England Green Infrastructure Mapping Database

Beta Version 1.1 User Guide

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England Green Infrastructure Mapping Database Beta Version 1.1 User Guide

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Acknowledgements

Contents

Introduction

The England Green Infrastructure Mapping Database is designed to provide technical evidence on the Green Infrastructure of England as an open data product under Open Government License (OGL) conditions.

This first version (Version 1.1) of the England National Green Infrastructure Mapping Database is being made available as an initial "pre-release" version aimed primarily at Local Authorities and other public sector organisations in order to provide a first and initial version of the data and maps.

Further work is planned to be incorporated into an updated version during 2022.

The England Green Infrastructure Mapping Database aims to be;

- A publicly accessible data, analysis and mapping resource.
- A resource providing a nationally consistent approach to Green Infrastructure mapping.
- A resource capable of providing information at multiple scales from England wide, Upper and Lower Tier Local Authority, Middle Super Output Area (MSOA) and Lower Super Output Area (LSOA).
- A resource that can be used to provide evidence to inform a variety of national to local planning, strategy and targeting exercises involving Green Infrastructure.
- A baseline evidence resource providing a consistent level of data and analysis across England capable of being supplemented with additional and/or local data as required by the end user.

The resource is a database of factual spatial and statistical information and is not intended to be either a plan or strategy in itself and no interpretation, analysis or narrative on the data is attempted in this version (V 1.1).

This User Guide provides information on the content of Version 1.1, how it was put together, what approach to undertaking the various assessments was and information concerning limitations on use and gaps etc.

The database will be maintained and updated periodically. Periodic updates will lead to the issue of an updated database which will be identified by a new version number (for example V 1.2).

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Version 1.1 brings together data from over 40 datasets and has required a whole range of assumptions, simplifications, combinations, interpretations and generalisations to create workable maps.

We cannot check the exact details for every land parcel on the map so what the map says can be at variance with the situation on the ground.

This underscores the importance of ground truthing and supplementation with local data (and knowledge) when using the maps at local scales.

Be aware –

- **There are margins for error in the source data that will have transferred into the maps.**
- **There are margins for error generated by the generalisations and assumptions that have had to be made to make the mapping practicable.**
- **There may be errors that have been generated by processing error or data corruptions.**
- **There are margins for error generated by time lag (data drift) – change on the ground takes time to appear on newer versions of the source data.**

Section 1.4 – Acknowledgements

The England Green Infrastructure Mapping Database has been created as a part of delivering the 25 Year Environment Plan aspiration to establish a National Framework of Green Infrastructure Standards for England.

The work for Version 1.1 was undertaken during the financial year 2020 – 21.

The work was commissioned and funded by Defra, Natural England and the Natural Capital and Ecosystems Assessment Programme.

The work was undertaken for Defra and Natural England by ADAS (Main contractor) and the West Country Rivers Ltd (Blue Infrastructure Assessments).

Presentation of V1.1 (OGL) on the Green Infrastructure Website and was undertaken by Exegesis.

2. Source Data

List of data sources used in the creation of Version 1.1

Section 2.1 – Green Infrastructure Datasets

Data source	Link	Copyright
Ancient Woodland Inventory	Ancient Woodland (England) | Natural England Open Data Geoportal (arcgis.com)	Open Government Licence (nationalarchives.gov.uk)
Areas of Outstanding Natural Beauty	Areas of Outstanding Natural Beauty | Natural England Open Data	Open Government Licence (nationalarchives.gov.uk)
Country Parks	Country Parks | Natural England Open Data	Open Government Licence (nationalarchives.gov.uk)
Doorstep Greens	Doorstep Greens (England) | Natural England Open Data	Open Government Licence (nationalarchives.gov.uk)
Environment Agency – WFD Ecological Status 2019	Rivers https://environment.data.gov.uk/dataset/c481c391-1008-4b05-bbfb-b0764b89ce8d Lakes https://environment.data.gov.uk/dataset/edee5adf-dea9-41df-98d5-874808e4d886	Open Government Licence (nationalarchives.gov.uk)

	Canals https://environment.data.gov.uk/dataset/c481c391-1008-4b05-bbfb-b0764b89ce8d Transitional https://environment.data.gov.uk/dataset/fdedb957-380d-4051-8a8e-284bb9815029 Coastal https://environment.data.gov.uk/dataset/fdedb957-380d-4051-8a8e-284bb9815029	
Historic England – Historic Parks and Gardens	Download Listing Data - GIS Shapefiles | Historic England	Open Government Licence (nationalarchives.gov.uk)
Local Nature Reserves	Local Nature Reserves (England) - data.gov.uk	Open Government Licence (nationalarchives.gov.uk)
Millennium Greens	Millennium Greens (England) Polygons | Natural England Open Data Geoportal (arcgis.com)	Open Government Licence (nationalarchives.gov.uk)
National Forest Inventory	National Forest Inventory Woodland England 2018 | Forestry Commission (arcgis.com)	Open Government Licence (nationalarchives.gov.uk)

National Parks	[National Parks (England)	Natural England Open Data](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
National Nature Reserves	[National Nature Reserves (England) - data.gov.uk](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
Natural England Access Land	[Natural England Access Land	Natural England Open Data](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
Natural England Section 15 Land	[Natural England Section 15 land	Natural England Open Data](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
OS Open Greenspace	[OS Open Greenspace	Greenspaces in urban and rural areas	Vector Map Data	Free Download (ordnancesurvey.co.uk)](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
OS Mastermap Greenspace	This is not open data and was used to create derived products.	License options available via OS website.
OS Mastermap Topography	This is not open data and was used to create derived products.	License options available via OS website.
OS Open Rivers	[OS Open Rivers	High Level View of Watercourses	Vector Map Data	Free Download (ordnancesurvey.co.uk)](#)	[Open Government Licence (nationalarchives.gov.uk)](#)

OS Openmap Surface Water	[OS OpenMap Local | Detailed Street Level | Vector & Raster Map Data | Free Download (ordnancesurvey.co.uk)](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
OS Openmap Local Surface Water Line	[https://osdatahub.os.uk/downloads/open/OpenMapLocal](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
OS OpenMap Local Tidal Water	[https://osdatahub.os.uk/downloads/open/OpenMapLocal](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
OS Woodland – OS OpenMap Local	[OS OpenMap Local | Detailed Street Level | Vector & Raster Map Data | Free Download (ordnancesurvey.co.uk)](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
Priority Habitat Inventory	[Natural England Priority Habitat Inventory | Natural England Open Data](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
Sites of Special Scientific Interest	[Sites of Special Scientific Interest | Natural England Open Data](#)	[Open Government Licence (nationalarchives.gov.uk)](#)
Public Rights of Way	Available via individual Local Authority websites – there is a collation of links on rowmaps. [Maps, KML and GPX showing rights of way (rowmaps.com)](#)	[Open Government Licence (nationalarchives.gov.uk)](#)

Section 2.2 – Socio-economic datasets

Data source	Link	Copyright
Population - Census 2011 population (Office for National Statistics)	Lower layer Super Output Area population estimates (supporting information) - Office for National Statistics (ons.gov.uk)	Open Government Licence (nationalarchives.gov.uk)
Population estimate 2018 (Office for National Statistics)	Lower layer Super Output Area population estimates (supporting information) - Office for National Statistics (ons.gov.uk)	Open Government Licence (nationalarchives.gov.uk)
Population – Ethnicity 2011 (Office for National Statistics)	2011 Census data catalogue - Office for National Statistics (ons.gov.uk)	Open Government Licence (nationalarchives.gov.uk)
Health – Activities limited a lot (due to health) (Nomis)	QS303EW (Long-term health problem or disability) - Nomis - Official Labour Market Statistics (nomisweb.co.uk)	Open Government Licence (nationalarchives.gov.uk)
Health – Activities limited a little (due to health) (Nomis)	QS303EW (Long-term health problem or disability) - Nomis - Official Labour Market Statistics (nomisweb.co.uk)	Open Government Licence (nationalarchives.gov.uk)
Health – Activities not limited (due to health) (Nomis)	QS303EW (Long-term health problem or disability) - Nomis - Official Labour Market Statistics (nomisweb.co.uk)	Open Government Licence (nationalarchives.gov.uk)

Health – Mental Health (Small Area Mental Health Index) (Place-based Longitudinal Resource)	Small Area Mental Health Index (SAMHI) – Place-based Longitudinal Data Resource (pldr.org)	Open Government Licence (nationalarchives.gov.uk)
Health – Obesity adult (Public Health England)	Public Health Profiles - PHE	Public Health England. Public Health Profiles. 2021 https://fingertips.phe.org.uk © Crown copyright 2021
Health – Obesity child reception (Public Health England)	Public Health Profiles - PHE	Public Health England. Public Health Profiles. 2021 https://fingertips.phe.org.uk © Crown copyright 2021
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Index of Multiple Deprivation 2019 (MHCLG)	MHCLG Open Data : English Indices of Deprivation 2019 - Summaries at Local Authority Level (opendatacommunities.org)	Open Government Licence (nationalarchives.gov.uk)
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Rural Urban Classification 2011 (Office for National Statistics)	Search for 'rural' | Open Geography Portal (statistics.gov.uk)	Open Government Licence (nationalarchives.gov.uk)

3. Content Review

Version 1.1 of the England Green Infrastructure Database is presented as a series of modules with each module being a collation of related content (layers).

This section provides short (1 or 2 line) descriptions of the individual layers within the modules displayed on the website.

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Module 1 – Green and Blue Infrastructure Asset Maps

This module includes general datasets of Green Infrastructure assets.

1.1 – Combined Green and Blue Infrastructure Assets.

This layer is the central dataset used to create other assessments and maps. It depicts polygons of different types of Green Infrastructure (according to a systematic typology system – see method statement) and has attached "attributes" or data derived from the source data giving detail about each individual polygon.

1.2 – Accessible Green Infrastructure.

This layer displays all Green Infrastructure assets that have been flagged as accessible green spaces for the development of Version 1.1 (see method statement).

Note on treatment of "Publicly Accessible".

The determination of public access was done typologically. To be included in the database as "Publicly Accessible" a typology had to be (on the basis of usual probability), formally open to the general public (at least during daylight hours), free to access and available for at least informal recreation and visiting (although many accessible spaces will provide for a range of formal and informal recreation and activities).

Definitions of accessible used in the Beta Version 1.1

- *Accessible Green Space – defined as a green space specifically provided FOR public access, or one to which the public would usually expect to access (such as a cemetery), or one over which there is a public RIGHT to open access, and deemed likely to be accessible to the public at any reasonable time, free to entry and available for a range of pastimes.*
- Accessible Natural Green Space – a sub-set of the above where 'natural green space' was defined using an amended approach based on Nature Nearby and using spaces typologies deemed usually to have naturalness levels 1 and 2 (excludes playing fields and other typologies in level 3 and 4).

In the GI mapping context 'accessibility' and 'access to green space' is used to describe the proximity to greenspace, but it is recognised that 'access' and 'accessibility' have much wider definitions to those set out above and these aspects are currently being considered in our work on quality of green spaces.

Accessibility should not only be seen in terms of distance from people's houses and access into and within a site. People need to know where their local green spaces are, and should feel comfortable in using them. Places should be available to all, meaning that every reasonable effort is made to comply with the requirements under the Disability Discrimination Act (DDA 1995). We have not been able to incorporate these considerations in the Beta V 1.1 mapping.

An accessible place will also be known to the target users, including potential users who live within the site catchment area. This means that all those responsible for providing access to greenspace must justifiably consider provision for disabled people across a whole range of services including physical access, information, interpretation and signage.

Note on National Nature Reserves (NNR).

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Non S15 NNR have not been mapped as accessible. However, they had previously been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their previous inclusion in 1.4 results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

1.3 – Woodlands and access.

This layer extracts from layer 1.1 all woodland data and applies an initial sift for likely public accessibility (see method statement).

1.4 – Greenness Grid.

This layer provides a 250m grid based assessment of the "% manmade area" (surface that is not water, vegetation or soils) within the grid squares covering all England (see method statement).

1.5 – Private Gardens.

This layer displays the amount of private garden space at LSOA level in urban areas only – blocked out areas mean there is no available data on the map.

1.6– Natural Accessible Green Space.

This layer displays the amount of "Accessible Natural Green Space" at LSOA level for all areas.

Module 2 – Accessible Natural Green Space Standards Assessment

This module is a full Accessible Natural Green Space Standards (ANGSt) assessment for England.

Source Data for the All England ANGSt assessment.

Accessible Green Space (Layer 1.2)

Layer 1.2 is the source layer for the England ANGSt assessment.

Layer 1.2 displays all accessible green spaces as defined in the method statement. A sub-set of all accessible green spaces was used to run a full England wide ANGSt analysis (see above layer 1.4 and see method statement).

The spaces used for the ANGSt analysis were those assigned a Naturalness rating of 1 or 2 (see method statement).

See note on use of "accessible" and "accessible natural" green space in section 1.2 above.

Note on National Nature Reserves (NNR).

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Other NNR have not been mapped as accessible for the purposes of the ANGSt analysis. However, they have been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their inclusion in 1.4 also results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

Accessible Natural Green Space Standards (ANGSt) Assessment layers (See method statement).

2.1 – ANGSt Doorstep Standard.

This layer presents the Doorstep ANGSt assessment (A green space of at least 0.5 ha within 200m). Buffers of 200m have been created around all "Natural Green Spaces and Playing Fields" (see method statement).

Note on inclusion of Playing Fields.

Playing Fields (as identified in the OS Open Green Space source data) are included in the 200m Buffer to give a more general green space accessibility audit at this very local level. Playing Fields are NOT included in the remaining ANGSt assessments.

2.2 – ANGSt Local Standard.

This layer presents the Local ANGSt assessment (A natural green space of at least 2 ha within 300m). Buffers of 300m have been created around all "Natural Green Spaces" (see method statement).

2.3 – ANGSt Neighbourhood Standard.

This layer presents the Neighbourhood ANGSt assessment (A natural green space of at least 10 ha within 1 km). Buffers of 1 km have been created around all "Natural Green Spaces" (see method statement).

2.4 – ANGSt Wider Neighbourhood Standard.

This layer presents the Wider Neighbourhood ANGSt assessment (A natural green space of at least 20 ha within 2 km). Buffers of 2 km have been created around all "Natural Green Spaces" (see method statement).

2.5 – ANGSt District Standard.

This layer presents the District ANGSt assessment (A natural green space of at least 100 ha within 5 km). Buffers of 5 km have been created around all "Natural Green Spaces" (see method statement).

2.6 – ANGSt Sub-Regional Standard.

This layer presents the Sub-Regional ANGSt assessment (A natural green space of at least 500 ha within 10 km). Buffers of 10 km have been created around all "Natural Green Spaces" (see method statement).

2.7 – ANGSt Profile.

This layer brings together the full set of ANGSt assessments into one "combined buffer" map to allow an understanding of the ANGSt Profile for any given location. The ANGSt Profile sets out which ANGSt Standards are met at any given location.

Module 3 – Linear Access Network

This module presents information concerning linear access rights (Public Rights of Way).

3.1 – PRoW Network Map.

This layer is a compilation of data from Local Authorities of their Public Rights of Way networks. Please note that not all Local Authorities have published data in this form and that there are therefore areas of the map with no data.

3.2 – PRoW Density Map.

This layer uses a 1 km grid to assess the density (km length of PRoW per square km). Please note not all grid squares are covered as data may not be available.

Note of designated cycleways. Unless also mapped as a Public Right of Way (such as Bridleway or Byway) designated cycleways are not included in Version 1.1 of the mapping.

Module 4 – Blue Infrastructure (Water Bodies and Courses)

This module focusses on the water or "Blue Infrastructure" elements of the wider Green Infrastructure.

4.1 – Blue Infrastructure Network (Surface water bodies, Surface line and tidal).

This layer presents the full Blue Infrastructure Network map used to undertake subsequent assessments. It brings together surface water bodies and line data with tidal water bodies.

4.2 – All Waterside Distribution Maps.

This layer displays statistical maps of the distribution of "Waterside" – the sides of water bodies.

4.3 – All accessible waterside (PRoW and Access Land).

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible either by proximity to a Public Right of Way (within 10 metres) and/or is a waterbody adjacent to (within 1 metre) accessible green space.

4.4 – Waterside accessible by PRoW proximity.

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible by proximity to a Public Right of Way (within 10 metres).

4.5 – Waterside accessible by Access Land proximity.

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible because the waterbody is adjacent to designated Access Land (within 1 metre).

4.6 – Water Quality (WFD Biological).

This layer presents water quality data using WFD Biological Water Quality data.

4.7 – Waterside Statistics.

This layer presents data on total amount of waterside and total accessible at County, District, MSOA and LSOA level.

Module 5 – Designated and Defined Areas (Selected)

This module incorporates a selection of maps for a range of statutory Designated Areas or other areas that have been defined and are recognised in national and local policy.

5.1 – Biodiversity (with Ancient Woodland).

This layer displays biodiversity designated and defined areas (Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR) and Ancient Woodland).

5.2 – Historic.

This layer displays Historic (Registered) Parks and Gardens and Scheduled Monuments.

5.3 – Landscape and Access.

This layer displays nationally designated and defined landscapes (National Parks, Areas of Outstanding Natural Beauty (AONB) and Heritage Coasts. No access designations are currently included.

5.4 – SPA (Special Protection Area) / SAC (Special Area of Conservation) / RAMSAR (site listed under the RAMSAR Convention).

This layer displays International biodiversity designations and defined areas.

5.5 – Local Authority Boundaries.

This layer displays Upper (Country) and Lower (District) Tier Local Authority boundaries (including Unitary Authorities. This layer does not include Combined Authorities.

5.6 – National Character Areas.

This layer displays the National Character Areas boundaries.

Module 6 – Access to Nature Close2Home Assessment

This module uses a combined ANGSt Buffer Doorstep and Local (without Playing Fields) to look at proximity or spaces that are likely to be "more nature rich" to specific population cohorts. The module seeks to assess the likelihood of daily, local contact with nature.

6.1 – Nature Close2home Children (under 16 and people 65+).

This layer assesses locations by % children and young people under 16 and % people 65 and over who probably live within 300m of a natural green space. The layer also provides data on the ha per person within the 300m buffer available.

Module 7 – Accessible Natural Green Space Inequalities (Index of Multiple Deprivation) Assessment

This module is an assessment derived from the England ANGSt assessment (module 2) that looks at relative inequalities in the provision of access to natural green spaces.

See method statement for a full explanation of the assessment approaches.

Natural Green Space accessibility and deprivation.

These layers assess locations with respect to level of accessibility of natural green spaces and IMD decile for all the Accessible Natural Green Space Standards.

All layers are presented at LSOA level.

Buffer Coverage = Percent of LSOA covered by the specified ANGSt Buffer.

The Index of Multiple Deprivation, commonly known as the IMD, is the official measure of relative deprivation for small areas in England. It is the most widely used of the Indices of Deprivation (IoD).

The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are a statistical geography called Lower-layer Super Output Areas.

The IMD combines information from the seven domains to produce an overall relative measure of deprivation. The domains are combined using the following weights:

• Income Deprivation (22.5%) • Employment Deprivation (22.5%) • Education, Skills and Training Deprivation (13.5%) • Health Deprivation and Disability (13.5%) • Crime (9.3%) • Barriers to Housing and Services (9.3%) • Living Environment Deprivation (9.3%)

The weights were derived from consideration of the academic literature on poverty and deprivation, as well as the levels of robustness of the indicators.

Information on the IMD can be found at;

https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

7.1 – Doorstep Buffer Coverage and IMD Decile.

7.2 – Local Buffer Coverage and IMD Decile.

7.3 – Neighbourhood Buffer Coverage and IMD Decile.

7.4 – Wider Neighbourhood Buffer Coverage and IMD Decile.

7.5 – District Buffer Coverage and IMD Decile.

7.6 – Sub-Regional Buffer Coverage and IMD Decile.

Module 8 – Accessible Natural Green Space Inequalities (Population Density) Assessment

This module is an assessment derived from the England ANGSt assessment (module 2) that looks at relative inequalities in the provision of access to natural green spaces.

See method statement for a full explanation of the assessment approaches.

Natural Green Space accessibility and Population Density.

These layers assess locations with respect to level of accessibility of natural green spaces and Population Density (People per Square km) for all the Accessible Natural Green Space Standards.

All layers are presented at LSOA level.

Buffer Coverage = Percent of LSOA covered by the specified ANGSt Buffer.

8.1 – Doorstep Buffer Coverage and Population Density.

8.2 – Local Buffer Coverage and Population Density.

8.3 – Neighbourhood Buffer Coverage and Population Density.

8.4 – Wider Neighbourhood Buffer Coverage and Population Density.

8.5 – District Buffer Coverage and Population Density.

8.6 – Sub-Regional Buffer Coverage and Population Density.

Module 9 – Social Statistics

This module presents the socio-economic data used to undertake various assessments in the form of statistical maps.

9.1 – Index of Multiple Deprivation.

This layer includes Ministry of Housing, Communities and Local Government (MHCLG) open data on English Indices of Deprivation SCORE 2019. Scores are presented at County, District, MSOA and LSOA level.

9.2 – Index of Multiple Deprivation Decile.

This layer includes Ministry of Housing, Communities and Local Government (MHCLG) open data on English Indices of Deprivation DECILE 2019. Deciles are presented at LSOA level.

Please note that MHCLG is now called The Department for Levelling Up, Homes and Communities (DLUHC).

Note on the Index of Multiple Deprivation.

The Index of Multiple Deprivation, commonly known as the IMD, is the official measure of relative deprivation for small areas in England. It is the most widely used of the Indices of Deprivation (IoD).

The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are a statistical geography called Lower-layer Super Output Areas.

The IMD combines information from the seven domains to produce an overall relative measure of deprivation. The domains are combined using the following weights:

• Income Deprivation (22.5%) • Employment Deprivation (22.5%) • Education, Skills and Training Deprivation (13.5%) • Health Deprivation and Disability (13.5%) • Crime (9.3%) • Barriers to Housing and Services (9.3%) • Living Environment Deprivation (9.3%)

The weights were derived from consideration of the academic literature on poverty and deprivation, as well as the levels of robustness of the indicators.

Information on the IMD can be found at;

https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

9.3 – Population Density.

This layer includes ONS Census population 2011 data. Population per square km presented at County, District, MSOA and LSOA level.

9.2 – Ethnicity.

This layer includes ONS 2011 Census data by ethnicity grouping presented at County, District, MSOA and LSOA.

9.5 – Health and Disability.

This dataset (Nomis) provides 2011 estimates that classify usual residents in England and Wales by long-term health problems or disabilities. The estimates are as at census day, 27 March 2011.

The data is presented for the category "Activities limited a lot" with attribute data on split into Activities limited a lot, limited a little or not limited.

9.6 – Mental Health.

This layer is the Small Area Mental Health Indicator (SAMHI) developed by the Place Based Longitudinal Data Resource (PLDR).

The SAMHI is a composite annual measure of population mental health for each Lower Super Output Area (LSOA) in England. The SAMHI combines data on mental health from

multiple sources (NHS-Mental health-related hospital attendances, Prescribing data – Antidepressants, QOF - depression, and DWP - Incapacity benefit and Employment support allowance for mental illness) into a single index.

The data is presented for LSOA.

4. Detailed Module Explanations

This section provides detailed technical descriptions of the content of the individual map layers.

The descriptions focus on providing information on;

- *What is this layer?*
  An explanation of the data shown in the layer.

- *What data was used?*
  A list of the data used to create the layer.

- *What are the layer attributes?*
  A list of the data attributes attached to the data in the layer.

- *What are the limitations and caveats to content?*
  Information on any known significant issues, omissions, gaps and limitations to the data used or resulting layer content.

Statement on sources of error.

Version 1.1 brings together data from over 40 datasets and has required a whole range of assumptions, simplifications, combinations, interpretations and generalisations to create workable maps.

We cannot check the exact details for every land parcel on the map so what the map says can be at variance with the situation on the ground.

This underscores the importance of ground truthing and supplementation with local data (and knowledge) in order to create a more accurate local product.

Be aware –

- **There are margins for error in the source data that will have transferred into the maps.**
- **There are margins for error generated by the generalisations and assumptions that have had to be made to make the mapping practicable.**
- **There may be errors that have been generated by processing error or data corruptions.**
- **There are margins for error generated by time lag (data drift) – change on the ground takes time to appear on newer versions of the source data.**

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Section 4.1

Module 1 – Green and Blue Infrastructure Asset Maps

1.1 – Combined Green and Blue Infrastructure Assets.

What is this layer?

This layer is the core Green Infrastructure dataset that fuels the other assessments and maps. It brings together a wide suite of spatial datasets on Green Infrastructure assets into one map using an integrating Green Infrastructure Typology (see method statement).

Attached to each Green Infrastructure polygon is an "Attribute Table" that provides relevant information about that space derived from the range of datasets used to create the overall layer (see table below for data used).

What data was used?

Incorporated into this layer are the following data:

- OS Greenspace (Open)
- OS Woodland
- OS Open Water
- OS Open Rivers
- OS Woodland
- Natural England LNR/NNR/Access Land/DG/MG/Country Parks - NE open
- National Forest Inventory
- Ancient Woodlands

What are the layer attributes?

Field Names	Field Description
Code	Green Infrastructure Typology Code assigned.
Type	Green Infrastructure Typology Name.
Naturalness	Assigned rating 1 to 4 – see method statement.
Percent Manmade	% of polygon that is manmade surface (Not vegetation, water or soils)

What are the limitations and caveats to content?

This layer does not categorise every land parcel in England. In this version only those parts of England covered by the source data are provided with a Green Infrastructure Typology.

The accuracy of the data is that inherited from the source data. Reasonable effort has been made to ensure that the map accurately represents the input from the source data, but all source data will contain error and the existence of a polygon and its associated attributes on the map does not necessarily match circumstances on the ground. When using the map, ground truthing of the data will be required.

Note on treatment of "Playing Fields".

The Town and Country Planning (Development Management Procedure) (England) Order 2015 defines "Playing Fields" as;

> 'the whole of a site which encompasses at least one playing pitch'

In addition "playing pitches" are described as;

> 'a delineated area which, together with any run-off area, is of 0.2 hectares or more, and which is used for association football, American football, rugby, cricket, hockey, lacrosse, rounders, baseball, softball, Australian football, Gaelic football, shinty, hurling, polo or cycle polo.'

In the Green Infrastructure Mapping V 1.1, source data from the OS Open Green Space data has been used to identify both "Playing Fields" and "Other Sports Facilities" which are defined in the OS Technical Specification as follows;

> Playing Fields - Large, flat areas of grass or specially designed surfaces, generally with marked pitches, used primarily for outdoor sports, i.e. football, rugby, cricket.

> Other Sports Facilities - Land used for sports not specifically described by other categories. Includes those facilities where participation in sport is the primary use of the area.

Please note that Other Sports Facilities may include or be made up wholly of buildings (identifiable using the Greenness attribute).

The OS depictions of Playing Fields may thus not be entirely in accordance with the TCPA definition and the Green Infrastructure mapping has used the data as provided by the OS source. The use of typology descriptions "Playing Fields" or "Other Sports Facilities" in the mapping is purely for the purposes of typological differentiation of spaces and in the event of any discrepancy, the depiction of Playing Fields and/or Sports Facility in the mapping does not override the definition in the TCPA (Development Management Procedure) 2015 or that used in the National Planning Policy Framework which should be followed in any formal, policy or legal consideration of "Playing Fields".

1.2 – Accessible Green Infrastructure.

What is this layer?

This layer displays all Green Infrastructure assets that have been regarded as accessible green spaces for the development of Version 1.1 (see method statement).

Map 1.2 is a subset of Map 1.1.

Polygons from Map 1.1 were retained based on the accessibility flag. This means that private greenspaces such as golf courses, allotments, private sports facilities, gardens are not included in Map 1.2.

Note on treatment of "Publicly Accessible".

The determination of public access was done typologically. To be included in the database as "Publicly Accessible" a typology had to be (on the basis of usual probability), formally open to the general public (at least during daylight hours), free to access and available for at least informal recreation and visiting (although many accessible spaces will provide for a range of formal and informal recreation and activities).

Definitions of accessible used in the Beta Version 1.1

- *Accessible Green Space – defined as a green space specifically provided FOR public access, or one to which the public would usually expect to access (such as a cemetery), or one over which there is a public RIGHT to open access, and deemed likely to be accessible to the public at any reasonable time, free to entry and available for a range of pastimes.*
- Accessible Natural Green Space – a sub-set of the above where 'natural green space' was defined using an amended approach based on Nature Nearby and using spaces typologies deemed usually to have naturalness levels 1 and 2 (excludes playing fields and other typologies in level 3 and 4).

In the GI mapping context 'accessibility' and 'access to green space' is used to describe the proximity to greenspace, but it is recognised that 'access' and 'accessibility' have much wider definitions to those set out above and these aspects are currently being considered in our work on quality of green spaces.

Accessibility should not only be seen in terms of distance from people's houses and access into and within a site. People need to know where their local green spaces are, and should feel comfortable in using them. Places should be available to all, meaning that every reasonable effort is made to comply with the requirements under the Disability Discrimination Act (DDA 1995). We have not been able to incorporate these considerations in the Beta V 1.1 mapping.

An accessible place will also be known to the target users, including potential users who live within the site catchment area. This means that all those responsible for providing access to greenspace must justifiably consider provision for disabled people across a whole range of services including physical access, information, interpretation and signage.

All polygons deemed 'accessible' in Map 1.1 were dissolved to create a single vector dataset and each were assigned the attributes detailed below. This dissolving process removed the problem of overlapping polygons from different datasets seen in Map 1.1 as it joins adjacent greenspace polygons and creates a single, larger polygon where two or more polygons intersect. Finally, the polygons created by this process were intersected with the manmade surface dataset and a percentage of each greenspace area that is manmade surface was calculated based on this intersection.

Determination of publicly accessible green space using Green Infrastructure Typology.

Dataset	Attribute	Accessible	Used in ANGSt
OS Greenspace	Allotments or Community Growing Spaces	No	No
OS Greenspace	Bowling Green	No	No
OS Greenspace	Cemetery	Yes	No
OS Greenspace	Golf Course	No	No
OS Greenspace	Other Sports Facility	No	No
OS Greenspace	Play Space	Yes	No
OS Greenspace	Playing Field	Yes	Buffer_200 only
OS Greenspace	Public Park or Garden	Yes	Yes
OS Greenspace	Religious Grounds	Yes	No
OS Greenspace	Tennis Court	No	No
Local Nature Reserve	None	Yes	Yes
National Nature Reserve	None	No	No
Natural England open access data (including section 15)	None	Yes	Yes
Millennium Greens	None	Yes	Yes

Country Parks	None	Yes	Yes
Doorstep Greens	None	Yes	Yes
OS Woodland	None	No	No
OS Surface Water	None	No	No
National Forest Inventory	None	No	No
Ancient Woodland	None	No	No
Parks and Gardens	None	Yes	Yes
SSSI	None	No	No
OS Open Rivers	canal	No	No
OS Open Rivers	inlandRiver	No	No
OS Open Rivers	lake	No	No
OS Open Rivers	tidalRiver	No	No

Note on exceptions.

Some typologies deemed normally not accessible were included as accessible if they formed part of a wider typology deemed accessible. For example, woodland has been classed as not accessible but included accessible if it forms part of a public park. Likewise Tennis Courts and Bowling Greens (which on their own are deemed not accessible but accessible if within a public park.

What data was used?

See table above.

Data to identify accessible green infrastructure was derived from Map 1.1

What are the layer attributes?

Field Name	Field description
Area_ha	Area of the polygon in hectares
Perc_Manmade	Percentage of area which is manmade surface (Not vegetation, water or soils)

What are the limitations and caveats to content?

The assignment of an "accessibility flag" to a polygon was typologically driven.

Assignment of accessibility was done on the basis of the expected likelihood of access to the general public to a given typology. Accessible GI is expected to be usually accessible to the general public at will (people able to enter at will), free of charge and open at any reasonable time (or at least during day light hours).

However, there will always be exceptions where a specific space, despite its general expected typological characteristics; is not usually accessible to the public or may be permanently closed or private. **The inclusion of a space on the Accessible Green Infrastructure Layer does not create any forms of access.**

Likewise, there may be a range of spaces that are accessed by the public but to which formal access provision is either not general (ie formally limited to identified individuals, groups or residents etc), or may be tolerated or incidental.

In addition, sites to which access is permissive have not been included. These are sites that are usually in private or organisational ownership which may permit public access. Data on such sites has not yet been collated for potential inclusion.

More accurate mapping of spaces accessible to the public or accessed under some form of permissive/incidental arrangements would require local determination by ground truthing and data addition.

The existence of a polygon on this map flagged as accessible does not create any form of legal access.

Note on National Nature Reserves (NNR).

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Non S15 NNR have not been mapped as accessible. However, they had previously been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their previous inclusion in 1.4 results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

1.3 – Woodlands and access.

What is this layer?

This layer extracts from layer 1.1 all woodland data and applies an initial sift for likely public accessibility (see method statement).

The assessment of access to woodlands is initial and limited. Woodlands were sifted on the basis of fulfilling one of three criteria to assigned an access flag as either;

- Linear Accessible – Woodland that is intersected by Public Right of Way (PRoW) either crossed by or around the edge.
- Accessible – Woodland is accessible if it intersects Map 1.4 Accessible Greenspaces.
- Non-Accessible – All other woodland (this may include woodland that is accessible but for which access arrangements were unknown).

What data was used?

Incorporated into this layer are the following data:

- OS Woodlands
- National Forest Inventory
- Ancient Woodland Inventory
- PRoW Network (Map 3.1)
- Accessible Green Infrastructure (Map 1.2)

What are the layer attributes?

Field name	Field description
Area_ha	Area of woodland polygon in hectares
Access Level	Linear accessible, non-accessible, or accessible (see method statement)

What are the limitations and caveats to content?

The assessment of accessibility solely looks at whether a woodland polygon is accessible as a consequence of being a part of an accessible green space and/or is accessible in part by Public Rights of Way.

Where Public Rights of Way data were not available, Woodlands accessible by PRoW could not be mapped and will not show up on the layer.

The layer does not contain any information on permissive or incidental access. Woodlands classed as "Not accessible" on this map may in fact be accessible because of permissive agreement or toleration. Equally, a woodland flagged as "Not accessible" on this map may in fact be private.

Circumstances would require local determination to ascertain any conditions of access exercised at a local level.

The inclusion of a woodland classed as accessible on the map does not create any right of access.

The Woodlands and access layer does not include data on trees outside of woods or urban trees/tree canopy. It is intended to incorporate tree data in due course.

1.4 – Greenness Grid.

What is this layer?

This layer provides a 250m grid (aligned with OS grid) based assessment of the % manmade area (not vegetation, water or soils) within the grid squares covering all England. The grid is aligned with the OS grid and depicted in colour coded 10% deciles.

What data was used?

The manmade surface was derived from manmade surface dataset for the whole of England which was extracted from the topography layer from Ordnance Survey's (OS) 'Master Map' data. The OS data used is not open data and the Greenness Grid is thus a derived product.

What are the layer attributes?

The grid squares come with simple attribute data on % of the grid square that is manmade surface (not vegetation, water or soils).

What are the limitations and caveats to content?

Greenness is a measure of % manmade surface but does not take account of single trees. In urban areas, this will impact on this measure of greenness as the presence of urban trees introduces a canopy level greenness not represented in the OS Topography layer source data.

1.5 – Private Gardens.

What is this layer?

This layer displays the amount of private garden space at LSOA level in urban areas.

What data was used?

This layer is derived from the OS Mastermap Green Space data (Gardens extract). This data is not open data and the map presented is a derived product.

What are the attributes?

The attribute box simply displays a location descriptor (name) alongside the total amount (Ha) of Private Garden Space (from the OS data) in each LSOA and the Ha Private Garden Space per 1000 population. The data is depicted in colour coded deciles (by number of records not equal interval).

What are the caveats and limitations to content?

Because the data is derived from OS Mastermap Green Space data, the coverage is restricted to the urban areas covered by the data. The "Not recorded" category covers areas where there is no OS Mastermap Green Space data.

1.6 – Natural Accessible Green Space.

What is this layer?

This layer displays the amount of "Accessible Natural Green Space" at LSOA level for all areas.

What data was used?

This map uses the outputs from the Accessible Natural Green Space Standards assessment – green space polygons used for the ANGSt analysis (minus Playing Fields) and ONS Census 2011 population data.

What are the attributes?

The attribute box simply displays a location descriptor (name) alongside the total amount (Ha) of Accessible Natural Green Space in each LSOA and the Ha of Accessible Natural Green Space per person. The data is depicted as colour coded deciles (by number of records not equal interval).

What are the caveats and limitations to content?

This is a measure of Accessible Natural Green Spaces supply that only includes typologies listed for use in the ANGSt assessment.

Section 4.2

Module 2 – Accessible Natural Green Space Standards (ANGSt) Assessment

This module is a full Accessible Natural Green Space Standards assessment for England.

The assessment was undertaken using a subset of the data for layer 1.4 (see table in 1.4) and utilised a new system of ANGSt Benchmarks as set out below.

Name of ANGSt criterion	Size distance criteria
Doorstep Green Space (NEW)	At least 0.5 ha within 200 metres Less than 5 mins walk
Local Natural Green Space	At least 2 ha within 300 m 5-10 mins walk, 1-2 mins cycle
Neighbourhood Natural Green Space (NEW)	10 ha within 1 km 15-20 mins walk, 3-4 mins cycle
Wider Neighbourhood Natural Green Space	At least 20ha within 2km 35 mins walk, 6-8min cycle
District Natural Green Space	100 ha within 5 km 15-20 mins cycle
Sub-regional Natural Green Space	500 ha within 10 km 30-40 mins cycle
Local and National Nature Reserves **(LNRs & NNRs)**	LNRs and NNRs of at least 1 ha per 1000 population

Note: Actual walking routes may be 50% longer than the straight-line distance due to barriers such as railways and rivers and due to the position of access points to greenspace (see method statement – note on use of straight line versus network analysis). Best practice is to measure actual walking routes in applying this standard (network analysis). But there are practical and data availability limitations to this. Version 1.1 has thus employed the "Straight Line Buffer" method.

Note on distance and walking times.

The Chartered Institution for Highways and Transportation reports that average walking speed is approximately 60 metres per minute. 90 metres per minute is fast and 30-40 metres is slow. On the basis of 60 metres a minute:

- 5 mins is 300 metres
- 10 mins is 600 metres
- 15 mins is 900 metres
- 20 mins is 1200 met
- 35 mins is 2 km

Note on cycling times.

The Department for Transport (Local Transport Note 2/08) reports that the average speed of cyclists on a level surface is around 12 mph.

Transport for London assume an **average** cycle **speed** of 15 kilometres per hour.

Caveats and limitations to content.

In the context of ANGSt, "access" refers to the creation of distance buffers around publicly accessible green spaces. The buffer thus creates a zone of proximity to the relevant spaces. However, the ability of people to physically access the space will be affected by a range of factors including physical barriers and those created through personal circumstances such as personal health issues. Proximity to a space may thus not lead to an ability physically access it.

In addition, on this occasion no corrections were done to understand the impact of major barriers (such as motorways, railways or rivers etc) on local buffers. More detailed assessment would understand the impact of major barriers on buffers and the impact of existing bridging points on network analysis.

Note on layers 2.1 to 2.6

The Accessible Natural Greenspace Assessment process identified all those greenspaces in Map 1.1 which were flagged to be included in the ANGSt assessment (see table for layer 1.4 and/or method statement). All features flagged as ANGSt were dissolved to create a single feature to avoid distortions that could be created if polygons overlapped (as they do on map 1.1). The area of each of the spatially isolated polygons was calculated to determine the size of the buffer that was created around them based on the standards set out in the table above.

These ANGSt buffers were applied to the accessible natural greenspace (ANGSt) polygons in a straight line (as crow flies) distance analysis. Maps were produced to show the zones created by each of the buffer analyses separately, representing areas that meet each of the ANGSt size and distance criteria.

The ANGSt polygons also incorporate any sub-divisions of spaces separately identified as components of a wider green space. For example, Playing Fields or Bowling Greens within wider Public Parks will be included in the ANGSt polygons (despite not being at least Naturalness 2) but are excluded if mapped as separate polygons.

2.1 – ANGSt Doorstep Standard.

This layer presents the Doorstep ANGSt assessment (A green space of at least 0.5 ha within 200m). Buffers of 200m have been created around all "Natural Green Spaces and Playing Fields" (see method statement). The incorporation of Playing Fields is unique to the 200m buffer and results in a more general Accessible Green Space measure for the most local level of green space provision.

2.2 – ANGSt Local Standard.

This layer presents the Local ANGSt assessment (A natural green space of at least 2 ha within 300m). Buffers of 300m have been created around all "Natural Green Spaces" (see method statement).

2.3 – ANGSt Neighbourhood Standard.

This layer presents the Neighbourhood ANGSt assessment (A natural green space of at least 10 ha within 1 km). Buffers of 1 km have been created around all "Natural Green Spaces" (see method statement).

2.4 – ANGSt Wider Neighbourhood Standard.

This layer presents the Wider Neighbourhood ANGSt assessment (A natural green space of at least 20 ha within 2 km). Buffers of 2 km have been created around all "Natural Green Spaces" (see method statement).

2.5 – ANGSt District Standard.

This layer presents the District ANGSt assessment (A natural green space of at least 100 ha within 5 km). Buffers of 5 km have been created around all "Natural Green Spaces" (see method statement).

2.6 – ANGSt Sub-Regional Standard.

This layer presents the Sub-Regional ANGSt assessment (A natural green space of at least 500 ha within 10 km). Buffers of 10 km have been created around all "Natural Green Spaces" (see method statement).

2.7 – ANGSt Profile.

What is this layer?

This layer brings together the full set of ANGSt assessments into one "combined buffer" map to allow an understanding of the ANGSt Profile for any given location. The ANGSt Profile sets out which ANGSt Standards are met at any given location.

What data was used?

This layer was generated using the single buffer layers for 2.1 to 2.6

What are the attributes of this layer?

The attribute box simply identifies the buffers being met. "1" = buffer met, "0" = not met.

What are the limitations and caveats to content?

This layer provides information on the range of different ANGSt Standards that are met within each output area. It does not however provide information on how significant the meeting of any benchmark is at any given location or provide information on significance of any location not meeting any ANGSt Benchmark. Such significance will be affected by a range of variables (including presence or absence of population) that will require local determination to understand whether the ANGSt profile for any given location is or is not likely to be meeting the accessibility needs of that location.

Note on National Nature Reserves (NNR).

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Other NNR have not been mapped as accessible for the purposes of the ANGSt analysis. However, they have been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their inclusion in 1.4 also results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

Section 4.3

Module 3 – Linear Access Network

This module presents information concerning linear access rights (Public Rights of Way - PRoW).

3.1 – PRoW Network Map.

What is this layer?

This layer is a compilation of data from Local Authorities of their Public Rights of Way networks. Please note that not all Local Authorities have published data in this form (those for which data could not be sourced this time round are listed below).

Map 6.1 contains openly available Public Rights of Way (PRoW) data. These were obtained from all Local Authorities where this data was downloadable from their websites.

What data was used?

Data was sourced for every Local Authority via download from their website (subject to data being available at time of creating the layer (Autumn 2020).

The data provided by local authorities on their rights of way network is based on their individual Definitive Maps. However, the published data does not constitute or amend the Definitive Map itself and the representation or omission in the data of any right of way does not constitute evidence of any legal status of any route.

To establish the legal status or accurate and up to date route of any right of way in any Local Authority area, it is the Definitive Map that should be consulted.

What are the attributes?

Field Names	Field Description
Name	Unique route identification.
Type	Type of Public Right of Way • Bridleways • Byways open to all traffic • Footpaths • Restricted Byways 'No category recorded' was assigned where no information was provided

What are the limitations and caveats to content?

Data for the PRoW Network map could not (on this occasion) be sourced for the following Local Authority areas.

Local Authority code	Local Authority Name
E06000001	Hartlepool
E06000002	Middlesbrough
E06000005	Darlington
E06000006	Halton
E06000012	North East Lincolnshire
E06000015	Derby
E06000020	Telford and Wrekin
E06000021	Stoke-on-Trent
E06000030	Swindon
E06000042	Milton Keynes
E06000032	Luton
E06000033	Southend-on-Sea
E06000053	Isles of Scilly
E08000012	Liverpool
E08000021	Newcastle upon Tyne
E08000022	North Tyneside
E08000023	South Tyneside

E08000024	Sunderland
E08000026	Coventry
E08000028	Sandwell
E08000029	Solihull
E08000031	Wolverhampton
E08000035	Leeds
E09000001	City of London
E09000002	Barking and Dagenham
E09000003	Barnet
E09000019	Islington
E09000005	Brent
E09000007	Camden
E09000008	Croydon
E09000009	Ealing
E09000010	Enfield
E09000011	Greenwich
E09000012	Hackney
E09000013	Hammersmith and Fulham
E09000014	Haringey
E09000015	Harrow

E09000016	Havering
E09000017	Hillingdon
E09000018	Hounslow
E09000020	Kensington and Chelsea
E09000033	Westminster
E09000021	Kingston upon Thames
E09000022	Lambeth
E09000023	Lewisham
E09000024	Merton
E09000025	Newham
E09000026	Redbridge
E09000027	Richmond upon Thames
E09000028	Southwark
E09000029	Sutton
E09000030	Tower Hamlets
E09000031	Waltham Forest
E09000032	Wandsworth

3.2 – PRoW Density Map.

What is this layer?

This layer uses a 1 km grid (aligned with the OS Grid) to assess the density (km length of PRoW per square km). Please note that not all grid squares are covered as data may not be available. Where this is so, the square is "greyed out" with an attribute of "no data available".

A 1 km grid covering whole of England, in alignment with the 250 m grid (and thus the OS grid) used in layer 11.2 was created.

Public Right of Way (PRoW) data from layer 6.1 was used to assess the density of PRoW within each 1 km grid square (km of PRoW per km2) by measuring the length of each PRoW type per 1 km grid square.

Calculations were made for all PRoW and each PRoW type (footpath, bridleway, byways etc.) as well as total length. National Trails and England coastal path linear access was also added to layer 6.1 and included in this PRoW density assessment.

A 'Data_Available' field was added to the 1 km grid dataset and, where no PRoW data was available withing a grid square, the grid square was assigned 'no' in this field and each length field was left as 'null'.

This was done in order to distinguish these grid squares from those where data is available but there is 0m of PRoW within that grid square. Data availability was determined by selecting grid squares whose entire area was within with Local Authority boundaries for which no PRoW data has been obtained.

What data was used?

Data compiled for layer 6.1 was used.

What are the attributes?

Field	Description
Total Length of Public Rights of Way	Total length of all PRoW in metres.
Footpaths	Total length of public footpaths in metres.
Bridleways	Total length of public bridleways in metres.
Byways open to all traffic	Total lengths of BOAT in metres.
Restricted Byways	Total length of Restricted Byways in metres.
National Trails	Total length of designated National Trial in metres.
Coastal Paths	Total length of designated England Coast Path in metres.
No category	PRoW status uncertain.

What are the limitations and caveats to content?

Note of designated cycleways.

Unless also mapped as a Public Right of Way (such as Bridleway or Byway) designated cycleways are not included in Version 1.1 of the mapping.

Data for the PRoW Network map could not (on this occasion) be sourced for all Local Authority areas (see layer 3.1), this has resulted in there being grid squares for which there is no current data. These are identified as block grey in colour with attribute box "no data available".

Section 4.4

Module 4 – Blue Infrastructure (Water Bodies and Courses)

This module concerns water courses and water bodies (including Tidal but not coastal) and presents an Access to Waterside Assessment.

Note on coastal waters.

It has not been possible to include coastal data in this version (V 1.1) due to issues with some of the data. The inclusion of coastal data is planned for a future version.

4.1 – Blue Infrastructure Network (Surface water bodies, Surface line and tidal).

What is this layer?

This layer presents the full Blue Infrastructure Network map used to undertake subsequent assessments. It brings together surface water bodies and line data with tidal water bodies. For detailed description of the method used to create this layer, see the method statement.

What data was used?

- Ordnance Survey (OS) OpenMap Local Surface Water Area
- OS OpenMap Local Surface Water Line
- OS OpenMap Local Tidal Water

What are the attributes?

The attribute box simply identifies to source data.

What are the limitations and caveats to content?

Whilst some more detailed data on surface water exists in the OS MasterMap Topographic Area – Surface Water dataset, this data set is not available as open data and is thus not included. This means some of the smaller water bodies will not appear on this layer.

4.2 – Inland Waterside Distribution Maps.

This layer displays the location of "waterside" extracted from Layer 4.1 source data that was used to undertake the Access to Waterside Assessment.

4.3 – All accessible waterside (by proximity to PRoW and Access Land).

What is this layer?

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible either by proximity to a Public Right of Way and/or is a waterbody adjacent to designated Access Land.

The Ordnance Survey (OS) OpenMap Local Surface Water (polygon and line) and Tidal Water (polygon) datasets described in task one were used to define the Blue Infrastructure (BI) to which access is measured. This includes rivers, streams, lakes, reservoirs, canals and tidal waters.

Coastal waters have not been included in Version 1.1 of the England Green Infrastructure Mapping Database.

What data was used?

- Blue Infrastructure Network layer (4.1)
- Accessible Green Infrastructure layer (1.4)
- Public Rights of Way Network layer (6.1)

What are the attributes?

The attribute box simply identifies the depicted waterside as accessible either by PRoW and/or accessible Green Infrastructure.

What are the limitations and caveats to content?

The access to waterside assessment only maps the likelihood that the edges of water bodies and course are accessible. The accessibility is created purely by proximity of water edge to publicly accessible green infrastructure and/or a Public Right of Way.

The access to waterside maps DO NOT consider any access to the actual water body itself and the existence of accessible waterside DOES NOT create or imply any such rights of access to the water for any purpose.

The PRoW dataset was compiled using data made openly accessible by Local Authorities across England. However, there are some gaps; PRoW data was unavailable for 53 local authorities. The lack of data for these areas is highlighted on the resulting maps.

Access to waterside was assessed using proximity buffers which may contain local barriers not picked up in the assessment. Not all of the waterside mapped as accessible may therefore be actually accessible on site. This could include topography or structures resulting in the waterside not being visible.

Other potential access infrastructure includes footpaths that are not designated as PRoW and small/quiet roads that are suitable for walking. However, these are not included in this assessment. These types of access infrastructure can vary greatly in their level of suitability (for walking). For example, a small lane in one location may be an acceptable walking route,

however a small lane in another location may be unsuitable for walking, for instance if it experiences fast-moving traffic or poor visibility (blind corners). Footpaths that are not designated as PRoW may also be locally used viable access routes. Unfortunately, these are not mapped for most of the country and the conditions of access (assuming it is by some form of permissive agreement) are also unknown.

Waterside access created by permissive agreement or arrangements are not included in this assessment.

4.4 – Waterside accessible by PRoW proximity.

What is this layer?

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible by proximity (using a 10m buffer) to a Public Right of Way.

What data was used?

- Blue Infrastructure Network layer (4.1)
- Public Rights of Way Network layer (6.1)

What are the attributes?

The attribute box simply identifies the depicted waterside as within the PRoW 10m buffer.

What are the limitations and caveats to content.

The access to waterside assessment only maps the likelihood that the edges of water bodies and courses are accessible. The accessibility is created purely by proximity of water edge to publicly accessible green infrastructure and/or a Public Right of Way.

The access to waterside maps DO NOT consider any access to the actual water body itself and the existence of accessible waterside DOES NOT create or imply any such rights of access to the water for any purpose.

The PRoW dataset was compiled using data made openly accessible by Local Authorities across England. However, there are some gaps; PRoW data was unavailable for 53 local authorities. The lack of data for these areas is highlighted on the resulting maps.

Access to waterside was assessed using proximity buffers which may contain local barriers not picked up in the assessment. Not all of the waterside mapped as accessible may therefore be actually accessible on site. This could include topography or structures resulting in the waterside not being visible.

4.5 – Waterside accessible by Accessible Green Infrastructure proximity.

What is this layer?

This layer uses the 4.2 data to identify the location of the total waterside resource that is publicly accessible because the waterbody is adjacent to designated Access Land.

What data was used?

- Blue Infrastructure Network layer (4.1)
- Accessible Green Infrastructure layer (1.4)

What are the attributes?

The attribute box simply identifies the depicted waterside as within the Accessible Green Infrastructure 1m buffer (ie – adjacent to accessible green infrastructure).

What are the limitations and caveats to content?

The access to waterside assessment only maps the likelihood that the edges of water bodies and course are accessible. The accessibility is created purely by proximity of water edge to publicly accessible green infrastructure and/or a Public Right of Way.

The access to waterside maps DO NOT consider any access to the actual water body itself and the existence of accessible waterside DOES NOT create or imply any such rights of access to the water for any purpose.

4.6 – Water Quality (WFD Biological).

What is this layer?

This layer presents water quality data using WFD Biological Water Quality data.

The layer uses WFD ecological status 2019 (for river, lake, canal and TraC water bodies) as a general descriptor of Blue Infrastructure (BI) water quality across England. This was because WFD ecological status is the most comprehensive and best overall indicator of water quality,

What data was used?

- Environment Agency – WFD Ecological Status 2019

What are the attributes?

The attribute box identifies type of water body, it's name and the WFD Biological Quality Class.

What are the limitations and caveats to content.

Limitations include the fact that it does not include smaller water bodies, monitoring frequency varies for water bodies, the range of parameters measured varies for water bodies.

4.7 – Blue Infrastructure Statistical Maps.

This layer presents statistical data derived from assessments 4.3, 4.4 and 4.5.

Note on Blue Infrastructure Statistical Maps.

The main statistics calculated from these assessments are related to the length of **accessible waterside** (not area or length of the water body itself). Water bodies that were mapped as polygons were converted to lines (i.e. lines delineating their perimeter) in order to measure the length of the waters' edge. The water's edge data is presented in section 4.2

The advantages of this method include; the ability to include both sides of a river if a PRoW is present on both sides; a clearer statistic for water bodies (e.g. lakes) that are only partially within an accessible area; a more accurate measurement of water's edge (as opposed to river centrelines); a singular statistic type (length) as opposed to a mixture of area and lengths for the different water body types and dataset shapes.

However, this method has limitations. For example, when a PRoW is within close proximity of a narrow river/stream, both sides of the river fall within the 10m buffer zone skewing any "length of waterside" analyses. It was decided that both sides of the river should be counted when PRoW is present on both sides; however the aforementioned scenario should only count one side.

Also, when a PRoW crosses a river, a 10m stretch of waterside is selected (5m upstream and 5m downstream) for both sides of the river. Furthermore, the smaller streams that were mapped as lines from the start (centreline of stream as opposed to a polygon) produce a statistic describing the length of the river only, not the length of individual banks. These limitations have not yet been resolved and may therefore create local distortions in the data.

The Accessible Waterside maps should thus be regarded as indicative and actual accessible waterside should thus be established by local ground truthing when undertaking local assessments and the statistics adjusted.

The layers present statistical data at different scales of Upper and Lower Tier Local Authority (County and District), MSOA and LSOA.

What are the attributes?

- Location identifier
- Total waterside in area (m)
- Total waterside accessible by PRoW and/or Accessible Green Infrastructure
- Total waterside accessible by proximity to PRoW (m)
- Total waterside accessible by proximity to Accessible Green Infrastructure (m)

Section 4.5

Module 5 – Designated and Defined Areas (Selected)

This module incorporates a selection of maps for a range of statutory Designated Areas or other areas that have been defined and are recognised in national and local policy.

The layers combine related data into themes.

5.1 – Biodiversity (with Ancient Woodland).

This layer displays biodiversity related designated and defined areas (Sites of Special Scientific Interest - SSSI, Local Nature Reserves - LNR, National Nature Reserves - NNR, Ancient Woodland)

5.2 – Historic Environment.

This layer displays Scheduled Monuments and Registered Historic Parks and Gardens.

5.3 – Landscape and Access.

This layer displays national landscape designations and defined areas (National Parks, Areas of Outstanding Natural Beauty - AONBs and Heritage Coasts).

5.4 – SPA/SAC/RAMSAR.

This layer displays International biodiversity designations and defined areas. Special Protection Areas (SPA), Special Areas of Conservation (SAC), RAMSAR sites defined under the RAMSAR Convention.

5.5 – Local Authority Districts Boundaries.

This layer displays Lower (District) Tier Local Authority boundaries (including Unitary Authorities).

5.6 – National Character Areas.

This layer displays the boundaries of the England National Character Areas.

Section 4.6

Module 6 – Access to Nature Close2Home Assessment

See method statement for a full explanation of how these maps were generated.

6.1 – Access to Nature Close2Home.

What is this layer?

The Nature Close2Home assessment aims to understand the supply of publicly accessible green spaces that are likely to be moderate to high in terms of biodiversity (nature rich) qualities and thus capable of providing a "contact with nature" experience on a regular, daily and local basis.

The "Nature Close2Home" assessment focusses on the supply of green spaces with a Naturalness rank of either 1 or 2. However, this is a general approach to assessing naturalness which means some of the level 2 spaces may not be that biodiverse at current time, although many may have potential for biodiversity enhancement.

To assess the supply of nature rich spaces close to home, a new Close2Home buffer was created around all green spaces ranked 1 or 2 for Naturalness and within the 200 and 300m buffer combined. Playing fields were excluded from the 200m buffer for the purposes of the Close2Home buffer.

The spaces included are thus those that are likely to be currently offering the most local opportunity to have contact with nature on a regular or routine daily basis.

The Close2Home buffer is thus a hybrid buffer incorporating ANGSt Doorstep and ANGSt Local Green Spaces minus Playing Fields (Naturalness 3 – Playing Fields were used in the ANGSt buffer 200 assessment but are removed from the Close2Home 300 buffer).

For this initial assessment, two target groups were identified;

- Children and young people under 16.
- Older people 65+.

This layer presents outputs in Upper and Lower Tier Local Authority, MSOA and LSOA.

What data was used?

- ANGSt Buffer Maps
- ONS Census 2011 population
- ONS Census 2011 age cohorts

What are the attributes?

- Location identifier
- Total population covered by Nature Close2Home buffer (and %)
- Total population of children and young people under 16
- Total estimated population of children and young people under 15 within Nature Close2Home Buffer
- Ha of "Nature rich green space close to home" per person under 16
- Total population of people 65 and over in output areas
- Total estimated population of people 65 and over within the Nature Close2Home Buffer
- Ha of "Nature rich green space close to home" per person 65 and older

What are the limitations and caveats and limitations to content?

In order to derived % population affected, it has been assumed that population is evenly distributed across output areas. This will introduce some skewing of the data, likely to be most acute at LSOA level (particularly rural LSOA).

The identification of "nature rich spaces" is based purely on the application of Naturalness Factors. The actual level of biodiversity and its condition is not depicted on the maps which purely identify likely to provide reasonable access to nature.

Section 4.7

Accessible Natural Green Space Inequalities layers.

See method statement for a full explanation of how these maps were generated.

This module is an assessment derived from the England ANGSt assessment that looks at relative inequalities of provision of access to natural green spaces.

Maps of Accessible Natural Green Space Inequalities were generated at LSOA level.

These maps explore the spatial relationship between accessibility of green spaces (measured as % LSOA covered by the respective ANGSt buffer) across the range of ANGSt Benchmarks and compares with one other variable. The two variables selected for assessment were;

- Deprivation – as measured by the Index of Multiple Deprivation (MHCLG 2019)
- Population Density – Derived from ONS Census 2011.

Note on Index of Multiple Deprivation.

The Index of Multiple Deprivation, commonly known as the IMD, is the official measure of relative deprivation for small areas in England. It is the most widely used of the Indices of Deprivation (IoD).

The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are a statistical geography called Lower-layer Super Output Areas.

The IMD combines information from the seven domains to produce an overall relative measure of deprivation. The domains are combined using the following weights:

• Income Deprivation (22.5%) • Employment Deprivation (22.5%) • Education, Skills and Training Deprivation (13.5%) • Health Deprivation and Disability (13.5%) • Crime (9.3%) • Barriers to Housing and Services (9.3%) • Living Environment Deprivation (9.3%)

The weights were derived from consideration of the academic literature on poverty and deprivation, as well as the levels of robustness of the indicators.

Information on the IMD can be found at;

https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

The resultant maps provide a relative measure of places with respect to potential issues concerning supply and demand for accessible natural green space.

In order to aid the display of inequalities, a bi-variate assessment grid was created with each sector of the grid shown below being assigned an alphanumeric code to represent it, creating a system of "Access Inequalities Categories".

Category L1 – represents the least favourable category of very low ANGSt buffer coverage and high level of other deprivation/population density.

Category H3 – represents the most favourable category with relatively high ANGSt buffer coverage and low level of deprivation/population density.

LSOAs which fall within each grid category (assessed using metrics set out in 3.1 and 3.2) were then assigned the corresponding code for each ANGSt buffer distance. These alphanumeric codes can be used to easily identify which sector of the grid each LSOA falls within.

In this system;

L, M and H refer to low, medium and high level of ANGSt Buffer coverage.

1, 2 and 3 are the relative bands for the other variable (1 high, 2 medium, 3 low).

The Access to Natural Green Space inequalities maps only look at those green spaces that were used to run the England ANGSt analysis and were done only at LSOA level.

Assessments 3.1 and 3.2 only look at green spaces included in the ANGSt assessment (Natural Green Spaces). LSOA may contain other (not Natural) green spaces whose presence will not be picked up in this assessment.
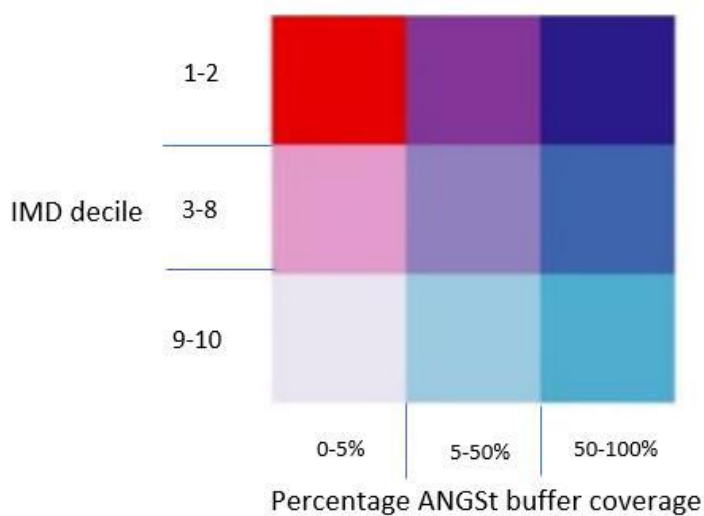
Module 7 – Accessible Natural Green Space Inequalities and Index of Multiple Deprivation (IMD) Assessment

7.1 – Natural Green Space Accessibility and Deprivation.

What is this layer?

This layer presents LSOA with respect to level of accessibility of natural green spaces compared with the IMD decile. Each output area is assigned an "access inequalities class" according to which of the boxes the statistics for ANGSt Buffer coverage and IMD place it.

These were assigned using the selected criteria thresholds set out below.

Maps are presented for all 6 ANGSt buffer sizes.

What data was used?

- ANGSt buffer coverage was derived from the England ANGSt assessment
- Index of Multiple Deprivation 2019 – Decile
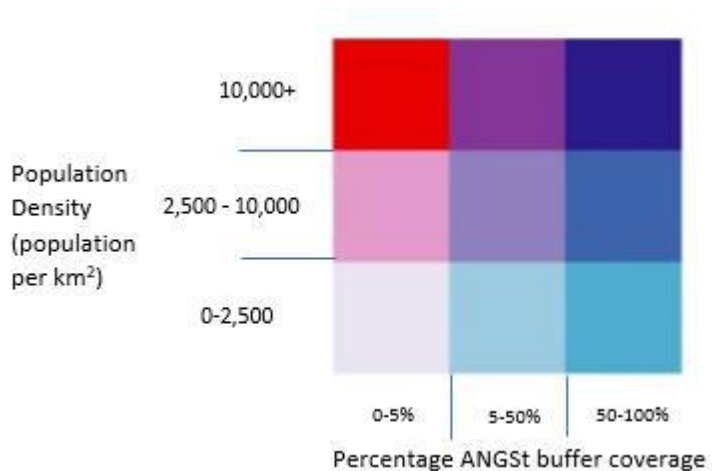
What are the attributes?

- LSOA name
- Access inequalities class
- IMD Decile
- % of LSOA covered by selected buffer

Module 8 – Accessible Natural Green Space Inequalities (Population Density) Assessment

8.1 – Natural Green Space Accessibility and Population Density.

What is this layer?

This layer presents LSOA with respect to level of accessibility to natural green spaces compared with population density. Each LSOA is assigned an "access inequalities class" according to which of the boxes the statistics for ANGSt Buffer coverage and population density place it.

What data was used?

- ANGSt buffer coverage was derived from the England ANGSt assessment
- Population density derived from ONS census data 2011

What are the attributes?

- LSOA name
- Access inequalities class
- Population Density (Census 2011)
- % of LSOA covered by selected buffer

Section 4.8

Module 9 – Social Statistics

This module presents the socio-economic data used to undertake various assessments in the form of statistical maps.

9.1 – IMD Decile.

This layer presents MHCLG (now DLUHC) open data on English Indices of Deprivation DECILE and RANK 2019. Decile 1 represents most deprived and decile 10 least deprived.

Note on the Index of Multiple Deprivation.

What is the Index of Multiple Deprivation (IMD)?

The Index of Multiple Deprivation, commonly known as the IMD, is the official measure of relative deprivation for small areas in England.

The Index of Multiple Deprivation (IMD) ranks every small area in England from 1 (most deprived area) to 32,844 (least deprived area). These small areas are a statistical geography called Lower-layer Super Output Areas.

The IMD combines information from the seven domains to produce an overall relative measure of deprivation. The domains are combined using the following weights:

 • Income Deprivation (22.5%) • Employment Deprivation (22.5%) • Education, Skills and Training Deprivation (13.5%) • Health Deprivation and Disability (13.5%) • Crime (9.3%) • Barriers to Housing and Services (9.3%) • Living Environment Deprivation (9.3%)

The weights were derived from consideration of the academic literature on poverty and deprivation, as well as the levels of robustness of the indicators. A fuller account of the Index of Multiple Deprivation is available from:

https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

9.2 – Population.

This layer presents Census population 2011 data (most up to date at time of assessment), population estimate 2018 (most up to date at time of assessment).

9.3 – Ethnicity.

This layer presents ONS 2011 Census data by ethnicity grouping.

9.4 – Health and disability.

This layer presents Nomis data that provides 2011 estimates that classify usual residents in England and Wales by long-term health problems or disabilities. The estimates are as at census day 27 March 2011.

The data is split into Activities limited a lot, limited a little or not limited.

9.5 – Mental Health.

This layer is the Small Area Mental Health Indicator (SAMHI) developed by the Place Based Longitudinal Data Resource (PLDR).

The SAMHI is a composite annual measure of population mental health for each Lower Super Output Area (LSOA) in England. The SAMHI combines data on mental health from multiple sources (NHS-Mental health-related hospital attendances, Prescribing data – Antidepressants, QOF - depression, and DWP - Incapacity benefit and Employment support allowance for mental illness) into a single index.

5. Assessment Method Statements

This section contains detailed technical descriptions of approaches and methods of assessment used to develop the Green Infrastructure Baseline Database (Version 1.1).

Section 5.1 – Typology System and Attributes

A system of Green Infrastructure Typologies was devised to enable the integration of a range of spatial datasets that sometimes describe similar spaces in different ways. In devising the typology system effort was taken to mimic the descriptions in the source data as closely as possible.

The system of Green Infrastructure Typologies used in Version 1.1 (OGL) of the database is set out below.

England Green Infrastructure Mapping	Version 1.1 (OGL)	
Typology Mapping System		
Typology Family	**Typology Code**	**Typology Title**
1 Public and Community Spaces	1.1	Public Park - General
	1.2	Public Park - Country Park
	1.3	Millennium or Doorstep Green
	1.4	Local Nature Reserve
	1.5	National Nature Reserve
	1.6	Playing Fields
	1.7	Other Sports Facilities
2 Access Land	2.1	Access Land (CRoW)
3 Woodland	3.1	Woodland

4 Water Features	4.1	4 Water Courses and Surface Water Features
5 Functional Green Spaces	5.1	Allotments or Community Growing Spaces
	5.2	Activity Spaces Provision (Inc Bowling Greens, Tennis Courts)
	5.3	Cemeteries and Religious Grounds
	5.4	Golf Course
	5.5	Play Space Provision

The assignment of Green Infrastructure Typologies from the source data is set out below. Several categories from the source data were brought together into one Green Infrastructure type to keep the resulting map (Combined Green and Blue Infrastructure) layer relatively simple and therefore clearer to display.

Dataset	Attribute	License	V 1.1 Typology code	V 1.1 Typology title
OS Greenspace	Allotments or Community Growing Spaces	OGL	5.1	Allotment and Community Growing Spaces
OS Greenspace	Bowling Green	OGL	5.2	Activity Spaces Provision
OS Greenspace	Cemetery	OGL	5.3	Cemeteries and Religious Grounds
OS Greenspace	Golf Course	OGL	5.4	Golf Course
OS Greenspace	Other Sports Facility	OGL	1.7	Other Sports Facility
OS Greenspace	Play Space	OGL	5.2	Activity Spaces Provision
OS Greenspace	Playing Field	OGL	1.6	Playing Fields
OS Greenspace	Public Park Or Garden	OGL	1.1	Public Park - General
OS Greenspace	Religious Grounds	OGL	5.3	Cemeteries and Religious Grounds
OS Greenspace	Tennis Court	OGL	5.2	Activity Spaces Provision
Local Nature Reserve	None	OGL	1.4	Local Nature Reserve
National Nature Reserve	None	OGL	1.5	National Nature Reserve

Natural England open access data	None	OGL	2.1	Access Land (CRoW)
Natural England open access S15	None	OGL	2.1	Access Land (CRoW)
Millennium Greens	None	OGL	1.3	Millennium or Doorstep Green
Country Parks	None	OGL	1.2	Public Park - Country Park
Doorstep Greens	None	OGL	1.3	Millennium or Doorstep Green
OS Woodland	None	OGL	3.1	Woodland
OS Surface Water	None	OGL	4.1	Water Courses and Surface Water Features
National Forest Inventory	None	OGL	3.1	Woodland
Ancient Woodland	None	OGL	3.1	Woodland
OS Open Rivers	canal	OGL	4.1	Water Courses and Surface Water Features
OS Open Rivers	inlandRiver	OGL	4.1	Water Courses and Surface Water Features
OS Open Rivers	lake	OGL	4.1	Water Courses and Surface Water Features
OS Open Rivers	tidalRiver	OGL	4.1	Water Courses and Surface Water Features

The combined Green and Blue Infrastructure layer is a collection of all the data that provide a typology for all Green and Blue Land cover. Due to data quality and extent limitations, this map is not a comprehensive map of all Green and Blue Land Cover in this version (1.1). It is intended that the content of Map 1 will expand over time to become more comprehensive as further data are added.

Data used to create the Combined Green and Blue Infrastructure layer may have overlapping geographical extents. This means that there can be multiple overlapping polygons in an area which relate to the same green or blue landcover and which have different attributes due to different data sources.

Note on treatment of "Playing Fields".

The Town and Country Planning (Development Management Procedure) (England) Order 2015 defines "Playing Fields" as;

> 'the whole of a site which encompasses at least one playing pitch'

In addition "playing pitches" are described as;

> 'a delineated area which, together with any run-off area, is of 0.2 hectares or more, and which is used for association football, American football, rugby, cricket, hockey, lacrosse, rounders, baseball, softball, Australian football, Gaelic football, shinty, hurling, polo or cycle polo.'

In the Green Infrastructure Mapping V 1.1, source data from the OS Open Green Space data has been used to identify both "Playing Fields" and "Other Sports Facilities" which are defined in the OS Technical Specification as follows;

> Playing Fields - Large, flat areas of grass or specially designed surfaces, generally with marked pitches, used primarily for outdoor sports, i.e. football, rugby, cricket.

> Other Sports Facilities – Land used for sports not specifically described by other categories. Includes those facilities where participation in sport is the primary use of the area.

Please note that Other Sports Facilities may include or be made up wholly of buildings (identifiable using the Greenness attribute).

The OS depictions of Playing Fields may thus not be entirely in accordance with the TCPA definition and the Green Infrastructure mapping has used the data as provided by the OS source. The use of typology descriptions "Playing Fields" or "Other Sports Facilities" in the mapping is purely for the purposes of typological differentiation of spaces and in the event of any discrepancy, the depiction of Playing Fields and/or Sports Facility in the mapping does not override the definition in the TCPA (Development Management Procedure) 2015 or that used in the National Planning Policy Framework which should be followed in any formal, policy or legal consideration of "Playing Fields".

The table below sets out the attributes that were given to the data (shape files). Not all these attributes appear on the web maps.

Data attribution and description.

Field Names	Field Description.
Dataset	Dataset from which the polygon is derived
Attribute	The attribute from the dataset which was used for mapping
Accessible	Flag to determine whether the greenspace is accessible to the public or not
Accessible Natural Green Space	Flag to determine if the greenspace is included in the Accessible Natural Greenspace Standards (ANGSt) analyses
Naturalness (used on website map)	Level 1 to 4
Typology Code (Used on website map)	GI Typology Code
Typology Title (Used on website map)	GI Typology Title
License	Open Government License or Public Sector Geospatial Agreement
Green Space Topology	Flag to determine if layer is greenspace topology layer
Habitat	Flag to determine if polygon overlaps with PHI
Designation	Flag to determine if polygon overlaps with designation
Manmade area	Area of Greenspace which is manmade
Percent manmade area (used on website map)	Percentage of greenspace which is manmade

Determination of Accessible.

Those data with a greenspace "accessible" flag were merged using ArcMap GIS into a single national vector.

Accessibility was determined primarily from the typology of the GI. A judgement was made based on a review of the source data typologies as to whether an identified space was likely to be publicly accessible or not.

To be considered publicly accessible, a type of open space had to be regarded as likely to be open to the general public, free of charge and provided as a space where the public would expect to be able to access at least during daylight hours. This could either be via a formal public right of access (such as access land) or it being a space provided for a broad range of activities requiring public access (including for example public parks but also places such as cemeteries or public playing fields/sports pitches etc. Other Sport Facilities were not consider accessible as they may be buildings or spaces normally providing restricted and/or private access.

Spaces that are usually private, pay to access, or usually accessible by permissive agreement only, were not included in the assessment of accessible Green Infrastructure.

In addition, spaces provided for specific activities that usually restrict general access were also excluded unless they are provided as a part of a "higher level" space. For example, a Tennis court outside of a park was not judged accessible Green Infrastructure if it was provided as a facility outside of the context of a broader public green space. Judgement on accessibility is set out in the Data Attribution section below.

Dataset	Attribute	Accessible	Used in ANGSt
OS Greenspace	Allotments or Community Growing Spaces	No	No
OS Greenspace	Bowling Green	No	No
OS Greenspace	Cemetery	Yes	No
OS Greenspace	Golf Course	No	No
OS Greenspace	Other Sports Facility	No	No
OS Greenspace	Play Space	Yes	No
OS Greenspace	Playing Field	Yes	Buffer_200 only

OS Greenspace	Public Park or Garden	Yes	Yes
OS Greenspace	Religious Grounds	Yes	No
OS Greenspace	Tennis Court	No	No
Local Nature Reserve	None	Yes	Yes
National Nature Reserve (see note)	None	No	No
Natural England open access data (including section 15)	None	Yes	Yes
Millenium Greens	None	Yes	Yes
Country Parks	None	Yes	Yes
Doorstep Greens	None	Yes	Yes
OS Woodland	None	No	No
OS Surface Water	None	No	No
National Forest Inventory	None	No	No
Ancient Woodland	None	No	No
OS Open Rivers	canal	No	No

OS Open Rivers	inlandRiver	No	No
OS Open Rivers	lake	No	No
OS Open Rivers	tidalRiver	No	No

Note on exceptions.

Some typologies deemed normally not accessible were included as accessible if they formed part of a wider typology deemed accessible. For example, woodland has been classed as not accessible but included accessible if it forms part of a public park. Likewise Tennis Courts and Bowling Greens (which on their own are deemed not accessible but accessible if within a public park).

Note on National Nature Reserves (NNR).

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Other NNR have not been mapped as accessible for the purposes of the ANGSt analysis. However, they have been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their inclusion in 1.4 also results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

Determination of Naturalness.

'Naturalness' was determined using the Green Infrastructure Typology as a proxy.

A system based on that set out in Nature Nearby was devised to fit with the mapping requirements.

(http://www.ukmaburbanforum.co.uk/docunents/other/nature_nearby.pdf)

Typologies were assigned a Naturalness rating based on judgement as to the average rating a particular typology was likely to attain. The meaning of "naturalness" for V 1.1 is set out below;

- Level 1 (most natural – lowest apparent levels of management intensity).
- Level 2 (Mixed attributes – overall less intensive management)
- Level 3 (Highly or intensively managed spaces – may contain an element of less intensively managed areas).
- Level 4 (least natural and/or man made surface (not vegetation, water or soils)) No mapped GI typology was assigned this rank although some Formal Sports Facilities may be 100% man made surface and these can be identified using the Greenness attribute).

Dataset	Attribute (sub-title in the data – where relevant)	Naturalness
OS Greenspace	Allotments or Community Growing Spaces	3
OS Greenspace	Bowling Green	3
OS Greenspace	Cemetery	3
OS Greenspace	Golf Course	3
OS Greenspace	Other Sports Facility	3
OS Greenspace	Play Space	3
OS Greenspace	Playing Field	3
OS Greenspace	Public Park or Garden	2
OS Greenspace	Religious Grounds	2
OS Greenspace	Tennis Court	3

Local Nature Reserve	None	1
National Nature Reserve	None	1
Natural England open access data (including S15)	None	1
Millennium Greens	None	2
Country Parks	None	2
Doorstep Greens	None	2
OS Woodland	None	1
OS Surface Water	None	1
National Forest Inventory	None	1
Ancient Woodland	None	1
OS Open Rivers	canal	2
OS Open Rivers	inlandRiver	1
OS Open Rivers	lake	1
OS Open Rivers	tidalRiver	1

The Naturalness rank assignments will be full of exceptions and should only be considered as a loose fit. For example, some Golf Courses (rank 3) contain significant natural space that is not picked up whilst some cemeteries (rank 2) will be more intensively managed than others. Likewise, the management regimes for public parks is likely to be highly varied but they have been given a general rank of 2.

Further work on Naturalness is planned to improve on the way in which this attribute is used in future mapping.

Determination of ANGSt attribution.

This field identifies those greenspaces that were both accessible and spaces that would be suitable for inclusion in the Access to Natural Green Space Standards (ANGSt) assessments.

ANGSt aims to address differences in access to the natural environment across the country through local green spaces; setting a range of accessibility benchmarks for sites of higher level naturalness and areas within easy reach of people's homes.

Once those typologies that were judged accessible (see section above) had been identified, a subsequent judgement process reviewed each typology to consider its likely "naturalness score" (based on the approach set out in Nature Nearby).

Those with a Naturalness score of 1 or 2 (most natural) were then further considered to generate a sub-set of typologies that would be identified as Accessible *Natural* Green Spaces. This was an "on balance of probability" basis seeking to identify those spaces that were likely to be most natural but would also generally be considered as public green spaces, provided either for public access (where provision of public access is a core purpose of the land) or to which there is a public right of access and providing for a range of open air and recreational activities (lawful sports and pastimes).

An exception was made for "Playing Fields" (Naturalness 3) which in some datasets are identified as "recreation grounds" and in others as provision for formal sporting activities. Playing Fields were included in the ANGSt assessments if they were either;

- An integral part of a wider public open green space (Parks and Gardens);

Or

- Were within the new 'Doorstep' ANGSt Benchmark Buffer of 200 m (where it was judged that whilst their Naturalness factor is likely to be 3 because they are likely to be quite highly managed for formal sport and recreation, they nonetheless are likely to be important green space resources at this very local level).

Formal "Sports Facilities" were completely excluded from the ANGSt analysis as they are likely to be highly managed functional spaces and may be 100% man made.

Facilities such as Play Spaces, Tennis Courts or Bowling Greens were included only if they formed part of a larger "Public Park" with Naturalness Rank 2 (as this rank covers the fact that such sites are likely to be variable).

Determination of Percentage manmade area.

This field shows the percentage of the total area of each green infrastructure polygon that is covered by manmade surface (not vegetation, water or soils). It is intended as a companion indicator of naturalness and can indicate some green infrastructure areas which were mapped in this process as, in fact, being entirely manmade.

For example, some sport facilities which appear in this dataset may be indoor sport areas and this can be determined using the percentage manmade area. The manmade area was calculated using a manmade surface dataset for the whole of England which was extracted from the topography layer from Ordnance Survey's (OS) 'MasterMap' data. The data presented in V 1.1 is thus a derived product as the source data is not available under OGL terms.

Section 5.2 – Publicly Accessible Green Infrastructure

The accessible Green Infrastructure layer is a subset of polygons from the Combined Green and Blue Infrastructure layer.

Polygons from the Combined Green and Blue Infrastructure layer were retained based on the accessibility flag. This means that private greenspaces such as golf courses, allotments, private sports facilities, gardens are not included in Map 1.2

To be flagged as "Publicly Accessible" a typology had to be (on the basis of usual probability), formally open to the general public (at least during daylight hours), free to access and available for at least informal recreation and visiting (although many accessible spaces will provide for a range of formal and informal recreation and activities).

All polygons deemed 'accessible' in Map 1.1 were dissolved to create a single vector dataset and each were assigned the attributes detailed in the table below. This dissolving process removed the problem of overlapping polygons from different datasets seen in Map 1 as it joins adjacent greenspace polygons and creates a single, larger polygon where two or more polygons intersect. Finally, the polygons created by this process were intersected with the manmade surface dataset and a percentage of each greenspace area that is manmade surface was calculated based on this intersection.

Table of Attributes.

Not all attributes occur on the website maps.

Greenspace data Attributes.	Field Description
Shape_Length	Length of the polygon
Shape_Area	Area of the polygon
Area_ha (Used on website maps)	Area of the polygon in hectares
Perc_Manmade (Used on website maps)	Percentage of area which is manmade surface

Table of accessibility determination (by typology).

Dataset	Attribute	Accessible	Used in ANGSt
OS Greenspace	Allotments or Community Growing Spaces	No	No
OS Greenspace	Bowling Green	No	No
OS Greenspace	Cemetery	Yes	No
OS Greenspace	Golf Course	No	No
OS Greenspace	Other Sports Facility	No	No
OS Greenspace	Play Space	Yes	No
OS Greenspace	Playing Field	Yes	Buffer_200 only
OS Greenspace	Public Park or Garden	Yes	Yes
OS Greenspace	Religious Grounds	Yes	No

OS Greenspace	Tennis Court	No	No
Local Nature Reserve	None	Yes	Yes
National Nature Reserve (see note)	None	No	No
Natural England open access data (including section 15)	None	Yes	Yes
Millennium Greens	None	Yes	Yes
Country Parks	None	Yes	Yes
Doorstep Greens	None	Yes	Yes
OS Woodland	None	No	No
OS Surface Water	None	No	No
National Forest Inventory	None	No	No
Ancient Woodland	None	No	No
OS Open Rivers	canal	No	No
OS Open Rivers	inlandRiver	No	No
OS Open Rivers	lake	No	No
OS Open Rivers	tidalRiver	No	No

Note on exceptions.

Some typologies deemed normally not accessible were included as accessible if they formed part of a wider typology deemed accessible. For example, woodland has been classed as not accessible but included accessible if it forms part of a public park. Likewise Tennis Courts and Bowling Greens (which on their own are deemed not accessible but accessible if within a public park.

Note on National Nature Reserves.

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Other NNR have not been mapped as accessible for the purposes of the ANGSt analysis. However, they have been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their inclusion in 1.4 also results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

Section 5.3 – Woodlands and Access

There has been limited incorporation of woodlands data into Version 1.1 of the Green Infrastructure Database. This has involved bringing together OS Open Data with National Forest Inventory and Ancient Woodland Inventory data.

Urban Tree data and Trees Outside of Woods data have not been incorporated in this version but may be so in future iterations. The existing Woodlands and Access map should be regarded as an initial product only.

Woodland Access Standards have not been incorporated into V 1.1, however; a limited "Woodlands and access" assessment was undertaken to identify those woods that are either;

- Accessible because they form part of publicly accessible green space (a place specifically provided for public access);

- Are partially accessible because of the existence of a Public Right of Way either within or along the edge of a woodland;

- Are not part of a publicly accessible green space and have no PRoW access and are thus for the purpose of this exercise deemed as "not accessible".

No data relating to permissive access or incidental access to woodlands is included in this analysis.

Layer 1.3 is a subset of layer 1.1 with polygons being retained if they were classed as woodland, based on the 'TypologyLabel' greenspace typology. Woodland polygons were dissolved to create a single vector dataset, and each were assigned the attributes detailed in below.

Table of attributes.

Not all attributes appear on website maps.

Field names	Field description
perc_Manmade	Percentage of woodland that is manmade surface
TypologyLabel	Typology label
Area_ha (used on website maps)	Area of woodland polygon in hectares
AccessLevel (Used on website maps)	Linear accessible, non-accessible, or accessible
prow_Length	length of public right of way within woodland polygon
prow_ratio	length of public right of way within woodland polygon divided by area of woodland polygon in hectares

The percentage of manmade area was calculated based on an intersection with the manmade surface dataset. PRoW length and length of PRoW per ha of woodland were calculated based on intersection with Public right of way maps. This means that for areas where there are gaps in the coverage of PRoW data, the value of PRoW length and PRoW per ha will be incorrect. This also leads to some woodland being classed as inaccessible where, in reality, the woodland is intersected by PRoW and should be classed as accessible.

Section 5.4 – Greenness

Greenness is mapped with respect to the percentage of a polygon/area that is not vegetation, water or soils.

Greenness is used to permit two things;

- At a site level, a means of understanding the amount of any given space mapped as green space that is actually man-made surface.
- On an area basis, a simple measure of general environmental quality as derived from understanding how much of an area is manmade as oppose to vegetation, water or soils.

The manmade area was calculated using a manmade surface dataset for the whole of England which was extracted from the "topography layer" from Ordnance Survey's (OS) 'MasterMap' data. The data presented in V1.1 (OGL) is a derived product because OS Mastermap Topography Layer is not open data and not available under OGL.

Greenness in the Combined Green and Blue Infrastructure layer.

Within the Combined Green and Blue Infrastructure layer, Greenness exists as an attribute attached to each mapped Green Infrastructure polygon.

The attribute field shows the percentage of the total area of each green space that is covered by manmade surface (not vegetation, water or soils). It is intended as a companion indicator of naturalness and can indicate some green infrastructure areas which were mapped in this process as, in fact, being entirely manmade. For example, some sport facilities which appear in this dataset may be indoor sport areas and this can be determined using the percentage manmade area.

Greenness Layer.

There is also a specific "Greenness" layer which shows the **Proportion of land surface that is man-made as opposed to vegetation, water or soils using a 250 metre grid (aligned with the OS Grid).**

This national map purely shows the estimated amount (derived from the source data) of surface within a grid square that is not vegetation, water or soils. A 250m grid was chosen as it strikes a balance between detailed geographical area coverage, processing requirements to create the data and overall size of the data.

Section 5.5 – Accessible Natural Green Space Standards (ANGSt) Assessment

The Accessible Natural Green Space Standards assessment is the first England scale ANGSt assessment and the first to use an updated system of 6 ANGSt Standards (see table below).

The purpose of the assessment was to determine the baseline (current situation) for access to natural green space across England and for each standard.

For the purpose of this exercise, a system of 6 standards was used following an earlier review of the ANGSt system led by Manchester University.

The assessment was undertaken using a subset of the data for layer 1.4 (see table in 1.4) and utilised a new system of ANGSt Benchmarks as set out below.

Name of ANGSt criterion	Size distance criteria
Doorstep Green Space (NEW)	At least 0.5 ha within 200 metres Less than 5 mins walk
Local Natural Green Space	At least 2 ha within 300 m 5-10 mins walk, 1-2 mins cycle
Neighbourhood Natural Green Space (NEW)	10 ha within 1 km 15-20 mins walk, 3-4 mins cycle
Wider Neighbourhood Natural Green Space	At least 20ha within 2km 35 mins walk, 6-8min cycle
District Natural Green Space	100 ha within 5 km 15-20 mins cycle
Sub-regional Natural Green Space	500 ha within 10 km 30-40 mins cycle

Note on distance and walking times.

The Chartered Institution for Highways and Transportation reports that average walking speed is approximately 60 metres per minute. 90 metres per minute is fast and 30-40 metres is slow. On the basis of 60 metres a minute:

- 5 mins is 300 metres
- 10 mins is 600 metres
- 15 mins is 900 metres
- 20 mins is 1200 met
- 35 mins is 2 km

Note on cycling times.

The Department for Transport (Local Transport Note 2/08) reports that the average speed of cyclists on a level surface is around 12 mph.

Transport for London assume an **average** cycle **speed** of 15 kilometres per hour.

Actual walking routes may be 50% longer than the straight-line distance due to barriers such as railways and rivers and due to the position of access points to greenspace (see method statement – note on use of straight line versus network analysis). Best practice is to measure actual walking routes in applying this standard (network analysis). But there are practical and data availability issues in the national application of Network Analysis meaning that the "Straight line buffer" method was used for this assessment.

In the context of ANGSt, "access" refers to the creation of distance buffers around publicly accessible green spaces. The buffer thus creates a zone of proximity to the relevant spaces. However, the ability of people to physically access the space will be affected by a range of factors including physical barriers and those created through personal circumstances such as personal health issues. Proximity to a space may thus not lead to an ability physically access it.

In addition, on this occasion no corrections were done to understand the impact of major barriers (such as motorways, railways or rivers etc) on local buffers. More detailed assessment would understand the impact of major barriers on buffers and the impact of existing bridging points on network analysis.

ANGSt Assessment method – selection of polygons to include.

ANGSt aims to address differences in access to the natural environment across the country through local green spaces, setting a range of accessibility standards for natural sites and areas within easy reach of people's homes.

Once those typologies that were judged accessible (see section 5.2) had been identified, a subsequent judgement process reviewed each typology to consider its likely "naturalness score" (based on the approach set out in Nature Nearby, see section 5.2).

Those with a Naturalness score of 1 or 2 (likely most or partly natural) were then further considered to generate a sub-set of typologies that would be identified as Accessible *Natural* Green Spaces. This was an "on balance of probability" basis seeking to identify those spaces that were likely to be most natural but would also generally be considered as public green spaces, provided either for public access (where public access is a core purpose of the site) or to which there is a public right of access and providing for a range of open air and recreational activities (lawful sports and pastimes).

An exception was made for "Playing Fields" (Naturalness 3) which in some datasets are identified as "recreation grounds" and in others as provision for formal sporting activities. Playing Fields were included in the ANGSt assessments if they were either;

- An integral part of a wider public open green space (Parks and Gardens);

Or
- Were within the new 'Doorstep' ANGSt Benchmark Buffer of 200 m (where it was judged that whilst their Naturalness factor is likely to be 3 because they are likely to be quite highly managed for formal sport and recreation, they nonetheless are likely to be important green space resources at this very local level).

Formal "Sports Facilities" were completely excluded from the ANGSt analysis as they are likely to be highly managed functional spaces and may be 100% man made.

The incorporation of formal activity spaces such as Tennis Courts and Bowling Greens etc were included if they part of a wider public green space (given a Naturalness rank of 2) but not if isolated facilities.

EXCEPTION. For the Doorstep standard, a different approach was taken by including Playing Fields (Naturalness 3) in the assessment. This means that the Doorstep Standard is actually a measure of wider access to green space rather than the narrower "Natural Green Space" that underpins the assessments for the other standards in the system.

This was because the Doorstep standards includes spaces down to 0.5 ha where it is difficult to determine a robust view of what "Natural" means at such a small scale. In addition, the rationale for this standard relates to the provision of very local green space assets and more formal spaces are likely to be valued resources at community level irrespective of actual Naturalness qualities.

All features flagged to be included in the ANGSt assessment were dissolved to create a single feature where individual layers overlapped. The area of each of the spatially isolated polygons was calculated to determine the size of the buffer that was created around them based on the standards set out above.

Typologies used in the ANGSt assessment are set out in the table below.

Dataset	Attribute	Accessible	Used in ANGSt
OS Greenspace	Allotments or Community Growing Spaces	No	No
OS Greenspace	Bowling Green	No	No
OS Greenspace	Cemetery	Yes	No
OS Greenspace	Golf Course	No	No
OS Greenspace	Other Sports Facility	No	No
OS Greenspace	Play Space	Yes	No
OS Greenspace	Playing Field	Yes	Buffer_200 only
OS Greenspace	Public Park or Garden	Yes	Yes
OS Greenspace	Religious Grounds	Yes	No
OS Greenspace	Tennis Court	No	No
Local Nature Reserve	None	Yes	Yes
National Nature Reserve (see note)	None	No	No
Natural England open access data (including section 15)	None	Yes	Yes
Millennium Greens	None	Yes	Yes
Country Parks	None	Yes	Yes

Doorstep Greens	None	Yes	Yes
OS Woodland	None	No	No
OS Surface Water	None	No	No
National Forest Inventory	None	No	No
Ancient Woodland	None	No	No
OS Open Rivers	canal	No	No
OS Open Rivers	inlandRiver	No	No
OS Open Rivers	lake	No	No
OS Open Rivers	tidalRiver	No	No

Note on National Nature Reserves.

Some NNR are designated Section 15 Access Land but others may be private or not open to the public. NNRs that are S15 are mapped as Section 15 Access Land.

Other NNR have not been mapped as accessible for the purposes of the ANGSt analysis. However, they have been mapped as accessible (in map 1.4) in error. Their inclusion in error DOES NOT CREATE ANY ARRANGEMENT FOR PUBLIC ACCESS. Their inclusion in 1.4 also results in the existence of some buffers in the ANGSt maps that do not have core accessible GI. This error will be corrected for Version 1.2

ANGSt Assessment Method – Application of Buffers.

The ANGSt buffer distances were applied to the accessible natural greenspace (ANGSt) polygons in a straight line (as crow flies) distance analysis. Maps were produced to show the zones created by each of the buffer analyses separately, representing areas that meet each of the ANGSt size and distance criteria.

Example Area showing Accessible Natural Greenspace Standards (ANGSt) features used for ANGSt buffer analysis and the different size buffers created.

The diagram below is purely illustrative and does not include the 1 km buffer as it pre-dates its introduction to the mapping.
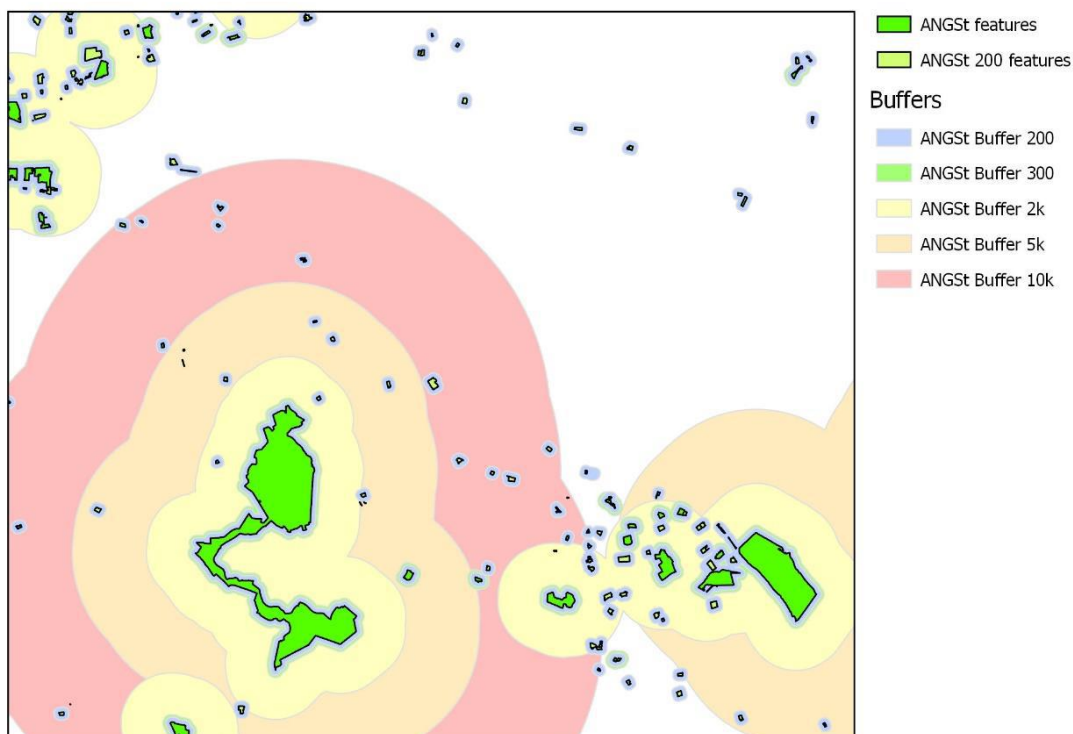
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ANGSt Profiles Method.

Maps were generated to show overlaps of the different buffers (combined Buffers Map) to create an ANGSt Profile for each area. The ANGSt profile identifies the combined number of buffers in any given area and identifies which of the 6 standards are therefore met (creating the ANGSt profile).

An example ANGSt profile map is set out below.

Example Area showing Accessible Natural Greenspace Standards (ANGSt) features used for ANGSt buffer analysis and the combined ANGSt buffers which indicate how many buffers are met by the area.

The diagram below is purely illustrative and does not include the 1 km buffer as it pre-dates its introduction to the mapping.
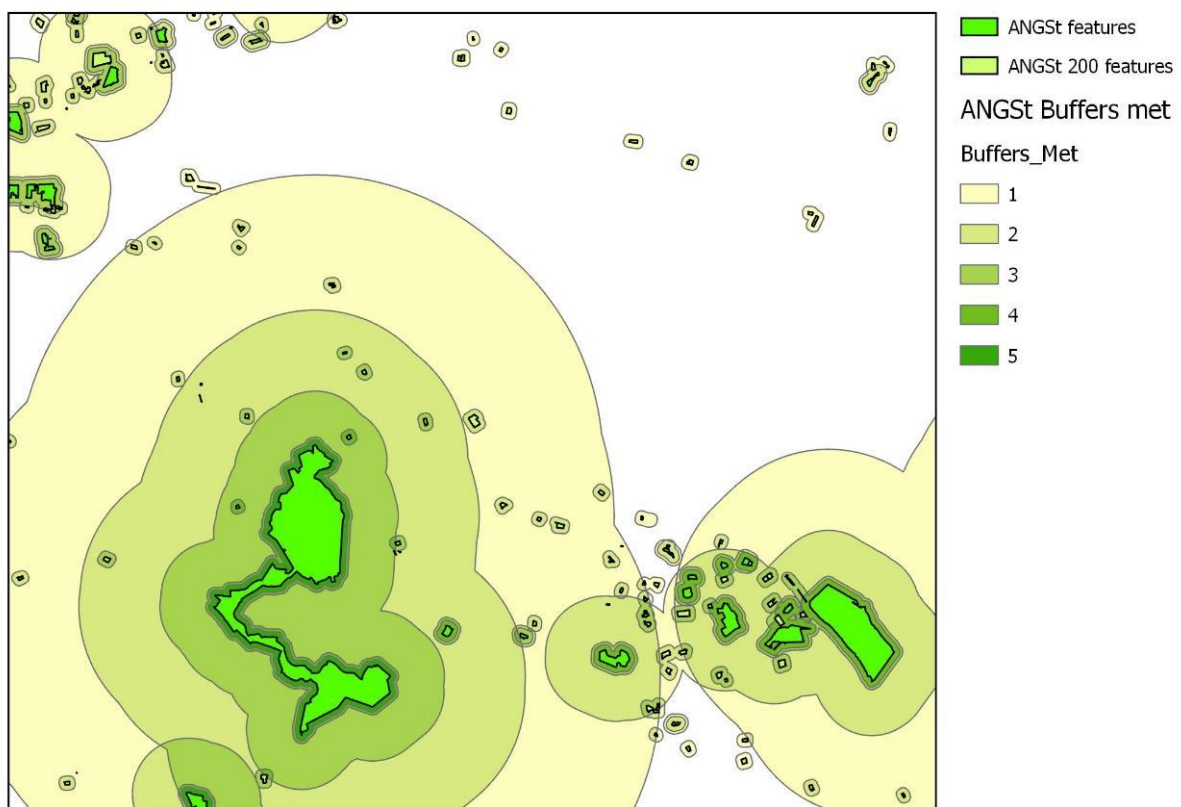
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ANGSt population calculation.

In order to estimate the population who have access to greenspace according to each ANGSt buffer, the percentage of each LSOA that was covered by the zones meeting each of the ANGSt size and distance criteria was multiplied by the population density in that output area. This analysis had to assume that the population is evenly spread within each LSOA (this will not be the case for all LSOA).

The population that has access to greenspace for each of the benchmarks was then aggregated to the larger administrative regions and expressed as a percentage of the total population in those regions.

Note on the use of "Straight Line" buffer method as oppose to "Network Analysis".

The England ANGSt assessment uses a simple "straight line" or "as the crow flies" method to generate the ANGSt buffers around Natural Green Spaces.

This has the advantage of being relatively simple and generates lower amounts of data than using more complex "Network Analysis".

However, the use of straight line buffering will likely over estimate the number of people who are within the distance element of the respective ANGSt standard because it assumes everyone can access the green space in a straight line. In reality, access will be along local networks of routes and to (usually) the nearest access point.

Full network analysis could not be carried out for the V 1.1 ANGSt assessment because of the lack of a comprehensive dataset showing access points to all included Natural Green Spaces.

However, to develop some indication of the different results that Straight line and Network approaches would deliver, a test was undertaken using the Cambridgeshire area comparing the outputs from the ANGSt Straight Line assessment with a bespoke Network Analysis approach.

Network analysis buffers were created using the ESRI ArcGIS tool 'Generate Service Areas'. The tool creates buffers to a specified distance along a linear network which is held by ESRI. The linear network appears to correlate well with OS open road and available Public Rights of Way open datasets. It was decided to use the centroid points of ANGSt polygons as input for the 'generate service areas' tool.

The diagrams below are purely illustrative and do not include the 1 km buffer as they pre-date its introduction to the mapping.
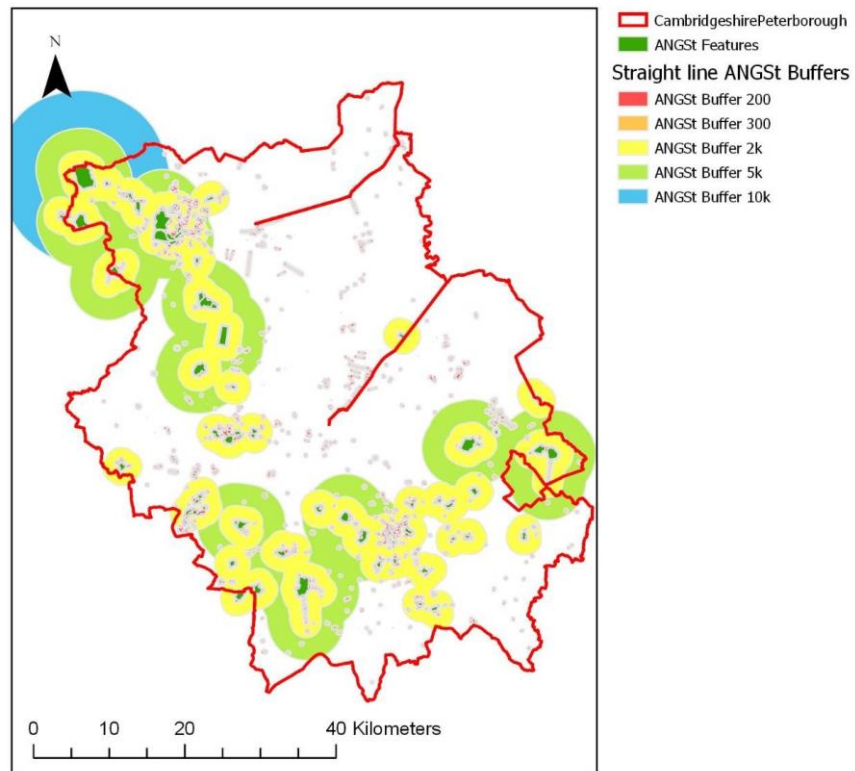
Results.

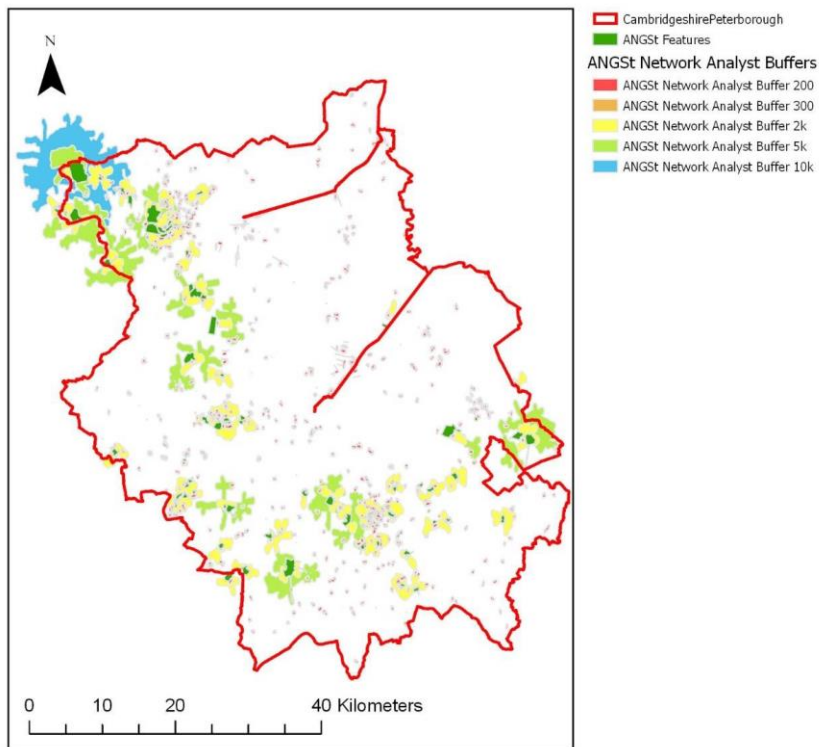ANGSt features in Cambridgeshire.
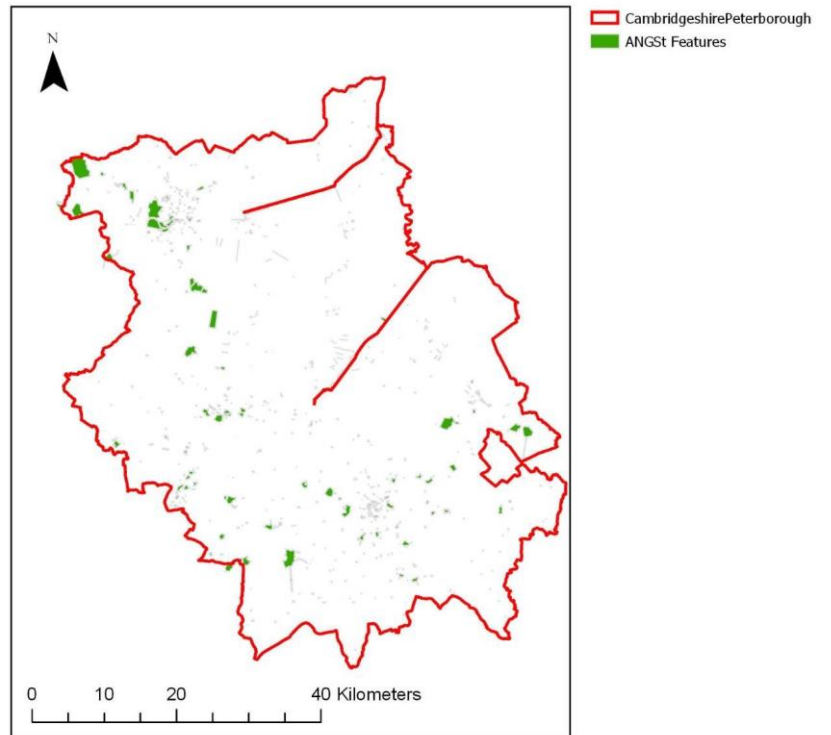
Comparison of buffer outputs.

Cambridgeshire ANGSt Straight Line Buffers.

Cambridgeshire ANGSt Network Analysis using Centroids

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Impact of different methods on analysis statistics.

ANGSt Buffer	Area (ha) within trial area		% trial area		Number of people within buffer		% population within buffer (assumes even distribution across LSOA)		% Population Net/SL
	SL	Net	SL	Net	SL	Net	SL	Net	
200m	26,398	10,291	7.8	3.0	205,481	117,209	25.5	14.6	42.1
300m	23,934	6,324	7.0	1.9	196,134	70,032	24.4	8.7	64.4
2 km	86,077	24,125	25.4	7.1	396,276	184,074	49.2	22.9	53.5
5km	103,135	27,831	30.4	8.2	363,648	98,593	45.2	12.3	72.8
10km	13,408	5,247	4.0	1.5	14,126	5,311	1.8	0.7	61.1
Average total % reduction for % population within buffer									58.78

Note – the 1km buffer was not used in this comparison as it had not at the time been agreed.

A major issue with comparing the two ANGSt buffering methods was that the 'generate service areas' tool requires point data as an input for the buffering process. The network used by ESRI showed some parts of the network were within the ANGSt polygon (especially larger ones) and therefore, when centroid points were used as input for the network analysis tool as in this analysis, the buffer areas may have been smaller as some of the distance travelled along the network was within the area of the greenspace. This raises issues with comparing the straight line and network analysis polygons as, although in only a few cases

in this trial area; some of the network analysis buffers either failed to extend outside of the greenspace boundary, or only extended a small way.

In addition, the situation for Cambridgeshire is not likely to be representative across all England. Results would likely vary considerably depending on local levels of Accessible Natural Green Space provision and the range of site sizes.

However, the analysis does suggest that the use of network analysis across England might possibly impact on the figures derived resulting in significant reductions in number of people within the buffers. The straight line ANGSt assessment figures should therefore be regarding (at least for the moment) as upper limit estimates.

Note on barriers.

For Version 1.1 it was not possible to take account of major barriers that cut across buffer zones (such as major roads, railways and rivers etc) across England. However, such barriers would clearly have impact on local buffer coverage and people affected that should be considered for inclusion when undertaking more local ANGSt assessments (whether straight line or network).

Section 5.6 – Accessible Natural Green Space Inequalities (including Nature Close2Home Assessment)

This assessment was undertaken using two approaches.

- **Accessible Natural Green Space Inequalities maps were created for LSOAs comparing levels of accessibility with other socio-economic variables.**
- **Nature Close2Home assessments were undertaken for selected age cohorts of population using a unique combined 300m buffer that incorporates all Green Spaces with Naturalness factor of 1 or 2 and above 0.5 ha in size.**

5.6.1 – Accessible Natural Green Space Inequalities Mapping.

The Accessible Natural Green Space Inequalities mapping looks at the RELATIVE disparity between LSOA when it comes to levels of access to Natural Green Space. The measure of accessibility used is "Percent of output area covered by selected ANGSt buffer". This measure of accessibility is then compared (using bivariate analysis) with another key indicator of interest.

For Version 1.1 of the GI Database two comparator variables were selected for analysis. They were;

- Index of Multiple Deprivation (by decile).
- Population Density (by square km).

The resulting maps give an overview of LSOA across England showing the differential between Green Space "Demand Factors" of IMD and Population density against a proxy supply factor of "% LSOA covered by ANGSt buffer". The assessment was undertaken for the full set of 6 ANGSt Standards.

In order to investigate the location of areas of high population density or high deprivation (IMD 1 or 2) AND with low ANGSt buffer coverage a method of bivariate colour mapping was used. This is where 2 factors are identified and mapped at the same time, with different colour gradients. The use of this bivariate colour mapping method makes it easier to appreciate the different supply and demand circumstances extant within areas and how they compare with others. Overall this gives a spatial measure of relative Accessible Natural Green Space Inequalities.

An example of bivariate colour scale is shown below;

To run the analysis, band widths were selected to allow the two variables to be co-mapped.

The selected approach to band widths is set out below.
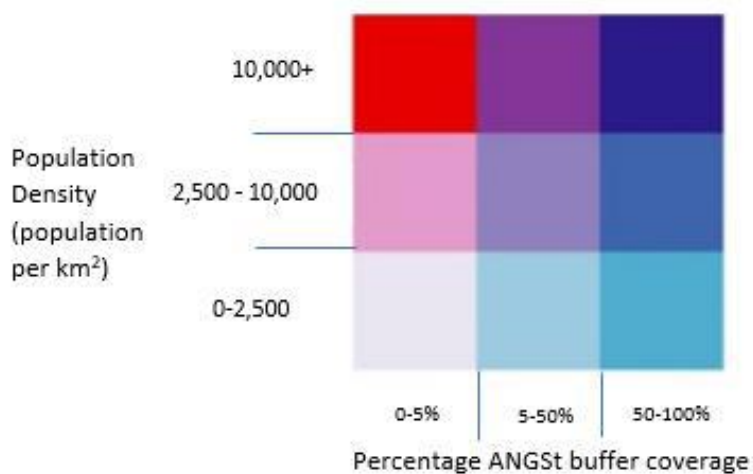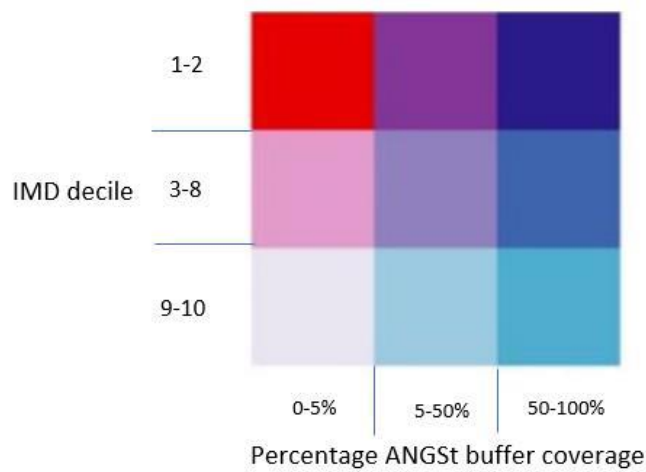
The band width of the variables are not equal. This is to simplify the outputs of the analysis and permit a focus on those places considered to be in the "least favourable scenario".

In order to aid the display and assessment of inequalities, each sector of the grid was assigned an alphanumeric code to represent it. LSOAs which fall within each category were then assigned the corresponding code for each ANGSt buffer. The grid with codes (used to identify each Access Inequalities Class) is shown below.

These alphanumeric codes can be used to easily identify LSOA by level of accessibility to Natural Green Space compared with level of deprivation / population density.

Bivariate colour grid used in Access to Natural Green Space Inequalities mapping with the alphanumeric code assigned to each sector (assessment class).

In this system, the assessment classes represent the different scenarios as defined by the mix of variables to create an "Assessment Class" ranging from L1 to H3.

L, M and H represent Low, Medium and High for "Percent ANGSt Buffer Coverage".

1, 2 and 3 represent High, Medium and Low for IMD or Population Density.

This creates a range of Access Inequalities Classes with;

- L1 = Being the Least Favourable Scenario (ie: lowest accessibility and highest level of IMD/Population Density.
- H3 = Being the Most Favourable Scenario (ie: highest accessibility and lowest level of IMD/Population density).

Please note that these are relative not absolute measures and that H3 as a scenario does not mean that the situation on the ground necessarily fulfils local green space requirements.

In addition, the assessment can take no account of the quality of green spaces.

5.6.2 – Nature Rich Spaces Close to Home (Nature Close2Home).

The Nature Close2Home assessment aims to understand the supply of publicly accessible green spaces that are likely to be moderate to high in terms of biodiversity (nature rich) qualities and thus capable of providing a "contact with nature" experience on a regular, daily and local basis.

The "Nature Close2Home" assessment focusses on the supply of green spaces with a Naturalness rank of either 1 or 2. However, this is a general approach to assessing naturalness which means some of the level 2 spaces may not be that biodiverse at current time, although many may have potential for biodiversity enhancement.

To assess the supply of nature rich spaces close to home, a new Close2Home buffer was created around all green spaces ranked 1 or 2 for Naturalness and the 300m buffer was selected to represent the "Close to home" element of the assessment.

The spaces included are thus those that are likely to be currently offering the most local opportunity to have contact with nature on a regular or routine daily basis.

The Close2Home buffer is a hybrid buffer incorporating ANGSt Doorstep and ANGSt Local Green Spaces minus Playing Fields (Naturalness 3 – Playing Fields were used in the ANGSt buffer 200 assessment).

The Close2Home buffer is shown below.
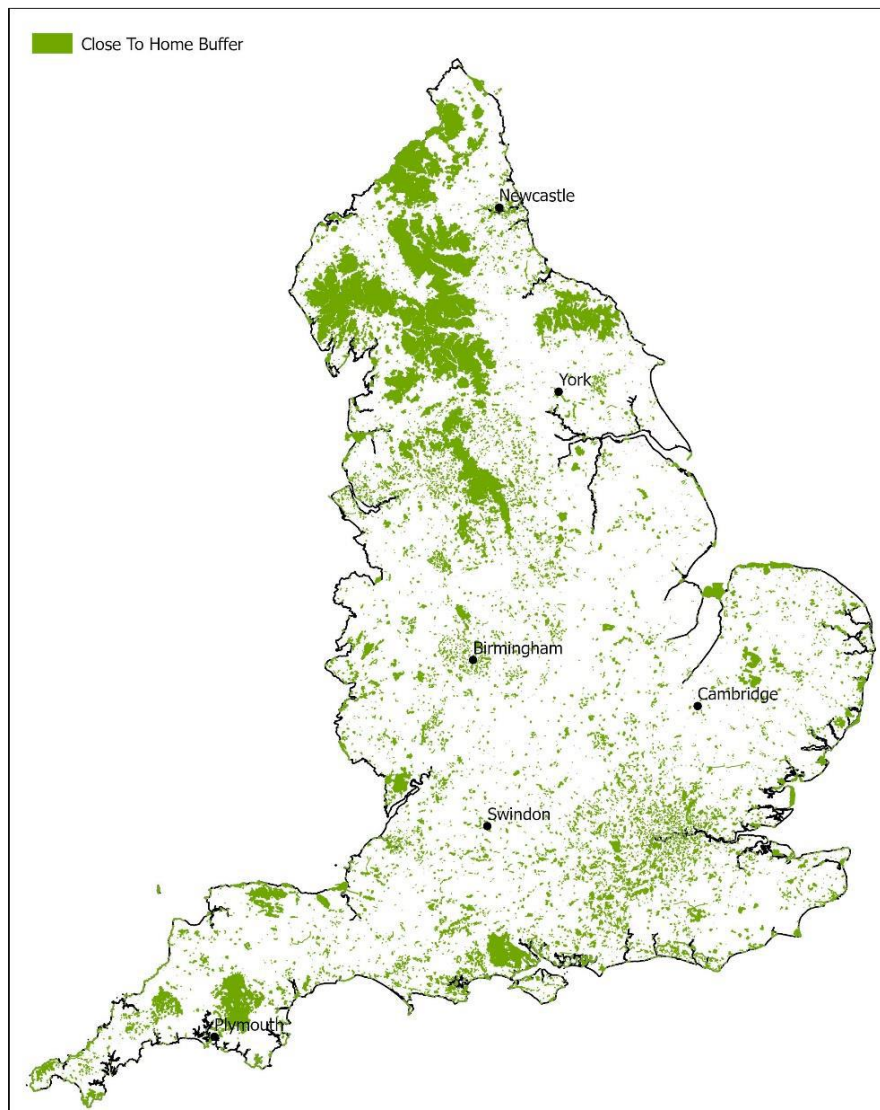
The Nature Close2Home Buffer.
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The Nature Close2Home assessment has focussed on two key groups for the purposes of Version 1.1

- Children and young people (under 16).
- Older people (65 and older).

Population data from ONS (2011 census) was gathered which provides a breakdown of population for all different age cohorts (0-5, 5-10, 10-15, 65-75 and 75+). Relevant cohort populations were summed together to define new "children" and "older people" population groups.

The new Close2Home buffer was intersected with LSOA to calculate the percentage area of LSOA within at least 300 m of a Close2Home natural greenspace. This percentage area was then used to calculate the percentage of total population and percentage of Children (ages 15 and under) and Older people (Age 65 plus) which were within this Close2Home buffer.

This calculation assumes population is evenly distributed across LSOA which is probably true for some, but not for all. This assumption introduces a level of distortion into the statistics and maps.

The age cohort data was then be used to create maps of Greenspace provision for different age cohorts showing area in hectares of accessible greenspace per head of population for Children and Older people at County, District, MSOA and LSOA level. Maps were colour coded after sorting into 10 equal sized bands (deciles) based on area of greenspace per head for each cohort.

Section 5.7 – Blue Infrastructure Network Mapping

In Version 1.1 of the England Green Infrastructure Mapping Database, the term "Blue Infrastructure" is used as a general description for those elements of the wider Green Infrastructure that are water dominated. The Blue Infrastructure Network brings together data to identify and highlight the water courses, water bodies and tidal water elements of the overall Green Infrastructure.

Note on Coastal - For version 1.1 of the database it was not possible to complete work designed to provide a coastal module which is thus not covered in Version 1.1

The Combined Green and Blue Infrastructure layer (1.1) includes some Blue Infrastructure data on inland water courses and bodies. To create a more detailed Blue Infrastructure Network (Open) map, a range of data options were reviewed.

It was decided that the **Ordnance Survey (OS) OpenMap Local Surface Water Area** dataset (already utilised in layer 1.1) was the most suitable dataset for mapping inland water in terms of balancing spatial resolution and data accessibility.

The spatial resolution of this dataset is not too dissimilar from OS MasterMap Topographic Area - Surface Water (the most detailed dataset that exists), yet it is openly accessible. It includes rivers, canals, lakes and reservoirs. However, this polygon dataset omits smaller streams and therefore it was decided to also include the equivalent polyline dataset (**OS OpenMap Local Surface Water Line**). Furthermore, tidal sections of rivers are not included in the two aforementioned datasets, therefore the equivalent tidal water dataset was also included (**OS OpenMap Local Tidal Water**).

The resulting map (a extract of which is shown below) represents a comprehensive collation of Blue Infrastructure data but will nonetheless not show the smallest of water boies/courses.
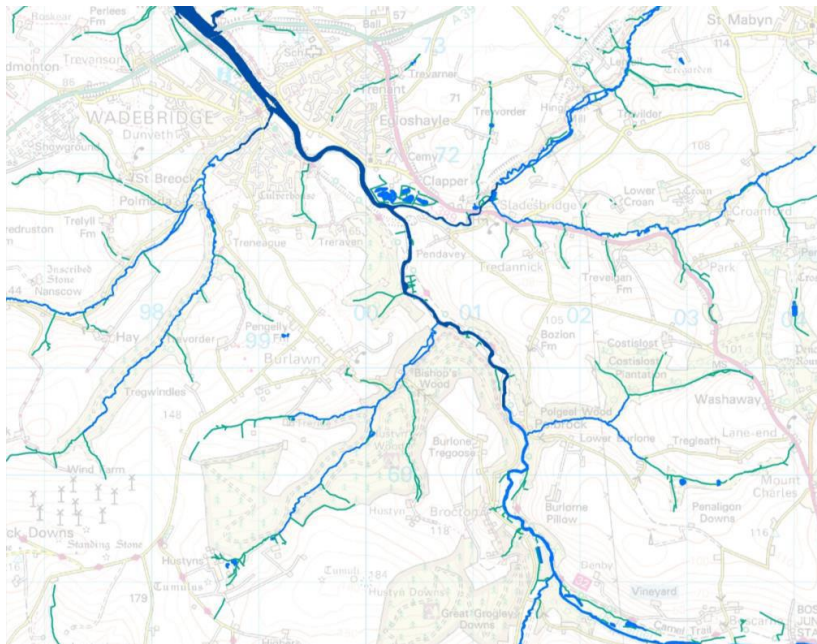
Map showing example of Blue Infrastructure Network Map (Combined OS OpenMap Local Surface Water Area, Surface Water Lines and Tidal Waters).

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Section 5.8 – Access to Waterside Assessment

The Access to Waterside Assessment aims to map the level of (probable) public access to the side of water courses and bodies across England.

The assessment focussed on access on foot to inland water bodies.

The results are displayed at different administrative scales (Upper and Lower Tier Local Authority, MSOA and LSOA) to be able to sit alongside the access to Green Space assessments.

The access to waterside assessment only maps the likelihood that the edges of water bodies and course are accessible. The accessibility is created purely by proximity of water edge to publicly accessible green infrastructure and/or a Public Right of Way.

The access to waterside maps DO NOT consider any access to the actual water body itself and the existence of accessible waterside DOES NOT create or imply any such rights of access to the water for any purpose.

No attempt has been made to create standards relating to access to waterside.

The approach uses the Public Rights of Way (PRoW) dataset that was compiled using data made openly accessible by Local Authorities across England. However, there are some gaps. PRoW data was unavailable for 54 local authorities. The lack of data for these areas is highlighted on the resulting maps.

Access to waterside was assessed using proximity buffers which may contain local barriers not picked up in the assessment. Not all of the waterside mapped as accessible may therefore be actually accessible on site.

Other potential access infrastructure includes footpaths that are not designated as PRoW and small/quiet roads that are suitable for walking. However, these are not included in this assessment. These types of access infrastructure can vary greatly in their level of suitability (for walking). For example, a small lane in one location may be an acceptable walking route, however a small lane in another location may be unsuitable for walking, for instance if it experiences fast-moving traffic or poor visibility (blind corners). Footpaths that are not designated as PRoW may also be locally used viable access routes. Unfortunately, these are not mapped for most of the country and the conditions of access (assuming it is by some form of permissive agreement) are also unknown.

Waterside access created by permissive agreement or arrangements are thus not included in this assessment.

Assessment Approach.

Source data.

The Blue Infrastructure Network Layer was used as the source data for the access to Waterside Analysis.

However, when using these data to analyse access, there are a number of other factors to take into consideration. For example, the smaller rivers are mapped as lines with unknown widths, meaning the water's edge cannot be accurately delineated. This causes complications when considering how close a person can get to the water's edge.

The access to waterside assessment does not include any factors describing the physical condition or aesthetic qualities of the watercourse. The assessment provides no indication of how attractive for access it may be which will affect demand to use any existing access.

The assessment also presumes that the surface water bodies are visible; underground rivers and culverts are not included in the dataset.

Access Criteria.

The analysis considered access to waterside on foot.

Access to waterside was deemed to be created by the proximity of the edge of a water body/course and within 10 metres of a Public Right of Way (layer 3.1) and/or adjacent to or within 1 metre of an area of Accessible Green Infrastructure (Layer 1.2).

Mapping access by proximity to PRoW was affected by a lack of data for 54 Local Authorities which create gaps on the maps.

The accessible green infrastructure typologies include;

- Cemeteries.
- Play spaces / playing fields
- Public parks and gardens.
- Religious grounds.
- LNR
- Open Access Land
- Millennium and Doorstep Greens.
- Country Parks

Footpaths that are not designated as PRoW potentially provide access to waterside. However, many of these are not consistently mapped for most of the country and they are not included in this assessment.

Spatial analysis.

The Access to waterside assessment looked at the likelihood of PRoW and accessible Green Infrastructure providing direct access to waterside only. No attempt has been made to map any form of access to the water bodies themselves.

For PRoW, access to waterside was deemed probable if the route of the PRoW (as depicted on layer 3.1) was within a 10m buffer created around the edges of all water bodies and courses in the Blue Infrastructure Network Layer (layer 4.1).

A 10m buffer was used because a distance allowance had to be made for 1) a gap between the water and the path, 2) the width of the path, 3) the width of the river bank zone (e.g. mudbanks, vegetation), 4) potential low spatial resolution of the PRoW datasets. Less than 10m was thought to exclude a large number of genuine waterside paths, while more than 10m has greater potential to include paths that have no access to the waterside itself (e.g. there could be buildings between the path and water body).

For Accessible Green Infrastructure, access to waterside was deemed probable if the edge of the water body and the edge of the accessible green infrastructure were within 1 m of each other (ie; effectively contiguous).

For accessible green space, we considered any edge of a water body located within such a space to be accessible. A 1m buffer on the accessible natural space in order to capture the

edge of water bodies (e.g. rivers) that border the natural space; where differences in spatial resolution may cause them to slightly misalign.

Tidal waters modification.

Some rivers are tidal for a long distance inland (e.g. the River Severn), therefore much of this tidal stretch of river should be included in the inland access to waterside analysis (using a 10m buffer). The tidal water dataset (OS OpenMap Local Tidal Water) includes these sections of river but also includes coastal waters (water on the seaward side of the mouth of the river and along the coastline). These seaward polygons were removed from the 'inland water' analysis, in order to focus on inland waters. To do this, the tidal waters dataset was clipped by the GB boundary (OS BoundaryLine – GB region) with a 250m landward buffer to remove coastal waters. The landward buffer was used to exclude numerous tidal water polygons/slivers along the coast. This generally worked well, splitting the tidal rivers at the river mouth (retaining tidal rivers but excluding coastal waters), but it does retain some additional coastal polygons. This is a limitation of the method. If a PRoW comes within 10m of one of these coastal polygons, they will be included in the 'inland surface water' statistics for each administrative scale.
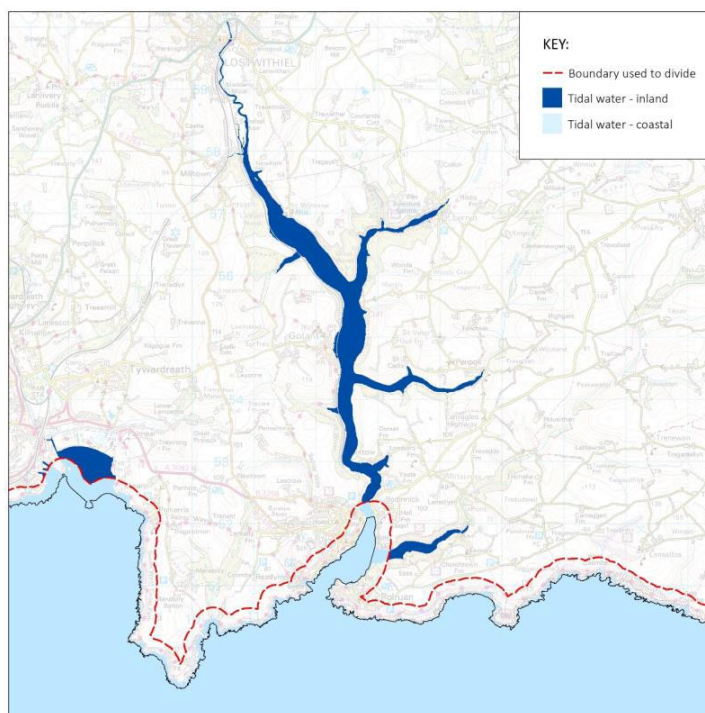
Map showing example of tidal waters 'inland' and 'offshore', with cut-off boundary highlighted.

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Note on statistics.

The main statistics calculated from the assessment are related to the length of **accessible waterside** (not area or length of the water body itself). Water bodies that were mapped as polygons were converted to lines (i.e. lines delineating their perimeter) in order to measure the length of the waters' edge. The advantages of this method include; the ability to include both sides of a river if a PRoW is present on both sides; a clearer statistic for water bodies (e.g. lakes) that are only partially within an accessible area; a more accurate measurement of water's edge (as opposed to river centrelines); a singular statistic type (length) as opposed to a mixture of area and lengths for the different water body types and dataset shapes. However, this method has limitations. For example, when a PRoW is within close proximity of a narrow river/stream, both sides of the river fall within the 10m buffer zone skewing any "length of waterside" analyses. It was decided that both sides of the river should be counted when a PRoW is present on both sides; however the aforementioned scenario should only count one side but may count both due to proximity of each side.

When a PROW crosses a river, a 10m stretch of waterside is selected (5m upstream and 5m downstream) for both sides of the river. Furthermore, the smaller streams that were mapped as lines from the start (centreline of stream as opposed to a polygon) produce statistics describing the length of the river only, not the length of individual banks.

These sources of error may distort local statistics.

# Section 5.9 – Public Rights of Way Density

A 1 km grid covering whole of England, in alignment with the 250 m grid used in the Greenness Gird (Layer 1.4) of the GI database, was created. Public Rights of Way (PRoW) data from layer 3.1 was used to assess the density of PRoW within each 1 km grid square (in m of PRoW per km2) by measuring the length of each PRoW type per 1 km grid square.

Calculations were made for all PRoW and each PRoW type (footpath, bridleway, byways etc.) as well as total length.

A 'Data_Available' field was added to the 1 km grid dataset and, where no PRoW data was available within a grid square; the grid square was assigned 'no' in this field and each length field was left as 'null'. This was done in order to distinguish those grid squares where data is available but there is 0m of PRoW within that grid square from those without available data.

Data availability was determined by selecting grid squares whose entire area was within with Local Authority boundaries for which no PRoW data has been obtained (there may thus be some edge effects where part of the square has data and part does not).

An illustrative map showing the 1 km grid created for the linear access density assessment and colour coded by density of linear access routes is shown in below. There are a total of 134,486 1km grid squares. There are 4,055 grid squares where no PRoW data was available (3%). A histogram showing total length (in metres) of all PRoW types per 1 km grid square is shown.
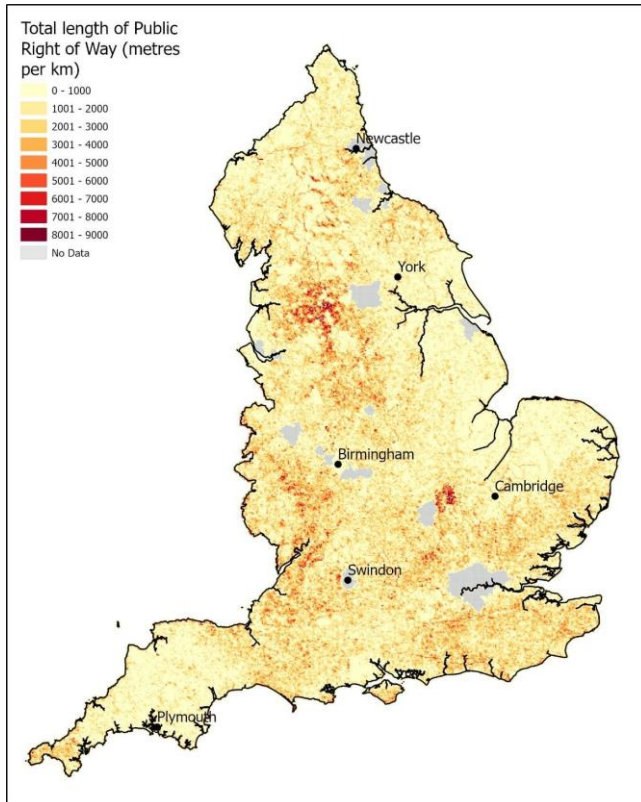
Map showing England 1 km grid and PRoW density in metres of PRoW per km2.

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List of Abbreviations

ANGSt – Accessible Natural Green Space Standards

AONB – Area of Outstanding Natural Beauty

BI – Blue Infrastructure

CRoW – Countryside and Rights of Way Act 2000

DG – Doorstep Green

DLUHC – Department for Levelling Up, Homes and Communities

GI – Green Infrastructure

IMD – Index of Multiple Deprivation

IoD – Indices of Deprivation

LNR- Local Nature Reserve

LSOA – Lower Super Output Area

MG – Millennium Green

MHCLG – Ministry of Housing, Communities and Local Government

MSOA – Middle Super Output Area

NNR – National Nature Reserve

OGL – Open Government License

ONS – Office for National Statistics

OS – Ordnance Survey

PLDR – Place based Longitudinal Data Resource

PRoW – Public Rights of Way

RAMSAR – site listed under the RAMSAR Convention

SAC – Special Area of Conservation

SAMHI – Small Area Mental Health Indicator

SPA – Special Protection Area

SSSI – Site of Special Scientific Interest

Glossary

Green infrastructure - A network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity. (National Planning Policy Framework 2021)

It includes both green and blue infrastructure such as:
- o Parks and Gardens – urban parks, country and regional parks, formal gardens
- o Amenity Green Space – informal recreation spaces, housing green spaces, domestic gardens, village greens, urban commons, other incidental space
- o Natural and semi-natural urban green spaces - woodland and scrub, grassland, heath or moor, wetlands, open and running water, wastelands and disturbed ground.
- o Green corridors – rivers and canals including their banks, road and rail corridors, green bridges, field margins, cycling routes, pedestrian paths, and rights of way.
- o Vegetated sustainable drainage systems, SuDS, (please see definition of SUDs later in the Key Terms). Includes: green roofs, blue roofs, rainwater harvesting and smart controls, downpipe disconnection planters, rain gardens and biofiltration strips, swales, ponds, detention basins
- o Features for species such as bird and bat boxes, swift bricks and hedgehog holes.
- o Other **–** street trees, allotments, community gardens and orchards, private gardens, city farms, green walls, cemeteries and churchyards.

Green Space

- **Accessible Green Space** – places that are available for the general public to use free of charge and without time restrictions (although some sites may be closed to the public overnight and there may be fees for parking a vehicle). The places are available to all, meaning that every reasonable effort is made to comply with the requirements of the Equality Act 2020.   The GI Mapping Database User Guide sets out how Accessible Green Space has been interpreted in developing the GI Mapping.

- **Accessible Natural Green Space** – green spaces meeting the definitions of accessible green space and natural green space. The GI Mapping Database User Guide sets out how Accessible Natural Green Space has been interpreted in developing the GI Mapping.

- **Natural Green Space** – Places where human control and activities are not intensive so that a feeling of naturalness is allowed to predominate. Natural and semi-natural green space exists as a distinct typology but also as discrete areas within the majority of other green space typologies. The GI Mapping User Guide sets out how natural green space has been interpreted in the GI Mapping.

Green Space Quality –meeting the needs and expectations of both the staff and users of a site and the wider community and neighbourhood. Such sites are visually stimulating and attractive, safe and welcoming to all sections of society, managed and maintained to the highest standards of sustainability, and provide an enjoyable and inspirational visitor experience. The Green Flag Award is the nationally accepted standard for parks and green spaces, supported by Natural England.

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