**Tools for Planning and Evaluating Urban Green Infrastructure: Bicester and Beyond**

# Guidance note: Creating a Green Infrastructure base map

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This note is one of the outputs from the NERC-funded project "Tools for mapping and assessing green infrastructure: Bicester and Beyond". The project aimed to provide local authorities with quick, easy and freely available tools for mapping, planning and assessing the costs and benefits of urban Green Infrastructure. The guidance was developed by the Environmental Change Institute at the University of Oxford, working in partnership with Cherwell District Council, Bicester Town Council and other stakeholders in Bicester and beyond.

This short guidance note lists potential datasets that can be used to create a base map of existing green infrastructure assets, and suggests how they could be combined into a single asset map.

## Potential data sources

Data on existing habitats, land use and green infrastructure can be obtained from a variety of sources. This list explains how to obtain and use each type of data as Geographic Information System (GIS) datasets, which can typically be downloaded in two formats - as shapefiles or feature classes.

### Ordnance Survey MasterMap Topography Layer (OSMM)

OSMM a very detailed base map that does down to the level of individual gardens and roadside verges. It is available to local authorities via a Public Sector Mapping Agreement (PSMA) license, or to academic users for research purposes via Edina Digimap. There are plans to make most elements of it freely available to all users in due course (with the exception of garden boundaries). The habitat and land use information is contained in three attribute fields: Descriptive Group, Descriptive Term and Make. These contain good information on habitats, e.g. natural land will be classified according to whether it contains coniferous or deciduous trees, shrub, rough grassland, marsh, boulders, etc. We have created a GIS layer symbology (OSMM.lyr) for displaying the habitat based on these three attributes, which can be downloaded from our website. Note: this is set up to work with the habitats present in the Oxfordshire to Cambridgeshire Arc, but it does not cover habitats not present within this region.

### OS Open Zoomstack

This is a freely available base map. However it does not include the level of detail of OS mastermap, e.g. it does not show property boundaries and has limited information on different types of green space.

### Ordnance Survey Mastermap Greenspace Layer

This dataset is available here under a Public Sector Mapping Agreement license or to academic users for research purposes via Edina Digimap. It is based on OS MasterMap and shows all types of green space, including gardens and roadside verges, but only for towns and cities. It has four categories: primary function, primary form, secondary function and secondary form. The function identifies various greenspace categories: public parks and gardens, playing fields, play spaces, bowling greens, golf courses, tennis courts, other sports facilities, natural land, campsites, institutional grounds, religious grounds, cemeteries, school grounds and allotments. The form identifies whether the feature within each type of greenspace is water, woodland, open semi-natural, manmade or multi-surface. Secondary function and form is used where a green space has more than one function, e.g. a play space within a public park, or playing field within school grounds.

### Ordnance Survey Open Greenspace

This dataset is freely available here. It includes green spaces suitable for recreation (public parks, playing fields, sports facilities, play areas and allotments), which are thought to be publically accessible, and it includes these green spaces in rural areas as well as towns and cities. The outlines of the polygons do not exactly match OS Mastermap, but if you want to combine the two layers there is a lookup table which comes with the OS Mastermap Greenspace layer.

### Habitat data

**Phase 1 habitat surveys** may be available under license from the local Environmental Record Centre (see http://www.alerc.org.uk/ ). Usually the record centres have a funding arrangement that allows local authorities to access this data, but sometimes a charge may be payable. For the Bicester work, we used Phase 1 Habitat and Land Use dataset provided by the Thames Valley Environmental Record Centre (TVERC), with a sub-contractor license issued via Cherwell District Council. This dataset is largely compiled from aerial photos but with some local information and ground surveys (e.g. from nature reserves). It covers all semi-natural habitats, arable land and improved grassland, but excludes urban areas apart from large areas of green space such as parks, playing fields and some allotments.

**Natural England's Priority Habitat Inventory** covers the whole of England and can be downloaded here. This covers only the priority habitats, not farmland (arable or improved grassland) or urban green space. Two types of priority habitat are contained in separate datasets: Wood Pasture and Parkland with Scattered Trees, and Open Mosaic Habitats on Previously Developed Land. These datasets are less accurate – for example the parkland dataset may cover the whole of a large estate, including areas that are arable, grassland or buildings as well as genuine wood pasture or parkland with scattered trees.

**CEH Land Cover Map 2015** is a vector map of broad land cover categories derived from satellite data, including coniferous and deciduous woodland, acid, neutral and calcareous grassland, heather, bog, arable, improved grassland and suburban / urban areas. However it is freely available only to academic users. If Phase 1 habitat data is not available it can be used in conjunction with the Priority Habitat Inventory, to distinguish between arable land and improved grassland.

## Open space surveys

Some local authorities may maintain their own open space surveys. We had access to a 2011 open space survey by Cherwell District Council, which identified the same categories as OS Open Greenspace (allotments, playing fields, playgrounds, public parks, cemeteries, etc).

## Town grounds and tree databases

We also had access to a Grounds database and a survey of trees on publicly owned land, from Bicester Town Council. This was very useful, as urban trees form a key part of green infrastructure. The grounds database was a comprehensive dataset derived from OS Mastermap and included all green space owned by the council, including roadside verges and roundabouts as well as parks, amenity grassland, allotments, playing fields, nature reserves, etc.

## Designated areas (SSSIs, local and national nature reserves, district wildlife sites, conservation target areas, etc)

Datasets for most types of nature and cultural designation are freely available, mainly from data.gov.uk. However some local designations may be only available through the council or via the local Environmental Record Centre. We obtained data for Local Wildlife Sites, Local Geological Sites and Road Verge Nature Reserves under license from TVERC, via Cherwell District Council. Freely available datasets include:

- [National Nature Reserves](#)
- [Local Nature Reserves](#)
- [SSSIs](#)
- [Ancient Woodlands](#)
- [RSPB Reserves](#)

The following datasets are also available from data.gov.uk:

- Special Areas of Conservation
- Special Protection Areas
- World Heritage Sites
- Country Parks
- AONBs
- Green Belts
- Doorstep and Millennium Greens
- National Trust Properties

In addition, the Woodland Trust maintains a database of Ancient and Veteran trees, collected via citizen science, available on request.

## Public rights of way

PROWs are available from local authorities. There is no national dataset, although a few local authorities have made their data available online.

## OrVal paths and parks

The University of Exeter has developed a very useful dataset of Paths and Parks, as part of the [OrVal](#) tool. The paths and parks datasets can be downloaded from the OrVal website. They were compiled

from multiple sources (including Open Street Map) and include most of the publically accessible green spaces and paths in England, though some paths and some small informal green spaces are missing.

### Open Street Map

This is useful for paths if public rights of way cannot be obtained from the local council. It includes urban paths and permissive paths that do not appear in PROW datasets, though the most easily downloadable dataset does not include the tag to show whether there is public access or not.

### BlueSky national tree map

BlueSky mapshop sells tree maps, currently costing around £300 for a 6x6km area.

### Hedgerows

Ordnance Survey have a map of all hedgerows and lines of trees in England, but it is available only to academic users on request for research purposes. It was created by combining field boundaries, LIDAR height data and NDVI vegetation maps.  CEH also have a hedgerow map created by combining field boundaries and LIDAR height data (but not the vegetation map, so it is possible this might pick up walls by mistake). However the CEH dataset is not freely available.

## Combining the layers into a single GI map

It is quite tricky to combine these multiple layers into a single GI map.  The most obvious method is to perform a series of Intersect or Identity operations in GIS. However, when combining polygon boundaries that do not line up exactly with each other, this can result in thousands or even millions of tiny slivers around the edge of polygons.

We have developed a set of python scripts for combining OSMM and other habitat and greenspace layers into a single base map without creating too many slivers. We plan to make these scripts publically available in due course, though they are not yet suitable for wider use. We display trees, paths and hedgerows as separate layers on top of the base map.

The freely available EcoServ-GIS model, created by the Wildlife Trusts, also creates a base map automatically from OS Mastermap, habitat and green space data. However this model is currently not usable, as it has not been maintained and no longer works with the latest versions of ArcGIS. We are working with Natural Capital Solutions, Liverpool John Moore University and Chloe Bellamy (one of the original developers of EcoServ-GIS) to help rewrite EcoServ-GIS in R, so that it can be used by anyone.

A quick alternative to creating a single integrated GI map is simply to display the relevant layers in a sensible order. We recommend the following order (with the top layer listed first).

- Trees, hedgerows and paths (if available)
- Green space and / or open space data
- Habitat data for non-urban areas
- OS Mastermap