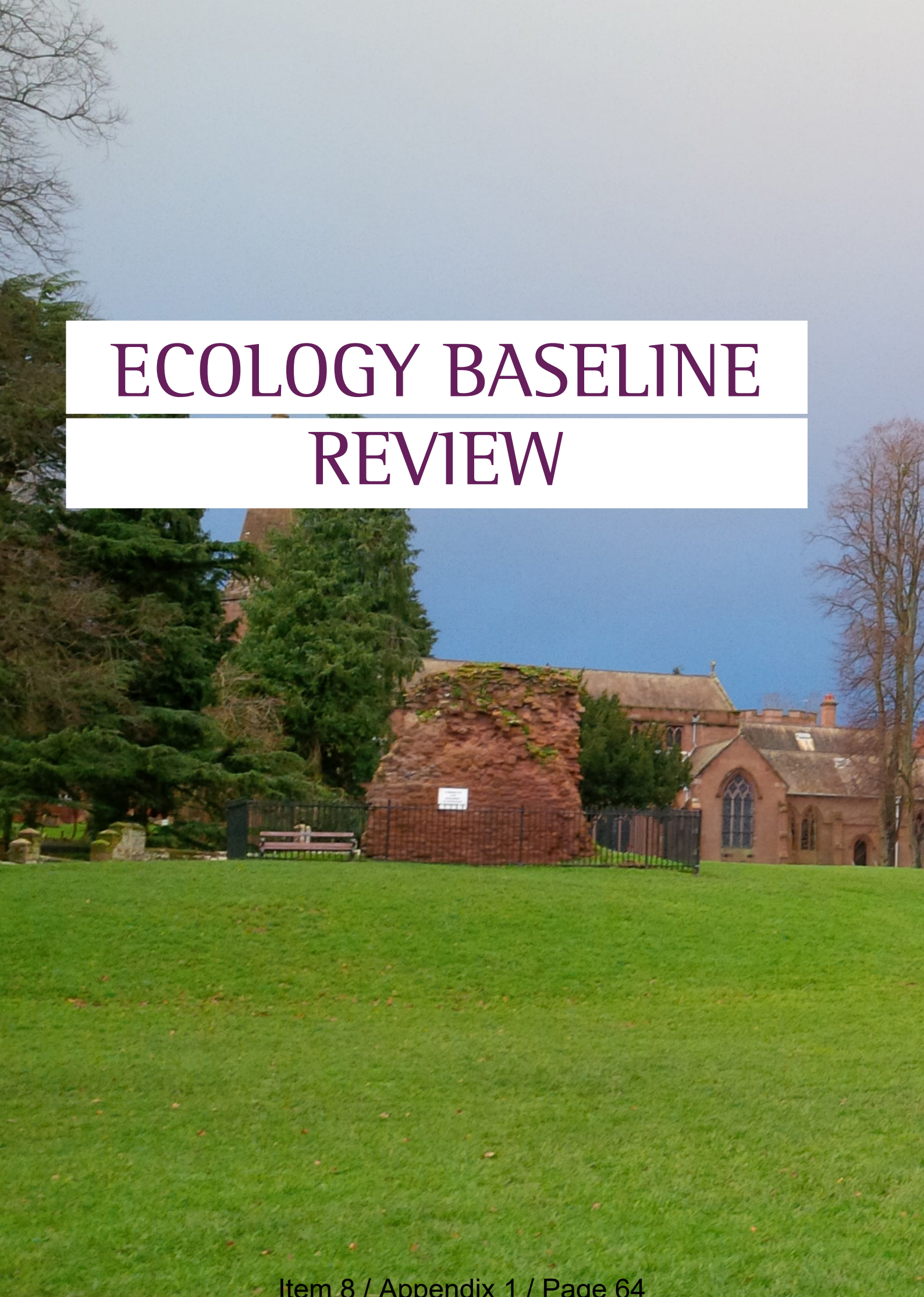


ECOLOGY BASELINE REVIEW

6.

Ecology baseline review

This report has been prepared following an initial review of ecological information provided by Middlemarch Environmental, including:

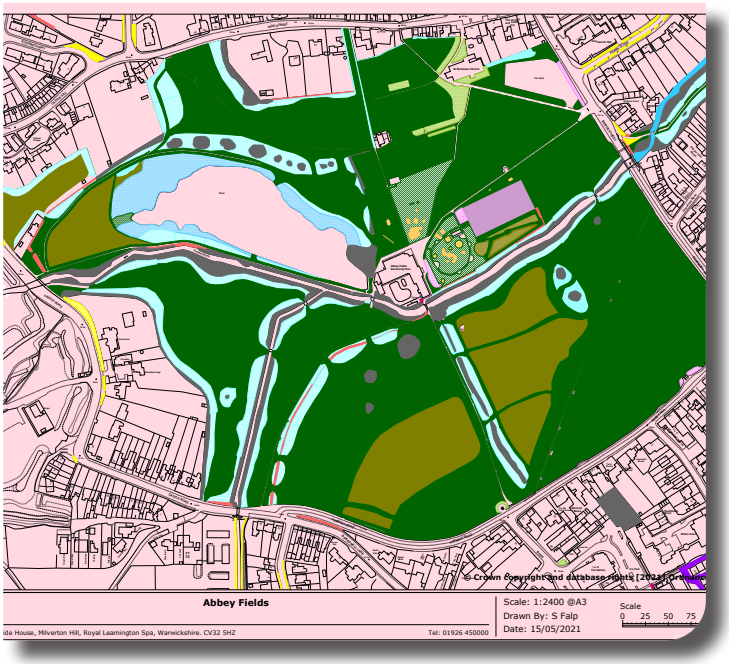
- **Warwickshire Biological Records Centre (November 4th, 2020)**
- **Natural England - MAGIC system for conservation sites**
- **National Site Network (European statutory nature conservation sites (UK) within a 5km radius (10km for bat species)**
- **UK Statutory Sites (within a 2km radius)**
- **Non-statutory sites and protected/ notable species (within 2km radius)**
- **Phase 1 habitat survey (October 27th 2020 & July 1st & 13th 2021)**
- **Phase 2 habitat survey**
- **Designated sites**

Abbey Fields and the adjoining St. Nicholas Churchyard are designated as a Local Wildlife Site (LWS) and Ecosite, respectively. The LWS designation is based on a mosaic of habitats which the 27 ha. site supports (including woodland, priority grassland, wetlands, scrub, mature trees and those listed in habitats section below, all of which have dependent species. In particular, the site supports acid grassland (a national and local priority habitat) as well as a riparian corridor that links other sites in the area.

Habitats

Key habitats within the site of particular value for nature conservation, comprise of:

- **Semi-natural broadleaved woodland**
- **Mature and veteran trees (as parkland or avenue trees)**
- **Acid grassland**
- **Neutral grassland (amenity grassland)**
- **Ponds and wetlands**
- **Built environment (buildings/walls)**
- **Introduced scrub & natural scrub**
- **Plantation woodland**
- **Reed-swamp**
- **Running water**
- **Scattered trees**
- **Species rich hedgerow**
- **Standing water**
- **Tall ruderals**



Species

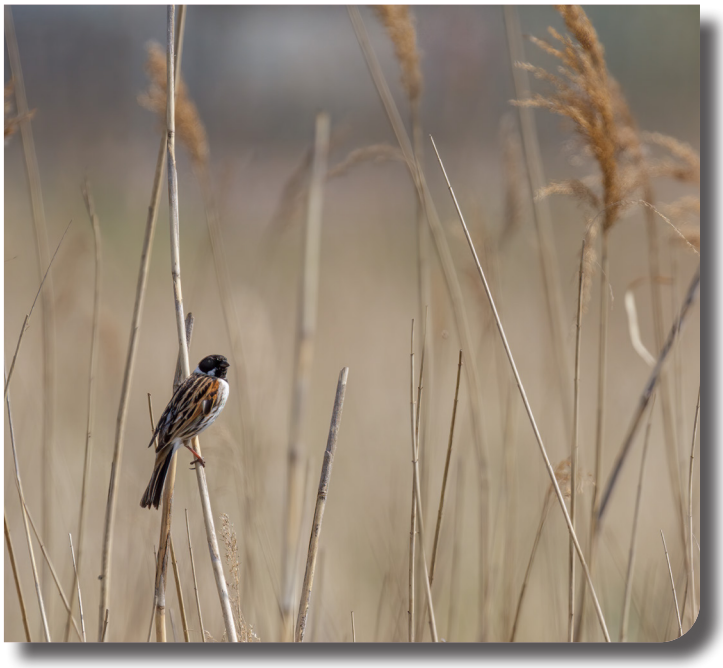
A number of protected and/or notable species have been recorded on the site and within a 1km vicinity.

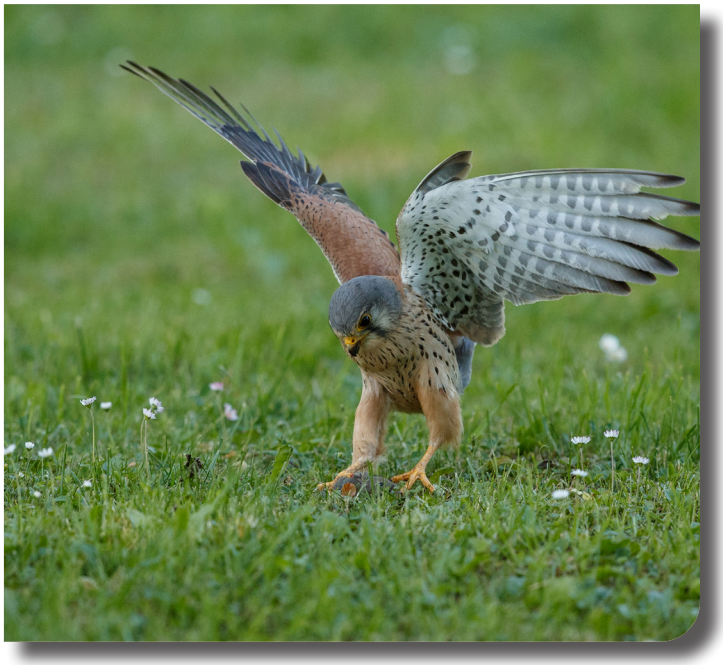
These include Species of Principle Importance for Nature Conservation and Local Biodiversity Action Plan priority species.

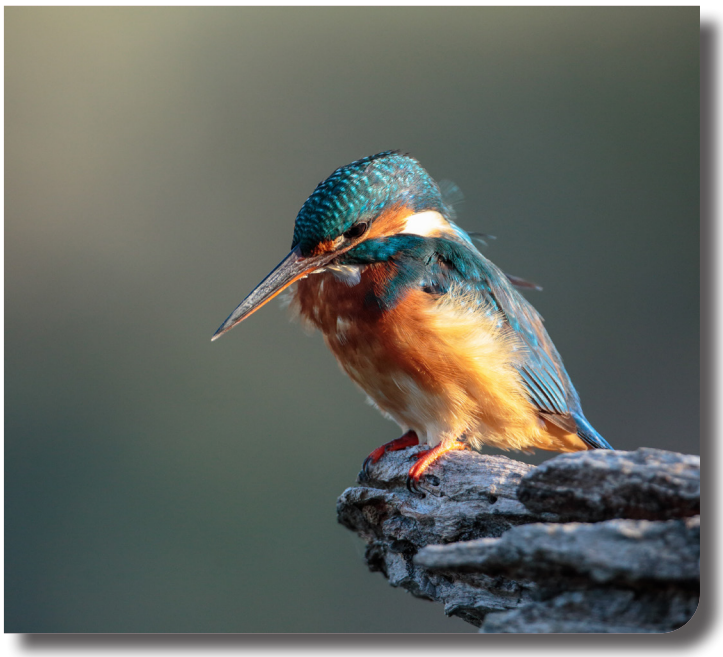
The following species or species groups identified within the search records are considered of particular interest given the habitats present on site and potential management implications:

- **Bats:**
  (on-site*) daubenton's, natterer's bat, noctule, pipistrelle, soprano pipistrelle, brown long-eared bat, common pipistrelle. (off-site) leisler's bat
- **Amphibians:**
  (off-site) common toad, common frog, great crested newt, smooth newt
- **Reptiles:**
  (on-site) slow worm (off-site) grass snake, common lizard
- **Invertebrates:**
  (off-site) stag beetle
- **Birds:**
  (on-site) kingfisher*, barn owl* (off-site) fieldfare, redwing, red kite, greylag goose*, Whooper swan*
- **Birds of Principal Importance within 1km:**
  lapwing, reed bunting, marsh tit and dunnock
- **Birds on RSPB Amber List within 1km:**
  tawny owl, kestrel and mute swan

** Potentially on-site due to 6-figure grid reference code, therefore could be within 100 meters.*



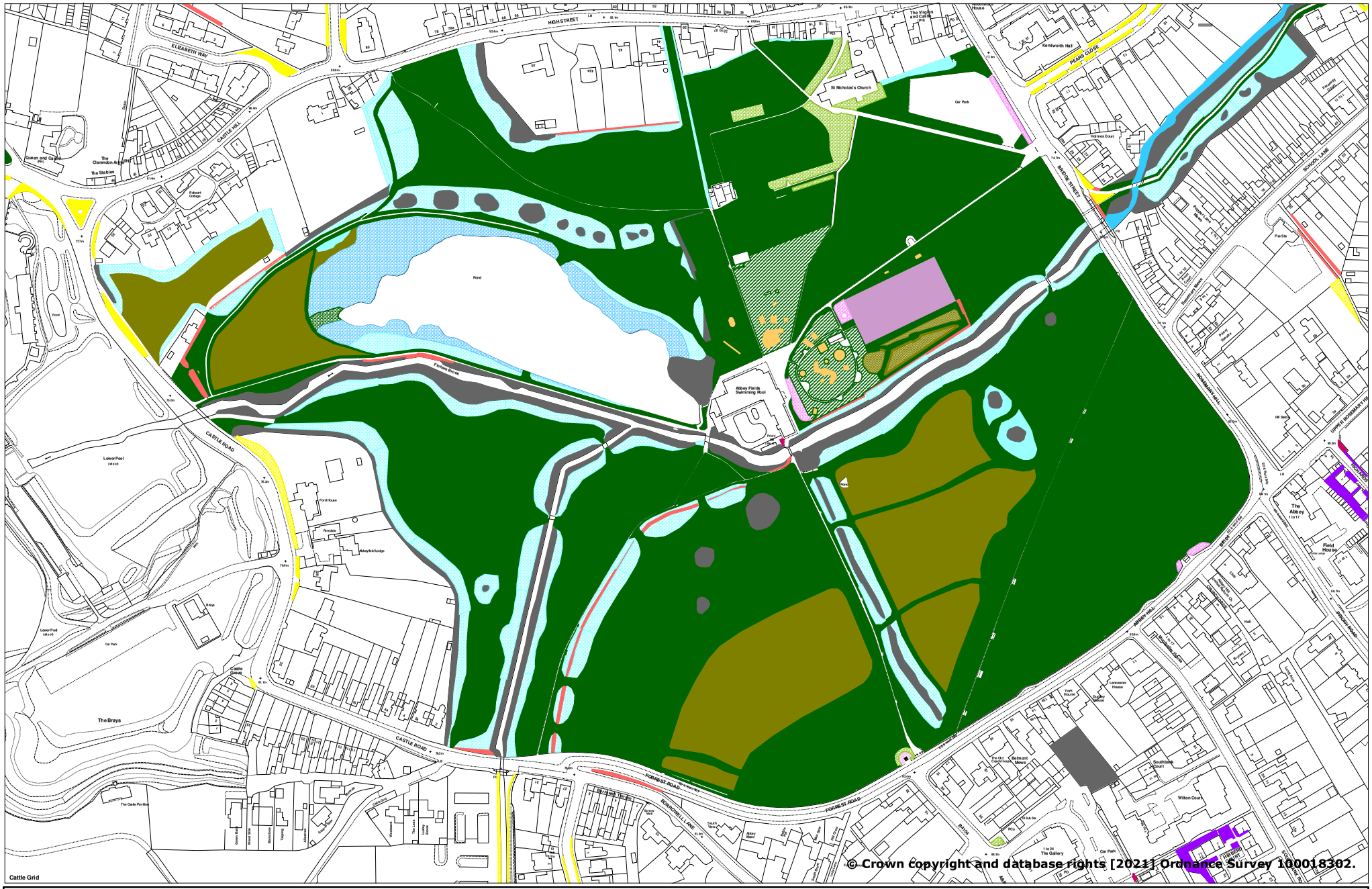




Implications

Given the findings collated through site visits, ecological records and the Middlemarch ecology report; the following priority habitats have been identified for specific consideration within the Habitat and Management Plan with, key issues and management implications identified.

It should be noted that some proposed interventions may be subject to Historic England Approval.



WARWICK DISTRICT COUNCIL

Abbey Fields

Riverside House, Milverton Hill, Royal Leamington Spa, Warwickshire. CV32 5HZ Tel: 01926 450000

Scale: 1:2400 @A3
Drawn By: S Falp
Date: 15/05/2021

Scale
0 25 50 75 100 125 m

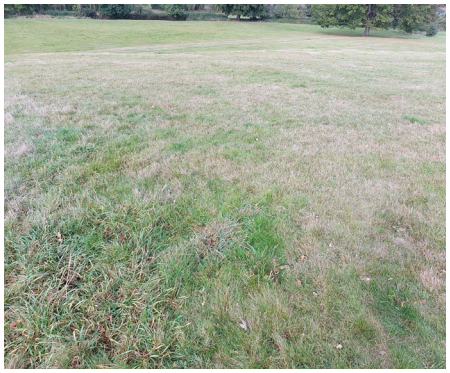
N

Priority habitat	Description and target species
Semi-natural broadleaved woodland  Plates: 36, 48, 56, 110, 114, 116, 118, 120, 124, 134,174, 176,178, /// what3words locations: lace.strike.fish nods.luxury.bigger soccer.dress.agents with.wounds.retire tired.basin.expand	Found in linear areas, generally bordering the water courses that cross the site. Notable mature and diverse broadleaved woodland is present along the entirety of the Finham and Luzely Brook. Oak, poplar, holly, ash, alder, sycamore and beech forming a closed/dense canopy over the Finham Brook. A few notable mature trees had English ivy growth which formed large clumps. Hazel, blackthorn, hawthorn, holly, ivy, elder and bramble were present in the understorey alongside regeneration of sycamore, oak and ash. The field layer was not obvious on this visit (October), although signs of late regenerating spring plants such as red campion were present along with ferns, nettles, sedges and grasses along the banks. Pockets of Himalayan balsam observed in flower/seed. Willow (Salix spp.) is dominant along the Luzely Brook which flows into Finham Brook and is causing over-shading and debris in the channel. There is an understorey dominated by bramble and tall ruderals which offers sanctuary for birds.

Issues	Management Implications
• Overcrowding of the watercourse particularly from regeneration of sycamore and willow • Encroachment of bramble in the field layer lessening the opportunity for floral diversity • Safety issues associated with dead wood / tree stability due to entry points into the brook caused by dogs, children etc • Bank erosion found beneath several mature/veteran Oak's on the Finham Brook, leading to possible deterioration of trees and a health/safety risk to the public • Invasive species such as Himalayan balsam spreading downstream to effect other areas/sites • Severe canopy cover of Willow (Salix fragilis) along the Luzely Brook causing shading to the banks and watercourse and lessening understorey and field layer diversity	• Potential opening of canopy/glade creation to encourage understory and field layer regeneration • Cyclical understory management to create open areas for regeneration • Erosion control of banks, especially around root systems of mature trees • Potential for creation of standing deadwood from ring-barking sycamore and Willow where it does not conflict with health and safety concerns • Further survey and monitoring needed to assess possible impact on bats and birds that use the linear woodland for commuting/ foraging/roosting and nesting • Ongoing management control of invasive species (Early summer before flowering of Himalayan balsam, preferable) • Tree management (such as pollarding/ coppicing) carried out in-keeping with aesthetic of site with interpretation, awareness and education properly provided • Willow management techniques such as pollarding on a rotational basis to provide structural diversity along Luzely Brook and encourage a more diverse understorey

Priority habitat	Description and target species
Mature adult and veteran trees  Plates: 21, 43, 52,146, 110, 119, 174, 176 /// what3words locations: sums.spun.lace clubs.quiet.gravel thing.stone.valley shot.cove.spill	Mature adult trees are identified throughout the site as either parkland trees, or within wooded areas or avenues. A number of veteran trees are to be found along the edges of Finham Brook (mainly oaks) and along hedge boundaries around the site. These mature adult and veteran trees support a range of priority bird and invertebrate species including, lesser spotted woodpecker, greater spotted woodpecker, tree creeper, nuthatch, tawny owl, little owl, and possible redstart and spotted flycatcher as well as roosting opportunities for bats, including all those listed in the above 'species' section (especially Noctule bats). 2,500 species are related to mature oak trees including lichens, fungi, moths, and invertebrates.

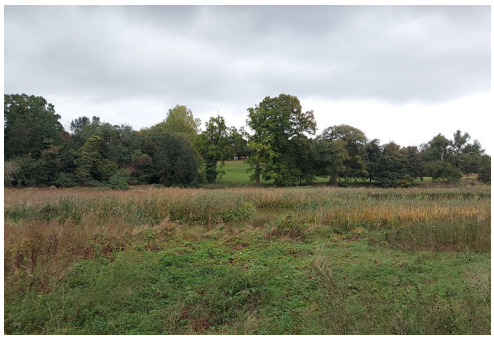
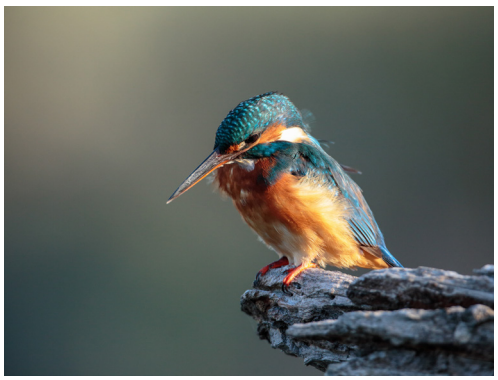
Issues	Management Implications
• Security and longevity of canopy and root systems from overcrowding species and ground compaction, soil erosion and stress caused by pollutants • Safety issues associated with dead wood / tree stability • Tree diseases spread by human and animal interactions • Poor maintenance of trees leading to fungal attack from stress, rot or limb failure/splitting	• Surveys for the purpose of the Ancient Tree Inventory and The Tree Register • Potential for nearby vegetation/canopy/limb management to improve tree health • Planting of replacement trees and adequate protection • Tighter controls over horticultural movements on-site, equipment and tools to avoid spread of disease • Retention of dead wood as standing where appropriate or fallen where it does not conflict with safety of site users • Consideration and assessment to related species before any tree management work is carried out • Combine with Abbey Fields and Warwickshire-wide Tree Strategy

Priority habitat	Description and target species
Acid grassland (semi-improved)  Plates: 29, 140, 186 /// what3words locations: logic.legs.skinny	About 1ha of the site providing habitat for notable invertebrates, and foraging resource for wildlife, including green woodpecker, meadow pipit, skylark, kestrel, common lizard, adder, small mammals, meadow ants, mining bees and butterfly species including, meadow brown, small copper and small and large skippers BAP species associated with lowland dry acid grassland: • 4-banded weevil wasp (Cerceris quadricincta) • 5-banded weevil wasp (Cerceris quinquefasciata) • oak mining bee Andrena ferox • banded mining bee (Andrena gravida) • brush-thighed seed-eater (Harpalus froelichii) • a ground beetle Harpalus dimidiatus • field cricket (Gryllus campestris)

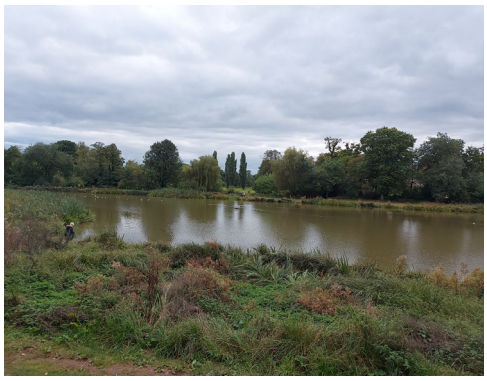
Issues	Management Implications
• Recreation pressure, including trampling/ compaction/erosion/pollution from litter/ dog fouling • Inappropriate cutting cycles, lengths, timings and removal of cuttings • No diversity in the vegetation caused by inappropriate management • Colonisation and increased abundance of coarser grasses, herbs and weeds including Ragwort, Thistles, Nettle and Doc • Possible colonisation and abundance of scrub/trees including future inappropriate planting of memorial trees, leading to shading and or nutrient enrichment as a result of nearby trees or woodland	• Potential measures to manage recreation use, including longer length patches and creating pathways with rotational 'cut' zones Identification of key zones for potential restoration to increase vegetation diversity: Use test patch areas for green-hay dispersal from local Acid Grassland donor site/s • Appropriate acid grassland management to favour associated species: creating biannually cut zones (six) to create structure and age mosaics, with main cut in September and arisings removed. Six zones in total – Three of those zones cut each year on rotation with half of the area not cut for two years to leave areas of cover/food in winter • Interpretation is a necessity to educate and inform site users by way of signs community engagement, and awareness of management aims and why • Decrease coarser species by mowing in July (if necessary, in patches) as well as September to remove thatch • Implement and maintain surveys and monitoring of baseline data and changes • Selected removal of trees or scrub (if necessary), that may be causing issues with shade, seed dispersal and nutrients

Priority habitat	Description and target species
Neutral grassland Plates: 29, 140, 186 /// what3words locations: affair.places.truly print.fully.wink motor.table.escape	Areas with relaxed mowing regimes allowing the development of meadow grassland habitat. Potential habitat for notable, uncommon plant species, diverse insect fauna, reptiles and amphibians- providing foraging resource for a range of birds and mammals. UK BAP species related to this classification of grassland, are: Small Heath butterflies whose caterpillars rely on finer/ short grasses such as fescues, bents and annual meadow grasses. Skylark use grasslands in this class for nesting in early spring. Starlings are often found feeding on the seed husks left over in winter and forage through the shorter grassed areas. House sparrow and tree sparrow both utilise seed head food sources on the more uncommon plants such as knapweed and scabious. An abundance of cricket and grasshopper's, moths and flying insects also rely on the mixture of tall and shorter grasses during peak summer months.

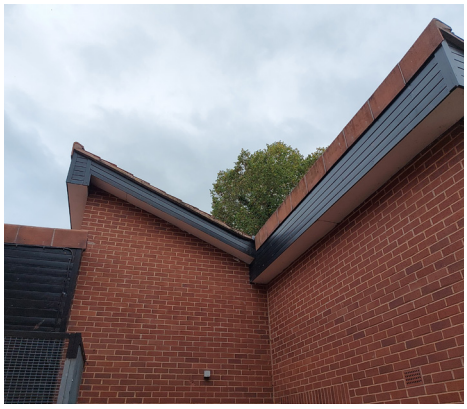
Issues	Management Implications
• Colonisation or abundance of scrub trees encroaching from nearby planting • Possible inappropriate introductions of perennial plug plants • Public perception of meadow area with longer grasses being kept throughout summer • Incorrect timing of cut and removal of arising, or the non-removal of arising at all causing a thatch to accumulate • Taking the cut too low therefore not leaving enough sward for overwintering species • July cuts can seriously affect the populations of grasshoppers and crickets • August and September cuts, whilst better for wildlife, can encourage stronger plant species to encroach leading to a reduction in plant diversity and nectar resource in later years • Recreational pressure from park users, including dog fouling and increased nutrients on soil composition leading to adaptive vegetation taking hold (doc and nettle)	Appropriate grassland management to favour long-term diversity, including; • Creating zones of rotational cuts can create greater diversity to encourage a number of species all-year round. Protracted cutting between July and September within zones • Biannual cuts on rotated zones, leaving half of those zones to over-winter until the following April cut (then no shorter than 100mm). • Maintain half of the zones at >150mm for overwintering species and create shorter areas from 100mm as borders to taller grasses • Remove all arisings after majority of seeds have dropped (7-10 days) • Mowing of pathways through area to encourage a diversity of vegetation including low-growing grasses and herbs • Promote interaction and provide education and engagement opportunities (spotter sheets/citizen science apps or campaigns) • Interpretation boards needed to explain meadow management and species that benefit • Potential opportunities for enhancement through further seeding/plug • Planting, including yellow rattle and red clover • Transferring of green hay from donor sites into test patches in zoned areas (donor sites with increased diversity of plant species)

Priority habitat	Description and target species
Standing water and Reed-swamp  Plates: 17, 106, 170, 211, 212, 215, /// what3words locations: smoke.lied.upon moons.looks.fuel march.coins.host chats.goals.unit smashes.bared.layers	A shallow pond forms the main waterbody incorporating approx. 10% of the site in size, and surrounded in wetland related habitats including alder plantation woodland, reedbed (Phragmites, Typha and Carex spp.) with marsh grassland forming a buffer zone. Habitat for breeding and foraging amphibians such as common toad and frog. grass snakes' benefit from this area with transitions between wetland zones, reedbed, grassland and open water. Breeding, nesting and foraging opportunities for bird species including coot, moorhen, mallard, heron and grebe, with the amber listed kingfisher and red listed grey wagtail benefitting from fish and invertebrates in shallow marginal areas. A vital habitat for migrant birds including swallow, swift and house martin which hunt over wetlands for the abundance of rising insects in the morning and evenings. Foraging resource for a range of wildlife including the seven species of bat that have been recorded on the site.
	Enhancement for kingfisher (red listed), via the installation of a nesting bank around the location of the alder/scrub woodland to the South East of the pond; (///march.coins.host). This would provide breeding habitat for Kingfisher in the area and allow for an enhanced engagement/visitor experience on the site

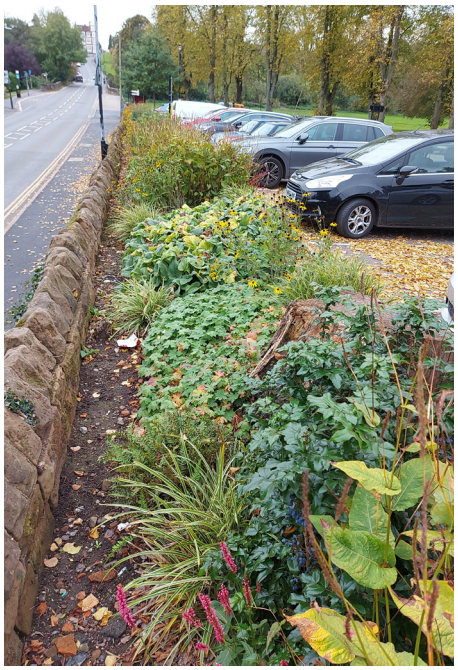
Issues	Management Implications
• Water quality of pond is of low standard due to high numbers of carp/tench and bottom feeding fish. The lake is also affected by run-off from the surrounding landscape and possible high nutrient levels from over-feeding of water fowl • Thinning of plantation woodland to the north of the swimming pool to allow better diversity to establish (///chats.goals.unit) • Conflicts with site users, including dog owners, the feeding of water fowl and the deliberate/ accidental cross contamination or introduction of non-native plants (dogs carrying seed into the water) • Silting-up, shallowing and succession of shrubs, trees and reedbed • Succession of marginal vegetation reducing level of open water and increasing silt build up leading to drying out and shrinking of pond area • Invasive species transferring from running water courses in immediate vicinity through human and animal (dog) cross contamination • The lake area is heavily used and frequently disturbed by pets along with a high amount of bottom feeding fish causing the water to be turbid in nature	• Further potential for edge enhancements around the main water body with further maintenance of reedbed, shrub and trees on a cyclical, compartmental routine especially in the area of alder woodland closest to the swimming pool • Ongoing cyclical vegetation management to create structure and diversity in compartments around the edge of the pond on a 5-year rotation • Invasive species monitoring (surveys) including control (contractor, Friends of Group, volunteers). Seasonal timing of invasive species to avoid further spreading of plant species with intervention for the removal of plant and animal species as and when required
• Kingfisher nest bank would need to be in a secluded spot, within easy access of clear water to a depth of 18 inches with at least 1 meter of drop. Disturbance would need to be minimal around the area. Further artificial/natural perches should be provided around the pond and watercourses for hunting purposes • Area would need to be secured to deter entry into back of the kingfisher bank	• General monitoring and maintenance within the life-time expectancy (20 years). Ongoing monitoring under wider site surveying of bank on kingfisher activity/numbers • Due to clear water being preferred, on-going management of water quality and/or disturbance would be needed before a kingfisher bank could be viable • Possibility of using dead hedges around certain areas to deter entry

Priority habitat	Description and target species
Standing water and Reed-swamp continued 	Further enhancements with the installation of a pond-dipping platform for use by local residents, schools and site users to educate and integrate the community. (///smoked.lied.upon)
	Potential for the creation of at least one more small-scale area of wet grassland (sedge, reed and grassland species) that adjoins the Finham Brook at location ///moons.looks.fuel which would enhance the site further for water-borne species. The banks of the 'depression' (possibly an old pond) would also lend themselves greatly for planting with nectar-friendly species to create a butterfly bank on three sides. Further work to create areas of taller grass, deadwood and underground chambers (hibernacula) in the banks would benefit amphibians, insect (beetles in particular) and common meadow mammals.

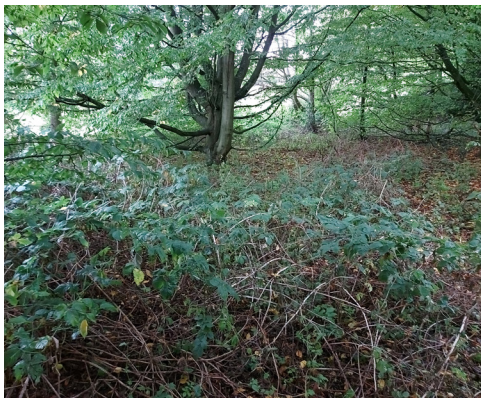
Issues	Management Implications
• Safety of users for any pond-dipping installation and supervision needed by trained leaders • Fenced and gated off platform to deter intrusion when not in use	• General maintenance and safety checks carried out on possible pond-dipping platform although a platform already exists for feeding waterfowl from – this has no access restrictions or barrierssww
• Creating a further area of wet grassland/ marsh would need ongoing management for the removal of vigorous growing species such as common reed and reedmace • Area could cause safety issues with site users as wet bog conditions could form. Another area like this, already exists 100 yards to the east which has boggy conditions. This area is not fenced but does provide an interesting and viable habitat for damp-loving species	• Added wetland area may need fencing off. Maybe issues with drying out or flooding. Would need general maintenance to help become established (would need to check soils and possibility of containment/retention of water) • Halt and reduce the cutting cycle in the depression basin to ascertain what grassland species are present. Possible meadow and wet grassland species could already be present which would support and increase biodiversity on this patch along with pollinator friendly banks • Cutting regime would need to change and interpretation added to inform of work and objectives for the area

Priority habitat	Description and target species
Built environment  Plates: /// what3words locations: eating.lifting.decide enter.bleat.weeks foil.chair.united pillow.sheep.ranked light.curl.grant pushy.verse.doing	Height and aspect of buildings and structures lend themselves to the nesting preferences for certain bird species of concern (amber and red listed) including; • House sparrow (red) • Starling (red) • Swift (amber) • Grey wagtail (red) One possible addition to the site would be to create a structure to provide nesting opportunity for swifts (58% decline in 25 years), such as a swift tower. This could be either a major project and act as a community funded installation as part of wider community swift work, or the erection of poles (telegraph pole size) to accommodate a dozen swift boxes and a solar-powered calling device. The installation of swift tower and boxes could provide further enhancements to community engagement, education and citizen science in conjunction with RSPB's Swift-Mapper App. A potential site for this could be at the northern end of the site; (///pushy.verse.doing) Other Swift projects have utilized church towers for the installation of boxes.

Issues	Management Implications
• The structures on site are included in the Warwickshire-wide LBAP as potential sites for wildlife enhancement, although no visible signs of bird boxes suitable for priority species are observed. • The site already has adequate provision for bats with boxes installed in many locations. There are also a number of bird boxes around the site, although open-fronted bird boxes were not abundant and therefore could be incorporated into areas around the buildings at points; (///eating.lifting.decide ///foil.chair.united ///enter.bleat.weeks) • Certain species of birds may cause more 'management' issues than others if suitable nesting sites were installed. Starlings for example do create far more mess than swifts, although swifts would ideally require nesting sites that are higher up on the buildings. House sparrows and swifts often share the same boxes with swifts arriving later in the Spring after house sparrows have utilized the boxes or to push sparrows out • Other structures on-site could be utilized for grey wagtails, such as under bridges over the Finham Brook at; (///pillow.sheep.ranked) and (///light.curl.grant) • Would need consultation with St. Nicholas church' Parochial Church Council (PCC) to look at installing swift boxes in belfry	• Installing boxes into church belfry would incur ongoing arrangements with church PCC to install, access and monitor usage. RSPB/ *i*dverde have made contact with St Nicholas' in 2022 with a view to incorporating into a Midland's-wide swift project, however at this stage access to the interior has been denied. • Future refurbishment of buildings on-site could provide opportunity to incorporate roof and eaves nesting sites with built-in bricks or fascia for swifts or house sparrows RSPB/ *i*dverde will consult with architects and client for feasibility of swift brick installations in 2022 • Certain species require little or no annual maintenance of nest boxes (swifts) whilst creating very little in the way of whitewash over buildings, footpaths or public areas • No ongoing maintenance of boxes after initial install. The solar swift caller would need to be removed September to April • Surveys of installed boxes or bricks as part of wider site monitoring from 2022 onwards

Priority habitat	Description and target species
Introduced shrubs  Plates: /// what3words locations: hill.error.select descended.adults.lime hogs.broke.bossy	There are three mixed herbaceous plant beds onsite. One of these can be found bordering the car park and the A452 (///hill.error.select). Another is opposite the entrance to the swimming pool (/// descended.adults.lime) A third is at the northern end of the site around a bus stop on Abbey Hill (///hogs.broke.bossy) All of these borders contain a diverse range of annuals and biannual plants which provide added nectar sources for related species in early and late season (March & October), as well as high impact nectar source throughout the summer. Echinops, Vinca-minor, Geranium (Rozanne), Polygonun and Rudbeckia are among several herbaceous plants, that as well as providing nectar source for insects, also exhibit good colour for much of the year and are transforming these recreational areas into aesthetically pleasing spaces. There could be slight improvements to the shrub border outside of the swimming pool building (///descended. adults.lime) with the cutting back of larger/spreading shrubs and bushes (buddleia, conifer) and the removal of invasive plants such as columbine. Adding more high impact plants such as lavender or early flowering bulbs such as dwarf daffodils, snowdrops and snakes-head fritillary to provide more nectar opportunity all-year round.

Issues	Management Implications
• Possibly too many plants flowering at one time rather than spread out across the year • Gaps starting to appear where plants/ shrubs have died back – allowing for weed species to colonise • Large and aggressive species with no particular wildlife benefits overcrowding small to medium size areas • Maintenance is essential to ensure flowering continues throughout the season, including cutting back, watering if needed, weeding, staking and so on. • Can be litter traps so ongoing litter picking on these areas is essential to keep appearance up • Time needed to maintain and weed may lead to unnecessary pesticide use • Where possible, use locally sourced plants and ensure that any imported plant material has the correct documentation i.e plant passport where required	• Shrub beds in three locations on the site are of high benefit to pollinators, particularly butterflies. Ongoing maintenance and planting schemes in these areas should continue as they are • Shrub beds have been well thought out for pollinator benefits, especially the area around the swimming pool entrance which has been laid out as a butterfly border • Only improvements to be made are for re-introduction of plants which have been lost, possibly with early flowering bulbs (if not already planted) or early flowering plants such as lesser celandine, cowslip and wild primrose • The three beds are possibly, already being maintained and managed to be left over-winter and cut back/mulched in early spring. This method of management should continue to allow insects (ladybird, lacewings, butterflies, beetles etc) to find cover and shelter until mid to late March.

Priority habitat	Description and target species
Plantation woodland  Plates: 83,85,89,91 /// what3words locations: closes.price.book stages.shine.share rams.loans.active	Plantation woodland contributes a small fraction of area to Abbey Fields. There are two notable spots where young woodland is starting to reach maturity with a combined area less than an acre. Plantation woodland can often be of lesser value to biodiversity especially if conifers are present. Fortunately, the two areas pinpointed in the site visit are of some benefit and would support some priority species, including hedgehog.

Issues	Management Implications
• Plantation needs intermedial management for healthy tree growth, viable shrub layer and to encourage beneficial vegetation at ground level • Selective thinning or removal of certain trees needs careful consideration • A considered balance between light, shade, moisture retention, the effects of wind and warmth of soils will produce a healthy, maturing woodland • Public perception of thinning/felling trees needs to be addressed with awareness of management needs • Monitoring of waste being dumped over the fences from adjoining houses which may cause to non-native species occurring • Trees fighting for light in close proximity to each other will cause the plantation to become dominated by narrow-girthed, spindly trees which offer less in the way of benefit for associated species • Condensed area of plantation with full canopy shades out shrub and field layer species, encouraging tougher ground cover plants like cow parsley and ivy to become dominant • Many shrubs in the plantation (location) are actually dead or dying and could be better used for the creation of brash piles in the plantation or go towards forming a dead hedge to stop access • •	• The larger plantation at the Northern end of Abbey Fields had a limited understory due to a crowded canopy, although there was a high level of leaf litter, humous-rich soil, intermittent low-level shrubs and access to adjoining gardens – presenting ideal opportunity for foraging and hibernating hedgehogs • This area contains good numbers of blackbirds foraging in the field layer along with robin and blue tit actively foraging in shrub layer. Provision for nest boxes (open and closed front) would be beneficial • Light thinning of the canopy to encourage a more diverse shrub and field layer, leaving timber in-situ to create deadwood opportunity for birds, mammals and insects • Introducing some species into the understory, such as hazel, wayfaring tree, spindle and guelder-rose would provide shrubs with food sources in autumn and winter and increase shrub diversity • Maintain the ecozone or soft edge that is present between the area of amenity grassland and the plantation area. This gradient or transition zone of vegetation (non-mowing) is beneficial for the woodland edge to be less open and more discreet • A further, smaller plantation area can be found at the Southern end of the pond, close to the swimming pool building (location). This area is dominated by alder, with occasional oak and ash. An understory of blackthorn, hawthorn, elder and ground cover of blackberry, nettle cow parsley, sedges, grasses and ivy. This area would benefit from some maintenance on a rotational basis to thin out some alder (20%) and allow a more diverse shrub layer to develop.

Priority habitat	Description and target species
Scrub and Ruderals Plates: /// what3words locations:	This type of habitat is often over-looked for its benefits to wildlife and the surrounding ecosystem. Ruderals play a vital role in urban spaces; often taking the place of vegetation that has become absent due to human intervention. Ruderals are a spontaneous and adaptive group that play a vital role in the urban environment, providing food sources, hibernation areas and cover for a plethora of species from insects to birds and mammals to amphibians. This dense forming area of scrub can often look unruly or is seen as untidy or unkept, but historic research suggests that sympathetically managing these areas can also provide ecosystem services such as carbon sequestration, slowing down run-off into watercourses, especially during heavy rain, and helping to regulate temperature in urban green space – creating micro-climates for a diverse range of species. Ruderals and scrub areas provide buffer zones to sensitive areas such as watercourses, hedgerows and grasslands.

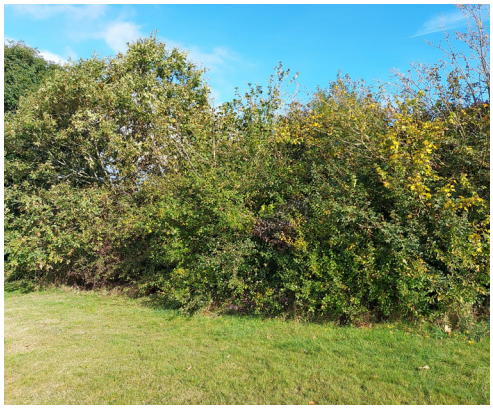
Issues	Management Implications
• Are seen as unsightly due to a lack of understanding around plant/species relationships and an ongoing culture of 'tidiness and order' to appease public opinion • Lack of public or governmental understanding or awareness of the added benefits to the environment scrub areas can bring • Native and non-native scrub must be defined and managed accordingly with non-native species having an impact on the surrounding environment • Management of scrub areas with no phasing or rotational cutting can have detrimental effects on breeding birds and related wildlife through a loss of transition zones between intensively managed areas and non- intensively managed areas • Clearing 20% of bramble/boundary ruderals each year may cause a gap in the amount of viable nesting and feeding habitat for birds, as structure and age is altered	• Site is already being managed sensitively for these habitats with a large proportion of scrub and ruderals being allowed to remain. This ongoing maintenance regime of 20% per year should continue to create structural diversity for bramble and allow other pollinating, berry providing vegetation to establish in cleared areas • Monitoring for effects to dependent species should be implemented and action taken to reduce the 20% if necessary • More awareness and education on the site as to why some types of scrub are left, such as brambles, tall grasses, umbellifer's and creepers • Management enhancements of the cleared areas of scrub (mainly bramble) by introducing a variety of taller, seed producing ruderals which can provide foraging opportunity in winter e.g., teasel, rosebay willowherb, black knapweed or hemp agrimony • Any felling or maintenance of trees in the park should be able to provide dead-wood opportunity for the 20% boundary clearance zones • Deadwood can be installed in heaps or aesthetical hibernacula for bramble to recolonize over

Priority habitat	Description and target species
Running water  **P**lates: 37, 45, 108, 110, 114, 116, 118, 120, 124, 134, 136, 160, 178, 202 ///what3word locations: badge.walks.sheet ears.impact.nests lower.haven.logs bikes.card.tricks trend.reform.lied	Finham Brook and Luzely Brook join at location: ///badge.walks.sheet These are classed as 'near-natural' water courses and are therefore Habitats of Principal Importance in UK Nature Conservation. Both of the watercourses are also contained in the Warwickshire, Coventry and Solihull LBAP. Both watercourses act as natural corridors that traverse the site and link it up with other sites of importance in the local vicinity. The brooks are normally shallow, outside episodes of flooding; consisting of a gravel/sand bed, (rocky substrate in places) and a moderate flow. As with many brooks of this type, the water is aerated and oxygenized by the make-up of the bedrock and natural or man-made obstacles. In some areas those man-made and natural obstacles create deeper pools which could provide habitat for common and niche aquatic species such as white-clawed crayfish and bullhead (*survey dependent information). Due to the distance and habitats the Finham Brook travels through, there is a high possibility that it and the Luzely Brook are utilized by otters (occasionally) gaining access to the pond to hunt, although no records of otters exist for the site. The Luzely Brook may also provide opportunity for water vole, although no records exist – some habitat improvement management of recreational usage may encourage water vole presence. Stretches of the Finham Brook to the east of the swimming pool building are very enclosed in tree and shrub canopy, albeit, the stretch to the north of the building is (in places) more open and wider. The open sections of the Finham Brook are therefore ideal hunting areas for bats which will use the mature tree-lined corridor. The banks of both watercourses contain a wide range of aquatic plant species which benefit a host of water-borne flora and fauna

Issues	Management Implications
• Contamination of water courses from the dispersal of seeds, disease and ground run-off including, Himalayan balsam dispersal from neighboring areas, and fungal cross contamination causing tree and shrub ill-health • Erosion of banks undermining the biodiversity (trees, roots and vegetation) and leading to higher levels of siltation which could change the nature of the waterway • Sporadic flow increases leading to waterlogging, flooding and erosion of banks from formation of pools and eddy's • Stability of banks along the brooks which underpin mature and veteran trees while supporting aquatic plant species beneficial to aquatic life • Colonisation of invasive species, including signal crayfish which take shelter under rocks, within tree roots or in burrows and cavities within banks. • Closed canopies (especially in Luzely Brook) causing reduced biodiversity from over-shading (temperature, humidity, growth potential, light) • High amounts of leaf litter leading to areas of accumulated silt, deadwood and waste blockages- lessening of flow rate with potential to cause silted areas for Himalayan balsam to establish	• Reduce the number of access points into the brooks via fencing, dead hedging, tree planting (with guards and fencing). Interpretation boards must be displayed with information on why • Continue controlling small outbreaks and pockets of Impatiens glandulifera (Himalayan Balsam) across the site while collaborating with neighboring sites to eradicate upstream. Aim to remove Himalayan balsam in early season before flower and seed heads form (May-early June) • Create one dedicated access point for those wishing to use the Finham Brook. An area like this already exists (plate 178), but could be better maintained with bank stabilization and making smaller to deter over- use from dog owners • Willow stakes and spiling (taken from pollarded willow on Luzely Brook), brash and large wood techniques may be deployed to replicate natural regeneration of banks and deter access • Pollarding of Salix fragilis along Luzely Brook on a 25% annual (4-year) rotation • Ongoing monitoring of water quality, siltation rates, decay and detritus in the watercourses with reactional management. Luzely Brook has the potential to support water-vole although it is at risk of becoming silted up, shallow and over-run with encroaching bank-side vegetation of successional species. A plan should be formulated to open the watercourse up by rotational removal of silt, debris, leaf litter, detritus and encroaching vegetation. • Surveys of watercourses to form part of ongoing site surveys for biodiversity

Priority habitat	Description and target species
Scattered trees  Plates: 21, 52, 43, 48, 146, 152, 154, 193, 201, 207 ///what3word locations: drops.mouth.groom heavy.wages.share patrol.itself.former drive.common.define sprint.native.rests	There are an estimated 75-100 scattered trees on the site that provide significant added benefit for a number of reasons; • Intrinsic to the historic heritage of the site • Aesthetical appeal within a parkland setting • Age and structure conducive to habitats suitable for a wide-range of species • Shelter and protection • Carbon sequestration • Pollution control (air, light and noise) • Recreational significance (nature engagement, photography, education, leisure) The areas on site classed as 'woodland' are generally made up of these scattered trees forming clumps, avenues or linear habitats. There are an estimated forty trees of mature adult status including, black poplar, oak, copper beech, ash, white poplar, sycamore and introduced specimens. There are at least six trees (mainly oak and beech) that are approaching veteran status These trees, due to their age, natural shape, structure and lifecycle, provide considerable ecological value to hundreds of species from lichens and mosses to bats and beetles

Issues	Management Implications
• Exposure to elements and recreational pressure (wind, waterlogging, heat, soil compaction, increased nutrients, pollution and spreading of tree disease such as sudden oak death and acute oak decline. • Lack of re-planting or natural regeneration causing long-term loss of a parkland landscape • Biodiversity Fragmentation caused by a lack of interconnectivity between adult and veteran trees across the parkland • Removal of limbs for H&S reasons which may be detrimental to the long-term health of the tree with the deadwood tidied or removed from the vicinity of the donor tree • Overcrowding of mature/veteran trees from younger trees and understory will lead to deterioration in health and longevity of mature/veteran trees • Public perception of scattered trees - not having same benefits as a woodland, meadow or waterbody	• Increased buffer zones under or around trees using taller vegetation as seen already in some areas of the site (giving benefit to further species of insects and birds) with management of shrub and sapling growth • Adopt a plan for successional planting to replenish aging stock of trees within the parkland to ensure a continuity of the landscape • Implementing buffer zones in and around selected mature/veteran specimens will increase connectivity through longer grassed area and newly planted, replacement trees for a diverse tree age structure on the site • H&S of park users is of highest priority. Creating safety zones around certain trees of mature/veteran status (fencing for example) would allow for limbs to stay in situ or at least be left as deadwood in a safe area with access discouraged, especially as oaks reach the stage of retrenchment • Selecting thinning along linear treescapes with limb removal of younger trees or saplings that dehydrate soils. Space and light availability enhanced for mature/veteran trees to breath • Where mature or veteran trees are found within close proximity to hedgerows or younger trees, it is important to manage coppicing, hedge maintenance and vegetation clearance with consideration for light and humidity to avoid loss of delicate moss and lichen species • More interpretation and public awareness of the importance of specimen trees (mature/veteran) in a parkland landscape and the need for connectivity, replenishment and protection from environmental pressures • Veteran trees are listed under the Old Parkland and Veteran Trees category on the Warwickshire, Coventry and Solihull LBAP.

Priority habitat	Description and target species
Species-rich hedgerow & Walls  Plates: 23, 28, 36, 92, 94, 98, 102, 104, 188, 189, 192 ///what3word locations: policy.froze.sober think.noted.puff stow.dips.apron fats.desk.dusk	Hedgerows were found to be diverse in their make-up, with many species present, pointing to possible 'ancient' status with one stretch of hedgerow having at least 5 species along its length: hawthorn (Crataegus monogyna), blackthorn (Prunus spinosa), Dogwood (Cornus sanguinea), elder (Sambucas nigra), field maple (Acer campestre), english ivy (Hedera helix), wych elm (Ulmus glabra), hazel (Corylus avellana) and holly (Ilex aquifolium) all indicating an ancient hedgerow system. Some other hedgerows on the site could be left-overs from old boundaries dating back from pre-enclosure times. Further survey work would need to be carried out in Spring to get a data set of the species that make up these habitats. Maintenance of the hedgerows is currently 'sympathetic' and in-keeping with the aesthetic of the site while exhibiting good management for wildlife and longevity of hedgerows. There is an abundance of stone walls around the site especially in St Nicholas' churchyard (plate 192) and around the ruins of the abbey. Other locations are found at the northern end of the Abbey Fields alongside an access point from High Street: plates 94, 98 and 104 (///fats.desk.dust). These ancient and modern structures provide ample habitat for many specialist species of plants which prefer shade/sun or damp conditions often found next to or in walls, including ferns (Polypodium spp.) Birds, insects, mammals and the possibly, reptiles and amphibians (survey dependant), utilise these walls for nesting, shelter and foraging purposes.

Issues	Management Implications
• Potential issues could arise from a change in cutting regime and a loss of diversity and structure • Hedge becomes overgrown and species start to outcompete each other and surroundings. Tree species will take advantage and lead to hedges becoming fragmented over longer periods of time • Hedges trimmed to short or at the wrong time will provide less coverage for nesting and foraging purposes, or may not flower or produce nectar, seed or berries at all when needed • Some species prefer high hedges with new growth for perching and foraging, some species prefer shorter more compact hedges for cover and nesting • Balance between access (footpaths that border hedgerows), vegetation around base of hedgerows and height of hedges leading to a change of view across the landscape • Public perception of hedges, views, access and general upkeep • Removal of vegetation from walls can lead to benefits for some (reptiles) and disadvantages for others (amphibians) due to heat, moisture retention and removal of woody debris	• Maintain the current hedgerow management regime as this is beneficial to biodiversity, longevity of hedgerow and aesthetic of parkland • Laying of hedges should be considered if within the ten-year management plan, only if hedgerows show signs of structural deficiency • Possibility of creating new tracts of hedgerow to connect habitats, further divide up areas (such as the neutral grassland) or act as buffer zones for sensitive habitats (riparian, mature or veteran linear tree features) • Consider some longer cut cycles as pressure can be put on the hedge in the long term by repeat cutting at the same height. Again, zoning lengths of hedgerow may help to form a cycle of cuts and create more structure along the length • All hedgerow maintenance should be avoided between 1st March and 31st August which is bird breeding season • Maintain the current plan of tall ruderals, nectar rich vegetation, grasses and shrubs at the base of the hedgerow which all offer extra wildlife benefits and stop the hedgerow from drying out • Maintenance of wall structures and vegetation around them, or more specifically, in them • Surveys of hedgerows and walls should be ongoing, especially during bird breeding season and Spring or Autumn