Greening The City

How the Urban Forest Masterplan is addressing tree inequalities in the city.

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THE QUEEN'S GREEN CANOPY

THE PLATINUM JUBILEE 2022

Champion City

Birmingham City Council


BULLRING
Premier Inn
DEBENHAMS
Premier Inn

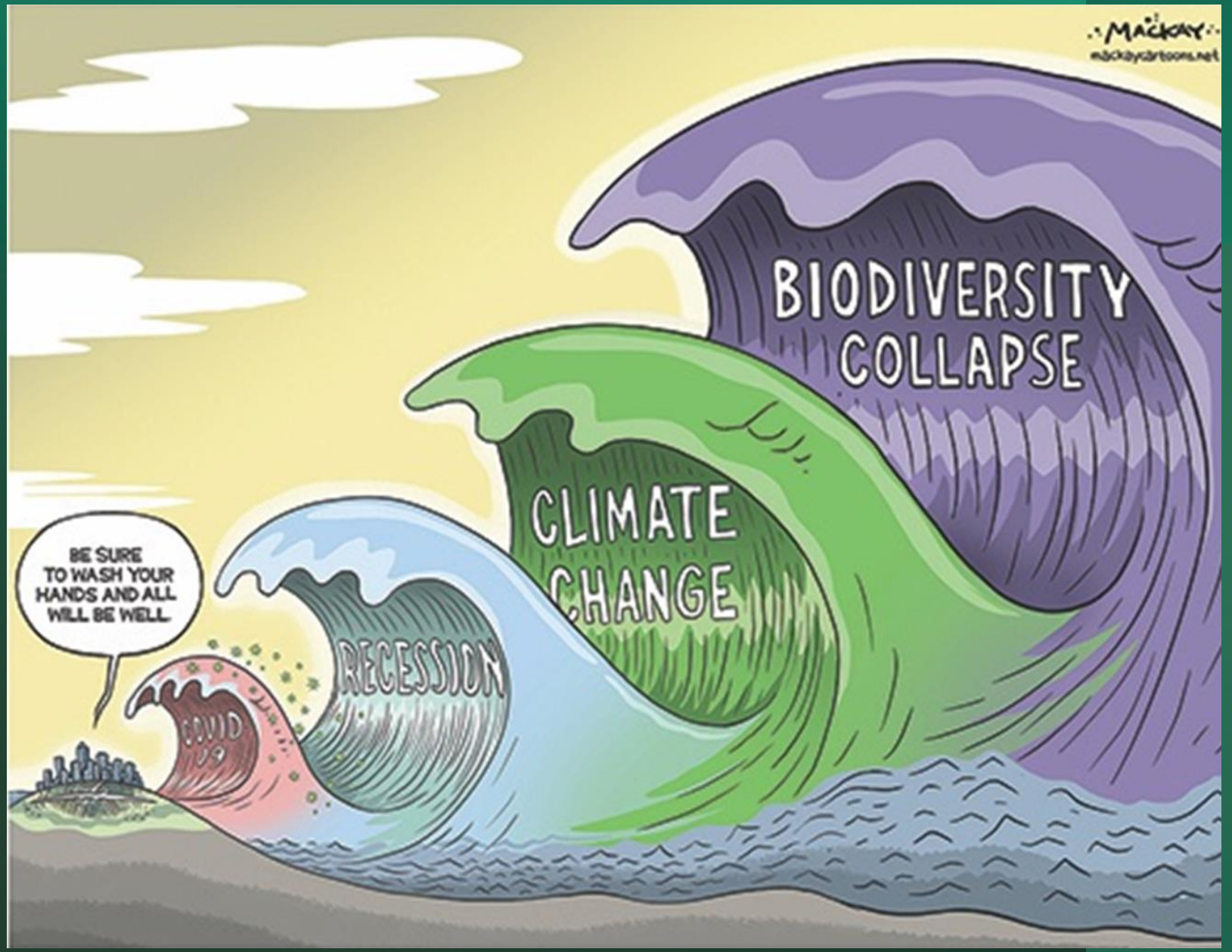
The Challenges

- Population at 1.1million and rising
- One of the youngest populations in Europe
- Significant number of wards in top 10 percentile IMD
- High levels YLL in certain quarters
- Air Pollution
- UHI
- Pluvial and Fluvial flooding
- Demand for housing.

COVID19 pandemic has brought to the fore the inequality of accessible green space
BAME more impacted by pandemic

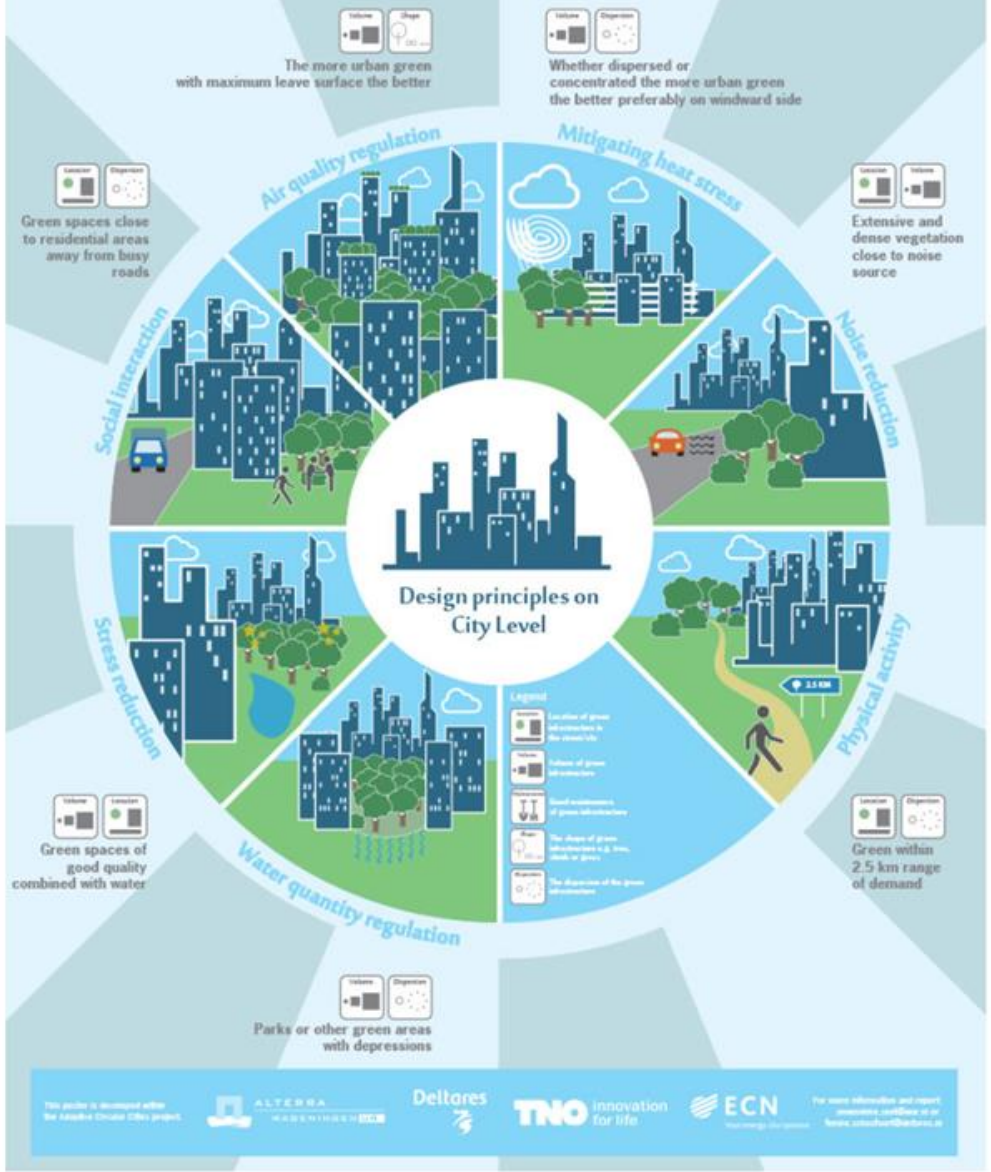
Higher levels of BAME in areas of low GI, poorer air quality and high UHI.

Liaison with other Departments such as Public Health are critical to understanding impacts and benefits.


MACKAY
mackaycartoons.net
BIODIVERSITY COLLAPSE
CLIMATE CHANGE
RECESSION
COVID 19
BE SURE TO WASH YOUR HANDS AND ALL WILL BE WELL

Adaptive Circular Cities

Design principles for health-supporting green infrastructure



Adaptive Circular Cities

Design principles for health-supporting green infrastructure

An Urban Forest Master Plan for Birmingham 2021-2051

Executive Report

Birmingham City Council

NATURE BASED SOLUTIONS INSTITUTE

Treeconomics

Adaptive Management

CRITERIA & INDICATORS

03 At A Glance - Sustainable Resource Management Approach

Key Performance Indicator	Performance Level				Priority
	Low	Moderate	Good	Optimal	
R1 – Tree and woodlands inventory					High
R2 – Tree valuation and asset management approach					Medium
R3 – Canopy cover assessment and goals					High
R4 – Environmental justice					High
R5 – Reviewing and improving the urban forest Master Plan					Medium
R6a– Urban forestry funding					High
R6b– Arboricultural funding					High
R7 – Urban forestry program capacity and staffing					High
R8 – Tree establishment planning and implementation					High
R9– Growing site suitability					High
R10 – Tree protection policy development and enforcement					High
R11 – Maintenance of publicly owned, “intensively” managed trees					Medium
R12 – Management of publicly owned natural “extensively” managed areas					Low
R13 – Tree risk management					Medium
R14 – Biosecurity					High
R15 – Urban wood and green waste utilisation					Low
R16 – Native vegetation					Low
R17 – Research and Development					Medium
R18 – Open Urban Forest data and Web-map					High

R4 Environmental Justice, Cultural Values and Equity

Birmingham is the UK's most diverse city, with around 50% of the population being of ethnic minority backgrounds. The urban forest should reflect the diversity of people and cultures at a neighbourhood level, and planting and management should respect the views and values of the many different communities it serves. Birmingham's Community Cohesion Strategy aims to progress equality in all spheres of social and economic life and empower and engage neighbourhoods.

Urban forests are connected to a range of socio-economic factors, with studies linking canopy cover to health, wealth, education, and crime. Typically, lower income areas have fewer trees, and this inequality should be addressed across Birmingham. Lack of tree canopy cover can also be linked to the level of urban intensification and lack of physical space to plant trees (low cost housing with small gardens are not always suitable for trees). Therefore utilising other aspects of the urban forest such as green walls/roofs may be a part of the solution. The benefits of trees should be made available to all people in all areas of the city. Tree planting should not always go hand in hand with new development and land repurposing, as this can lead to those with lower income becoming priced out of areas as they develop. The city must recognise that trees and green space should be a right for all people, and environmental exclusion must be avoided.

This target aims to ensure that the planting and management of the urban forest can be focussed in the areas where it will most benefit the local people, by increasing planting in the areas with the lowest canopy cover. Tree management plans in these areas should include community engagement and neighbourhood outreach to maximise the benefits of trees in the area. The multi-faceted meanings of trees to different people should be recognised.

Actions

1. *Develop and monitor specific tools for assessing fair access to all;*
2. *Produce a 'Tree Equity map';*
3. *Ensure that new tree planting is linked to local need and involves local communities.*

Priority	Responsibility for Action	For Review:
High	1-3. The Tree Board	April 2022 - Medium to long term project

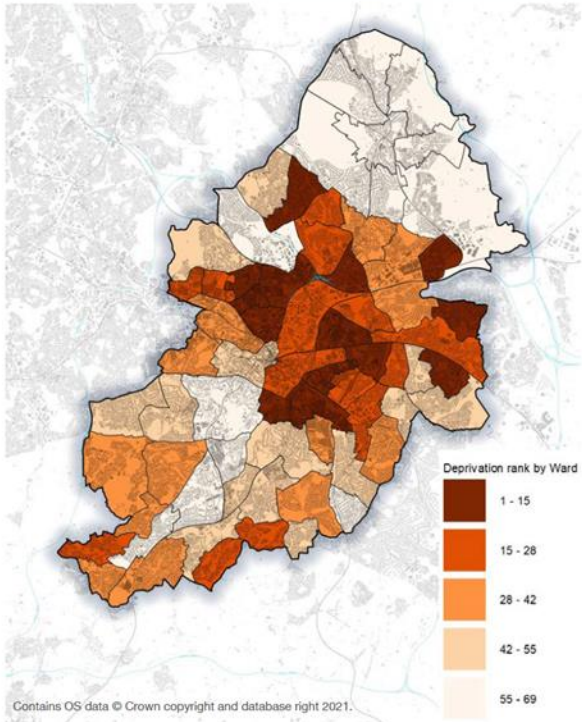


Figure 16: Indices of Multiple Deprivation Ranking by Ward (1=most deprived)

Sources and references:

BCNUEJ, 2021: Policy and Planning Tools for Urban Green Justice-Fighting displacement and gentrification and improving accessibility and inclusiveness to green amenities.

Nesbitt, L., Meitner, M.J., Sheppard, S.R. and Girling, C., 2018. The dimensions of urban green equity: A framework for analysis. Urban forestry & urban greening, 34, pp.240-248.

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	Tree planting and outreach is not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighbourhoods or areas.	Planting and outreach targets neighbourhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighbourhood level is guided by strong citizen engagement in those low-canopy/ high-need areas.

R3 Canopy Cover Assessment and Goals

Assessing canopy cover is vital, as this metric is used frequently as a figure which is clear and easy to compare with other areas. Whilst canopy cover is not a thorough study of the health and diversity and therefore overall benefit of the urban forest, it is an important aspect which should not be overlooked simply for its simplicity.

This target involves assessing the existing canopy cover in detail, and setting goals based on reasonable potential canopy cover and achievable steps to maximising cover. This leads into T1-'Relative Tree Canopy Cover'- and would provide the necessary baseline for achieving that target. It is important that any tree canopy target is achievable within a reasonable time frame, and considered within the wider context of the Master Plan.

Birmingham has set a target of Carbon net neutrality by 2030, and this increase in canopy cover would contribute immensely. It should also be noted that tree planting does not necessarily provide an instant increase to canopy cover; in an urban setting trees are constantly being felled for any number of reasons, so insufficient planting can contribute to making up the deficit without actually increasing canopy cover.

City	London	Bristol	Plymouth	Cambridge	Torbay
Existing Canopy Cover	21% (2015)	18% (2018)	18.5% (2017)	17% (2008)	12% (2011)
2050 Target	30%	30%	20%	19%	20%

Table 2: Comparable Cities' Canopy Cover Estimates and Goals

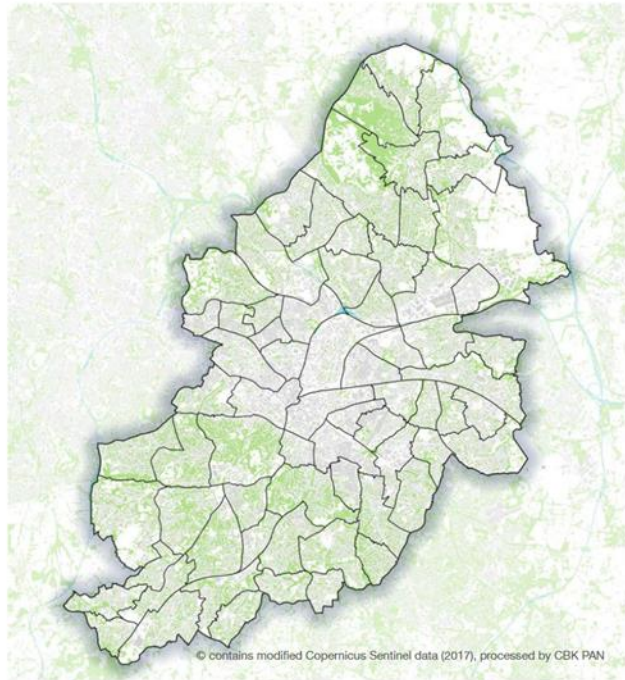


Figure 15: Tree Canopy Cover across Birmingham from National Tree Map (NTM) Satellite Data

Actions

1. *Once a basic assessment has been done, then T1 canopy targets can be established and further analysis undertaken.*

Priority	Responsibility for Action	For Review:
High	1. BCC	April 2022 - Medium to Long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery – and limited or no goal-setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.	As described for "Good" rating – and all utilised effectively to drive urban forest policy and practice municipality-wide and at neighbourhood or smaller management level.

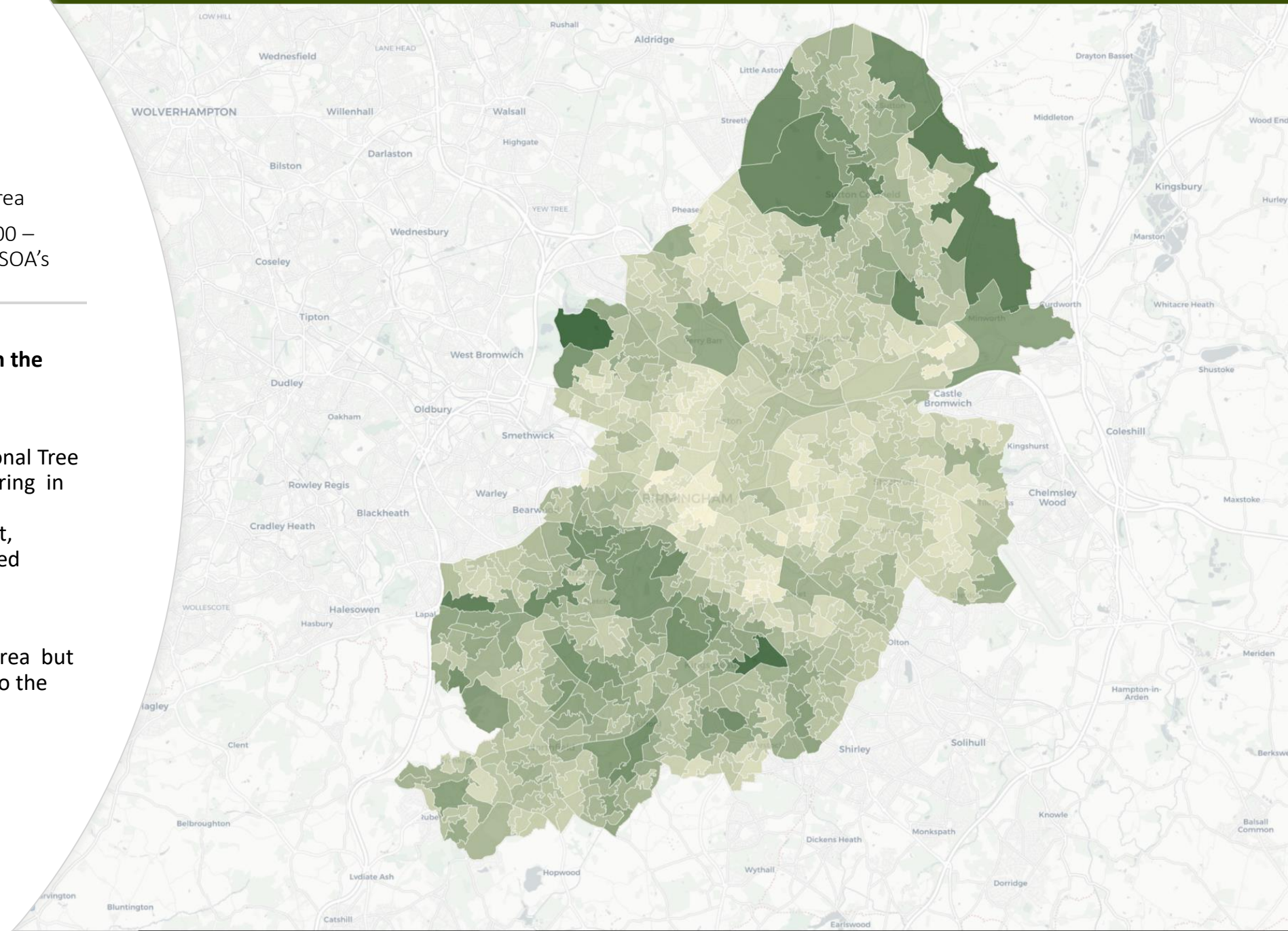
Canopy Cover by Lower Super Output Area

Smallest unit for ONS stats – approx. 1000 – 1500 residents/ 650 households – 639 LSOA's

- **Establishing Canopy Cover levels in the City**

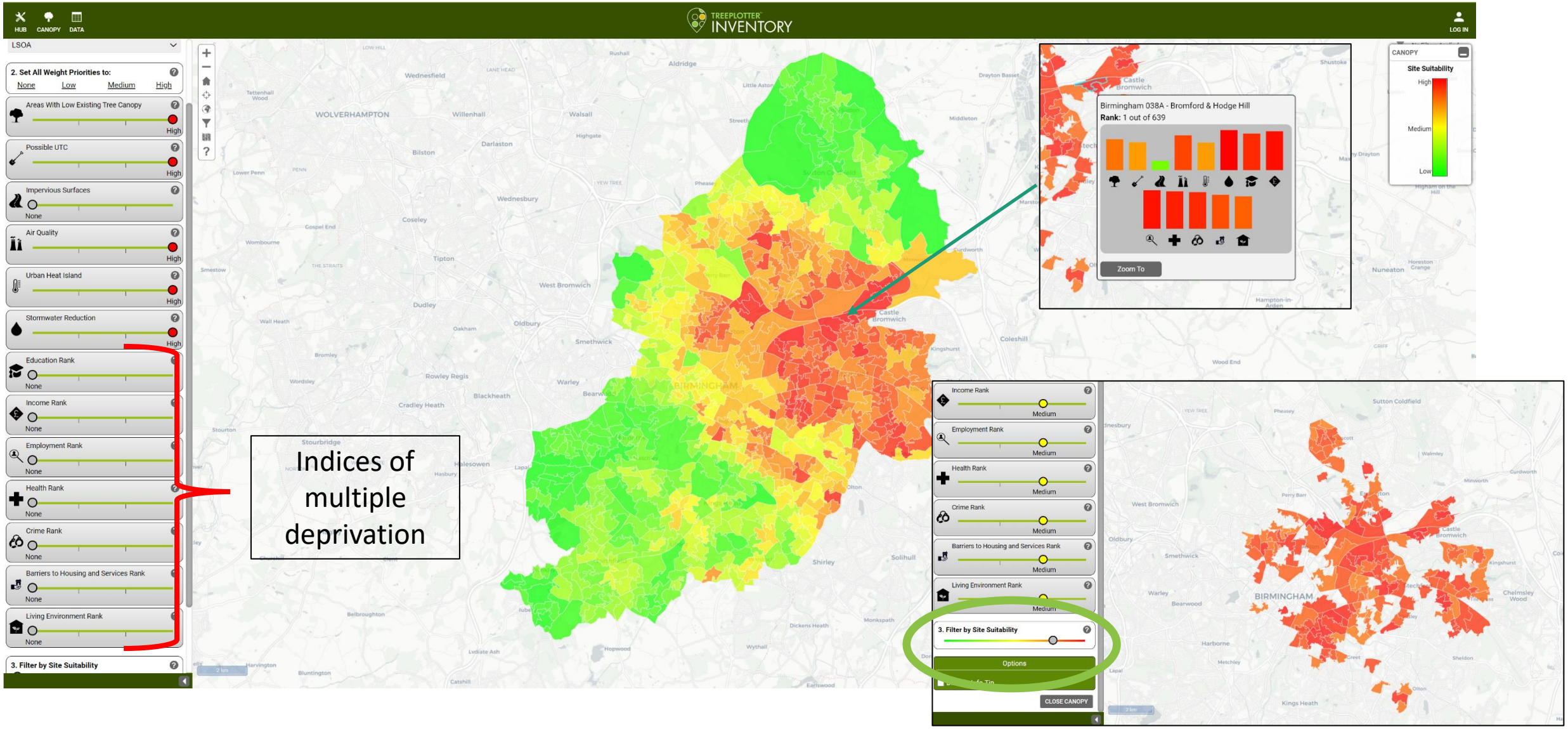
- Canopy cover derived from UK National Tree Map (Blue Sky) and land area but factoring in area of exclusion such as water bodies, dedicated sporting areas (stadia, cricket, football, bowls etc.) and some designated nature conservation sites such as SSSI's.

- Overall, approx. 18.6% CC by total area but with excluded areas that increases in to the low 20% range.
Distribution uneven across the city.



Climate Vulnerability Risk and using trees for Climate Adaptation
Prioritising areas for action

Map changes dynamically based on selected priorities and weighting given to each.



VIEW | PLAN | GROW

The **Grow** tool is designed to help evaluate potential urban tree canopy goals and the number of trees to reach the goal. With just three inputs - canopy %, mortality rate, and average tree size at maturity - the tool outputs how many trees are needed, what the impact is on canopy cover regionally, and the impact on urban forest ecosystem services. **Grow** can be used incrementally, e.g. add 10% canopy to one or more areas using a medium size stature tree, and then add 5% canopy to other areas using a large stature average tree size, and then evaluate the results.

Grow is meant to be a simple tool to assist communities in developing tree planting and canopy goals. To keep it simple, factors such as natural regeneration and the impacts from land development have not been taken into account.

RESET GROW | RESET ALL

ASSUMPTIONS

Select a Geography

LSOA

- (•) Target Canopy %
- ( ) Increase Canopy By %

Target Canopy %

30%

10% 20 30 40 50 60

Average Tree Crown Diameter

5 m 8 10 13 15

Mortality Rate

0%

0% 4 8 12 16 20

CLEAR SCENARIO | APPLY TO ALL VISIBLE

HUB | CANOPY | DATA

TREEPLOTTER INVENTORY

MODELED ECOSYSTEM BENEFITS

OVERALL | AIR QUALITY | CARBON

Current

Carbon Monetary Benefit
£1,539,319

Carbon Sequestered (kg)
21,288,232

Modeled

Carbon Monetary Benefit
£1,628,817

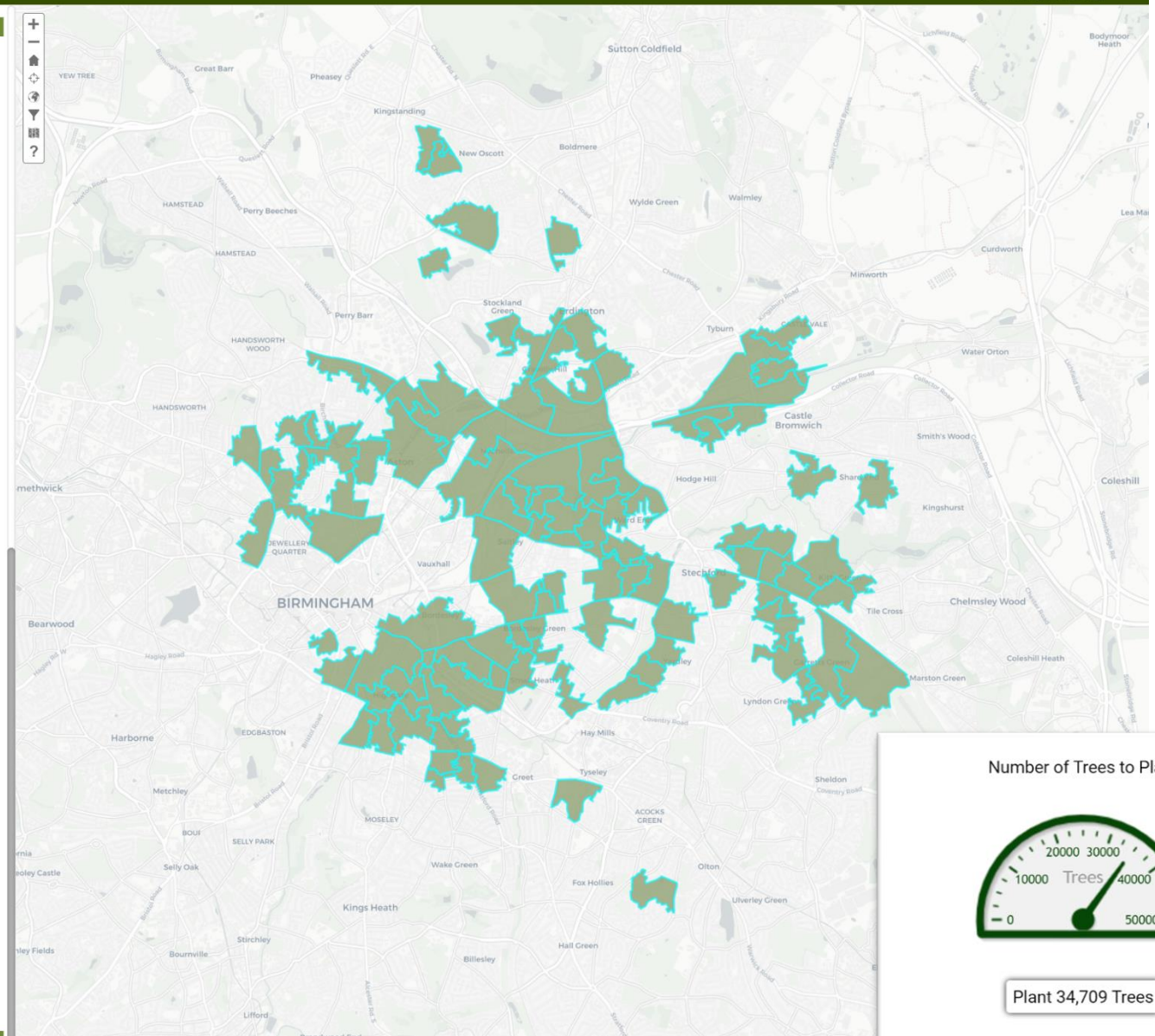
Carbon Sequestered (kg)
22,525,962

Net

Carbon Monetary Benefit
£89,498

Carbon Sequestered (kg)
1,237,730

STORMWATER



Number of Trees to Plant

Plant 34,709 Trees

Creation of new woodland blocks within the landscape needs to consider how these may relate to and complement other ecological features such as priority habitats such as grassland, wetland and rivers as well as balancing the recreational and sporting needs of citizens.

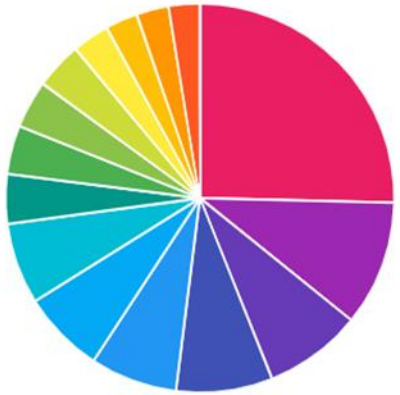
Prioritising amenity mown sites to create a more intimate matrix and where possible enhancing existing tree'd areas.

Individual urban trees are an integral and crucial part of the mix.

For a highly urban city such as Birmingham with huge competition for land (housing, recreation, non-tree habitats etc.) a few trees in thousands of locations has to be a focus rather than thousands of trees in one location. This bolsters and adds resilience to the urban forest as a whole and brings nature and ecosystem services to citizens doorsteps.

Trees in these locations are more likely to be non-native but can, through careful selection still provide significant wildlife benefits.

PIE BAR TABULAR



Common lime	25.4%
Norway maple	10.4%
Basswood sp.	8.1%
Sycamore	8.0%
Plum sp.	7.2%
London planetre...	6.9%
Common ash	6.7%
Horse chestnut	4.1%
Pedunculate oak	4.0%
Whitebeam	4.0%
Rowan	3.9%
Silver birch	3.1%
Callery pear 'C...	2.7%
Hornbeam	2.7%
Small-leaved li...	2.6%

Most Common Genus - Top 15

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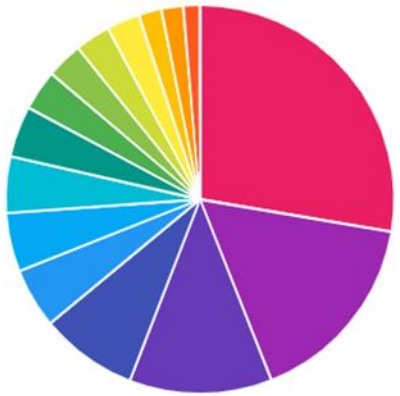
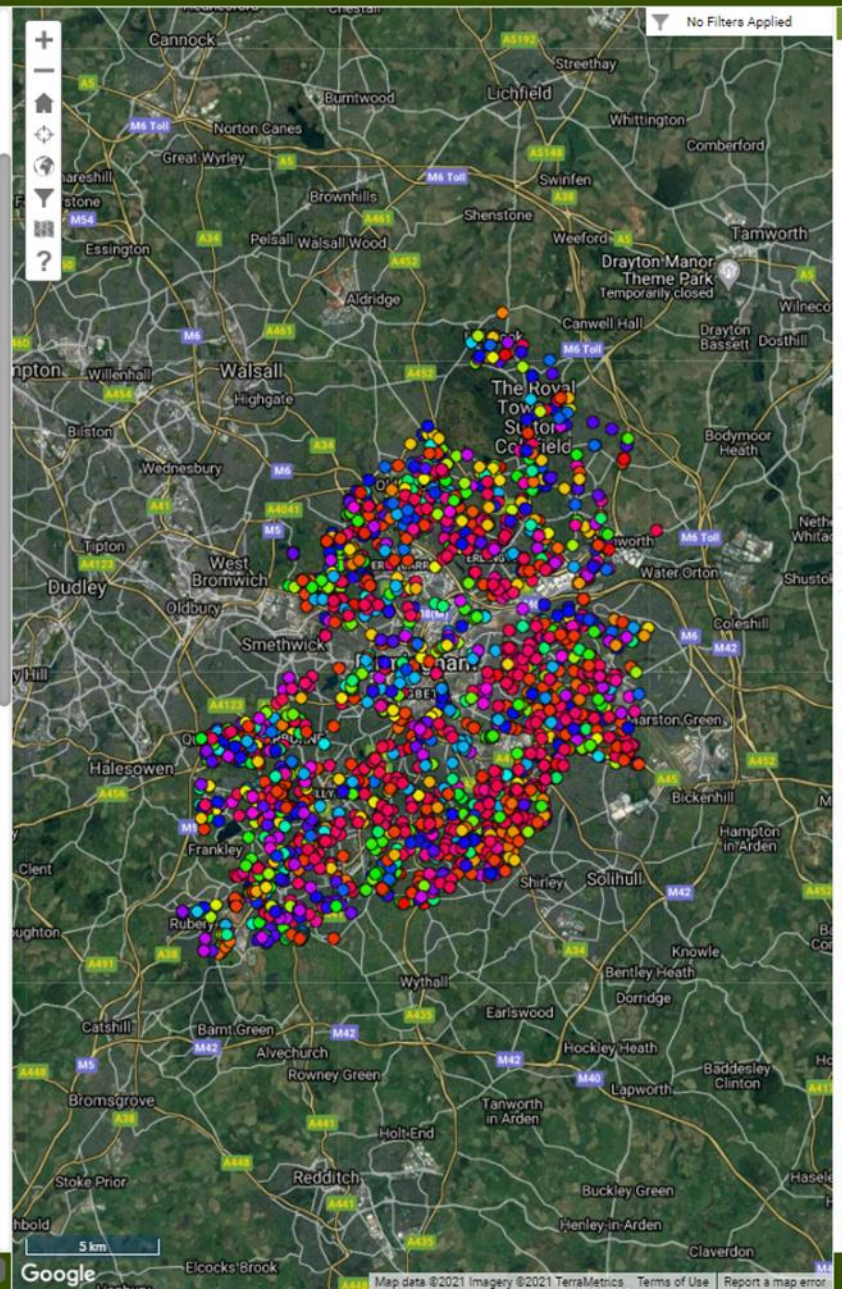


Tilia	27.7%
Acer	16.3%
Prunus	11.9%
Sorbus	8.1%
Betula	5.0%
Fraxinus	4.9%
Platanus	4.7%
Quercus	4.2%
Crataegus	3.4%
Aesculus	3.0%
Carpinus	2.9%
Malus	2.8%
Pyrus	1.9%
Liquidambar	1.8%
Corylus	1.4%

Most Common Species by Landuse - Top 10

STACKED TABULAR



LEGEND

BIRMINGHAM TREE PEOPLE

Layer: Trees

Display by: Scientific Name

Symbology: None

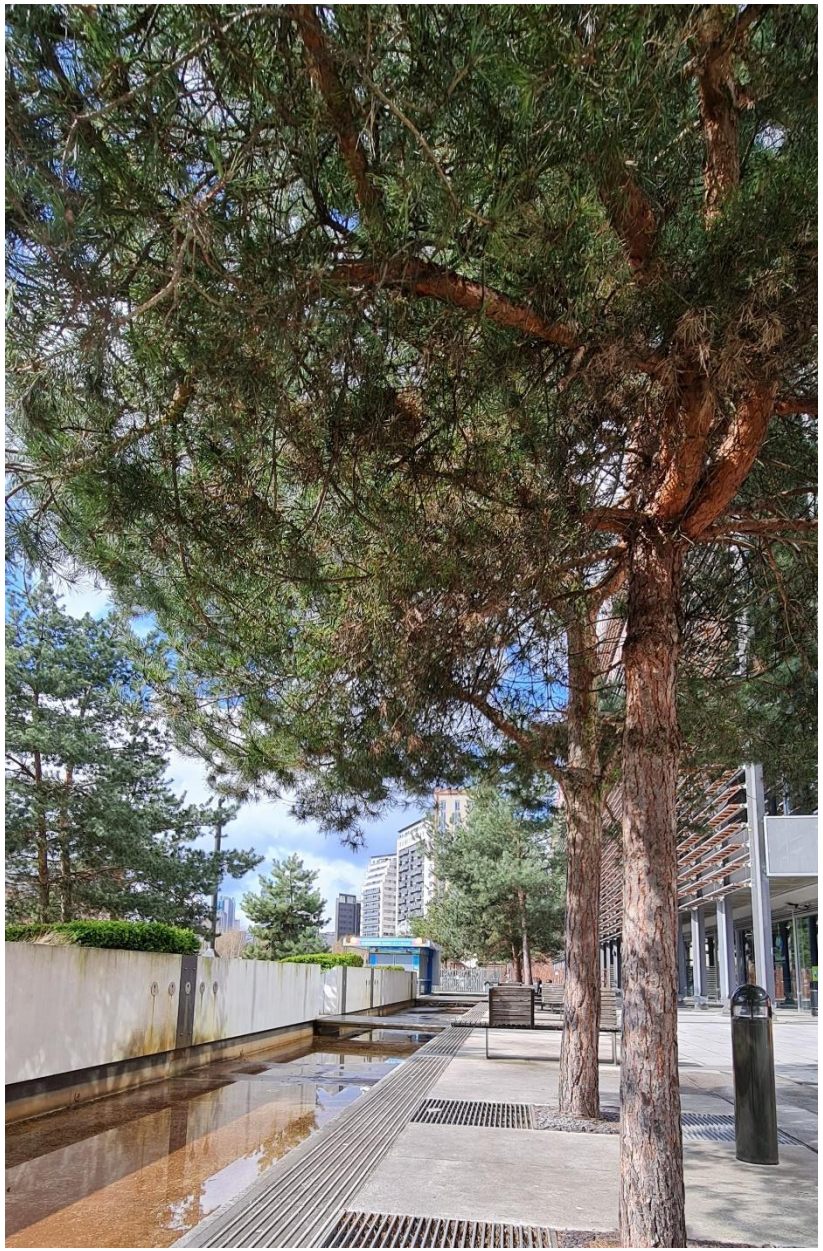
View Filter: Off

Showing 2,000 of 73,374 sites.

Search

Toggle All

- Abies sp. (3)
- Acer campestre (1,113)
- Acer campestre 'Elegant' (748)
- Acer campestre 'Queen Elizabeth' (101)
- Acer capillipes (11)
- Acer cappadocicum (128)
- Acer davidii (7)
- Acer negundo (18)
- Acer platanoides (4,678)
- Acer platanoides 'Farlakes Green' (55)
- Acer pseudoplatanus (3,607)
- Acer rubrum (13)
- Acer rufinerve (3)
- Acer saccharinum (337)
- Acer saccharum (104)
- Acer sp. (43)
- Acer x freemanii 'Autumn Blaze' (12)
- Aesculus flava
- Aesculus hippocastanum (1,857)
- Aesculus pavia (14)

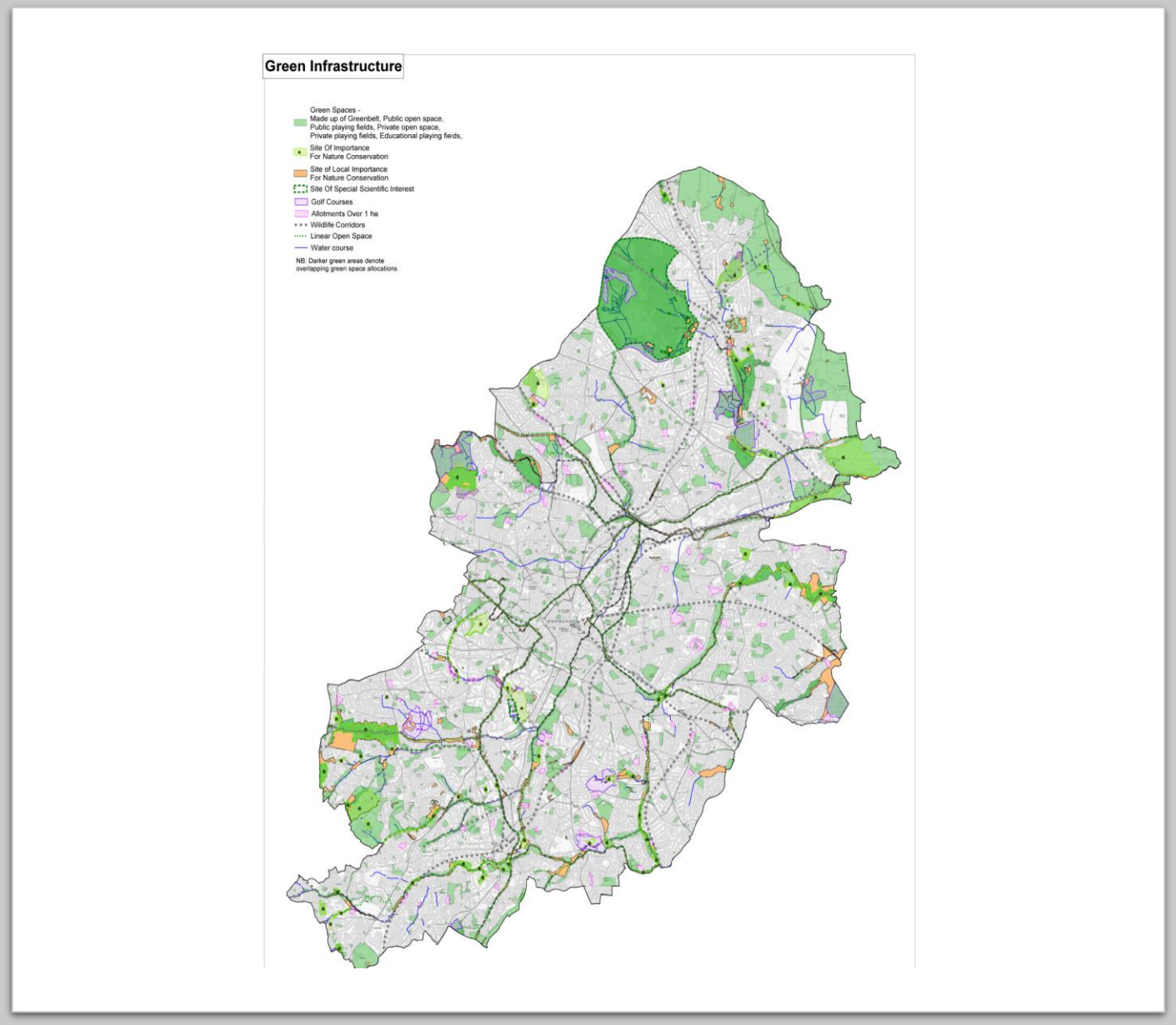


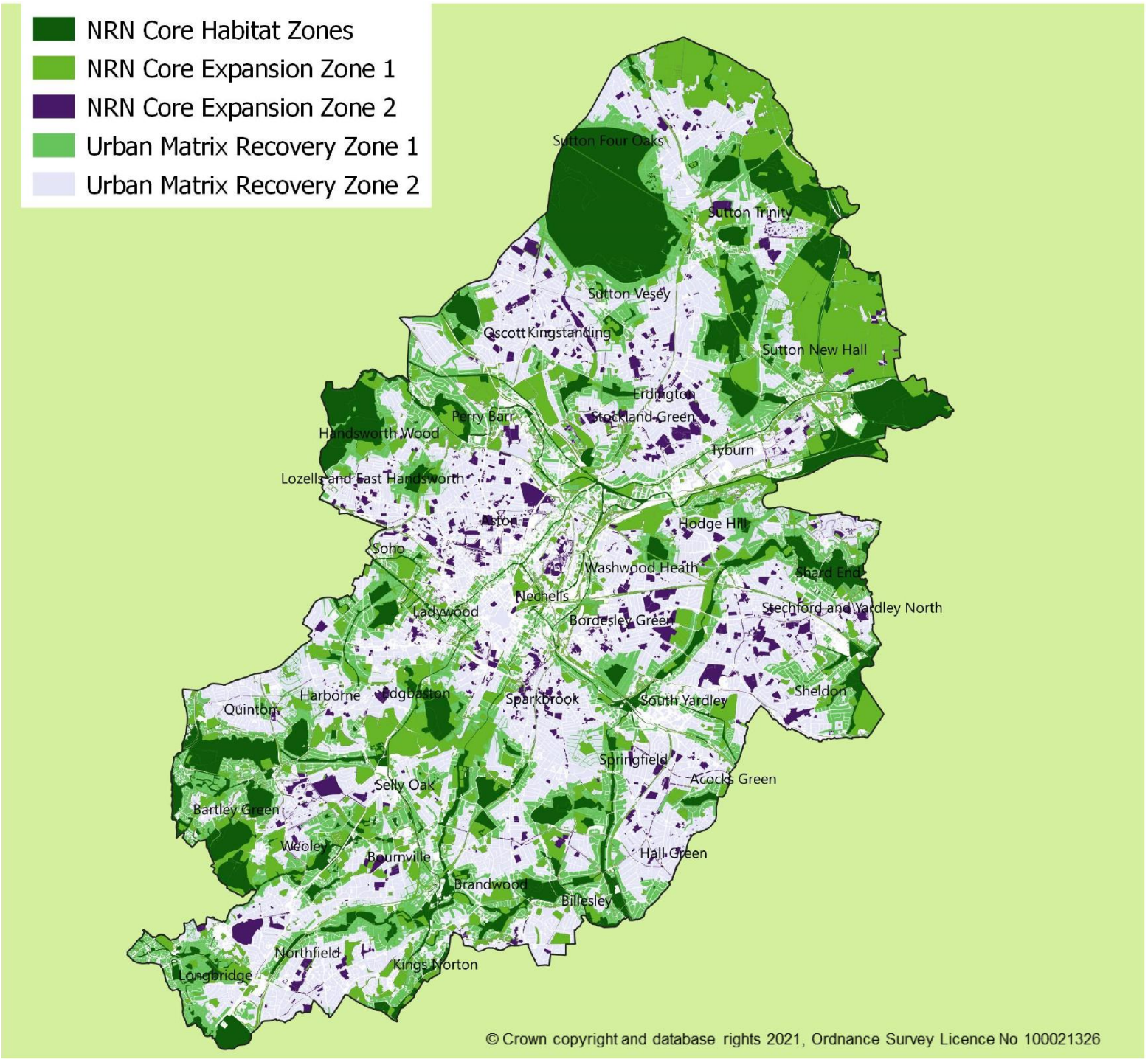
Birmingham

City of NATURE

- Birmingham - total land area 103.5 Square miles

- 13.5 Square miles of Public Open Space
- 9.2 Square miles of designated Nature Conservation sites
- 5.4 Square miles of designated woodlands (in Parks and open spaces).
- 250 miles of rivers, brooks and *streams*
- *35 miles of canals*





Local Nature Recovery Networks

LNRN's identify areas that provide greatest benefit/ opportunities for supporting ecological networks – established as part of the Environment Act 2021.

Using Climate vulnerability data and LNRN mapping can show delivery of multiple benefits.

Woodland created after the 30th January 2020 could be eligible for Habitat Banking through the mandatory Biodiversity Net Gain requirements. (potentially securing funds for 30 years management) if suitable pre intervention habitat mapping exists.

NRN Core Habitat Zone: These are the areas that contain the most valuable habitat.

The strategic objectives for these areas are Protection, Restoration, Enhancement

NRN Core Expansion Zones: The purpose of these areas is to make the core areas bigger and better connected. Within this category, two zone are identified as follows:

Core Expansion Zone 1: Comprises those land parcels that are of lower ecological value than those in the Core Habitat Zone but due to inherent value or location have the most potential to contribute to a coherent ecological network.

Core Expansion Zone 2: Comprises all areas of green space that do not meet the criteria for inclusion in Zone 1. These provide an opportunity for the restoration and creation of new habitats but investment in these areas is a lower ecological priority than those areas in Zone 1 but may be higher priority from an environmental justice point of view.

The strategic objectives for these areas are Restoration, Enhancement, Creation

NRN Urban Matrix Recovery Zones: The remaining areas of the Urban Landscape Matrix form part of this category. Within this category, two zones were identified as follows:

Urban Matrix Recovery Zone 1: Comprises all features of the built environment within 100 meters of the Core Habitat Zones and may include residential and commercial properties, gardens, road verges, street trees and minor water courses.

The protection, enhancement, and creation of green infrastructure within these areas is a priority.

Urban Matrix Recovery Zone 2: Comprises all features of the built environment outside of Zone1. These areas provide an opportunity for the protection, enhancement, and creation of green infrastructure.

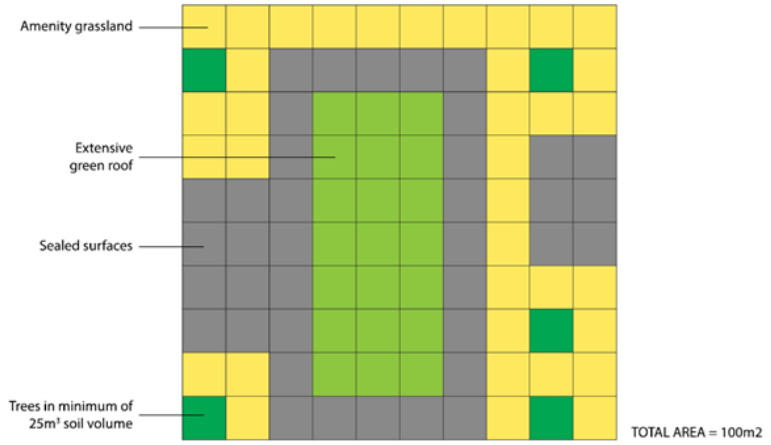
What is the Urban Greening Factor and how does it work?

The “Green Space Factor” (GSF) is a planning policy tool that originated in Berlin and has been adopted and adapted in a number of other cities in Europe and North America to encourage urban greening. GSF schemes work by assigning a factor of between 0 and 1 for various surface cover types, with sealed surfaces given 0 and the most natural cover, 1.

To calculate a UGF for a site, the factor for a particular surface cover is multiplied by its area.
This is repeated for each surface cover type.
The multiplied sums are added together and then divided by the overall site area to give an overall GSF score for a site of between 0 and 1.

A planning authority can set a minimum target (typically 0.3, although this varies according to the type of development and class of land use).
This can provide certainty to developers as to what is expected from new developments in terms of urban greening.
It can also identify planning proposals with insufficient quantity and functionality of greening in order to encourage improvements to a proposal.
It can also be useful in determining the scale and benefit of subsequent improvements to plans.

1. Measure site area, measure various surface cover types



2. Table showing areas of each cover type and factor assigned to each:

		Factor	Area (m^2)
	Extensive green roof	0.7	21
	Sealed surfaces	0.0	38
	Amenity grassland	0.4	36
	Trees in minimum of $25m^3$ soil volume	0.8	5
			100

3. Calculation of the overall score for the site

$$\frac{(0.7 \times 21) + (0 \times 38) + (0.4 \times 36) + (0.8 \times 5)}{100}$$

Score = 0.33

The main elements that need to be considered are:

- Source of water for irrigation;
- Reference habitat/s and focal species; and
- Management.

Any wall can be designed to have biodiversity value

Typology	Description	Notes
Modular green wall	System built structures with plants in pockets, troughs (soil based) or rooted in fabric (hydroponic).	Irrigation is typically needed and can be expensive. Can be costly to maintain. Some designs can provide nesting opportunities for birds.
Traditional, climbing green wall	Climbing plants rooted in the ground and provided with support (e.g. trellis, steel cables etc.).	Irrigation not usually needed. Less able to provide nesting habitat until mature or well established.
Balcony planters	Planting space integrated into balcony architecture.	Less irrigation needed, so easier to maintain. Can be subject to windburn.
Window boxes	Often temporary planters installed by resident.	Regular watering needed due to desiccation and windburn.
Nest boxes	A range of bird and bat nest boxes can be intergrated into facades and green walls.	Some species are territorial and will not use boxes close together. Aspect and height also matters.

The Athenaeum Hotel near Green Park, Mayfair, has a large and diverse living wall designed by Patrick Blanc in 2003. Its features include shrubs, climbers, grasses and mosses.

Many vertical surfaces can be greened, such as fences, low walls, pillars, parapets, and railings, as here near Moorgate, City of London.

Try to	Avoid
• Use rainwater and/or grey water to irrigate the wall. • Add native grasses and herbs that provide homes as well as food for butterflies and moths. • Think about natural vertical habitats and mimic plant groupings and structure into wall design. • Provide artificial nesting and roosting sites for bats, birds and solitary bees. • Encourage residents' participation by providing balcony planters and window boxes on residential or office schemes.	• Lighting green walls, which will deter nocturnal wildlife such as moths and bats. • Use of combustible materials. • Only using non-native plant species that are not able to provide homes or food for the early life-stages of most invertebrate species.

Table 1: Proposed surface cover type descriptions and factors

Surface Cover Type	Factor
Semi-natural vegetation (e.g. woodland, flower-rich grassland) created on site.	1
Wetland or open water (semi-natural; not chlorinated) created on site.	1
Intensive green roof or vegetation over structure. Vegetated sections only. Substrate minimum settled depth of 150mm – see livingroofs.org for descriptions[6].	0.8
Standard trees planted in natural soils or with a minimum of 25 cubic metres soil volume per tree (preferably with load-bearing substrates and connected pits) – see Trees in Hard Landscapes for overview[7].	0.8
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code (2014).	0.7
Flower-rich perennial planting – see Centre for Designed Ecology for case-studies[8].	0.7
Rain gardens and other vegetated sustainable drainage elements – See CIRIA for case-studies[9].	0.7
Hedges (line of mature shrubs one or two shrubs wide) – see RHS for guidance[10].	0.6
Standard trees planted in individual pits with less than 25 cubic metres soil volume.-	0.6
Green wall –modular system or climbers rooted in soil – see NBS Guide to Façade Greening for overview[11].	.0.6
Groundcover planting – see RHS Groundcover Plants for overview[12].	0.5
Amenity grassland (species-poor regularly mown lawn).	0.4
Extensive green roof of sedum mat without substrate or other systems that do not meet GRO Code (2014)[13].	0.3
Water features (chlorinated) or unplanted detention basins.	0.2
Permeable paving - see CIRIA for overview[14].	0.1
Sealed surfaces (e.g. concrete, asphalt, waterproofing, stone).	0

People intrinsically know what makes them feel better but they can't always express that in professional/ scientific terms.

When we asked for peoples hopes for green spaces (as part of the City of Nature consultation) a common response across cultures and ages was:

"We would like to see more trees and more flowers"

Thank You for listening.