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OPEN MOSAIC HABITATS ON

1. INTRODUCTION

Open mosaic habitats (OHM) are typically characterised by a mosaic of bare ground and other habitat types such as flower-rich meadows, short, patchy grassland, scrub and wet areas. The individual component habitats may not be notable in their own right, however, in combination they can create areas of high value for biodiversity. These habitats occur on sites that have been previously developed or within which the ground has been heavily modified through disturbance or the extraction or addition of materials.



Dordon Spoil Heap
© Camille Newton

Open mosaic habitat can occur on some surprising substrates, being acidic or calcareous depending on past use. Plant indicators of these two conditions are blinks (*Montia fontana*) and bird's foot trefoil (*Lotus corniculatus*) on acidic ground and bee orchid (and the wasp orchid variation) on calcareous substrate.

The long history of industrial land-use for transport, quarrying, storage, demolition and landfill has left a legacy of many neglected patches of land, especially within the more built-up parts of our region. Many of these have only been 'open' for less than 60 years - but where heavy disturbance ceases and re-development is delayed, semi-natural habitats such as grasslands, wetlands, ruderal habitats, scrub and secondary woodland start to develop and can evolve into highly complicated habitat mosaics. Examples are abandoned industrial sites, former railways and sidings, extraction pits, former military land and land adjacent to canals. These inauspicious areas on sites which have previously been developed or have a history of disturbance can contain pockets of biodiversity that are incredibly important in the landscape. New road and railway cuttings may create potential habitat.

In the past open mosaic areas have supported some of the richest plant communities in the county (200+ species) however many are suffering from loss of grassland habitat due to the growth of scrub. With the discontinuation of activity, this encroachment has occurred on approximately 90% of disused transport sites and it is now necessary to slow or reverse the natural succession in order to maintain sites in favourable condition for wildlife. Such 'restoration' may involve disturbance to reverse the habitat to an earlier successional stage, or even to bare ground, in order to retain and / or re-creating and enhance habitats. A more detailed account of the plants of disturbed ground can be found in 'Warwickshire's Wildflowers' (Falk, 2009) which reveals the high percentage of neophytes (a plant recently introduced to an area) and casuals associated with this habitat category. These sites may also support mosses, liverworts and lichens.

Nearly 15% of all nationally scarce invertebrates are found within this priority habitat and in the Midlands, open mosaic sites are some of the best for invertebrates, with many nationally rare species present. Many insect meta-populations appear to be centred on certain combinations of old industrial sites, whilst being absent from other, apparently

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suitable habitat or sites. The bloody-nosed beetle (*Timarcha tenebricosa*), has suffered a very serious decline in the county in the last hundred years or so and is currently confined to localised areas in the Lawford Heath district. Unfortunately the development of scrub along the railway line is proving detrimental to the beetle and its foodplant cleavers (*Galium aparine*) through over-shading of habitat (see [Bloody Nosed Beetle](#) Action Plan). Another beetle, the common glow-worm (*Lampyris noctiluca*), is useful indicator for assessing the quality of open mosaic habitats; it uses [bioluminescence](#) to attract mates. Highly dependent on Senecio (ragwort) species is the day-flying cinnabar moth (*Tyria jacobaeae*) which has suffered some worrying declines but seems to be picking up.

Post-industrial sites tend to be nectar-rich and therefore good habitats for bumblebees and butterflies such as grizzled skipper (*Pyrgus malvae*) and dingy skipper (*Erynnis tages*). The small blue (*Cupido minimus*) is rather restricted but common blues (*Polyommatus icarus*) seem to fare very well in a wide array of post-industrial sites due to the abundance of legumes such as bird's foot trefoil.

Open mosaic habitat is an important habitat for a range of vertebrates including great crested newt (*Triturus cristatus*), common toad (*Bufo bufo*), common lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), grass snake (*Natrix helvetica*) and adder (*Vipera beris*); however, there have been no confirmed sightings of adders in Warwickshire since 2004. Birds are typical of both grassland and scrub and may include cuckoo (*Cuculus canorus*), meadow pipit (*Anthus pratensis*), dunnock (*Prunella modularis*), grasshopper warbler (*Locustella naevia*), willow warbler (*Phylloscopus trochilus*), common whitethroat (*Sylvia communis*), long-tailed tit (*Aegithalos caudatus*), bullfinch (*Pyrrhula pyrrhula*) and yellowhammer (*Emberiza citrinella*), depending on how much scrub is present.

Many bird species are heavily dependent on the bare or disturbed soil of this habitat, including declining species such as linnet (*Carduelis cannabina*), skylark (*Alauda arvensis*) and the turtle dove (*Streptopelia turtur*) which feeds on arable weed seeds. Disused industrial sites, particularly those with large structures and close to water, may be used by wading birds which are rare in Warwickshire. By the nature of their habitat requirements, these birds are nomadic, moving on to find new food sources as their former haunts are redeveloped. Any rough grassland associated with this habitat would be valuable for barn owls (*Tyto alba*).

These sites can be an invaluable resource for local communities by providing easily accessible areas of informal green space in urban parks – where a rich variety of wildlife can be appreciated, and the often robust nature of the sites can support heavier recreational usage than many wildlife sites. Even spoil heaps can be very valuable stepping stone sites for wildlife. Disused transport lines act as wildlife corridors and public walkways, often passing through intensive farmland or heavily built-up areas, though the loss of grassland to scrub partially reduces their value for biodiversity.

Most of these sites fall into the category of 'previously developed' or 'brownfield' land, which is viewed as a more acceptable location for new development than 'greenfield' land. This creates an extra challenge for the conservation of such sites. While many of the component habitats contained within this plan are the subject of other action plans, Open Mosaic Habitats is geared towards promoting the diverse character of such sites and assisting the organisations that specifically own, manage or otherwise control them.

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Continuing development of the transport network and a continuing supply of land fill sites will produce more open mosaic habitat in the future.

2.	OBJECTIVES	TARGETS
Associated Action Plans are: 'Grasslands (all types)', 'Built Environment', 'Woodland', 'Ponds', 'Bats', 'Barn Owl', 'Adder', 'Great Crested Newt', 'Small Blue', 'Rare Bumblebees', 'Chalk Carpet', 'Dotted Bee-fly', 'A Cuckoo Bee' and 'Dingy Skipper'		
PLEASE CONSULT THE '<i>GENERIC HABITATS</i>' ACTION PLAN IN CONJUNCTION WITH THIS DOCUMENT FOR OBJECTIVES COMMON TO ALL HABITAT PLANS		
A.	To complete the identification of all 90ha of existing open mosaic habitats and their ownership.	2026
B.	To restore 80ha of degraded priority sites by 2026. <i>This target has been reset in the light of progress 2011-2017.</i>	2026

3. NATIONAL BAP OBJECTIVES & TARGETS

A description of OMH may be seen at [Open Mosaic Habitats on Previously Developed Land](#). It became a UK Priority Habitat in 2010 ([JNCC](#)). Such sites provide a unique opportunity to promote habitat creation in a manner that helps address national targets for various other habitats.

The [Open Mosaic Habitat Inventory](#) launched by Natural England in 2014 in partnership with [Buglife](#) (the Invertebrate Conservation Trust) & [DEFRA](#) distinguishes OMH from other brownfields or previously modified land. It is a valuable tool for anyone with an interest in nature conservation or local planning, but particularly for local authorities, strategic planners, ecologists and local wildlife groups.

Criteria for the identification of open mosaic habitat on previously developed land priority habitat are suggested in [Identifying open mosaic habitat](#) (Buglife, 2014) and are shown below:

Criterion 1	The site is at least 0.25 ha in size. This minimum size may be part of a much larger site containing other habitats or developed land.
Criterion 2	Known history of disturbance at the site or evidence that soil has been removed or severely modified by previous use(s) of the site. Extraneous materials/substrates such as industrial spoil may have been added.
Criterion 3	The site contains some vegetation. This will comprise early successional communities consisting mainly of stress tolerant species (e.g. indicative of low nutrient status or drought). Early successional communities are composed of: <ul style="list-style-type: none"> a) annuals <i>or</i> b) mosses/liverworts <i>or</i> c) lichens <i>or</i> d) ruderals <i>or</i> e) inundation species <i>or</i> f) open grassland <i>or</i> g) flower-rich grassland <i>or</i> h) heathland
Criterion 4	The site contains unvegetated, loose bare substrate and pools may be present.
Criterion 5	The site shows spatial variation, forming a mosaic of one or more of the early successional communities plus bare substrate, within 0.25ha.

4. CURRENT STATUS

Old Industrial Sites

Some particularly large and ecologically diverse examples exist in the Coventry, Nuneaton and Bedworth, Southam and Shipston areas, though many only have fragments of quality habitat. Some have valuable ponds, pools and wetlands in addition to grasslands and scrub. Some of the best sites designated as [Sites of Special Scientific Interest](#) (SSSI), are geological SSSIs, e.g. Bishops Bowl and Bishops Hill. Several [Warwickshire Wildlife Trust](#) (WWT) reserves, e.g. [Harbury Spoilbank](#), [Ufton Fields](#) and [Claybrookes Marsh](#), are also SSSIs, the latter also both Local Nature Reserves (LNR).

Several [Local Wildlife Sites](#) (LWS) of this habitat have been lost to development in the last 20 year; examples include Emscote Power Station between Warwick and Leamington, Sharman's Tip in Coventry (1.86ha) and Foleshill Gasworks (24.11ha). The Coventry Homefire Plant (11.32ha) has been destroyed but the Houldsworth Crescent Corridor part of the LWS (7.63ha) remains.

Temporary small sites

Small, short-lived sites such as the storage area of a building development, rarely gain LWS-quality, but can contribute markedly to the stock of wildlife habitat present in urban areas by providing stepping stones in the green infrastructure and wildlife corridors for species to move into urban areas. They provide a welcome splash of colour in summer and often become invaded with butterfly bush (*Buddleia spp.*), ragwort (*Jacobaea vulgaris*), thistles (*Cirsium spp.*) and willowherbs (*Onagraceae*), which in turn attract butterflies, e.g. grizzled skipper (*Pyrgus malvae*), bees and flocks of seed-eating birds like goldfinch (*Carduelis carduelis*) and linnet. This undoubtedly boosts the biodiversity of our towns and cities though it is unclear what the current rate of loss or gain is; gradual loss is suspected due to the current levels of house building.

Disused transport lines and railway sidings

Approximately 350km of disused railway line occurs within the sub-region, and is of highly variable quality and character. The most interesting stretches are those with some species-rich grassland, some scrub and some wetlands, especially if located within a cutting or upon a raised embankment, thereby creating a wider wildlife feature. The best examples include [Ashlawn Cutting](#) and Newton Cutting in Rugby (part of the old Great Central line), [Goldicote Cutting](#) near Ettington, [The Greenway](#) near Stratford, [Weddington Country Walk](#) in Nuneaton (all designated LWS) and [Stockton Cutting](#), an SSSI. Some of these sites are also WWT reserves or LNRs and informal access exists on many other stretches. A few stretches have minimal nature conservation value, either because they have become completely scrubbed over or are excessively grazed. The County Council has worked with the charity [SUSTRANS](#) to increase the amenity value of certain stretches of line ('greenways' at Stratford, Burton Green and Offchurch). The railway cutting due west of Cawston Grange Farm is a designated LWS to protect one of the remaining sites for the bloody nosed beetle, discovered there in 1975.

By 2017 six other disused railways had been designated as LWS: The Lias Line, Rugby-Leicester, Alcester-Broom, Hinckley Road, Stockton and Leamington-Rugby disused railway and extension.

Other categories

Much flower-rich habitat and scrub is associated with active transport lines e.g. Harbury Bull Ring, part of Harbury SSSI, especially sidings, embankments, cuttings and trapped land between larger junctions. However, land adjacent to canals, and between junctions, is covered by the [Canals Action Plan](#).

- Many former urban tips have been capped and restored to green space, both formal and semi-natural. Good examples of the latter include Burnsall Road Nature Reserve, [Wyken Croft Park](#), (both designated LWS), Fenny Compton Tunnels, [Ryton Wood Meadows](#) (a [Butterfly Conservation Warwickshire](#) Reserve) and parts of Longford Park in Coventry, and Bailey Park in Nuneaton.
- New road cuttings (e.g. Ettington M40), and transport schemes in the future, provide opportunities to create new open mosaic habitat.
- Former military land (e.g. [Kineton MOD](#), Long Marston),
- Land now occupied by [Jaguar Land Rover](#), originally RAF Gaydon.

4.1 Legal and Policy Status

A wide range of species and habitats are protected under international and domestic laws, including the [Wild Birds Directive](#) (1979), the [Wildlife and Countryside Act](#) (1981), the [Conservation Regulations](#) (1994) and [EC Habitats Directive](#) (1992). Protection of sites is afforded nationally through [Sites of Special Scientific Interest](#) (SSSI), [Special Areas of Conservation](#) (SAC) and [Local Nature Reserve](#) (LNR) statutory status. Other sites are offered recognition of their value through LWS status Local Character Areas and identified Landscape Scale Areas. The [National Planning Policy Framework](#) (2021) paragraph 180 states conditions with regard to any development negatively affecting biodiversity, including protected sites, ancient woodland and other irreplaceable habitats. The Wildlife & Countryside Act and schedule 2 of the [Conservation of Habitats & Species Regulations](#) (EU exit, 2019) make it an offence to intentionally kill, injure, take, possess, sell, buy or transport a range of species.

By 2017 15 Open Mosaic Habitat sites had been formally designated as LWSs, 12 of which were disused railways. Several sites support great-crested newt which is specially protected under the 1981 Wildlife & Countryside Act.

4.2 Current Factors Affecting the Habitat

- **Development** – most sites fall into the category of Previously Developed land or brownfield land, which is under increasing threat from development, despite in some cases being more biodiversity rich than green field land. There has been a lack of appropriate habitat compensation for losses of LWS quality post-industrial sites.
- **The inherent temporary or ephemeral nature of this habitat** – ultimately natural succession combined with too much disturbance or lack of disturbance impacts on the quality and composition of site.
- **Lack of disturbance** – has led to substantial encroachment of scrub, bramble, rank grassland and even secondary woodland especially of non-native species such as sycamore (*Acer pseudoplatanus*), *Cotoneaster spp.*,

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etc.; these can reduce biodiversity if species rich grassland, ruderal habitats or open wetland become too restricted. Although the same process can help create valuable habitat mosaics where kept in check, all sites need some management to maintain their value in the long-term,

- **Excessive disturbance** – while most of sites benefit from light or piecemeal disturbance as it helps combat succession, catastrophic disturbance that destroys much habitat over a short time period can be very harmful.
- **Recreational pressure** – although light disturbance benefits early successional habitats and can increase habitat diversity, it can occasionally be a problem for birds, and excessive dog-fouling can promote species-poor grassland by enriching the soil. Some sites suffer from regular arson; fly tipping and anti-social behaviour, perhaps due to perceived lack of value because it looks untidy or unmanaged; this can result in sites losing popularity with local residents and politicians.
- **Unsympathetic management or restoration** – this has been a serious issue in the past and can still present problems. However, planning procedure can help to ensure that restoration plans include management for nature conservation as a consideration.
 - Practices such as regular mowing, tree planting and hard surfacing, have reduced the ecological value of some sites.
 - Resurfacing of the middle of disused transport lines to create pedestrian and cycle ways can be damaging to stretches of species-rich grasslands and important invertebrate populations. Encouraging natural regeneration of vegetation directly upon subsoil or spoil, and allowing human trampling pressure to maintain pathways is far better for species diversity than using fertile top-soil, artificial seed mixtures or artificial surfacing.
 - Tree planting is usually not appropriate within the body of the site, where the creation of floristically-rich habitats or wetlands are more desirable; some would benefit from the creation of humps, hollows and clifflets.
 - Lack of bare ground can reduce breeding and foraging sites for invertebrates and for wading birds.
- **Isolation** – isolated sites act as refuges for scarce, less mobile species that have disappeared from the surrounding countryside. They can be valuable as stepping stone sites for highly mobile species, promoting genetic variation between populations (e.g. plants with wind-dispersed seeds).
- **Small sites** - small sites may only support weak populations of species, which are vulnerable to change, extinction events and lack of genetic variability. The quality of surrounding land may be crucial as species may require adjacent habitats for foraging.

5. LOCAL ACTION

- Survey work and designation – many sites have been subject to a long history of wildlife recording, though the data is of varying scope, detail and age. Coventry has the most comprehensive data due to various surveys

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carried out between 1982 and 1998. This data has been used to determine the designation of new LWSs and resulted in a SSSI (Claybrookes Marsh).

- Education – the LNRs and many of the Wildlife Trust reserves host programmes of educational events for varying age groups.
- In 2006 the first LBAP conference was organised to respond to the [Minerals Development Framework Core Strategy](#) 'Issues and Options'.
- The identification of all ecologically important industrial sites, derelict land and stretches of disused transport lines and their ownership had largely been completed by 2012 (pers.comm. Steven Falk). Nuneaton mound and Newdigate colliery (NBBC) are two examples.
- **Management of open mosaic habitat** is most active within the SSSIs, LNRs, Warwickshire Wildlife Trust reserves and country parks such as Wyken Croft Park, parts of Longford Nature Park in Coventry and Ryton Pools (Warwickshire County Council), most of which will have management plans and a work programme of management activity.
- **Restoration of open mosaic habitat:**
 - The damaging effects of excessive scrub encroachment are now recognised, and substantial scrub has been removed from Claybrookes Marsh, Stockton Cutting and Ashlawn Cutting from 2001 onwards, improving conditions for various scarce flowers and insects, through the efforts of contractors and volunteers.
 - Tree removal by Butterfly Conservation Warwickshire (BCW) at Pagets Pool ([Ryton Pools Country Park](#)) has improved conditions for the grizzled skipper.
 - The restoration of former landfill sites such as [Ryton Wood Meadows](#) and more recently Gaydon landfill (Kingston Grange Farm) are examples of success.
- **Creation of mosaic habitat:** a butterfly bank was built from spoil from the new carpark at [Sunrising Natural Burial Ground](#) in 2014.
- [Foundry Wood](#) is a piece of regenerated woodland on part of the old Ford Foundry site off Princes Drive, Leamington Spa; the project which began in 2012 is run by a local community group.
- In 2017 Sustrans enhanced conditions for wildlife by the clearance of scrub:
 - along the Cawston Greenway at 4 locations, benefitting small blue butterfly (*Cupido minimus*) and bloody nosed beetle (*Timarcha tenebricosa*).
 - at Long Itchington disused railway canal cutting, another Sustrans cycle routes.

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6. PROPOSED LOCAL ACTIONS

ACTION	Lead	Partners	By
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Policy, Legislation & Protection			
PL1. Ensure that any site meeting the relevant criteria is considered for designation as an SSSI.	NE	WWT WCC	ongoing
PL2. Continue to select all qualifying open mosaic sites as LWSs and enter onto database.	LWSP	NE WWT WCC HBA LAs	ongoing
PL3. Ensure that the protection of all designated SSSI and LWS brownfield sites is included in Local Development Plans, Neighbourhood Plans and any other relevant strategies.	WCC	EA WWT LAs LOs	ongoing
PL4. Ensure that new minor or major developments aim for net biodiversity gain through adherence to the mitigation hierarchy.	WCC	NE LPAs NWBC WWT NBBC	ongoing
Site / Species Safeguard & Management			
SM1. Maintain open mosaic habitat in favourable condition by appropriate management, especially at LWSs and priority sites identified in the National Inventory.	CSG	NE WWT SusT Buglife LAs	ongoing
SM2. Inform landowners/ managers of the ecological significance of their sites and advise accordingly, ensuring the production of management guidance plans for the key areas of interest for all LWSs.	LWSP	WWT HBA WCC LAs	ongoing
SM3. Restore a further 40ha of degraded priority sites by 2026, including the creation of areas of bare and disturbed soil for birds, e.g. turtle dove. By 2017 the 2026 target of 10ha had already been exceeded, with 40ha restored and has now been reset.	LOs	HBA BCW WWT WCC	2026
SM4. Take opportunities with developments to create new and temporary sites.	WCC	LAs Devs	ongoing
Advisory			
A1. Advise landowners of the value of such sites, especially as they are undervalued, and urge their retention as stepping stones.	WCC	EA WWT LOs	ongoing

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Research & Monitoring				
RM1. Identify and map, with photographic records, all remaining open mosaic habitats by desktop and ground survey. Re-survey every 5 years to inform site management to keep sites in favourable condition (see SM1).	HBA	LWSP	LAAs	2026
RM2. Update the register of existing open mosaic habitats and their ownership annually.	BCW	WCC WBRC	WWT	ongoing
RM3. Identify plant indicator species for assessing the quality of open mosaic habitat.	HBA	WART LRGs	BCW LWSP	Achieved

Abbreviations: **BCW** - Butterfly Conservation Warwickshire, **Devs** – Developers, **EA** - Environment Agency, **HBA** – Habitat Biodiversity Audit partnership, **LAAs** – Local Authorities, **LOs** – Landowners, **LPAs** – Local Planning Authorities, **LWSP** – Local Wildlife Sites Project, **NBBC** – Nuneaton & Bedworth Borough Council, **NE** – Natural England, **NWBC** – North Warwickshire Borough, **SusT** – Sustrans, **WART** – Warwickshire Reptile and Amphibian team, **WBRC** – Warwickshire Biological Record Centre, **WCC** – Warwickshire County Council, **WWT** – Warwickshire Wildlife Trust.

7. PROGRESS WITH ACTIONS

From 2015–2020 there will be a rolling programme of reporting on progress, of 10 action plans per year with an annual summary of results. Progress with this plan up to 2017 can be seen at <https://www.warwickshirewildlifetrust.org.uk/LBAP>

8. BIBLIOGRAPHY

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RSPB (2016) [State of Nature](#) – a stocktake of all our native wildlife by over 50 wildlife organisations.

Natural England (2016) The [Conservation Strategy for the 21st Century](#) sets out how NE will help deliver DEFRA's ambitions for the environment to reverse biodiversity loss, sustain distinctive landscapes and enhance engagement with nature.

Worldwide Fund for Nature (2018) [The Living Planet Report](#): aiming higher. Published in collaboration with the Zoological Society of London.

9. FURTHER INFORMATION

Habitat Biodiversity Audit (HBA) for Warwickshire, Coventry & Solihull – mapping data set and associated information. Phase 1 ([JNCC](#)) 1996-2002 and Phase 2 (Local Wildlife Sites) ongoing.

Biodiversity Planning Toolkit - a new online resource to help incorporate biodiversity and geodiversity into the planning system and new development.

Buglife - the Invertebrate Conservation Trust (2004) – provides Information on the habitat management requirements of key invertebrates – see '[Managing Aggregate Sites for Invertebrates](#) – A Best Practice Guide and the Open Mosaic Habitat Assessment Form.

RSPB (2003). [Habitat Creation Handbook for the Minerals Industry](#) - a practical guide to the creation of priority Biodiversity Action Plan habitats on redundant mineral workings.

Butterfly Conservation - [Butterfly Banks](#), [Scallops](#), [Scrapes](#), [Seeding and Plug Planting](#) - management factsheets for advice on habitat creation and maintenance that can benefit several species of butterfly and moth in one location.

[Nature After Minerals](#), a resource for everyone with an interest in quarry restoration & minerals planning for biodiversity.

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MineralsUK - the British Geological Survey's [Centre for Sustainable Mineral Development](#). This website has a wealth of information on mineral resources, mineral planning, policy and legislation, sustainable development, statistics and exploration.

[Warwickshire CC Mineral Strategy](#) - the minerals development framework consists of a number of documents.

[Plantlife](#) – carries out plant species and habitat conservation, owns and manages nature reserves, campaigns, and raises awareness through education.

[The Colliery Spoil Biodiversity Initiative](#) (2016) highlights the importance and vulnerability of colliery spoil habitats and wildlife.

Buglife (2017) [The B-Lines project](#) aims to create a network of flower- rich pathways across the landscape, linking the countryside, towns and the best of our wildlife sites by working with farmers, communities, local authorities, wildlife organisations and businesses.

10. CONTACT

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