles and invertebrates. Issues noted within Sowerby included:

- Hedgerows have been cleared to make better use of space, with wire stock fencing more commonly used to keep livestock.
- Changes in farming practice towards the production of silage with grasslands often cut earlier and more frequently preventing some species setting seed.
- Applications of fertiliser and pesticides have also resulted in a large loss of diversity.
- Over grazing is also a common problem with fields grazed at the same level of intensity year-round.

### **5.9.2. Lack of management**

Although over management can be an issue for urban habitats and grasslands, a complete lack of management can have other repercussions especially in woodland, hedgerow and pond habitats including:

- Succession which had occurred over one of the ponds to the south of Sowerby resulting in woody growth and a loss of wetland habitat.
- Many hedgerows have been left unmanaged and as a result have grown into lines of evenly spaced trees.
- The woodlands within Sowerby are in an unfavourable condition due to a lack of management which has resulted in invasive species colonising several areas and a lack of structural and species diversity.

### **5.9.3. Urban development**

Continuous development in urban areas, on a small and large scale, can lead to significant losses of urban wildlife such as birds, bats and hedgehogs. Threats within Sowerby include:

- Loss of natural surfaces to create driveways and artificial grass gardens
- Limiting terrestrial connectivity due to loss of hedgerows and construction of roads or fences
- Light pollution
- Development of unmanaged “waste land”
- Conversion and renovation of old buildings and barns

## 6. Conclusion and Recommendations

### 6.1. Further surveys

#### **6.1.1. NVC of woodlands and grasslands**

As the surveys were undertaken between the end of July and August, many flowering species may not have been present, particularly within the woodlands. To better understand the habitats present and classify them to a higher level it is recommended that vegetation communities within selected woodland habitats are assessed according to the National Vegetation Classification. (NVC). Surveys should be undertaken between April and May to identify any species which were not present during the original survey and identify woodland based on the ground flora present. Woodlands suitable for NVC surveys are indicated on Appendix 8.

#### **6.1.2. Breeding bird surveys**

As there are a number of habitats suitable for nesting birds, further surveys would identify the species and numbers of birds utilising habitats within Sowerby. Yearly surveys of the same sites could be used to monitor ecological enhancement schemes and the health of habitats.

Two surveys should be undertaken in each area at least four weeks apart; the first between April and mid-May and the second between mid-May and June. Surveys should follow methods prescribed by Gregory *et al.* (2004) and Noble *et al.* (2000). All birds seen or heard during the survey should be recorded and any behaviour including territorial displays or nesting behaviour. This information can be used to establish how breeding birds are using features within habitats. Areas of interest to breeding bird surveys are indicated on Appendix 9.

#### **6.1.3. Bat transects**

Several habitats were identified as suitable for foraging and roosting bats. Only common pipistrelle bats have been recorded within Sowerby by WYJS but there is likely to be several others present. Bat transect surveys can inform the variety of species using an area and how it is being used. Surveys should follow Bat Conservation Trust guidelines (Collins, 2016). Surveys should be carried out between May and August in suitable weather conditions. A bat detector should be used to record all bat activity in the area including commuting, foraging and roosting behaviour.

In addition to bat transects, inspections of trees with potential roost features could be undertaken using an endoscope. This may necessitate an aerial tree inspection if the feature is higher than ground level. Inspections are best undertaken over winter to identify hibernating bat roosts. Areas of interest for bat surveys are indicated on map Appendix 10.

#### **6.1.4. Badger camera trapping**

Badgers are potentially utilising the overgrown fields above Rochdale Road to the south of Sowerby. To establish how badgers are using this area and the size of the population, camera trapping could be carried out. This should consist of monitoring the area and adjacent commuting routes with camera traps for a minimum of three weeks. Areas of interest to badger monitoring are indicated on Appendix 11.

#### **6.1.5. Otter surveys**

Previous otter surveys were undertaken in Sowerby in 2008 and these found evidence of otter utilising both the River Calder and the River Ryburn. Further surveys would establish whether otters are still present within Sowerby and comparisons drawn with the previous survey as to the extent of the population. Otter surveys can be undertaken at any time of the year, but spring, when thick vegetation does not obscure any potential evidence, is considered optimal. Surveys involve searching for signs of otters including spraints (dung), tracks, feeding remains and holts.

#### **6.1.6. Reptile surveys**

No records of reptiles within Sowerby were held by WYJS, however there are habitats present which are suitable for reptiles and it is likely there are populations of grass snake and slow worm within Sowerby. To establish the variety of species present reptile surveys could be carried out in suitable habitats. Surveys are best undertaken in April, May or September when reptiles are more easily detected. Surveys should consist of laying out artificial refugia (Usually squares of corrugated tin or roofing felt) and periodically checking these for reptiles.

#### **6.1.7. Pond surveys**

As two ponds (Ponds 3 and 4) were identified as providing at least average habitat for great crested newts, further surveys could establish whether great crested newts or other amphibians are present. Surveys could consist of either:

- An eDNA test, which can be carried out between mid-April and mid-June; or
- Presence/absence surveys which can be carried out between mid-March and mid-June, each of which should be at least one week apart. Methods used should include bottle trapping, egg searching and torchlight searching. Intrusive methods such as bottle trapping can only be carried out by a licensed great crested newt ecologist.

Of the two methods, physically searching the ponds is likely to identify all amphibian species present rather than exclusively great crested newts. Permission should be sought from the land owners where ponds are present before surveys are carried out.

### **6.2. Ecological enhancement opportunities**

#### **6.2.1. Woodland management plan**

##### *Invasive Species Management*

Invasive species such as Himalayan balsam and Japanese knotweed are particularly widespread in woodlands close to the River Calder, the River Ryburn and the active railway line. These have potential to become a major problem if left unchecked - smothering the ground and preventing the regeneration of young trees and native flora.

Himalayan balsam can be controlled via traditional non-chemical methods; perhaps most effectively by pulling up the plants before they flower and set seed. Organised removal of Himalayan balsam also provides an ideal opportunity for volunteer involvement, engaging the community within the management of local woodlands.

Japanese knotweed on the other hand - although rarely seeding in the UK - can regenerate from minute sections of rhizome, and therefore traditional methods of control are ineffective. Specialist professional companies can however, to a degree, ensure eradication and will subsequently dispose of the plant waste at licenced landfill sites.

### *Species Diversification*

In an effort to restore areas of upland oak woodlands to the south-east of Sowerby, adjacent to the River Calder, targeted thinning of shade tolerant species, such as beech *Fagus sylvatica* and sycamore *Acer pseudoplatanus*, will encourage natural regeneration of light demanding pioneer species, i.e. silver birch *Betula pendula* and rowan *Sorbus aucuparia* in canopy gaps. Selectively thinned trees can be 'monolithed', whereby a section of the stem is left standing so it can continue to provide ecological benefits through the provision of deadwood, a vital part of woodland ecosystems.

If longer-lived, light demanding native species – such as, sessile oak *Quercus petraea* and field maple - are also planted within these openings, pioneer species can act as 'nurse trees', providing shelter from the elements, as the slower growing longer-lived species establish (Starr, 2005).

### *Woodland Margins and Glades*

The creation of woodland glades in Dodge Royd Wood – through the removal of beech - which casts a dense shade and limit the development of ground flora – would also improve species diversity by providing alternative un-shaded or dappled shade habitats within the woodland.

This can be particularly effective if low level shrubs and trees – such as, hawthorn *Crataegus monogyna* and hazel *Corylus avellana* are planted along the woodland/glade transition zone.

Maintenance of woodland boundaries and glade is very different from habitat within a woodland and ideally should involve alternating cycles of mowing and coppicing, conducted during autumn and winter, in order to allow the full life cycle of plants and associated insects to be completed (Starr, 2005).

### *Suburban Woodland*

Woodland boundaries also should be managed from a safety perspective; large woodland edge trees which are positioned in close proximity to urbanised areas should be inspected for disease, decay or other defects on a regular basis.

Any work required on trees – including removals and/or pruning should be carried out by a fully insured and suitably qualified arboricultural contractor who is able to comply with BS3998: 2010 – Tree Works: Recommendations.

## *Biodiversity*

Dying and dead wood provide one of the greatest natural resources within woodlands, with many forms of wildlife depending directly or indirectly upon it, these include; beetles, flies, solitary bees, wasps, insectivorous birds and bats, alongside numerous fungi, mosses and lichens (Lonsdale, 2015).

Management of the woodlands within Sowerby should at the very least seek to conserve existing deadwood habitats, particularly in areas where its presence does not create a hazard to people or property. Ideally, a minimum of three fallen and three standing pieces of deadwood should be preserved per hectare of woodland (Starr, 2005). Any material removed from woodland trees during the conduction of remedial works should also be left on site, ideally in the position where it has fallen, and in as larger sections as practicable.

Bat boxes and bird boxes can also be used within woodlands to create artificial nesting sites which may not be present in an even aged woodland until appropriate management begins to take effect. These should be fixed to existing trees at least 3m from the ground, with clear flight paths to the entrances.

### **6.2.2. Grassland management plan**

#### *Allocating areas to improve*

As much of the grassland within Sowerby will be owned by a number of different individuals, consulting local farmers and landowners in the area is the best place to start when deciding target areas for improvement. It is impractical to expect large areas of restoration as restored grassland will inevitably be less productive than improved agricultural grassland and thus less commercially viable. However, if several landowners allocated a small percentage of their land to be restored and maintained with traditional farming techniques, this would create a mosaic of habitats of great value to wildlife (Galbraith, 1988). If entire meadows cannot be allocated to restoration, using borders on the outside of fields or small areas of disused farmland could provide an alternative.

#### *Replenishing the seed bank*

As the grasslands within Sowerby will have undergone years of agricultural improvement, the seed banks will be impoverished and even with traditional farming techniques it is unlikely that native species will naturally recolonise the area. Therefore, new seeds must be introduced into the grassland. This can be done via green hay sourced from a local donor site, although this may be difficult due to the rarity of upland hay meadows in the South Pennines. Alternatives include a native seed mixture obtained from a UK supplier such as Habitataid, Scotiaseeds or Wildseed. Attention should be paid to the original source of seed as seed derived from a distant source is often less successful (Auestad *et al.*, 2015). Advice on site and species selection could be sought from similar projects including Pennine projects and the Hay Time Project. At the very least the seed mixture should contain the species listed below in table 6.1.

**Table 6.1. Upland hay meadow species**

Common name	Binomial name
<b>Grass species</b>	
Common bent	<i>Agrostis capillaris</i>
Sweet vernal grass	<i>Anthoxanthum odoratum</i>
Quaking grass	<i>Briza media</i>
Crested dogtail	<i>Cynosurus cristatus</i>
<b>Wildflower species</b>	
Yarrow	<i>Achillea millefolium</i>
Pignut	<i>Conopodium majus</i>
Yellow-rattle	<i>Rhinanthus minor</i>
Lady's bedstraw	<i>Galium verum</i>
Meadow vetchling	<i>Lathyrus pratensis</i>
Wood crane's bill	<i>Geranium sylvaticum</i>
Cowslip	<i>Primula veris</i>
Great burnet	<i>Sanguisorba officinalis</i>

Techniques for sowing grassland and approximate sowing rates are included in Appendix 2.

#### *Reinstating traditional management*

Traditional farming techniques aim to diversify the species composition and sward structure. Applications of fertiliser and lime should be as infrequent as possible to prevent rapid growth of competitive species such as perennial ryegrass and clover.

Although intensive grazing and cutting of grassland can be damaging, they are also important in maintaining diversity. Grazing is particularly effective at opening bare ground important for basking reptiles whilst maintaining tussocks used by a variety of breeding birds. Scrub encroachment is also effectively controlled by grazing livestock particularly native breeds. Unlike grazing, cutting maintains an even sward but is important to allow native stress tolerant plants growth by removing taller competitive species. It is recommended a mixture of grazing and cutting are continued to be used in Sowerby on both restored grassland areas and existing grassland. If a rotational system of grazing, cutting and some fallow years is applied this would maintain a mosaic of habitats suitable for a variety of notable species. Landowners will have their own management regimes and it is recommended that they are consulted on the best way to arrange this.

It may also be necessary to remove large areas of injurious weeds classified under the Weeds Act (1959) such as common ragwort *Jacobaea vulgaris*, spear thistle *Cirsium vulgare*, creeping thistle *Cirsium arvense*, broadleaf dock *Rumex obtusifolius*, in addition to any invasive species such as Himalayan balsam and Japanese knotweed.

Recommendations for grazing, cutting and weeding regimes for hay meadow restoration are included in Appendix 2.

### **6.2.3. Enhancing urban areas**

#### *Maintaining wildlife corridors*

Gardens and urban areas are an important resource for species such as hedgehogs which require good terrestrial links for commuting and foraging. To enhance terrestrial connectivity within suburban areas of Sowerby, the boundaries of new developments could be divided with hedgerows. Within the community, residents could also be encouraged to plant hedgerows or to cut a hole approximately 15x15cm wide within fences to facilitate access. Residents could also be encouraged to create compost heaps or to leave garden cuttings such as twigs and branches in place over winter to provide hibernation opportunities.

Bats also commonly use suburban areas for commuting and foraging with noctule and pipistrelle bats often congregating around street lamps to take advantage of the invertebrates they attract. There are numerous street tree corridors throughout Sowerby which facilitate access for these bat species; however, other bats including brown long eared bat and most myotis species are generally less tolerant of light. These species may be cut off from potential foraging or roosting sites due to continuous lighting such as that along roads. To allow bats to continue to use wildlife corridors any lighting planned in these areas could follow recommendations prescribed by the Bat Conservation Trust (2018) including;

- The spread of light should be at, or near horizontal level.
- The times that lights are used should be limited to provide some dark periods.
- Light sources to be used should lack ultra-violet light.
- A warm white spectrum (Ideally <2700 kelvin) should be adopted
- Lights should peak higher than 550nm
- Streetlights can be located so that the rear shields are adjacent to habitats

#### *Enhance biodiversity*

The majority of street trees within Sowerby were sycamore. The lack of species diversity makes the population particularly susceptible to the impacts of species-specific pathogens. Species diversity could be encouraged by ensuring future planting follows a recommended composition of no more than 10% of any individual species, 20% of any genus and 30% of any family or the 10/20/30 rule (as recommended by Santamour, 1990).

A wide range of species should be considered for planting. These should consist of natives species, which are generally assumed to provide greater ecological benefits, and non-natives, which can be selected for their tolerance to the built environment and to notable pests and diseases. Suggested species for tree planting are shown in Table 6.2, below.

Trees planted should be sourced from UK grown stock. Trees should be standard in size and should be planted in accordance with BS8545: 2014 – Trees: from Nursery to Independence in the Landscape. Aftercare to ensure survival of trees planted for ecological enhancement will be required for a period of at least three years after planting.

In the interests of biosecurity, tree should be sourced from a local nursery. Trees should either be grown from seed within the UK, or if this is not possible to source, should be grown on in the UK for at least one year after import.



**Table 6.2. Suitable tree species for planting**

<b>Common name</b>	<b>Binomial name</b>
<b>Native species</b>	
Field maple	<i>Acer campestre</i>
Silver birch	<i>Betula pendula</i>
Downy birch	<i>Betula pubescens</i>
Hornbeam	<i>Carpinus betulus</i>
Aspen	<i>Populus tremula</i>
Wild cherry	<i>Prunus avium</i>
Rowan	<i>Sorbus aucuparia</i>
Sessile oak	<i>Quercus petraea</i>
<b>Non-native species</b>	
Indian bean tree	<i>Catalpa bignonioides</i>
Katsura	<i>Cercidiphyllum japonicum</i>
Maidenhair tree	<i>Ginkgo biloba</i>
Sweet gum	<i>Liquidambar styraciflua</i>
Tulip tree	<i>Liriodendron styraciflua</i>
Dawn redwood	<i>Metasequoia glyptostroboides</i>
Red oak	<i>Quercus rubra</i>

## 7. References

- Auestad, I., Austad, I. and Rydgren, K. (2015) Nature will have its way: local vegetation trumps restoration treatments in semi-natural grassland. *Applied vegetation science* 18(2):190-196
- Bat Conservation Trust (2018). *Bats and artificial lighting in the UK*. Bats and the Built Environment Series.
- Blakesley, D. and Buckley, G.P. (2016) *Grassland restoration and management*. Exeter: Pelagic Publishing, UK.
- BTO (2017). *The Breeding Bird Survey 2017*.
- Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> Edition)*. The Bat Conservation Trust, London
- Fuller, R.J, Bellamy P.E., Broome, A, Siriwardena, G.M (2014) *Effects of woodland structure on woodland bird populations with particular reference to woodland management and deer browsing*. DEFRA Project.
- DEFRA (2018) Magic Maps [online]. Available at: >[www.magic.defra.gov.uk](http://www.magic.defra.gov.uk)< [accessed 26<sup>th</sup> September 2018]
- Dietz, C., Helversen, O., Dietmar, N. (2011). *Bats of Britain, Europe & Northwest Africa*. A & C Black, London
- Duke, C.P, Firman, H. (2015) *A species audit for Calderdale*. English Nature.
- Firman, H. (2003). *Calderdale's Natural Heritage: A Biodiversity Action Plan for Calderdale*. Calderdale Council, Halifax.
- Galbraith, H. (1988). Effects of agriculture on the breeding ecology of Lapwings *Vanellus vanellus*. *J.appl. Ecol.* 25: 487-503
- Gent A.H. & Gibson S.D. eds, (1998). *Herpetofauna worker's manual*. Peterborough, JNCC – Chapter 6 Habitats and their management pp61-69
- Gent, T., Gibson S. (2003). *Herpetofauna Workers Manual*
- Gill, R. M., & Fuller, R. J. (2007). The effects of deer browsing on woodland structure and songbirds in lowland Britain. *Ibis*, **149**, 119-127.
- Google Earth Pro (2018). Google Earth [online]. Available at: >[www.google.co.uk/earth](http://www.google.co.uk/earth)< [accessed 26<sup>th</sup> September 2018]
- Harris, S., Yalden, D. (eds.) (2008). *Mammals of the British Isles: Handbook 4<sup>th</sup> Edition*. The Mammal Society, London
- Lonsdale, D. (2015) *Principles of Tree Hazard Assessment and Management*. The Stationery Office, London

Marsheder, R., Lavelle, B., Hillier, P. and Gray, T. (2008). *River Calder Otter Survey 2008*. West Yorkshire Ecology, Wakefield.

Mitchell-Jones, A.J. (2004). *Bat Mitigation Guidelines*. English Nature

Mitchell-Jones, A.J., McLeish, A.P. (2004). *Bat Workers Manual*. Joint Nature Conservation Committee

Oldham, R.S., Keeble, J., Swan, M.J.S., Jeffcote, M. (2000). Evaluating the suitability of habitat for the Great crested Newt (*Triturus cristatus*). *Herpetological Journal* **10** (4): 143-155

Roper, T.J. (2010). *Badger*. HaperCollins, London.

Santamour, F.S. (1990). Trees for urban planting: diversity, uniformity, and common sense. *Proceedings of the seventh conference of the Metropolitan Tree Improvement Alliance (METRIA)*, pp 57-65

Starr, C. (2005) *Woodland Management: A Practical Guide*. The Crowood Press Ltd, Ramsbury

Winspear, R., & Davies, G. (2005). *Management guide to birds of lowland farmland*. Royal Society for the Protection of Birds.

## Appendices

### Appendix 1: Photographs



Typical grazed pasture



Trees with veteran features near Nether Ends Beck



Trees with veteran features near Nether Ends Beck



Trees with veteran features near Nether Ends Beck



Upland acid grassland



Species rich hedgerow along Well Head Lane



Grazed rough grassland



Pond 1



Pond 3



Pond 4



Quarry on Bowood Lane



Deadwood in wood pasture



Tree with veteran features in wood pasture



Wood pasture



Scrub on meadow above Rochdale Road



Scrub on meadow above Rochdale Road



Disused railway through Dodge Royd Wood



Beech woodland



Typical grazed farmland



Woodland close to Belmont Recycling Centre

**Appendix 2: Grassland restoration and management schedule of works as suggested by Blakesley & Buckley (2016)**

Outline of work	Approximate timing of works
Survey fields to be targeted for restoration to determine suitability	May - June
Plough fields to remove existing vegetation and create substrate suitable for seed sowing.	Early summer (June – August)
Allow undesirable weed species in the seed bank (such as broadleaf dock) to germinate for one month before spraying with herbicide	August
Sow meadow with seed mixture (approx. 3g per m <sup>2</sup> or 30kg per hectare)	Mid-September – Mid-October
If feasible cattle should be released into the field to aid seed establishment via trampling	Immediately after seed is sown
Maintain short sward (<10cm) via regular cutting	October - March
Control large patches of weeds via mechanical methods or herbicide	April - July
Maintain the sward length at 5-10cm via cutting	Late July - December
Future management of the grassland should consist of low intensity grazing in winter/spring followed by cutting the grass for hay mid-July or early August. The sward should then be cut regularly or grazed until the end of the growing season.	Yearly
It may be necessary to introduce new seeds yearly until they are established. This should be assessed via regular surveys under taken before the field is cut.	Yearly



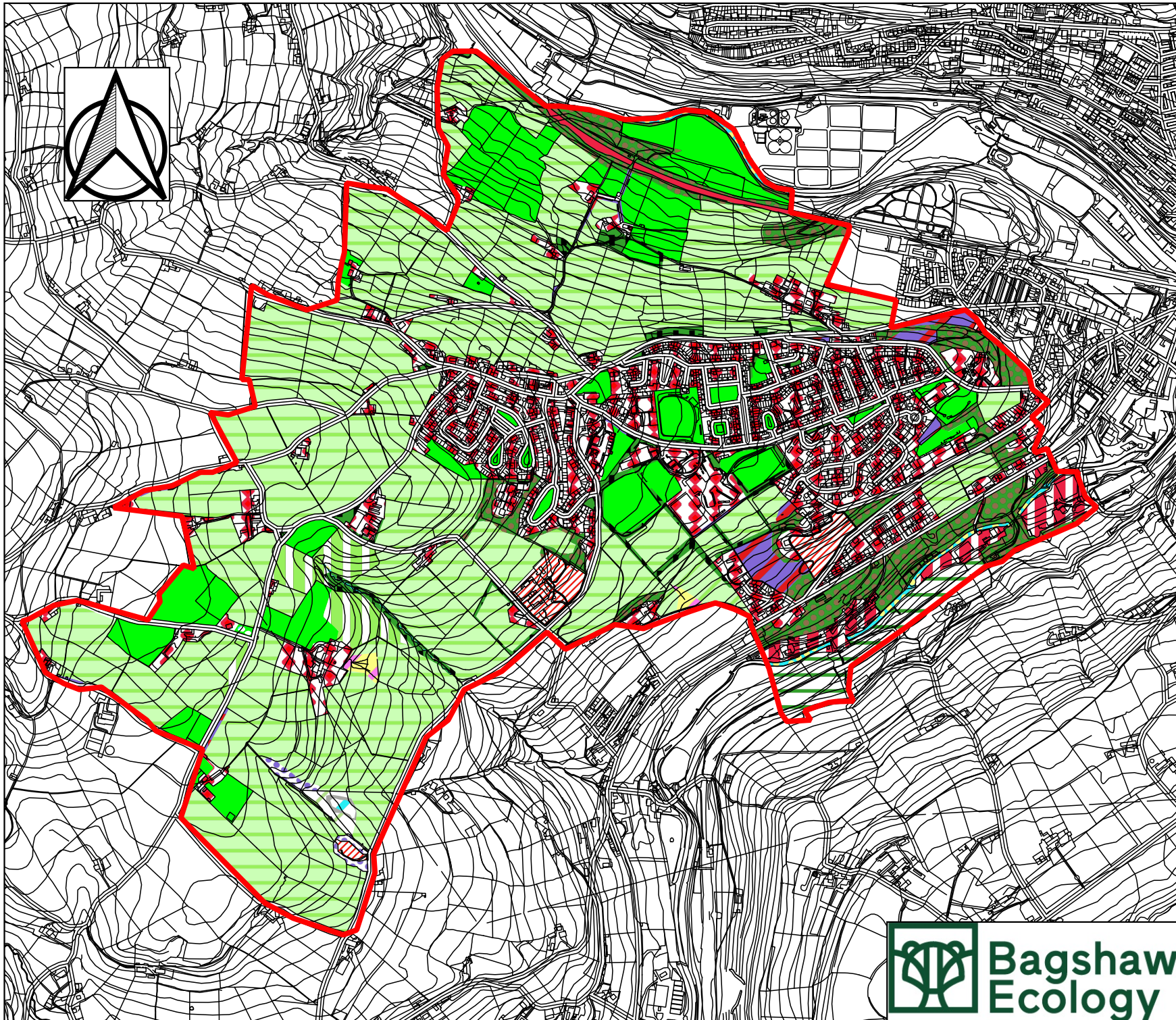
# Appendix 3: Phase 1 Habitat Map

Project: Sowerby neighbourhood plan

Drawn by: Amy Reddick

Date: 12th October 2018

0 250 500 m



 Sowerby boundary

Uk hab:

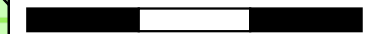
-  g1b - upland acid grassland
-  g3c - Poor semi-improved neutral grassland
-  g4 - modified grassland
-  w1c - beech woodland
-  w1g - other woodland-broadleaved
-  w1g6 - line of trees
-  h1b5 - dry heaths
-  h2a - Species rich hedgerow
-  h2b - other hedgerows
-  h3 - dense scrub
-  f2 - flush
-  u1b - developed land
-  u1d - suburban mosaic
-  u1e - built linear features
-  r1 - ponds
-  r2 - rivers and streams
-  Unsurveyed



# Appendix 4: Phase 1 Habitat Map West Section

Project:	Sowerby neighbourhood plan
Drawn by:	Amy Reddick
Date:	12th October 2018

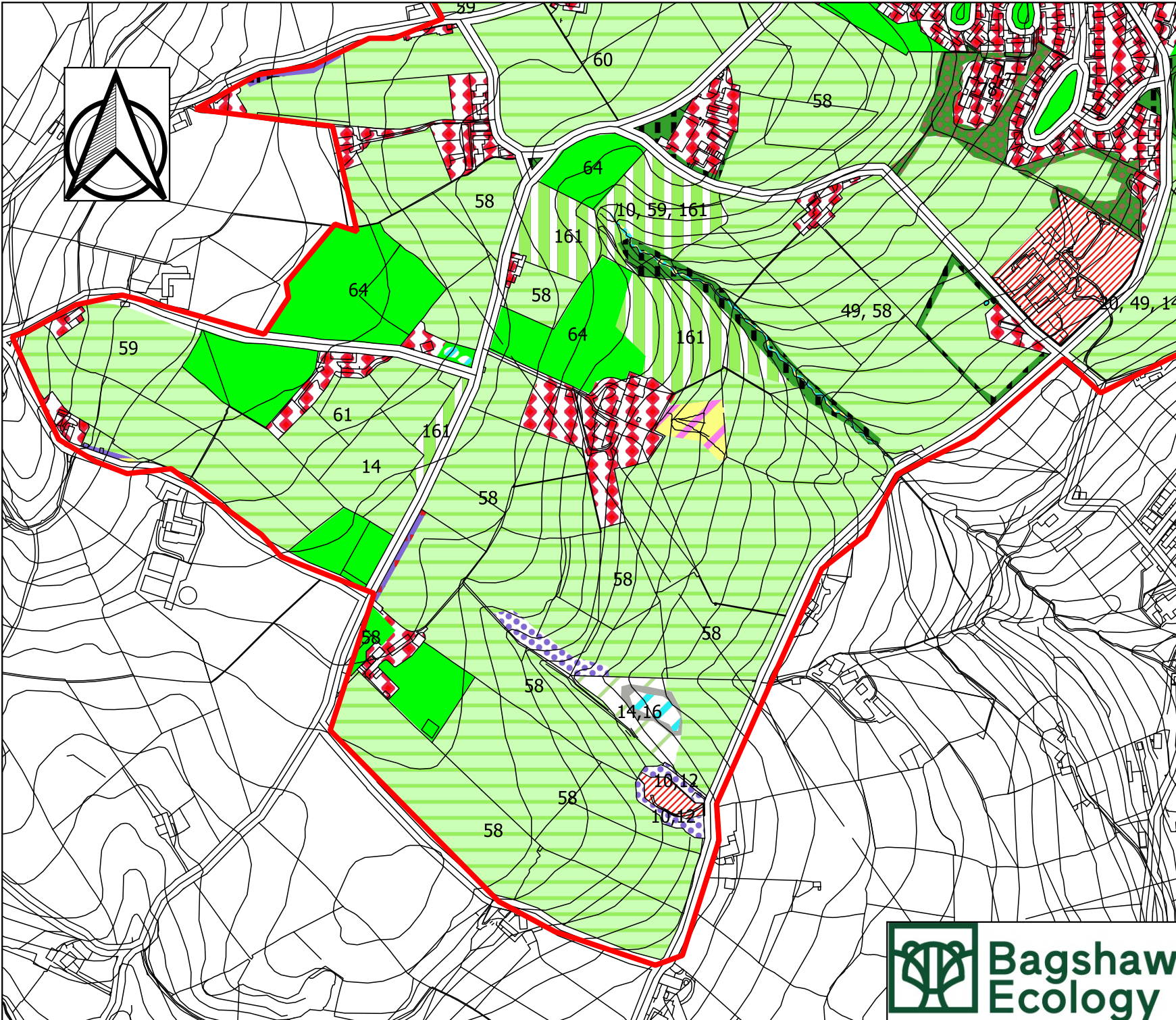
0 100 200 300 m



Sowerby boundary

Uk hab:

- g1b - upland acid grassland
- g3c - Poor semi-improved neutral grassland
- g4 - modified grassland
- w1c - beech woodland
- w1g - other woodland-broadleaved
- w1g6 - line of trees
- h1b5 - dry heaths
- h2a - Species rich hedgerow
- h2b - other hedgerows
- h3 - dense scrub
- f2 - flush
- u1b - developed land
- u1d - suburban mosaic
- u1e - built linear features
- r1 - ponds
- r2 - rivers and streams
- Unsurveyed



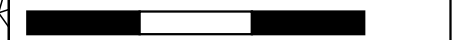
# Appendix 5: Phase 1 Habitat Map North

Project: Sowerby neighbourhood plan

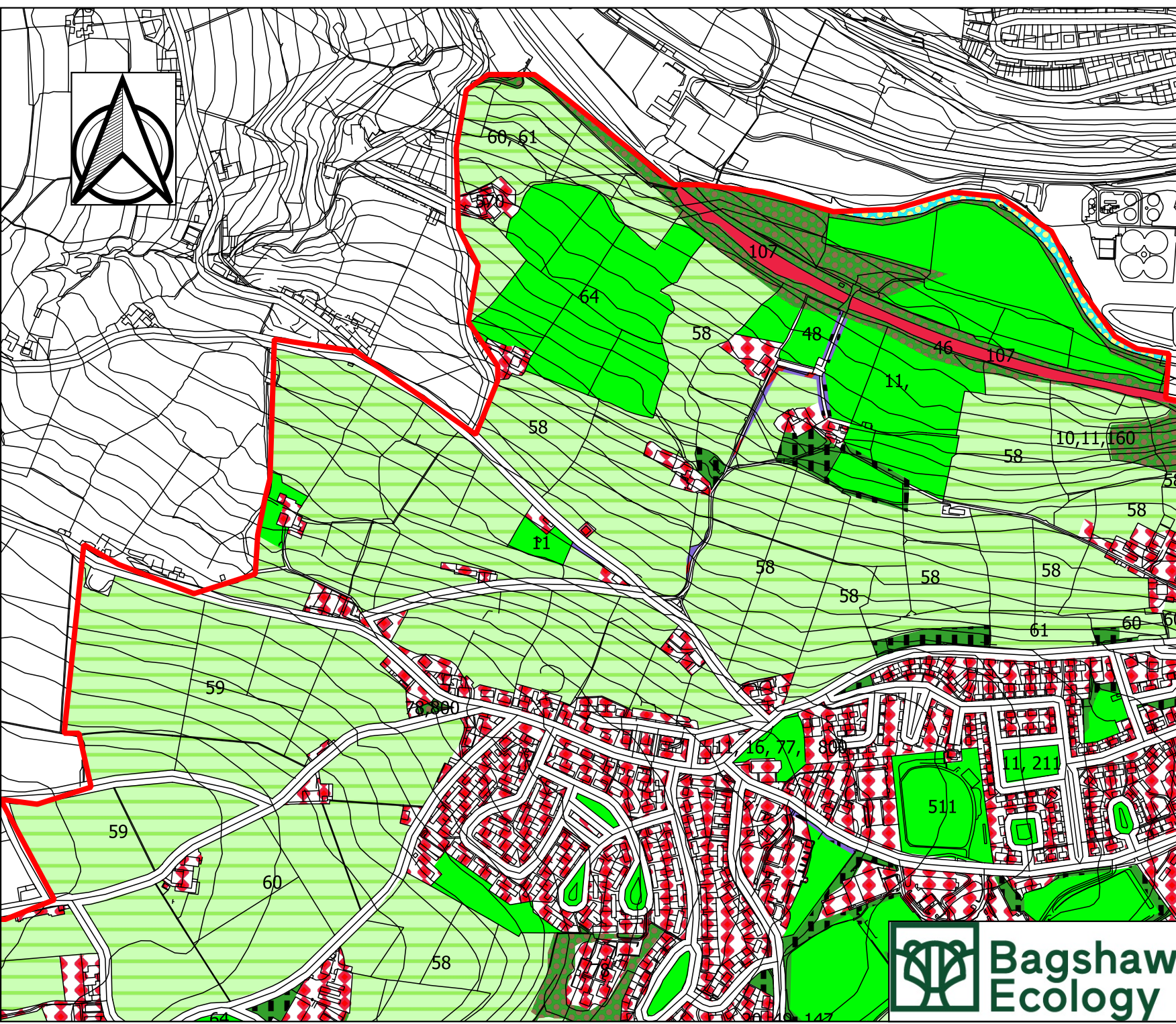
Drawn by: Amy Reddick

Date: 12th October 2018

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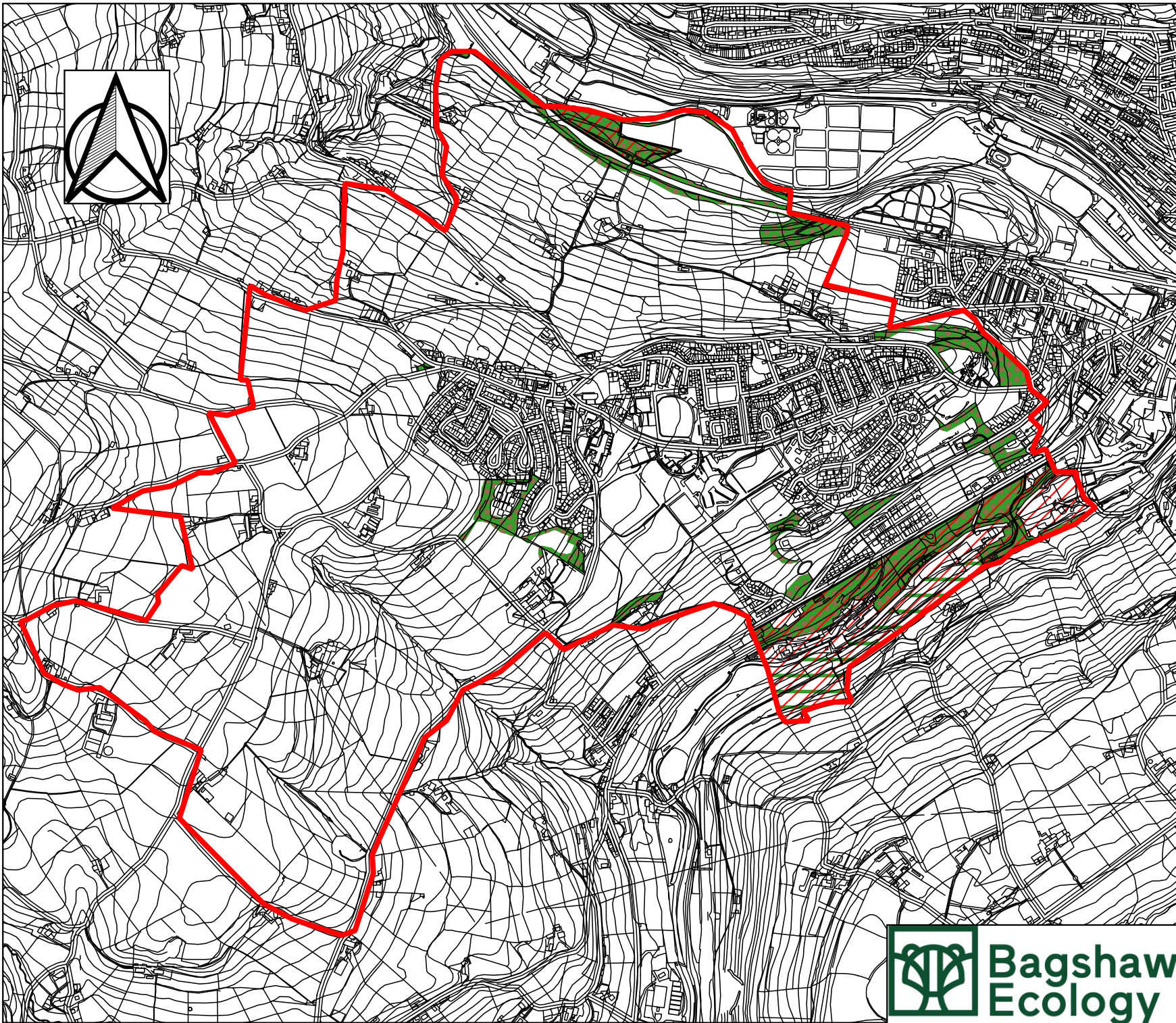
- Sowerby boundary
- UK hab:
- g1b - upland acid grassland
- g3c - Poor semi-improved neutral grassland
- g4 - modified grassland
- w1c - beech woodland
- w1g - other woodland-broadleaved
- w1g6 - line of trees
- h1b5 - dry heaths
- h2a - Species rich hedgerow
- h2b - other hedgerows
- h3 - dense scrub
- f2 - flush
- u1b - developed land
- u1d - suburban mosaic
- u1e - built linear features
- r1 - ponds
- r2 - rivers and streams
- Unsurveyed





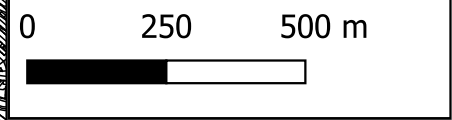
Appendix 7: Secondary codes used when mapping UK Habitats

Secondary code	Definition	Description
10	Scattered scrub	Non-woodland habitats that include patches of scattered scrub below 0.04ha
11	Scattered trees	Non-woodland habitat that include trees growing at low density with canopy cover <20%
14	Scattered rushes	Rushes ( <i>Juncus spp.</i> ) at low density in vegetation such as grassland or heathland
16	Tall herb	Stands of tall herbs such as rosebay willowherb, nettle and hogweed.
17	Ruderal	Patchy plant associations typical of unmanaged areas
20	Wood- pasture and parkland	Wood pasture/ parkland displaying one of the following characteristics; Open grown trees some of which have veteran features, scrub as individual plants or groups providing protection for trees or evidence of past land use for agriculture.
46	Railside	Land including rail embankments and cuttings between the rail track and rail corridor.
48	Non-native	Predominantly species which have been introduced by human action outside their distribution.
49	Veteran trees	Trees in the second or mature stage of live with important wildlife habitat features including; hollowing, decay fungi, large dead branches and dead wood.
58	Grazed	Managed by farm animals
59	Cattle grazed	Managed by cattle
60	Sheep grazed	Managed by sheep
61	Horse grazed	Managed by horses
64	Mown	Mechanised cutting or grass, bracken, tall herbs or shrubs.
77	Neglected	The habitat is not actively being managed and is likely to have been unmanaged for 3-10 years.
78	Abandoned	The habitat is not being actively managed and has not been for at least 10 years.
105	Quarry	A large deep pit from which stone or other material has been extracted
107	Railway	The rail track of an active railway
147	Fallen dead wood abundant	Fallen dead wood in woodland
161	Tall or tussocky sward	Tall swards with or without tussocks.
211	Pocket park	Small <1ha urban park with few facilities.
330	Scrub	Vegetation dominated by more or less closed canopy shrubs up to 5m in height.
570	Equestrian usage	Any land used for intensive horse keeping and riding.
800	Cemeteries and churchyards	Areas of open space associated with religious institutions.



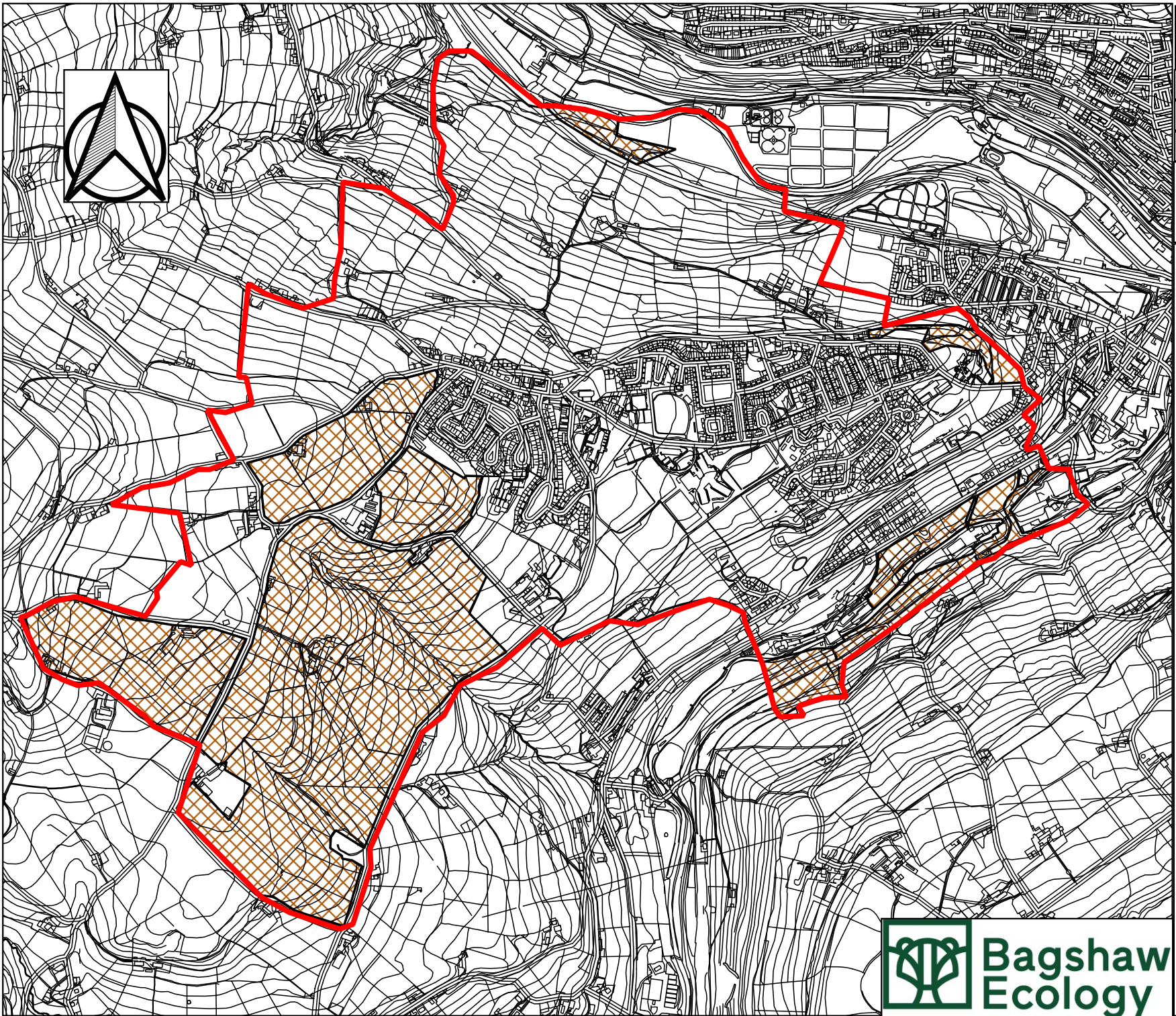
## Appendix 8: Areas of Woodland to survey

Project:	Sowerby neighbourhood plan
Drawn by:	Amy Reddick
Date:	12th October 2018



- Key**
- Sowerby Neighbourhood
  - Woodland NVC areas:
    - w1c - lowland beech woodland
    - w1g - other woodland-broadleaved
  - Woodland Habitats:
    - w1c - lowland beech woodland
    - w1g - other woodland-broadleaved



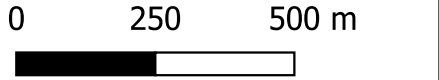


# Appendix 9: Bird Survey Areas

Project: Sowerby neighbourhood plan

Drawn by: Amy Reddick

Date: 12th October 2018

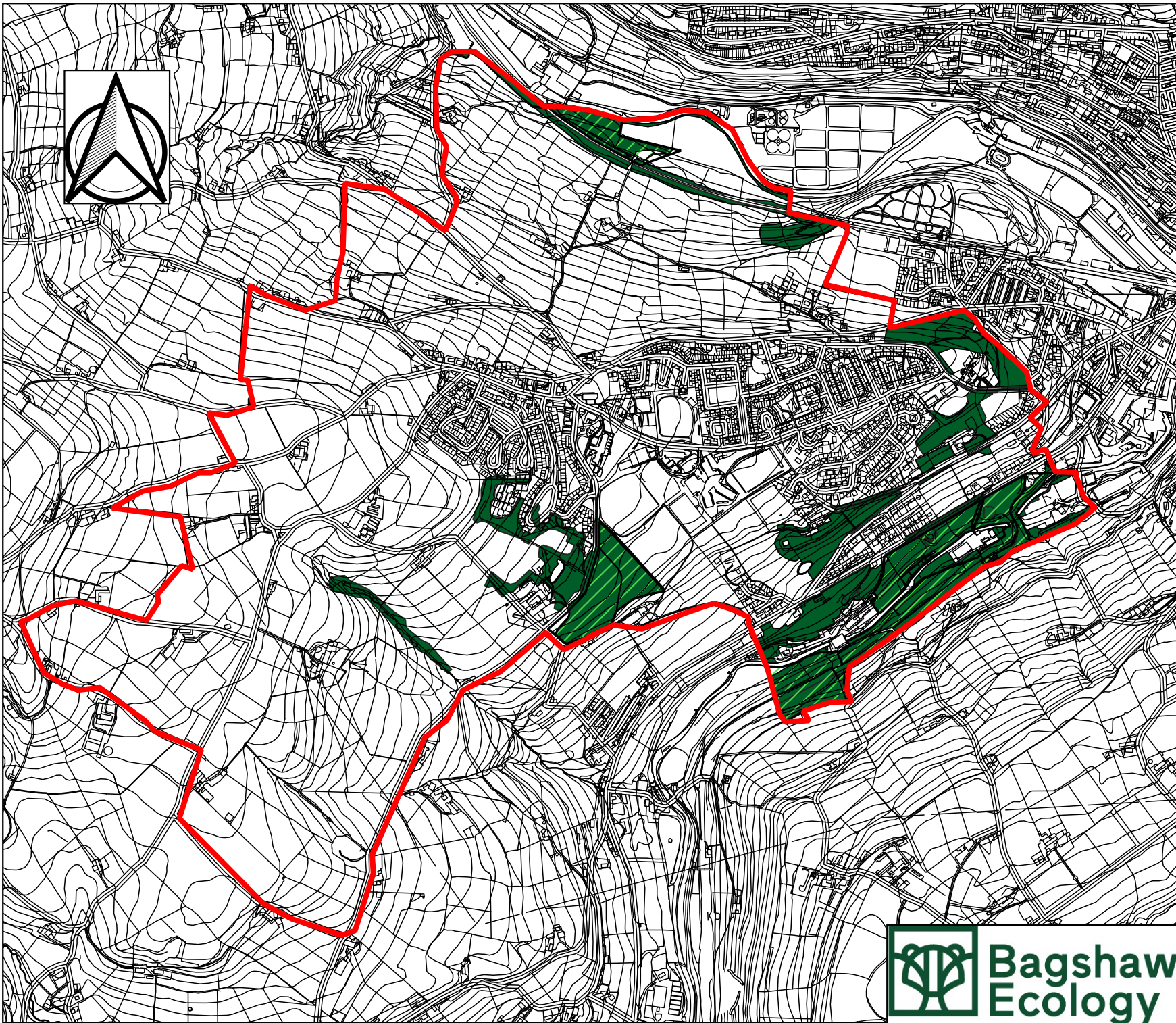


## Key

 Sowerby Boundary

Target bird survey areas:



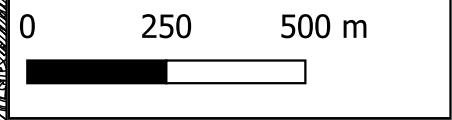


# Appendix 10: Bat habitat and survey areas




Project: Sowerby neighbourhood plan

Drawn by: Amy Reddick

Date: 12th October 2018

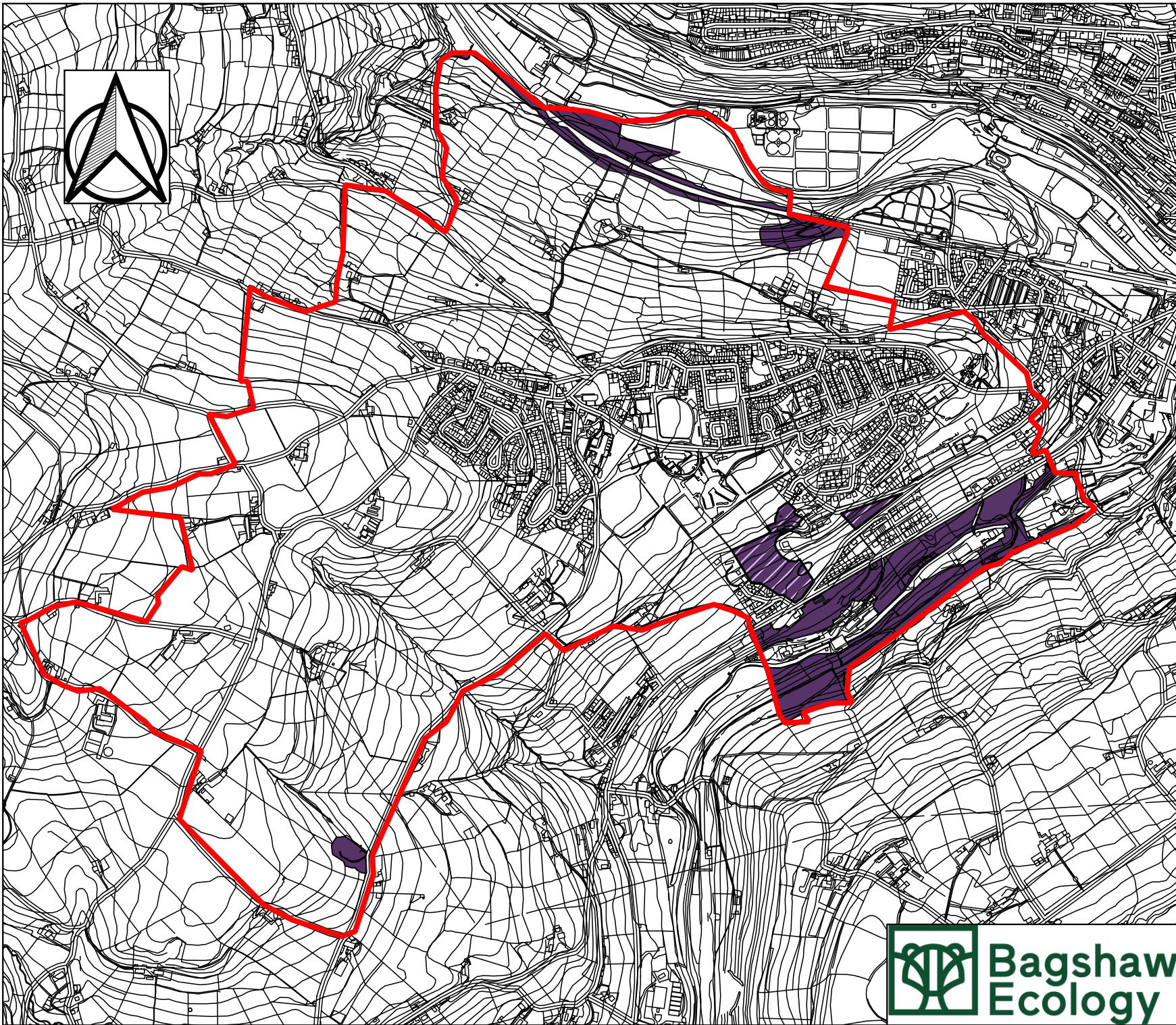


**Key**

-  Sowerby Boundary
- Target survey areas:  

- Potential bat habitat:  






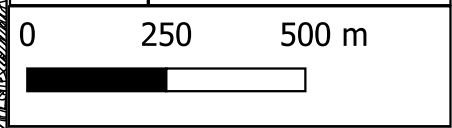




# Appendix 11: Badger habitat and survey areas

Project: Sowerby neighbourhood plan

Drawn by: Amy Reddick

Date: 12th October 2018



- Key**
-  Sowerby Boundary
  - Target Badger Survey Areas:**
    -  Potential Badger Habitat

