

Westbury Area Board: Pollinator Project

Wildlife Management Report and Schedule

Westbury: Leigh Park Way, Slag Lane, Edward Street, Avebury Close, and Bitham Park

Dilton Marsh: Landsdowne Close, Orchard Close, Village Green, and Fairwood Park Triangle

Edington: Parish Hall, Church Yard, Entrance to Village (Westbury Rd) and Berry Road

Bratton: The Orchard

Control Sheet

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1. Site Information

Site name	Westbury Area Board	
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Contact details	Name	Graeme Morrison
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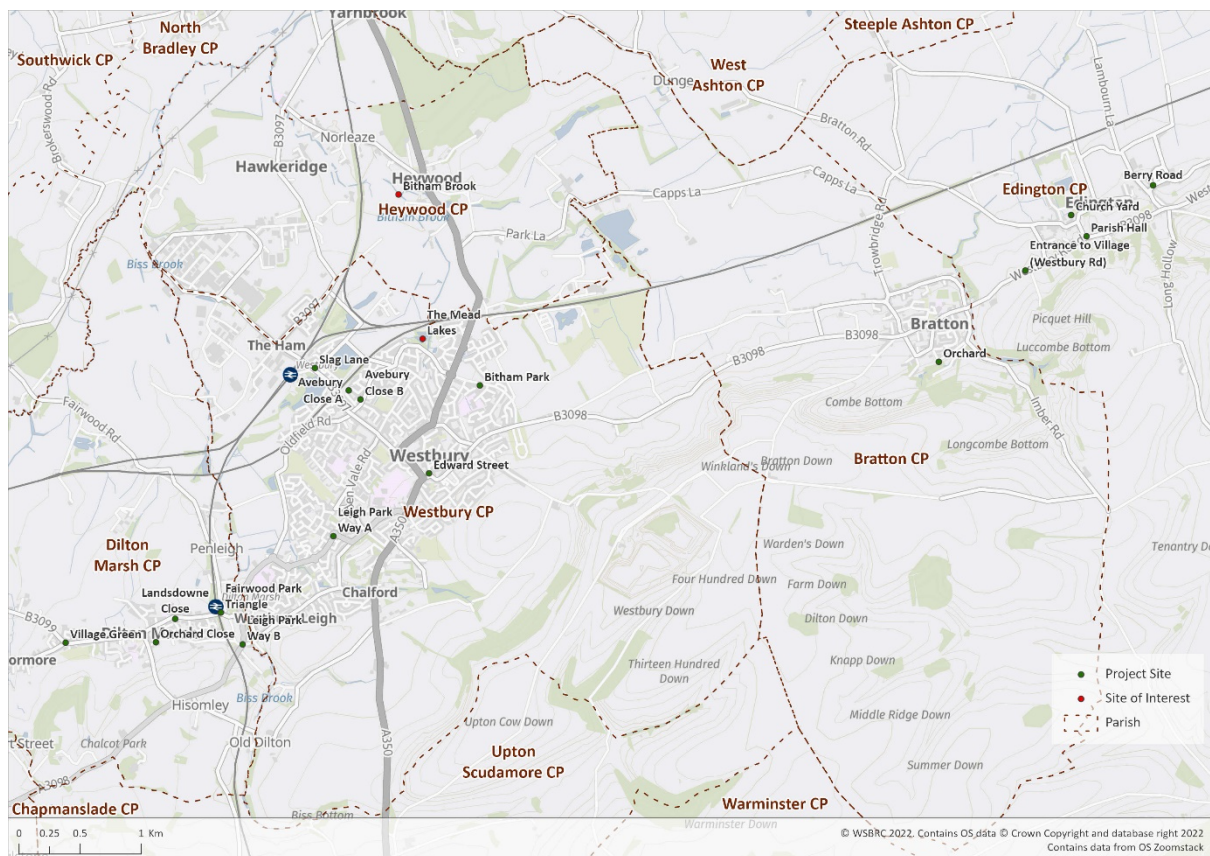


Figure 1: Annotated map of site locations (WSBRC 2022)

2. Introduction

2.1 Summary

Westbury Area Board contacted Wild Landscapes at Wiltshire Wildlife Trust in March 2022 with a brief of creating a comprehensive maintenance schedule for use across the council's suite of green space and natural sites. The focus of this schedule was to guide and support the managing partners to manage in a way that is beneficial to the wildlife that lives there, with a primary focus on creating wildlife corridors and supporting the local pollinator population.

This project is intended to expand and continue throughout the town of Westbury and its surrounding parishes. This initial 'phase one' of this includes 14 pilot sites that range from expansive roadside verges to small urban green space. These chosen sites have been grouped by location; these are as follows.

Westbury:

Leigh Park Way, Slag Lane, Edward Street, Avebury Close, and Bitham Park

Dilton Marsh:

Landsdowne Close, Orchard Close, Village Green, and Fairwood Park Triangle

Edington:

Parish Hall, Church Yard, Entrance to Village (Westbury Rd) and Berry Road

Bratton:

The Orchard

Wild Landscapes carried out site assessments of all these sites over the course of Autumn 2022

(Site specific information can be found in sections 5-8)

2.2 Purpose

Land management plans are produced to provide schedules of work, and to ensure sites are well managed for their defined purpose, and within capacity of managing partners.

In this case, the sites are a mix of valuable public green spaces, roadside verges and community ran projects with a selection used for recreation and leisure. The sites have also been assessed and evaluated for their benefits to local wildlife populations. Therefore, this maintenance schedule will aim to address management practices beneficial for both wildlife and people.

As mentioned above there is an overarching focus on supporting pollinators through the implementation of 'Wildlife Corridors' or 'Steppingstones' this not only relies on implementation of habitat enhancements but also education and community engagement. Due to the scale of the sites in phases one of this project, the aim is not to remedy the biodiversity crisis in one hit, but rather change the mindset of the local population, to empower communities to take their own action for nature.

2.3 Method

This land maintenance schedule has been informed by undertaking one site assessment visit and an ecological desk study. Close liaison with the local Parish Councils and volunteer groups using the sites was sought throughout this process. This report aims to provide well-considered maintenance options and recommendations that are applicable across the sites. This gives the individual managing partners agency to plan, develop and continue to improve the sites over the course of the next 5-year period, with the intention that these sites become 'stepping stones' or 'corridors' for ecological connection between the wider sites of ecological interest within Westbury Area Board's catchment and urban natural spaces.

2.4 How to Use This Report

2.4.1 Forward: For the purpose of this management plan, Year 1 refers to 1st November 2022 to 31st October 2023. Henceforth, each of the sites will be referred to as 'the site' when written in their respective sections, Westbury Area Board as 'WAB' and Parish Council as 'PC'. Although the term 'Green Space' has a designation attached, for the purpose of this report it will be used unchangeably with 'Natural Space' meaning an area of natural value, that is intended to be managed for ecological benefit.

2.4.2 Format: The report contains a large 'General Management Strategies' section. This section will inform managing partners on the best practise and to give further insight into strategies to support the management objectives. It is intended that managing partners will select what is suitable and in line with the capacity and budget of individual groups, then to create a site-specific maintenance schedule that can be used thereafter.

2.5 Foundation Information

2.5.1 Pollinators:

"We have pollinators to thank for every third mouthful we eat. Not only do they pollinate our food crops, but they're also vital for the survival of other wild plants that support so much of our wildlife." (*Wildlifetrusts.org 2022*)

Pollination is when a pollen grain moves from the anther (male part) of a flower to the stigma (female part) This is the first step in producing seeds, fruits, and future generations of plants. This process can take place through self-pollination, wind and water pollination or through the work of vectors that move pollen within the flower and from bloom to bloom. These vectors are the group called 'Pollinators'.

When people think of pollinators it is usual that the majority think of bees, however insect pollination is an extremely complex and diverse grouping. Honeybees are estimated to likely pollinate around 5-15% of the UK's insect-pollinated crops, meaning that 85-95% of the UK's insect-pollinated crops rely on wild pollinators. These include many species of bee, moth, butterfly, hoverfly, fly and beetle which all play an essential service in the UK. Pollinating £690 million worth of crops annually and giving invaluable support to our natural ecosystem these species are vital to the health of our global economy and natural and physical resilience.

Pollinator species are currently under threat and are in decline, this is a broad and complex area that has multifaceted reasoning, though the data shows irrefutably that species are rapidly declining or going extinct. "Three bumblebee species have become extinct in recent decades. The recent European Red List for Bees reports that almost one in ten species of wild bee face extinction, and over the past 50 years, half the bee, butterfly and moth species studied in the 2013 State of Nature Report have declined" (*Wildlifetrusts.org 2022*) Some of the problems that pollinators face are:

- Loss of suitable habitat- this includes forage, nesting and breeding sites. The amount and quality of flowering resources have declined due to the changes to agriculture practices, where suitable forage is available, it is often fragmented meaning it is harder for these species to expand and colonise new area.
- Climate change- is also affecting the geographical ranges which are suitable for these species. It has been shown that some bumblebees, butterflies, and moths are moving northwards, and with lack of suitable habitat in this area a decline is predicted.
- Pesticides and insecticides, including weedkillers – interfere with the ecosystem by removing natural food sources and prey species

2.5.2 Ecosystems and Biodiversity: Although this project aims to support pollinators specifically, it is key to understand that when looking at ecosystems you cannot isolate a group. Interdependence of species is at the core of ecology. You cannot change one thing without in turn changing another. This means that to support a specific group one must take a broader look and aim to factor in as many variables as possible, this whole ecosystem is dependent on biodiversity for its success. Therefore, when implementing strategies on the project sites, essentially anything that takes a step to support a natural process will find its way back into the support of pollinators. For example, influencing management of grass cutting, that therefore changes soil biology in a way to encourage wildflowers, will then encourage the plant species that the pollinators rely on.

2.5.3 Wildlife Corridors and Steppingstones: Creating wildlife corridors is a practise that is used within conservation and land management to support wildlife transition between habitats, often implemented to help species navigate human infrastructure and urban environments. These corridors can consist of wetlands, hedgerows, and grasslands that link a more expansive natural habitat to another.

This project uses a similar concept of steppingstones. Where long expanses of corridors are not appropriate small clusters of space managed to support wildlife become steppingstones to navigate between habitats. This begins to combat the problem of fragmentation by producing suitable habitat for foraging, nesting and breeding during pollinator species expansion. Within these urban environments, the steppingstones are often complimented by personal gardens, that can provide for wildlife.

2.5.3 Considerations for Managing partners: When creating habitat enhancements there is always an element of sourcing materials from offsite. It is recommended that wherever possible, sourcing is carried out as local as possible, with ethics and sustainability in mind, and ideally through a synergistic opportunity, e.g. A Tree must be felled locally due to safety reasons, the material is transported a short distance to then be turned into habitat enhancement.

2.6 Existing Species and Habitat

Wiltshire and Swindon Biological Records Centre have provided data sets and maps to indicate protected or noteworthy species and habitats that have been previously recorded within the WAB boundaries. The accompanying data set can be found as attached workbook, ‘**NotableSpecies WestburyAB**’ and additional maps not included in this section can be found in the appendices.

2.6.1 Habitat: Due to the nature of the project, it is important to understand the proximity to neighbouring sites of significant value or interest, to establish where steppingstones or corridors are to transition to and from. These sites can be statutory sites such as Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs), non-statutory designations such as County Wildlife Sites (CWS), or the unofficial acknowledgment of important habitats and species. These nearby habitats can also be used to give guidance on what is naturally found within the local landscape and will give guidance on suitable land management practices and indicators.

The map below shows all designations, protected areas and sites of interest within the WAB's boundaries. The Mead Lakes and Bitham Brook have been included as there are ongoing habitat enhancement projects being undertaken at the time of writing. As shown below, both Bratton and Eddington have considerable coverage of SSI land to the south of parishes, and Westbury and Dilton Marsh have sites of interest and designations to the North.

This is a positive starting point, as the wider landscape is clearly recorded and will aid with the habitat destinations that the corridors will be leading to. It is recommended that a strategic plan is put in place to place the sites most effectively in 'phase two' of the project, so that a more defined pathway starts to form as the project evolves.

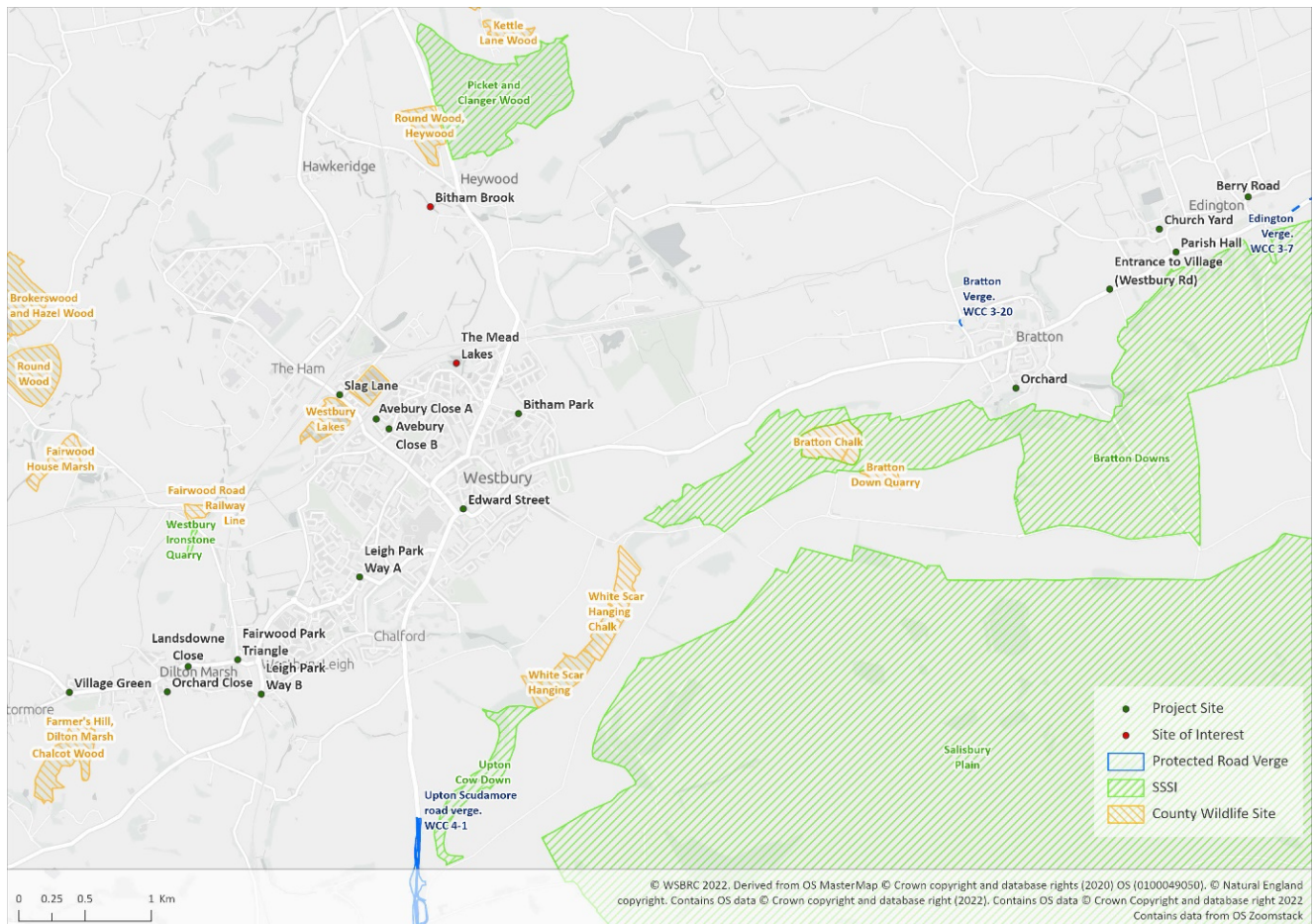


Figure 2: Annotated map of site locations in reference to other sites of interest (WSBRC 2022)

2.6.2 Combined Habitat Networks: *(The following data set, is aimed to be used at a strategic level to aid in the placement of future sites.)* This is a spatial dataset provided by Natural England that describes the geographic extent and location of Habitat Networks for 18 priority habitats based primarily, but not exclusively, on the priority habitat inventory with additional data added in relation to habitat restoration-creation, restorable habitat, plus fragmentation action, and network enhancement and expansion zones. The maps are created following a standardised process that incorporates a range of data layers and identifies specific locations for a range of actions to help improve the ecological resilience for each of the habitats/habitat networks.

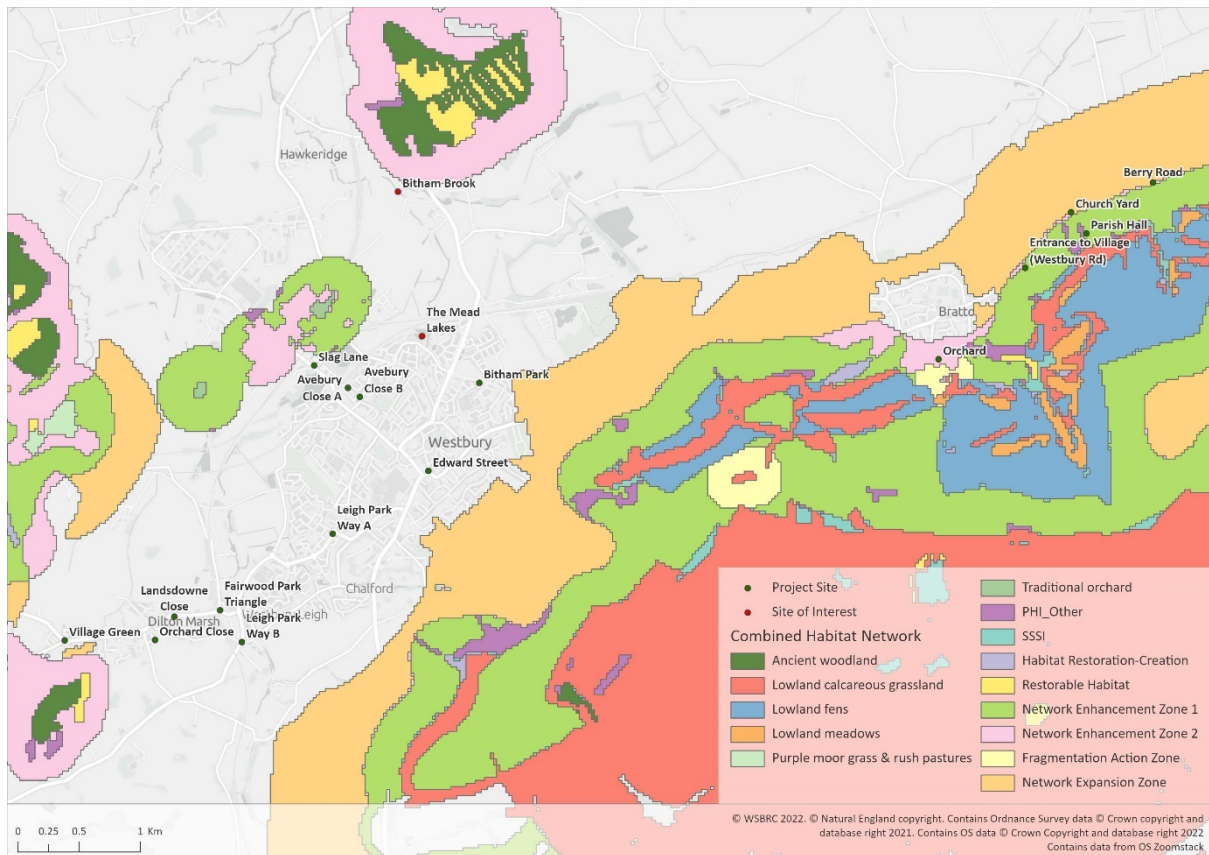


Figure 3: Annotated map of Natural England Habitat Zones (WSBRC 2022)

Habitat Components: The location of existing patches of a specific habitat for which the network is developed. This is termed the 'Primary habitat' e.g. lowland heathland. The main baseline data used for this is the Priority Habitat Inventories (PHI).

Network Zones: this is land within proximity to the existing habitat components that are more likely to be suitable for habitat re-creation. These areas are primarily based on soils but in many cases have been refined by also using other data such as hydrology, altitude and proximity to the coast. This is termed the 'Network Enhancement Zone 1'. Land within proximity to the existing habitat components that are unlikely to be suitable for habitat re-creation but where other types of habitats may be created, or land management may be enhanced including delivery of suitable Green Infrastructure. This is termed the 'Network Enhancement Zone 2'. Land immediately adjoining existing habitat patches that are small or have excessive edge to area ratio where habitat creation is likely to help reduce the effects of habitat fragmentation. This is termed the 'Fragmentation Action Zone'. Land within relative proximity to the Network Enhancement Zones 1 & 2 that are more likely to be suitable for habitat creation for the habitat and identifying possible locations for connecting and linking up networks across a landscape. This is termed the 'Network Expansion Zone'

2.6.3 Species: The map below shows the number of notable species per grid square around the project sites. This is an interesting and positive finding. It shows that all the sites fall within or have proximity to areas that have had many notable species found.

This information should be used to focus biological recording and be held in mind when planning future works in these areas.

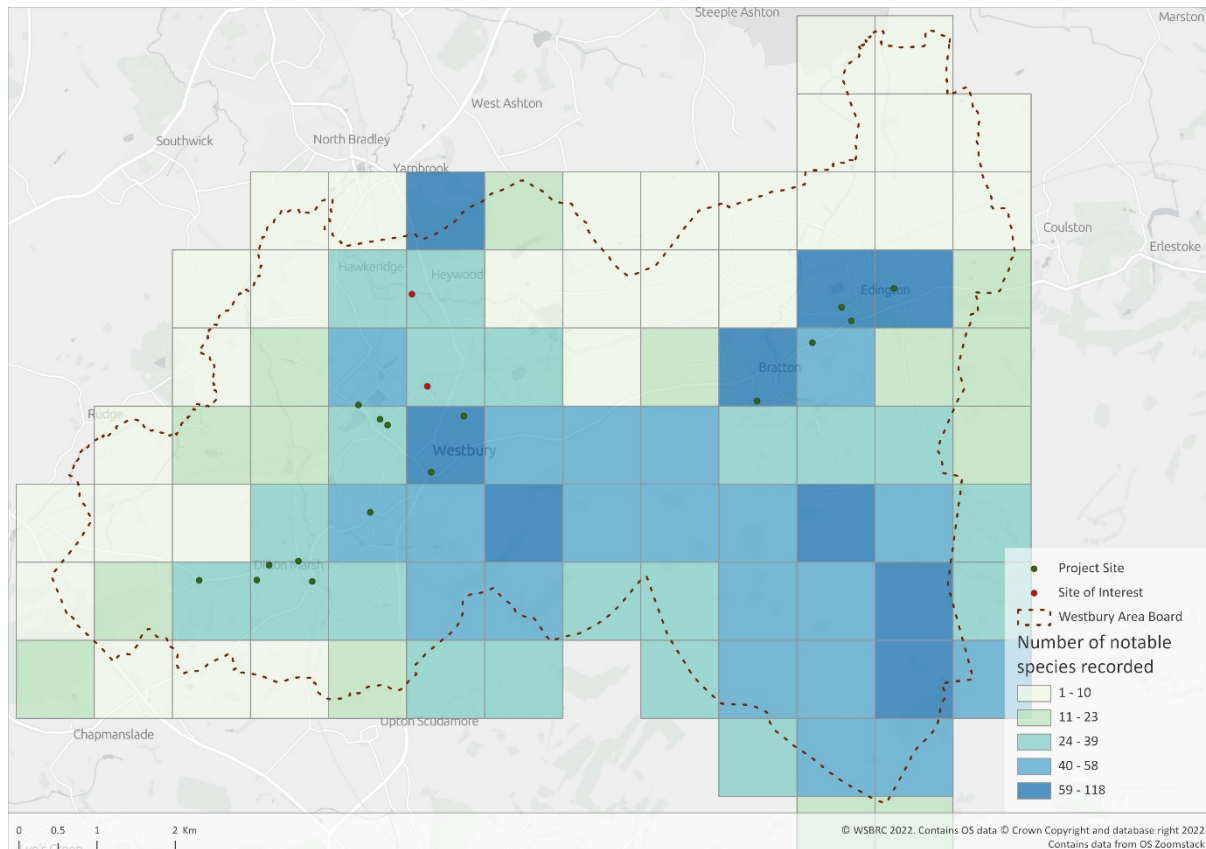


Figure 4: Map showing number of notable species per grid square (WSBRC 2022)

2.6.4a Protected Species: Protected species in Britain include many animals and plants that are legally protected under UK and European legislation such as the Wildlife and Countryside Act 1981 and Section 41 Natural Environment and Rural Communities Act 2006. Their presence on site can have significant implications for the timing and delivery of habitat management and conservation work.

There are several levels of protection depending on the relevant legislation, the species in question and its rarity. Full protection usually means that it is an offence to intentionally kill, injure or take a protected species and recklessly damage or destroy a nest, or place of shelter or rest for protected species whether intentional or not. There are exceptions to these rules.

2.6.4b Woodland Birds: All birds, their nests and eggs are protected by law under the Protection of Birds Act 1954 and the Wildlife and Countryside Act 1981. Therefore, it is an offence to carry out certain actions. These include:

- Intentionally kill, injure or take any wild bird.
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built.
- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.

Schedule 1 refers to the various schedules within the Wildlife and Countryside Act 1981. It is important to be aware of schedule 1 species across the sites, and if recorded protection strategies should be implemented. For example, fieldfare (*Turdus pilaris*), redwing (*Turdus iliacus*) and red kite (*Milvus milvus*) have all been noted in the areas of the sites.

This protection will have an influence on when work can be carried out in woodlands and hedgerows. It is usual to exclude tree work during the nesting season between 1st March and 31st August. An exception to this would be for work that was required immediately because of a health and safety risk.

2.6.4c Mammals: Mammals within the UK are protected under various schedules of the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2017. Badgers (*Meles meles*) are also protected under the Protection of Badgers Act 1992. No records of on-site badgers were found whilst conducting the record search, though the presence of badgers cannot be completely ruled out at sites because there were records within the 2km search area.

Governmental guidance on how to manage protected species and how to get a mitigation licence is available at this link: <https://www.gov.uk/guidance/manage-and-protect-woodland-wildlife#protected-species-checklists>

2.6.4d Bats & Roosts: Most bats in the UK evolved to roost in trees and around three quarters of British bat species are known to roost in trees. Trees provide shelter and attract a diverse range of insect species for bats to feed on. Since bats are not able to bore holes or make nests, they use whatever gaps are available such as cavities made by other birds and animals and the natural decay of the wood.

All UK bat species are protected under the Wildlife and Countryside Act 1981 and therefore, steps must be taken to ensure that any work to be carried out will not harm or disturb any bats. If there is potential for such harm, then permission must be obtained from Natural England prior to carrying out the work.

All trees should be surveyed to check for features which could be potentially used by bats for roosting such as: cracks, splits, cavities, rot holes, loose bark and dense ivy. Where the bat habitat potential has been identified as 'moderate' or 'high' and works specified in the management recommendations may result in disturbance, the contractor, who will have suitable training in assessing bat roosts, should undertake a more detailed secondary inspection to assess these features more closely before commencing with the work. If a bat or its roost will be affected, then a licence will be required from Natural England.

3. Overall Management Objectives

3.1 Management Objectives

- To begin to establish clear wildlife corridors/steppingstones across the Westbury Area Board with a focus on supporting pollinator species.
- To maintain biodiversity and ensure that existing features of ecological value are retained and protected in the long-term.
- To implement an appropriate management regime, maintaining and enhancing the existing habitats in a sustainable and efficient way.
- To create a range of habitat types, such as long grass, scrub, and hedgerow to give a 'matrix' of habitats and a variety of age structure that supports biodiversity and a multitude of species.

4. General Management Strategies

The management strategies detailed below are to be incorporated into a site/parish specific maintenance schedule and implemented at the managing partners' discretion. The application on these strategies will vary depending on the size and the habitat of the site.

4.1 Administrative

4.1.1 Training: It is advised that whenever manual work is carried out, workers have received the relevant training and tickets. Most strategies suggested are achievable through use of manual hand tools, however where brush cutters or mowers are needed, it is down to the managing partners to organise that all relevant training is undertaken, and to ensure that the practise is covered by your insurance provider.

Seek professional guidance on liability regarding to green space management.

4.1.2 Risk assessments: It is also highly recommended that each managing partner create a risk assessment for the proposed task, this ensures all eventualities are covered and prevention is put in place. The absence of a risk assessment in the event of an accident can be detrimental to any project. This risk assessment should include the training measures spoken of above as a precautionary step when using tools with high risk.

4.2 Volunteering

There are a range of managing partners involved with this project all with varying degrees of help and support in place, some with existing volunteer groups, some relying on parish council support, and then some relying on paid maintenance contractors. Establishing volunteer groups is an effective means of expanding the social impact and sense of ownership over of the site while also achieving previously unattainable management prescriptions due to capacity of managing partners.

There is guidance available through Wiltshire Wildlife Trust on creating, expanding, and successfully running a volunteer group, that can be accessed through the #TeamWilder website. Linking in with the #TeamWilder project could also open access to Trust fundraising staff. There may be specific funds available to help with habitat management projects, materials, ongoing costs or trees and wildflower plugs. Wiltshire Council Area Board have several funding pots that could be accessed. Funding options should also be discussed from the WAB side with the group directly.

4.3 Education and Engagement

It is often the general public's opinion that dictates the success of a project. When a community feel detached, or 'in the dark' around the purpose of a project, it is unlikely they will stand in support. It is often found that when changing the traditional management of urban green spaces to conservation/wildlife-oriented management some friction arises. This is normally due to the initial aesthetic appearance of a site undergoing new management.



Figure 5: <https://www.etsy.com/uk/listing/232890464/pardon-the-weeds-im-feeding-the-bees?>



Figure 6: Credit- Governor Whitmer and MDOT
Michigan

For example, when creating a perennial meadow, the first 1 or 2 years it can appear messy to a lot of the public, with long grass (compared to the traditional trim and proper lawn) or more “weeds” however projects that clearly state their purpose and work on engagement with the community often find that the project is received better. A sign explaining an area is designed to help bees and butterflies can go a long way. Not only does this outreach help generate support, but it can begin to inspire others to act, by get involved with the management of their local natural spaces or creating a space for wildlife in their own gardens. It is recommended that during this first stage of the project that managing partners work hard to generate awareness around the new management strategies and create as many educational aids to be included with the spaces as possible.

It is recommended that standardised signage is utilised, creating uniformity across the WAB area, this will allow for residents to see that there is a collective movement falling under the ‘Pollinator Project’ ran by the council. A ‘brand image’ can benefit projects significantly as it unites multiple managing partners and allows for there to be a larger collective working towards the end goal.

4.4 Health and Safety

Issues that relate to health and safety or welfare of staff or the general public should be reported immediately and actioned accordingly, continuous management prescriptions are to be issued and integrated into management schedule. In addition to the reported or immediately apparent issues, a ‘Site and Visitor Safety Assessment’ is recommended to be completed on an annual basis in line with Wiltshire Council protocol. These assessments can vary in time, depending on the size of the site and should aim to identify and address any Health and Safety issues, and enhance the visitor experience. This takes form as a standardised project that can be applicable and common to all WAB sites. These assessments are recommended to be completed on at least an annual basis. To complete a Visitor Site Safety Assessment a competent individual will need to walk the entire site and boundary, checking structures and features, for potential hazards. During the first assessment standard forms and maps, incorporating the permanent infrastructure and areas that need to be reviewed year on year, can be created to guide the assessment. These will need to be updated as new infrastructure is added or removed.

Procedure: Check and photograph all features noted and any other potential hazards. After undertaking the assessment, further time should be allocated to remedy of issues identified in the report.

Reports must be actioned. Any HIGH risks items should be dealt with immediately (rectified or satisfactorily secured or isolated) and brought to the attention of the appropriate Site Manager/Head of Section. Medium risks must be actioned within three months or Low within one year.

Records should be made and kept of all actions undertaken and resources (funding) should be planned to rectify any issues. Reports should be signed by the person undertaking the assessment and the Manager responsible for that site (if they are different). Actions must be signed and dated in the same manner.

Once completed a report must be generated and actions monitored. Trees are visually inspected when the annual Visitor and Site Safety Assessment (VASSA) is carried out and monitored separately during tree safety inspections. A template format for this assessment has been included in the appendices.

4.5 Tree Safety Inspections

Carrying out an inspection, as described here, allows the site holder to have a clear understanding of trees that pose a threat to public safety, those that are in ill health or vulnerable, while establishing a schedule of when these need attention again.

Training for 'Basic Tree Safety Inspection' can be provided by LANTRA, and allows for in-house routine tree checks, an example inspection form is provided in the appendices.

Tree Safety Inspections must be carried out by a competent individual. Trees requiring urgent action within the red zone should be dealt with as a matter of urgency. If there is uncertainty regarding tree health or for work on large trees, hung up trees or trees in difficult positions for felling or along a main road a professional assessment by a qualified tree surgeon should be sought.

Trees are zoned based on the following:

Red – roadsides, areas around buildings or other highly-used infrastructure e.g., dipping platforms, benches, footpaths, or tracks with very high traffic

Orange – all site boundaries, well-used paths

Green – paths used regularly by low numbers of people

A recommended survey frequency for each zone is:

Zone	Poor	Fair	Good	VSSA
Red	Urgent/immediate action (within 30 days)	6 months	2 years	Visual inspection
Amber	Urgent/immediate action (within 3 months)	1 year	3 years	
Green	Urgent/immediate action (within 6 months)	3 years	5 years	
No zone	Prior to task only			
After storm	Visual inspection			

4.6 Ash Dieback (*Hymenoscyphus fraxineus*)

It is important for all involved with the management of natural spaces to be aware of the current issues surrounding Ash trees.

4.6.1: Ash dieback is caused by a fungus believed to have originated in Asia. The introduction to Europe about 30 years ago has devastated the native European ash (*Fraxinus excelsior*) as the species did not evolve with the fungus and has not built-up natural immunity.

The fungus and its cycle can be better understood when broken into two stages.

- 1- The Fruiting/sexual stage- where it overwinters in leaf litter on the ground, particularly on ash leaf stalks, producing small white fruiting bodies between July and October which release spores into the surrounding atmosphere. The spores in search of new substrate/food land on surrounding leaves, at this stage still attached to the tree as the spring new growth.

- 2- The fungus then begins its colonisation of tree, from the leaf and then beyond. This results in blockages to the water transport systems, leading to lesions in the bark, leaf loss and the dieback of the crown. Eventually killing off sections of the tree internally and externally.

The tree can fight back, but repeated attacks year on year, weaken the tree. Trees may eventually drop limbs, collapse or fall. The symptoms are often easier to spot in mid-late summer when a healthy ash should be in full leaf. It becomes much harder in autumn when leaves are naturally changing colour and falling. Once a tree is infected the disease is usually fatal, either directly, or indirectly by weakening the tree to the point where it succumbs more readily to attacks by other pests or pathogens, such as honey fungus. These secondary pathogens can cause butt or root rot, leading to the tree falling. It is thought that a large majority of ash trees in the UK will eventually be lost. This is going to have a devastating impact on the landscape and the biodiversity of woodlands.

4.6.2 Management:

The first recommended step in dealing with Dieback is surveying and recording the ash on sites, this is advised to be worked alongside an ongoing 'Basic Tree Safety Inspection' (see below) and using a zoning system which will help to focus efforts on mitigating risk and demonstrates due diligence in event of an incident.

In places where infected trees grow beside roads and footpaths and are likely to pose a threat to public safety, the trees may need to be pollarded. In some cases, infected ash trees are removed completely for the safety of site users. In these cases, ecological surveys are important to check for the presence of protected species such as dormice and particularly bats, enabling the appropriate mitigation to be undertaken.

It is strongly advised you seek independent legal advice and create an 'Ash Dieback Strategy' that is bespoke to your organisation. Management must seek information on and follow Forestry Commission guidelines on felling licences.

4.7 Biological Recording

Biological recording by groups and individuals using the sites should be encouraged. All wildlife sighting records from surveys and the public should be submitted annually to the Wiltshire and Swindon Biological Records Centre (WSBRC). This can be done through the WSBRC website.

One very easy method of submitting biological data is via the iRecord website (<https://www.brc.ac.uk/irecord/>). This website has a smart-phone app and is run by the Biological Records Centres across the country. It is a very powerful, yet simple, way to get records to where they need to be.

In its simplest form each individual biological record contains four essential pieces of information: who identified the organism, the species name, where and when it was found. These are often called 'the four Ws' – who, what, where and when. High quality biological records provide evidence that an animal or plant was present in a particular place at a specific time. This is important because the data can be used to calculate population trends for species of conservation concern. In the context of the three sites, biological records will be most useful in relation to protected species such as badger (*Meles meles*) and hedgehog (*Erinaceus europaeus*) which must not be disturbed or injured during any land management work (see below).

4.8 Monitoring Opportunities

To further support biodiversity enhancement throughout the sited, basic monitoring is encouraged in order to inform future changes or amendments to practices. This could include but is not limited to:

- Hedgehog nest box monitoring
- Small mammal ink traps (hedgehogs)
- Bat detector surveys
- Bat box surveys
- End of season bird nest box checks
- Surveys for invasive species (Muntjac and grey squirrel)
- River floating clay raft

4.9 Habitat Enhancements

4.9.1 General: This section gives brief overviews and descriptions of a variety of habitat enhancements that would be suitable across the project sites. Many documents can be found online which give information on how to construct these enhancements. Two very useful documents are 'Guidance on creating habitat and biodiversity features for parks and open spaces' by Southwark Council and 'Importance of deadwood for wildlife' which has links to many more resources (see reference section).

4.9.2a Bird and Bat Box Implementation: British Trust for Ornithology have produced a document entitled 'Nest Boxes, Your Essential Guide' (see reference section). This provides valuable information on choosing, siting and maintaining a nest box. Different birds use different style boxes, but for small birds such as blue tits (*Cyanistes caeruleus*) and great tits (*Parus major*) higher up in the canopy, a 25mm round entrance hole should be used. The box should be secured within cover on a tree trunk, ideally with the hole facing north-east. In a similar vein but regarding bats, the Bat Conservation Trust produce a document entitled 'Bat Box Information Pack' (see reference section). There are many more considerations when choosing and siting bat boxes compared to birds, so consultation of the document is essential. Monitoring can be tricky because all bats are protected species. It is feasible to use non-invasive checks like looking for droppings near the bat box entrance, or watching bats enter and exit, but lights must not be shone into the entrance cavity. If a box must be opened, then a fully qualified and licenced bat worker must be present.

4.9.2b Bird and Bat Box Maintenance:

Bird- Maintenance of bird nesting boxes is important to remove parasites, or their eggs, before a new family of birds move. These parasites can be very harmful to chicks and can drastically reduce their chances of survival. Bird boxes should be thoroughly cleaned when they're no longer occupied. While birds will clean bird boxes themselves before nesting, it's best to make sure they're completely clear.

Clean nest boxes once a year by removing any bedding and washing out the box using boiling water, leaving it to dry out; this will kill off any parasites. It is recommended that old nests be removed in the autumn, from September onwards once the birds have stopped using the box. Insecticides and flea powders must not be used.

Unhatched eggs in the box can only be removed legally between September and January and must then be disposed of. Take care to ensure the nest is no longer active as some species can nest right through September. It is quite normal for a few eggs to fail to hatch, or for some young to die. Blue and great tits lay up to 14 eggs to allow for such losses. Cold weather and food shortage may lead to nest desertion, or to only the strongest young surviving. The death of one parent or interference from animals or humans may also cause desertion.

Bat- Once bats have inhabited a roost site, they may only be disturbed by licensed bat workers. Sometimes, members of the local Bat Group can check if a box is in use and provide the advice needed. If they aren't able to

help, an ecological consultant will need to be employed. It is recommended that no maintenance is taken on by volunteer groups or unqualified persons. Seek advice from a specialist regarding cleaning, painting, and repositioning of bat boxes.

4.9.3 Solitary Beehives: Currently, it is very popular to bring hives of honeybees onto land with the hope that this will support pollination, however this is not the 'one stop fix' that it seems to be. There is evidence to suggest that a human introduction of honeybees can destabilise local populations, it is possible that due to the lack of food sources available they can outcompete other species in the area. Therefore, it is recommended that support of solitary bees and other pollinators is prioritised. If managing partners choose to bring a honeybee hive onto a site, it is recommended that they find out if there are other hives in close locality and make an informed decision.



Figure 7: <https://pjbees.co.uk/product/honeycomb-bee-hotel/>

"Unlike the familiar bumblebee and honeybee, most of our bees do not make colonies but are solitary. The female spends most of her life searching for suitable nesting sites. Some species will nest in holes in the ground, while others will look for old beetle holes or hollow stems in which to lay their eggs. If you can provide a suitable home, these bees will come to you." (Wildlife Trusts 2022)

Here are two examples of solitary bee habitat-

Figure 7: <https://www.arkwildlife.co.uk/product/solitary-bee-house/>



4.9.4 Loggery / Stag Beetle habitat: This dead wood habitat is crucial to the Stag beetle, as they rely on dead wood in contact with the soil to feed on as larvae and lay eggs on. Stag beetles stay close to where they emerge, a female doesn't travel further than 20m from where she emerged to lay eggs. This means fragmentation has left populations isolated and if there isn't enough dead wood habitat nearby, they die out completely

Although this habitat is primary aimed at Stag beetles, which themselves are not a pollinating beetle, this pile will benefit a range of other species that include pollinators, such as invertebrates and species that feed on them alongside potentially solitary bees. It will also create forage, basking and nesting for mammals and reptiles.



Figure 8: An example of a loggery habitat enhancement (Heart of England Forest)

4.9.5 Wildlife Ponds: Wildlife ponds are a vital habitat; they enable wetland wildlife to survive in our urban environments.

- Birds will bathe and drink from it
- Amphibians such as newts and frogs will breed in it
- Supports invertebrate life, such as dragonflies, damselflies, pond skaters, and water boatmen



Figure 9: Wildlife Trust's Wildlife Watch

It is important to note that along with the benefits, pond can pose a safety risk in public areas. This can be mitigated if planned and constructed correctly. Danger to humans can be avoided with fencing, clear signage and making sure that the pond isn't hidden from sight. The danger of any small person or pet falling in can be dealt with by either purchasing a strong net to fix over the water, this allows for all amphibians, birds and mammals to access but would stop anything larger from getting to the water. Although if correct fencing and mitigation is in place, any cat or dog that could fall in, should be able to get out using the stones/steps built in for the pond species to exit with. Ponds require maintenance like any other habitat, and may require vegetation clearance, or surrounding tree canopy reductions over time.

The incorporation of ponds is highly recommended as a habitat enhancement, and if more information or guidance is required, please contact Wild Landscapes or #TeamWilder at Wiltshire Wildlife Trust.

4.9.6 Hibernaculum: The construction of a hibernaculum falls closely with Pond creation. Hibernacula are underground chambers or crevasses that reptiles and amphibians use to hibernate and protect themselves over winter.

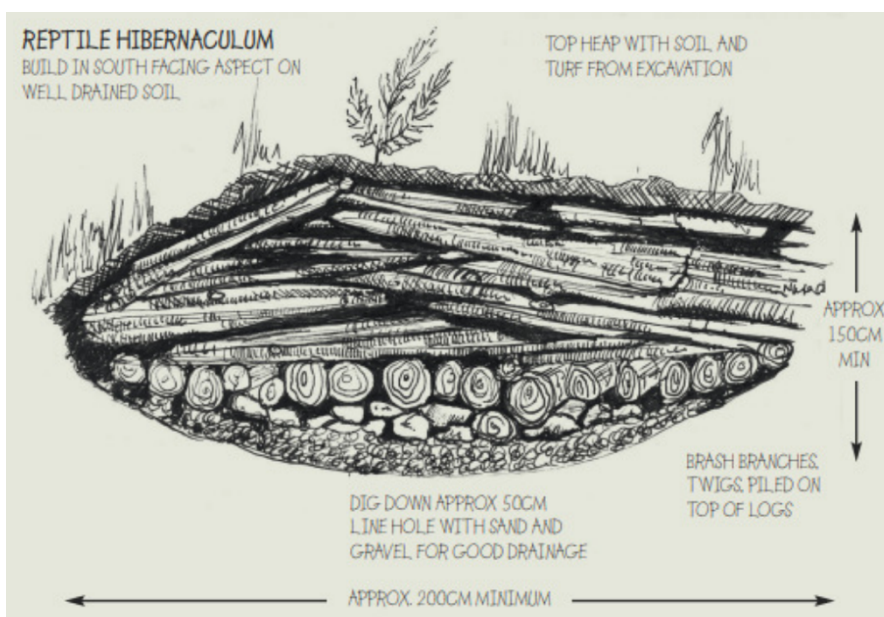


Figure 10: <https://www.arguk.org/>

This does not mean they need to be constructed exclusively with a pond, as they will benefit wildlife alone away from wetland. Alongside supporting frogs, lizards, newts, and snakes, Hibernacula will often host multitudes of invertebrates, solitary bees and can become basking spots for birds.

4.9.7 Bug Hotels: Bug Hotels can come in many shapes and sizes, ranging from Bug Cities, where large spaces are filled with towers of nesting material and the surrounds planted with forage. These additions are suitable for all sites but will vary depending on existing habitat and size of site. The creation of an ‘bug hotel’ or ‘insect wall’ both offers habitat and engages with local families/children. A standalone ‘bug hotel’ is advised in areas with other habitat surrounding, such as grassland, scrub or a wetland, and is seen a complimentary feature where there are existing species. A large ‘bug hotel’, which could possibly be made or at least filled by local children, softened into the landscape with an island of pollinator planting and log piles/waves is suitable to larger spaces. Interpretation signage could be installed to encourage children to look for certain insects and magnifying glasses (plastic) could be secured to ‘observation posts’ for children to use.



Figure 11: Examples of ‘log waves’ and bug hotels (Nigel Dunnett / Woodland Trust)

4.9.8 Dead Hedges: Dead hedges are an efficient and beneficial way of dealing with “waste material” that is created during thinning and cutting regimes. They consist of branches and twigs arranged to form a barrier/hedge, using surplus material in this way has multi-purpose benefit for wildlife, especially for small mammals and birds which use this as a corridor of protection and shelter from the elements. This can be used to establish boundaries of scrub scallops, or to deter the public from walking through specific areas. They can be created by simply dumping the waste in a pile, as shown in figure 8 or in a more controlled style, see figure 9.



Figure 12: Example of a dead hedge (www.permies.com)

4.10 The Habitat Matrix

The habitat matrix or mosaic approach ensures that plants and wildlife have the places they need to live and reproduce. Most species require a range of elements within a site in order to complete their life cycle. These elements, which includes small patches of bare ground, tall flower-rich vegetation, or scattered trees and scrub are often absent from the English landscape. This has contributed to serious declines in many species with some now close to extinction.

Providing a mosaic of these elements at a site meets the needs of many of these species, enabling them to thrive once again. Across all three sites the suggested future management is the creation, continued expansion, and maintenance of a grassland/scrub/shrub/woodland habitat matrix. Figure 13 below shows an example of such a habitat matrix. It contains small areas of planted and naturally regenerated hedgerow, shrubs and scrub, all of which are maintained on a long cutting rotation. A sequence of grassland areas intersperses the taller vegetation, providing paths and sunnier grass areas that should be managed to maintain botanical interest.

An ecotone is the area where two habitats (in this case scrub and grassland or woodland) join, or transition. Ecotones often contain species from both habitats and are areas where the greatest diversity of species are found. A gradual transition between habitats is preferred management method because, from an ecological perspective, this will provide the greatest number of habitat opportunities to the widest range of species.

It is recommended that partners research sites implementing this matrix strategy, <https://www.woodmeadowtrust.org.uk/> have wonderful examples of the potential of using this strategy.

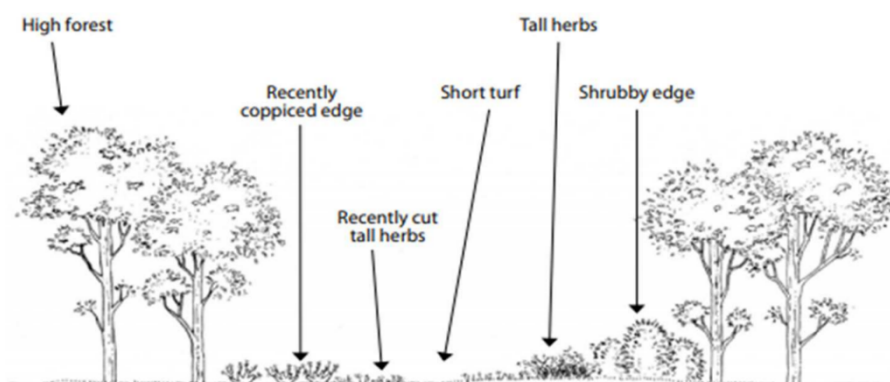


Figure 13: Woodland structure and habitat matrix diagram (Woodlands.co.uk)

4.11 Bramble and Ruderal Vegetation

The presence of Bramble (*Rubus fruticosus*) and Nettles (*Urtica dioica*) was noted around many sites during the visits. It is important that when cutting pathways and glades to consider human comfort and access through the site. However, the bramble scrub is an excellent habitat for invertebrates, especially butterflies such as the comma (*Polygonium c-album*), peacock (*Aglais io*) and small tortoiseshell (*Aglais urticae*). These butterflies also require ruderal vegetation, such as nettles and comfrey (*Symphytum officinale*), to lay their eggs on and complete their life cycle. Therefore, keeping some of the longer vegetation within the mosaic of habitat is important and could be worked into a rotational cutting cycle.

4.12 Grassland and Wildflower Meadow Management

4.12.1 General Information: All the project sites have areas of grass that if managed correctly could benefit wildlife greatly. The following section aims to highlight the different choices when managing grassland and the challenges associated with them. The choice of implementing these management styles will be heavily influenced by the capacity of individual groups and the machinery available.

4.12.2 Meadow Types: There are two main differing types of wildflower meadow. The first is an annual meadow and this is composed of plants that would historically be found at the edge of arable fields. Annual seed mixes are comprised of species that grow, flower and set seed in one growing season. Such species include Poppy (*Papaver rhoeas*), Corn Chamomile (*Anthemis arvensis*) and Corn flower (*Centaurea cyanus*). There is a misconception that annuals will keep coming back year after year, but this is not the case. Annual plants have adapted to agricultural practices such as ploughing and require soil disturbance to germinate from seed. Therefore, if the annual meadow does not receive soil disturbance of some form each year, seeds would need to be purchased and re-sown each year. For this reason, annuals are not as economical as perennials and are more suited to smaller, more formal settings where yearly soil disturbance is easier to achieve. However, because annuals flower in the first year they have an immediate impact and colourful show. Perennial meadows take much longer to establish. Annual mixes sown in autumn tend to get more poppies as they are helped to germinate by the winter frost, whereas yellow corn marigolds can dominate spring sowings. (National Biodiversity Data Centre 2017)

Perennial meadows, or hay meadows are areas of grassland which are managed to grow a hay crop. Historically this crop was used to feed farm animals over the winter. The traditional management of meadows involves a combination of cutting, grazing and hay making at specific times of year. Species-rich lowland hay meadows support a large number of wildflowers which in turn attract many types of insects. Hay meadows have evolved over hundreds of years through the practice of low-intensity farm management. In addition to being of great value for wildlife, hay meadows are an important element of the social and cultural heritage of Wiltshire.

Perennial meadows are comprised of plants that will flower each year if managed correctly. These mixes don't usually flower in the first year and in the second year the dominant species will tend to be Ox eye daisies. These short-lived perennials tend to dominate until the meadow settles down. Some of the perennials such those in the Scabious family may take several years to establish.

4.12.3 Yellow Rattle: Yellow rattle (*Rhinanthus minor*), known as 'the meadow maker' is the single most important plant needed to establish a perennial wildflower meadow. Without it, vigorous grasses grow unchecked and smother the flowers to be encouraged. It is a hemi-parasite on grasses and legumes. This means that it is partially parasitic, gaining energy through the roots of plants but can also photosynthesise. This ability makes it extremely useful in the restoration of wildflower meadows as it reduces vegetation cover enabling perennial wildflowers to grow.

However, yellow rattle can be difficult to establish. It must be sown into bare soil in autumn as it needs a prolonged period of low temperatures to germinate. Bare areas can be created by using scarification or harrowing prior to sowing. To mimic the effects of grazing, further grass cuts may be needed through early winter and spring. For the procurement of yellow rattle and all other seed mixes, Wiltshire Wildlife Trust's recommended supplier is Emorsgate Seeds.

4.12.4 Ground Preparation: Most of the project sites are too small to be suited for ground preparation using tractors or larger scale machinery. Heavy machinery would also lead to possibly impacted soil and impeded drainage. Therefore it is advised to use petrol powered push along machinery for ground preparation. This would likely involve rotivation of the topsoil layers to produce a fine, weed free tilth. Any grasses or weeds present should be removed, and this is likely to be possible by hand in smaller settings. There are two ideal windows of opportunity for sowing wildflower seeds, either in Spring (no later than May) or Autumn when there is sufficient warmth and moisture. Both time periods can also be used to sow any additional 'nurse seeds' such as Cornfield Annuals alongside your main Perennial Meadow Mix.

4.12.5 Seed and Sowing: Sowing rates will depend on the mixture selected but is usually around 2-4g/m² (check with the mixture you select, some recommendations for seed selection will be made in this document). The seed must be surface sown and can be applied by machine or broadcast by hand. To get an even distribution and avoid running out divide the seed into two or more parts and sow in overlapping sections. Do not incorporate or cover the seed, but firm in with a roll, or by treading, to give good soil/seed contact. The use of a garden roller would be sufficient for small areas. It may be worth considering a seeding of Yellow Rattle later in Autumn if you do the main first sowing in Spring, as this is a wildflower seed which will rarely germinate and establish through spring sowing as it requires a cold snap (winter) – cold stratification. Cold stratification is the process of subjecting seeds to both cold and moist conditions. Seeds of many trees, shrubs and perennials require these conditions before germination will ensue. These are simple factors to bear in mind, but both spring and autumn offers potential windows for successful sowing.

When sourcing seed, it can be beneficial to undertake a soil test to be sure of the composition and soil type and there for enabling the correct seed mix to be used. Guidance from the seed distributor can be sought once this information is obtained. Here are some of the recommended distributors:

- <https://wildseed.co.uk/> (Emorsgate- WWT's main supplier)
- <https://www.wildflower.co.uk>
- <https://meadowinmygarden.co.uk/>

4.12.6a Management: Wildflower meadows require management of some sort. This usually involves an annual cutting and removal of the cuttings. Cuttings are removed to keep the nutrients from the decaying organic matter from entering back into the soil. As wildflowers have evolved alongside grazing or cutting cycles the wildflowers that we are encouraging here all require low nutrient levels.

Management of a perennial meadow will vary from year to year. In the first year after establishment, it is important to keep the area cut short. This will help to keep on top of weeds but will also provide light to growing seedlings. Cut the sward to a height of 75 mm whenever the vegetation reaches 150mm and remove the cut vegetation if possible. Over the first season perennial weeds should be removed by mechanical or manual means. Cut the meadow no later than mid-November to a height of 30 mm and remove all vegetation.

After the first year the meadow is cut just once annually around July and August, depending on weather conditions. If possible, leave the cut vegetation for 3 days, then remove. This will enable unset seed to drop from the cut material. The goal is to allow the seed to ripen and fall from the seed heads before cutting, but a late cut will favour the coarser vegetation and grasses. Therefore, some variation in cutting dates can be beneficial, for example a later cutting date of September one year in five, will support later flowering plants such as Devil's-bit scabious (*Succisa pratensis*). Further diversity can be encouraged by planting plug plants in future years if necessary.

4.12.6b First year: While this mixture is establishing, the display may be somewhat underwhelming, and areas of open ground becomes vulnerable to competitive weed/grass growth. To combat this, it would be advisable to consider a 'nursing seed' mix in addition. When using this method both mixtures are sown together at the same time on to a clean, prepared, bare soil seedbed. Sow the perennial meadow mixture at its full normal sowing rate (4g/m² as you would when sowing without nurse cover) as this will deliver the long-term ground cover and diversity. Add cornfield annuals to this up to the full sowing rate for cornfield annuals sown alone (2g/m²) - total combined sowing rate up to 6g/m².

A cornfield annual mixture can be very successful as nurse cover. The main advantage of using cornfield annuals is that the mixture will give a colourful display of flowers in the first summer. Against their use are their cost and the disappointment that follows their disappearance the following year!

We have seen some excellent results following the use of cornfield annuals. The growth of the annuals in the early summer can suppress weed growth and moderate the vigour of the faster growing perennials and grasses to produce a more open and balanced sward. Yellow Rattle also has a better chance to complete its (annual) life cycle under this regime.

Mow newly sown meadows regularly throughout the first year of establishment to a height of 40-60mm, and remove cuttings. This will control annual weeds and help maintain balance between faster growing grasses and slower developing wildflowers.

Avoid cutting in the spring and early summer if the mixture has been sown with a nurse cover of cornfield annuals, or if autumn sown and contains Yellow Rattle. These sown annuals should be allowed to flower, then in mid-summer cut back and the cut vegetation removed. It is important to cut back cornfield annuals before they die back, set seed or collapse: this cut will reveal the developing meadow mixture and give it the space it needs to develop. Carefully dig out any residual perennial weeds such as docks.

4.12.6c Management once established: In the second and subsequent years sowings can be managed in several ways which, in association with soil fertility, will determine the character of the grassland. The best results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing. Meadow grassland is not cut or grazed from spring through to late July/August to give the sown species an opportunity to flower. After flowering in July or August take a 'hay cut': cut back with a scythe, petrol trimmer or tractor mower to c 50mm. Leave the 'hay' to dry and shed seed for 1-7 days then remove from site.

Mow or graze the re-growth through to late autumn/winter to c 50mm and again in spring if needed. This management practice is then repeated season on season whilst the meadow establishes. During this time monitor changes in weather and conditions.

4.12.6d Grassland quality surveys: The quality of grasslands is often based on the presence of wildflowers and grasses. Rapid assessment (RA) was developed to be a quick survey method and provides a snapshot of the plants present on a site. It is a surveillance method that can feed directly into the management of a grassland using indicator species to inform site management. RA should be undertaken at regular intervals, around every 3 years. However, annual monitoring should be undertaken on grasslands that are undergoing management changes or restoration. More information can be found on the Plant Life website.

4.13 Pesticides

As mentioned above, Pesticide and Insecticide use is detrimental to the effort to support pollinators and insects. Once a site has been chosen to support wildlife, it is imperative that the use of chemical treatment stops. Wiltshire Wildlife Trust commissioned a report that give a fully comprehensive overview of Insect decline and covers in depth how pesticides are damaging the ecosystem. It is advised that managing partners take time to look through this: [Insect Declines and why they matter TWT.pdf](#)

4.14 Focus on plants for pollinators

The following list has been taken from the Wildlife Trust's website, and includes some small space, native and non-natives that would be suitable throughout this urban setting.

Nectar plant suggestions:

Early season	Mid season	Late season
<i>Aubretia</i> spp	Heather - <i>Erica cinerea</i>	Coneflower - <i>Echinacea</i> spp.
English bluebell - <i>Hyacinthoides non-scripta</i>	Lady's bedstraw - <i>Galium verum</i>	French marigold - <i>Tagetes patula</i>
Currant - <i>Ribes</i> spp.	Lavender - <i>Lavandula angustifolia</i>	Golden rod - <i>Solidago</i> spp.
Grape hyacinth - <i>Muscari armeniacum</i>	Common mallow - <i>Malva sylvestri</i>	Honeysuckle - <i>Lonicera periclymenum</i>
Lungwort - <i>Pulmonaria officinalis</i>	Purple toadflax - <i>Linaria purpurea</i>	Ice plant - <i>Sedum spectabile</i>
Primrose - <i>Primula vulgaris</i>	Rock cress - <i>Arabis</i> spp.	Ivy - <i>Hedera helix</i>
Sweet violet - <i>Viola odorata</i>	Sea holly - <i>Eryngium maritimum</i>	Meadow saffron - <i>Colchicum autumnale</i>
Winter aconite - <i>Eranthis hyemalis</i>	Verbena - <i>Verbena bonariensis</i>	Michaelmas daisy - <i>Aster pyrenaicus</i>

Wood anemone - *Anemone nemorosa*

Wallflower - *Erysimum cheiri*

Common sunflower - *Helianthus annuus*

Alyssum - *Alyssum montanum*

Red valerian - *Centranthus ruber*

4.15 Trees/Shrubs

4.15.1 Sourcing: Plant material should be sourced from reputable and well-established nurseries - those who adhere to strict traceability regimes in all their production and purchasing methods. Choose to plant only native trees/shrubs to limit any risk to local habitat/environment. Planting British natives is beneficial – not only for our landscape heritage and natural beauty, but for the wildlife community, too. British native species occur naturally in the landscape and are well-adapted to the soil conditions and can survive and thrive under the rigours of British weather. They support a far greater variety of wildlife than their imported counterparts, are more likely to survive and stand a greater chance of flourishing. Native trees/shrubs are best purchased as ‘bareroot’ meaning roots are smaller and exposed. Each season, these are only available from November onwards, whilst they are dormant and can tolerate being re-sited. Bare rooted trees are preferable because they are more economical to purchase and transport and are easier to plant. Bare root trees are available in a range of ages and sizes from whips (30-60cm in height) up to full standards (2m+ in height). Orders should be placed in summer to give good notice to suppliers, particularly where large orders are concerned. Most native trees are sold as ‘field transplants’ meaning they are grown from native stock within the UK.

4.15.2 Planting advice: Try to ensure you can plant new trees as soon as they arrive to prevent any risk of damage from drought or frost, particularly in the case of bare root trees. Keep all exposed roots protected from the elements until they are ready to go into the ground by keeping them wrapped in their packaging. This includes the day of planting as roots can be damaged within minutes or hours of exposure.

Pit planting is recommended because it ensures the trees have better contact with the soil. It is suitable for all ground types. Pit planting refers to the process of digging a hole slightly deeper and wider than the tree root system and ensuring the tree is gently held central whilst backfilling with the loose soil.

- Look for the collar – the mark on the tree where it originally started to grow above the ground. This should be level with the top of the soil. If the tree is planted too deep, the stem may rot; too shallow and the roots above the ground will die.
- Hold the tree upright and gently push back the soil, pressing it down onto the roots. Don’t compact the soil as this will stop water and air circulation, but make sure the tree is secure.
- Place or hammer a cane or stake (dependent on tree size) next to the tree and fit any tree guards or spirals to protect the sapling. Press the protection firmly into the soil.
- Use a wood chip mulch to retain water and encourage beneficial mycorrhizal fungi to colonise root systems.

4.15.3 Protection: Once planted, it will most likely be a necessity to protect the trees from pests, namely grazers such as rabbit and deer. Large scale protection may be preferable including ‘deer fencing’ or stock netting which is usually installed around new planting blocks to prevent deer access. This is a relatively costly option, particularly if the site in question is large, uneven or spread out.

The most common protection methods used for large scale tree planting is the use of stakes/canes and plastic/eco guards which are fitted directly around the tree trunk. For small whips (30-60cm in height), spiral rabbit guards or plastic tubes are fitted with a supporting cane. For larger trees, a plastic tube guard will most likely be used with a fitting cane, but a stake and support tie may also be fitted to ensure trees remain upright whilst establishing a strong root base.

4.15.4 Scrub Management:

4.15.4a Existing Scrub: Throughout the site there are good examples of mature scrub belts. Holly (*Ilex aquifolium*), Blackthorn (*Prunus spinosa*) and Hawthorn (*Crataegus monogyna*) trees have been noted across a few of the sites. However, there is room for more scrub to develop and this would add value to the biodiversity on site. Implementation of a Habitat Matrix system is advised, and this can be broken into two management systems:

4.15.4b 1st Method Rotational Cutting: This entails dividing sections of scrub into defined areas which can then be managed on a 5-year rotation. This would be particularly effective on longer strips or where there was a significant amount of scrubland to warrant a rotation system. This can be achieved through allowing scrub to colonise and regenerate naturally or through planting Scrubland species, such as Dogwood (*Cornus sanguinea*), Elder (*Sambucus nigra*), Dog Rose (*Rosa canina*), Hawthorn, Blackthorn, Holly, Guelder Rose (*Viburnum opulus*), Hazel (*Corylus avellana*) and Spindle (*Euonymus europaeus*). Once these areas have been designated, one section is cut every year in winter. This results in a consistently staggered aged progression in the scrublands. (See Figure 6 below) These are often designed in scallop formations, like the wildflower glade already existing on site, however this is subjective and will be influence by the shape of land and the areas that are available.

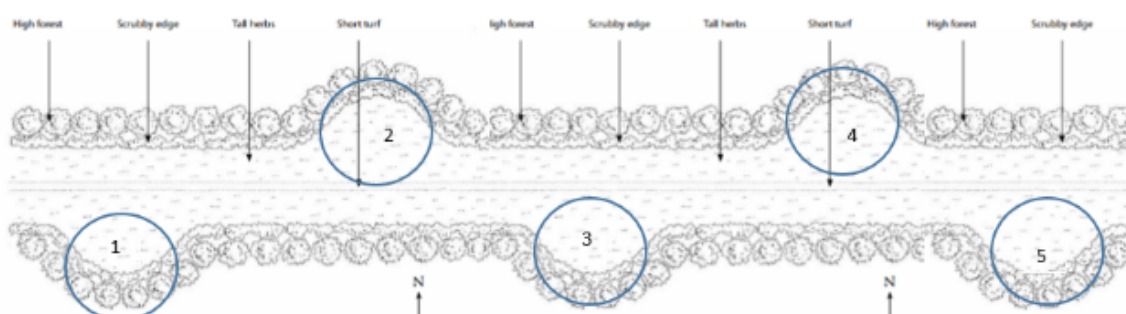


Figure 14: Aerial view of a ride showing how scallops may be positioned in long rotation system (www.woodlands.co.uk)

4.15.4c 2nd Method Planting Additional Scrub (with the intention of letting it mature): This method requires a primary survey to indicate areas where scrub belts could be extended or restocked, as well as areas that have a naturally created opening. In the selected areas trees (species recommendation above) should be planted with suitable protection. They should be allowed to mature with the intention of minimal intervention until they are of size where thinning and restocking can take place again. This is a long-term implementation, 10 to 15 years would be a reasonable time before intervention is required, probably in the form of thinning out, dead hedging and possibly restocking. This should be continuously monitored for progress, as stated in the schedule, as summer 'success and plant health checks'.

4.15.4d Comment on hedgerow management: It was noted during the visits that the management of several hedge is extreme flailing. When this occurs the hedgerow loses most of its new growth, and leafy green density which provides beneficial habitat to many birds and small mammals. When this is cut in the same way each year, the wildlife inhabiting this area will be deprived of that habitat immediately. Here a wildlife friendly 'Three-Part' rotational cutting regime is recommended, this means that each year only one side of the hedge is cut, first one side, then the top, then the last side and this is repeated on a three-year rotation. This allows for this valuable habitat to maintain a consistency for the wildlife depending upon it, as there will always be a portion of the hedge available year-round, while simultaneously not allowing a long enough period for the hedge row to become unmanageable for the public's comfort while using the site.

4.15.4e Monitor for Health and Success: This is a simple check of the newly planted trees; this should be a practise that is routinely carried out wherever new planting has occurred. Basic checks and remedies provided below:

Check	Remedy
Check tree has new growth and is still alive.	Replant, or removed cane and guard and allow tree to stay as dead standing.
Check tree guard is positioned correctly and in good condition.	Replace, ensure bottom is dug in- in cases of deer interference- consider fencing or taller guards.
There is no interference by other vegetation encroaching or swamping- resulting in a poor tree growth.	Carefully remove vegetation growing inside the guards, re-apply mulch if needed.

4.15.4f Funding and Woodland Tree Packs: There are multiple avenues of exploration when trying to find funding for tree planting. Some recommendations are as follows:

- TVC's 'I Dig Trees' Scheme
 - The Woodland Trust's free tree packs
 - Grants provided by 'The Tree Council' and 'Heritage Lottery Fund'
- (Web links provided in section 8. References)

4.15.4g Hazel (*Corylus avellana*) and Sycamore (*Acer pseudoplatanus*) in relation to Ash Dieback: Ash trees have an alkaline bark, very close to that of the elm tree. This meant that when Britain's Elm trees were infected with Dutch Elm disease which is caused by fungus, '*Ophiostoma novo-ulmi*' a large majority of the species relying on Elm transferred to the closest suitable host. This resulted in Ash becoming the host for many Invertebrates, Bryophytes, Lichens, Fungi among others on top of those already relying on it.

The Ash, now faced with a similarly deadly disease and rapidly declining in number puts these species at detrimental risk. Therefore, it is encouraged to begin to strategize how to support these species and provide the most suitable habitat for them to transition to. Mature Hazel and Sycamore happen to be the closest suitable host for these. So, encouraging a certain amount of Hazel and Sycamore to mature, will be an incredibly important habitat in the coming years.

4.16 Ivy (*Hedera helix*)

There are two native subspecies of ivy in Britain, and the plant forms a vital component of healthy ecosystems. Ivy is not a parasite and does no harm to trees. The plant grows from the ground, getting its own water and nutrients, simply using the tree for support. The dense foliage that ivy forms provides plenty of space for wildlife to shelter and breed. Birds, mammals and bats, will make the most of the cover it provides.

Ivy is an evergreen plant that provides shelter year-round. Moth and butterfly caterpillars feed on ivy leaves in spring, and it produces berries in winter, which are an important fat source for birds - in particular thrushes and blackbirds. Ivy flowers very late in the year, from September onwards. The late nectar of ivy provides a last chance for invertebrates to feed up before they hibernate for the winter. Ivy bees are a recent coloniser of Britain, and these bees are dependent on the plant when they emerge in late summer.

Ivy is not parasitic as often misconstrued; a healthy tree can grow to full maturity alongside a maturing ivy clad symbiotically. Occasionally, if ivy is growing on a tree that is already diseased or dying, it may be necessary to cut ivy stems to kill the plant. This reduces the health and safety risk if the tree is near a path or building, as the fragile tree will bear less weight and have less of a sail for wind interference.

Ivy can also be problematic when assessing bat roost potential and tree health from the ground, and can become overbearing in unbalanced woodlands, dominating ground cover, in these cases it may be advisable to selectively remove a portion.

4.17 Fallen and Standing Deadwood

Dead wood is an excellent habitat for wildlife especially invertebrates. Fungi soften the wood through decay, and the larvae of beetles start to chew it up. In turn the larvae provide food for woodland birds which make nest holes in the rotting wood. Holes that form where old broken branches have rotted provide crevices for bats and birds to roost.

If there is no risk of a tree falling onto a person, leaving a dead or dying tree standing can benefit a woodland's wildlife. Where a tree is a public hazard, it can be dismantled to a monolith of about 3m to 4m. Brushwood and timber from clearing and coppicing should be left in piles, or turned into dead hedges, piles of branches and twigs arranged to form a barrier.

In areas particularly lacking in dead wood, consideration can be given to 'ring barking' unwanted trees. However, with the future proliferation of diseased ash trees, this will almost certainly not be necessary at these sites. When dead trees fall, they should be left intact where it is safe to do so. Whole trees are better for wildlife than those that have been cut.

Fallen or felled dead wood is an extremely important factor in a healthy ecosystem. Wood on the ground encourages and supports mycorrhizal fungi, beetles and invertebrates.

4.18 Management Schedule

See attached document - **WAB PP Maintenance Schedule PDF FINAL v0.1 - 05-10-22**

5. Westbury:

The sites put forward for Westbury Town are the most expansive and public of all the sites in Phase 1 of the project. This means they have potential for large scale public engagement. It is recommended that throughout these sites there is a focus on showcasing as many different strategies as possible and creating signage to compliment.

5.1 Leigh Park Way

Leigh Park way is an expansive stretch of roadside verges that extends through the whole of the Westbury Leigh area following the main road. It is heavily used with many amenities surrounding the location.

A large selection of the stretch has existing scrub, hedgerow and a stretch of parkland style planted trees that are semi-mature. The stretch with planted trees is an asset to this area, and they should be highlighted as a great addition to the neighbourhood's habitat. Due to the size of the roadside verge here it will be difficult to implement meadow/wildlife management of grassland. However, it is recommended that a planting of medium size scrub species as an understory, underneath the trees here could be a great addition, alongside the potential of bulb planting between trees and the addition of bird and bat nest/root boxes throughout this area. These should be selected to carry on with the aesthetically pleasing nature of the species existing and aim to combine benefits for nature and human enjoyment.

It was also noted that most of the roundabouts throughout this stretch are already maintained by sponsors, it is advised that the partners that are sponsoring are consulted around the ideas spoke of in this report, and a plan put in place that allow that whole stretch to have continuity with its purpose as both a space for wildlife and the general public.

At one end of this stretch, closest to The Spur Road turn off, there is a wide space that would be best suited to a more extensive wildlife-oriented management style. There is existing scrub, trees and bulbs planted here, so expansion could be easy and some of the enhancements mentioned in section 4.9 would be suitable, such as the bug hotel and loggery habitat.

There are several spaces along the stretch, opposite to the footpath, that would benefit from planting up with hedgerow species. Along this stretch there is adjacent fields used as paddocks and farmland. It is advised that managing partners also consult with the landowners before implementing and planting here as an act of consideration, and possible collaboration.

5.2 Bitham Park

Bitham Park is the second expansive stretch of roadside verges and patches of green space that run next to the housing estate from the entrance to the Lidl carpark till the turning opposite the Cemetery on the B3098. This stretch boasts wider roadside greenspace, that would be suitable for larger scale wildlife management.

The spaces here could be turned into wildflower areas, through the adoption of the correct cutting regime, incorporating the habitat matrix concept and has scope and space suitable for a wildlife pond and many additional enhancements.

The first wide green space after the turning for Kingfisher Drive and the second after the turning for Danvers Way would be suitable spaces for this implementation, with planting in clusters around the existing trees and scrub that could also be constructed with a minimal intervention maintenance schedule.

Note on Machinery for 5.1 & 5.2: One of the common limiting factors when trying to incorporate new management for grassland, is the lack of suitable equipment. It is common that the maintenance crews do not have the machinery available that will allow them to cut and collect grass of a tall sward height. It could be possible if there was enough space across the area that a machine suitable could be purchased. However, the use of brush cutters and volunteers raking up and disposing of the organic matter is usually the most cost-effective means of implementing this system. This can often seem a daunting task, though the need for the spaces to be cut only once or twice a year, means that less management is required overall.

5.3 Slag Lane

The Slag Lane site is a rough rectangle of ruderal vegetation on a slope away from the road at the entrance to Slag Lane. The site is surrounded by existing hedgerow, and it is recommended that here partners plant native hedgerow species and several woodland trees in order to continue this habitat. It would also be beneficial to allow the bramble existing to carry on growing alongside the other ruderal species, this would eventually produce its own hedgerow/ scrub through natural regeneration.

Management of this site should be kept to minimal, as access is difficult, and it can be dangerous to implement cutting regimes on a slope. It should be noted that the bottom of this slope meets the fence of resident's gardens. Here the consideration of the public should be kept in mind. Often allowing a 1m strip directly next to a fence, so that a push mower can keep the boundary clear, will mitigate disturbance.

There is potential here to create a boarder on the roadside edge of this site, that could consist of garden shrubs requiring minimal aftercare, flowering bulbs, or annual meadow seed mix. This would combat the possibility that the site being allowed to "scrub up" would cause residents to feel the area has been neglected. Again, here public engagement and education is needed to combat the idea that the space is "messy".

5.4 Avebury Close

Avebury Close's sites are two patches of green space embedded within the estate. One with an already full planting of semi mature tree species and the other with just one stand-alone tree.

The first of these sites, with the existing tree cover, could benefit from bird and bat boxes and then planting planned to provide food for these species. The second site would be suitable for wildflower meadow management, which would complement the first site by bringing species that are preyed on by the wildlife residents living within the dense canopy.

Both sites, due to location must be managed in a way not to cause discomfort to the residents, so it is advised that consultation and involvement from the neighbouring houses is incorporated ensuring that any enhancements implemented fit with their aesthetic needs.

Note on Wetland habitat support for 5.3 & 5.4: The Slag Lane and Avebury Close Sites sit near surrounding wetland habitat on either side, this means that an objective of these sites could be to complement the existing wetland habitat and support species as they travel between them. It is advised that managing partners research activity on both these wetland sites, and plan accordingly. The sites are perfect steppingstones for wetland bird species to forage or nest in, while keeping in suitable range of their desired habitat.

5.5 Edward Street

Edward Street is the most central of the Westbury Town sites. This means it has potential to be a key engagement zone. It is a small site with two mature trees existing, and with little room for extensive enhancements. Here it is recommended that an interactive educational display is designed. This could incorporate several additions found in section 4.9, such as a mini pond, bug hotel, and nesting boxes. Bird feeders would also be a nice addition to encourage birds to the space.

Again, keeping the site ascetically appealing would be important to draw public to engage. The implementation of signage, explaining the WAB wide project, the different techniques and some short facts and figures on why this is important is recommended. If this display was built around more manicured flower beds that featured wildflower species and pollinator supporting garden shrubs, it would encourage residents to try out the ideas at home.

6. Dilton Marsh:

6.1 Landsdowne Close

The space chosen at Landsdowne Close consists of two patches of green space either side of the road as you enter the estate. It has existing garden shrubs planted at the roadside front edge and a selection of trees throughout.

The space here would be best utilised in a matrix of habitats. Some hedgerow species and a small selection of woodland trees could be used to expand the existing habitat. Due the spaces being directly outside the front of resident's homes, it is again advised here that a degree of consultation is undertaken. The space has potential to be full of scrub and trees, with pockets of unmown meadow and some small glades where a lawn can be kept for public recreation. This mowing of small glades and pathways through will create an interactive feature to be enjoyed by the public. However, this same idea can be implemented with less intrusive choice of vegetation, the potential for planting some visually please scrub, such as Elder, Dog Rose, Guelder Rose and Spindle (*Euonymus europaeus*) alongside a selection of either fruit trees or woodland species. Tree species such as Birch (*Betula pendula*) and Aspen (*Populus tremula*) are often regarded as ascetically pleasing.

It is possible here that the idea of thick planning and unmown grass could cause some controversy. As an alternative this space could be suited to have a medium size wildlife pond built, fenced off and the boundaries planted up with scrub. The surrounding area between the existing trees could then have selected patches designated for wildflower meadows and the remaining cut as a lawn. This could be seen as a less intrusive or 'messy' option.

6.2 Orchard Close

The space within Orchard Close is a very small rectangle patch of grass embedded within the estate. This would be an ideal site for a small-scale display of annual wildflowers. The size makes the purchase of seed and the preparation and management accessible and would potentially inspire others in the estate to also dedicate a patch of their lawn to wildflowers.

6.3 Village Green

The Village Green consists of two strips of grassland and parkland trees that run along the footpath and a patch opposite with a public bench.

During the site visit it was mentioned that this space's purpose was to feel welcoming, colourful and inspire passers-by to interact. For this reason, it is advised that this site should remain managed in a hybrid style, with the current mowing regime in place alongside some more controlled habitat enhancements and planting.

The idea of providing food that the villages could pick was spoke about. The planting of some traditional fruit cultivars is recommended, alongside exploring the potential of a "Incredible Edible" style help yourself system. This system can be utilised in many different scales, from having a few herb bushes that villages can pick and use, to having a salad bed that is restocked by the maintenance crew. It is advised that Dilton's managing partners research this scheme. Found here: <https://www.incredibleedible.org.uk/>

The additional planting could consist of both native species and garden shrubs, all keeping with a theme of colour and visual appeal. Some recommendations are: The Butterfly Bush (*Buddleja davidii*), Elder, Dog Rose, Guelder Rose and Spindle. These plantings alongside a controlled bed of annual wildflowers would create a colourful show. Here the use of additional signage and displays, engaging and education on the need to support pollinators would complement the space well.

6.4 Fairwood Park Triangle

The Fairwood Park Triangle is an island that sits on a road junction. The space is already occupied by a handful of trees, and there is not enough canopy space for additional trees to be planted at present. It is advised on this site that either the planting of hedgerow species is implanted between trees and around the boundary of the site, or that the grassland is managed to encourage a perennial meadow.

It was noted during the site visit, that measures are being taken to stop cars driving onto the space to park or cut across. It seemed that plans of building bollards were underway, however it is advised that natural ways to discourage this activity be explored. The planting of a hedge row around the whole perimeter, with just a 1m gap to allow for access could stop people parking. If this hedge row was broken up with a few bug hotels the space would become unsuitable for parking. This hedgerow could be managed with traditional technique of laying, that would overtime build a live natural fence.

Due to the existing trees being semi-mature and surrounded by mature hedgerow and woodland, it is likely that they are used as nesting sites for birds. The addition of a couple of bird boxes would be suitable here.

7. Edington:

7.1 Parish Hall

The surroundings of the Parish Hall is already boasting a long hedge of bramble, which provides great refuge and forage for many species. This is advised to be left standing and managed in a way to make the pathway accessible for the public. Most of the area is on a slope, so it is advised that there be minimal use of machinery, due to health and safety concerns.

It is advised that the slope is allowed to “scrub up” with selective planting of pollinator supporting plants. Any area that is left unplanted, and where safe to do so can be managed with a yearly meadow cut, to encourage wildflowers. As the slope proves difficult regarding the building of many habitat enhancements, implementing some solitary bee refugia along the bank attached to posts driven into the ground would be suitable. The bottom of the slope, as it meets the car park could be utilised as an annual wildflower area, as ground preparation would be accessible, and this would add some vibrant colour to the space.

7.1 Church Yard

The site within the Church yard is a sizable area of grass, that is surrounded by native hedgerow and a traditional garden hedge and features one mature apple tree. This space is currently used for public events and needs to have a management schedule in place that allows for the dual purpose of this site. It is recommended here that the space is managed as a hay meadow, and the cutting regime adapted to fit with the village festival in August. It would be possible to allow for the summer flower growth and cut in July, then keep manicured, and short until the village festival has taken place. Having clear cut pathways and a 1m border mown regularly during the months of prolific growth would be useful here, as the public have already shown discomfort with the access to the site, this and the addition of clear signage could rally support and allow public comfort when passing through the field. It was also noted that the potential of uneven surface here would cause discomfort when being used as a function site, this is a risk that would need to be monitored and addressed as the site evolves.

There is a slope to a public walkway that grants access to the site, that has areas of ruderal vegetation consisting of nettles, comfrey, docks and bramble. It was mentioned that these areas were causing distress to the public. The managing partners have a few choices here. They can acknowledge this as valuable habitat and try to engage with the public surrounding these spaces, they could plant more native hedgerow species and extend the parameter while suppressing the growth of ruderal veg with mulch and regular cutting. Or it could be attempted to rotavate these areas each year and sown with wildflower seeds. The success of annual seeds here is not guaranteed as it is clearly a soil of high nutrient content, and the ruderal growth is already so prolific that trying to eradicate may become a tiresome effort.

7.1 Entrance to Village (Westbury Rd)

This space is a strip of roadside verges running along Westbury Road at the entrance of Edington. It already has mature hedgerow and tree cover and has around 1-2m of grass that is available for new management. It was discussed while undertaking the site visit that a primary function of this area would be to create wildflower strips that both add a beauty feature to frame the arrival into the village and slow down speeding cars.

It is recommended that this be achieved through initial sowing annual seeds as a nurse cover and from there onwards aiming to convert this area into a perennial meadow. If the resources allow it, to achieve a more likely full display of flowers to purchase and re sow annual seeds each year. This would be at the discretion of the managing partners. It was also advised on site that the restocking on the hedgerow with native species would be beneficial to thicken the existing habitat. A rotational cut could then be implemented to manage this into the future.

7.1 Berry Road

The Berry Road site, consist of two patches of grass that sit either side of the road into the estate. There are existing trees and shrubs on site and the residents have been taking ownership with “guerrilla” planting of herbs and garden shrubs. This should be encouraged as it will relive the Parish Council of taking care of the space, consulting with these residents and allowing them to read this report would be productive, as they could decide on next steps that align with the Pollinator Project. Due to the size of the area annual wildflower patches would fit well in between the existing plantings. If a perennial meadow system was established there is also potential for the verge on the opposite side of the road to be managed in the same way, both patches would benefit each other.

8. Bratton:

7.1 The Orchard

The orchard in Bratton is an extensive site with much potential to carry on being a huge asset to Bratton for both people and wildlife.

During the site visit, there was large discussion around the creation of wildflower meadow around the orchard. It is recommended that 10 small patches are scarified and sown with a perennial seed mix (including yellow rattle), also a heavy sowing of additional yellow rattle separately in selective areas in between. The organic matter from the cutting would be well utilised if composted onsite for use on the orchard trees.

As discussed on site, it can be challenging controlling the balance of nutrients for the orchard trees and the desired, lack of, for wildflowers. It is recommended that a soil test be taken to ensure that the seed mix is suitable to increase germination success. A way to combat any overlap in nutrients is to designate clear sections of wildflowers, and clear orchard tree zones, ensuring there is a buffer strip in-between.

The use of a heavy woodchip mulch in circles of 1m+ diameter around the trees is advised to encourage mycorrhizal fungi growth. Any pruning trim from the trees can be moved to the base of a tree of another variety, this adds to the wood mulch while lowering the chances of disease spreading from the dying wood back to the host tree.

The site also has a large portion directly next to the river, here sowing a river edge seed mix, and encouraging scrub to grow would benefit the river inhabitants. There is also potential for a full host of habitat enhancements found in section 4.9, to be implemented.

9. References

Amenity Grassland Management:

http://www.barnsleybiodiversity.org.uk/amenitygrassland_management.html#:~:text=Mowing%20once%20every%20four%20weeks,mowing%20later%20in%20the%20year.

Managing Grassland Road Verges:

https://www.plantlife.org.uk/application/files/3315/7063/5411/Managing_grassland_road_verges_Singles.pdf

Grassland – Cutting and Enhancement:

<https://www.nature.scot/sites/default/files/2018-02/Guidance%20Note%20-%20Grassland%20Management%20-%20cutting%20and%20enhancement.pdf>

Ash Dieback: <https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/tree-pests-and-diseases/key-tree-pests-and-diseases/ash-dieback/>

Ash Dieback: <https://www.wildlifetrusts.org/ash-dieback>

Basic Tree Survey and Inspection Course: <https://www.lantra.co.uk/course/basic-tree-survey-and-inspection>

iRecord website: <https://irecord.org.uk/>

Wiltshire and Swindon Biological Records Centre Website: <http://wsbrc.org.uk/>

Managing Your Woodland for Wildlife: <https://www.woodlands.co.uk/owning-a-wood/managing-your-woodland-for-wildlife/managing-your-woodland-for-wildlife.pdf>

Emorsgate Seeds: <https://wildseed.co.uk/>

Tree Funding and Packs:

<https://treecouncil.org.uk/>

<https://tcv.org.uk/communities/i-dig-trees/>

<https://www.woodlandtrust.org.uk/plant-trees/schools-and-communities/>

<https://www.heritagefund.org.uk/>

Nest Boxes, Your Essential Guide: <https://www.bto.org/sites/default/files/bto-nest-boxes-essential-guide.pdf>

Bat Box Information Pack: <https://cdn.bats.org.uk/pdf/Bat-Box-Information-Pack.pdf?mtime=20181101151309>

Guidance on creating habitat and biodiversity features for parks and open spaces:

https://www.southwark.gov.uk/assets/attach/2359/Guidance_on_creating_habitat_and_biodiversity_features_for_parks_and_open_spaces.pdf

Wildlife Watch activities: <https://www.wildlifewatch.org.uk/activities>

Importance of deadwood for wildlife: <https://heartofenglandforest.org/news/importance-deadwood-wildlife>

Coppice: <https://www.nationaltrust.org.uk/little-dartmouth/features/what-is-woodland-coppicing>

Pollinators :

<https://www.wildlifetrusts.org/savingbees>

<https://www.rhs.org.uk/wildlife/pollinators-decline-in-numbers>

[Insect Declines and why they matter TWT.pdf](#)

<https://www.pan-uk.org/herbicides-and-pollinators/>

10. Appendices

Ref	GPS	Priority	Type (S/P/Multi stem)	Photo Y/N	% Dieback	DBH	Cracks/crevices woodpecker holes/ Ivy	Notes

10.1 Tree Survey Template

Risk Matrix		Level of Risk		
		Low	Medium	High
Likelihood of Risk	Low	Low	Low/Medium	Medium
	Medium	Low/Medium	Medium	Medium/High
	High	Medium	Medium/High	High

10.2 Risk Matrix and Word Bank for use on 'Site and Visitor Safety Assessment'

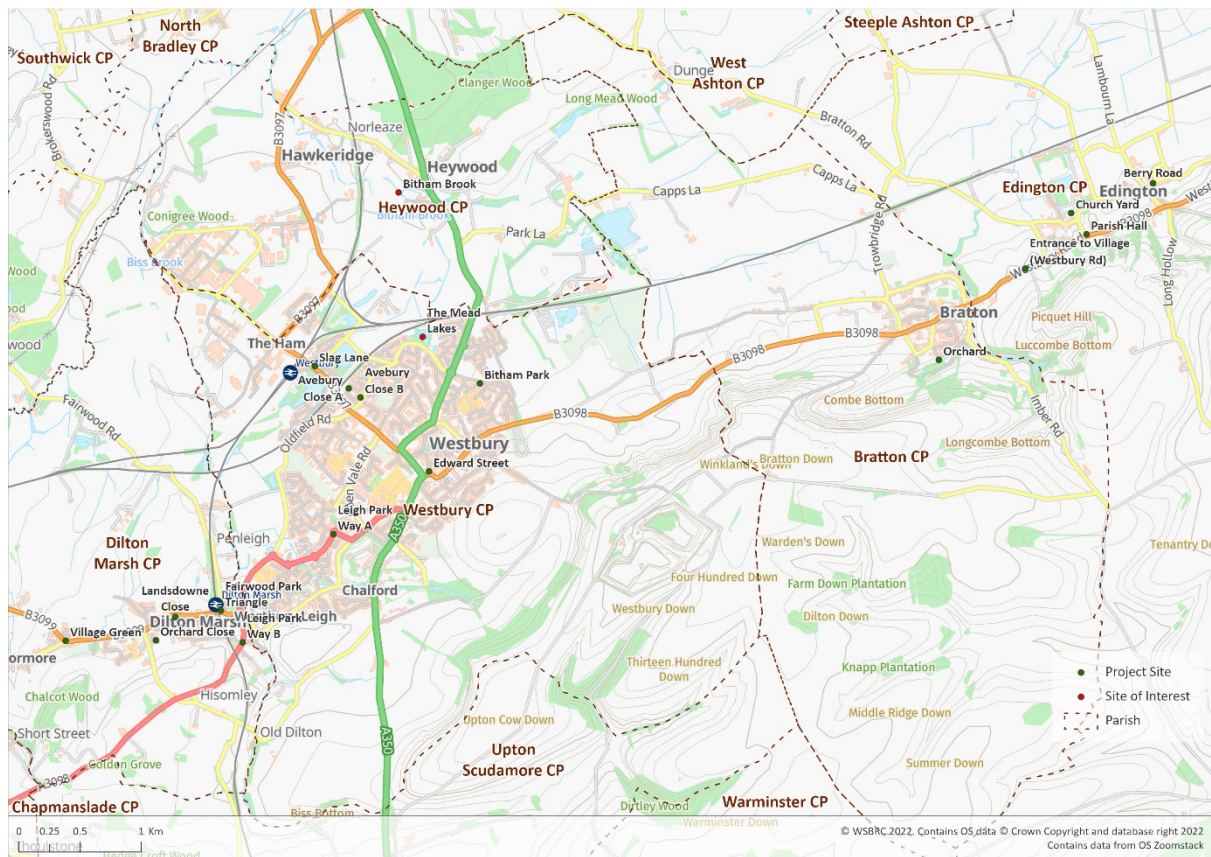
Condition	Persons at Risk	Level Risk	Likelihood Risk	Grade of Risk
New	Visitors	Low	Low	Low
Good - No Wear	Volunteers	Medium	Medium	Low/Medium
Fair - Minor Wear	Staff	High	High	Medium
Poor - Minor Hazards	All	None	None	Medium/High
Broken - Possible High Risk	None			High
				None

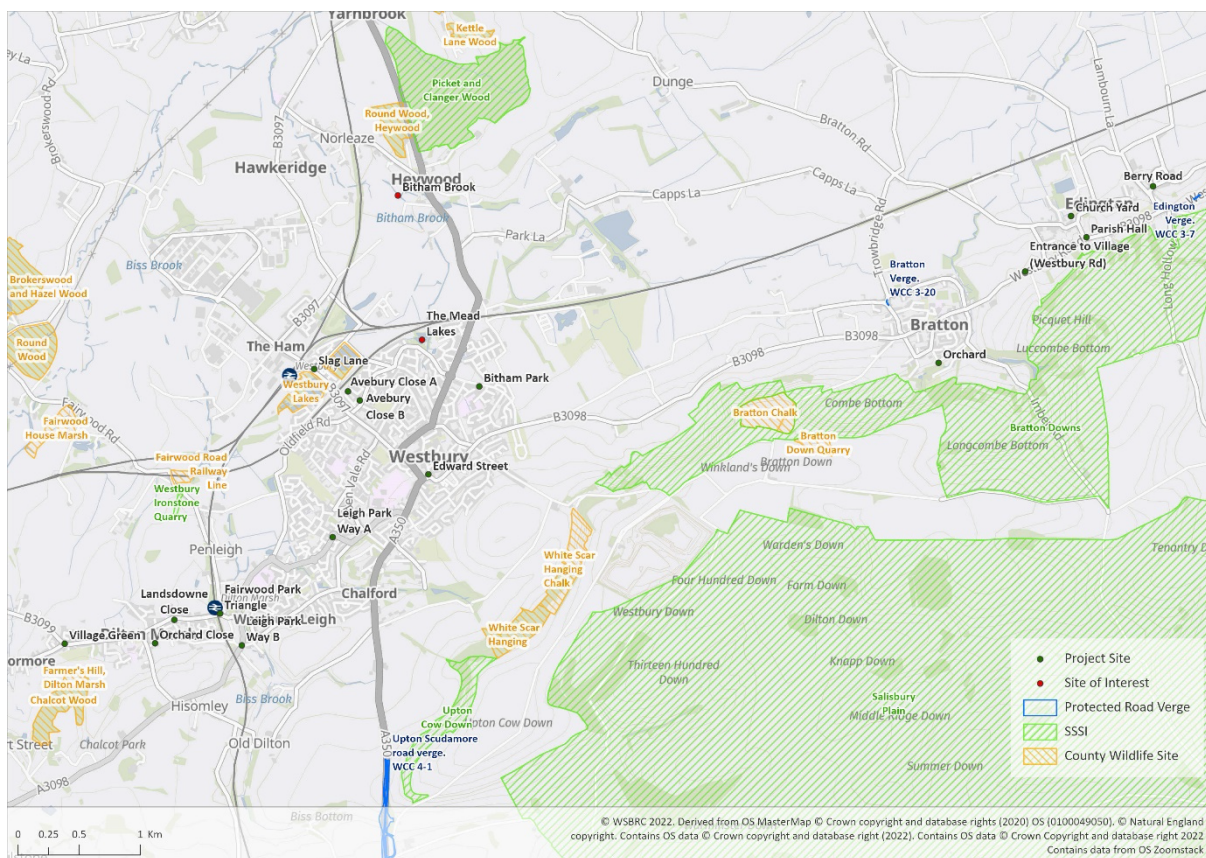
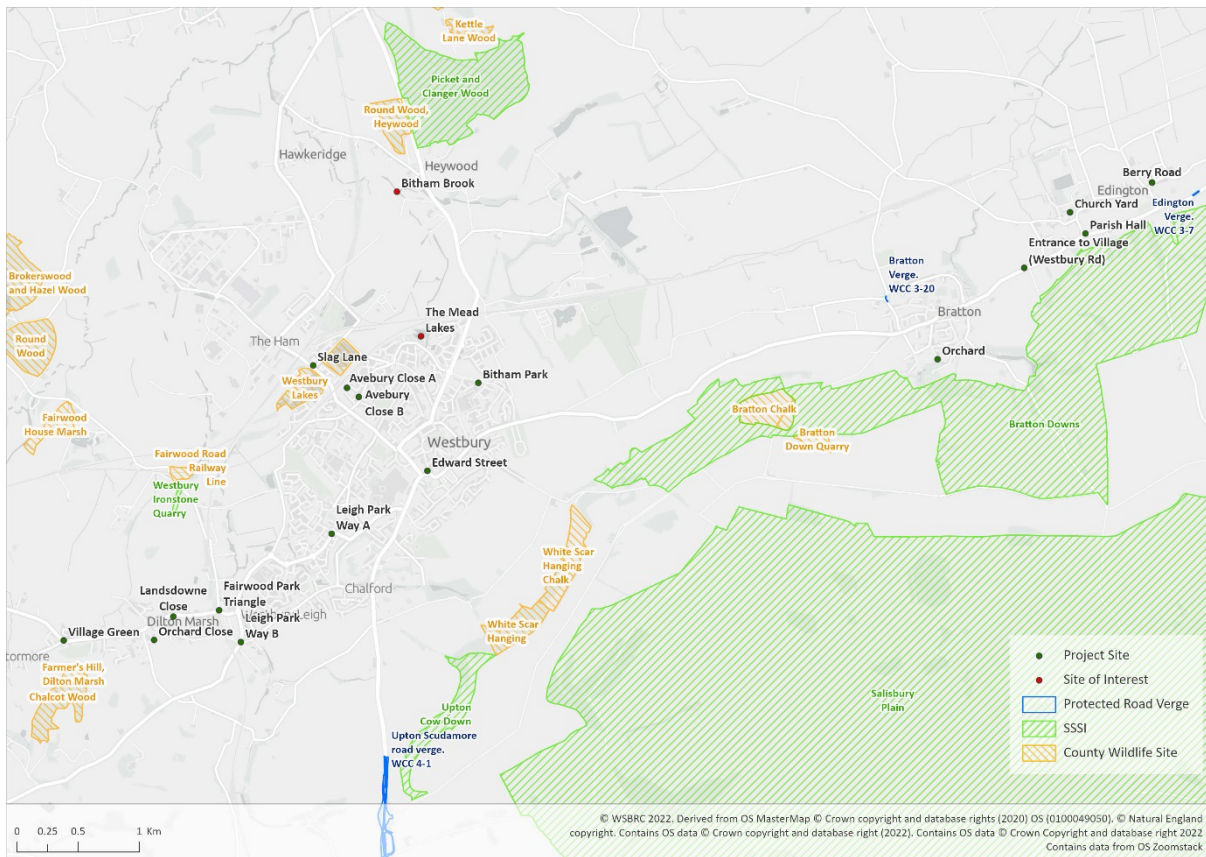
A	B	C	D	E	F	G	H	I	J	K	L
Existing Infrastructure		Hazard and Risk		Persons at Risk		Risk Matrix		Actions			
Map Code	Item	Condition	Hazard Identified	Risk	Photo	Level of Risk	Likelihood of Risk	Overall Risk Grade	Action(s) Required	Action(s) Taken (Provide Date of Action)	
A											
B											
C											
D											
E											
F											
G											
H											
I											
J											
K											
L											

NEW Hazard and Risk - Add Positions to Infrastructure Map					Persons at Risk		Risk Matrix		Actions	
Map Code	Hazard	Risk	Photo	Level of Risk	Likelihood of Risk	Overall Risk Grade	Action(s) Required	Action(s) Taken (Provide Date of Action)		

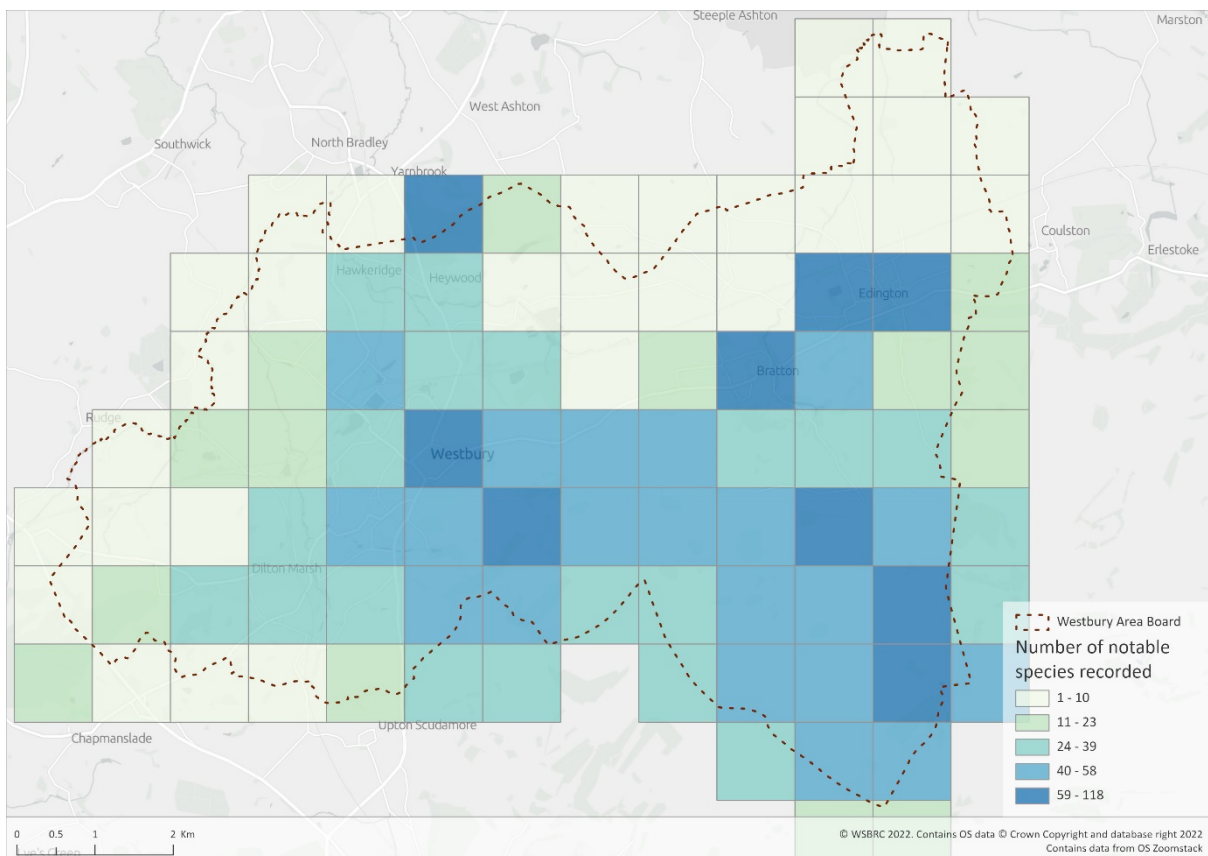
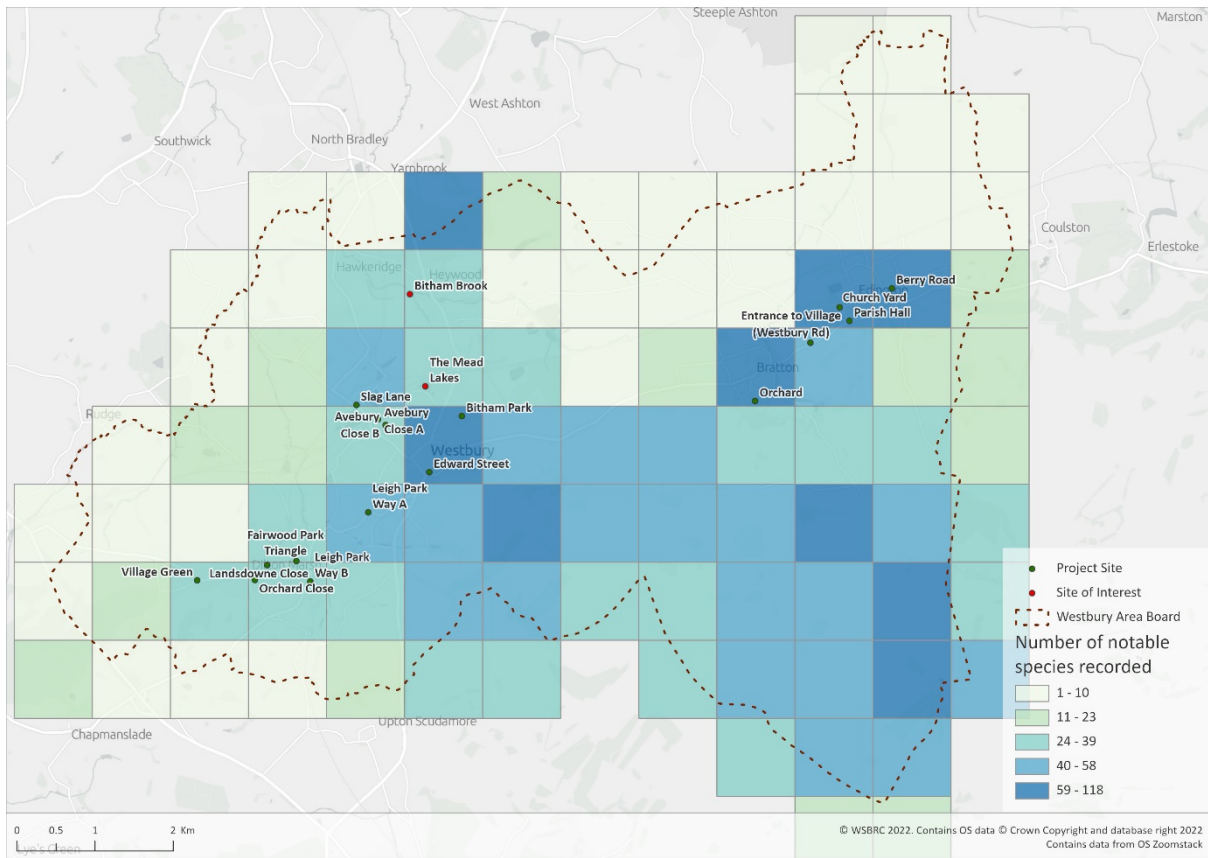
Completed by:	Signature:	Date:
Manager Responsible for Reserve:	Signature:	Date:

10.4 Maps variants produced for WAB use by WSBRC

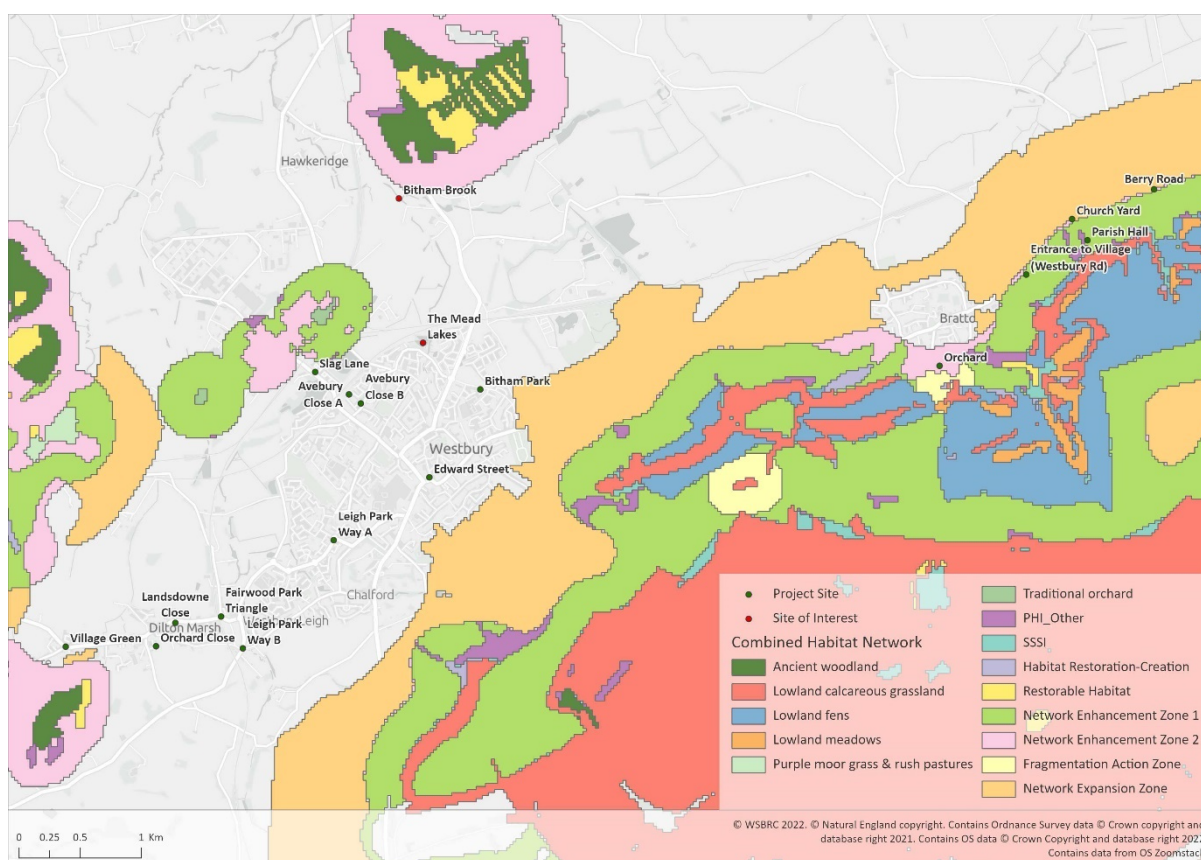




10.4 Species map variants produced for WAB use by WSBRC



10.5 NE Habitat zone map for WAB use by WSBRC, and accompanying data source information



*Data source: <https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::habitat-networks-combined-habitats-england/about>

*Metadata:

<https://www.arcgis.com/sharing/rest/content/items/fceb93850462454ab3fb5accea2be35b/info/metadata/metadata.xml?format=default&output=html>

*Guidance document: https://s3-eu-west-1.amazonaws.com/data.defra.gov.uk/Natural_England/Habitat_Species/Habitats/Habitat_Network_England_NE/Habitat_Networks_England_Version_2_Guidance.pdf