



Retford Town Centre Neighbourhood Plan

Ecological Assessment

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For:

Retford Town Centre

Neighbourhood Planning Group Management Committee

Control sheet

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1. Introduction

1.1. Purpose and Scope of the Report

1.1.1. EMEC Ecology was commissioned by Retford Town Centre Neighbourhood Planning Group Management Committee to complete an ecological assessment of Retford town centre, detailing the current ecological value and recommending ways of increasing the ecological value of the Site (see Figure 1) through creation and enhancement of green areas. Objectives of the assessment included:

- To provide a critical analysis of the suitability of plants and trees within the town centre;
- To recommend alternative species with regards to the ecological value and the amenity of the town centre users;
- To recommend the feasibility of creating a wildlife corridor access the town centre;
- To assess the suitability of planting a tree on the town centre roundabout;
- Identify the current ecological value of the town centre, with regards to areas already providing high ecological value and areas with negligible value, and;
- To assess the quality of the various ‘mini-parks’ (areas of green space separating buildings and hardstanding) and provide a concept design to improve one of the mini-parks.



Figure 1 – Image of the site¹

¹ (Imagery ©2021 Google, Imagery ©2021 Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2021)

1.2. Site Location and Context

1.2.1. The Site encompasses an area of Retford town centre identified by the red-line boundary in Figure 1, above; hereafter referred to as the ‘Site’. The Site largely encompasses buildings and hardstanding with some areas of green space (largely amenity grassland, planted trees and non-native introduced shrubs) providing some ecological value to Retford town centre. Bordering the west, a small section of The River Idle is located within the Site and is lined with broadleaved trees, grassland and scattered scrub. The Chesterfield Canal (Local Wildlife Site) borders the southern edge of the Site and provides a corridor for terrestrial species and suitability for aquatic species such as fishes and waterfowl.

1.2.2. Areas of high ecological value that are located just outside of the Site include, Spa Common (south-east) and King’s Park (south-west) these green spaces comprise largely amenity grassland and broadleaved parkland scattered trees and provide refuge and foraging suitability for amphibians and small mammals including European hedgehog (*Erinaceus europaeus*), terrestrial invertebrate suitability, nesting and foraging opportunities for birds and commuting, foraging and roosting opportunities for species of bat. Areas within the Site earmarked for potential ecological opportunities can be seen in Figures 2 and 3.



2. Methodology

2.1. Desk Study

- 2.1.1. A desk based appraisal for the Site was undertaken. The MAGIC (Multi-Agency Geographic Information for the Countryside) website was reviewed to identify any statutory and/or non-statutory designated nature conservation sites, Habitats and Species of Principal Importance (Section 41, NERC Act, 2006) and any other protected and/or notable species or habitats within the study area. Nottinghamshire Insight Mapping was used to identify any non-statutory designated nature conservation sites.
- 2.1.2. Ordnance Survey (OS) maps and aerial photographs (maps.google.co.uk/maps) were reviewed to identify other notable habitats within the Site and National Biological Network (NBN) atlas identified historic records of fauna and flora within the Site.

2.2. Field Survey

- 2.2.1. A walkover of the Site was undertaken to assess the ecological value of the habitats present and to identify areas which could be enhanced and areas where habitat could be created to increase the ecological value of the Site. The potential of habitats to support legally protected and/or notable species was also considered. An ecological opportunities plan (Figures 2 and 3) was completed using Geographical Information Systems (GIS), Target Notes (TN) detailing notable habitat and areas highlighted for future enhancement/habitat creation.

3. Results



3.1. Desk Based Assessment



- 3.1.1. There were no statutory designated nature conservation sites within the study area, however a stretch of the Chesterfield Canal (located to the southern edge of the Site) was identified as a Local Wildlife Site. This non-statutory designated nature conservation site offered suitable foraging and commuting habitat for species of bat such as Daubenton's bat (*Myotis daubentonii*) favouring riparian habitats. Aquatic plant species offered suitable resting and breeding habitat for common fresh water fishes such as roach (*Rutilus rutilus*), bream (*Abramis brama*), pike (*Esox lucius*) and three-spined stickleback (*Gasterosteus aculeatus*). Waterfowl including mallard (*Anas platyrhynchos*), coot (*Fulica atra*) and moorhen (*Gallinula chloropus*) also use the Chesterfield Canal for nesting and foraging, whilst kingfisher (*Alcedo atthis*) are likely to use the waterbody for commuting and foraging.
- 3.1.2. The River Idle and an area of deciduous woodland (TN18) within King's Park to the south of Sports Direct (NGR: SK70358114) were identified as Habitats of Principal Importance (HPI), these provided high ecological value. Although the area of deciduous woodland was located outside of the Site, it was connected to the Market Square though a strip of amenity grassland and scattered trees. This linking corridor could be enhanced to increase its biodiversity value which will in turn offer a more diverse commuting link between the woodland and the habitats present within the Market Square.



3.2. Habitats



- 3.2.1. Habitat locations are detailed in Figures 2 and 3 below, whilst Table 1 provides a description of species currently present and their ecological value. Habitats were defined using UK Habitat Classification (UK Hab). Plant species nomenclature follows Stace (2019).




Table: 1 - Habitats On Site

Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p>Other Neutral Grassland</p> <p>An area of neutral grassland (TN23) was identified to the north-west boundary of the Site. Found along the banks of the River Idle, species composition was poor and dominated by perennial rye-grass (<i>Lolium perenne</i>), false oat-grass (<i>Arrhenatherum elatius</i>), common couch (<i>Elytrigia repens</i>), cock's-foot (<i>Dactylis glomerata</i>), cow parsley (<i>Anthriscus sylvestris</i>) and common nettle (<i>Urtica dioica</i>).</p>	<p>Low ecological value, due to low species diversity. Suitability for foraging and resting small mammals, common amphibians and birds. Sward height was largely tall (>40cm) species composition indicates lack of management and nutrient input.</p>	523m ²	Poor	Sowing a spring-summer flowering mix will incorporate a diverse assemblage of wildflower and grass species and would increase pollinator habitat within the immediate area.	
<p>Other Neutral Grassland</p> <p>An area of other neutral grassland (TN25) was assessed to the east of Sports Direct. Tall herb perennials/biennials were present although the management regime at present was more consistent with that of neutral grassland. Species comprised; weld (<i>Reseda luteola</i>), spear thistle (<i>Cirsium vulgare</i>), dandelion (<i>Taraxacum officinale</i> agg.), cleavers (<i>Galium aparine</i>), groundsel (<i>Senecio vulgaris</i>), common nettle, hawk's-beard (<i>Crepis</i> Sp.), red dead-nettle (<i>Lamium purpureum</i>), small-flowered crane's-bill (<i>Geranium pusillum</i>), mallow (<i>Malva sylvestris</i>), broad-leaved dock (<i>Rumex obtusifolius</i>), cut-leaved crane's-bill (<i>Geranium dissectum</i>), mugwort (<i>Artemisia vulgaris</i>), cow parsley, yarrow (<i>Achillea millefolium</i>), white clover (<i>Trifolium repens</i>), green alkanet (<i>Pentaglottis sempervirens</i>), false oat-grass, forget-me-not (<i>Plagiobothrys</i> Sp.), herb-Robert (<i>Geranium robertianum</i>) and butterfly-bush (<i>Buddleja davidii</i>).</p>	<p>Low ecological value, due to low species composition due to intensive management regime. Suitability for small mammals and common invertebrate species.</p>	20m ²	Poor	Enhancement of this area by sowing a species rich flower and nectar seed mix such as 'N4 summer flowering butterfly and bee meadow mixture' would increase pollinator foraging habitat.	

Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p>Other Neutral Grassland St Swithun’s Church and graveyard (TN33) provides a large area of managed neutral grassland. The sward was short during the survey and is likely subject to a regular mowing regime. Species comprised bulbous buttercup (<i>Ranunculus bulbosus</i>), common mouse-ear (<i>Cerastium fontanum</i>), hawkweed (<i>Hieracium</i> Sp.), lesser trefoil (<i>Trifolium dubium</i>), smooth meadow-grass (<i>Poa pratensis</i>) and sticky mouse-ear (<i>Cerastium glomeratum</i>).</p>	<p>Low ecological value, due to lack of varying sward height and low species composition, although no invasive species were present and bare ground was <1% coverage of the total area. Suitability for pollinators when sward is left to flower and small mammals. The mosaic of habitats including the scattered urban trees within the graveyard increase the ecological value a substantive amount (see Urban trees section below).</p>	920m ²	Poor	<p>A selective management regime could be adopted leaving areas un-cut to allow a varied sward height providing a mosaic amongst the grassland. Seeding select areas with a species rich flower and grass mix would increase the biodiversity value. Native bluebells could be planted beneath the mature trees offering pollinator habitat.</p>	
<p>Modified Grassland A strip of modified grassland (TN18) was assessed to link King’s Park to the Market Square, intensive management is evident although the sward was 20cm during the initial survey. Species comprised largely perennial rye-grass (<i>Lolium perenne</i>), white clover, dandelion and groundsel.</p>	<p>Low ecological value, due to low species diversity and intensive management regime. Suitability for small mammals, common amphibians and foraging suitability for common passerines.</p>	265m ²	Poor	<p>Enhancement of existing grassland with a native flower and grass mix such as Naturescape’s Butterfly Plant Collection could be undertaken to increase the value of this strip of grassland. A mowing regime would need to be adopted.</p>	

Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p>Other Woodland-Broadleaved</p> <p>An area of broadleaved woodland was found to the north of Armcott way, comprising largely ash (<i>Fraxinus excelsior</i>), sycamore (<i>Acer pseudoplatanus</i>), aspen (<i>Populus tremula</i>), robinia species (<i>Robinia Sp.</i>) and maple (<i>Acer Sp.</i>). Stands were young to semi-mature lacking any deadwood and veteran stands. The shrub layer was sparse and ground flora lacking diversity, the area was fenced and was assessed from the pavement.</p>	<p>Moderate ecological value, due to number of non-native tree species. Suitability for small mammals, common amphibians and foraging and nesting suitability for common bird species.</p>	6187m ²	Poor	Provision of bird and bat nest boxes and planting of native tree species such as rowan (<i>sorbus aucuparia</i>), elder (<i>sambucus nigra</i>), whitebeam (<i>sorbus aria</i>) and hazel (<i>Corylus avellana</i>).	
<p>Line of Trees</p> <p>Lines of broadleaved trees were found along The River Idle (TN36) to the north-west boundary of the Site and along the Chesterfield Canal towards the southern edge of the Site. Species composition was largely similar, comprising young to semi-mature stands of ash, Norway maple (<i>Acer platanoides</i>), sycamore and poplar (<i>Acer Sp.</i>). Lines of trees were identified along the Arlington Way and surrounding super market car parks including Asda, along Carolgate and within the Market Square. Tree species identified within the Market Square comprised entirely London plane (<i>Platanus occidentalis x orientalis</i>) which offered very low ecological value. Hornbeam (<i>Carpinus betulus</i>) dominated the line of trees along Carolgate, this species offered foraging suitability to a range of species, including caterpillars and foraging of the seeds by finches and tits.</p>	<p>Moderate ecological value offering good commuting and foraging corridor for bats and nesting opportunities for common bird species. Distinct lack of shrub layer/ground flora, limiting diversity somewhat.</p>	1600m	Moderate	Thin out any non-native species such as Norway maple and plant any gaps with native stands. Provision of bird and bat nesting boxes to increase biodiversity value.	

Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p>Scrub An area of recently cleared scrub (TN35) was identified outside of the Site boundary, located to the very north-west. Broadleaved trees bordered and the River Idle ran south to north along the eastern edge. Species comprised bramble (<i>Rubus fruticosus agg.</i>), common nettle, ground elder (<i>Aegopodium podagraria</i>) and hawthorn (<i>Crataegus monogyna</i>). Prior to being cleared this habitat would have offered nesting and foraging habitat for a range of bird species, invertebrate suitability which in turn would offer bat foraging habitat. Small mammals including European hedgehog and common amphibians will likely have used this area for refuge and foraging.</p>	<p>Moderate ecological value prior to being cleared. Post clearance, this habitat offers low ecological value, although the remaining trees offer suitable bird nesting habitat and foraging suitability for bats.</p>	7267m ²	Poor	Native planting of shrub species such as elder, dogwood (<i>Cornus sanguinea</i>), dogrose (<i>Rosa canina</i>), alder buckthorn (<i>Frangula alnus</i>) and allow an area for bramble (<i>Rubus fruticosus agg.</i>) to establish to provide sheltering opportunities for hedgehog.	
<p>Canal and River The River Idle and Chesterfield Canal bordered the western edge and southern boundary, respectively. Both supported aquatic vegetation albeit low quantities were found within the canal. The River Idle featured long trailing strands of river water-crowfoot (<i>Ranunculus fluitans</i>) which oxygenated the water, small ledges and riffles offered suitable foraging and resting areas for species of fish including brown trout (<i>Salmo trutta</i>) and chub (<i>Squalius cephalus</i>). Both linear features offered commuting and foraging habitat for bats and birds, the canal also likely offered common amphibian breeding suitability.</p>	<p>High ecological value, offering suitability to a range of aquatic and terrestrial species.</p>	1260m ² – River 1248m ² - Canal	Moderate Moderate	Provision of in-channel habitat if possible such as submerged logs and boulders to provide riffles and pools to provide fish spawning habitat. Removal of non-native invasive species (INNS) such as Himalayan Balsam (<i>Impatiens glandulifera</i>). Removal or modification of the weir would help return the river to a more natural state and allow ease of movement for migratory fishes.	 <p>The River Idle; where the old 'red-ford' was located.</p>

Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p>Urban - Introduced Shrubs</p> <p>There were several raised planters (TN29) located across the Site, comprising introduced shrub species such as; Japanese rose (<i>Rosa rugosa</i>), snowberry (<i>Symphoricarpos albus</i>), Portugal laurel (<i>Prunus lusitanica</i>), cotoneaster species (<i>Cotoneaster</i> Sp.), cherry laurel (<i>Prunus laurocerasus</i>) and fortune’s spindle (<i>Euonymus fortunei</i>). Although this habitat provides cover for common bird species and small mammals their ecological value is low and often out competing native species.</p>	<p>Low ecological value offering cover and foraging suitability for birds and small mammals.</p>	785m ²	Poor	Planting with a wildflower seed mix and native shrubs such as dogwood and elder to increase pollinator and bird foraging and mammal sheltering opportunities.	
<p>Urban Tree</p> <p>The town centre featured a number of urban trees of young to semi-mature age class. A notable copper beech (<i>Fagus sylvatica</i>) which featured veteran characteristics was located to the east of Riverside Heath Centre. Other notable urban trees were located within New Street car park and along Wharf road, comprising a mature London plane and Norway maples, respectively.</p>	<p>Low ecological value. On their own urban trees offer an ecological island within an urban environment. The species of tree present within the Site offered low ecological value other than nesting habitat for common bird species and limited invertebrate habitat.</p>		Poor	Removal of non-native stands and re-planting with native species such as whitebeam, alder and hornbeam (<i>Carpinus betulus</i>). Ensuring minimal gapping within the canopy by planting additional stands. Allow a root protection zone to be established to protect tree health.	
<p>St Swithun’s Church graveyard comprised several mature stands including horse-chestnut (<i>Aesculus hippocastanum</i>), common lime (<i>Tilia platyphyllos x cordata</i>), sycamore and cherry (<i>Prunus padus</i>). Although non-native, veteran characteristics were present within the horse-chestnut, offering micro-habitats for birds, bats and invertebrates.</p>	<p>Moderate ecological value offered a range of habitats for birds, bats and invertebrates within areas of deadwood and the canopy oversailing the grassland below.</p>		Moderate	See Urban Tree (above). Provision of bird and bat boxes to increase nesting / roosting habitat, respectively.	



Habitat	Ecological Value	Area on Site	Condition	Enhancement Measures	Photograph
<p><u>Sparsely Vegetated Land – Ruderal</u> An area of ruderal and scattered scrub (TN19) was found north of the Market Square and was surrounded by brick buildings. Piles of rubble and timber were present and Norway maple and sycamore saplings had become established. Common nettles dominated with cleavers, willowherb (<i>Chamerion angustifolium</i>), cock's-foot and cow parsley found sporadically.</p>	<p>Low ecological value as this habitat was isolated and likely experienced high levels of disturbance. Although fenced off, due to its close proximity to The River Idle and King's park this area offered suitable refuge for small mammals, amphibians and foraging suitability for common bird species. A singing grey wagtail (<i>Motacilla cinerea</i>) was recorded during the survey and possibly breeds nearby.</p>	<p>591m²</p>	<p>Poor</p>	<p>Creation of a 'Community Garden' within this area will drastically increase the biodiversity value of this area. See Section 4.2.28. and Appendix A.</p>	
<p><u>Buildings and Hardstanding</u> Much of the Site comprised residential and commercial buildings with paving and tarmac hardstanding walkways. Large car parks were present throughout the Site and lacked any ecological value.</p>	<p>Negligible to Low ecological value other than potential bat roosting and bird nesting habitat as is discussed below (see photograph adjacent of active house martin nest).</p>	<p>N/A</p>	<p>N/A</p>		

Table: 2 – Fauna and Flora on Site²

Species	
Plants including Invasive Species	<p>The habitats on Site did not offer suitability for notable or rare plant species and no notable plants were observed on Site during the surveys.</p> <p>Himalayan balsam was recorded within TN23 along the banks of the River Idle and cotoneaster (<i>Cotoneaster</i> Sp.) was recorded within the Site. These species are classed as an Invasive Non-native Species (INNS) listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) and it is an offence to allow these species to spread and grow within the wild. Other INNS but not listed within Schedule 9 were identified, including snowberry, butterfly bush and cherry laurel. Although invasive these species do not legally require controlling, they also provide albeit limited, suitable foraging habitat for birds and pollinators.</p> <p>It is recommended that the Himalayan balsam be ‘pulled’ and the stems disposed of through contaminated waste but only prior to seeding. The cotoneaster would need to be identified to species as only certain species of cotoneaster are listed on schedule 9. If known to be on schedule 9, the plant should be dug up prior to fruiting and disposed of in contaminated waste.</p>
Amphibians and Reptiles	<p>No amphibians or reptiles were observed on Site during the surveys however certain areas of rank grassland and lines of trees along the banks of The River Idle offered suitable foraging, sheltering and commuting habitat for common amphibians such as common frog (<i>Rana temporaria</i>) and common toad (<i>Bufo bufo</i>). A record of a single slow worm (<i>Anguis fragilis</i>) was noted in 2013, although much of the habitat on Site did not provide suitability for this species.</p> <p>TN23, TN34 – 36 acted as a suitable corridor along the banks of The River Idle where common amphibians and grass snake (<i>Natrix natrix</i>) are likely to be found commuting, foraging and resting within the rank grassland, scrub and refugia. The River Idle offered suitable foraging and commuting habitat for grass snake and a sighting was recorded on the banks of The River Idle in April 2022, just 0.79km to the north of the Site.</p> <p>Located adjacent to The River Idle and King’s park, TN18 and TN19 provided a strip of amenity grassland and ruderal vegetation (respectively) which offered some foraging and commuting habitat for common amphibians.</p>
Badger	<p>No evidence or signs of badger activity was identified and the Site largely encompassed hardstanding and buildings and did not offer suitable sett building habitat. Largely isolated between road systems, although areas such as TN34 and TN35 did offer some foraging and commuting habitat for badgers which may commute along the banks of The River Idle to find suitable foraging habitat.</p>
Bats	<p>The buildings on Site provided bat roosting habitat for common species such as common pipistrelle (<i>Pipistrellus pipistrellus</i>) and soprano pipistrelle (<i>Pipistrellus pygmaeus</i>) which are light tolerant and used to urban habitats that feature a level of disturbance from lighting and noise. EMEC Ecology previously identified pipistrelle roosts in 2015, located within the former St Michael’s View residential home. Low numbers of pipistrelle bats were found to be roosting within the building which was located 0.29km west of the Site. Areas such as St Swithun’s Church and graveyard offered suitable foraging and roosting habitat for pipistrelle species. The mature trees within the adjacent King’s park and along the banks of The River Idle and Chesterfield Canal offer suitable roosting, foraging and commuting habitat for species such as noctule (<i>Nyctalus noctula</i>) and Daubenton’s bat (<i>Myotis daubentonii</i>), respectively.</p>
Birds	<p>King’s Park and Spa Common provide areas of woodland and scattered trees that offer nesting habitat for common garden and woodland species. However, certain species of birds require buildings to sight their nests, this includes house sparrow, starling and house martin, all of which are Red-list Birds of Conservation Concern (BoCC) with the former two listed as Species of Principal Importance (SPIs) under the Natural Environment and Rural Communities Act (NERC) 2006. This act places a legal obligation on public bodies in England to have regard to particular living organisms which are of the greatest conservation importance. The aforementioned species have suffered dramatic declines of up to 60% since the 1970’s and require human intervention to halt said decline. Evidence of nesting feral pigeon (<i>Columba livia domestica</i>) was frequent within the tall buildings of the town centre and exclusion netting was observed on the roof of the Town Hall. Netting can be effective if correctly fitted or can cause birds to be trapped and experience an antagonising death if not. Other methods to deter feral pigeons can involve falconry, deterrent gels and audio playback of birds in distress, however, these methods are less effective. A nesting pair of peregrine falcons (<i>Falco peregrinus</i>) will</p>

² No protected species surveys were undertaken across the Site. However, the walkover survey was used to identify the potential of the present habitats for their suitability to support protected species.

Species	
Species	<p>predate feral pigeons and keep the population down. Provision of a nesting ledge is discussed in Section 4.2.29. House martins (<i>Delichon urbicum</i>) were observed nesting under the eaves of M&Co and Costa Coffee and house sparrows (<i>Passer domesticus</i>) and starlings (<i>Sturnus vulgaris</i>) were observed nesting under tiles along Carolgate, the latter two are both Red-Listed Birds of Conservation Concern (BoCC) due to their dramatic reduction in populations. Specific nest boxes can be provided for the aforementioned bird species, limiting access to target species only and can be fixed to buildings within the town centre. Further details surrounding nesting provision can be seen in Sections 4.2.26 – 29.</p> <p>The dense snowberry located along Arlington way offered suitable nesting habitat for a range of hedgerow/garden species and a song thrush (<i>Turdus philomelos</i>) was observed singing within this area on more than one occasion, meaning it was likely breeding nearby.</p> <p>The urban scattered trees found throughout the town centre provided limited nesting opportunities for species such as wood pigeon (<i>Columba palumbus</i>) although the line of trees along the banks of the River Idle provided suitable nesting opportunities for a range of passerines.</p> <p>A grey wagtail (Amber listed BoCC) nest with young was observed along the Chesterfield Canal just to the south-west of Carolgate bridge and kingfisher (schedule 1 breeding bird) are like to commute and forage along the canal and river. Although just outside of the Site boundary, the area of King's Park to the south of Sports Direct offered suitable nesting and foraging habitat for a range of woodland and parkland species, including great spotted woodpecker (<i>Dendrocopos major</i>), nuthatch (<i>Sitta Europaea</i>), treecreeper (<i>Certhia familiaris</i>) and mistle thrush (<i>Turdus viscivorus</i>) (Red-Listed BoCC).</p> <p>Peregrine falcon have been seen foraging over Idle Valley Nature Reserve, located to the north of the Site, although no nest site has been identified within the town centre.</p>
Aquatic species	<p>The River Idle provided a gravel bed with areas of shallow water, pools and riffles, providing suitable breeding habitat for species such as brown trout, barbel (<i>Barbus barbus</i>) and chub which favour the gravel substrate. Several chub were observed foraging within the dense river water-crowfoot (<i>Ranunculus fluitans</i>) that offered cover and foraging for a range of fish species. The Chesterfield Canal provided a different habitat with very little flow providing suitable breeding and foraging habitat for species such as bream (<i>Abramis brama</i>). Alteration to the weir within the River Idle would allow ease of movement up-stream and down-stream by migratory fish such as eels and brown trout. Whilst the provision of in-channel habitat through creation of logs fixed to the river bed and boulders would create pools and riffles which would create breeding habitat for fish.</p> <p>No evidence of otter (<i>Lutra lutra</i>) or water vole (<i>Arvicola amphibius</i>) was observed during the surveys however the River Idle provided optimal foraging, commuting and breeding habitat for otter. The evidence of a good fish stock is likely to encourage the presence of otter in the area. Otters require areas with low levels of disturbance, particularly from humans and dogs, therefore the stretch of the River Idle north of Morrisons is likely to offer the most suitable section. An artificial holt could be created in this area to provide suitable otter breeding and resting habitat. Similarly, no signs of water vole presence were observed on Site, although the northern section of The River Idle in particular offered suitable breeding habitat with earth banks and vegetated banksides offering cover and foraging habitat. Water vole require un-cut bankside vegetation for where they shelter from predators, foraging and create their burrows. Marginal species can be planted within the bankside habitat to provide pollinator habitat and cover for water vole including water figwort (<i>Scrophularia auriculata</i>), meadowsweet (<i>Filipendula ulmaria</i>) and purple loosestrife (<i>Lythrum salicaria</i>).</p>
Other mammals	<p>European hedgehog are likely to forage along the banks of The River Idle and scrubby bankside vegetation and grassland. TN35 would have provided suitable refugia for hedgehog prior to its clearance and TN34 still provides a mosaic of grassland and scrub for foraging and sheltering hedgehog. Allowing areas of scrub to become dense is a simple solution to providing hedgehog resting and breeding habitat. Whilst artificial hedgehog boxes can provide breeding and resting habitat, providing they are placed in quiet sheltered areas of grassland and shrubs.</p>
Invertebrates	<p>The habitats on Site offered some suitability for terrestrial invertebrates including common species of moths and butterflies that are likely to forage within the areas of grassland and ornamental flowerbeds found sporadically around the town centre. The River Idle provides suitable breeding habitats for a range of aquatic invertebrates including mayfly (<i>Ephemeroptera</i> Sp.) and stonefly (<i>Plecoptera</i> Sp.) species which in turn offers suitable foraging suitability for birds, bats and fishes.</p>

4. Ecological Opportunities

Refer to the Ecological Opportunities Map found below, which highlights (TN) areas of the Site that have been earmarked for ecological enhancement, methodology for achieving this is detailed in Section 4 below.

4.1. Designation of Local Wildlife Sites (LWS)

4.1.1. Details of the selection and designation of a LWS within Nottinghamshire can be found within the Nottinghamshire LWS Handbook - Guidelines for the selection of Local Wildlife Sites in Nottinghamshire (Crouch 2018). Where a series of specific criteria must be met in order to satisfy designation criteria. These relate to amphibians and reptiles, bats, birds, mammals, fish, invertebrates and vascular plants and fungi. LWS are designated for their importance to hold notable and protected species including assemblages and aggregations of such.

4.1.2. Nottinghamshire Biological and Geological Records Centre (NBGRC) were consulted on the 18th July 2022 to discuss the suitability of designating notable areas of habitat as a LWS, within and adjacent to Retford Town Centre with the possibility of designating a stretch of the River Idle. Unfortunately, NBGRC replied with *“NBGRC will not be designating any new LWSs in and around the centre of Retford. Any existing habitats would have been picked up during the last Phase 1 habitat survey or by follow up surveys. No potential sites have been brought to our attention by NBGRC staff, individuals or organisations.”*

4.1.1. This does not rule out the designation of LWSs within Retford, as *“individuals or organisations can propose a site for designation as a LWS, where they believe the site to be of a suitable level of interest under the relevant criteria”*. Further survey work would be required by EMEC Ecology to determine which criteria may be possible to satisfy and subsequent surveys would need to be carried out to evidence this. The cost of these further surveys would be dependent on the proposed designation target criteria

4.2. Ecological Enhancement and Creation

Raised Planters – Enhancement

4.2.1. Existing raised planters comprised almost entirely non-native shrubs and flowering plant species as discussed in Table 1, above. The low ecological value of these areas could be enhanced through native planting thus increase the ecological value of these areas. Certain ornamental flowering plants and shrubs offer value to wildlife. These could be planted alongside native species where necessary. Species to consider include night-flowering jasmine (*Cestrum nocturnum*), Californian lilac such as 'Autumnal Blue' (*Ceanothus*) or 'Gloire de Versailles' (*Ceanothus*), lavender (*Lavandula angustifolia*) and Tobacco plants (*Nicotiana glauca*).

4.2.2. Existing Raised planters located within Home Bargains car park (TN29) and New Street car park (TN9) could be planted with a wildflower seed mix including species such as corn poppies (*Papaver rhoeas*), cornflowers (*Centaurea cyanus*), oxeye daisy (*Leucanthemum vulgare*), birdsfoot trefoil (*Lotus corniculatus*) and common St. John's Wort (*Hypericum perforatum*). These mini-wildflower meadows add aesthetic value and require minimal management. Wildflower seed mixes including the species listed above can be sourced from local native plant supplier; Naturescapes.

<p>Raised grassed and planted area adjacent to Home Bargains car park (TN29), featuring amenity grassland and saplings</p>	<p>Raised planter within New St. car park (TN9), featuring cotoneaster and Norway maple</p>

4.2.3. The large raised planters to the south-east of the bus station (TN11 and TN12) could accommodate shrub and climber species such as alder buckthorn (*Frangula alnus*), common buckthorn (*Rhamnus cathartica*), dogwood (*Cornus sanguinea*) and burnet rose (*Rose pimpinellifolia*) with tree species comprising oak (*Quercus robur*), field maple (*Acer campestre*) and crab apple (*Malus sylvestris*). Enhancement of these areas would increase the ecological value providing invertebrate, bird and bat foraging suitability and add to the aesthetic value of the Site.

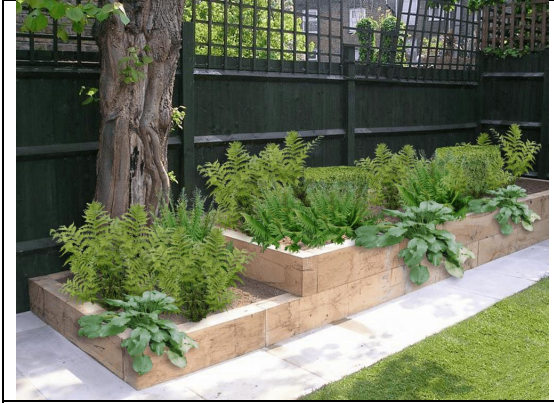
<p>Raised bed adjacent to Retford bus station (TN11), featuring Himalayan birch and butterfly-bush.</p>

Cost and Maintenance

4.2.4. 50 native plant plugs comprising the floral species mentioned above, could be sought from Naturescape at £57.00. Individual tree whips can be purchased for approximately £4 per 60 – 80cm whip. Native plugs and whips could be planted in place of non-desirable species. Initial watering during dry conditions would be required to allow the plants to become established. Weeding would be required to ensure that invasive and dominant colonising species did not outcompete.

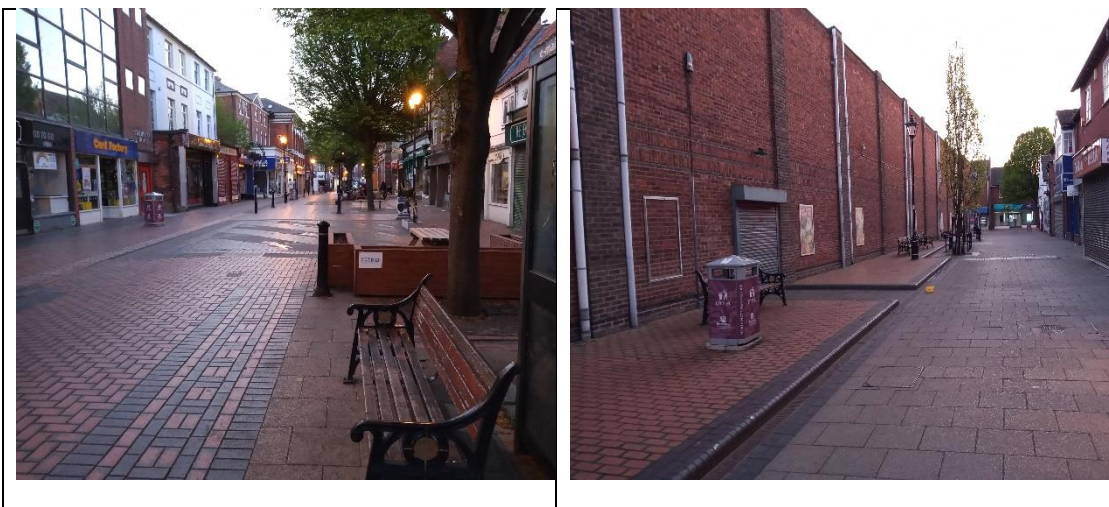
Raised Planters – Creation

- 4.2.5. Additional to the existing North Notts BID planters, large raised planters along Carolgate (TN16) could be installed between the existing line of trees, to increase the ecological value of the street. Raised planters could be used to section seating areas off from pedestrian walking routes as is seen in the photograph below. These break up the hardstanding and offer small oases for resting and eating and drinking. Currently hornbeam and raised timber planters with non-native annuals are present.



Example of a 'urban mini-woodland, showing substantial planter featuring perennials beneath existing tree canopy. Ideally larger shrubs would grow above the perennials and ferns seen here, to create the three-tier canopy structure.

- 4.2.6. An urban mini-woodland could be created with raised planters featuring native woodland flowering plants and shrubs beneath the existing hornbeam canopy. The ground flora could comprise flowering species such as; nettle leaved bellflower (*Campanula trachelium*), English bluebell (*Hyacinthoides non-scripta*), wild primrose (*Primula vulgaris*), self-heal (*Prunella vulgaris*), wood sage (*Teucrium scorodonia*) and wild angelica (*Angelica sylvestris*) whilst ferns such as common polypody (*Polypodium vulgare*), golden scale (*Dryopteris affinis*), and harts tongue (*Asplenium scolopendrium*) would offer year round foliage. The shrub layer would supersede the above and could include holly (*Ilex aquifolium*), hawthorn and rowan (*Sorbus aucuparia*) this would then grade into the canopy comprising the existing hornbeam. Not only would this habitat increase the ecological value along Carolgate, providing suitable foraging habitat for widespread birds and species of bats but coupled with the other ecological opportunities it could act as a wildlife corridor linking Spa Common to King's Park.



<p>Raised planter along Carolgate (TN16) separating seating area from walkway. Funded by North Notts BID.</p>	<p>Wilko’s building along Spa Road (TN13) where raised planters and a living wall could be created.</p>
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4.2.7. A large raised planter could be created outside Charcoal Grill near Cannon Square (TN22), this would break up the large area of hardstanding which offers negligible ecological value and would also act as an ecological ‘stepping-stone’ between St Swithun’s graveyard to the east and Market Square to the south-west. Species to consider planting could include early flowering species such as cowslips (*Primula veris*), red campion, white dead-nettle (*Lamium album*) and red dead-nettle and cuckoo flower (*Cardamine pratensis*). Late flowering species could also be planted to maintain coverage throughout spring and summer, comprising species such as; field scabious (*Knautia arvensis*), blue sowthistle (*Cicerbita macrophylla*) and wild marjoram (*Origanum vulgare*).



Space outside Charcoal Grill (TN22) where raised planters could be created.

4.2.8. Raised planters could be sited between the existing trees along Grove Street (TN27) to increase the aesthetic value of the street and increase the ecological value of the Site. Species listed in Section 4.1.3. could be considered, creating an understory beneath the existing canopy layer.

Cost and Maintenance

4.2.9. An example unit would cost £95.00 per large timber planter, although specification would need to be designed per area. An example collection of native plant plugs could be sought from Naturescape at £57.00 per 50 plugs, seeding the area would be considerably less expensive. Top soil would be required for planting and could be sought from a local supplier at approximately £67 per tonne or alternatively soil removed through wildflower meadow creation could be re-use

Hanging / Wall Planters

4.2.10. The North Notts BID have already funded an array of hanging / wall planters across the town centre with non-native species which will offer pollinator habitat as well as adding to the aesthetic value of the town. Establishing additional planters with native and non-native flowering plants would aim to increase pollinator habitat across the town centre. Areas that are not suitable for raised planters i.e. car parks with little space other than boundary walls may be suitable for hanging / wall planters or establishing climbers such as honeysuckle (*Lonicera periclymenum*). Chapelgate car park is one such space, offering a very limited area

for creation of ecological opportunities. The eastern boundary wall however offers a space where preferably wooden wall planters could be fixed in place and planted with a spring-summer flowering, wildflower species mix. Species which are likely to offer an aesthetic value and provide suitable pollinator habitat include; corn marigold (*Chrysanthemum segetum*), common heather (*Calluna vulgaris*), red dead-nettle and wild primrose (*Primula vulgaris*).

- 4.2.11. To create a wildlife corridor between Spa Common with King’s park a row of wall planters is required along Spa Road (TN13). Coupled with the creation of additional habitat and existing urban trees these planters will increase pollinator suitability and the ecological and aesthetic value of Spa road.



Brick wall which could feature hanging planters, along Spa Road (TN13) from New Street car park.

Cost and Maintenance

- 4.2.12. An example trough planter could be sought from B&Q for £45 per unit and a 10cm pot including species such as common heather and wild primrose would cost £4.50 per unit. Watering of proposed planters to co-inside with watering of existing planters, or installation of drip-line where possible.

Wildflower Meadows

- 4.2.13. Enhancement of the grassland to the north-west of Churchgate car park (TN23) is proposed. Sowing a spring-summer flowering mix will incorporate a diverse assemblage of wildflower and grass species. Likely to hold wetland meadow species, the composition could include knapweed (*Centaurea nigra*), meadowsweet (*Filipendula ulmaria*), ragged robin (*Lychnis flos-cuculi*), meadow buttercup (*Ranunculus acris*), meadow vetchling (*Lathyrus pratensis*), tufted hairgrass (*Deschampsia cespitosa*) and sweet vernal (*Anthoxanthum odoratum*). A wildflower meadow will attract pollinators, which in turn support a range of wildlife including species of birds, bats and small mammals such as European hedgehog.



Grassland adjacent to the River Idle (TN23) proposed for seeding with species rich wild flower and grass mix.

4.2.14. Enhancement of grassland areas on the Site (TN4, TN7 and TN25) by sowing a species rich flower and nectar seed mix such as ‘N4 summer flowering butterfly and bee meadow mixture³’ would increase pollinator habitat within the immediate area. Additionally, improving areas such as TN4 and TN7 will offer improved connectivity between Chesterfield Canal, Spa Common and Spa road.



³ Available: www.naturescape.co.uk/product/n4-summer-flowering-butterfly-bee-meadow-mixture

Strip of grassland to the east of MyGym (TN25), proposed for wildflower meadow creation.	Strip of grassland to the south of Sports Direct (TN18), proposed for wildflower meadow creation.
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4.2.15. The strip of modified grassland to the south of Sports Direct (TN18) could be enhanced with a native flower and grass mix such as Naturescape’s Butterfly Plant Collection, comprising wild carrot (*Daucus carota subsp. carota*), lady’s bedstraw (*Galium verum*), St. John’s-wort (*Hypericum perforatum*), field scabious (*Knautia arvensis*) and burnet saxifrage (*Pimpinella saxifraga*) to name a few species. This habitat would be greatly improved from the poor modified grassland that is currently situated here and increase the ecological value substantially. Additionally, night flowering species such as dandelion, autumn hawkbit (*Scorzonoides autumnalis*) and white dead-nettle could be planted to offer moth foraging habitat and subsequently offer foraging suitability for bats.



Example of a mini urban wildflower meadow, featuring poppy and cornflower species.

Cost and Maintenance

4.2.16. Meadows add aesthetic value and require minimal management, once established. See below for guidance on wildflower meadow creation:

- Remove much of the top soil (leave 12cm of topsoil over subsoil) to reduce fertility to desired level;
- If soil is fertile it may contain undesirable coarse grasses and broad leaf weeds, they and their shed seed will need elimination before it will be at all practical to pursue the idea of creating a meadow. If the site is covered with large numbers of nettles, thistles or docks, top soil removal will be required;
- Spraying with herbicide ‘Roundup’ at full rate in early May will eliminate any vegetation which might outcompete desirable species. The area should then be dug over to bury the dead vegetation along with any thatch and seeds shed onto the surface, and;
- Mowing regimes for spring and summer meadows differ, a spring meadow is cut from late June to September and a summer meadow is cut in March, then left uncut until September/October. The sward should never be cut too short and it is essential that all arisings are removed so as not to increase nutrient enrichment of the soil.

- 4.2.17. A 1kg bag of N4F Summer Flowering Butterfly & Bee Mix Flowers Only would cost £180. Sowing rate: 1.5g per square metre, 6Kg per acre and 15kg per hectare

Shrubs and Trees

- 4.2.18. The Market Square is a working area and requires large areas of sealed surface for trading, however, if possible a few select areas could feature native planting of shrubs and trees (TN20 and TN28) which would dramatically increase the ecological value of the otherwise artificial surfaces and non-native London plane stands. Stands of native whitebeam (*Sorbus aria*), alder (*Alnus glutinosa*) or blossoming species such as wild cherry (*Prunus avium*) could be positioned between the existing London plane stands to offer, colour from berries and flowers and pollinator and bird foraging habitat whilst offering shade and providing urban cooling through evapotranspiration. The London plane stands could be left in situ indefinitely to maintaining the existing canopy cover or removed once the whitebeam had reached maturity.
- 4.2.19. Currently a low number of small urban trees are located along Spa Road although gaps are present between stands. Planting additional native stands of oak, hornbeam or whitebeam (TN14) would improve the wildlife corridor along Spa Road, increase the ecological value of the Site and reduce the urban heat island effect in this area.
- 4.2.20. The strip of scrub and line of trees (TN31) which runs north to south along Arlington Way is located to the south of Grove Street Methodist Church and is dominated by non-native species such as snowberry and Norway maple. Similarly, an area to the east of Jewson’s (TN8) comprises similar species including dense areas of snowberry. Another area of introduced shrub and trees is located along Wharf Road (TN1), comprising areas of snowberry and Norway maple. These habitats provide low ecological value; offering refuge and foraging opportunities for common hedgerow bird species and small mammals, enhancement through planting of native shrubs and tree species would considerably increase their ecological value. The snowberry should be cleared and hawthorn, blackthorn (*Prunus spinosa*), field maple (*Acer campestre*), alder buckthorn and elder should be planted in its place. These species require little management and would offer foraging and sheltering suitability to a wide range of invertebrates and small mammals and nesting and foraging opportunities birds. The existing Norway maple could be left in situ or removed to allow stands of oak, alder, whitebeam and field maple to reach maturity.

<p>Proposed native planting along Wharf Road (TN1), comprising un-desirable species including Norway maple.</p>	<p>Proposed native planting to the East of Jewson’s (TN8) and to the west of Arlington Way, comprising areas of snowberry and Norway maple.</p>

<p>A line of Norway maple (TN10) runs north to south along Arlington Way, proposed for native shrub and tree planting.</p>	<p>A line of Norway maple (TN10) view south, highlighting bare earth below stands.</p>

4.2.21. Similarly, to above (4.2.19), a strip of trees and shrubs (TN10) runs north to south along Arlington Way located to the east of New Street car park. The shrub layer is sparse and large areas of bare ground are present, tree species comprise largely Norway maple to four meters. Suggested in Section 4.1.19., native shrubs and trees could be planted to increase the ecological value of this habitat, see species listed about. These linear habitats also act as wildlife corridors and if enhanced with the recommendations above, they could link Chesterfield Canal and Spa Common to the south with King’s park to the west (see Ecological Opportunities Map).

Cost and Maintenance

4.2.22. A bare-root hawthorn, blackthorn or whitebeam whip (40 – 50cm) would cost £4 – 5 per unit or £50 for a larger whip (120 – 130cm). One unit should be planted every 3m to allow enough space for growth and pruning may be required to maintain a shrub structure. Weeding between young whips may be required to prohibit competition from colonizing species

Town Centre Roundabout

4.2.23. The feasibility to plant a medium sized oak stand on the town centre roundabout (TN21) was reviewed and its was assessed to be largely unsuitable unless provisions were made to extensively widen the existing roundabout. Once established the large stand would likely cause root heave, thus damaging the tarmac road and paving surrounding the roundabout.

4.2.24. A more suitable location could be on the significantly larger roundabout the north-west of the Site (NGR: SK 70169 81418). If positioned within the centre of the roundabout the stand would have sufficient space for roots to spread, management could be adopted to ensure the stand was kept at a manageable size. Large oaks can be sourced from Majestic Trees⁴ offering a range of species. The oak tree would offer an aesthetic and ecological value to the town and would likely be viewed as a key feature of Retford. English oaks offer high ecological value and act as a host for more species than any other native tree.

⁴ Full price list can be found here: https://majestictrees.co.uk/images/_majestic_pdf_data/stock_lists_pdfs/Majestic_Complete_List.pdf



Roadabout located at Amcott and North Road where planting of a semi-mature oak tree is proposed.

Cost and Maintenance

- 4.2.25. Large oaks can be sourced from Majestic Trees⁵ offering a range of species a 4 – 5m English oak would cost £2,363.58 (inc VAT), delivery fees would need to be determined following identifying location, species and size of stand.

Rain Garden

- 4.2.26. A rain garden offers the opportunity to manage rainwater runoff from hard surfaces after heavy downpours, by planting floral species within a depression or bed which is fed from rain water (usually off roofs down pipes or water butts). The rain garden holds water following heavy downpours before slowly returning it to main drains, thus used as a flood alleviation method. Harmful pollutants are filtered through layers of sand and soil therefore reducing pollutants entering water courses such as The River Idle to the west of the Site. Rain gardens offer a mini-oasis for wildlife within an urban environment, native plants species to consider include water tolerant meadowsweet (*Filipendula ulmaria*), ragged robin, meadow buttercup (*Ranunculus acris*), great burnet (*Sanguisorba officinalis*) and oxeye daisy, draught tolerant plant species should be sited towards the edges, including; greater knapweed (*Centaurea scabiosa*), viper’s bugloss (*Echium vulgare*), birdsfoot trefoil (*Lotus corniculatus*) and bladder campion (*Silene vulgaris*).



Example of a small rain garden - Figure from Wildfowl and Wetlands Trust (WWT) Accessed 26/07/2022.

⁵ Full price list can be found here: https://majestictrees.co.uk/images/_majestic_pdf_data/stock_lists_pdfs/Majestic_Complete_List.pdf

- 4.2.27. A rain garden could be sited within the community garden (TN19 - see below 4.1.19) and fed from downpipes and two swales, filtering pollutants, providing flood alleviation and offering habitat for wildlife. An additional location to site a rain garden could be on the south-eastern side of the Aldi building (TN3). Currently an area comprising woodchip and sparse introduced shrubs are present, removing this habitat and creating a rain garden would dramatically increase the ecological value of the Site whilst reducing pollutant run-off into the Chesterfield Canal.

Cost and Maintenance

- 4.2.28. Creation of a rain garden is relatively cheap and is only labour intensive during construction phase. The first step is to excavate a large depression and divert a down pipe from a nearby building. Installing a pipe or swale is used to feed the area and finally planting of water tolerant species. Soil should be mixed with sand and loose aggregates to increase permeability if soil is heavy (clay). Excess soil could be used to create a berm on the low side to increase retention, following heavy downpours. Mulching the area once planted will also increase retention of moisture and add to the aesthetics. Wildflower species could be sought from Naturescape for approximately £3 - £4, planted at 0.5m intervals and separated by non-invasive grass or sedge species. Where excavating an area of ground is not suitable then a raised planter could be positioned under a downpipe and lined to retain moisture

Community Garden

- 4.2.29. An enclosed area (TN19) to the east of Sports Direct could support a mosaic of different habitats designed for wildlife and community wellbeing. A canopy of fruit trees including native apple (*Malus* Sp.) and pear (*Pyrus* Sp.) species within a wildflower meadow could be created, benches could be sited here to create an environment for people to enjoy. The south facing area could feature insect-hotels, and bat boxes, whilst the east facing boundary wall could feature house sparrow terrace, swift (*Apus apus*) and starling boxes, a sheltered area could house a grey wagtail nest box. An area of mixed scrub could be created along the eastern boundary comprising species such as elder, bramble, hazel and plum (*Prunus domestica*) providing suitable foraging habitat for invertebrates, birds and small mammals. Refugia or habitat piles would provide suitable resting areas for hedgehog and common amphibians. A small garden pond could be created which would provide breeding habitat for amphibians and invertebrates whilst offering a drinking source for birds and small mammals. Local schools could adopt a maintenance regime and use the area as an educational experience, learning about aquatic invertebrates and amphibians. A native hedgerow could be planted along the western boundary which would screen the community garden whilst offering vital refuge for birds and small mammals and foraging for bats and invertebrates. Creating an allotment would offer the community a chance to harvest produce and enjoy this space whilst providing additional habitat for a range of wildlife.



Cost and Maintenance

- 4.2.30. Creation of the wildflower meadow would include the cost of seeding at approximately £64 for a 200m² area. Approximate cost for all bat and bird boxes would amount to £150, see Figure 3 for more information. Fruit trees would cost anywhere from £20 - £300 per tree dependent on size required. Planting the area of scrub would be priced at £4 per unit at a planting rate of 3 x 1m x 14m = 42 x £4 = £168. Habitat refugia could be sourced from garden cut-offs and created through community engagement, amounting to a minimal cost. Planting of a native species hedgerow would amount to approximately £220 excluding labour costs. A grant or crowd fund could be sought for creation of the community garden at an approximate total of £1160. The physical creation of the garden could be arranged through a community lead activity day/s

Geopaving

- 4.2.31. Geopaving is a permeable surface which allows natural absorption of water whilst allowing plants to grow through the gaps. It can be used to replace hardstanding such as block paving, tarmac and concrete. Plants and grasses can be sown or native pioneer plant species can be allowed to flourish offering ecological value in an otherwise nature depleted environment. Geopaving should be used in areas where hardstanding is necessary, planting beds are more ecologically valuable and should be used before geopaving is considered. An area of tarmac to the north-east of Churchgate car park (TN24) could be removed and replaced with geopaving and planted with short ephemeral plant species or grasses, this would break up the hardstanding currently present and offer pollinator habitat if the right species were included. Geopaving could be used to break up the hardstanding along Exchange street (TN17) and would provide a green corridor for invertebrates if the right flowering plants were included. To increase the ecological value of West Street car park a strip of geopaving with native plant and grass species could be sited to the southern area of the car park (TN6).



Example of geopaving, flowering perennials could also be planted to provide higher biodiversity value.

Cost and Maintenance

- 4.2.32. An approximate cost of installing geopaving across the aforementioned areas on Site would amount to £6.70 per metre x 150m² = £1005, excluding labour costs. Weeding of any pioneer / un-desirable species would be required on a quarterly basis.

Green Roofs

- 4.2.33. A green roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproof membrane. The type of green roof depends on the strength of the structure beneath and size of the roof. Whole roofs would not need to be set-aside as a green roof, strips could be positioned between rows of solar panels providing these were positioned within sunlight for at least part of the day. Green roofs benefit wildlife and ease the load on drainage systems by reducing water run-off. They provide additional insulation and prolong the life of the roof by protecting the surface material from the elements. A very thin layer of nutrient poor soil is used which produces a patchy vegetation cover, susceptible to drought stress. Natural colonisation can provide habitat of high ecological value however planting of suitable plants will speed up to process. Sedum species should be avoided as they provide limited ecological value, a maximum of 30 percent sedum coverage should not be exceeded across a single roof. Native species to benefit pollinators include viper's bugloss, white dead-nettle, red clover, bird's-foot trefoil, bladder campion and white campion (*Silene latifolia*). Depending on the strength of the roof, biodiversity can be maximised by incorporating refugia piles, areas of bare ground, bee-banks and even shallow ponds (Buglife 2019).



Example of a green roof with flowering species and bare ground providing pollinator habitat in an area otherwise offering negligible biodiversity value.

4.2.34. Several roofs across the town could be provisioned with green roofs, including the Wilko and B&M roofs (TN32 and TN38 respectively) which would offer additional habitat in the proposed wildlife corridor between Spa Common and King’s Park. Other roofs located within strategic locations include Sports Direct roof (TN39) and the bus station (TN37). Although the bus station roof is not flat a green roof could still be created with sedum mats or creeping ferns used on areas of steep gradient. If possible, to increase the negligible ecological value of Chapelgate car park a green wall could be created on a large slightly sloping roof to the south of the car park (TN26).

Cost and Maintenance

4.2.35. An approximate cost of installing a green roof could amount to £500 - £800 per 8m², the same area installed by a qualified contractor could be anywhere from £1000 - £1500. Irrigation drip-line can be purchased for £50 per 100m and would be required in times of drought.

Living Walls

4.2.36. A living wall is much like a green roof although construction has to be adapted to a vertical structure. A simple structure providing a growing medium that holds a number of wall planters can be used and once plants are established and coverage across the structure is achieved then self-contained separate planters are hidden from view. Modular living wall systems have differences in their composition, weight and assembly and would be fitted to the wall so that plants roots do not come into contact with the structural properties of the building. They can be in the form of trays, vessels, planter tiles or flexible bags (Manso and Castro-Gomes 2015). Trays are usually rigid containers, attachable to each other, that can hold the plants and substrate weight. Self-fed irrigation systems can be established above the wall, where rain water can collect and be fed along drip tubes through the living wall system. Plant species which offer high ecological value providing suitable pollinator habitat include; lungwort (*Pulmonaria officinalis*), fritillary (*Fritillaria meleagris*), foxglove (*Digitalis purpurea*), marsh woundwort (*Stachys palustris*), white melilot (*Melilotus albus*), burdock (*Arctium* Sp.), common knapweed (*Centaurea nigra*), common vetch (*Vicia sativa subsp. segetalis*) red dead-nettle and honeysuckle.

4.2.37. A living wall could be created along Spa Road on the south facing wall of the Wilko building (TN15). This would enhance the proposed wildlife corridor between Spa Common and King’s Park, offering bat foraging habitat, provide a signature feature of the town and reduce the urban heat island. An area which comprises negligible ecological value is West Street car park, (only hardstanding and buildings are present) to enhance this area a living wall could be created on the eastern boundary wall (TN5), if a living wall is not possible then individual wall planters could be sited here to offer pollinator habitat and aesthetic values.

<p>Example of a native species living wall featuring insect hotel.</p>	<p>Example of a modular living wall system in the construction phase. More simple versions could be used in Retford.</p>

Cost and Maintenance

4.2.38. A 72 pocket modular planter could be sourced from B&Q for £20 x 1m a slightly more advanced option could include a plant box 2m x 0.6m for £205 which allows for deeper planting / taller plant species. These options are fixed to a wall and filled with a substrate and planted with the aforementioned species (at £4 per plug or seeded at considerably less expense). Irrigation drip-line at £50 per 100m would be required in times of drought

Bird, Bat and Invertebrate Habitat⁶

4.2.39. The provision of bat and bird boxes will increase the ecological value of the town centre providing habitat in areas which are otherwise lacking in suitable nesting / roosting features (see Table 3 below for specific habitat available). Alternatively, youth, community or church groups could become involved in the creation of wooden habitat boxes (bat / bird / insect), thus saving money and involving the local community. A bird / bat box map could be created to identify key locations where boxes are likely to become occupied, taking into consideration surrounding habitat and levels of disturbance such as artificial lighting and noise. Positioning of habitat is vital to ensure that boxes are used, areas along the Chesterfield canal (TN30) and The River Idle (TN36) are ideal for bat boxes, providing no external lighting is directed towards these. Bat boxes such as the Beaumaris Woodstone should be fitted to the side of buildings and located on a south facing aspect, 4m up; un-obstructed access is necessary. Three of these boxes could be positioned on the northerly area of the community garden (see Appendix A). The Vivara Pro Woodstone bat box could be sited within trees to the south of the Site along Chesterfield Canal.

4.2.40. The Vivara Pro Woodstone house sparrow, swift and starling boxes offer vital nesting habitat for house sparrow, swift and starling which are red-listed BoCC. A box for each could be sited

⁶ Habitat boxes can be sourced from NHBS – Wildlife habitat supplier: www.nhbs.com

on the eastern wall of the community garden. A Vivara Pro Woodstone grey wagtail box could be sited beneath a sheltered area on the south-eastern wall of the community garden. Grey wagtail were observed nesting and foraging along the running water on Site.

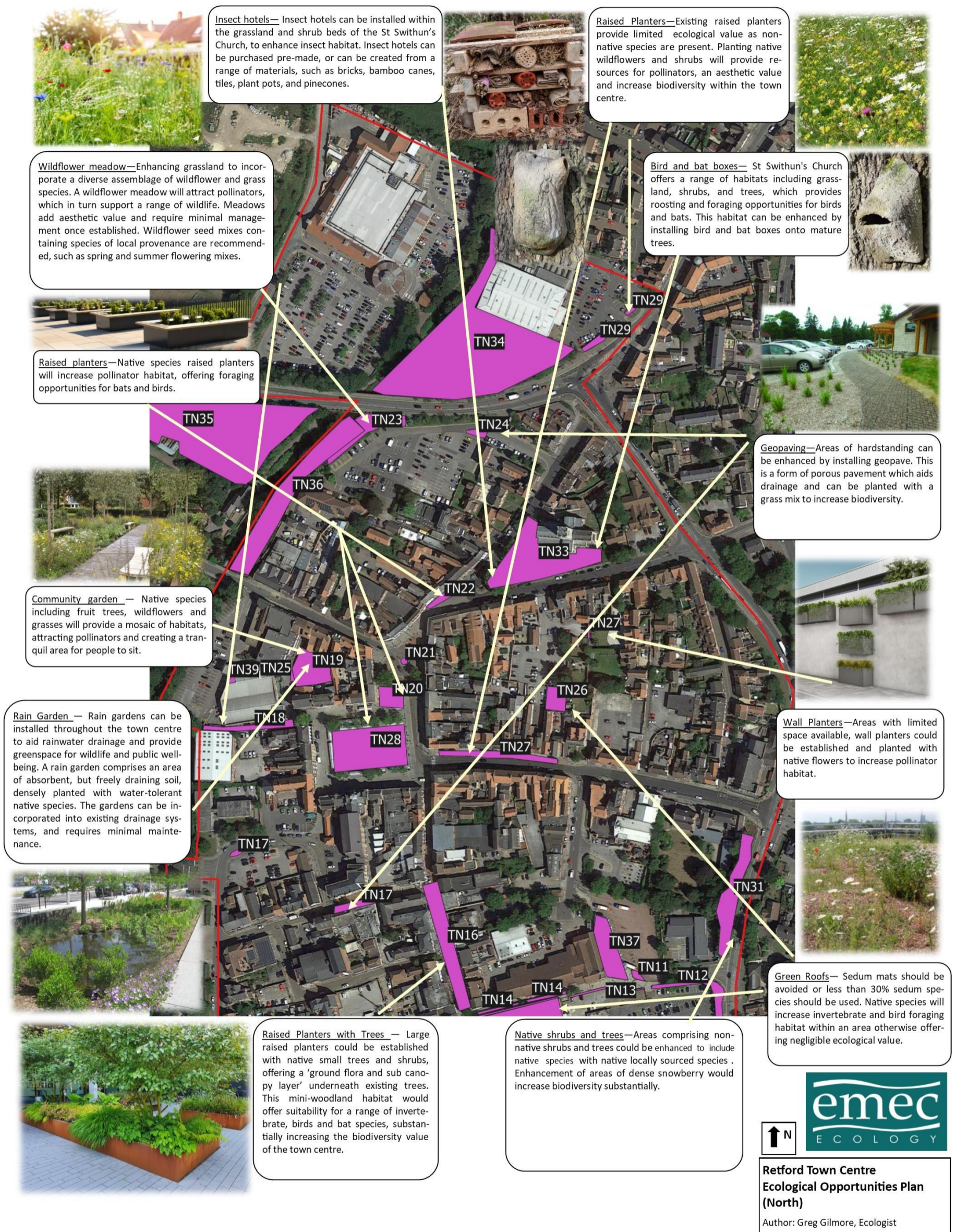
4.2.41. Located on the Chesterfield Canal towards the south of the Site, the Aldi building offers a strategic location for siting nesting / roosting habitat (TN2). The canal offers a commuting corridor and foraging habitat for bats and birds. Bat boxes such as the Beaumaris Woodstone could be fixed to the southern wall of the Aldi building and swift boxes could be sited on the eastern wall. Vivara Pro Woodstone bat boxes and starling boxes could be sited on the mature trees found in St Swithun's church grounds (TN33), increasing the nesting and roosting habitat for bats and birds that are likely to forage within the grassland and scattered trees.

4.2.42. A nesting ledge could be created and installed on St Swithun's church, comprising an open fronted and sheltered cavity, containing a substrate (a mix of gravel or pea shingle and compost or woodchips) and enough space to allow the young to exercise in safety as they develop. A raised edge on the artificial nest will help retain the substrate and the juveniles as they become more active (Dewar and Shawyer 2001). The nest ledge should be sited on the north-east or east aspect so as not in direct sunlight. Peregrines prefer tall structures and are known to nest up to 200m above ground level. St Swithun's church offers a good location due to its tall tower which is screened by mature trees offering a potential barrier to disturbance.

Cost and Maintenance

4.2.43. See Table 3 for individual cost of each type of box. Bird boxes should be cleaned out following each breeding season, September to February inclusive. Bat boxes do not need to be cleaned out as they tend to have openings at the base where droppings will simply fall out.

Figure 2: Ecological Opportunities Plan – North



Retford Town Centre
Ecological Opportunities Plan
(North)
Author: Greg Gilmore, Ecologist

Figure 3: Ecological Opportunities Plan – South

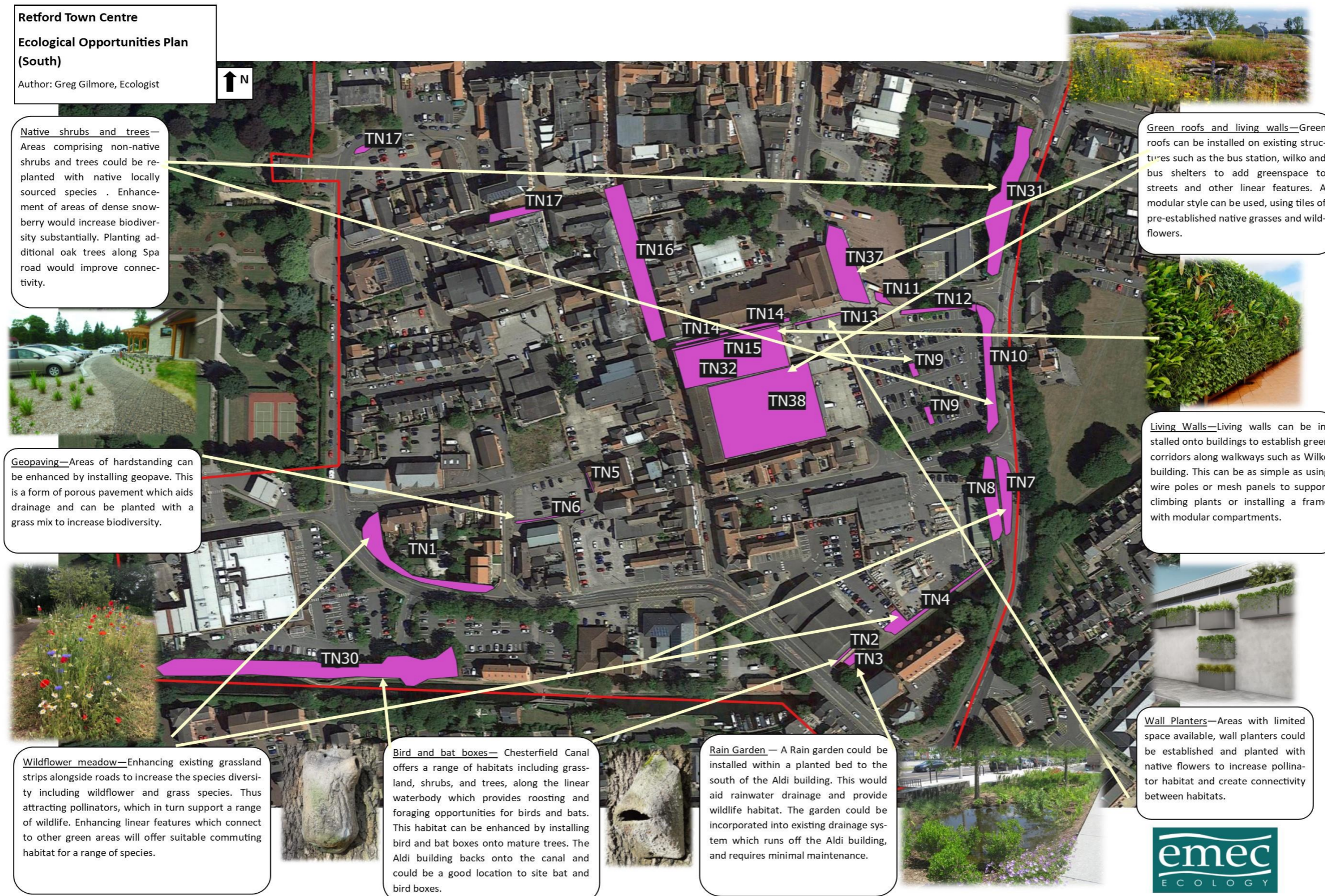


Table: 3 - Bat, Bird and Invertebrate Habitat

Bat Boxes	Bird Boxes	
		
<p>Beaumaris Woodstone Bat Box - £31.45</p>	<p>Vivara Pro WoodStone House Sparrow Nest Box - £31.50</p>	<p>Vivara Pro WoodStone Grey Wagtail and Dipper Nest Box - £25.99</p>
		
<p>Vivara Pro WoodStone Bat Box - £20.99</p>	<p>Vivara Pro WoodStone Starling Nest Box – £28.99</p>	<p>Insect Hotel Capri – By CJ Wildlife - £22.99</p>
		
<p>Flatpack Double Chamber Bat Box – £20.99</p>	<p>Vivara Pro WoodStone Swift Nest Box - £36.50</p>	<p>National Trust Apex Insect House - £24.95</p>

5. Evaluation

5.1. Ecological Value

Current Value

- 5.1.1. Retford town centre is located within an area of north Nottinghamshire which boasts important sites for nature, including Idle Valley Nature Reserve a Site of Special Scientific Interest (SSSI) located less than 2km to the north of the Site. Furthermore, the Site is connected to the aforementioned SSSI by The River Idle which is an important habitat in its own right. The Chesterfield Canal features a section which is designated a Local Wildlife Site and links to The River Idle, offering a wildlife corridor for aquatic species, birds and bats.
- 5.1.2. The town centre is largely built up with only small areas offering low to moderate ecological value, these comprise largely urban scattered trees, introduced shrub borders and modified grassland. Over half the planted trees comprise non-native species such as London plane and Norway maple that offer much lower ecological value than native species. The introduced shrub planters and borders offer some pollinator habitat and cover for birds and small mammals, although replanting and/or enhancing these with native species would increase the ecological value of these areas a substantive amount. Areas of modified grassland and other neutral grassland of poor condition are heavily managed and comprise species which offer low ecological value to pollinators only. Re-seeding these areas and adopting a much less intensive mowing regime would dramatically increase the ecological value offering species of bat, birds, common amphibians and small mammals suitable foraging, commuting and resting habitat.

Biodiversity Net Gain

- 5.1.3. If all of the aforementioned habitat enhancement / creation is adopted the ecological value of the Site will be dramatically increased. A calculation of the biodiversity value on Site was undertaken using the Department for Environment, Food and Rural Affairs (DEFRA) biodiversity metric 3.1. This was used to assess the current biodiversity value of the Site and to assess the value following the aforementioned recommendations. See Table 4 below for unit change and total net gain, post recommendations. Note that this amounts to total of all enhancement / creation recommendations. No habitat will be lost other than areas of hardstanding, enhancement of poor value habitat will be undertaken to achieve a ‘moderate’ condition. Enhancement of modified grassland with native wildflower and grass species will deliver an additional 1.38 habitat units and removal of introduced shrubs and replanting with native species will deliver 1.45 habitat units for scrub habitats on Site.
- 5.1.4. If all the aforementioned habitat enhancement / creation measures are adopted the total increase of habitat units will result in a 271.92% net gain across the Site. This is due to the low ecological value currently present on Site, comprising numerous buildings and large areas of hardstanding. It is unlikely that all measures can be adopted, therefore further assessment of created habitat units would need to be updated following suitability assessment.

Table: 4 – Biodiversity Impact Assessment

Habitat	Total Area (Ha)/Units	Condition	Habitat Units Delivered
Creation			
Grassland – Other neutral	0.0288	Moderate	0.19
Urban Tree	44	Moderate	0.65
Urban - Planters	0.017	N/A	0.03
Green Roof	0.41	N/A	0.79
Rain Garden	0.0087	Moderate	0.03
Green Wall	0.0107	Moderate	0.03

Enhancement			
Grassland – Other neutral	0.2024	Moderate	1.38
Mixed Scrub	0.207	Moderate	1.45
Total Net Change - Total Habitat Units (% Gain)			3.33 (271.92 %)

- 5.1.5. Although urban planters, rain gardens and green walls score low habitat units, this was likely due to the inability to input specific habitat data into the metric. Rain gardens comprise a mosaic of wetland plants and grasses, with areas where drought tolerant species thrive. Additionally, these features will create valuable habitat in an otherwise barren environment, offering suitable pollinator habitat and sheltering opportunities for small mammals and amphibians.
- 5.1.6. The recommendations were suggested because they involve low management regimes. The initial construction of green roofs and living walls may be labour intensive over a short period of time, although further management will consist of weeding pioneer species, replanting of lost species as if done throughout horticultural beds across the town. Enhancement of modified grassland through sowing of native flower and grass seed mixes involves low management other than the initial output and cutting once a year. Seeds could be directly sown into the existing grassland or the turf could be removed / weeds suppressed, then seeded in March-April, see Section 4.2.15. for further management details.

References

Buglife (2019). *Creating Green Roofs for Invertebrates Best-practice-guidance*. Available: www.cdn.buglife.org.uk/2019/07/Creating-Green-Roofs-for-Invertebrates_Best-practice-guidance

Crouch, N.C. (2018) *Nottinghamshire LWS Handbook – Guidelines for the selection of Local Wildlife Sites in Nottinghamshire. Part 2A – Local Wildlife Sites selection criteria: species*. 2nd Edition. Nottinghamshire Biological and Geological Records Centre, Nottingham.

Defra Biodiversity Net Gain (BNG) (2022). *The Biodiversity Metric 3.1*. Available: <http://publications.naturalengland.org.uk/publication/6049804846366720>

Dewar, S and Shawyer, C 2001. *Boxes, Baskets and Platforms, Artificial nest sites for owls and other birds of prey*. The Hawk and Owl Trust, London.

MAGIC *Site Check Report* [online]. Available: www.magic.gov.uk.

Manson and Castro-Gomes, 2015. *Green wall systems: A review of their characteristics*

National Biodiversity Network (NBN) Record Atlas Available: www.nbnatlas.org

Natural History Book Service (NHBS). Available: www.nhbs.com

Nottingham City – Insight Mapping. Available: www.maps.nottinghamcity.gov.uk/insightmapping

Stace, C. A. (2019) *New Flora of the British Isles*. Forth Edition. C&M Floristics.

Appendix A: Community Garden Design

