

Thames Valley

Environmental Records Centre



Sharing environmental information in Berkshire and Oxfordshire

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GREEN CORRIDORS IN EAST CHALLOW

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GREEN CORRIDORS IN EAST CHALLOW

SUMMARY

Thames Valley Environmental Records Centre (TVERC) has identified a network of green corridors in East Challow to support preparation of a Neighbourhood Plan. These corridors are based on modelled habitat networks and Public Rights of Way and facilitate the movement of wildlife and people through the landscape. There are a number of existing corridors principally running East-West through the parish. Proposed corridors have been identified that link existing corridors along rights of way. The identification of these green corridors accords with NPPF paragraph 117 in identifying and mapping ecological networks and wildlife corridors.



CONTENTS

Green Corridors in East Challow	2
Summary	2
Contents	3
List of Maps	4
1. Introduction	5
1.1 Green Corridors	5
1.2 Green Corridors in Neighbourhood Plans	5
1.3 Green Corridors in East Challow	5
2. Method	6
3. Results	8
3.1 Identified green corridors	8
3.2 Limitations	8
4. Maps.	9
5. Summary and Recommendations	13
Recommendations for further work	13
6. About TVERC	14
What we do	14
Our records	14
7. Appendices	15



LIST OF MAPS

Section	Map number	Title	Page
Maps	Map 1	Priority habitats in East Challow	no. 9
	Map 2	Woodland and grassland habitat networks in East Challow	no. 10
	Map 3	Final green corridors in East Challow	no. 12



1. INTRODUCTION

1.1 GREEN CORRIDORS

Green corridors are corridors that allow people and wildlife to move through the landscape. They are important both in connecting patches of habitat to allow wildlife to find food, homes and mates, but also in helping people to access the countryside and to experience wildlife first hand.

1.2 GREEN CORRIDORS IN NEIGHBOURHOOD PLANS

Many Neighbourhood Plans are identifying green corridors and including policies which specifically address the protection, creation and enhancement of new and existing green corridors.

Paragraph 117 of the National Planning Policy Framework (NPPF)¹ states: 'To minimise impacts on biodiversity and geodiversity, planning policies should:... identify and map components of the local ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them and areas identified by local partnerships for habitat restoration or creation;...'

The identification and mapping of green corridors is therefore in accordance with the NPPF.

1.3 GREEN CORRIDORS IN EAST CHALLOW

East Challow Neighbourhood Plan group asked Thames Valley Environmental Records Centre (TVERC) to identify and map green corridors in their Neighbourhood Plan area. This report describes the methods that TVERC used to identify green corridors in the parish of East Challow and presents a map of the final green corridors that resulted from this process. A map of the green corridors can be found in Section 4.

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

2. METHOD

Green corridors are defined in this report as areas where connected habitat networks for wildlife and Public Rights of Way coincide. As such they are corridors for the movement of both wildlife and people through the countryside, which in turn provide opportunities for the appreciation of nature by the users of the countryside.

TVERC has detailed mapping of habitats and land use for the whole of Oxfordshire, information on the location and value of Local Wildlife Sites and access to data for the Public Rights of Way network via Oxfordshire County Council. We used these data to propose green corridors in East Challow.

We identified priority habitats² in East Challow (Map 1). There are some areas of Lowland Deciduous Mixed Woodland in the parish. There are also some areas of grassland that have value for nature conservation either in the parish or on the borders. These are the most important habitats within East Challow and provide the focus for the green corridors.

Having identified priority habitats in the parish, TVERC then modelled connectivity between these patches of habitat. Habitats are well connected where the landscape is permeable to species and they are able to move easily between core habitat patches via corridors and stepping stones. Habitats are poorly connected when the landscape is not permeable and core habitat patches are isolated from each other due to barriers to movement e.g. roads, railways and built development.

TVERC modelled habitat connectivity for woodland and grassland habitats in East Challow. We used a Cost-Distance³ method which identifies the ecological energetic cost to species moving across the landscape between habitat patches (see Appendix 1 for technical details). The output of the model shows the connected habitat network for each of these habitats in East Challow (woodlands and grasslands) (Map 2).

TVERC identified green corridors where the habitat and Public Rights of Way networks coincided. This map was used as the basis for a discussion with members of the East Challow Neighbourhood Plan group to gather local information on the parish, the proposed green corridors and to identify any additional or aspirational green corridors for the parish.

² Section 41 habitats of principle importance for nature conservation, NERC 2006 Act.

³ CATCHPOLE, R.D.J. 2006. Planning for Biodiversity – opportunity mapping and habitat networks in practice: a technical guide. English Nature Research Reports, No 687

Green Corridors in East Challow



Using the output of the workshop discussion TVERC then mapped all of the existing and proposed green corridors in East Challow (Map 3).



3. RESULTS

3.1 IDENTIFIED GREEN CORRIDORS

TVERC has identified a network of green corridors in East Challow (Map 3). One corridor runs along the canal through East Challow, while a second links up footpaths and habitat in the centre of the village. There is a corridor along the parish boundary that coincides with the Byway here, while additional corridors run north from the centre of the village out into farmland.

Two proposed green corridors have been identified. The first runs East-West through the north of the parish and links the existing corridors running up to meet it. The second is a small corridor that links existing rights of way into the middle of the village. In order for these to function as green corridors there would need to be public access along them, as well as creation, restoration or enhancement to semi-natural habitats in the landscape to provide landscape permeability for wildlife.

3.2 LIMITATIONS

TVERC has identified the following limitations to this study:

- Hedgerows are not well mapped in Oxfordshire and these can provide significant connecting habitat, particularly for woodland habitats. Therefore woodland connectivity may be significantly better than the modelled habitat networks indicate. East Challow does have a significant hedgerow resource, so the survey and mapping of hedgerows would undoubtedly improve the connectivity modelling.
- The habitat data on which the models are based are a snapshot in time. While the data are updated where possible using survey data, there may have been changes in the habitat or land use in East Challow that have not been captured in TVERC's habitat mapping. As such there could be differences in the permeability scores applied to the landscape and as a result the connectivity models may be different where these changes to be included. However, there are unlikely to be large differences in habitats and land use in the area and small differences would not significantly affect the output of the modelling.



4. MAPS.

Map 1. Priority habitats and Local Wildlife Sites in East Challow

Map 2. Woodland and grassland habitat networks in East Challow

Map 3. Final green corridors in East Challow.

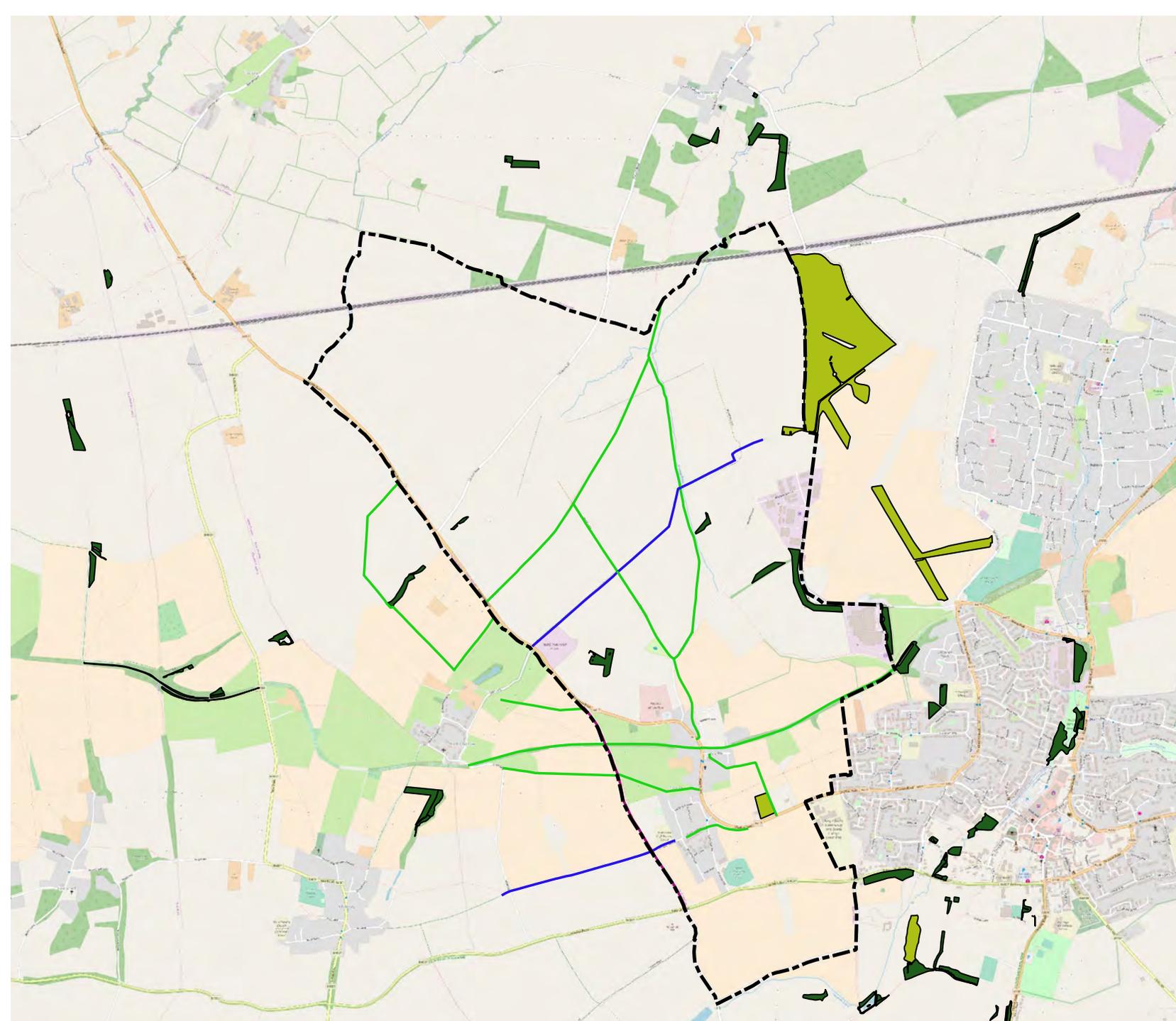


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East Challow: existing habitats

Legend

-  East Challow parish
 -  Public Rights of Way
 -  Byway Open to all Traffic
 -  Public Bridleway
 -  Public Footpath
 -  Restricted Byway
 -  Woodland habitats
 -  Grassland habitats
- OpenStreetMap



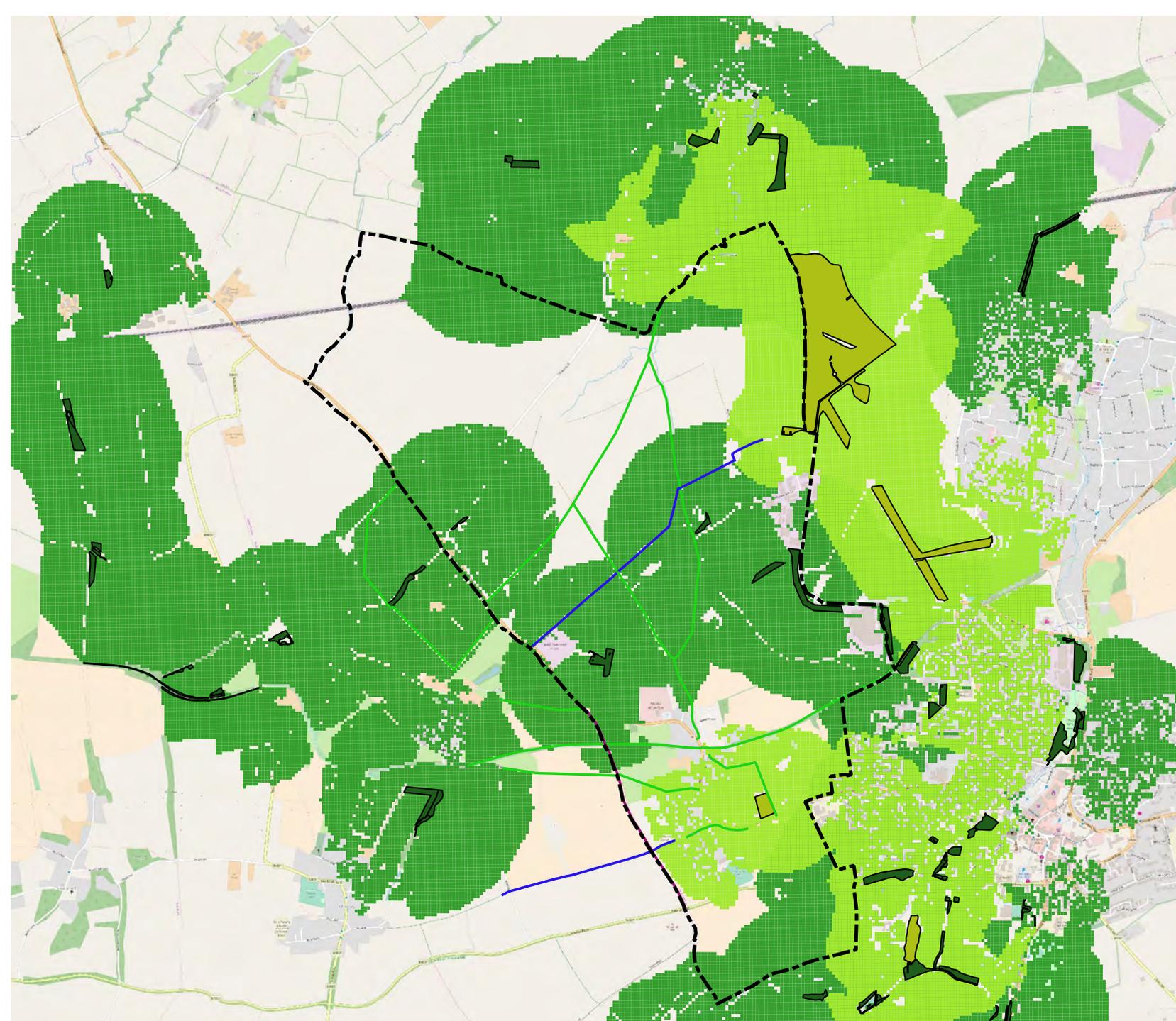


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East Challow: habitat networks

Legend

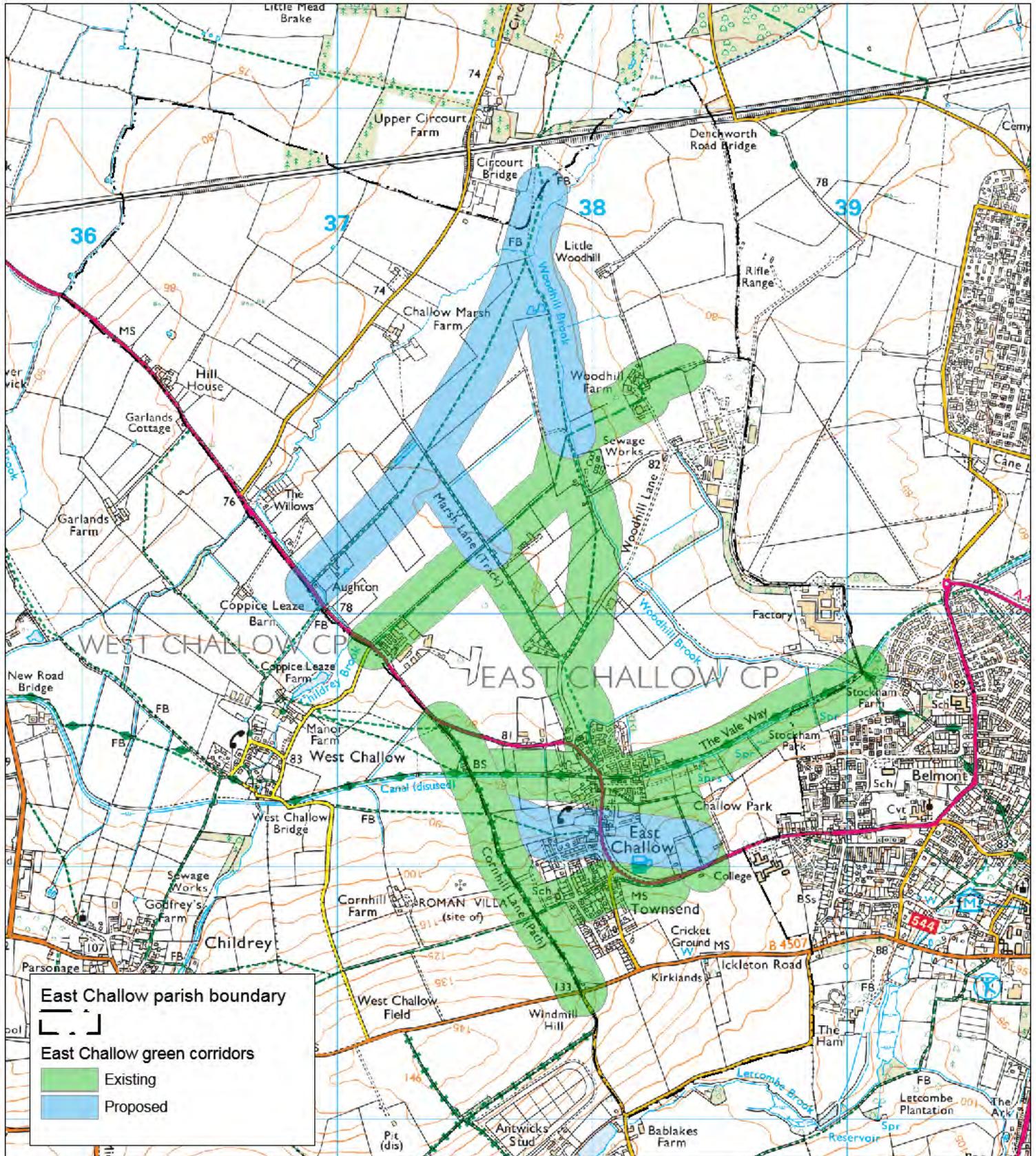
-  East Challow parish
-  Public Rights of Way
-  Byway Open to all Traffic
-  Public Bridleway
-  Public Footpath
-  Restricted Byway
-  Woodland habitats
-  Grassland habitats
- Grassland habitat network
 -  grassland habitat network
- Woodland habitat network
 -  woodland habitat network
- OpenStreetMap





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Green Corridors in East Challow





5. SUMMARY AND RECOMMENDATIONS

Thames Valley Environmental Records Centre (TVERC) has identified a network of green corridors in East Challow to support preparation of a Neighbourhood Plan. These corridors are based on modelled habitat networks and Public Rights of Way and facilitate the movement of wildlife and people through the landscape. There are a number of existing corridors principally running East-West through the parish, with some connectivity North-South. Two proposed corridors have been identified that run East-West. The identification of these green corridors accords with NPPF paragraph 117 in identifying and mapping ecological networks and wildlife corridors.

East Challow Neighbourhood Plan will be examined by a Planning Inspector prior to adoption. TVERC recommends that an appropriate policy is included to support the protection and enhancement of existing green corridors, and the creation of proposed green corridors. Should the inclusion of these green corridors be upheld by the Planning Inspector, it would be helpful if a copy of the agreed final neighbourhood plan is provided to TVERC so that the location of the green corridors can be shared with potential developers and the local planning authority. This will ensure everyone has the knowledge they need to make responsible decisions concerning our environment.

RECOMMENDATIONS FOR FURTHER WORK

TVERC recommend the following work to support green corridors and ecological networks in East Challow:

- Survey and map hedgerows in East Challow. Hedgerows provide important connective habitats for many species, in particular woodland species. Currently hedgerows are not well mapped in Oxfordshire and knowledge of hedgerow distribution and diversity would greatly improve the understanding of habitat connectivity across the parish. It would also be possible (with landowner permission) to identify important hedgerows under the Hedgerow Regulations 1997⁴.
Prepare a biodiversity action plan for East Challow. This would highlight the key habitats and other features of importance in the parish and set out steps for protecting and enhancing those assets. This would also serve as a focus for community action, such as practical conservation work or biological recording in the community. Other organisations in addition to TVERC could also provide assistance with this aspiration.

⁴ <https://www.gov.uk/guidance/countryside-hedgerows-regulation-and-management>



6. ABOUT TVERC

Thames Valley Environmental Records Centre (TVERC) is a 'not for profit' organisation covering Berkshire and Oxfordshire. We are run by a partnership and are one of a national network of local records centres. We are a member of the Association of Local Records Centres (ALERC) and the National Biodiversity Network (NBN). Our funding partners include all the local authorities in Oxfordshire & Berkshire plus the Environment Agency. We also work closely with the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust.

WHAT WE DO

We provide our funding partners with annually updated species and sites information as GIS tables, and undertake surveys of local wildlife sites. We also carry out data analysis for the monitoring of local authority Local Plans. We provide information to parish councils, local people, conservation bodies, land-owners, students and commercial organisations such as ecological consultants and utilities companies via data searches, data licensing and data exchanges. We provide other services such as ecological surveys, data analysis & presentation and training.

OUR RECORDS

We hold over 2 million records of flora and fauna in Berkshire and Oxfordshire plus information about Local Wildlife and Geological Sites, NERC Act S41 Habitats of Principal Importance (previously called UK Biodiversity Action Plan (BAP) habitats) and Ecological Networks (Conservation Target Areas and Biodiversity Opportunity Areas). We collect this data from the general public, skilled volunteer /amateur recorders, professionals working for wildlife charities (BBOWT and RSPB), professionals working for government agencies (the Environment Agency & local authorities) and ecological consultants. This information is used:

- by planning authorities and developers to make informed decisions on the design and location of sustainable development
- to help farmers, land-owners and conservation organisations manage land in the best way to enhance biodiversity
- by nature partnerships to direct wildlife conservation work
- by teachers, students and scientists for education and scientific research.

For more information please visit our website: www.tverc.org

7. APPENDICES

APPENDIX 1: TECHNICAL NOTES ON CONNECTIVITY MODELLING

Habitat connectivity describes the degree to which different patches of the same habitat are connected to each other, either physically or functionally. Maintaining and improving connectivity is one of the key principles identified by the Lawton Review⁵ that protected sites should be ‘more joined up’.

Development can have both positive and negative impacts on habitat connectivity. Connectivity can be severed by unsympathetic development due to the fragmentation and isolation of habitat patches or by introducing new barriers to the movement of species through the landscape. However, development can have a positive impact on habitat connectivity by creating corridors or stepping stones to better link existing habitat patches and improve the permeability of the landscape.

In order to plan strategically and maximise the benefits from development it is necessary to understand where there are existing habitat networks. There are a number of different approaches to mapping and modelling habitat networks which can be broadly split into structure-based approaches and species-based approaches⁶. Structure-based approaches investigate the physical connections between habitat patches, whereas species-based approaches investigate the functional connections between habitat patches based on the abilities of species to move between them.

For this study TVERC have taken a species based approach to habitat connectivity. Habitats are well connected where the landscape is permeable to species and they are able to move easily between core habitat patches via corridors and stepping stones. Habitats are poorly connected when the landscape is not permeable and core habitat patches are isolated from each other due to barriers to movement. TVERC have used a cost-distance (or least-cost) approach to modelling habitat connectivity, based on the habitat requirements and dispersal abilities of General Focal Species. General Focal Species (GFS) are model species that are representative of a range of species found in a particular habitat. Three GFS were used in this project: a woodland GFS; a grassland GFS; and a heathland/acid grassland GFS.

The Cost-Distance approach works by assigning a cost (financial, temporal, energetic etc...) to a surface (e.g. landscape) and calculating the cumulative cost of moving across that surface. For habitat connectivity

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<http://webarchive.nationalarchives.gov.uk/20130402151656/http://archive.defra.gov.uk/environment/biodiversity/documents/201009space-for-nature.pdf>

⁶ <http://www.snh.gov.uk/docs/B831805.pdf>



modelling, the ecological energy cost to a GFS of moving through different habitat types is assigned to a landscape. Table 3 shows how costs are related to habitat suitability. The cost surface can be thought of as the permeability of the landscape to the GFS. For example roads have a high energetic cost and can represent barriers to many species, whereas woodlands for example have a low energetic cost to woodland GFS.

TABLE 1: HABITAT COST SCORES AND HABITAT SUITABILITY⁷

Cost Score	Habitat suitability	Habitat suitability	Likelihood	Description
1	Optimal	Core habitat	Core habitat	Excellent food, shelter, breeding opportunities
2	Near Optimal	Core habitat	Core habitat	Good food, shelter, breeding opportunities
5	Good	Core habitat	Core habitat	Good food, shelter, breeding opportunities
10	Reasonable	Potential habitat	Occasionally	Reasonable food, shelter, breeding opportunities; may be missing one or more
20	Fairly Poor	Poor habitat	Rarely	Lacking either food, shelter or breeding opportunities
25	Poor	Poor habitat	Rarely	Lacking either food, shelter or breeding opportunities
30	Very Poor	Poor habitat	Rarely	Lacking either food, shelter or breeding opportunities
35	Extremely Poor	Poor habitat	Rarely	Lacking either food, shelter or breeding opportunities
40	Unsuitable	Unsuitable habitat	Very Unlikely	Few food, shelter or breeding opportunities
50	Very Unsuitable	Unsuitable habitat	Very Unlikely	No or little food, shelter or breeding opportunities
150	Partial	Partial	Almost	No or little food, shelter or breeding

⁷ http://jncc.defra.gov.uk/pdf/BRAG_HabMan_EnglishNatureResearchReport687-Planningforbiodiversity-opportunitymapping&habitatnetworks.pdf

Green Corridors in East Challow

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	Barrier	Barrier	never	opportunities with additional hazards or some physical exclusion
9999	Total Barrier	Total Barrier	Never	Total physical exclusion

To model a functionally connected habitat network a maximum cumulative cost, based on a maximum dispersal distance of the GFS, is used to show habitat patches that are functionally connected in the landscape. Maximum dispersal distances and maximum costs for each GFS are shown in Table 4.

TABLE 2: MAXIMUM COST AND DISPERSAL DISTANCES FOR EACH GENERAL FOCAL SPECIES⁸

General Focal Species	Maximum cost	Dispersal distance
Woodland	1,500	3 km
Grassland	1,000	2 km
Heathland	600	1.2 km

Costs were assigned to different habitats for each of the General Focal Species based on the work of Roger Catchpole for Natural England⁹ and adapted in Berkshire by the Berkshire Local Nature Partnership and the Berkshire Buckinghamshire and Oxfordshire Wildlife Trust (see Table 5). TVERC adapted them slightly for the data used in this project and the habitat types TVERC has mapped in Bracknell Forest. The main differences to the previous studies were using 9999 for impermeable surfaces (e.g. buildings and hardstanding) and using a standard value for roads and railways. We used 9999 for impermeable surfaces as the r.cost model (see paragraph xx below for explanation of r.cost model) treats zeros as no cost rather than no data. In order to ensure that impermeable surfaces were treated as such in the r.cost model, we assigned them a score of 9999 to indicate this impermeability. We used the same score (150) for all roads, rather than assigning different scores to different categories of roads (A roads, B roads). This is because we did not have polygon data for different road types.

⁸ http://jncc.defra.gov.uk/pdf/BRAG_HabMan_EnglishNatureResearchReport687-Planningforbiodiversity-opportunitymapping&habitatnetworks.pdf

⁹ http://jncc.defra.gov.uk/pdf/BRAG_HabMan_EnglishNatureResearchReport687-Planningforbiodiversity-opportunitymapping&habitatnetworks.pdf

Green Corridors in East Challow



TABLE 3: COSTS FOR PHASE 1 HABITAT TYPES FOR EACH GENERAL FOCAL SPECIES

Phase 1 Habitat type	Scores as 'cost' per metre		
	Woodland GFS	Grassland GFS	Heathland / acid grassland GFS
Acid grassland - semi-improved	30	2	1
Acid grassland - unimproved	30	2	1
Bare ground	40	20	30
Bracken - continuous	20	10	20
Broadleaved woodland	1	20	35
Broadleaved woodland - plantation	1	20	35
Broadleaved woodland - semi-natural	1	20	35
Buildings	9999	9999	9999
Built-up areas and gardens	25	10	50
Cemetery	25	10	50
Coniferous woodland - plantation	20	20	20
Coniferous woodland - semi-natural	20	20	20
Cultivated/disturbed land	50	50	50
Cultivated/disturbed land - amenity grassland	50	50	50
Cultivated/disturbed land - arable	50	50	50
Cultivated/disturbed land - ephemeral/short perennial	40	5	50
Cultivated/disturbed land: introduced shrub	20	30	50
Dry dwarf shrub heath	25	10	1
Dry heath/acid grassland mosaic	25	2	1
Eutrophic standing waters	50	50	50
Fen	20	5	30
Fen - valley mire	20	5	30
Hardstanding	9999	9999	9999

Green Corridors in East Challow

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Improved grassland	50	50	50
Marginal/inundation - marginal	20	20	40
Marsh/marshy grassland	20	5	30
Mixed woodland - plantation	1	20	35
Mixed woodland - semi-natural	1	20	35
Neutral grassland	30	1	30
Neutral grassland - semi-improved	30	1	30
Neutral grassland - unimproved	30	1	30
Not applicable	9999	9999	9999
Parkland and scattered trees	5	1	30
Parkland and scattered trees - broadleaved	5	1	30
Poor semi-improved	30	2	30
Quarry	50	50	50
Railway	150	150	150
Recently felled woodland - broadleaved	5	20	10
Recently felled woodland - coniferous	5	20	10
Recently felled woodland - mixed	5	20	10
Recently planted woodland	5	20	10
Road	150	150	150
Running water	50	50	50
Running water - eutrophic	50	50	50
Scrub - dense/continuous	1	20	10
Scrub - scattered	1	20	10
Scrub - scattered- dry dwarf shrub heath	25	10	1
Standing Water	50	50	50
Standing water - eutrophic	50	50	50
Standing water - mesotrophic	50	50	50
Standing water - oligotrophic	50	50	50
Swamp	20	20	40

Green Corridors in East Challow

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Tall ruderal	20	10	20
Track	40	20	30
Unidentified	50	50	50
Unidentified plus scattered scrub	50	50	50
Wet dwarf shrub heath	25	10	1

The costs were assigned to habitats mapped by TVERC in the Berkshire Habitat and Land Use layer. These data do not include linear habitats as these have not been comprehensively mapped in Bracknell Forest. Linear habitats (e.g. hedgerows) provide significant connecting habitat, particularly for woodland species. In addition, urban land use types (e.g. buildings, gardens etc.) were incorporated from OS Mastermap layers, as well as data from the Bracknell Forest Landscape Inventory layer. Habitat costs are based on the current distribution of mapped habitats; habitat permeability could change due to changes in habitat distributions or in the case of urban features mitigation or enhancement (e.g. provision of green roofs, green walls etc...). Raster layers were created from this combined Habitats and Land Use layer, one for each GFS. No data areas (i.e. those outside the study area) were scored 9999 and the raster cell values were multiplied by the cell size (10 metres) to give the cell value as the cost per metre to each GFS.

The Cost-Distance analysis was carried out using the r.cost tool¹⁰ in the GRASS (v7.0.6)¹¹ plugin in QGIS (v2.16)¹². The GRASS r.cost tool uses starting points (or polygons) to calculate the cumulative cost across the whole cost surface. To create these starting points TVERC selected priority habitat polygons from the Habitats and Land Use layer (lowland deciduous woodland, lowland meadows, lowland heathland and lowland dry acid grassland) and created 10 random points per polygon. These were then used as the start points for the cost distance tool.

The r.cost tool produces a cumulative cost raster. This raster was converted into a vector format (shapefile) and cells that had cumulative costs that were greater than the max cost for each GFS were removed. These cells were then combined into a single polygon to create **a layer that shows the functionally connected habitat network for each habitat type**. The output raster contains the cumulative cost for each cell and can be rendered to show different max costs.

¹⁰ <https://grass.osgeo.org/grass70/manuals/r.cost.html>

¹¹ <https://grass.osgeo.org/grass70/manuals/index.html>

¹² <http://www.qgis.org/en/site/>