Greater Norwich Green Infrastructure Strategy

Evidence and Opportunities Report

for

Greater Norwich Growth Board

By

Norfolk County Council

August 2023

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Preface

All data presented was considered accurate at the time of production but may since have been superseded by data presented in Norfolk's Local Nature Recovery Strategy (LNRS), which has been developed in response to statutory obligations of the Environment Act 2021. Wherever possible consistency between the GNGI Strategy and LNRS has been retained by adhering to common national guidance.

Contents

1. Introduction

1.1. Context

In 2022, the Greater Norwich Growth Board – a partnership between Norfolk County Council, Norwich City Council, South Norfolk District Council, Broadland District Council and the New Anglia Local Enterprise Partnership – commissioned the Natural Norfolk Team at Norfolk County Council to develop a Green Infrastructure (GI) Strategy for Greater Norwich (hereafter called the 'Strategy'). The area covered by the Strategy is shown in Figure 1.

This is the second report towards the delivery of the Strategy for Greater Norwich. It builds on the previous Baseline Report, finalised in March 2023, updating the evidence to incorporate new analysis and evidence developed by Natural Norfolk.

Importantly, since the production of the baseline report, there have been some National Policy developments:

- Natural England Green Infrastructure (GI) Framework.
- Statutory Guidance on the delivery of Local Nature Recovery Strategy (LNRS).

The Green Infrastructure (GI) Framework is a commitment in the Government's 25 Year Environment Plan. Developed by Natural England (NE), it will support the greening of our towns and cities and connections with the surrounding landscape. It includes a set of principles, standards and a GI Mapping tool. These have also been considered in the development of this Strategy (see Section 3.3).

The Local Nature Recovery Strategy (LNRS) guidance places responsibility on Norfolk County Council, as the Responsible Authority, and Norfolk's District Councils, as Supporting Authorities, to develop an ambitious and pragmatic strategy that:

- agrees priorities for nature's recovery.
- maps the existing areas most valuable for nature.
- maps specific proposals for creating or improving habitat for nature and wider environmental goals.

Further information on how this Strategy is being aligned with the development of the LNRS is provided in Section 3.5.1.

A full list of relevant strategies and documents was provided in the Strategy Scoping Report and is summarised in Annex 1. The final Strategy will provide more details on each individual document.

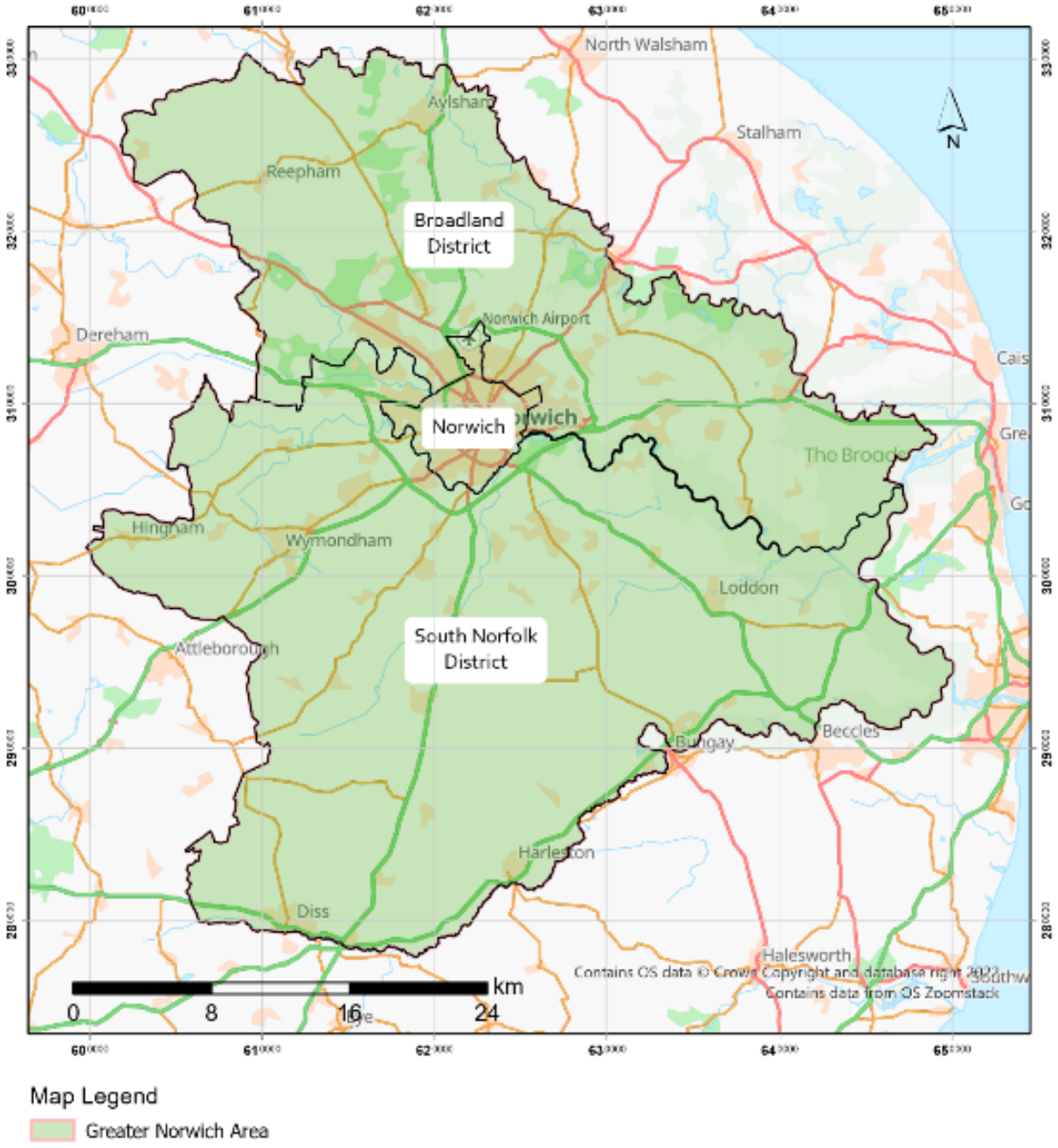


Figure 1. Map of the Greater Norwich area and constituent Districts

1.2. The Vision, the Purpose and Aims

The Greater Norwich authorities have proposed the following Vision for GI in the Greater Norwich Area:

"A multi-functional and connected network of greenspaces, green links and blue infrastructure, providing an environmental life support system for communities and nature, and protecting and enhancing the distinctive qualities that give the Greater Norwich Area its special character. The network should be high quality, bio-diverse and accessible and be widely valued by and engage local residents, businesses, and visitors to the Greater Norwich Area."

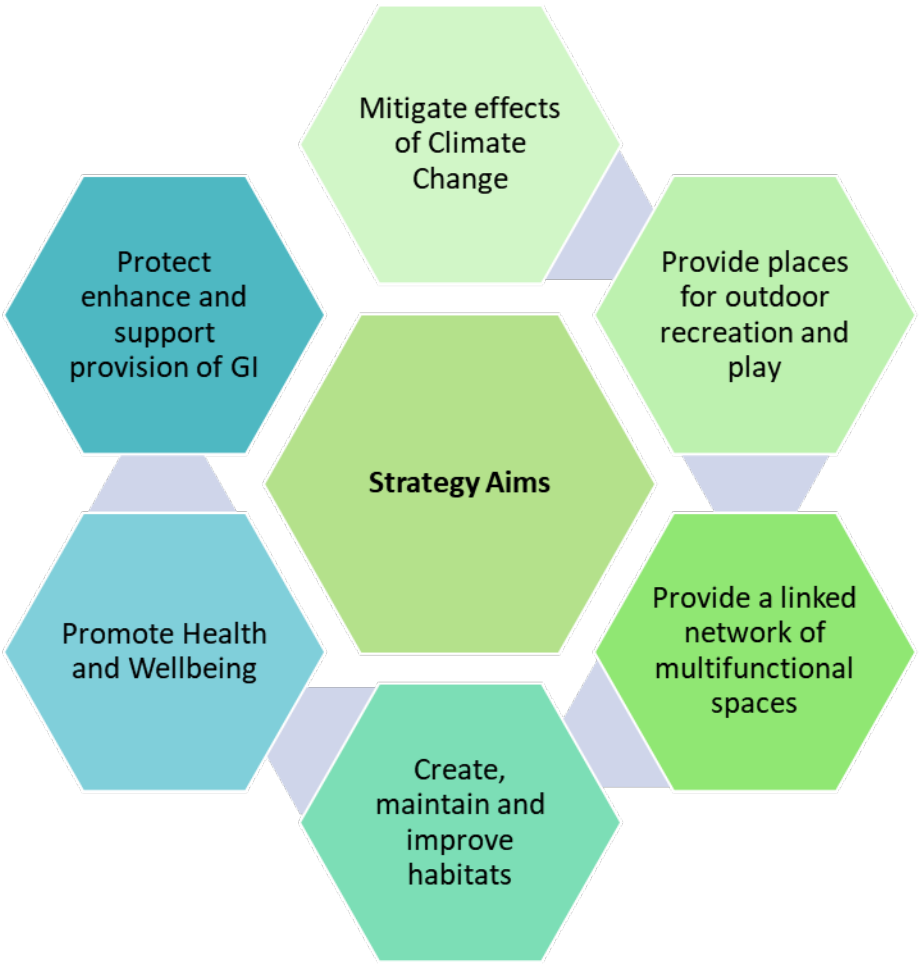


Figure 2. Greater Norwich Green Infrastructure Strategy Aims

The purpose of the strategy will be to help manage and improve existing assets; increase the level of provision to address identified deficiencies or needs; and develop a network of multi-functional spaces which will deliver biodiversity net gain and other natural assets.

The specific objectives of the new GI strategy are to:

- create a clear, coherent, and accessible strategy that will provide evidence to assist with the implementation of current and emerging plans, as well as future local plan production and implementation.
- identify future opportunities for GI to enable clear and swift decision making.
- assist in consideration of planning applications and their GI requirements.
- develop and agree a GI action plan with clear justification of project prioritisation which will be used as evidence to inform decision making regarding the allocation of resource and funding.
- ensure identification and provision of GI in Greater Norwich meets current and emerging legislative requirements.
- provide clarity on the monitoring of the strategy and its delivery.

In addition, it will provide the following outputs:

- a measurable baseline of GI provision across Greater Norwich.
- a delivery plan, identifying how the high-level GI study can be implemented through practical projects and interventions.
- evidence for future local plan production and implementation. It will make best use of existing available evidence and identify new evidence to inform the strategy and create a story map.

1.3. Strategy Development – Project Phases and Output

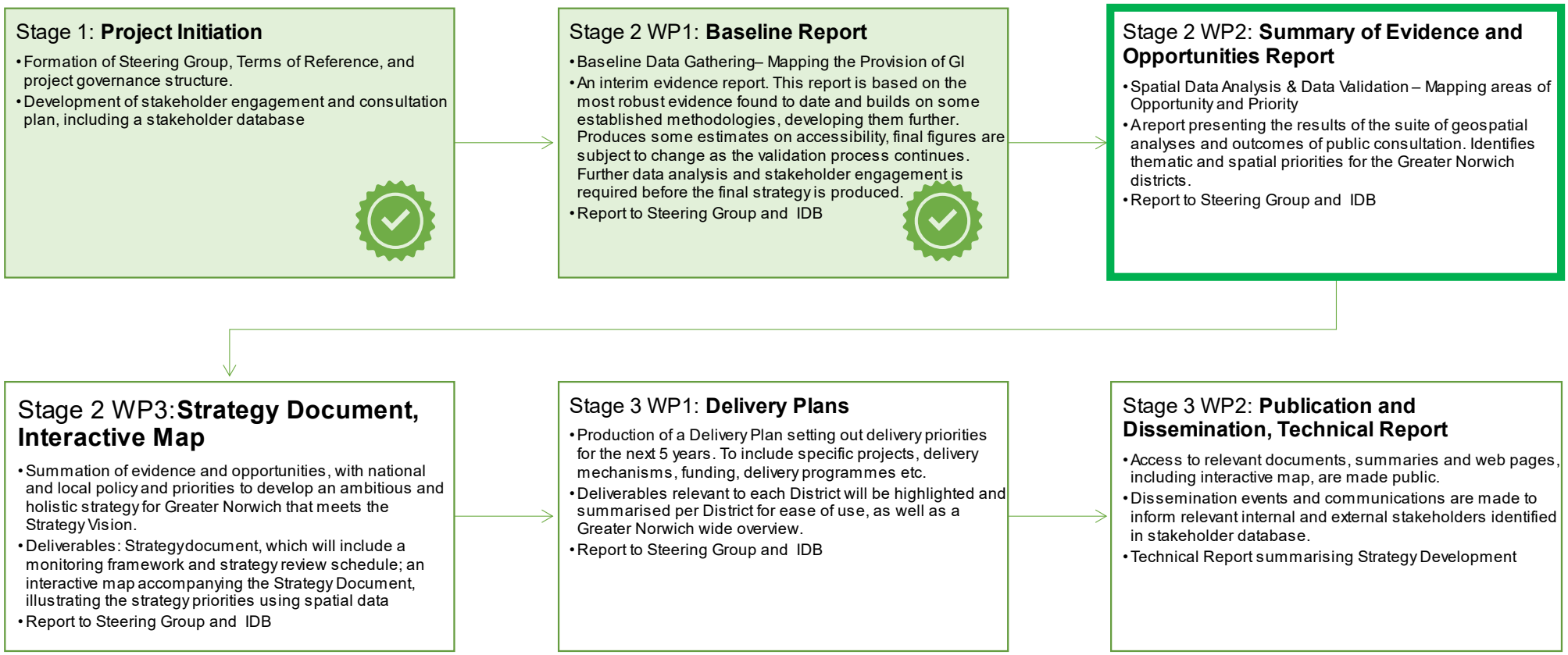


Figure 3. Summary of Project Phases. This Report is a deliverable of Stage 2, WP2, highlighted in a green box.

1.4. Structure of this Report

This report is based on the most robust evidence found to date and builds on some established methodologies, developing them further. It is structured as follows:

- Section 2: Summarises the Baseline Findings.
- Section 3: Describes the Methodology and Approach taken to the production of the presented evidence and opportunities.
    - Summarises the Methodology for analysis related to **Active Places** including Accessible Green Standards, Bivariate analysis against Socio-economic inequalities, Inclusive Access, Urban Greening Factor and Public Survey.
    - Summarises the Methodology for analysis related to **Natural Places** including Norfolk Habitat Base map, modelling landscape connectivity and mapping long continuity habitats.
- Section 4: Presents the results of analyses related to Active Places – Green Infrastructure for People.
    - Presents the results of analysis of the **Accessible Natural Greenspace** analysis for Doorstep, Local, Neighbourhood and District Standards and highlight locations for focus based on bivariate analysis of socio-economic factors.
    - Presents the results of the **Inclusive Access** scoring of Accessible Green Space which is summarised to LSOA level.
    - Presents the results of the **Urban Greening Factor** analysis.
    - Presents the results and analysis of the **Public Survey** Responses.
- Section 5: Presents the results of analyses related to Natural Places – Green Infrastructure for Nature.
    - Presents the results of analysis on **Irreplaceable Habitat.**
    - Presents the results of analysis on **Landscape Connectivity**, including hedgerow density and habitat permeability hot and cold spot analysis.
    - Presents the results of analysis on **Long Continuity Habitat**, including ancient woodland inventory refresh, veteran trees outside of woodland, long established grassland, long established ponds and ghost ponds.
- Section 6: Further analyses the results to arrive at suggested spatial and thematic priorities.
    - Presents a discussion for assessing the results for **priorities** across each District whilst considering allocated sites in the GNLP.
- Section 7: Summarises the findings and presents next steps.

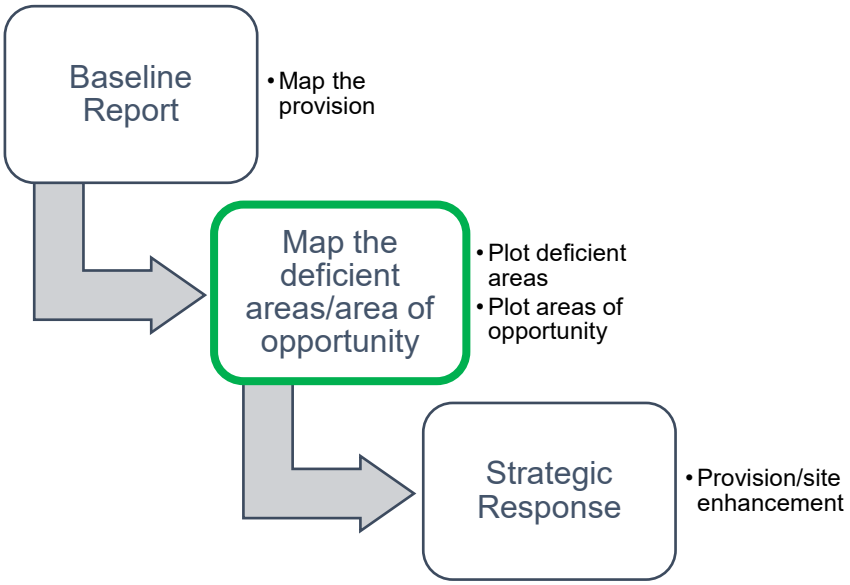


Figure 4. From Baseline Report to Strategic Response

2. Summary of Baseline Findings

The Baseline Report set definitions of terminology used in the production of the Strategy, including the hierarchy of GI Definitions, presented again here in Figure 5. Also provided in the Baseline Report were summaries of provision of the following aspects of GI:

i. **Natural Environment**, including sites designated for Nature.

ii. **Trees and Ancient Woodland**, including National Forest Inventory, Trees Outside of Woodland, Ancient Woodland and Canopy Coverage.

iii. **Historic Environment**, including Scheduled Ancient Monuments, Listed Buildings and Registered Parks and Gardens.

iv. **Greenspaces**, including parks and gardens; outdoor sport facilities (sport pitches, playing fields bowling greens, golf courses and others), cemeteries and religious grounds, allotments, community gardens and city farms, etc.

v. **Public Rights of Way**, including footpaths, bridleways and restricted byways.

vi. **Water**, including access to water via paths and greenspaces.

The Baseline Report of the Greater Norwich Green Infrastructure Strategy project presented what and where Green Infrastructure (GI) is within Greater Norwich (Figure 6). Figure 7 highlights the accessible green spaces used in subsequent analysis. It also introduced the key methodologies of assessing who has access to that GI, which is further developed and presented in this report.

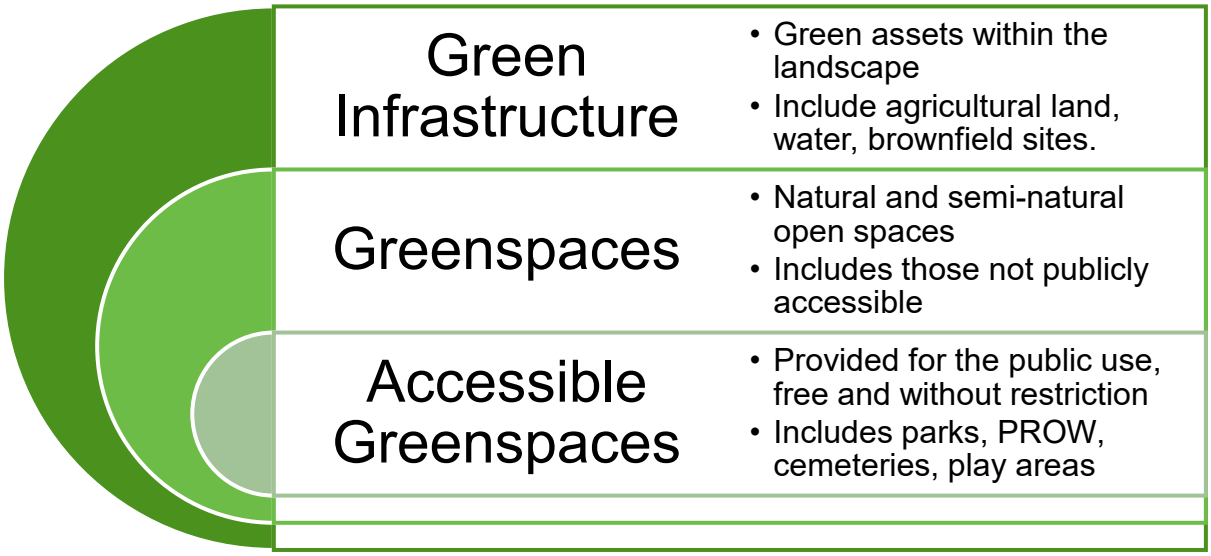


Figure 5. Hierarchy of GI definitions used in this report.

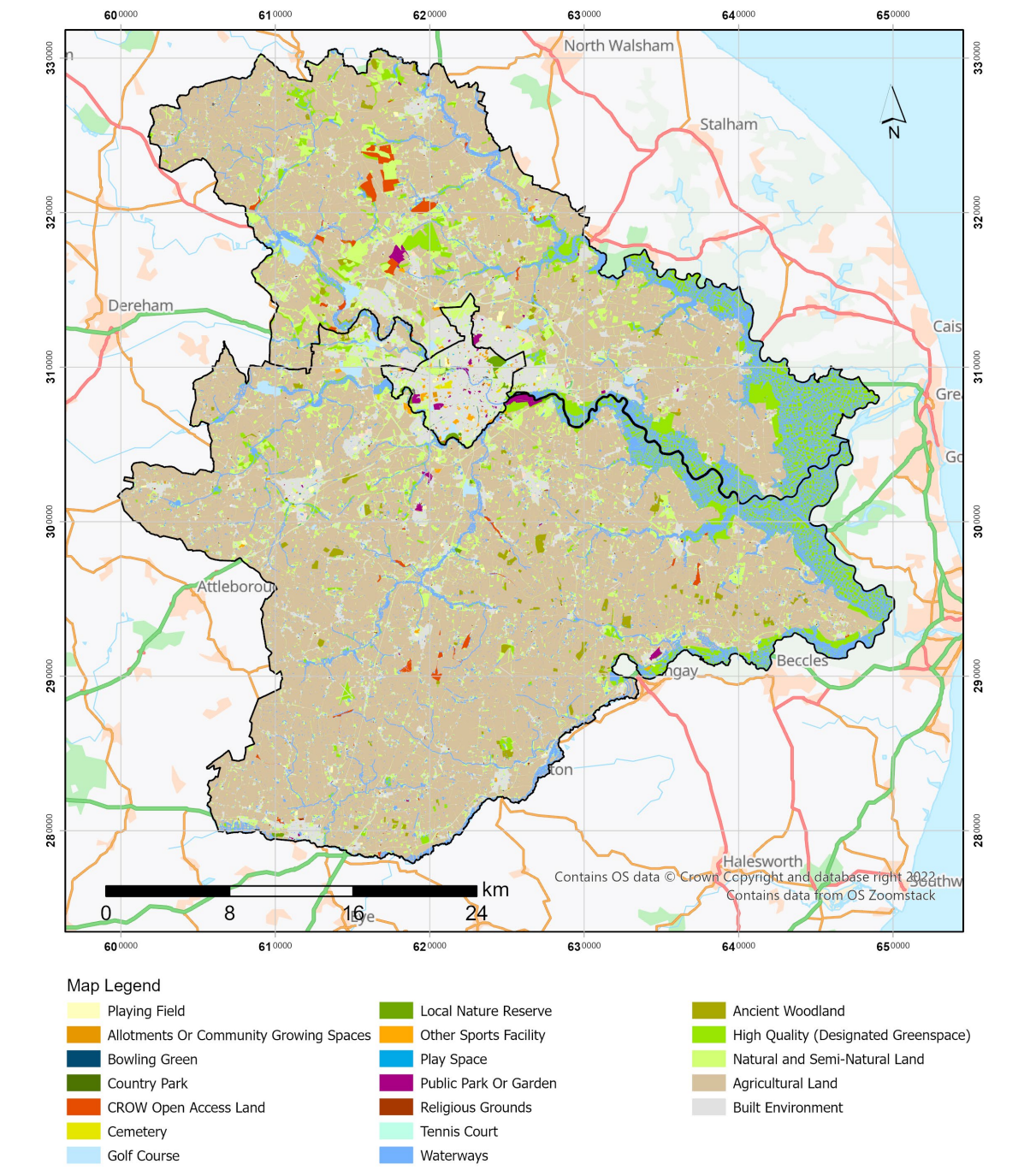


Figure 6. Summary map of Green Infrastructure Baseline for Greater Norwich

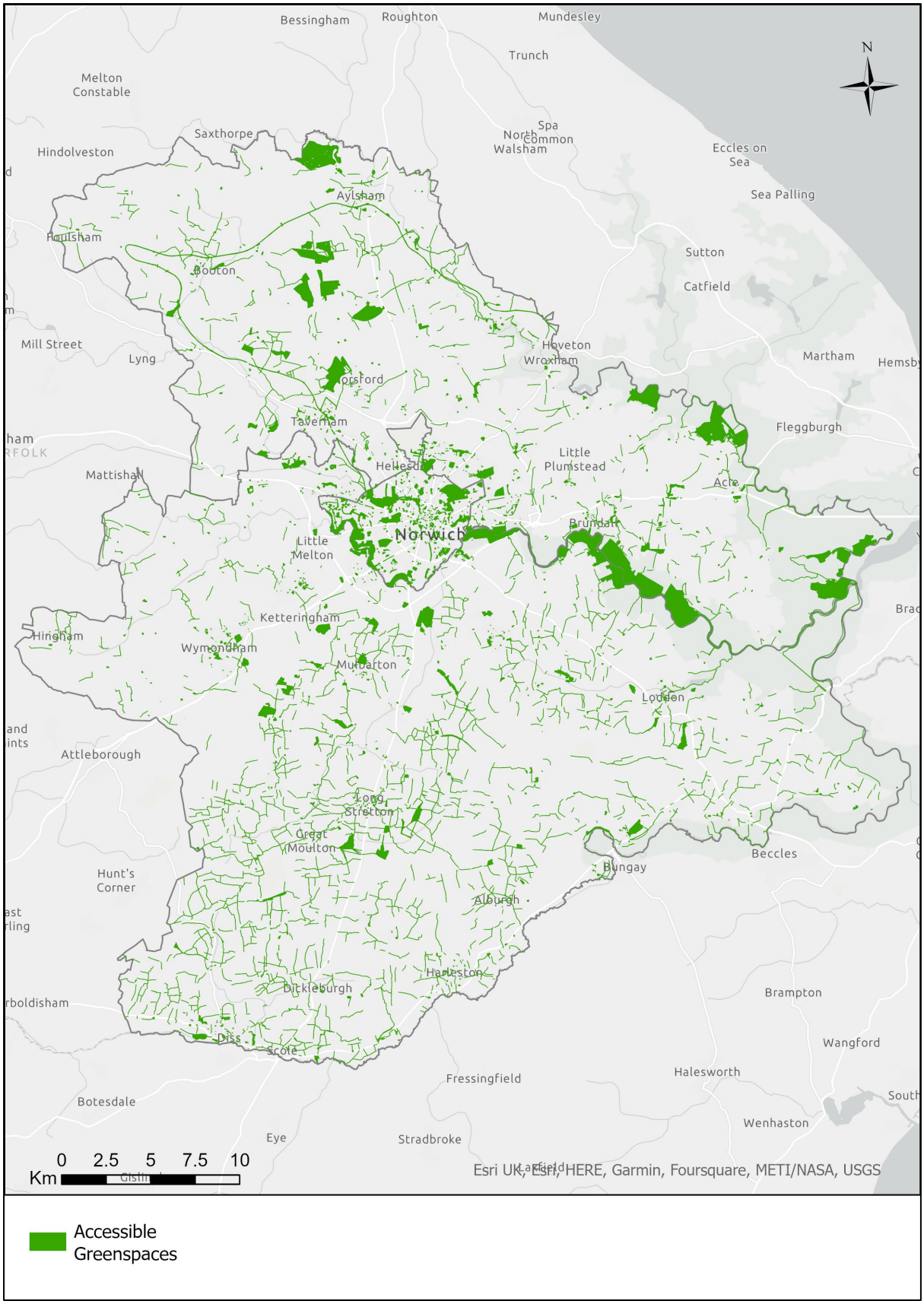


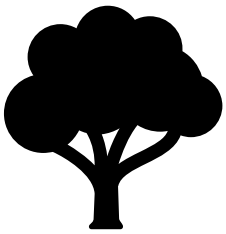
Figure 7. Accessible green spaces in the Greater Norwich area identified in the baseline.

3. Methodology and Approach

3.1. Green Infrastructure for People and Nature

The concept behind GI for Greater Norwich includes both active places and natural places:

Active Places: green spaces interact with residents and visitors and provide recreational opportunities, supporting people's mental and physical health and encouraging active travel.



Natural Places: green spaces interact with the natural environment and provide many ecosystem services, such as water quality, carbon storage, biodiversity benefits, flood defence, etc.

Both active places and natural places are not mutually exclusive and contribute jointly to a multi-functional GI network.

3.2. Overview of Methodology

The Natural Norfolk approach to developing this strategy has been led by two guiding principles following different rationales:

1. Assembling a baseline of Green Infrastructure to a **high level of detail.** The main reasons being:

- Consistency: Use the same information to inform strategic direction and site level action.
- Accuracy: Make informed decisions across the Greater Norwich Area based on the most accurate data available.
- Usability: Create a dataset that can be used and updated throughout the implementation of the strategy, e.g. by LA planners.

2. Relating the strategy to existing policy and best practice, with the following rationale:

- Methods and principles align with (and build on) Natural England Green Infrastructure Framework.
- Alignment with development of Norfolk's Local Nature Recovery Strategy.
- Linkages to district Biodiversity Studies.

Further information on datasets used and full details of methodological approaches will be presented in the Technical Report deliverable of the Strategy.

3.3. Natural England National Green Infrastructure (GI) Framework

Natural England launched the National Green Infrastructure (GI) Framework in January 2023. The Green Infrastructure Framework and its Standards are voluntary but are designed to help meet national and local planning policy. The GI Framework is a commitment in the Government's 25 Year Environment Plan to deliver more and better quality GI. It is expected to help local planning authorities (LPAs) and developers meet requirements in the National Planning Policy Framework to consider GI in local plans and new developments, and also to define what good GI looks like. Greater Norwich intends to use the framework to help inform their strategic planning, and it is expected that some aspects will be embedded into policy over time.

Natural England GI Framework Suggested Approach at a Local Level:

- *Local authorities and communities assess and strategically plan their green infrastructure provision e.g. through developing a Green Infrastructure Strategy and in other strategies and plans.*
- *In assessing and strategically planning their green infrastructure provision, local authorities can apply the Green Infrastructure Standards locally, adapting them to local context where appropriate, and setting green infrastructure policies, proposals and development requirements in development plans and local design codes.*
- *Local Planning Authorities set SMART targets, in a Delivery Plan, for achieving the Green Infrastructure Standards and local policies over time.*
- *Local Planning Authorities monitor and evaluate green infrastructure policies and delivery every 5 years.*

Green Infrastructure Standards for England – Summary, Natural England

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The Framework comprises 15 Principles, 5 Headline Standards and a Mapping Database. The 5 Headline GI Standards guide the quantity, accessibility/proximity, capacity, function and quality of GI as follows:

1. **GI Strategy Standards**, area wide, LPAs should plan strategically and apply the 15 GI Principles of the NE GI Principles Wheel, concerning the what, how and why of GI. Local authorities set SMART targets in a Delivery Plan for achieving the Green Infrastructure Framework Standards and local policies over time, as well as arrangements for the long-term management and maintenance of all green infrastructure.
2. **Accessible Greenspace Standards (AGS),** including quality. These standards note the following:

a) Everyone should have access to good quality green and blue space close to home, with an initial focus on access within 15 minutes' walk as follows:

Within 15 minutes' walk:

EITHER: a Doorstep **OR** Local Accessible Greenspace

- A doorstep greenspace of at least 0.5ha within 200m, OR
- A local natural greenspace of at least 2ha within 300m walk from home.

AND

- A medium sized neighbourhood natural greenspace (10ha) within 1km.

AND, beyond 15 minutes' walk:

- A medium/large wider neighbourhood natural greenspace (20ha) within 2km, AND
- A large district natural greenspace (100ha) within 5km, AND
- A very large subregional greenspace (500ha) within 10km.

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b) Local authorities should have at least 3 hectares of publicly accessible greenspace per 1,000 population and no net loss, including all major residential developments.

c) Quality criteria: accessible green space meets the Green Flag Award Criteria and Best Practice in Accessibility for all (by all reasonable means: Least restrictive access to the outdoors, the Sensory Trust, 2020).

3. **Urban Nature Recovery Standards.** These standards recognise the interaction of nature in urban settings as follows:

a) In urban and urban fringe areas the proportion of GI designed and managed for nature recovery is increased by an agreed percentage.

b) In urban and urban fringe areas Local Authorities should:

   a. Provide 1 ha of LNR per 1,000 population.

   b. Enhance and identify new areas that qualify as Local Wildlife Sites.

4. **Urban Greening Factor Standards.** Urban greening is at least 40% average green cover in urban residential neighbourhoods, and that there is no net loss of green cover.

5. **Urban Tree Canopy Cover Standard:** Urban tree canopy cover is increased by an agreed percentage based on a locally defined baseline.

This Greater Norwich Strategy will consider the above headline standards in the development of the Strategy and Delivery Plans. Table 1 describes how the different

standards have been considered and incorporated in the project development thus far.

Table 1. NE New Standards and GN GI Strategy

Natural England GI Framework Headline Standard	**Greater Norwich Green Infrastructure Response**
1. GI Strategy Standards	In commissioning this Strategy, the Greater Norwich Local Authorities have worked in partnership with key stakeholders and local communities via a public survey to assess and strategically plan their GI provision, as evidenced in the analysis presented in this report.
2. Accessible Greenspace Standards (AGS), including quality	The NE standards have been used in the identification of areas of deficiency and priority, in terms of size, proximity and capacity of GI, and are presented in this report. The NE methodology has been adapted to improve validity, by using an enhanced GI inventory and network-based analysis. Access to private greenspaces has also been included to further refine prioritisation. A new methodology for assessing the quality of inclusive accessibility is presented in this report. Methodology is described in Section 3.4.1 and results are presented in Section 4.1
3. Urban Nature Recovery Standards	Areas managed for nature recovery were identified in the Baseline Report. Detailed identification of opportunities for nature recovery and biodiversity enhancement are being progressed via District level Biodiversity Baseline studies, which will be integrated into the Strategy as they become available. Norfolk's Local Nature Recovery Strategy is also in development. Relevant methodologies, such as analysis of habitat permeability and connectivity, along with opportunities related to key habitat types, are presented in this report. Methodology is described in Section 3.5 and results are presented in Section 0
4. Urban Greening Factor Standard	Analysis has been conducted on neighbourhood level greening factor for Greater Norwich's urban areas. Those with a cover <40% have been identified in this report. Methodology is described in Section 3.4.5 and results are presented in Section 1.3
5. Urban Tree canopy Cover Standard	Tree canopy was measured and baselined for the Greater Norwich area in the Baseline Report.

3.4. Methods related to Active Places

This section describes the methods applied to assess GI in Greater Norwich and their interaction with residents and visitors (Figure 8). The results of these analyses are presented in Section 4.

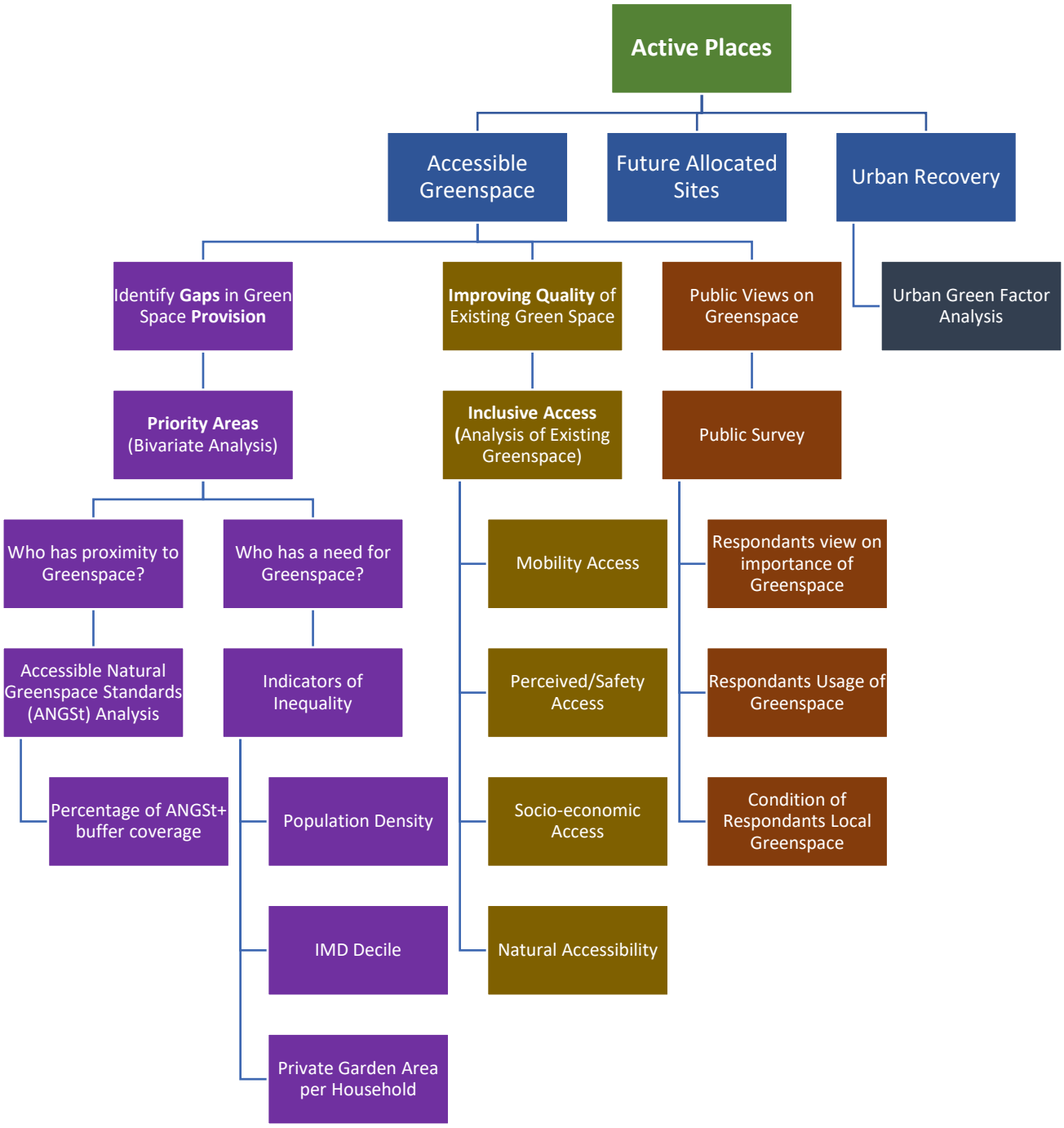

Figure 8: Diagram outlining Methods Used to identify Areas of Opportunity for Active Places

3.4.1. Accessible Natural Greenspace Standards (ANGSt)

ANGSt was developed to demonstrate how size and distance criteria can define greenspaces that best contribute to community sustainability. With its broad definition of natural areas, ANGSt is well-suited for overall assessments of existing greenspace provision, identifying gaps, and determining strategic greenspace requirements for major new developments. By adopting standards for adequate greenspace acreage and proximity to residents, ANGSt can effectively provide high-level guidance on local greenspace needs – both existing and future demand created by population growth or new developments.

The Natural Norfolk Team have implemented Natural England's recommended network analysis approach to modelling the Accessible Natural Greenspace Standards (Figure Figure 9) which we refer to as ANGSt**+**. The ANGSt+ method accurately measures the proximity of greenspace to residential areas according to six maximum distance thresholds. The Natural Norfolk team have assembled a comprehensive collection of mapped greenspaces sites as input into the ANGSt+ method to deliver the most accurate model of access to greenspace in the greater Norwich area to date. These greenspace sites have been validated by key stakeholders and the Greater Norwich Local Authorities.

Further details of the methodological approach to mapping accessible greenspace standards are provided in Section 1.5: Methodology in Brief of the Baseline Report. These methods have been updated following publication of the GI Framework (Figure 9). Following Natural England's focus, we have analysed the three most local ANGSt buffers, often referred to as 'Close to Home' Standards, to form a composite picture of access to different sizes of green space within a '15-minute walk zone'. Prioritising the most proximate tiers (Doorstep, Local, Neighbourhood) better serves community use within population centres and surrounding suburbs. District standards have also been considered as management and public funding typically occurs at the district level or below. So, targeting investments and partnerships to expand and connect greenspace patches across these Local Authority jurisdictions will yield realistic outcomes.

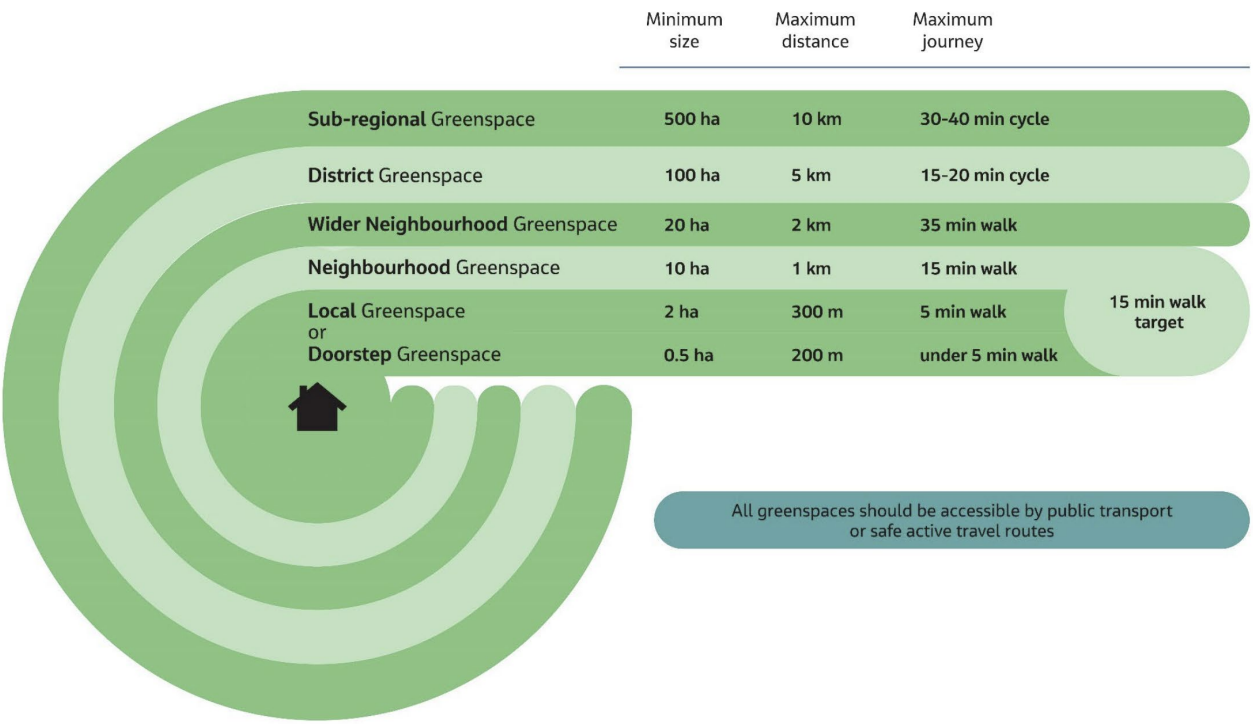

Figure 9. Accessible Greenspace Close to Home '15 minute walk' target

3.4.2. Accessible Greenspace Standards vs. Indicators of Inequality

Determining the allocation of greenspace access is easily addressed through ANGSt+ analysis when assuming equal significance across all areas. However, given the inherent disparities in areas, inequality indicators like population density and socio-economic factors must be considered. Consequently, the analysis needs to not only focus on who is **proximity** to natural greenspaces but also who has a **higher need** for greenspace. By directing efforts towards areas where the greatest net benefit can be achieved, a more targeted and impactful approach can be adopted.

Thus, the aims of the inequalities mapping are to identify priority areas that are not with the AGS standards and also have a high need for greenspace based on demographic inequalities. Our assessment is derived from the NE assessment that looks at bivariate analysis of inequalities (population density and IMD Decile) at Lower Super Output Area (LSOA) level[1]. However, the irregularity in sizes and shapes of the LSOA poses difficulties in discerning patterns and facilitating comparisons between the urban and rural districts. This becomes particularly crucial in rural settings where these boundaries do not reflect the dispersed characteristics of such regions. An alternative approach, adopted in this study, is to use a uniform geographical framework, where point data can be summarised to a grid. To this end, a hexagonal grid was used, each hexagon spans 200 metres and is oriented with its horizontal sides at the top and bottom.

[1] England Green Infrastructure Mapping Database (NERR105) by Natural England (2021)

This study has considered three 'indicators of inequalities' which indicate a high demand for increasing green infrastructure, this includes:

a. ***Population/Household Density***
   Household density is included as a measure of population density and urbanization. Higher density areas tend to have less available public greenspace per capita and a higher need for accessible green infrastructure. They may also exhibit less favourable environmental conditions due to factors like increased air pollution from heightened transportation, as well as elevated urban stressors, including noise pollution, vandalism, and crime.

b. ***Index of Multiple Deprivation (IMD)***
   IMD decile acts as an indicator of socioeconomic disadvantage. The IMD is a composite index that considers various factors such as income, employment, education, health, crime, and living environment to measure the relative deprivation of different small areas within the country. Deprived communities tend to experience higher levels of health inequalities and reduced life expectancy. There is also less resources and ability to access high quality green space.

c. ***Private Garden Area (m^2) per household***
   Private garden space provides a measure of existing access to personal outdoor space. Smaller garden sizes can limit the scale of the recreational, social, and mental health benefits residents can obtain by having daily access to outdoor nature space right at home. Households are therefore more reliant on public greenspace for these benefits, such as gardening and physical exercise.

Bivariate Analysis

In the analysis the AGS is measured as percentage of the hexagon covered by the respective ANGSt+ buffer, this is compared against the three indicators in a bivariate analysis. A bivariate analysis maps two factors with different colour gradients, to give a prioritisation matrix. As adopted by Natural England methodology a 3x3 bivariate matrix is used with three thresholds are chosen for each variable to focus on 'low', 'medium' and 'high' priority areas. Assigning each grid position an alphanumeric code (L1-H3) can help when describing the prioritisation matrix e.g. "least or most favourable scenarios" when interpreting the analysis (Figure 10).

- "L3" represents the 'Least Favourable Scenario' so is Highest Priority
- "H1" represents the 'Most Favourable Scenario' so is the Lowest Priority.

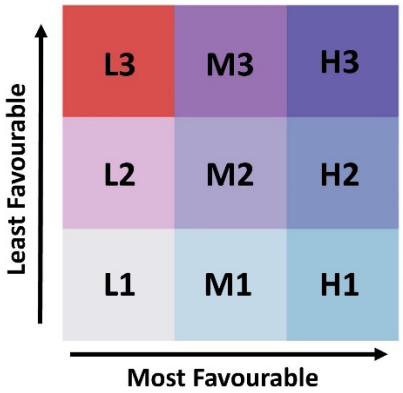

Figure 10. Example of bivariate analysis results grid.

The three indicator variables were classified into three thresholds by using the quantile method which involves dividing a dataset into equal-sized groups, or quantiles, based on the values of the data. To offer a more focused method for identifying priority areas, we used a composite score derived from combining the three variables, so the highest priority would be given to areas that score highly across all three variables (Table 2). This approach allows for adjustments based on specific contextual scenarios. For instance, in urban areas, affluent enclaves within city centres often feature smaller private gardens. In such cases, incorporating both the private garden area score and the IMD decile may moderate their priority ranking, so that diminished private garden space in deprived areas receive increased focus and intervention. However, this method adheres to predefined thresholds, potentially missing nuanced differences across regions. Additionally, each indicator introduces complexities related to data accuracy and potential conflicts in priority setting.

Results of this analysis and relevant bivariate analysis results grids are presented in Section 4.1 and in Annex 4.

Table 2: Table showing breakdown of 'favourability' thresholds for each of the inequality variables.

Priority	Score	Household Density (Number of Residential Households per km^2)	IMD Decile	Private Garden Area (m_2) per household
High Priority (Least Favourable Scenario)	3	380+	1-6	0-430
Medium Priority (Moderate Favourable Scenario)	2	60-380	7	430-1180
Low Priority (Most Favourable Scenario)	1	0-60	8-10	1180+

3.4.3. Incorporating Future Greenspaces

In addition to enabling an accurate model of access to existing greenspace provision the ANGSt+ method can be applied to proposed or allocated greenspace provision to report on the number and location of residents at postcode level who would benefit from improved access to greenspace if or when a proposed or allocated greenspace is delivered.

A key factor in this analysis will involve the setting up of a standardised method for compiling the available data on proposed new developments as it becomes available. GIS boundaries can be estimated to approximate the extent of the planned allocation, allowing the ANGSt+ model to be updated to show the impact of the proposals on the surrounding population. These models can then be routinely updated to include the exact boundaries of new GI as this detail becomes available.

A map of present and future GI, along with the relevant ANGSt+ buffers and analyses, will be able to provide key strategic insight, helping to predict how new or expanded GI assets will improve access for people in the surrounding areas. It is proposed that information regarding future allocations, including any available GIS data, is fed into a central log and categorised into three levels of certainty:

1. **Proposed**: Future GI which is in the initial proposal phase, with low certainty of realisation.
2. **Pending:** Plans which are under consideration, but still awaiting a final decision, with medium certainty of realisation.
3. **Approved:** Future GI which has received official go-ahead, and has a high likelihood of being realised.

Section 1.1.4 presents an example of how mapped extents of future GI assets may then be analysed to quantify the impact on people' access to green spaces, based on the same ANGSt+ standard approach. Producing ANGSt+ buffers for future allocations will require polygon data showing the proposed site boundaries to be produced, as well as data showing potential access points. Other site allocations described within the GNLP, such as those for additional housing, do not provide the layout of the proposed development, however an estimation of access to greenspace for future residents will still be possible to approximate using generalised outlines.

3.4.4. Inclusive Access to Greenspace

The NE GI Framework references the Sensory Trust for best practice principles of inclusive access. Norfolk County Council's Environment Service are currently adopting The Outdoor Accessibility Guidance developed by the Sensory Trust and Paths for All for conducting Access Audits of Norfolk's Trails, which will collect accurate and up-to-date spatial data on the accessibility of paths going forward. The guidance sets out recommendations for creating high quality and inclusive spaces for all. The methodology presented here provides an initial suggestion for a broader desk-based analysis of inclusive accessibility in Greater Norwich, assessed through four metrics representing different aspects of accessibility (Figure 12). This will be further refined through engagement with relevant external groups.

Different factors that may make a site more or less accessible to a wide range of users were combined to score the accessibility of individual sites based on four overarching categories: perceived safety, mobility access, socioeconomic access and natural accessibility.

Table 3 shows the datasets and metrics that were used to assess each category. Results were normalised across Greater Norwich for each theme, producing overall scores for each greenspace that range from 0 (least accessible) to 1 (most accessible). This scoring system is intended as a method of prioritising areas to audit more fully, and to use in conjunction with additional data on health and usage to identify where there may be further barriers to accessing green spaces in addition to basic proximity. Due to issues with data availability and the wide variation in user needs and experiences, this metric is not suitable as a standalone measure, and should be developed further in conjunction with on-the-ground site assessments.

Data availability restricted the types of metrics it was possible to quantify for each theme of accessibility, and many green spaces may contain additional features that increase or decrease accessibility which are currently unmapped. With available data sources it is only possible to measure generalised factors such as the availability of toilets or carparking, and additional information about the types and quality of these facilities is currently unavailable in most areas.

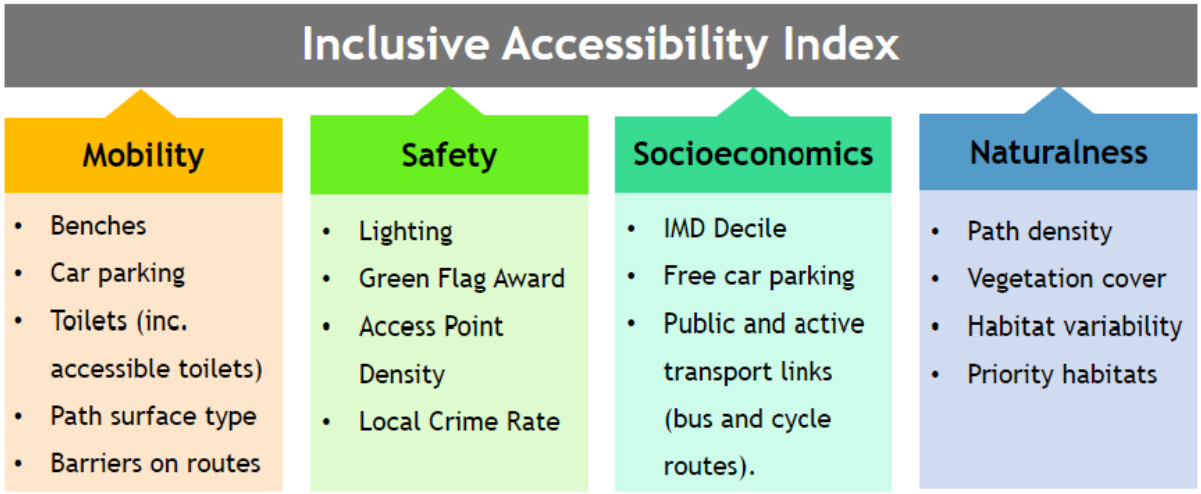

Figure 11. Inclusive Accessibility Index

Table 3: Datasets and Metrics used to calculate inclusive accessibility scores for greenspaces across 4 categories.

Theme	Dataset	Metric	Scoring
Mobility	OSM Highways (Barriers and steps)	Are all routes free from any recorded physical barriers and steps?[2]	Y/N binary
Mobility	OSM Highways (surface materials)	Proportion of path surface with material that is generally firm/free of loose material.	0-1 continuous
Mobility	Great British Toilet Map/OSM	Toilet availability within site (+10m Buffer)	Y/N binary
Mobility	Great British Toilet Map	Accessible Toilet provision within site (+10m Buffer)	Y/N binary
Mobility			
Mobility	OSM Amenity Car Parking	Carpark availability within 50m	Y/N binary
Safety	NCC Street Lighting	Estimated proportion of area which is lit	0-1 continuous
Safety	Green Flag Award	Green Flag Award status	Y/N binary
Safety	NCC Greenspace Access Points	Access points per unit perimeter	0-1 continuous
Safety	POLICE.UK Crime	Normalised crime rate for surrounding LSOA(s)	0-1 continuous
Socio-economic	IMD	Minimum decile of surrounding LSOAs	0-1
Socio-economic	OSM Amenity Car Parking	Free carparking availability within 50m	Y/N binary
Socio-economic	NCC Bus Routes, Trails, Sustrans National Cycle Network	Active and public transport routes within 200m	Y/N binary
Natural	OSM Highways	Path density (length per unit area)	0-1 continuous
Natural	Norfolk Vegetation Model	Proportion of canopy cover	0-1 continuous
Natural	NE Living England Habitat Map V4	Habitat diversity per unit area	0-1 continuous
Natural	NE Priority Habitat Inventory	Proportion of priority habitat	0-1 continuous

Mobility

Mobility access was assessed on the reported surface material of any recorded paths through each site, combined with information on available facilities and

[2] The OSM 'Barriers' category includes a broad range of gates, stiles, steps, bollards and fences. These were all considered as equally restrictive to avoid assumptions about the accessibility of certain features. A full description of the data used can be viewed at https://wiki.openstreetmap.org/wiki/Key:barrier

potential barriers such as stiles, gates and bollards that may restrict mobility. Open Street Map (OSM) provides a valuable source of data where official sources may be incomplete or entirely absent. It was used to supplement highways and Public Rights of Way datasets to provide a more complete picture of the paths and routes that exist within greenspaces. To account for the variations in the types of barriers individuals may find restrictive, OSM 'barrier' features were not filtered based on type, meaning any barriers present were marked as potential restrictions.

Path surfaces can create potential mobility restrictions, and the types of surfaces users may find accessible will vary between individuals. Whilst general surface materials are recorded in the available data, on-the-ground surveying would be needed to record maintenance issues that may present mobility issues and to assess other factors such as gradient, width and camber. This method followed general guidelines from the Outdoor Accessibility Guidance, classing generally firm/even surfaces as 'more accessible' and loose/unsurfaced paths as 'less accessible'.

More detailed information on the availability of accessible parking was found to be absent from almost all OSM records, and so could not be meaningfully analysed. The selection of a 50m radius for quantifying carparking availability was based on NCC's Parking Standards for Norfolk.

Safety
Perceived safety was quantified by apportioning crime rates at the LSOA level to each greenspace based on the area of overlap. It is important to note that where metrics were based on the presence of features such as street lighting, a low score may not represent an absence but a simple lack of data, for example in cases where lighting is not owned by NCC. These metrics were informed by the Safer Parks Guidance, however it is important to note that there are many factors affecting perceived safety that cannot be quantified by recorded crime statistics and other available datasets.

Inclusive accessibility results are outlined in Section 0.

3.4.5. Urban Greening Factor (UGF)

The Urban Greening Factor (UGF) is a land-use planning tool developed by Natural England to help integrate green infrastructure into new developments and ensure that urban areas benefit from the ecosystem services offered by natural vegetated areas. It assigns scores from 0 to 1 for different surface types based on their relative sustainability and contribution to urban greening—with more points allocated for vegetation and permeable surfaces (Figure 12). The UGF score is calculated by dividing the weighted total green score by the total site area. This allows planners to set minimum greening requirements for new developments.

For this project, Natural England's UGF methodology was adjusted for use in assessing greening levels across a broader region, whilst maintaining the 0-1 scoring approach. A typical application of the UGF would involve on-the-ground surveys of development sites to accurately map landcover. However, this level of detail was not practical for a county-wide analysis. Therefore, the UGF approach

was adapted using land cover datasets to estimate green cover as a proxy for overall green infrastructure provision. This allowed greening levels to be compared across the wider region. The scores were assigned to areas based on a combination of available datasets:

a. **Living England Habitat Map V4.**

   This was used as a baseline where more accurate datasets were unavailable. The UGF scores most semi-natural habitats as a '1', and the Living England dataset contains only broad categories such as 'urban', so where possible it was important to identify more detailed datasets.

b. **OS MasterMap.**

   MasterMap provides the best available level of detail for urban areas, distinguishing between manmade and natural surfaces with a high level of accuracy. Mastermap polygons were scored manually by comparing their descriptions to the NE UGF Guidance. This was then used instead of Living England where possible.

c. **Rural Payment Agency Land Parcels.**

   RPA land parcels data was overlaid above the previous two datasets to provide further distinction between habitats in agricultural land. Although largely unsuitable for use in built-up areas, the RPA data provided additional detail to differentiate cropland and semi-natural grassland in urban-fringe areas.

A weighted total UGF score was then created for Output Areas within Greater Norwich by calculating the area of overlap of differently scored features:

Urban Greening Factor Score = (Surface Area A x Factor A + Surface Area B x Factor B + Surface Area C x Factor C, etc.) / Total Output Area Size (m^2)

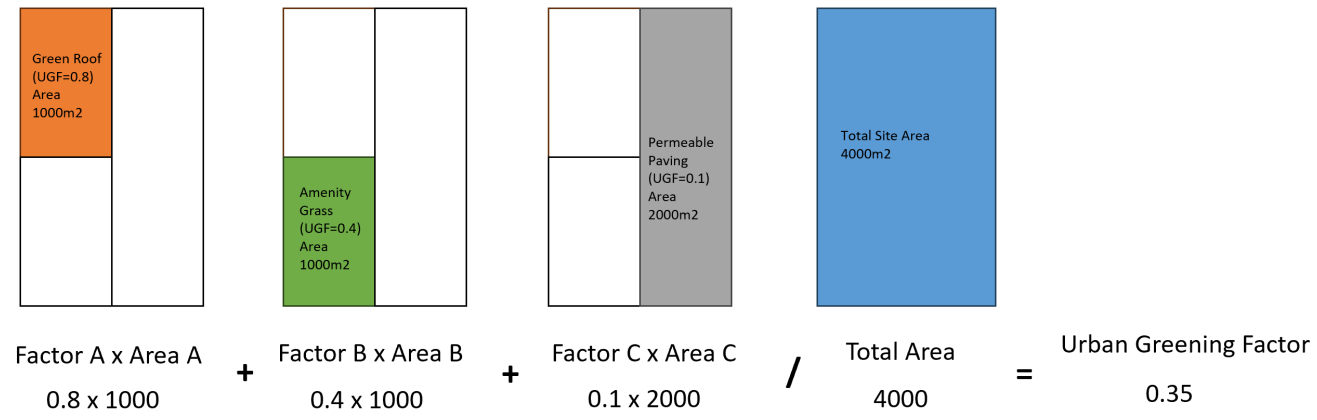

Figure 12: Illustration of the Urban Greening Factor Scoring

The UGF has limited suitability as a metric in rural areas, so analysis was restricted to a subset of the largest built-up areas in the Greater Norwich area. Due to the way

in which the UGF scores vegetation and any underlying habitat separately, it is possible to achieve a score of >1. The lowest UGF represents an environment consisting almost entirely of impermeable manmade surfaces.

Classification of OAs into ‘commercial’ and ’residential’ was achieved by determining the most frequent address type, using OS Addressbase data to count the occurrence of residential and commercial/other addresses within each area. Differing urban greening standard thresholds were then applied based on this designation, based on Natural England’s suggested targets of 30% (0.3) for commercial developments, and 40% (0.4) for predominantly residential areas. UGF scores summarised to built up areas, as well as mapping at the OA level, is presented in Section 1.3.

3.4.6. Public Survey

To support the desk-based analysis conducted to date, a survey was launched to engage the public and gather views from community groups, organisations and individuals. The aim of the public survey was to provide insight into how Norfolk residents relate to and use greenspaces in the Greater Norwich area. The public’s responses will advise the development of the new Green Infrastructure Strategy, by informing what and where the Strategy’s priorities should be so that Greater Norwich can improve the provision of greenspaces.

The survey was open to responses for six weeks, between 10th May 2023 and 21st June 2023 (inclusive). It was hosted on the Citizen Space platform, using Norfolk County Council’s Citizen Space license and Geospatial add-on, and developed by the Natural Norfolk team.

Questions were designed to gather views on:

a. The importance of greenspace.

b. How the public use greenspace.

c. The condition and quality of respondent’s local greenspace.

d. Access to greenspaces, including private gardens.

Further information on the design, promotion and demographics of respondents can be found in the Public Survey Summary Report.

Survey responses were analysed as a whole and separated into the three constituent Districts to look for differences. Mapped responses were summarised to LSOA units, and free text responses were reviewed and categorised to draw out sentiment and themes (see Section 1.4).

3.4.7. Public right of access and the potential to expand the Public Rights of Way network in greater Norwich

According to the government people have the right to access public rights of way for walking or certain other leisure activities.

In greater Norwich there are over 850 miles of footpaths, bridleways and byways which make up the public rights of way network. These paths, tracks and trails are available for everyone to enjoy all year round and are used daily by the public for exercise, routine travel and to connect with nature. It is likely that many of these public rights of way are of ancient origin and are therefore as much part of our shared heritage as the historic buildings and monuments that shape the character of the Greater Norwich area.

A recent survey of 19th and early 20th century maps by the Ramblers Association has revealed that an additional 334 miles of paths in the Greater Norwich area that are 'lost' in that they are visible on the old maps but are not presently recorded on the definitive map of public rights of way. It is possible that in some cases there will be grounds to add a lost path to the definitive map via the legal maxim ‘once a highway always a highway’ which means that a public right of way does not cease to exist, even if no one uses it.

The Countryside Act 1981 states that local authorities are obligated to keep the definitive map under review, and it includes further provision that enables anyone with the historic or documentary evidence that shows a public right of way was established in the past can apply for a path to be added to the definitive map. The government have set a deadline of 2031 after which it will no longer be possible to claim rights of way based on historic evidence. Consequently, there is a time limited opportunity to extend the definitive map of public rights of way in the greater Norwich area.

The Natural Norfolk team have produced a map with lost paths over laid with the current network of public rights of way. This provides an evidence base for identifying areas where the restoration of lost paths would deliver benefits. (See Section 1.5).

3.5. Methods related to Natural Places

This section describes the methods applied to assess Places for Nature in the Greater Norwich Area (Figure 13Figure 8). The results of these analyses are presented in Section 5.

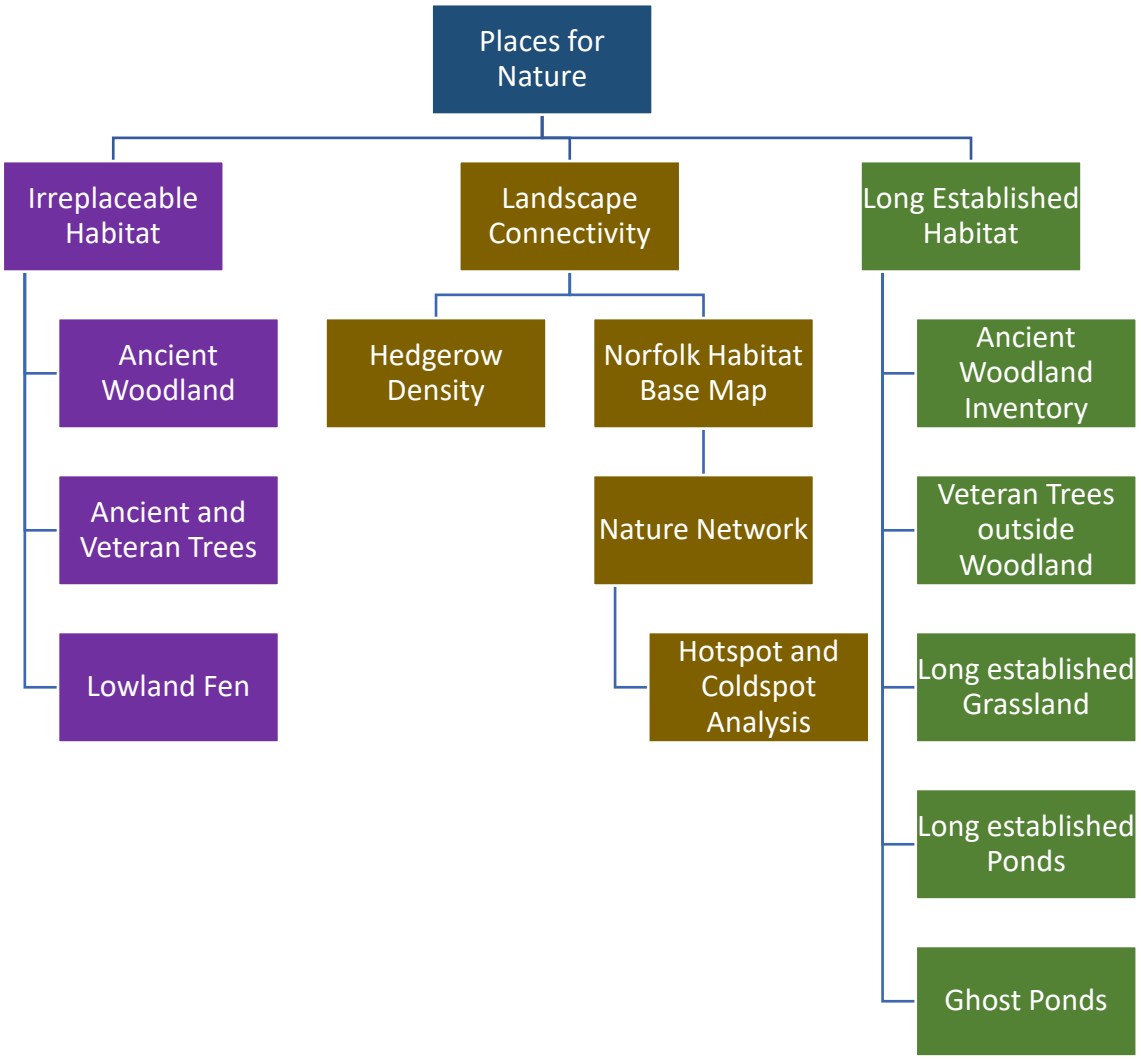

Figure 13: Diagram outlining Methods Used to identify Areas of Opportunity for Places for Nature

3.5.1. Policy context: LNRS, NRN, and NPPF

This section outlines methods for developing a strategic approach to maintain and enhance natural places consisting of habitat networks and green and blue infrastructure across greater Norwich. The approach taken is designed to pay full regard to the directives detailed in the Local Nature Recovery Strategy (LNRS) and the National Planning Policy Framework (NPPF). The aim is to generate the insight

necessary to enable the realisation of the nature recovery goals detailed in these policy documents across greater Norwich.

The Environment Bill of 2021 introduced the ambition to create a national Nature Recovery Network (NRN) and the statutory requirement that every responsible authority must produce a LNRS designed to contribute to the realisation of the NRN. Details of how this should be done were released in an LNRS statutory guidance document published in March 2023.

The LNRS statutory guidance states that every responsible authority must produce a local habitat map upon which all national conservation sites and local nature reserves are indicated. National conservation sites and local nature reserves are legally protected areas of significant importance for nature. Information on their location and extent is already publicly available. It is also for the responsible authority to identify other areas of importance for biodiversity and explain how this will be done in a consistent way. These other areas of importance will include all existing 'local wildlife sites' and areas of 'irreplaceable habitat'.

Public Rights of Way (PROW)

PROW are legal designations for paths and routes that allow public access and passage through various types of land, including private and public areas. These routes are typically established to ensure that people can traverse the landscape for recreational, transportation, and leisure purposes. PROWs are essential in maintaining public access to open spaces, countryside, and natural areas. It's important to acknowledge that there are several access routes in the Norwich area that may not have official designation as PROWs.

Local Wildlife Sites

These are sites identified at a local level for their biodiversity value and which are granted protection from inappropriate development or change of use. In Norfolk these local wildlife sites are known as 'County Wildlife Sites'(CWS) and their extents have been mapped in detail.

Irreplaceable habitat

The concept of ‘irreplaceable habitat’ is already used in NPPF to recognise that some habitats, such as ancient woodland, should be protected due to the impracticality of recreating them in new locations as the important ecosystems they support are particularly slow or complicated to fully establish. The government is bringing forward separate biodiversity net gain regulations that will define which habitats should be considered ‘irreplaceable’ and therefore afforded high levels of protection. Until this is available, responsible authorities are instructed to use the definition of irreplaceable habitat in the NPPF list includes the following as irreplaceable habitat:

- ancient woodland
- ancient and veteran trees
- lowland fen

The Natural Norfolk team have mapped all national conservation sites, local nature reserves, county wildlife sites, and probable veteran trees in greater Norwich. The locations of ancient woodland and lowland fen have been mapped by Natural England and are publicly available. The inclusion of a mapped layer representing the probable veteran trees in Greater Norwich is an innovation developed by the Natural Norfolk team which is discussed further in section 5.3.2.

The irreplaceable habitat map is presented in Section 5.

3.5.2. The Norfolk Habitat Base Map and LNRS

The LNRS statutory guidance requires that NCC provide a 'description of the strategy area (Norfolk) and its biodiversity and opportunities for recovering and enhancing biodiversity'. This description should include the full range of habitats in the strategy area and draw on a wide range of other available data.

To meet this requirement, the Natural Norfolk Team have developed the Norfolk Habitat Base Map which is a digital mapping database that details the type and location of all existing habitat patches across the county by combining the authoritative mapping data for each habitat type into a single dataset. The authoritative input mapping datasets are:

- **Ordnance Survey MasterMap** - provides comprehensive topographic detail and authoritative habitat classifications for urban and built-up areas, waterbodies, woodland, roadside verges, and heathland.

- **The Norfolk Vegetation Model** – derived from Environment Agency LiDAR this provides a detailed model of the extent and height of all vegetation in Norfolk including woodland, trees outside of woodland, and hedgerows.

- **Rural Payments Agency Landcover** - provides land parcel level agricultural landcover classification and mapping that is verified by landowners. The RPA data is particularly important for accurately mapping the extent of grassland and arable land.

- **Natural England Living England Map –** provides habitat mapping for all habitat classes derived from remote sensed data. It is used to map habitat in areas not covered by the inputs listed above.

- **UKHab –** provides a hierarchy of standardised habitat type descriptions for all habitats. The UKHab habitat classification system is used in the Biodiversity Net Gain calculator.

Areas of Principal Importance

Step one of the LNRS process will also require mapping areas that are 'of principal importance for biodiversity'. A similar approach was used within the GNGI Baseline report to map 'High Quality' greenspaces, which included designated and legally protected sites, such as Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), RAMSAR sites (important wetland sites), Special protection areas (SPAs) and locally designated County Wildlife Sites (CWS). Since the production of the Baseline Report, the new guidance published for LNRS has confirmed the definition of 'Areas of Principal Importance for Biodiversity', which includes a variation of the sites identified as 'high quality' in the baseline report. This definition supersedes and should be used in place of the 'High Quality GI' definition presented in the Baseline, to ensure alignment of the GI strategy with LNRS.

The updated definition includes the extents of priority habitats, CWS, LNRs (local nature reserves), SPAs, and the Ancient Woodland Inventory.

Following this definition will ensure a consistent baseline comparable with other regions, and aligns with the wider context of LNRS. However, there are other areas also with importance as natural places not captured in this definition, and these are analysed further throughout this report.

3.5.3. The Norfolk Habitat Base Map and Natural Places for Greater Norwich

The vision for green infrastructure in greater Norwich is for a network of multi-functional green space and blue spaces which delivers benefits to both the environment and the local community. The Natural Norfolk team will use the Norfolk Habitat Base Map to strategically identify and prioritize opportunities to enhance, restore, and connect green and blue spaces in ways that maximize benefits for people and nature. The Norfolk Habitat Map provides the essential information needed to guide data-driven decision making and integrated planning to deliver multiple environmental, social, and economic benefits.

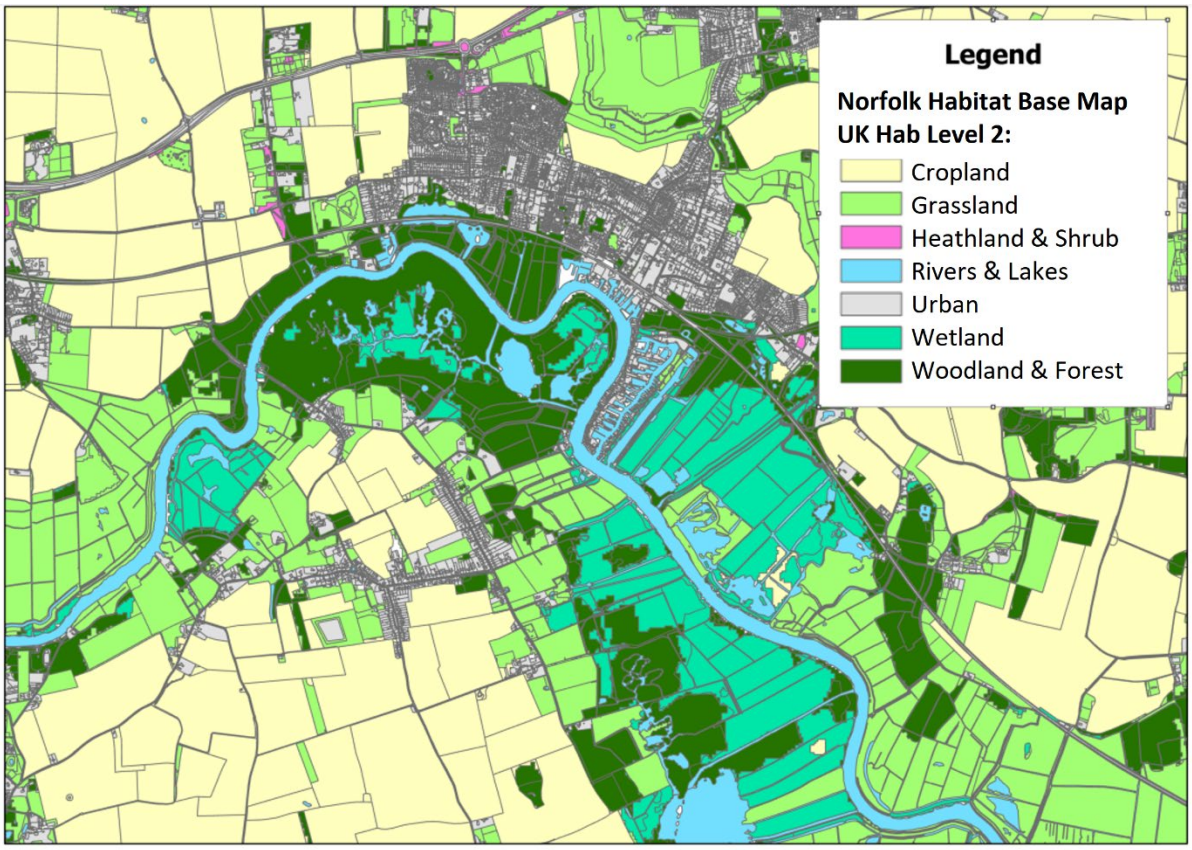

Figure 14. Example area of the Norfolk Habitat Basemap

The Norfolk Habitat Base Map is designed to be a robust and easy to maintain data resource. It will be refreshed with new data from each of the listed inputs according to a schedule. Digital archive copies of the Norfolk Habitat Base Map will be retained to enable a comparative analysis of habitat change over time. Figure 14 illustrates the use of the UKHab classification to deliver a clear representation of the habitat types around the village of Brundall.

3.5.4. Modelling landscape connectivity

For present purposes the term landscape connectivity refers to the physical connections between habitat patches and green spaces across a landscape. It allows species to move between different areas to feed, breed, and shelter. Connectivity is a key part of John Lawton's guiding principles for nature recovery. Lawton states that nature recovery requires "more, bigger, better, and joined" habitats. Connectivity addresses the "joined" aspect through habitat corridors and networks that link separated habitat patches. This allows wildlife to access the "more, bigger, better" habitats. Connectivity is crucial for sustaining ecosystems, enhancing resilience, and enabling species to shift across landscapes.

Mapping the existing quality of landscape connectivity is necessary for a strategic approach to nature recovery because it helps to identify areas where habitat restoration and conservation efforts should be focused to improve connectivity. The Natural Norfolk team have designed the Norfolk Habitat Base Map to facilitate landscape connectivity analysis and we have focussed on two approaches;

hedgerow density as a measure of landscape connectivity and habitat permeability as a measure of landscape connectivity.

When looking at habitat connectivity, it is crucial to specifically highlight the issue of severance. Severance refers to the complete severing or blocking of connectivity that isolate habitat areas which previously had continuity. Unlike semi-permeable obstructions to wildlife movement, severance imposes an absolute barrier to maintaining connectivity between habitats. Roads and highways, large pipelines, some segments of the built environment, and other linear infrastructure not designed for permeability can impose severance, resulting in fragmentation that divides formerly connected areas into isolated habitat "islands." The effects of severance go beyond limiting dispersal, altering fundamental ecosystem properties, hydrology, breeding patterns, and resilience. Mitigating existing pathways of severance and preventing additional severing of habitat patches needs explicit focus alongside connectivity across more semi-permeable barriers. Where severance is risked or unavoidable, efforts must be made to retain at minimum narrow corridors that permit some transit of wildlife and propagules, avoiding the extreme effects of habitat isolation through severance

Hedgerow density as a measure of landscape connectivity

Hedgerows are vital habitat for biodiversity in Norfolk's agricultural landscape, both as a distinct habitat and for the crucial connectivity function they provide between other habitats. The rural areas of greater Norwich are dominated by extensive arable farming and the fields of crops are a relatively hostile habitat for biodiversity. It is the network of hedgerow habitat that provides the connectivity between patches of woodland, grassland, wetlands, and other habitats that would otherwise be isolated from each other.

The Natural Norfolk team have developed an approach to mapping the density of hedgerows using the Norfolk Habitat Base map. The results of this analysis are presented in Section 2.2.1.

Habitat permeability as a measure of landscape connectivity

The Norfolk Habitat Base Map can be used to analyse the quality of existing landscape connectivity by assigning permeability values to UKHab habitat types.

In the context of landscape connectivity analysis, permeability refers to the degree to which a particular habitat allows or facilitates the movement and dispersal of species across the landscape. Habitats with high permeability are amenable to the free movement of species. For example, woodlands and other semi natural habitats allow easier movement and migration for many species compared to urban areas or open cropland. In the Norfolk Habitat Base Map, habitats that are more permeable receive higher permeability scores, while impassable or inhospitable habitats are assigned lower permeability scores.

The Natural Norfolk team have developed an approach to mapping habitat permeability using the Norfolk Habitat Base map. The results of this analysis are presented in Section 2.2.2.

A 2-hectare hexagonal grid was overlaid on the Norfolk Habitat Base map. The permeability values of underlying habitat parcels were aggregated into a weighted area average for each hexagon. This results in a hexagonal permeability surface map where the topographic detail is removed and the distinction between low permeability areas and high permeability emerges. This was further refined using a statistical hot-spot analysis tool (Hot Spot Analysis (Getis-Ord Gi*) Documentation), which identified statistically significantly clusters of high permeability (hot spots) and low permeability (cold spots). Results can be seen in Section 2.2.3.

3.5.5. Mapping long-established habitats

A characteristic common among habitats that are most important for biodiversity is long continuity. It is widely recognised that habitats that have been continuous for many decades or centuries, without significant change in their principal characteristics, have some key biodiversity attributes that are lacking in more recent features. It follows that having mapped the current extent of habitat in the Norfolk Habitat Base Map further useful insight would be gained if it could be established how long a given habitat has existed in a particular location. An effective approach to this problem is to compare contemporary mapped habitat with habitat recorded in old maps. In this way it is possible to identify 'long established habitat' which is habitat that is known to have been, or very likely to have been continuous as the primary habitat now recorded at this location since the time the old map was made.

The irreplaceable habitats identified in the National Planning Policy Framework are all long-established habitats and it is likely that additional areas of long-established habitat will be selected as areas that could become important for nature within the Norfolk LNRS.

In recent years excellent digital collections of old maps have become available on the National Library of Scotland’s website that give a near comprehensive record of the extent of particular habitats that existed between 100 and 150 years ago in Norfolk such that we can establish long continuity habitat for:

- Ancient Woodland
- Trees outside of woodland (TOW)
- Grassland
- Ponds

The Natural Norfolk team have developed automated techniques to enable the comparison of current and past habitat maps.

Ancient Woodland Inventory refresh project

Since the Ancient Woodland Inventory (AWI) was first compiled by Natural England in the 1980s improvements in technology, evidence availability, and understanding of woodland history mean that the AWI now needs updating. The task of updating the

AWI for Norfolk is being carried out by staff in the Natural Norfolk team following a process prescribed by Natural England and this work is due to be completed in 2024.

Veteran Trees Outside of Woodland

Veteran trees are recognised in the NPPF as irreplaceable habitat. The landscape character of greater Norwich is significantly influenced by the presence of numerous veteran trees. In rural areas of Broadland and South Norfolk veteran hedgerow trees are keystone structures within the landscape. In urban areas appreciable numbers of relict hedgerow trees survive as veteran trees. The age of veteran trees is a key factor influencing their biodiversity value. As trees grow old, they develop unique microhabitats and ecological niches. Veteran trees serve as stepping stones connecting disparate habitats like woodlands, meadows, and ponds through the landscape matrix. Veteran trees also make a striking contribution to the visual unity and character of the greater Norwich countryside. As prominent vertical features along field boundaries, they link landscape components and provide aesthetic continuity.

The Natural Norfolk team have developed a technique to identify the location of probable veteran trees by comparing the locations of all contemporary trees above 10m tall extracted from the Norfolk Vegetation model with the location of individual trees marked up on the Ordnance Survey first edition maps from the 1880s. The result is a map of probable veteran tree locations for the whole of greater Norwich. A ground truthing of this map in the parish of Saxlingham Nethergate has indicated that the probable veteran tree map is a strong predictor of actual veteran tree locations. Further desk-based work with comparing the veteran tree map with trees visible in Google Streetview lends weight to this conclusion though further validation work is needed.

Grassland

While the extent of grassland is still considerable in greater Norwich the true extent of the remaining long continuity semi-natural and unimproved grassland that it the most valuable for biodiversity is unknown. However, it is logical to assume that these habitats will only be found in areas that have been recorded as grassland for an extended period. The Dudley Stamp land use survey of 1930 mapped the extent of grassland as distinct from arable in detail and so provides this historical evidence base to enable the mapping of long continuity grassland.

Ponds

Over the past 20 years, research by organisations such as the Freshwater Habitats Trust and the European Pond Conservation Network has underlined how ponds are exceptionally biodiverse habitats. Many of the ponds in greater Norwich are examples of long continuity habitat; the location of many existing ponds can be seen to correspond with ponds marked on the first edition Ordnance Survey maps of the late nineteenth century and so are at least 140 years old and some are likely to be much older. Long established and healthy ponds are a haven for high levels of biodiversity and serve as 'stepping stone' habitats - groups of ponds create networks allowing species to move through landscapes. This is especially important for

amphibians which have seen significant declines in recent years. Other research indicates that ponds provide ecosystem services such as flood control and water storage and carbon sequestration. Ponds also serve focal points of interest for people experiencing the landscape; ponds are imbued with cultural significance and hold a particular aesthetic value.

The Natural Norfolk team have developed a technique to extract the location coordinates of every pond marked on the 1st Edition Ordnance Survey maps which enables a comparison with the location of existing ponds recorded in the modern Ordnance Survey Mastermap. This comparison identifies which ponds have been lost, which ponds appear on both maps, and which ponds have been created since the 1880s.

Ghost ponds

The process of identifying long established ponds from the first edition Ordnance Survey maps just described has also revealed that in the 1880s there were many more ponds that have since been filled in during agricultural intensification and urban development. These lost ponds have come to be known as ghost ponds.

Scientists and academics from University College London (UCL), have done important work on reviving ghost ponds in Norfolk. They have demonstrated that restoring ghost ponds is highly effective for reviving freshwater biodiversity since pond creation starts from a more natural intact soil seed bank. Field surveys have confirmed the abundant return of native flora and fauna in ghost ponds within just months of rewetting dried sites. They have demonstrated that even small ghost pond restoration projects can deliver substantial biodiversity gains. UCL provide scientific evidence and practical guidance to promote ghost pond restoration among conservation groups, farmers and policymakers. The UCL research has highlighted the great potential for pond habitat recreation at landscape scales by targeting ghost ponds.

Ghost pond restoration projects provide opportunities for biodiversity enhancement when done in proximity to existing ponds and hedgerows to enhance habitat connectivity. Those in publicly accessible areas for example next to a public right of way provide an opportunity to enhance access to blue space.

3.6. Biodiversity Baseline Studies - Opportunities

The Natural Norfolk team are currently undertaking a Biodiversity Baseline Study for Norwich City Council and are in discussion with Broadland and South Norfolk District Councils to apply the baselining methodology to the full Greater Norwich area.

The baseline study is comprised of six tasks, the most relevant of which is Task 4: Development of Biodiversity Character Areas and Opportunity Mapping (Figure 15). This includes identification of biodiversity hotspots in key biodiversity character areas, based on designation of sites, habitats of importance and species richness

scores. The study will also include a survey and monitoring framework that sets out the approaches for monitoring and measuring biodiversity. Combined with the habitat permeability mapping, described in Section 3.5, these are used to identify opportunities for enhancing biodiversity, aligning to the Lawton Principles as described in Section 3.5.

Whilst the results of the Norwich study and subsequent Broadland and South Norfolk Study are not available for presentation in this report, it is suggested that the identified Biodiversity Character Areas and associated biodiversity opportunities should be factored into the final Strategy and Delivery Plans.

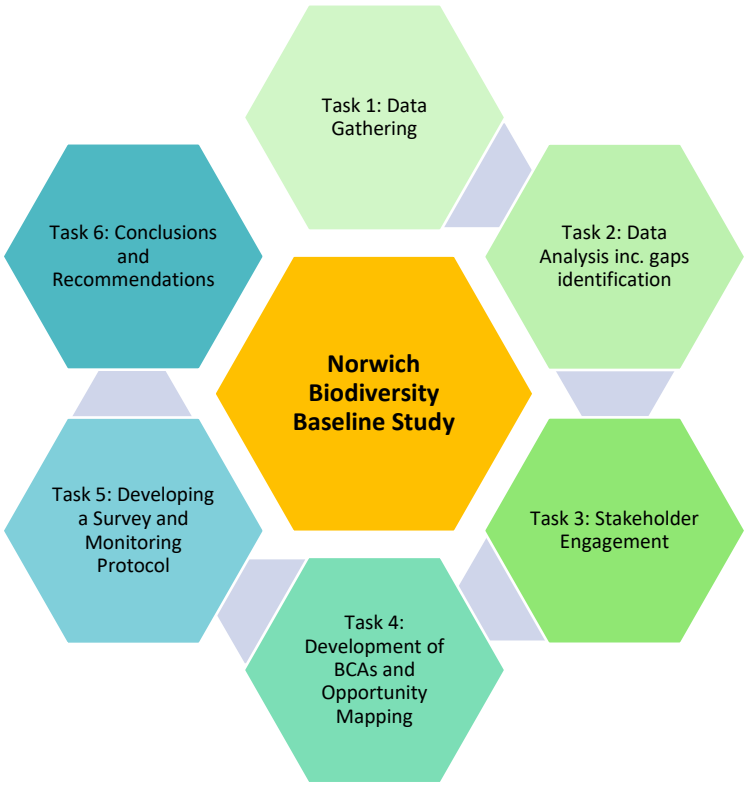

Figure 15. Biodiversity Baseline project design

4. Results related to Active Places – Green Infrastructure for People

4.1. Accessible Greenspace Standards (ANGSt) and Indicators of Inequality

The results of the ANGSt**+** analysis can be seen in Figure 17. The subsequent Accessible Natural Green Space Inequalities mapping focuses on identifying areas outside these ANGSt+ and prioritising them based on their socio-economic value. The methodologies used to derive these results are described in Section 3.4.

The results for the bivariate analysis for Doorstep, Local, Neighbourhood and District standard of accessible greenspace are presented here. Maps for the individual inequality indicators are provided in Annex 4, Figure 53-Figure 64.

In the bivariate matrix, hexagons displayed in the H1-H3 colour scale represent those with more than half of their areas within corresponding ANGSt+ buffer (Figure 16). In the 'H1' colour range, hexagons are regarded as being in the ‘most favourable scenario’ as they also possess the lowest composite inequality score (3-5). In contrast, the L1-L3 colour scale highlights hexagons outside ANGSt+ buffer coverage, with L3 indicating the “least favourable scenario” - hexagons completely outside ANGSt buffer coverage that also have the highest combined inequality scores (high thresholds for household density, deprivation, and lack of private garden access). For this report, the focus will be placed on L3 hexagons as the key target areas needing improvement. However, the full spectrum of inequality metrics in the matrix can help guide strategic planning investments and can be explored in the next steps.

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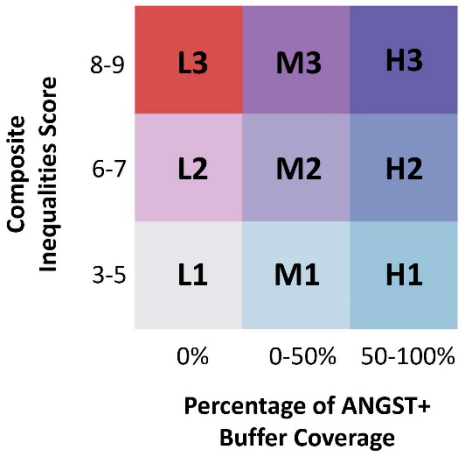


Figure 16. Bivariate analysis key for Composite Inequalities analysis

4.1.1. Doorstep OR Local Standard

In Norwich city, when performing the Doorstep and Local Standard bivariate analysis, we found that the ‘L3’ hexagons were clustered in parts of peripheral wards such as Mile Cross, Lakenham, University, and Crome, as well as small parts of central wards Sewell, Town Close and Mancroft. It should be noted that these clusters account for a small part of the Wards, the majority of which are within the ‘H3’ scenario. It is also observed that large parts of the area at the tri-boundary of Eaton, Nelson and Town Close Ward lie outside the buffer of these standards for AGS but are classified as 'L1' or 'L2' scenarios in the matrix due to low deprivation levels (high IMD Decile) in these areas (Figure 18, Annex 4).

In Broadland District, the ‘L3’ clusters predominantly form around satellite towns near Norwich (e.g. suburban towns Hellesdon, Thorpe St. Andrew and more distant towns of Felthorpe, Horsham St. Faiths and Hainsford), though it should be noted many of the hexagons within the suburban towns are within the ‘L1’ or ‘L2’ scenario due to their high IMD Decile rating. Clusters of ‘L3’ hexagons are also located along villages bordering the Broads such as Hoveton/Wroxham, Acle, Freethorpe and Halvergate (Figure 18).

In South Norfolk District, clusters of ‘L3’ are observable in the populous towns of Harleston, Diss, Hethersett, and parts of Wymondham. In the case of the latter two towns, significant portions of the area fall within the 'L2' scenario due to the high IMD Decile. Several smaller towns such as Little Melton, Kirby Cane, and Newton Flotman also fall with ‘L3’ in the bivariate matrix (Figure 18).

4.1.2. Neighbourhood Standard

In Norwich, the Neighbourhood ANGSt+ buffer encompasses most of the district, except for ‘L3’ clusters concentrated in centralised locations of the Town Close and Mancroft Wards. Notably, only one hexagon within the Town Close (postcode NR1 3RW) received an ‘L3’ score across the ’15 min walk’ standards (Figure 19).

In Broadland, areas classified as 'L3' in the bivariate matrix for Doorstep or Local ANGSt+ standards also align with the 'L3' scenario when evaluated against the Neighbourhood standards. It is worth noting that additional areas like Foulsham, Little Plumstead, Brundall and Blofield, despite having some access to Local or Doorstep AGS, have fallen within the 'L3' category in the bivariate matrix when examining solely against Neighbourhood ANGSt+ standards (Figure 19).

In South Norfolk, substantial portions of Hethersett, Wymondham, Harleston, and Diss persist within the 'L3' scenario in terms of the Neighbourhood standard analysis, indicating that they do not meet any of the three ’15 min walk’ standards. However, the ‘L3’ scenario also extends to smaller clusters of towns like Pulham St Mary, Dickleburgh, Thurlton, and Gillingham (Figure 19).

4.1.3. District Standard

When looking at the analysis of the District ANGSt+ standard, Norwich and the greater part of Broadland District are encompassed within the ANGSt+ buffer (H1-H3 on the matrix). Only Reepham and border towns such as Burton, Wroxham, and Coltishall lie within the 'L3' scenario of the bivariate matrix (Figure 20). In South Norfolk most of the district lies outside of the District ANGSt+ buffer, many of these towns and villages score poorly in terms of composite inequality (L3), akin to those highlighted in the previous standards (Figure 20).

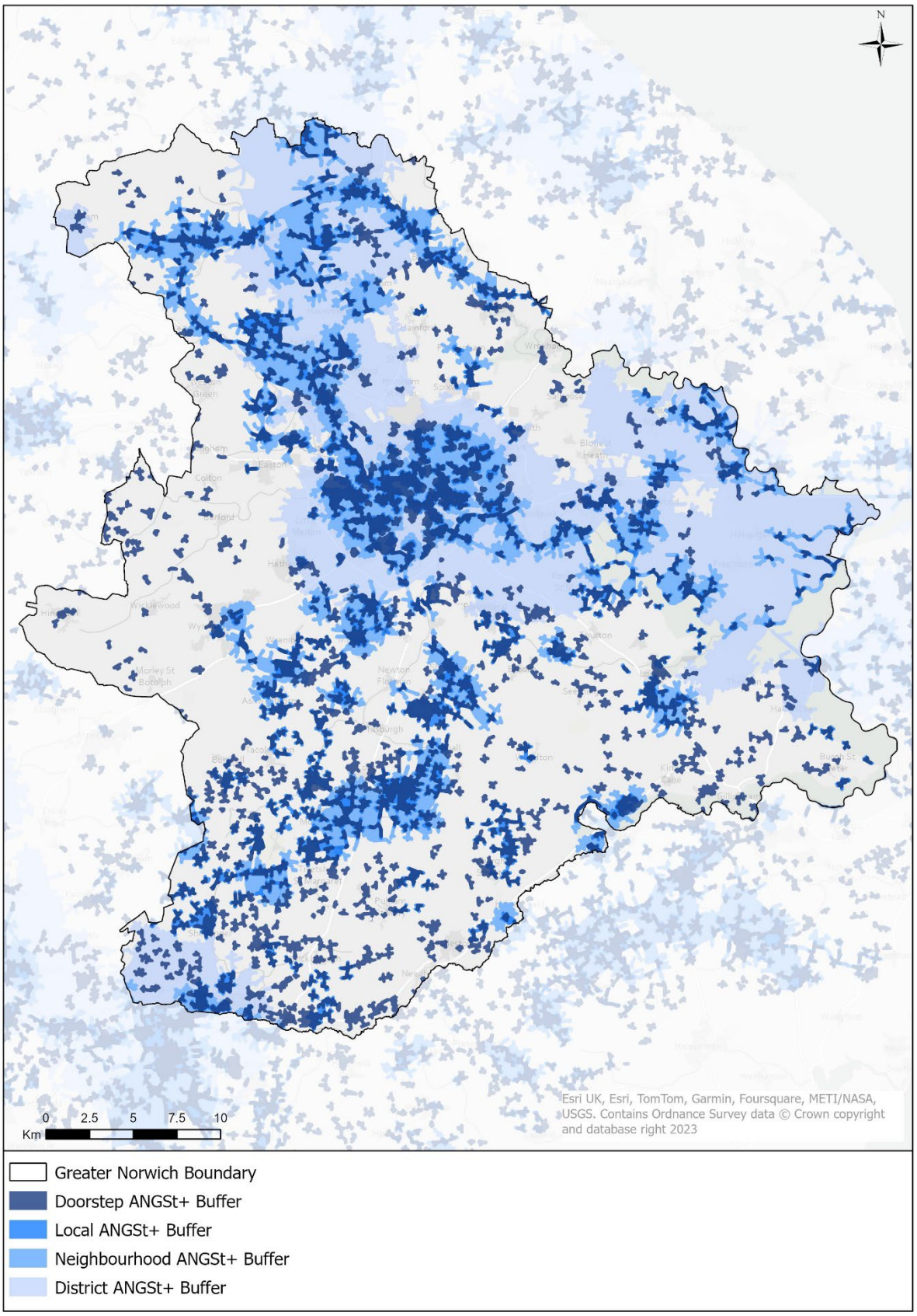


Figure 17: Buffers for each of the ANGSt+ Standards

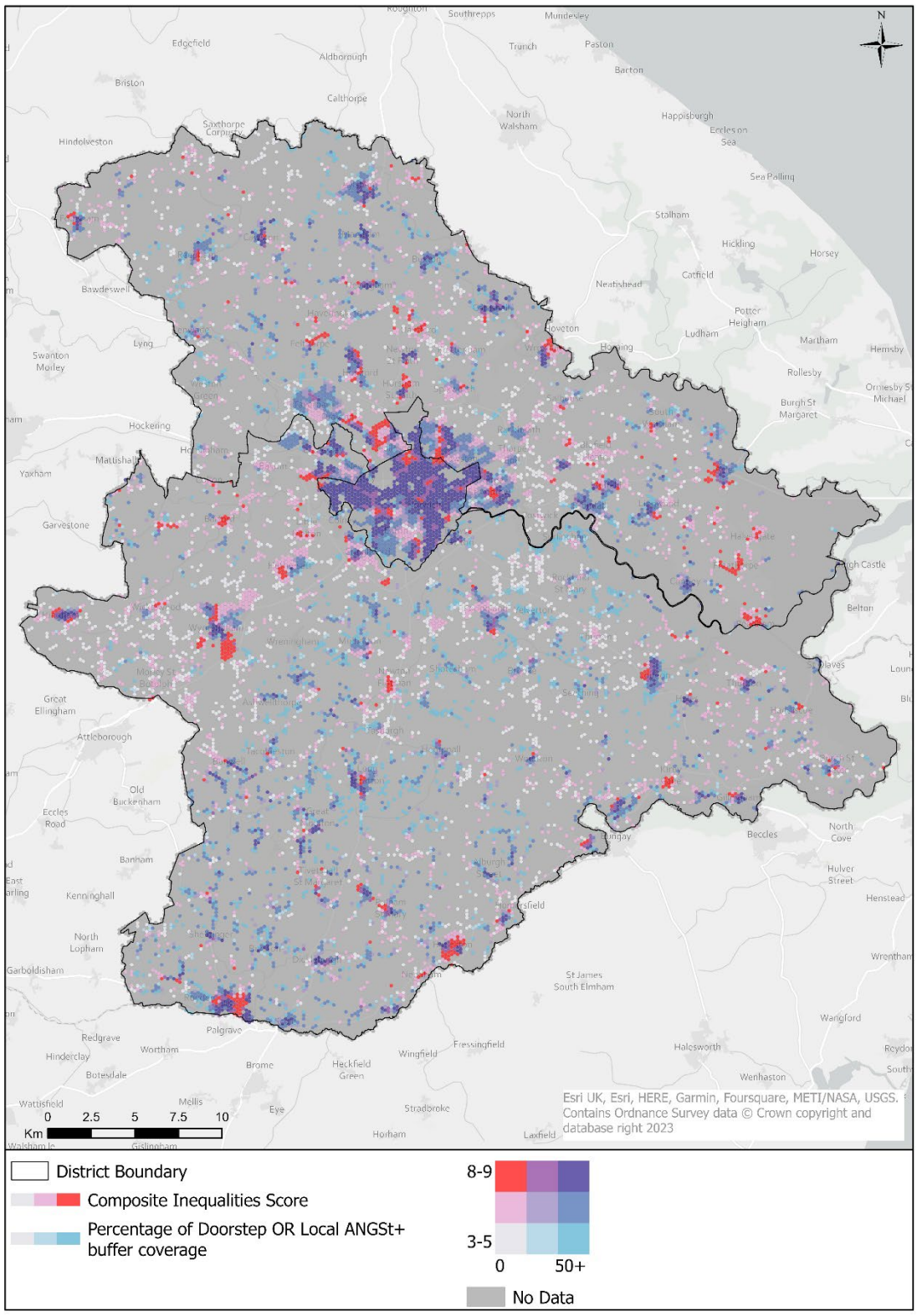


Figure 18: Bivariate Analysis showing Composite Inequalities Score against the Percentage of Doorstep OR Local ANGSt+ buffer coverage for a 200m hexagon tile. The highest composite inequality score with no accessible greenspace would be 'least favourable scenario' (L3, top left, in colour matrix).

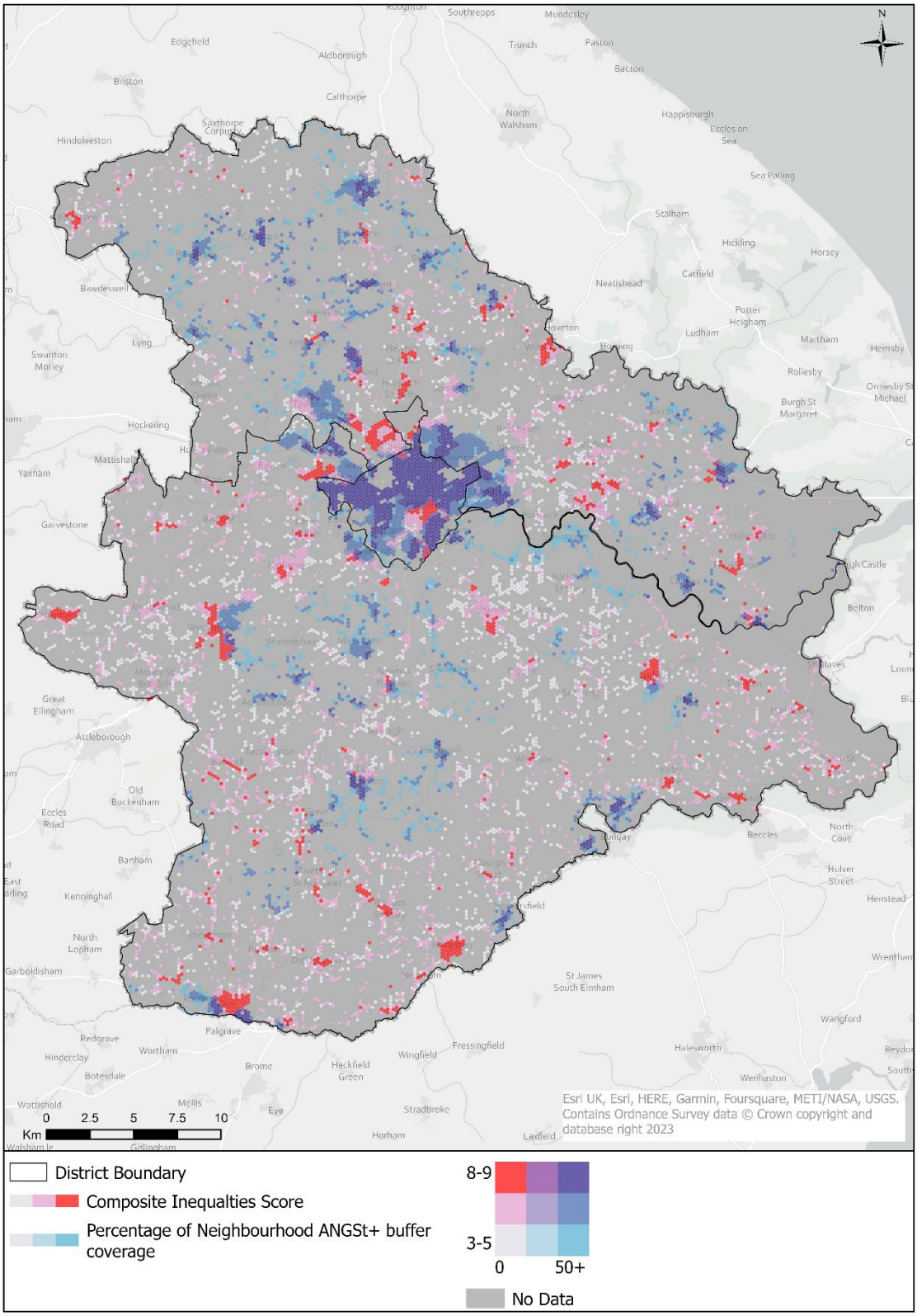


Figure 19: Bivariate Analysis showing Composite Inequalities Score against the Percentage of Neighbourhood ANGSt+ buffer coverage for a 200m hexagon tile. The highest composite inequality score with no accessible greenspace would be 'least favourable scenario' (L3, top left, in colour matrix).

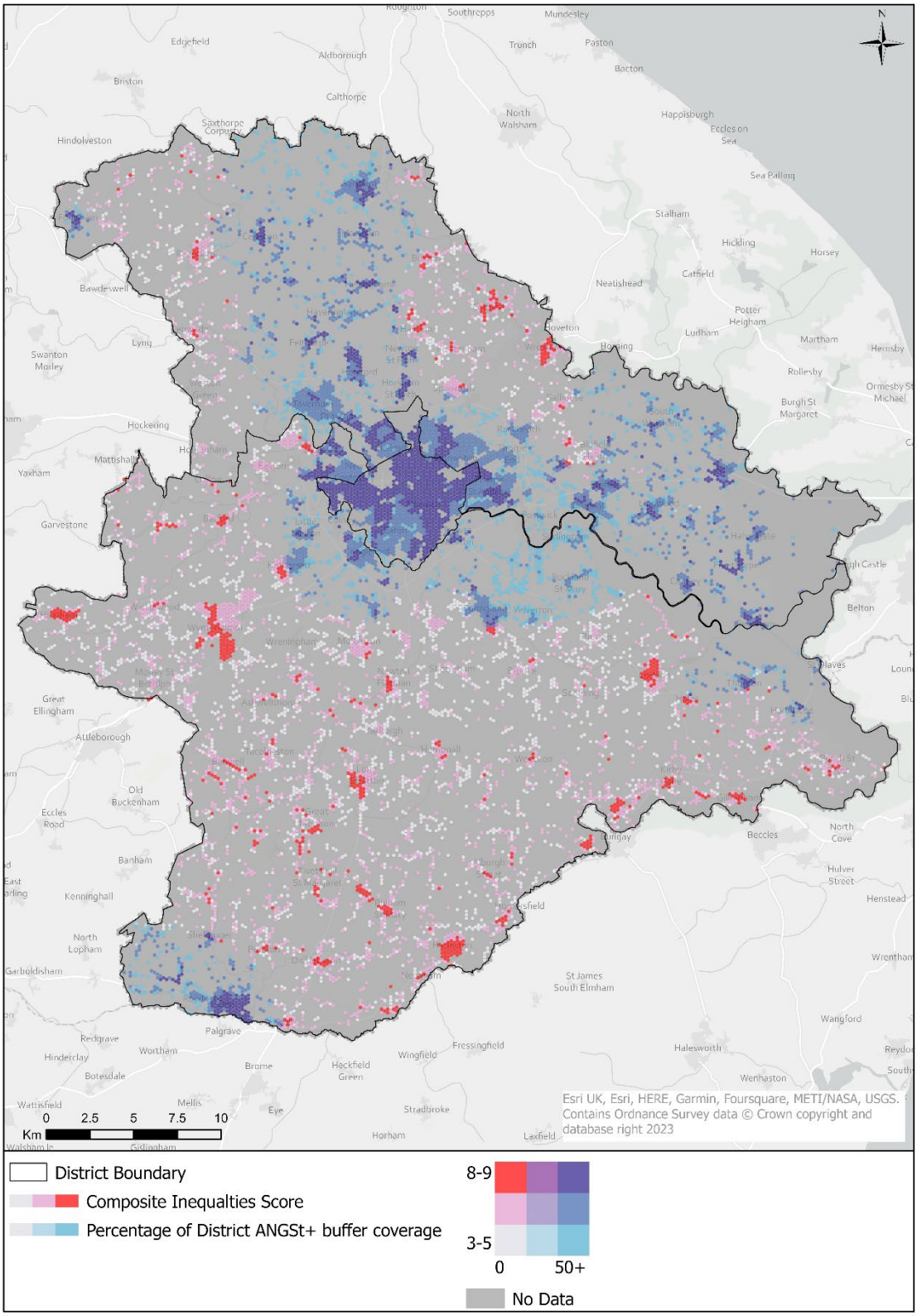


Figure 20: Bivariate Analysis showing Composite Inequalities Score against the Percentage of District ANGSt+ buffer coverage for a 200m hexagon tile. The highest composite inequality score with no accessible greenspace would be 'least favourable scenario' (L3, top left, in colour matrix).

4.1.4. Future GI: Impact on Priority Areas

As an example of the methodology proposed in section 3.4.3 for incorporating future allocations for GI, additional ANGSt+ buffers for each standard have been produced for mapped allocated sites[3] (Greater Norwich Local Plan). These have been overlaid onto the priority areas identified through the bivariate analyses (sections 1.1.1- 1.1.3) to illustrate how the impact of future GI assets on the surrounding populations can be quantified, allowing for more informed decision-making and prioritisation.

Figure 21 shows an example of how changes in access to greenspace can be monitored. Once boundaries showing the extent of proposed GI, and possible access points have been collated, the number of people who are within the relevant buffer zones for the new green space can be quantified. Counting the population within the neighbourhood ANGSt+ buffer for the exemplar proposed site in Figure 21 reveals that 4,114 people will be within the Neighbourhood Standard buffer for this new green space, including 2,657 who were identified as within priority areas for Neighbourhood Standard green space, based on the 'least favourable scenario' from the bivariate analysis shown in Figure 19.

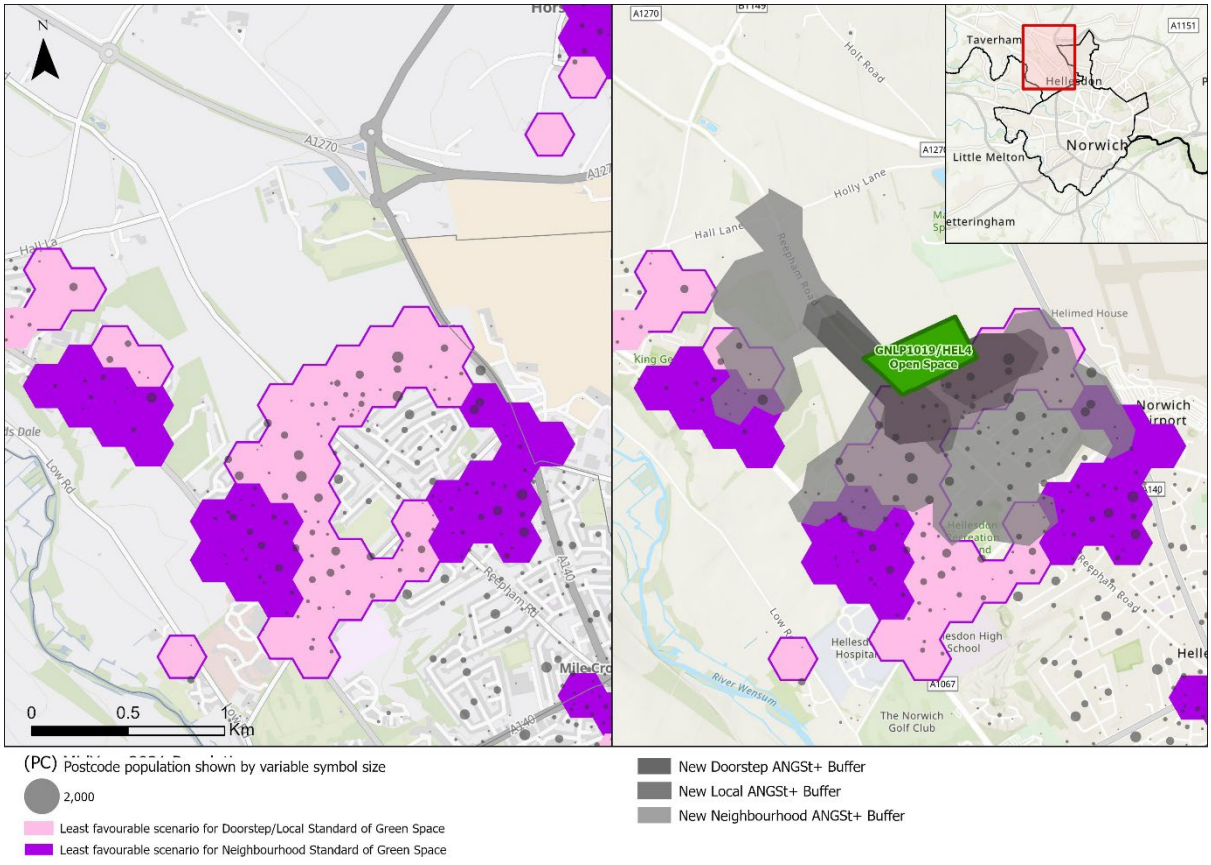


Figure 21. Example of a future GI analysis, using proposed boundaries for a recreational open space in Hellesdon, outlined in the Greater Norwich Local Plan (HEL4/GNLP1019). New ANGSt+ buffers are compared to priority areas to identify potential impacts of the allocation.

[3] Greater Norwich Green Infrastructure Study (December 2020)

This example methodology will be rolled out across the Greater Norwich area as new proposals are fed into the uncertainty log described in section 3.4.3. The opportunities presented by allocations currently included within the GNLP are further described in section 3.

4.2. Inclusive Access to Greenspace

In section 3.4.4 the methodology for creating a series of inclusive accessibility metrics was discussed. The inclusive access index was used to score green spaces across the Greater Norwich area, showing a relative comparison of which spaces may be generally more or less accessible based on the available data. These relative scores were then averaged within OAs to represent a preliminary approach to how the quality of inclusive access provision varies across the three districts.

There are five sites with a current Green Flag award in the Greater Norwich area, indicating that these have met a benchmark standard for good management. Four of these are in Norwich City itself, and the other is in Catton, just over the boundary in Broadland. Whilst the NE GI framework presents the Green Flag Award as the benchmark for inclusive accessibility, the inclusive access index presented here can be used to examine the remaining majority of green spaces which have not yet met the Green Flag criteria. Figure 22 and Figure 23 show a summary of the inclusive access scores in different OAs across the Greater Norwich area for each of the four categories: perceived safety, mobility, socioeconomics and naturalness.

OAs around the city generally scored higher (representing a higher level of inclusive accessibility) than more rural areas, which could be attributed to the greater density of facilities such as toilets, car parking, public transport and street lighting within urban greenspaces. As was previously depicted in Figure 7, Norwich has a higher density of publicly accessible greenspace sites than Broadland and South Norfolk, and many of these could be characterised as intensively managed urban spaces, more likely to contain hard-surfaced and barrier free routes suited to high levels of footfall, as well as other facilities that may encourage a wider range of users.

Examples of green spaces which scored highly across all categories of the index include the UEA campus, Mousehold Heath and Eaton Park. When considering averages across OAs for all categories of accessibility, areas in the North and West of Norwich tended to score highly, offering green spaces with good connectivity both to facilities and a wide range of natural habitats, including woodlands and the River Wensum. Outside of Norwich, Diss also contained OAs which scored highly across categories, with Diss Park and the Mere offering provision of green and blue infrastructure to the town. The highest mobility was generally associated with city centre green spaces, whilst OAs with higher safety and socioeconomic scores were found to be in the residential areas around Norwich. High naturalness was associated with sites along the river Yare and out towards the Broads.

Figure 24 shows the greenspaces with the bottom 10% of scores for each of the four categories. Around 5% of sites scored scored low across multiple categories, with the majority of these being in South Norfolk, which has a high prevalence of Public Rights of Way (PROW) compared to other types of green space. Buffered PROW sites will tend to score low in the ‘naturalness’ category due to the invariably high path density, and low scores for ‘mobility’ reflect a lack of barrier-free and suitably surfaced routes within these areas that would be accessible for all users. Rural sites tend to have fewer public and active transport links, and generally consist of open countryside with few built facilities.

Norwich city centre had many sites within the bottom 10% for perceived safety, for example Wensum Park, the Castle Gardens and Chapelfield Gardens, as well as several small central churchyards. Outside of Norwich, sites in Wymondham and Queens Hills, Costessey were also in the bottom 10%. Socioeconomic accessibility tended to be lowest for rural sites, however Heigham Park in Norwich is a notable exception within the city centre.

Overall, this work represents a preliminary approach to highlighting differences in green space quality and inclusive accessibility and will undergo further refinement during the next stages of strategy development in order to help inform where barriers to access exist and can be improved.

Validation and Recommendations

This work represents a preliminary approach to highlighting differences in greenspaces quality and inclusive accessibility, and highlights the need for standardised and improved data collection to fill current widespread information gaps. Limitations relating to the validity of the index have been identified throughout the development of the evidence base, and through subsequent consultation with Norfolk CC Accessibility Officers. These issues should be considered alongside the potential value of the index when deciding whether to further develop the work within the strategy. Feedback from the review, a summary of limitations identified, and general suggestions from the project team on how these could potentially be addressed, are set out in Annex 5.

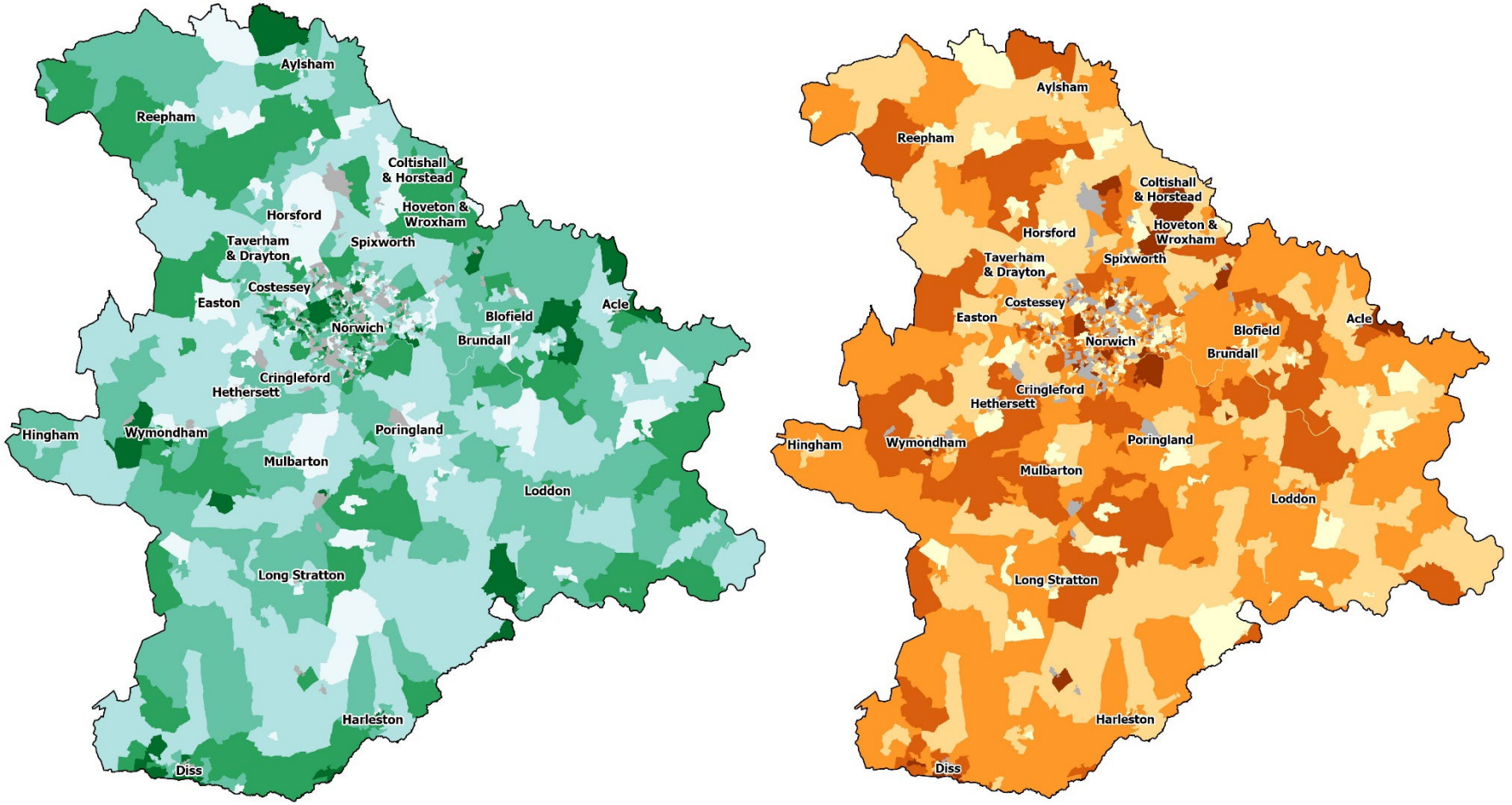


Figure 22. Average Inclusive Accessibility scores for Socioeconomics (left) and Mobility (right), summarised to the OA level. Darker colours represent a relative higher score. Grey areas contain no publicly accessible green spaces.

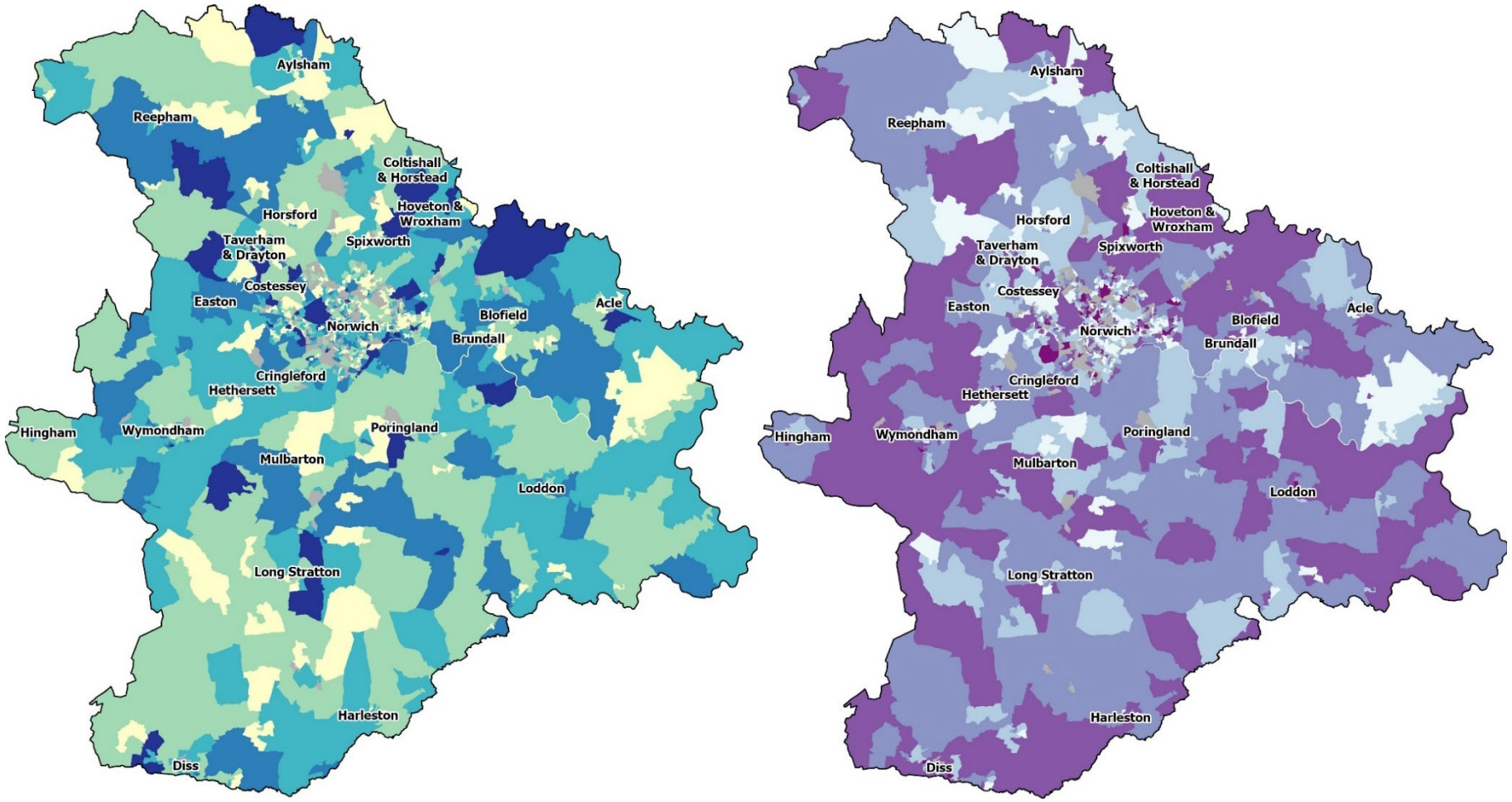


Figure 23. Average Inclusive Accessibility scores for Naturalness (left) and Perceived Safety (right), summarised to the OA level. Darker colours represent a relative higher score. Grey areas contain no publicly accessible green spaces.

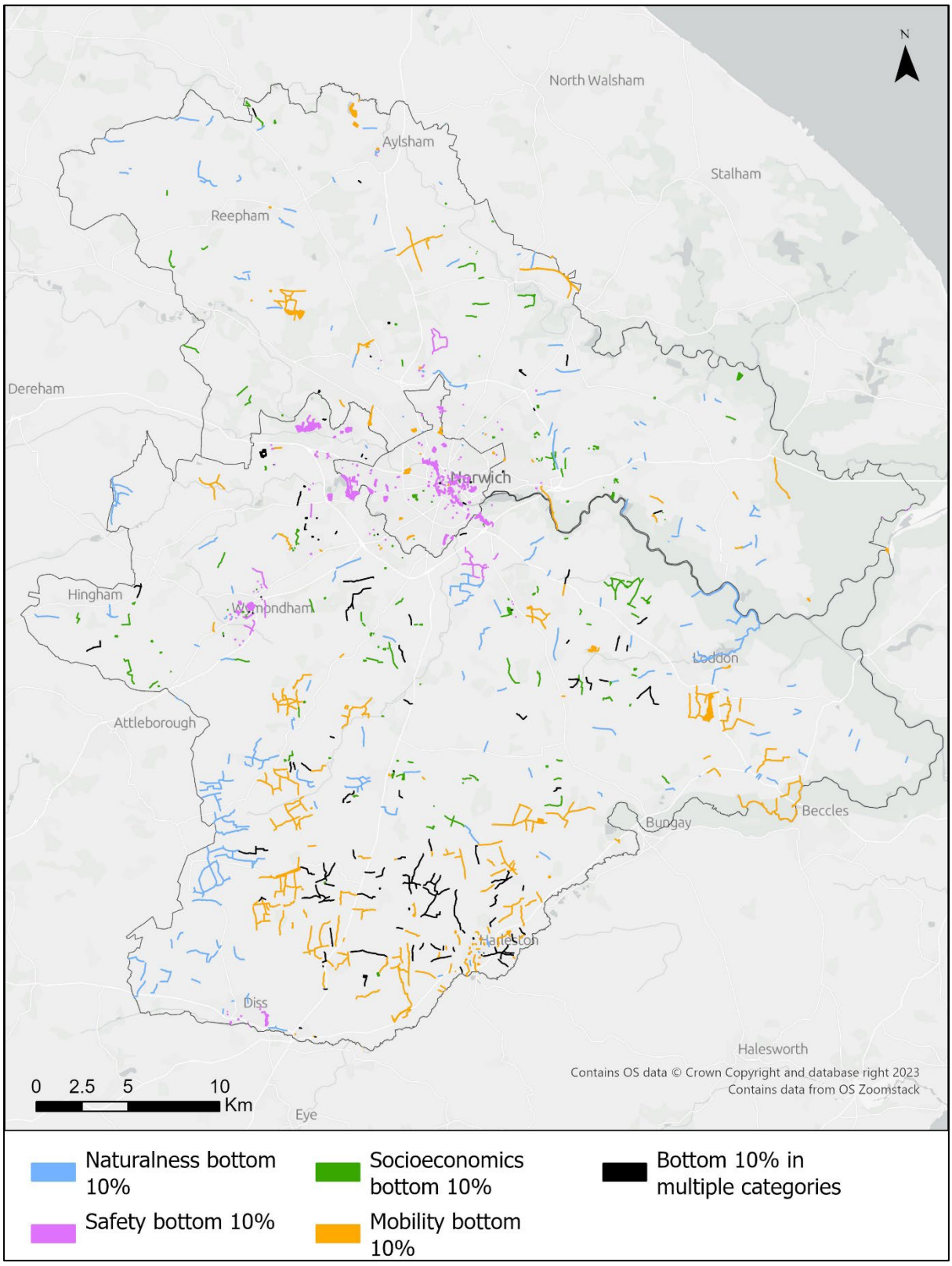


Figure 24. Greenspaces with scores within the bottom 10% in Greater Norwich. Black represents the highest priority areas, where green spaces rank in the bottom 10% for multiple categories.

4.3. Urban Green Factor Scores

The Urban Green Factor was calculated for the 20 largest built-up areas in Greater Norwich (Section 3.4.5), and was summarised to Output Areas (OAs). UGF scores are presented in Table 4, and range from 1 (representing the highest possible standard for urban greening) down to 0.12 (an area dominated by manmade impermeable surfaces, with very little vegetation).

In Figure 25, output areas have then been coloured according to this score, with darker colours representing a greener area, with a greater coverage of vegetation and natural or semi-natural habitats. The palest colours, representing a higher proportion of unvegetated and manmade surfaces, can be seen in parts of Norwich city centre, and less prominently in other built-up areas.
The lowest scoring ('least green') OAs which do not meet the NE Urban Green Factor standard for residential areas, have been highlighted in Figure 26.

Many of the lowest scoring areas consist of industrial and commercial zones within Norwich city centre and to the North of the city, however there are also some residential areas which do not meet the standard, for example certain areas of denser terraced housing in NR2 and NR3 (Figure 26), including much of the Colegate, Magdalen St. and Mancroft/ city centre areas, as well as parts of Riverside.

Norwich city centre provides both challenge and opportunity for improving urban greening. Sites allocated for development, including several brownfields within areas which currently do not meet the 40% greening standard, could either uplift the green cover in the City through the inclusion of measures such as targeted tree planting and green roof creation, or further lower overall greening.

Table 4: UGF statistics by built up area, in descending order of mean UGF.

Built-Up Area Name	Mean UGF (%)	Proportion of Area with UGF <0.4 or <0.3 (depending on Classification) (%)
Coltishall and Horstead	76	0.0
Costessey	74	0.0
Reepham	72	0.0
Brundall	69	0.0
Hoveton and Wroxham	69	0.0
Cringleford	**67**	**1.9**
Easton	66	0.0
Poringland	**64**	**3.2**
Hethersett	63	0.0
Aylsham	**62**	**2.5**
Rackheath	62	0.0

Taverham and Drayton	61	0.0
Loddon	**59**	**0.2**
Harleston	**58**	**12.5**
Spixworth	58	0.0
Horsford	56	0.0
Diss	**55**	**23.0**
Long Stratton	**55**	**0.3**
Wymondham	**54**	**4.5**
Norwich	**53**	**11.2**

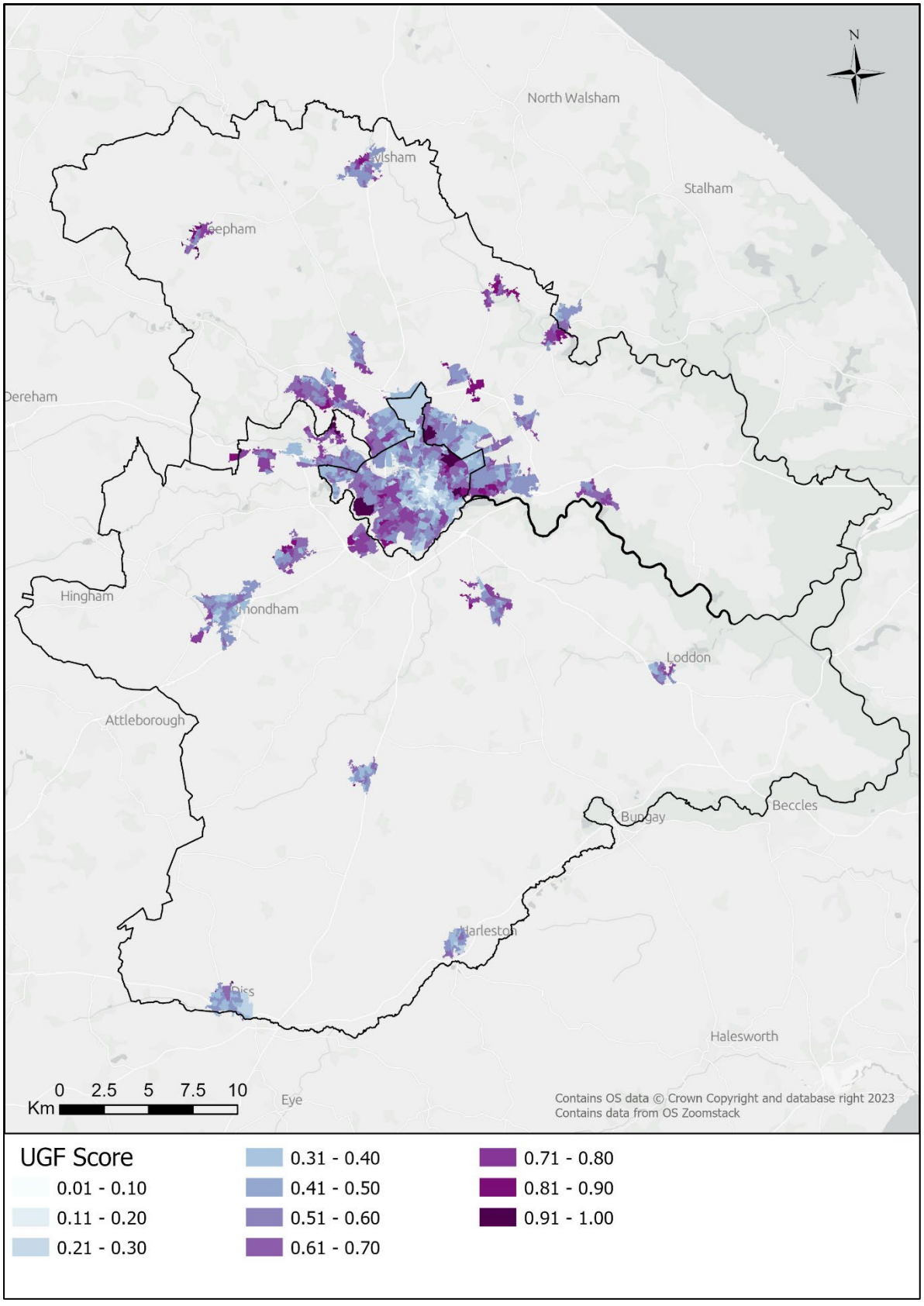


Figure 25: Urban Greening Factor results for the largest 20 built-up areas in Greater Norwich. A higher score represents a greater proportion of 'green' cover

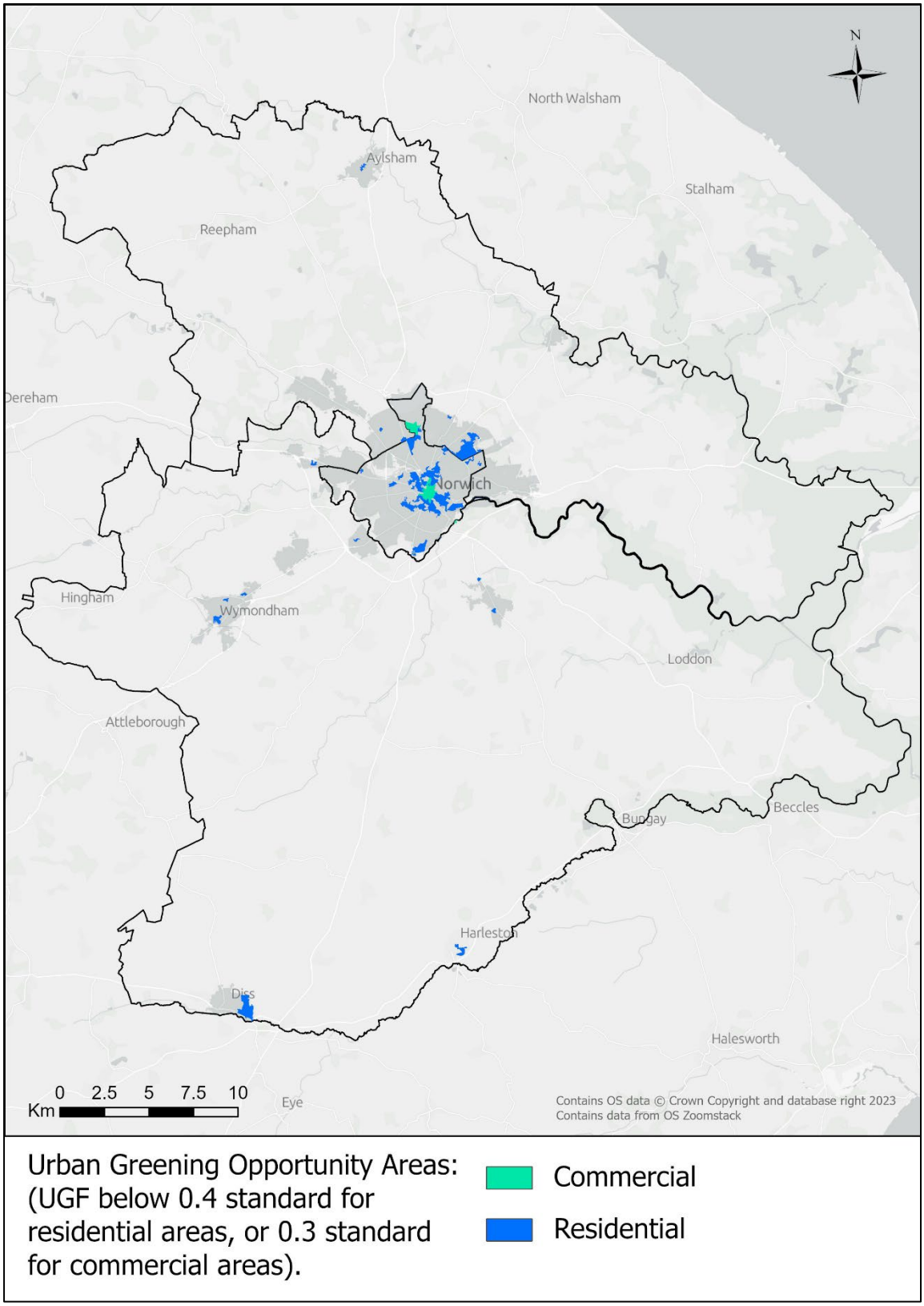


Figure 26. Urban Greening opportunity areas, consisting of OAs which currently do not meet the 40% threshold for residential usage, or the 30% threshold for commercial zones.

Table 4 shows the average UGF for each built up area in Greater Norwich, as well as the proportion of each area not meeting the standard of 0.4 set for residential developments. NE sets differing targets for commercial and industrial zones, and so further comparison of UGF scores against each area's predominant land-use will allow for clearer identification of deficiency areas. Figure 26 shows that there are multiple areas close to the City centre that have a high residential household density, which should be considered for prioritisation above commercial and industrial zones such as around Norwich Airport.

4.4. Public Survey Results

4.4.1. Visits to Greenspaces

In the survey, the public were asked to select on a map greenspace sites they had visited over the previous month. This has been summarised to LSOA, showing that the most clicked LSOA area was 'South Norfolk 006G' (Figure 27) which was selected 361 times by 179 individual respondents. The area contains Whitlingham Country Park, Caister St Edmund, High Ash Farm and other sites.

From these responses it is also possible to identify the sites most frequently visited by respondents. Among those are some of the historic parks and greenspaces in Norwich. The most visited site in Greater Norwich was Earlham Park and the area around UEA, followed by Mousehold Heath, the Whitlingham Country Park area in South Norfolk, and Eaton Park. The Blickling Estate was the most visited site in Broadland.

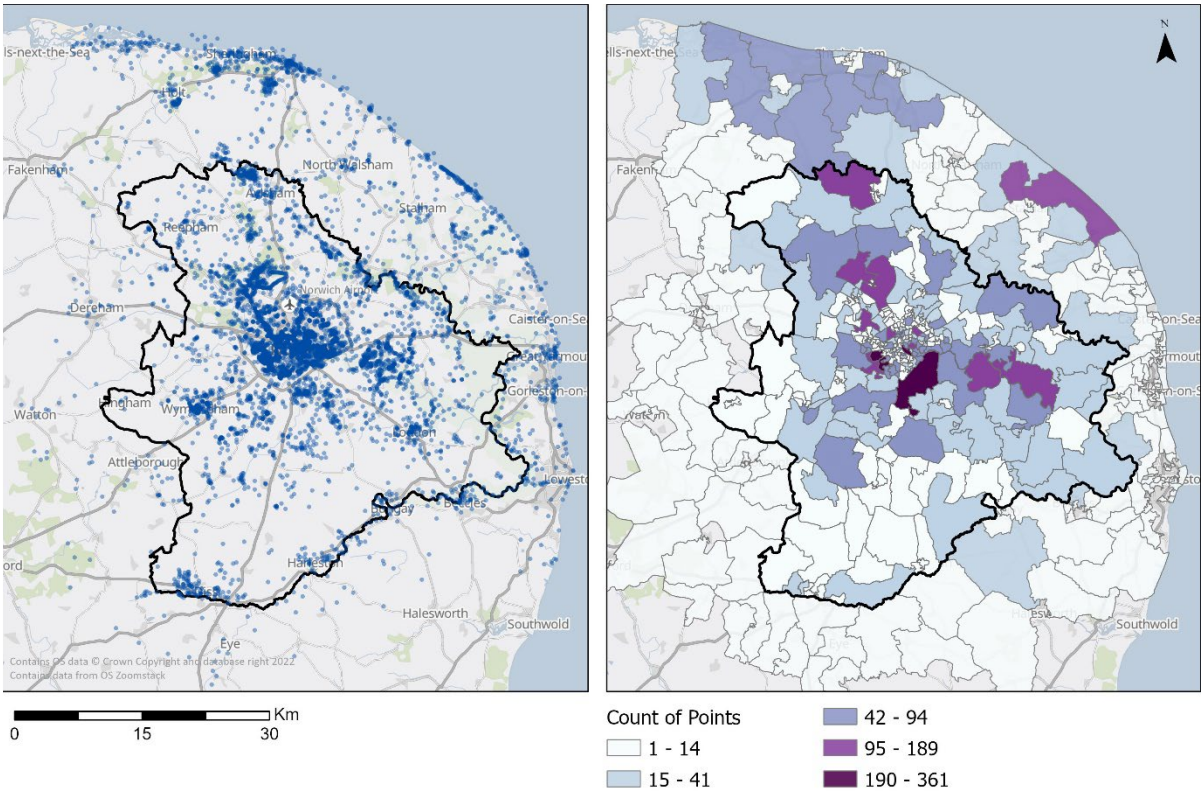


Figure 27. 'Please click all the greenspaces you have visited in the last month'. Answers as points and summarised to LSOA

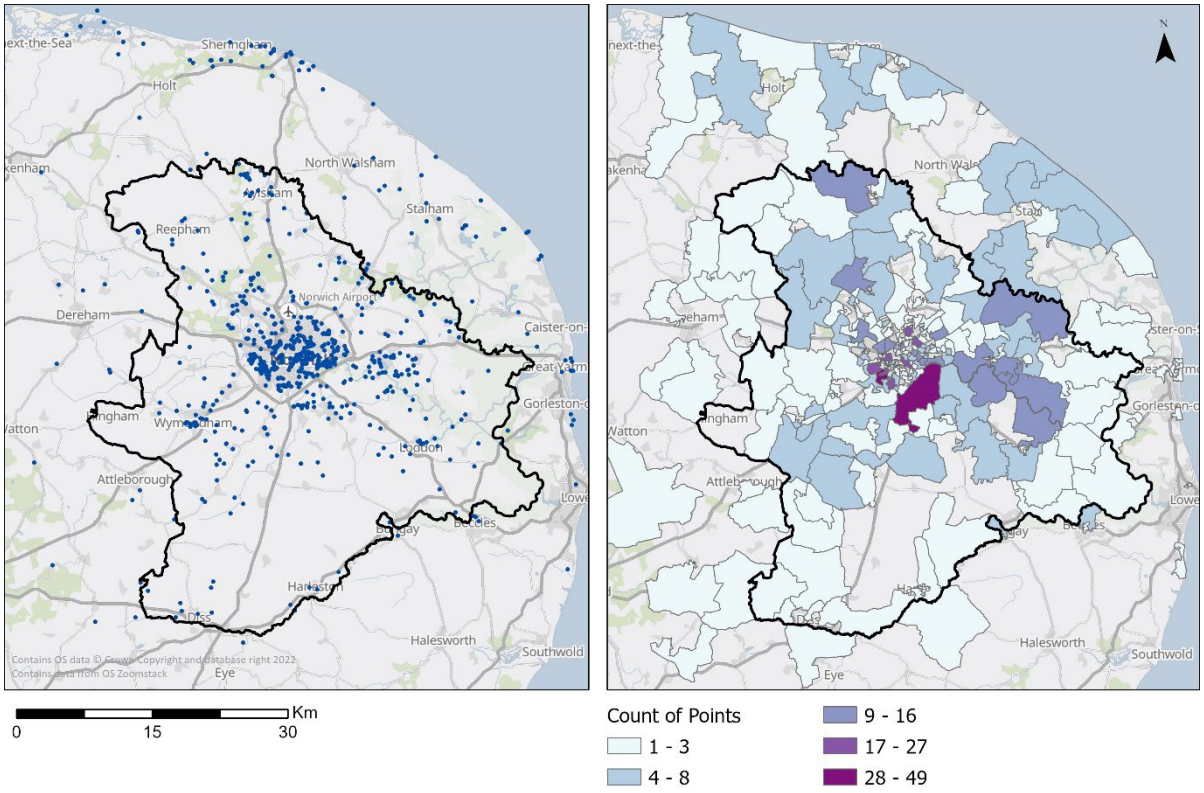


Figure 28. 'Please click the last greenspace you visited'. Answers as points and summarised to LSOA

Figure 28 illustrates the results of the survey on the greenspaces last visited by respondents. The findings show that urban greenspaces encompassing parks, fields,

and playgrounds attracted the highest number of respondents (Figure 29). 329 participants selected this option. By district, the highest percentage of these visits were by Norwich residents, as it could be expected due to the urban character of the district (43.85% of Norwich residents responding have visited an urban green space).

Forests and woodlands, nature/wildlife reserves, and rivers, lakes, or marshes were also popular choices, with 13.31%, 7.32%, and 14.26% of respondents respectively. For forest and woodlands, residents in Broadland were the ones going to this destination in larger numbers than the residents of the other two districts (24.9% of residents).

Grounds of historic properties or country parks, fields/farmland/countryside, and beaches/coastlines/seas were visited by a notable but slightly smaller number of participants. Respondents from Broadland are again those that most frequently visit these types of location.

Cemeteries or churchyards, allotments or community gardens, and hills, heathlands, or brecks were less frequently visited, and mostly by the residents of Norwich.

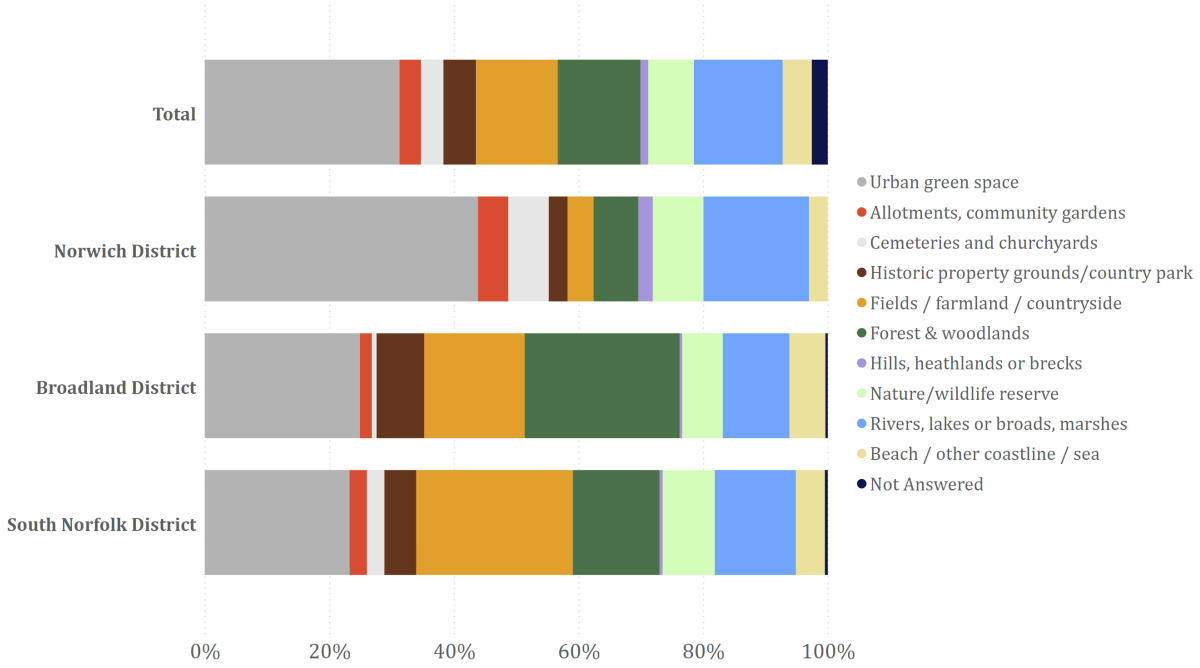


Figure 29. Type of greenspaces visited by respondents

The survey reveals a diverse range of motivations among respondents for their most recent visit to greenspaces (Figure 30). The findings show:

- The most common reason was to engage in physical exercise, with 250 participants selecting this option, which is around 24% of total responses.
- Walking dogs ranked as the second most common reason, with 231 respondents (nearly 22% of total responses).
- Exploring and being close to nature was indicated by 139 respondents (13.21% of respondents), while 133 visited greenspaces for the purpose of relaxation and unwinding (12.64%).

- Socialising and spending time with friends and family was also a significant motive, with 143 of individuals selecting this option (13.59% of total respondents).
- Additionally, 129 respondents specified other reasons that were not provided in the given options (12.26%). Other reasons included, tending to allotments, providing educational and recreational opportunities for children, participating in community events, and utilizing green spaces as convenient commuting routes.

These results underscore the varied and multifaceted benefits and attractions that greenspaces offer to individuals.

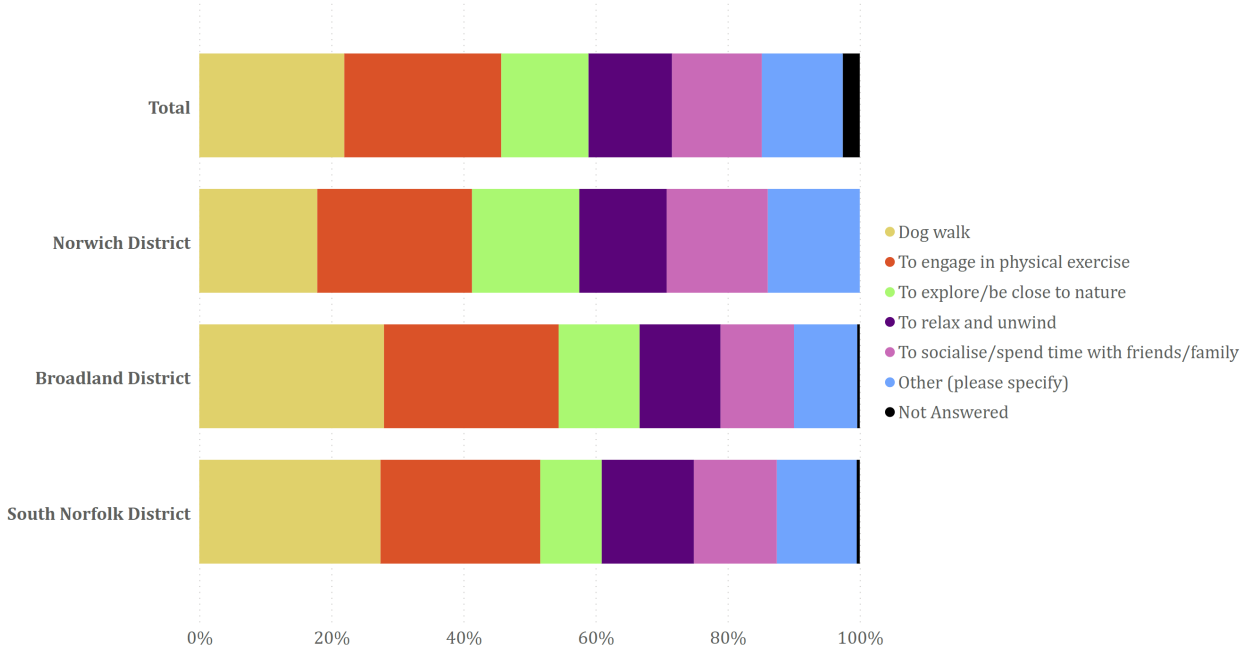


Figure 30. Main reason for visit of respondents and by local authority

When comparing the type of greenspace for reason of most recent visit (Figure 31), the survey shows:

- In Norwich, urban green spaces are predominantly utilised across all categories, except for the intention of 'exploring/closer to nature', where Rivers/Lakes (18.57%) and Nature/Wildlife reserves (21.43%) emerge as the more favoured options for green spaces.
- Within South Norfolk, the dominant green space type for dog walking and physical activities is 'fields/farmland/countryside' (37.29% and 32.69% respectively). For activities involving 'exploring nature' and 'relaxing and unwinding', the variety of preferred green space types expands to include nature reserves, rivers/lakes and forest/woodlands. Notably, 'urban parks' (51.85%) are the most frequent choice for those socialising with friends and family.
- In the Broadland area, the primary green space preferences for dog walking and physical engagement are 'fields/farmland/countryside' (30.14% and 13.43% respectively) and 'forest/woodland' (26.03% and 32.84%

respectively). Like South Norfolk, the selection of green space types becomes more diverse for 'exploring nature' and 'relaxing and unwinding', with historic parks as a popular option for relaxation in this district (18.75%). Respondents in this region were also found to favour beaches (17.24%) as well as urban parks (27.59%) as green spaces for socialising with friends and family.

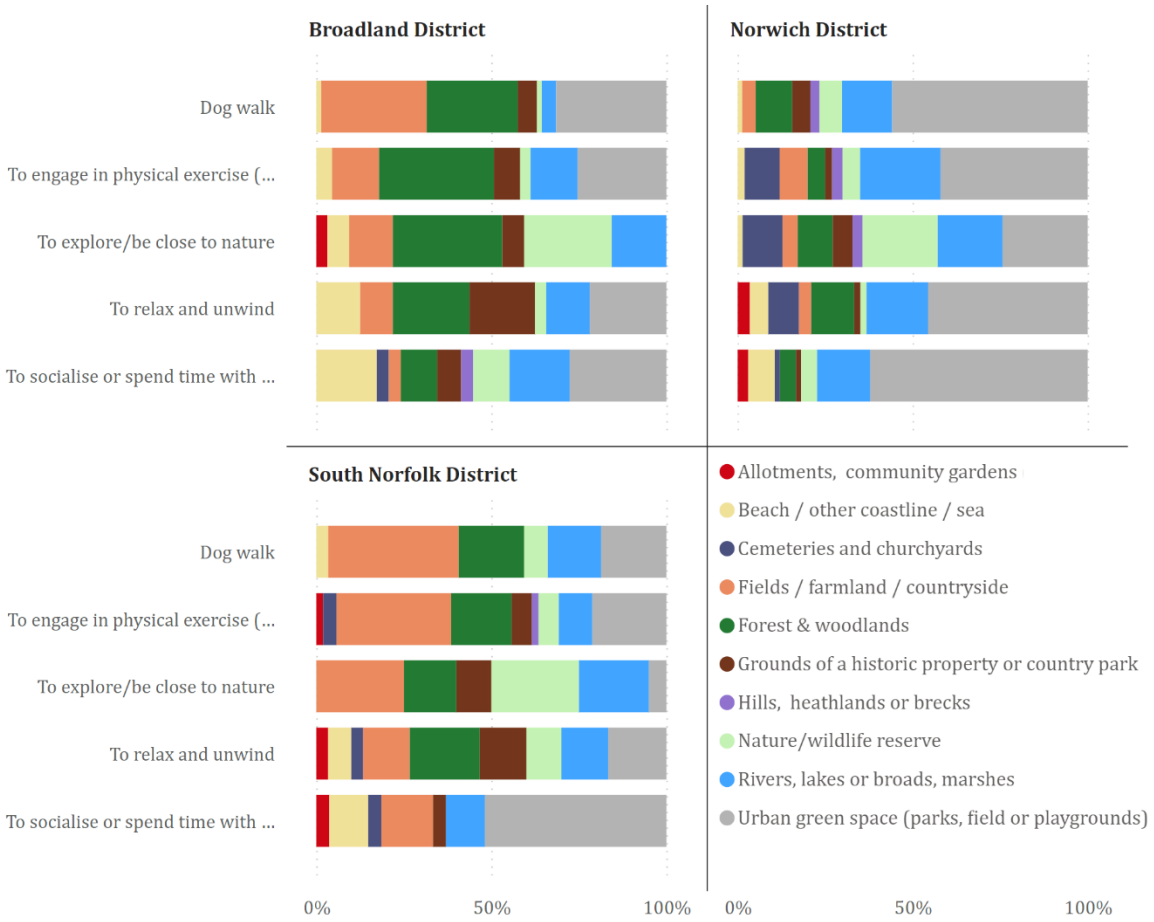


Figure 31. Stacked bar chart depicting the type and reason for visiting the most recent green space for respondents in the three Districts

4.4.2. Public perceptions of greenspaces and their benefits

The survey also gathered views on the quality of greenspaces and the benefits they provide.
Concerning the quality of greenspaces and the question of whether local greenspaces have improved over the last five years (Figure 32), results show:

- The majority of respondents in the survey (27.38%) perceived ‘no change’ in greenspace quality.
- A slightly lower number thought that quality had ‘Improved a Little’ (22.53%) with a small number (5.13%) indicating that the quality had "Improved a lot".
- When looking at declines, 12.93% believed they had “Reduced a little” and 15.30% felt they had “Reduced a lot”.

- Norwich District had the highest proportion of respondents reporting a significant improvement in greenspace quality with 7.42% stating it had ‘Improved a lot’ and 29% ‘Improved a little’. In comparison only 1.86% in South Norfolk District felt green space had 'Improved a lot’, however many respondents felt it had ‘Improved a little’, accounting for 25.12%.
- The perception of a significant decline ("Reduced a lot") in greenspace quality varied significantly among the districts. Broadland District had the highest percentage at 26.82%, followed by South Norfolk District at 22.79%. In contrast, Norwich District had a much lower percentage at 9.74%.

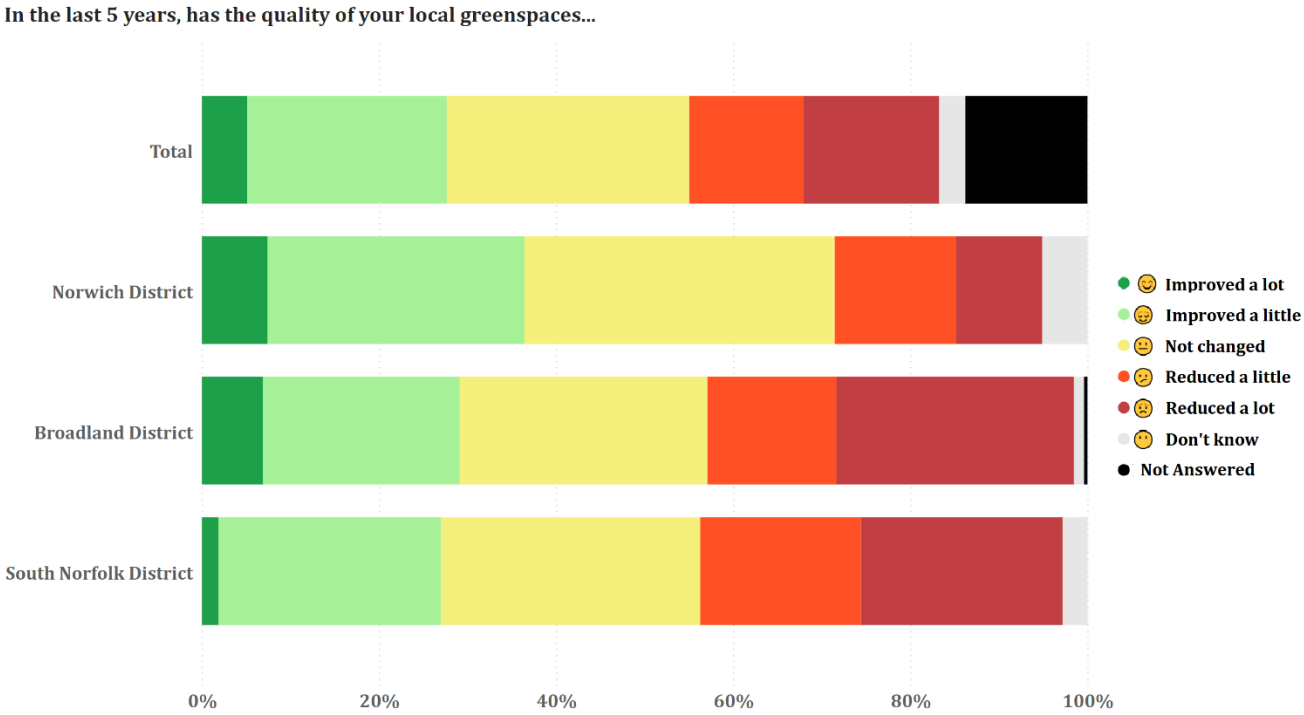


Figure 32. Perception of quality of greenspaces by residents and by local authority

Regarding how satisfied the respondents were with the amount of greenspace available (Figure 33), the results show:

- The majority of respondents (31.84%) expressed being ‘Happy’ with the greenspace available to them, whilst a considerable number reported being ‘Neither happy nor unhappy’ (16.92%) or just ‘Unhappy’ (16.63%) with the amount of green space available.
- Amongst the districts, Norwich notably had the highest level of satisfaction with the amount of green space available, with 44.08% of respondents being ‘Happy’ and 12.06% being ‘Very happy’. In contrast, Broadland had considerably higher number of unhappy and very unhappy respondents when compared to the other districts, with 20.69% respondents being ‘Unhappy’ and 17.24% respondents being ‘Very unhappy’.

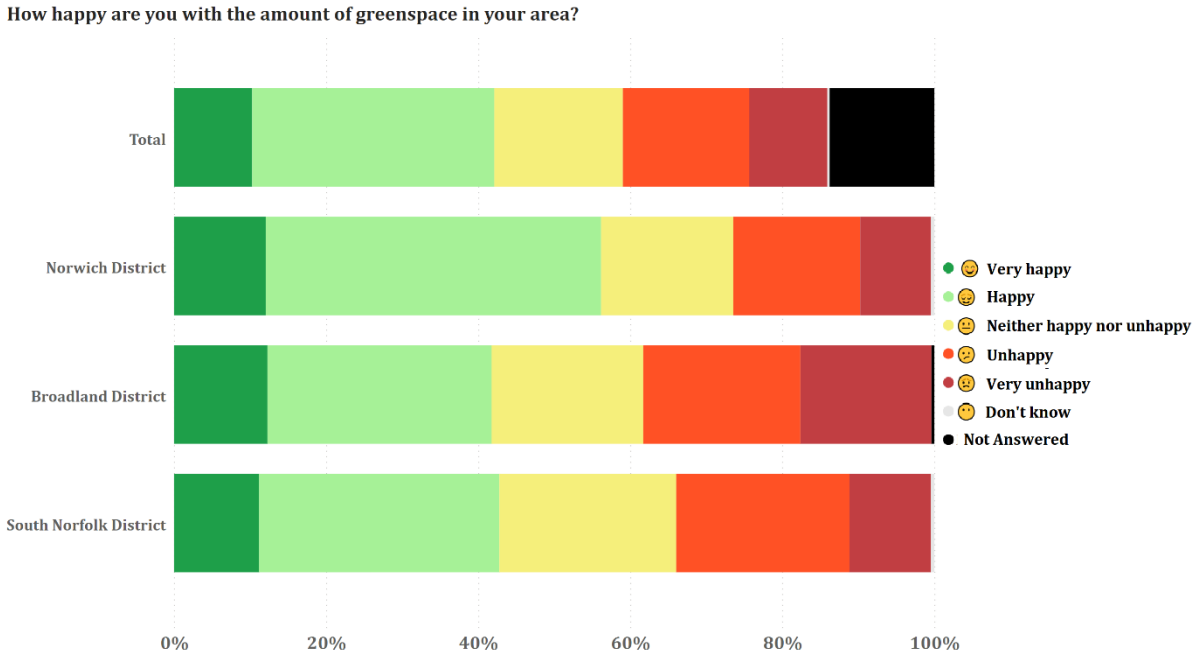


Figure 33. Level of happiness with local provision of greenspaces by residents for Greater Norwich and by local authority

4.4.3. Distance Travelled to Green Space

When looking at the transportation type for distance travelled (Figure 34), the survey shows:

- Across all three districts, people predominantly travel shorter distances (200m-800m) to green spaces by walking (94.33%). This trend decreases as the distance to greenspaces increases, with fewer individuals opting to walk to destinations 5km-15km away (4.52%).
- Conversely, the use of cars, vans, and motorcycles becomes more prevalent as people journey to more distant greenspaces over 15km away (90.48%).
- The likelihood of utilising public transport rises when travelling farther destinations, particularly for residents in Norwich (6.67%) and Broadland Districts (7.69%).
- Bicycles are a common mode of transportation, particularly for residents in Norwich District, when travelling to green spaces between 5km-15km away (19.57%).

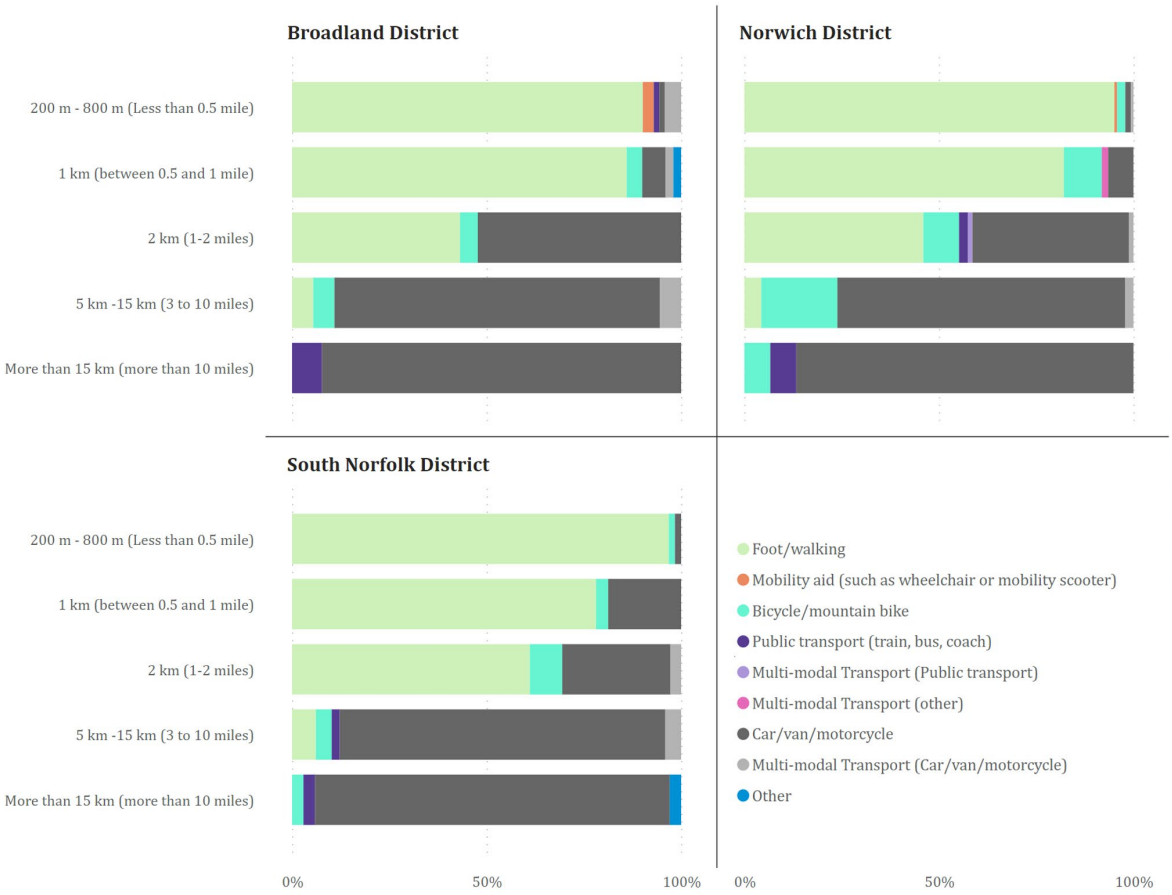


Figure 34. Stacked bar chart showing the mode of transportation used for the distance travelled to a recent green space.

When looking at the distance travelled and for what reason (Figure 35) the survey shows:

- In the districts of Broadland and South Norfolk, most individuals utilise nearby green spaces (within 200-800 metres) for dog walking (45.07% and 42.86% respectively) and engaging in physical activities (25.35% and 25.4% respectively). In contrast, respondents from Norwich use these nearby green spaces for a more diverse range of purposes, including 'to explore and be close to nature' (16.78%) and 'to relax and unwind' (16.08%).
- Across all three districts, participants predominantly utilise green spaces in their local proximity (within 1 to 2 kilometres) for dog walking and physical activities. However, in Norwich and South Norfolk, these spaces also serve as venues for 'to socialise or spend time with friends/family' (13.82% and 21.88% respectively).
- When considering green spaces located further away (>15km), respondents share common reasons for utilisation. These include 'to explore and be close to nature' (17.48%), 'to relax and unwind' (21.36%) and 'to socialise or spend time with friends/family' (22.33%).

Figure 35. Stacked bar chart depicting the reasons survey respondents from the three Districts travel specific distances to access their most 'recent' visited green space.

When looking at the distance travelled and the type of greenspace (Figure 36), the survey indicates:

- In Norwich, when considering nearby green spaces (200m-800m) that respondents have most recently visited, the predominant types are 'Urban parks, fields, or playgrounds' (53.15%), followed by 'cemeteries' (11.89%) and 'rivers and lakes' (12.59%). In Broadland, 'Urban parks, fields, or playgrounds' (35.21%) are also common, but 'Forest and woodland' (30.99%) and 'fields/farmyards and countryside' (26.76%) are almost as equally frequent. On the other hand, in South Norfolk, 'fields/farmyards/countryside' (36.51%) are the most common nearby green spaces.
- Examining most recently visited green spaces situated further away (>5km), all three districts exhibit a more varied usage pattern. Notably, the most frequently visited green space types more than 15km away include beaches (32.04%) and historic parks and gardens (16.5%). Rivers/lakes (15.53%) and Nature reserves and wildlife areas (9.71%) also see significant usage.

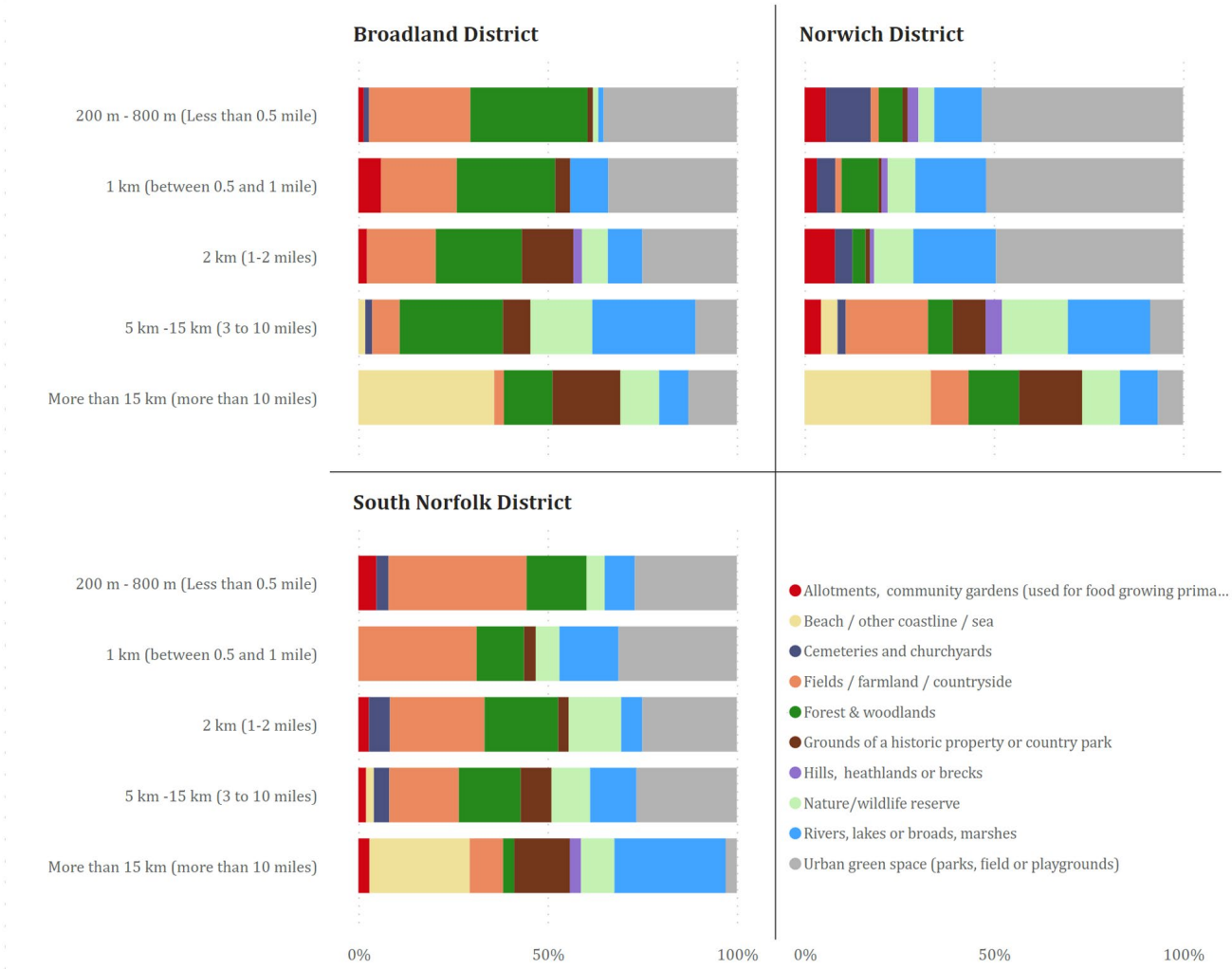


Figure 36. Stacked bar chart depicting the type of green space survey respondents from the three Districts travel specific distances to access their most 'recent' visited green space

4.4.4. Duration of stay at Green Space

When looking at the duration of stay and for what reason (Figure 37) the survey shows:

- For shorter time intervals (up to 30 mins), the predominant activities in green spaces are dog walking (30.39%) and physical exercise (29.41%). However, in Norwich, there is also a tendency to utilise green spaces for 'nature exploration' (16.67%) and 'relaxation and unwinding' (16.67%) within this shorter duration.
- For longer time spans, respondents from all three districts exhibit a variety of activities in green spaces. Socialising and relaxation are common purposes for longer visits across the districts. In Broadland, respondents are also more inclined to use this extended time (over 5 hours) for exploring and being in proximity to nature (28.57%).

Figure 37. Stacked bar chart illustrating the reasons and durations of the most recent green space visits by survey respondents from the three districts.

When looking at the duration of stay and type of greenspace for the most recent visit (Figure 38) the survey shows:

- During shorter durations (up to 30 mins), Urban fields and parks are commonly visited by residents from all three districts (62.75%). For slightly longer stays (up to 1 hour) Broadland and South Norfolk, respondents are also inclined to utilise 'fields/farmyards/countryside' (28.79% and 41.3% respectively) and 'forest and woodland' (27.27% and 21.74%) green spaces.
- For longer durations, the types of green spaces respondents used was a lot more varied. Notably, beaches (27.91%), rivers/lakes (16.28%), and nature/wildlife reserves (11.63%) are the most preferred types of green spaces for extended stays (over 5 hours). Respondents were also likely to spend longer in allotments, particularly in South Norfolk (7.69%) and Norwich Districts (6.25%).

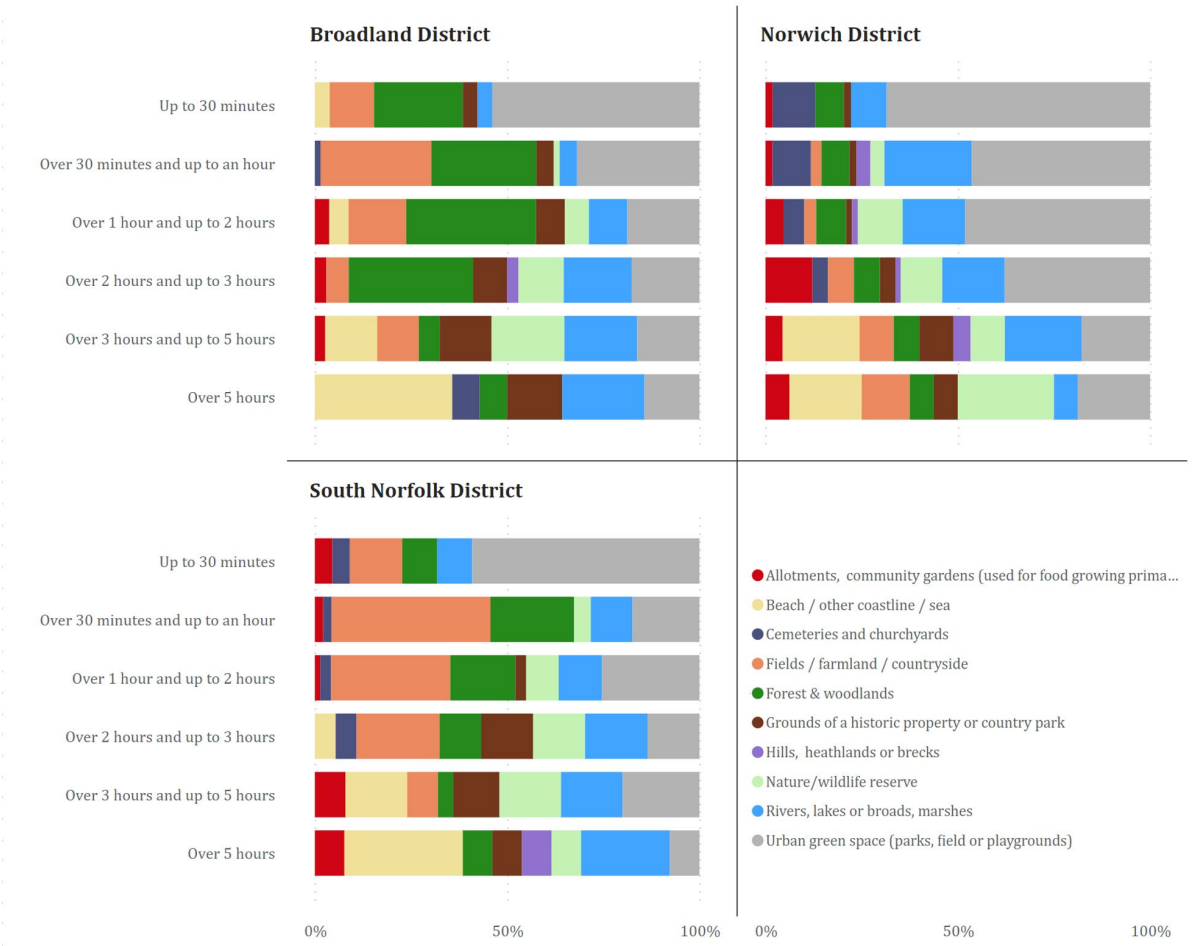


Figure 38. Stacked bar chart illustrating the type and duration of the most recent green space visits by survey respondents from the three districts.

4.4.5. Other feedback

Survey respondents were invited to share further feedback at the end of the survey. 341 out of 1052 (32.41%) respondents provided their comments (19,000 words) reflecting a mixture of both positive and negative sentiments. The following word cloud, in Figure 39, shows some of the recurrent themes (NB: some words such as “greenspace” have been excluded as they would skew the analysis). Words like “people” and “wildlife” are the most frequently mentioned by respondents. This is important to validate the two-pronged theme of the strategy, the delivery of greenspaces for both people and nature.

Figure 39. Word cloud of most recurrent themes in responses

While the overall tone of the responses leans towards concerns and criticisms, there were some opinions that highlighted the positive aspects and opportunities for improvement regarding greenspaces in Norfolk (Box 1).

Box 1: Summary of positive comments on greenspaces by survey respondents

1. **Variety, Quality and Proximity:** Many were happy with the number of parks and green spaces in Norwich. Residents valued parks being near home as it enables convenient, spontaneous access and use. Respondents commended the diversity of spaces, from city parks to rural countryside, offering different amenities. Norwich's parks were praised for their quality, and maintenance standards, contributing to the city's overall appeal.
2. **Natural, Health and Physical Benefits:** Many felt they were fantastic resources, offering amenities such as footpaths, playing fields, and play equipment. Residents admired the natural beauty of these green areas, with mentions of mature trees, grass verges, and "wild" spaces in parks like Earlham Park and UEA grounds. Green spaces were acknowledged as essential for mental health, with individuals citing how spending time in nature helps combat depression and anxiety. Residents appreciated the vital

ecosystem services offered by parks, including the presence of trees, a variety of plants, and habitats for wildlife.

3. **Preservation of Greenspace:** Many felt town councils, resident associations, and other community groups were taking the initiative to maintain local parks and green spaces to high standards. Responses highlighted value from protecting green heritage, such as resident-led efforts to preserve treasured community assets like ancient hedgerows and lime trees. Some felt there were productive partnerships in council collaborations with residents to upgrade facilities to higher standards, like improving Waterloo Park to Green Flag status. There is a strong self-motivation to seek natural connections despite limitations whether it is growing "own green spaces" or accessing PROW.

Some areas for concern about the current state of greenspaces in Norfolk and calls for better management, protection, and prioritisation of nature and biodiversity are raised, (refer to Box 2). Some of these could be explored further to become work areas.

There is some disagreement among respondents on certain priorities towards greenspaces, such as prioritising economic growth, spreading private housing, and focusing on leisure rather than conservation and community activism. There is strong support for better management of existing greenspaces with concerns about accessibility, footpath maintenance, parking fees and bin provision for litter and dog waste.

Box 2: Summary of concerns on greenspaces by survey respondents

4. **Environmental Impact and Biodiversity.** There was criticism of urban development on greenfield land, the negative effect of this on wildlife and biodiversity, and lack of preservation and conservation. Some also criticised continuous development, destruction of habitats for birdlife, and spoke of the need for more hedgerows, tree planting, and restoration of diverse natural spaces.
5. **Lack of Priority and Planning.** A key theme between respondents was lack of prioritisation. There was a perception that greenspaces are not prioritised in Norfolk, with a focus on road building and housing development over preserving and enhancing green areas. Some also mentioned inadequate planning, with criticism of poor planning; disregard for the countryside and natural world; destruction of mature trees and hedge boundaries; and the need to enforce natural greenspaces in new developments all being highlighted.
6. **Insufficient Facilities and Diversity:** Responses included requests for a variety of greenspaces catering to different interests, including sports, seating, play areas, gardens, and dog-free areas. Some comments expressed the need for more facilities for girls, and older retired individuals. Some also commented on a perceived lack of provision and integration. There were calls for improved provision of greenspaces, including community gardens, quiet greenspaces, and integration of resources for wildlife and community well-being.

7. **Maintenance and Tidiness.** Some commented on litter and lack of maintenance. There were concerns about littering, a lack of rubbish and dog waste bins, poor maintenance of play equipment, and unkempt paths. Other responses commented on an excessive focus of tidiness over nature. There was disapproval of excessive road verge cutting, and some highlighted the need to leave more natural untidy spaces to support biodiversity. Another theme was inadequate information and awareness, with requests for better information about local greenspaces, clearer guidance on dog access and behaviour, improved maintenance, and promotion of greenspace benefits for mental well-being.
8. **Access and Safety**. Many felt there was insufficient access and awareness. There were concerns about the lack of footpath signposting, low awareness of walking routes, and limited access to greenspaces in certain areas. There were requests for improved accessibility and repair of paths and boardwalks, better drainage in open spaces, enforcement of dog leash rules, and provision of more dog bins and benches. There was also concern about anti-social behaviour, particularly drug and alcohol use and disturbance caused by dogs.

Positive sentiments were expressed about specific parks and the commitment to improving greenspaces. There is support for greenspaces, natural environments, and sustainability with desire for more trees, wildflower areas, and wildlife conservation. Residents recognise the value of greenspaces for well-being and community engagement and that access improvements are needed e.g., more bus routes and dedicated walkways. There are calls for greater fines and enforcement against fly-tipping and environmental abuse.

Below is a selection of direct quotes from survey respondents that express a desire for environmental sustainability, conservation, community engagement, improved access, and appreciation for nature and greenspaces:

“Maintaining wildflowers and other plants vital for wildlife”

“More riparian tree planting”

“Respect and appreciation for the countryside and nature”

“Creating larger parks for wildlife”

“Allowing wild grass verges and wildflowers to flourish”

“Creating corridors for nature through the urban area”

“Preserving and reclaiming natural spaces”

“Protecting greenspaces from climate impacts”

“Sharing knowledge of ecological heritage”

“Creating more small community greenspaces”

“More food forests and community food gardens”

“More innovative exploration of community energy generation”

“Connecting pathways between different areas”

“Increasing access to greenspaces for people and wildlife”

“Providing more benches and seating areas”

“Promoting cycling infrastructure”

“Improving litter picking in parks”

“Promoting outdoor time for health and well-being”

“Better management of urban fields/grasslands for humans and wildlife”

“Increased provision of greenspaces in new housing developments”

4.5. Public Rights of Way and Lost Paths

The map of lost paths and public rights of way illustrates the potential to supplement the existing public rights of way network with paths that may have public right of way status but have become lost in that they are not marked on the definitive map and people are unaware of their existence (Figure 40). By extending the public rights of way network to include all the lost paths in the Greater Norwich area all the health and wellbeing benefits presently delivered by the existing PROW network would be substantially increased and, in some cases, multiplied in the following ways:

1. Linking up dead ends or filling gaps in routes.
2. Creating circular routes for leisure use.
3. Connecting people to sites of historical, cultural, or natural interest.
4. Connecting with Open Access Land – particularly 'Access Islands' which are currently not served by any rights of way.
5. Improving equality of access.
6. Adding routes to areas which currently lack rights of way or access to green space.
7. Connecting urban or built-up areas to green spaces
8. Supporting tourism, regeneration, or other community projects.
9. Saving historic paths for the health and wellbeing of future generations.

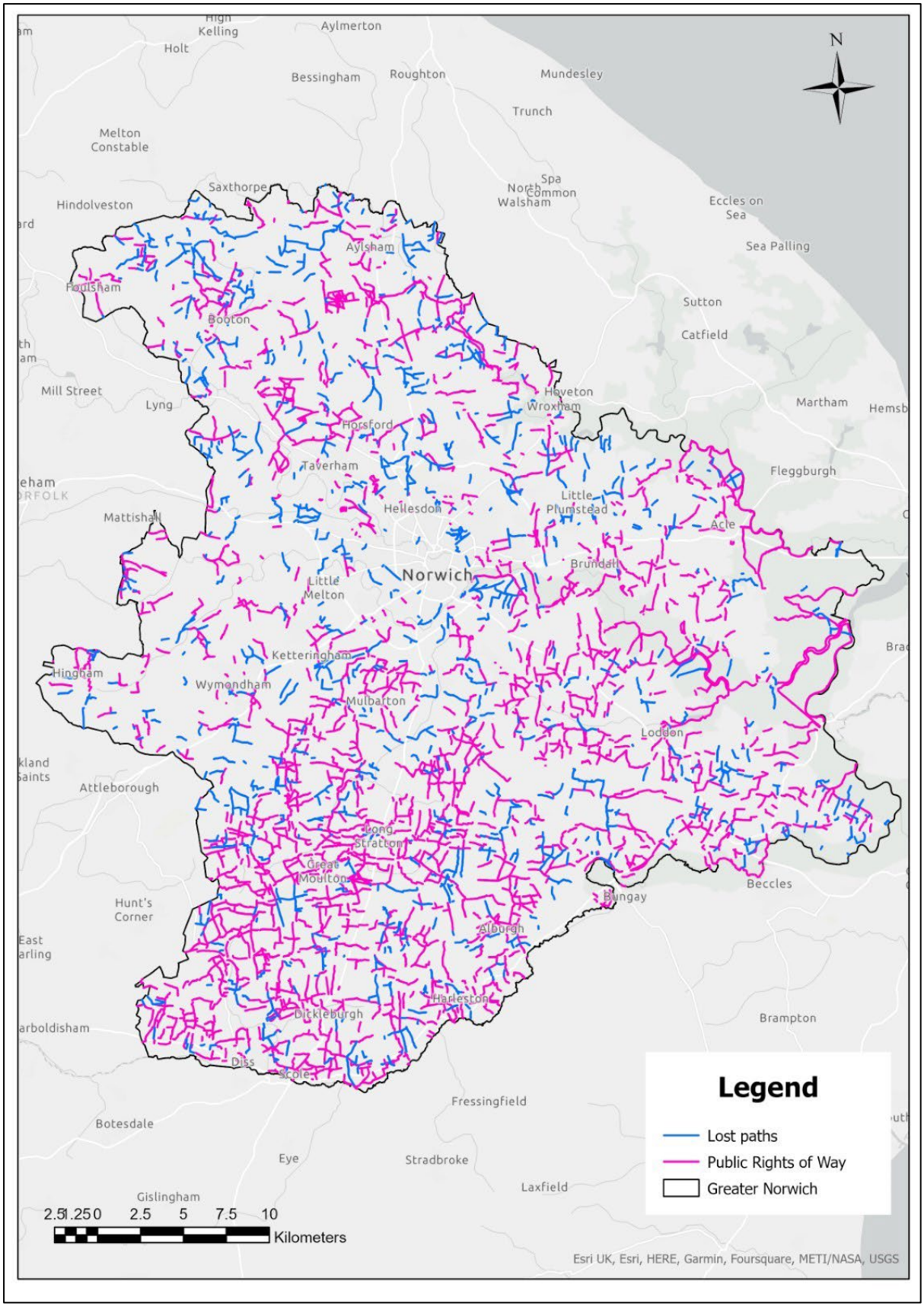


Figure 40. Public Rights of Way, and lost paths not shown on definitive map.

5. Results related to Natural Places – Green Infrastructure for Nature

5.1. Irreplaceable Habitat

The irreplaceable habitat map is designed to deliver a strategic overview of the most valuable areas for biodiversity both within and outside locally and nationally designated sites. The irreplaceable habitat map can provide valuable insights for both nature recovery strategies and development planning:

For nature recovery:

- Identifies irreplaceable habitat that may have potential for conservation designation or other protections to prevent loss.
- Highlights habitat corridors that connect concentrations of irreplaceable habitat to guide conservation to enhance landscape connectivity.
- Helps to build the case for public or private funding for conservation programs and land acquisition in these habitats.

For development planning:

- Steers development away from irreplaceable habitat concentrations whenever possible to avoid permanent losses.
- Guides site-level planning and design to avoid fragmentation or degradation of onsite irreplaceable habitat such as veteran trees.
- May assist in the determination of adequate conservation offsets when development in such areas cannot be fully avoided or minimized.

The irreplaceable habitat map gives planners and conservationists a shared understanding of ecological sensitivities, enabling smarter development patterns and nature recovery priorities tailored to the local context.

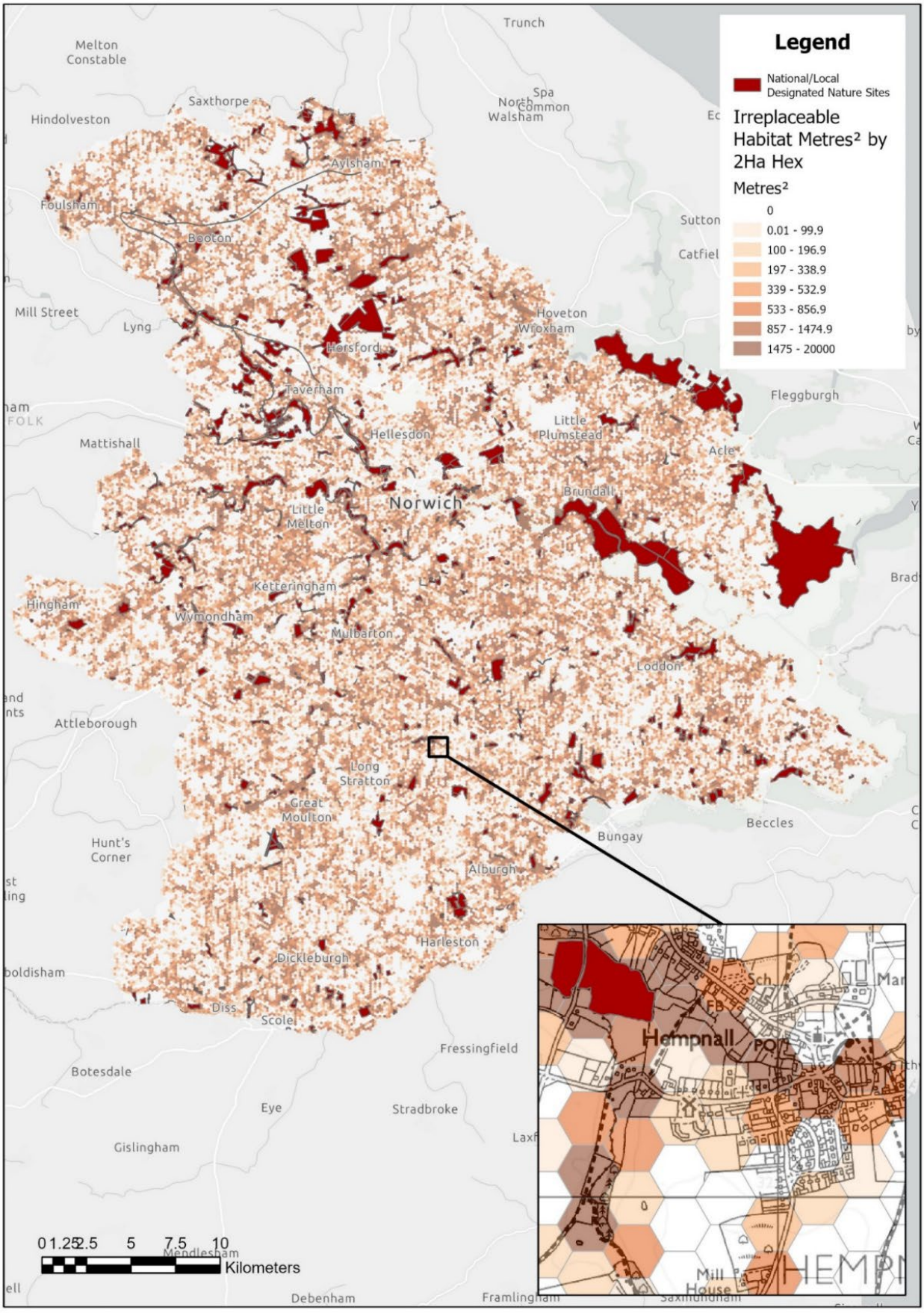


Figure 41. Irreplaceable habitat and designated sites in Greater Norwich

5.2. Landscape Connectivity

5.2.1. Hedgerow density as a measure of landscape connectivity

The hedgerow density as a measure of landscape connectivity map shows the sum length of vegetated (1m and over in height) hedgerow per 2 hectare hexagon. The display of the entire hexagon grid on a map of greater Norwich illustrates the density and distribution of hedgerows in a visually intuitive way.

Mapping the connectivity that hedgerows deliver at a landscape scale shows where there are gaps or fragmented areas in the network. It also shows the extent of areas that still have good connectivity through intact hedgerow networks. This map can be used to prioritize areas for restoring and enhancing the hedgerow network in the following ways.

- Focusing on filling in gaps in the network, connecting fragmented areas, and expanding hedgerows in areas with low density can help create larger, more connected habitats.
- When designing new plantings, the map informs which locations are the most strategic. Actions to connect existing remnants are often more beneficial than creating isolated new hedgerows.
- It delivers the overview necessary to develop and extend areas of good hedgerow connectivity with a focus on connecting core areas such as nationally or locally designated sites or areas of irreplaceable habitat.

Refreshes of the map and comparisons with earlier archived iterations will track changes in hedgerow extent over time enabling the monitoring of nature recovery strategy effectiveness.

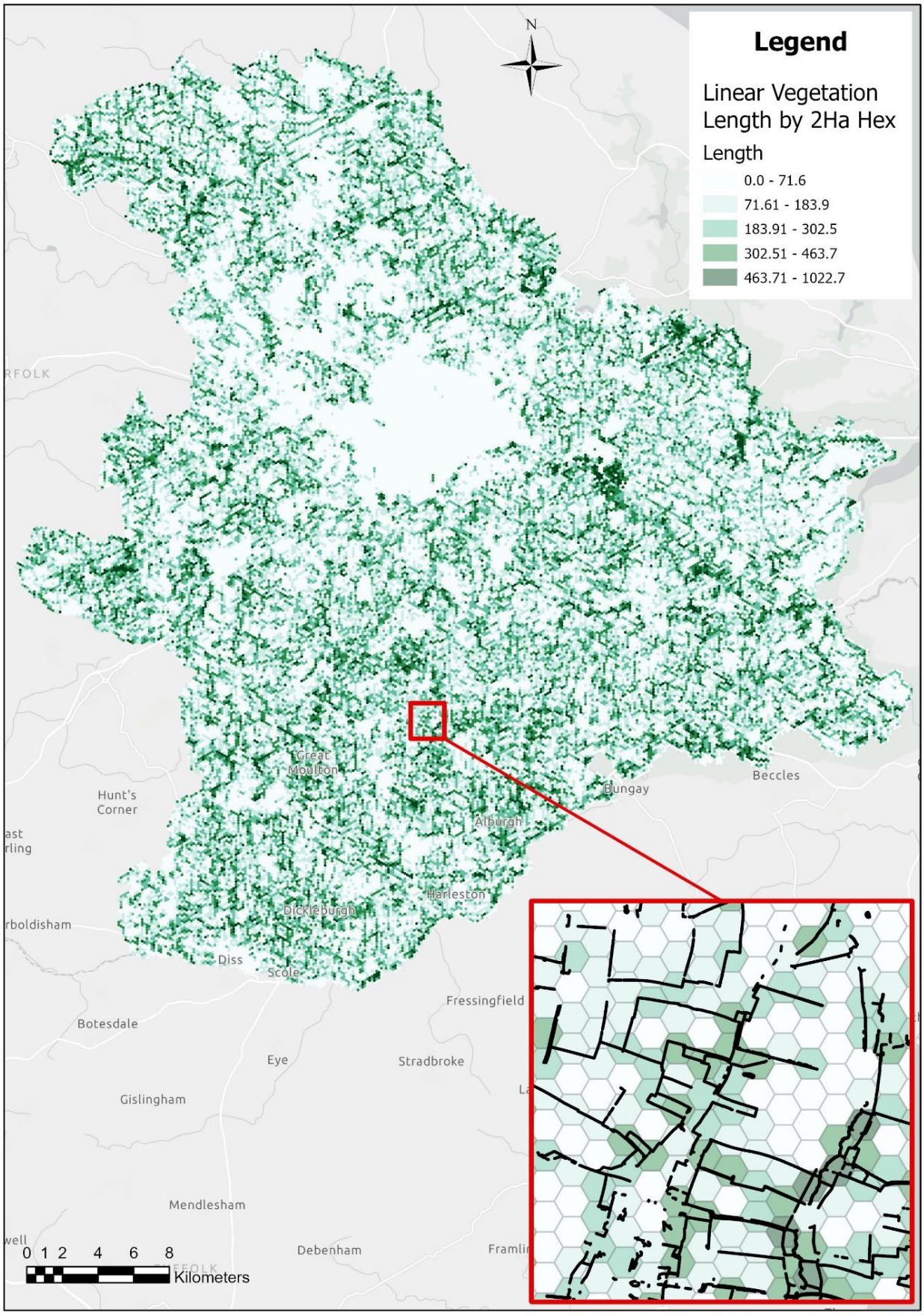


Figure 42. Total hedgerow length summarised within 2 Ha hexagon grid

5.2.2. Nature Network as a measure of landscape connectivity

The nature network refers to the ease with which species can move between different habitat patches in a landscape. High nature network values, natural and semi-natural habitats promote species movement, genetic diversity, and resilience, while low nature network value habitats, such as urban and intensively arable areas, can limit species' movement.

The nature network can be a measure of landscape connectivity. The map shows an area weighted average measure of permeability per 2 hectare hexagon.

A 2-hectare hexagonal grid was overlaid on the Norfolk Habitat Base map. Habitats that are more permeable to biodiversity such as woodland and grassland received higher permeability scores, while less hospitable habitats such as arable or built-up areas were assigned lower permeability scores. The permeability values of underlying habitat types were aggregated into a single area weighted average permeability value for each hexagon. This results in a hexagonal permeability map where the topographic detail is removed and the distinction between low permeability areas and high permeability can be visualised.

The display of the hexagon grid on a map of Greater Norwich illustrates the degree of habitat permeability across the Greater Norwich landscape delivering a strategic overview that serves as an evidence base for planning for both nature recovery and development in the following ways:

For nature recovery planning:

- The map identifies corridors and networks of high permeability that are important for biodiversity. This will inform a strategic approach to protect and enhance these areas.
- The map highlights low permeability areas where strategic action to improve connectivity between high permeablity habitats may be prioritised.
- Refreshes of the map and comparisons with earlier archived iterations will track changes in permeability over time enabling the monitoring of nature recovery strategy effectiveness.

For development planning:

- The map highlights low permeability areas that may be better suited for development over high permeability habitat.
- The map indicates the extent of wildlife corridors that could be safeguarded when developing in or near high permeability areas.

- The map may be useful for identifying locations where onsite biodiversity net gain actions would connect with permeability beyond a proposed development site.

The nature network value as a measure of landscape connectivity map informs a strategic trade-off analysis between development suitability and nature recovery potential.

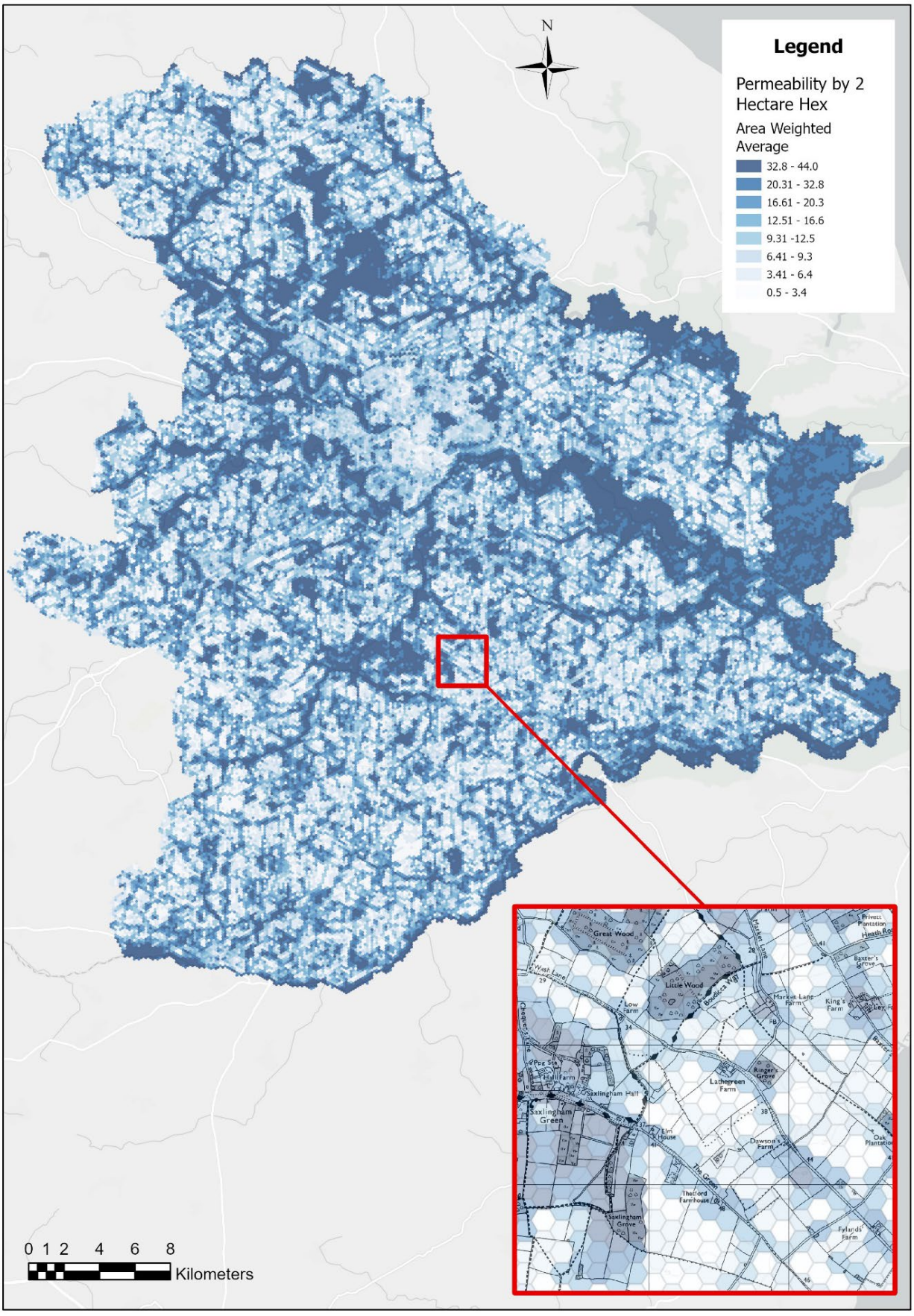


Figure 43. Permeability of habitats to nature, averaged over 2 Ha hex grid

5.2.3. Nature Network hot and cold spot analysis

The nature network as a measure of landscape connectivity map was further refined using a statistical hot-spot analysis tool (Hot Spot Analysis (Getis-Ord Gi*) documentation), which identified statistically significantly clusters of high permeability (hot spots) and low permeability (cold spots).

A Getis-Ord hot spot analysis of a habitat permeability model reveals significant spatial clusters of high and low permeability values at a landscape scale.

For nature recovery, hot spots represent concentrations of highly permeable, interconnected habitat. These may become priority areas for conservation, as they likely support higher biodiversity and ecological function. Enhancing and expanding the hot spots strengthens core habitat areas.

Cold spots signal locations with low permeability and fragmentation, which are opportunities for targeted restoration to improve connectivity. Linking cold spots to hot spots enables better movement and gene flow.

For development planning, cold spots represent logical areas to concentrate housing or infrastructure. This avoids fragmenting intact habitat in hot spots. However, connectivity between hot and cold spots should be maintained, such as with wildlife corridors.

The Habitat permeability hot and cold spot analysis map delivers a statistically robust overview of meaningful patterns in the permeability map at the landscape scale. Rather than looking at individual cells, it identifies regions of consistently high or low permeability. This insight can be used to guide macro level strategic considerations relating to both nature recovery and development.

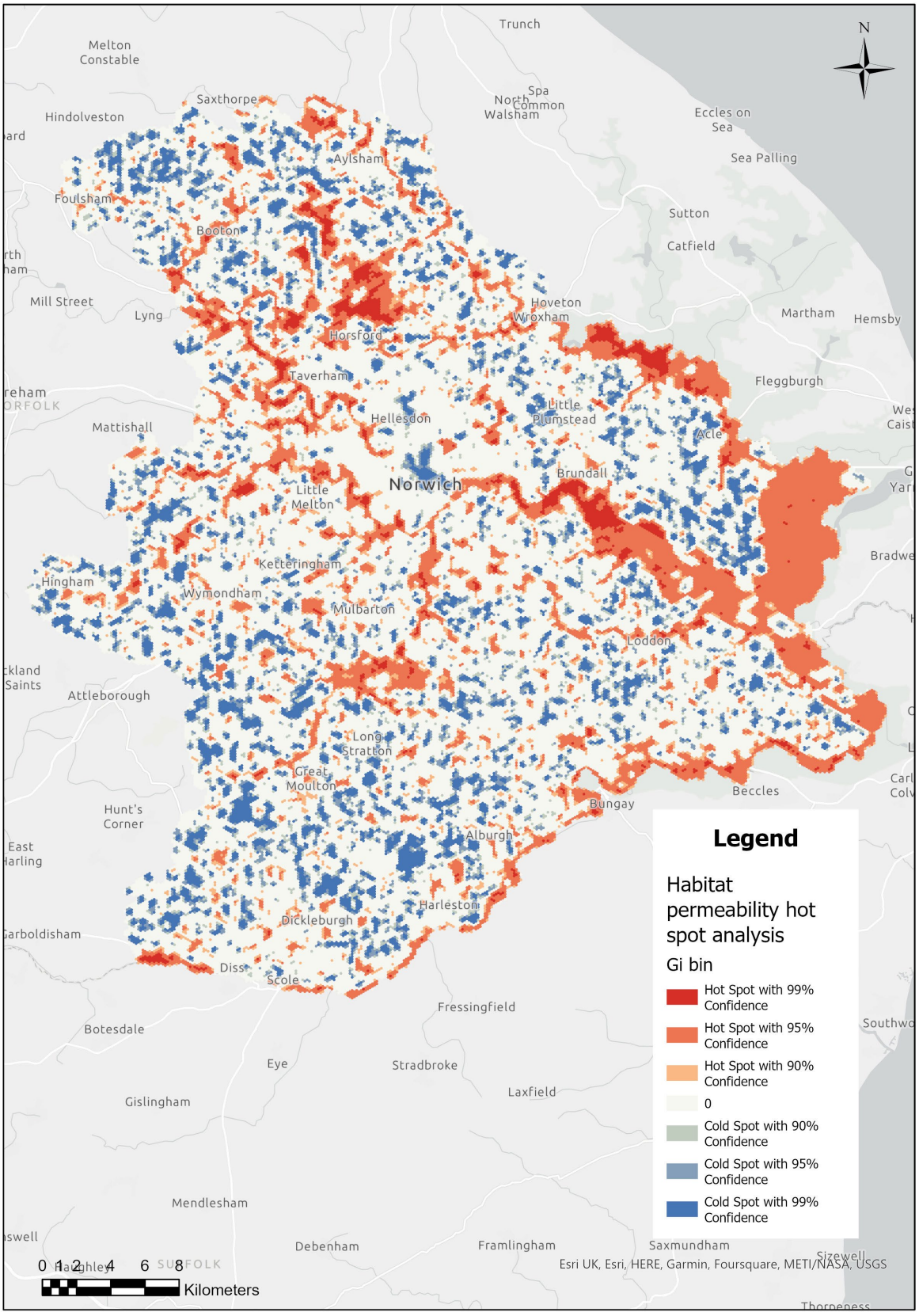


Figure 44. Nature network hot and cold spot analysis

5.3. Long Continuity Habitats

Habitat with long temporal continuity, meaning little change over time, is a common feature of areas with high biodiversity value. The most critical habitats for preserving biodiversity are often those that have remained relatively undisturbed over long time spans. The majority of nationally and locally designated nature sites encompass areas of long continuity habitat. There is however much long continuity habitat that lies outside these nationally and locally designated sites and these areas may be identified as where there are opportunities for recovering or enhancing habitats for biodiversity in Norfolk's LNRS. The Natural Norfolk team are progressing several approaches to capturing evidence for long established habitat and adding this information to the Norfolk Habitat Base Map. A greater awareness of where long-established habitat exists across Norfolk will inform both the nature recovery and planning agendas.

5.3.1. Ancient Woodland Inventory Refresh

Natural England defines ancient woodland in England as areas continuously wooded since at least 1600 AD, allowing for normal open spaces and management practices like coppicing, and provided there has been no total clearing to non-woodland uses. Ancient woods may exhibit irreplaceable ecological and cultural features. Compilation of the Ancient Woodland Inventory relies on specific historical evidence to identify qualifying sites. The key evidence is drawn from old maps to delineate ancient woodland locations.

The Ancient Woodland Inventory refresh project currently being undertaken by Natural Norfolk on behalf of Natural England is focussing on desk-based historical map analysis rather than extensive field surveys to identify potentially ancient sites. The updated inventory constitutes a complete rebuild of the original inventory to consistent standards, verifying original designations and refining them rather than just adding new sites. This comprehensive remapping aims to significantly improve the inventory's accuracy and precision as a tool for ancient woodland conservation.

It is expected that new areas of ancient woodland will be identified across Norfolk, and these will be recorded as areas of irreplaceable habitat in the Norfolk LNRS and added to the AWI.

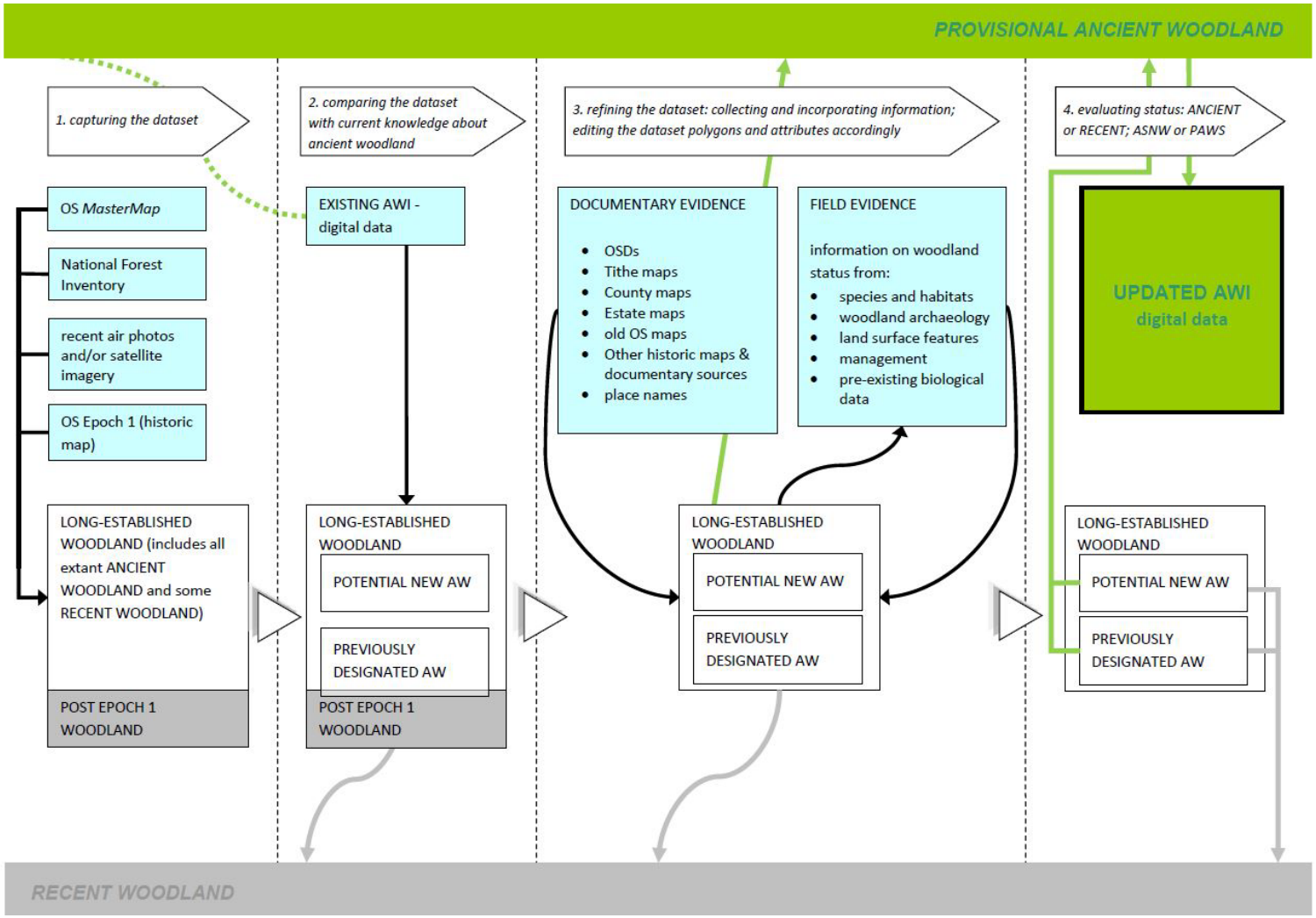


Figure 45. Workflow for updating AWI

5.3.2. Veteran trees outside of woodland

Veteran trees are listed as irreplaceable habitat in the NPPF and they may also be described as long continuity habitat. There is no national inventory detailing the location of veteran trees. The Norfolk Veteran Tree Probability Map is an innovative approach developed by the Natural Norfolk team that aims to predict the location of veteran trees at a landscape scale. Each location represents a probability that a tree is a veteran based on a comparison of the location of an existing large tree of 10m or more with the same location on an Ordnance Survey map from the 1880s. If the old map also indicates a tree at that location, then there is a degree of probability that the contemporary tree is the same tree that is marked on the old map. Further work is necessary to develop approaches to expressing the degree of probability. In addition, further targeted ground truthing of this map would help build confidence in this map's validity.

Unlike protected nature sites with defined boundaries, veteran trees represent biodiversity hotspots scattered across landscapes and embedded within lands impacted by human activities. The sheer number of veteran trees located across greater Norwich has in the past made quantifying them difficult to achieve. The Veteran Trees Outside of Woodland map provides a new level of insight into this vitally important irreplaceable habitat relevant to both the nature recovery and development agendas. As irreplaceable habitat veteran trees serve as important stepping stones of habitat in intensely arable areas. Safeguarding their habitat role for the future requires proactive management. Key steps may include further work to formally identify and recording the locations of veteran trees to improve protection. Providing buffer zones around veterans by taking adjacent land out of intensive production can help reduce disturbances. Establishing succession plans by underplanting young trees of the same native species within veteran buffers will ensure habitat continuity. Reducing chemical inputs near veterans protects associated organisms. Planners could use the map to pay regard to the value that veteran trees provide in a locality and use this insight to minimize environmental impact within developments. For example, open space within developments could be designed to connect isolated veterans rather than fragmenting habitats further.

The Trees Outside of Woodland map could serve several additional purposes; the map serves a baseline for quantifying the ecosystem services that veteran trees provide; large, mature trees provide ecological services like air purification, stormwater absorption, and carbon storage. It also provides insight into where concentrations of veteran trees are likely to make a particular contribution to landscape character and sense of place at a local level. The map could be used as a baseline dataset for community engagement projects focussed on veteran status verification further data gathering. Projects of this kind would help raise awareness and foster appreciation of veteran trees. Concentrations of veteran trees may be

identified as areas that could become important for biodiversity in Norfolk's LNRS statement of biodiversity priorities.

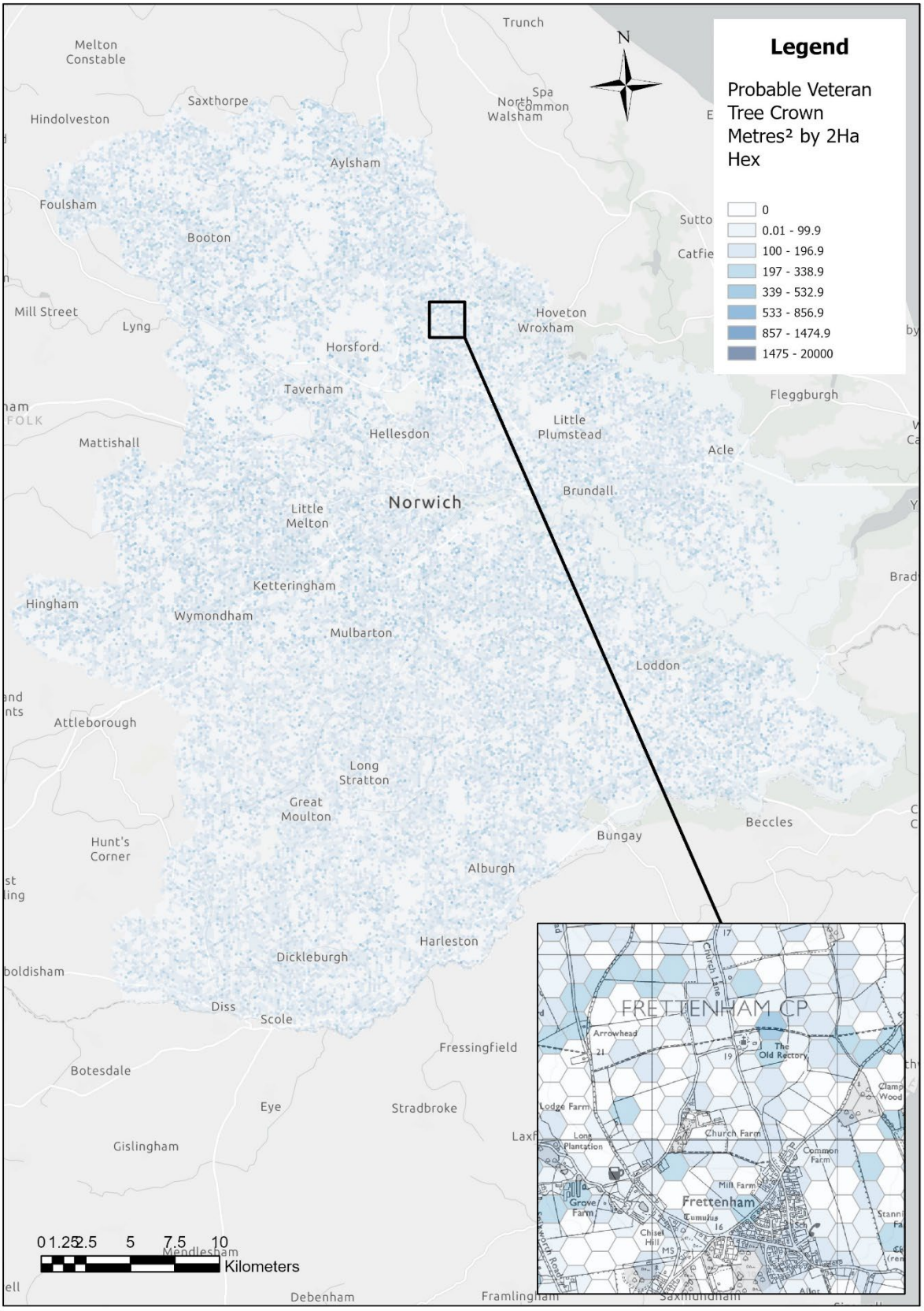


Figure 46. Number of Veteran Trees Outside of Woodland (TOW) per hex grid cell

5.3.3. Long Established Grassland

A comparison of contemporary grassland overlaid with that recorded on the Dudley Stamp land use survey dating from the 1930s reveals the extent of long continuity grassland. All long continuity grassland is likely to have some elevated value for biodiversity compared to recently established grassland and will also likely encompass the full extent of surviving semi-natural and unimproved grassland. This focussed mapping of long continuity grassland would be of great assistance in future efforts to map the true extent of semi-natural and unimproved grassland in greater Norwich. This would enable a strategic approach to conservation measures to protect this important habitat in greater Norwich.

This map provides insight into the probable location of semi-natural and unimproved grassland that could be identified as areas that may become important for biodiversity in Norfolk's LNRS statement of priorities.

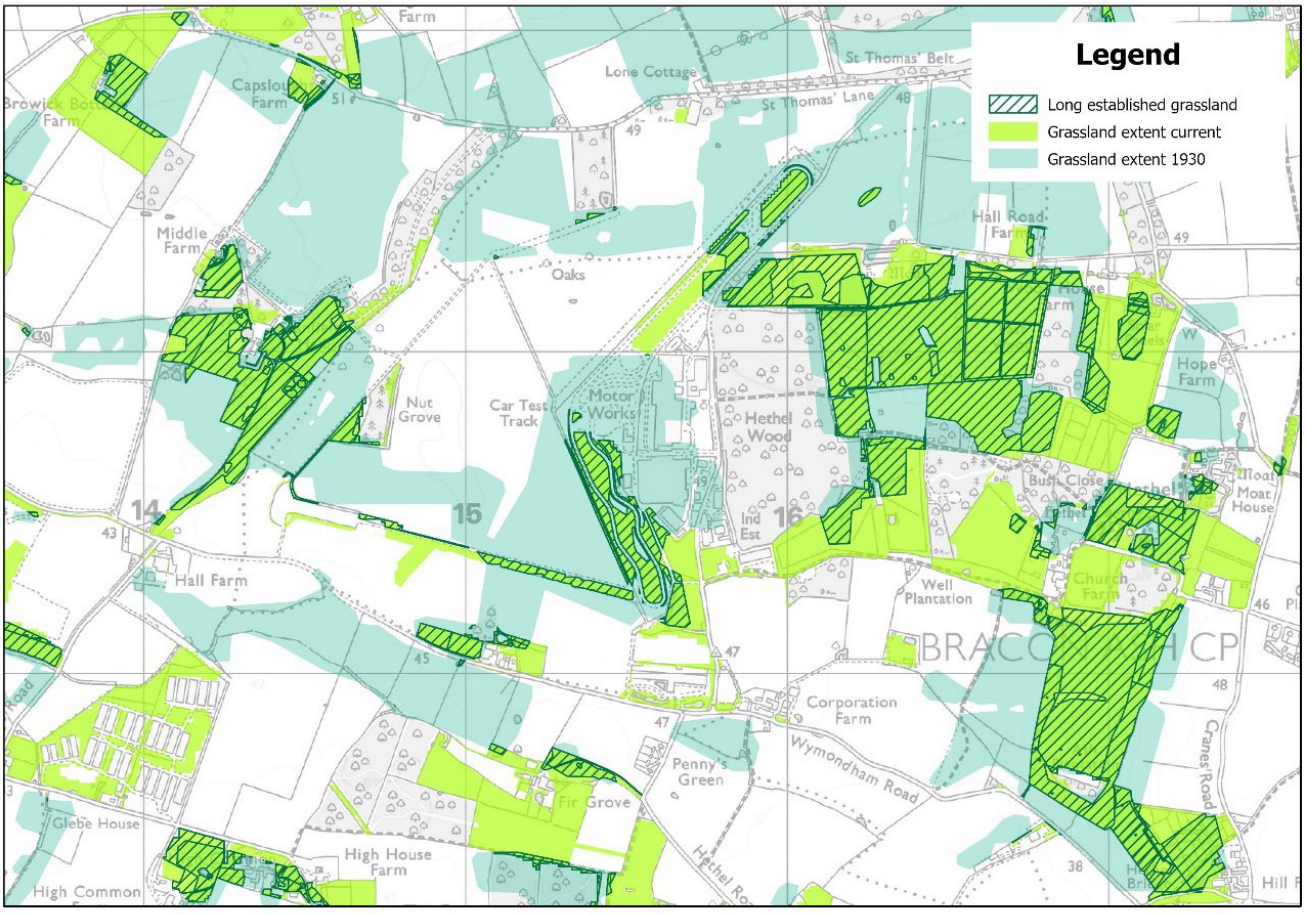


Figure 47. Long Established Grassland mapping example area

5.3.4. Long Established Ponds

The Long-established ponds map (fig 44) illustrates the distribution of this habitat type. This map serves as baseline reference for a strategic approach to protecting and enhancing long established ponds. The map provides information on pond distribution and density across greater Norwich. Areas with higher densities of long-established ponds could be priority sites for conservation in accordance with Lawton principles of bigger, better and more joined up. The map also shows where there are gaps in the distribution of long-established ponds. Strategically creating new ponds in these areas could help interconnect existing habitats, one solution in such cases could be to restore ghost ponds (see below). Linking ponds allows species to move between them to access resources, find mates, and maintain genetic diversity.

Individual ponds could be assessed to determine their current ecological value and potential. Ponds in poor condition could be restored through activities like removing excess sediment and over hanging vegetation. By clearing debris and making other enhancements, we can revive their full ecological potential and provide continuity with established wildlife corridors in a way that isolated new ponds may struggle to replicate. Healthy ponds could still benefit from enhancement such as planting native vegetation on the margins. Measures of this kind also offer opportunities for community engagement.

In addition to their value for biodiversity, long-established ponds are an integral element of greater Norwich's historic landscape character. These centuries-old ponds are often experienced in conjunction with other historic features like manor houses, traditional farms, and flint churches. They also occur alongside long-continuity habitat features such as veteran trees and long-established grasslands. Together, Norfolk's historic ponds and these associated landscape elements create a unique sense of place and contribute to the distinctive local character.

The implementation of measures to improve the quality of long-established ponds across greater Norwich would bring significant benefits for both nature recovery and the enhancement of the unique character of greater Norwich.

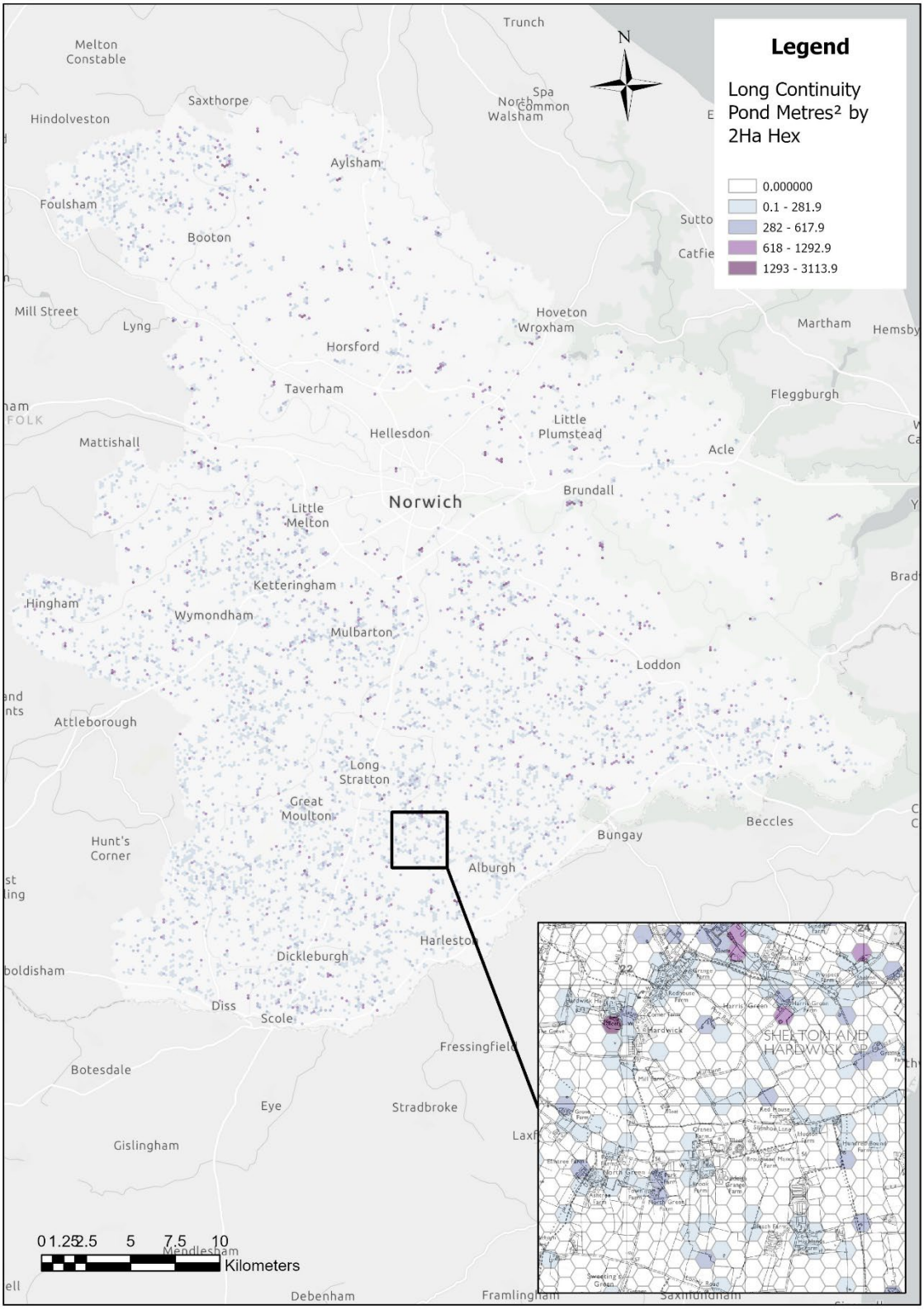


Figure 48. Long established ponds

5.3.5. Ghost ponds

The restoration of ghost ponds presents an opportunity to recover lost aquatic habitats and enhance biodiversity in agricultural landscapes. Excavating and restoring ponds that were buried decades or centuries ago under farmland can lead to the rapid re-colonization of a diverse community of aquatic plants, many arising from long-dormant seeds in the pond sediments. It has been demonstrated that species that have become scarce in intensively farmed areas can return when their ghost pond habitats are resurrected. Beyond plants, ghost ponds can provide habitat for aquatic invertebrates, amphibians, birds, bats, and other wildlife that rely on small wetlands. Coordinated efforts to restore networks of ghost ponds across agricultural regions would not only benefit biodiversity but also reconnect aquatic habitats that have become heavily fragmented. The dormant seed banks that ghost ponds contain allow for the re-establishment of locally adapted plants and animals that disappeared when the ponds were destroyed during agricultural intensification. In areas where pond restoration is not feasible, ghost pond sediments could even be used to "seed" newly created wetlands. Overall, incorporating ghost pond restoration into conservation initiatives represents an important opportunity to recover lost biodiversity, enhance connectivity, and revive scarce native species - countering some of the extensive damage done by agricultural pond loss.

Figure 49. Example area map showing current pond locations (pink) and additional ghost ponds (blue) found on historic OS mapping from 1880.

5.4. Multifunctional Spaces

This report sets out a series of analyses to explore the provision of green infrastructure through the two lenses of ‘natural’ and ‘active’ places, referring to the importance of GI to both people, and biodiversity. A preliminary analysis of which greenspaces have value to both nature and people, therefore offering a level of multifunctionality, is presented in Figure 50 below. The map presents an overview of the intersection between the accessible greenspace inventory and areas of principle importance for biodiversity. The latter, which was defined in section 3.5.2, builds on work from the GNGI Baseline Report, representing areas that are of importance to nature either via site designation or priority habitats present.

Further work is needed to draw together different strands of evidence, to measure where there is good provision of multifunctional GI. This will involve incorporating information on relevant ecosystem services provided by GI, including flood risk maps, soil and vegetation carbon inventory, and air quality data.

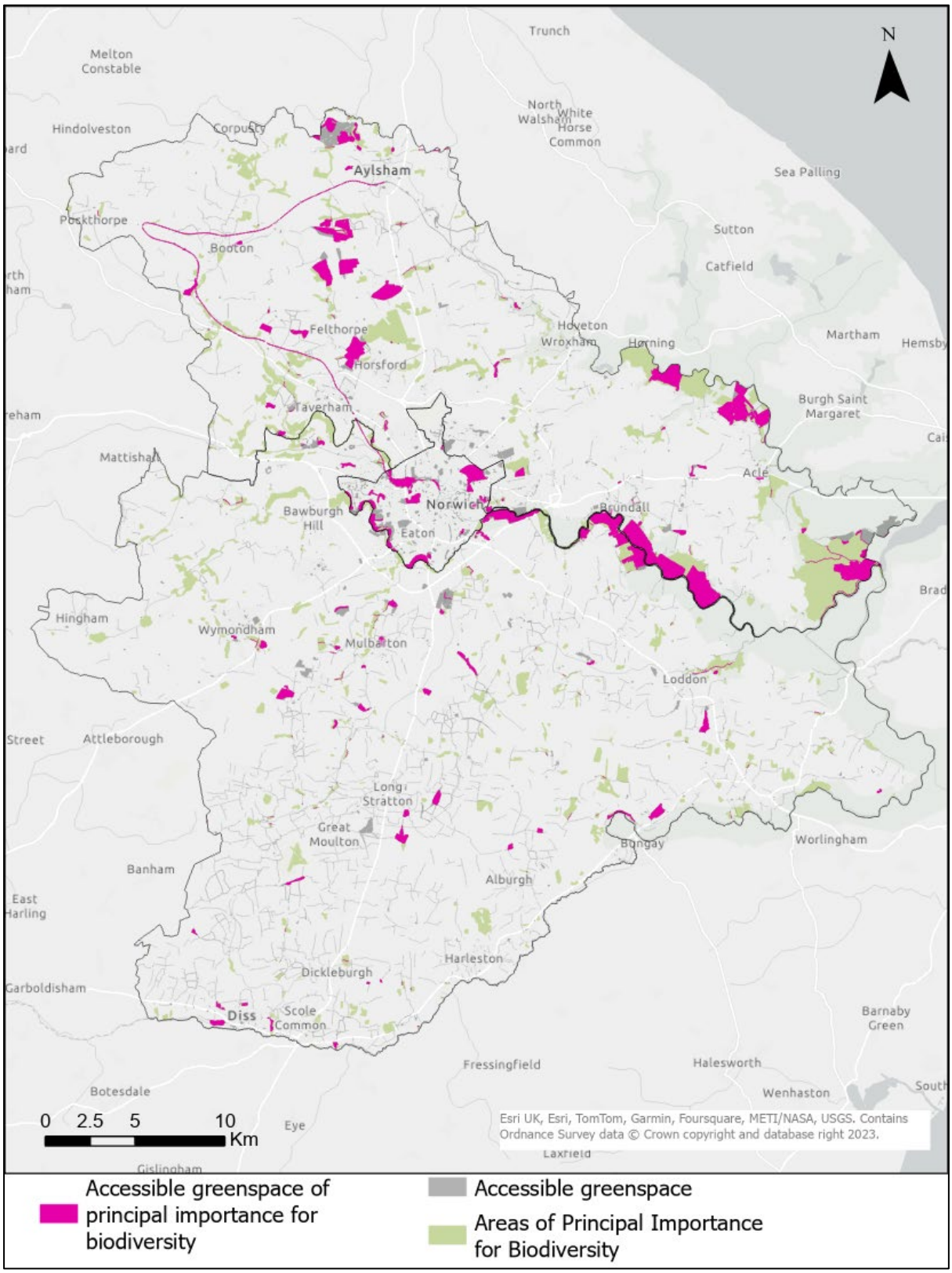


Figure 50. Areas of principal importance for biodiversity that are also part of the publicly accessible greenspace inventory. These represent a subset of greenspaces which are important natural and active places.

6. Discussion – Assessing the Results for Priorities and Opportunities.

The results presented in Sections 4 and 5 can be reviewed in combination with information on future allocations to identify headline spatial and thematic priorities for the Strategy, which are broadly assessed by the following types:

1. Opportunities: Areas or themes which could be improved, or are valuable for habitat connectivity.
2. Future Priorities: Areas where future development will require careful consideration of how best to ensure enhancement and improvement of GI.

The Greater Norwich Local Plan Allocations (Figure 52) provide an indication of areas that are earmarked for future development, and as such are used to assess known future priorities for enhancing GI within these allocations, in order to ensure compliance with BNG and create enhanced connectivity for both people and nature.

In Figure 52, the areas of deficiency, need or opportunity identified throughout the Active Places analyses presented in Section 4 are collated onto a single map to enable identification of opportunities and at-risk areas. This involved extracting all hexagons in the “least favourable scenario” (L3) for the bivariate analysis, extracting Output areas that contain sites within the bottom 10% of inclusive access across two or more categories, and identifying the Output Areas that scored below their relevant urban greening target thresholds. Natural Places analysis illustrating the nature network is also presented for assessment of priorities for enhancing connectivity and biodiversity value. These steps are outlined in Figure 51.

Areas of each map that are referenced in the text are numbered accordingly.

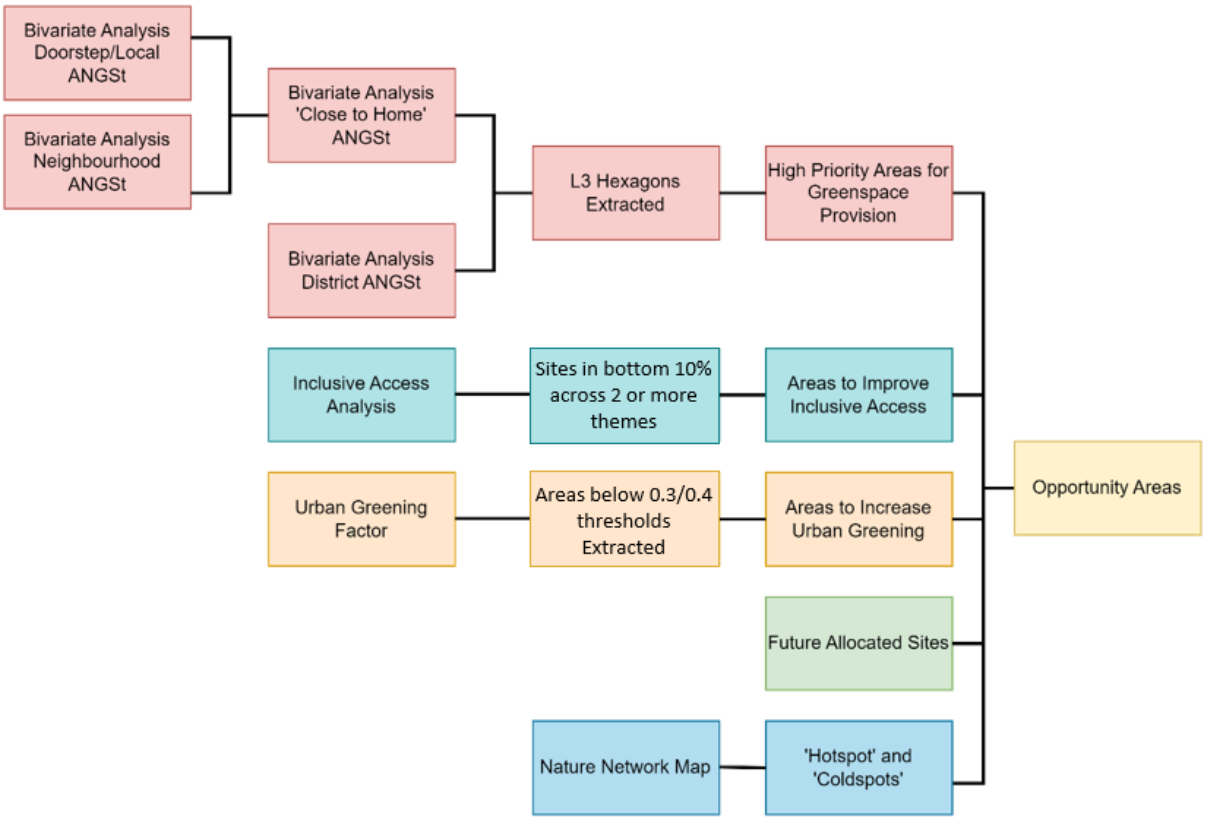


Figure 51: Diagram showing the elements of Active Places and Natural Places Analysis to identify thematic opportunities.

6.1. Norwich City

The below section identifies areas of opportunity in Norwich, which can be cross referenced with the maps provided in Figure 52 using the opportunity numbers indicated in bold text. E.g. **(Opp 1).**

In north Norwich, parts of the Catton Grove and Miles Cross Ward are identified as priority for Doorstep/ Local sized green space provision, having scored within the 'least favourable scenario' in the bivariate analysis as set out in section 4.1. The Urban Greening Factor score is also low in these parts, especially commercial and residential areas just South of Norwich Airport. An Aviation Related Employment Allocation (GNLP1061) is allocated on Brownfield site in Norwich Airport Area. If implemented conscientiously with nature-based solutions (making use of on and offsite BNG), development on this site could provide an opening to transform existing hardscapes into multifunctional green infrastructure that improves on the current low urban green factors. **(Opp 1)**

In the south of the district, the border between the Lakenham, Town Close, and Eaton Wards has been identified as an area that does not meet all three 'close to home' standards for Green Space provision (Figure 17). However only one hexagon within the Town Close area is highlighted as being a priority in the bivariate analysis due to its high deprivation (Figure 52). It's important to highlight that the assessment of composite access inequality focuses solely on the "least favourable scenario" in the bivariate matrix, so parts of Eaton Wards would not be prioritised in the analysis due to their high IMD Decile value (low deprivation). For the next phase of strategy

development, it's recommended to delve into other scenarios and examine individual indicators of inequality in relation to these access standards, in order to prioritise actions, which could include creating new community gardens, or creating new access routes to existing greenspaces. **(Opp 2)**

Enhanced links and access points to existing green spaces along the River Yare in these areas could help address recreational needs and interconnectivity. The mixed-use allocation at Three Score (R38) should continue to be delivered in line with the area's masterplan (with updates if necessary), to maximise enhancements to GI within the Yare Valley. This site borders multiple County Wildlife Sites, and planned GI improvements should be delivered to help increase ecological connectivity, especially with surrounding wetland and woodland habitats. Additional allocations GNLP0133E and R42, also within the Yare Valley strategic GI corridor, should seek to maximise the connectivity between surrounding GI assets, and should consider how to incorporate accessibility needs of future users, in line with the suggested inclusive accessibility framework and associated guidance. **(Opp 3)**

With respect to natural places, a low nature network value is observed within the city centre (Figure 52), as well as a low level of urban greening. Implementation of biodiversity enhancements, e.g. from the Norwich Biodiversity Baseline Study, would help create stronger nature network connectivity within the city. **(Opp 4)**

The constraints posed by the limited available space in the historic city centre create challenges when attempting to establish new green spaces or expand existing ones. This becomes especially problematic as the population continues to grow. However, many of the mixed-use sites allocated within the Greater Norwich Local Plan (Figure 52) overlap between areas that score low for urban greening. The redevelopment of brownfield sites, which make up a proportion of this allocated land, can present opportunities to regenerate and enhance green infrastructure through sustainable design, with requirements to integrate features like green roofs, rain gardens, street trees. **(Opp 4)**

Additional allocated sites at Carrow Works offer good opportunity to improve the provision of inclusively accessible GI in this area, and create connections that bring important natural habitats along the Yare and at Whitlingham further into the City. **(Opp 5)**

6.2. Broadland

In the satellite towns surrounding Norwich city, Hellesdon, Drayton and Horsham St. Faith, were identified as priorities for the provision of 'Close to Home' standard of Greenspace (Figure 52). Horsham St. Faiths and Horsford also scored low on the inclusivity score of current green space. This area contains a mix of PROW and small accessible greenspace sites, which score low on the inclusive accessibility metric due to a lack of facilities and accessible paths. Enhancing these spaces to provide greater access to all users, with particular focus on improvements to the mobility category, should be an area of priority. **(Opp 6)**

Thoughtful planning and design of greenspaces within developments can serve dual purposes of providing local AGS for residents and enhancing and expanding the nature network corridors in the surrounding area. There is a planned 11.9ha Open Space/Leisure Amenity Allocation (EL4/GNLP1019) within the Hellesdon area which provides an opportunity for much-needed recreational open space. Located on existing arable land at the northern edge of Hellesdon, the use of this site as an open green space could help fill deficiencies in access to larger natural green space for the nearby community. **(Opp 7)**

There are also other future opportunities north of Norwich from allocated sites (e.g. HEL2, GNLP0337R, GNLP0466R/HNF2 and GNLP0132) which should provide biodiversity net gain, including new GI corridors. Since a number of these sites are on greenfield land, it is essential that developments are implemented in line with policies so that the urban greening factor is enhanced. For instance, the strategic residential allocation GNLP0132 at White House Farm Sprowston encompasses Bulmer Coppice, an area of ancient replanted woodland. Planning policies require safeguarding of this woodland and for green corridors to be provided to link the coppice to Harrisons Woodland Park and Rackheath Park, thus integrating it better into the GI network. This area could also benefit from inclusive access improvements to existing greenspaces, subject to further assessment of individual sites **(Opp 8)**

The villages of Blofield and Brundall were identified as priorities for Neighbourhood standard of greenspace (Figure 19, Figure 52). In Brundall, the Greater Norwich Local Plan (GNLP) designates two Open Space/Leisure Amenity Allocations, BRU2 and BRU3, totalling 12.9 hectares, which if connected to form a continuous green space can aid in meeting this benchmark. Potential links from these sites to the Little Plumstead area could also be explored, particularly enhancing access opportunities by improving the A47 crossing.**(Opp 9)** The existing greenspace areas southeast of Brundall could also be prioritised for inclusive access improvements following further detailed audits of provision. There are large areas of accessible greenspace which are also of importance to biodiversity (Figure 52) to the south, and so improving access routes to these areas should be considered.

In the southern parts of the Broads, the towns in Halvergate, Freethorpe and Reedham (Figure 52) have been identified as priorities for the provision of ’Close to Home’ Standards of Green space. Whilst these areas enjoy proximity to the Broads, which implies easy access to natural surroundings, further exploration is needed in this area for localized AGS, and could potentially involve improving access routes and opening up existing natural spaces for public use (whilst maintaining the biodiversity value of these sites). Expanding existing spaces could also help to enhance the existing connectivity hotspot of the Broads habitats. **(Opp 10)**
The western parts of Acle are also highlighted as priorities for ’Close to Home’ standard of AGS. New housing allocations (GNLP2139R and GNLP0378R, ACL1), which combined aim to provide 480 dwellings, will need to be designed in line with GNLP policy requirements to provide good active travel links to facilities, and provides opportunity to deliver enhanced GI access both on and offsite. **(Opp 11)**

Areas along the River Bure Valley such as Buxton, Coltishall and Hoveton/Wroxham were identified as priorities when it comes to the provision of larger district scale

AGS. Maximising the amount of connected greenspace along the Broads that is publicly accessible, by creating connections between existing sites to create larger accessible areas, could fill Neighbourhood and District benchmark deficiencies. It is worth noting that the current analysis does not fully account for the large Blue Infrastructure surrounding the Broads, due to the challenge of representing the extensive river network within the constraints of specific site sizes. **(Opp 12)**

Foulsham has been identified as a priority for the provision of green space within the 'Close to Home' standard, particularly sites that meet Neighbourhood standard (Figure 52). The village is mainly serviced by PROW, so it may be advisable to explore the possibility of providing a larger AGS. **(Opp 13)** There is also an opportunity to establish connectivity for natural areas between the high permeability hotspots in Foulsham and Reepham/Booton.

6.3. South Norfolk

The populous town of Hethersett is identified as an area that should be prioritised for Doorstep/ Local Green space provision, particularly in the southern regions where there is a higher deprivation (Figure 18). An Open Space/Leisure Amenity Allocation of 6.8ha has been positioned near St. Marys Church in this area. Providing nearby access points or expanding green links to this allocated Open Space/Leisure Amenity could help to target these regions. **(Opp 14)**

Whilst the Costessey area has been identified as a priority for the 'Close to Home' standard the proposed Bawburgh Country Park (BAW 2), presents an opportunity to provide AGS to these surrounding residential areas, so green links to this proposed park should be explored. **(Opp 15)**

Allocated sites close to the Yare (GNLP0307/0327 and COL1) were identified as current priorities for Doorstep/Local green space, and so could provide opportunity, both to increase access for people, and to enhance the ecological value of the surrounding Yare Valley habitats. With this area being identified as a key nature network hotspot, priority for all developments within the Yare Valley should be to enhance connectivity and quality of the associated habitats and waterways, and create new accessible GI that can help to alleviate current recreational pressures. **(Opp 16)**

Along the River Waveney corridor and southeastern parts of district, major population centres including, Loddon (**Opp 22**) Harleston **(Opp 17)** and Diss **(Opp 18)** register in part as priorities for the 'Close to Home' standard of AGS (Figure 18-Figure 19). Diss is also a priority area for Urban Greening **(Opp 18)**, with a large portion of the town having scored below the standard. However, a designated housing development (GNLP0102) on a Brownfield site offers an opportunity to enhance green spaces in the area through BNG, with proposed plans that include tree planting, sustainable drainage systems, and the implementation of green walls. Allocated housing sites on arable/greenfield sites in the vicinity of Harleston are expected to generate an increasing demand for Accessible Green Space (AGS). Consequently, there is a need to explore the introduction of larger, neighbourhood-sized green spaces within this locality, with the potential to augment and bridge gaps in the nature network that runs alongside the river. Connecting the many PROW in

the area to wider greenspaces could also help to mitigate the indicated low inclusive accessibility of many areas in South Norfolk, if sites were developed with consideration of accessibility for all.

The western parts of Wymondham are identified as a priority area across all four green space standards (Figure 18-Figure 19). **(Opp 19)** Hingham is also highlighted as a priority and the same holds for smaller rural villages like Barford and Barnham Broome. These regions also have lower inclusive access scores due to their greenspaces predominantly comprising Public Rights of Way (PROW), which are generally characterised by a lack of facilities, and stretches of unpaved routes across agricultural land, leading to low scores for mobility access. **(Opp 20)** This is also reflected by lower satisfaction with the quality of greenspaces was reflected in responses from South Norfolk residents in the public survey (Figure 32). There are limited housing allocations in these areas which limits the current potential to increase the green infrastructure, necessitating further exploration. The provision of a larger Green Space (District Standard) in these localities should also be explored as it could also provide a valuable steppingstone to connect Hingham and Wymondham in the nature network.

Within the central area of the district around Long Stratton, many of the small rural towns are registered as a priority area for larger green space sites (District and Neighbourhood benchmarks). Creating accessible natural parks and upgrading Public Rights of Way to be wider green corridors could help to fill these rural deficiencies and help create higher quality greenspaces, addressing sentiments by some South Norfolk respondents in the public survey that the quality of greenspaces had decreased over the past 5 years. **(Opp 21)**

Loddon also contains an area that should be prioritised for Close-to-home and district standard greenspace. Improvements to GI provision here could also help to strengthen the existing nature network value hotspot, and create additional connectivity with the Norfolk Broads area. **(Opp 22)**

Wider opportunities in this district could include strengthening active and public transportation links, especially in the southern part of the district, which experiences higher levels of socio-economic deprivation and is a priority for inclusive accessibility improvements based on the initial evidence from the index (see section 0). The low index scores are likely driven by the prominence of PROW as the main greenspace type, which are generalised by a low level of accessible features and facilities. Larger sites in this area occur relatively infrequently by comparison. The nature network value analysis shows a large distribution of nature cold spots in the centre of the district, suggesting that opportunities for nature recovery and uplift of habitat permeability should be prioritised.

Another significant opportunity within these regions is the high density of ghost pond potential (Figure 48). Strategic revitalisation of historic pond sites, prioritising those still connected to existing hydrological and ecological networks, could re-establish vital freshwater ecosystems. This would strengthen landscape resilience by providing steppingstone habitats for species dispersal.

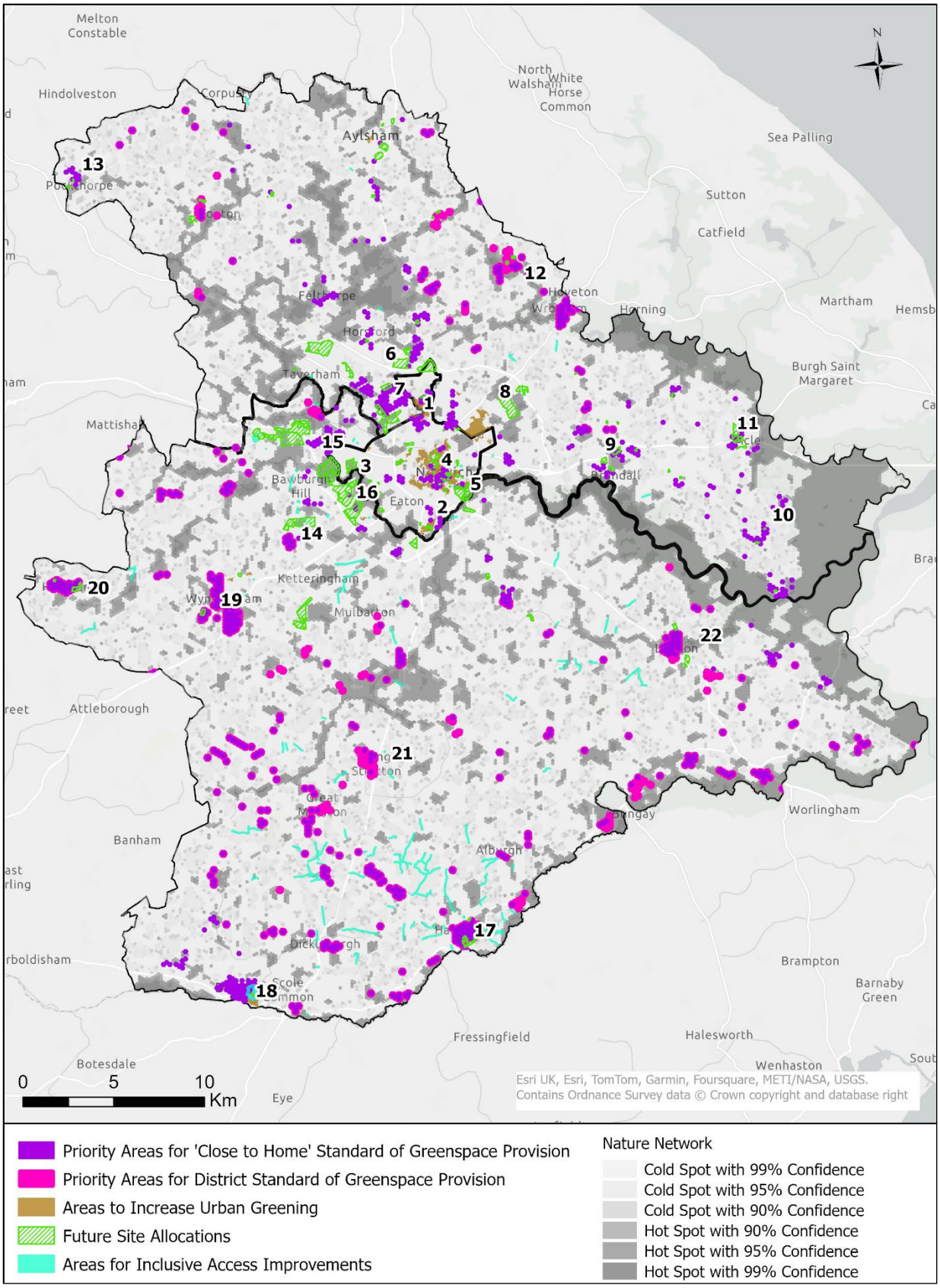


Figure 52. Assessing the Opportunity Areas for the Active Places and habitat permeability hot and cold spots analyses. Numbered labels represent the numbered opportunities listed within the section text.

7. Conclusion – Summary of Evidence and Areas of Opportunity

7.1. Summary of Public Findings

In this report, the summary results of spatial analysis to support the themes of Active and Natural Greenspaces are presented for the Greater Norwich Region, alongside the results of a public survey designed to gather information on the public's opinions and use of greenspace.

The results of the public survey offer helpful insight as to the greenspace preferences and utilisation patterns within Norwich, South Norfolk, and the Broadland area. Urban green spaces are consistently favoured for various activities across all regions, underscoring their accessibility and convenience. When individuals seek a more immersive connection with nature, areas such as rivers, lakes, and nature reserves emerge as popular choices, particularly in Norwich. The prominence of 'urban parks' as the preferred socialisation spots signifies their role as communal hubs, fostering interpersonal interactions. Moreover, the variation in greenspace preferences for relaxation and nature exploration, especially the popularity of historic parks in the Broadland area, reveals the nuanced ways in which people seek solace and engagement with nature.

There are some distinctions in the motivations behind utilising green spaces based on their proximity. For nearby green spaces, whilst dog walking and physical activity are prominent in Broadland and South Norfolk, Norwich residents have a broader range of motivations that go beyond exercise. The motivations behind using green spaces further away are consistent across the three districts, with individuals drawn to nature exploration, relaxation, and social interaction in these spaces regardless of their further location. The survey also found that respondents were spending longer at green spaces when engaging in these types of activities.

Nearby green spaces visited by respondents in Norwich are primarily urban, centred around urban parks and similar facilities. Respondents in Broadland tend to have more diverse experience, with nearby green spaces either within urban settings or natural landscapes, whilst respondents in South Norfolk tend to use nearby open rural spaces. Regardless of the district, easily accessible urban fields and parks are popular for short visits. For longer distances, people opt for more varied and unique green spaces, including beaches, historic sites and nature reserves. This suggests a wide appeal drawing respondents from all districts. Longer stays attract individuals to distinctive and enticing surroundings, notably coastal areas, water bodies, and natural reserves.

7.2. Proposed Thematic Priorities

The survey provided insight into the public's key areas of concern with relation to Green Infrastructure, providing a useful guide for suggestions of thematic priorities.

- Environmental Impact and Biodiversity

- Priority and Planning
- Facilities and Diversity
- Maintenance and Tidiness
- Access and Safety

Within these themes, a longlist of priorities, for further refinement and development in the next phase of the study, are provided below:

- improving equality in access to greenspace, addressing socio-economic disparities and responding to the demands in densely populated areas with limited or inadequately equipped private or accessible green space.
- enhancing provision of inclusively accessible greenspaces or improving current greenspaces.
- increasing canopy cover and urban green factors.
- connecting existing habitat via site placement, or linear features such as hedgerows.
- protect existing long-established habitat
- restoring or protecting historic features such as ghost ponds.
- encouraging people's connection to landscape.
- responding to population variability – different experiences and priorities identified through the survey.

These five areas of concern for the public can be aligned to strands of analysis presented in this report. They are discussed spatially within Sections 0 and 0.

Public's Key Concerns	**Relevant Analysis**
Environmental Impact and Biodiversity	Natural Places – Section 5 Biodiversity Baseline Study Opportunities – Section 2
Lack of Priority and Planning	The development of a GI Strategy – Section 1 Improving equality in access to greenspace – Section 4.1 Urban Greening Factor – Section 4.3
Insufficient Facilities and Diversity	Inclusive Access to Greenspace – Section 4.2 Survey Responses on greenspace priorities – Section 4.4
Maintenance and Tidiness	Inclusive Access to Greenspace – Section 4.2 Survey Responses on Visits to Greenspaces – Section 4.4
Access and Safety	Inclusive Access to Greenspace – Section 4.2 Survey Responses on Visits to Greenspaces – Section 4.4

7.3. Next Steps

The approach to evidence gathering in the development of the Greater Norwich Green Infrastructure Strategy is that evidence should be useful at the strategic and site level, so whilst a summary is presented in this report, the evidence can and should be further interrogated during the next phases of Strategy and Delivery Plan development. This can provide evidence for specific elements of the Delivery Plan, and more detailed recommendations for the Greater Norwich Districts.

A key next step for the strategy will be the development of tools, which will provide the interface for users of the strategy to interact with and explore the presented evidence. There are two main recommendations for how the data should be presented alongside the remaining strategy. These are an ArcGIS StoryMap, which can present the key findings and narrative in an engaging and accessible format, and a separate webmapping browser tool, which would provide an interactive way of viewing different combinations of data to answer specific questions.

StoryMaps

ArcGIS StoryMaps help to create a narrative around GIS data and mapping. The StoryMap allows maps to be presented alongside other media, written content and interactive elements in a web suited interface that can easily be embedded in or linked to from external websites.
Elements available within StoryMaps include:

- Interactive maps, that the user can explore manually or using custom buttons or sliders.
- Map tours, where the user is guided through specific points on a map
- Slideshows, which can incorporate a mixture of maps, images and video
- Embedded web content and power BI reports

For further information on the capability of StoryMaps and for examples, refer to the ESRI website guidance.

The strength of a StoryMap is its ability to present a stylish narrative-based view of complex data and mapping. The inbuilt design elements make it possible to easily present maps in an accessible and clear way, without users being required to decide which elements are most important to view. The end product guides users through key points in a familiar website format.
A StoryMap is unsuitable for presenting every detailed strand of evidence developed for the strategy and should instead focus on key findings and conclusions, as well as relevant case studies.

Webmapping Browser

A web browser is already utilised by NE to present the basic data available within the GI Framework, and this provides an example of the type of interface that could be emulated by the GNGI Strategy.

Individual data layer outputs would ideally be published online to allow for users of the strategy to explore the evidence in a variety of combinations and scales. Webmaps allow a wide variety of layers to be combined, and some would allow users to download data to use offline, or upload their own data to view alongside the presented information.

The evidence presented by the GI Strategy should help to inform both strategic and localised decision-making, and so a webmapping tool offers the greatest flexibility in allowing users to focus on particular locations and themes. When creating a mapping browser for the GI Strategy, particular focus should be on ensuring the tool is accessible, and allows users to easily and quickly draw the insight they need from the mapping.

Next Steps in Strategy Development

Many of the analyses presented in this report will require updates to incorporate newly available data and ensure that the evidence base remains current and accurate. The proposed routine collation of future GI proposals will require districts to provide the Natural Norfolk team with data on proposed and new allocations as they become available, this pipeline will be developed further within the strategy. The useability of the evidence presented in this report will be explored and demonstrated through the development of case studies for inclusion in the Strategy.

The headline priorities identified in this report will also be further refined via engagement through a series of workshops, aimed at the public, elected members, council officers and accessibility groups. The utility of the evidence presented in this report will be explored and demonstrated through the development of case studies for inclusion in the Strategy. The ‘Strategy’ Document will be collaboratively created with the Delivery and Steering Groups, outlining the thematic priorities and opportunities.

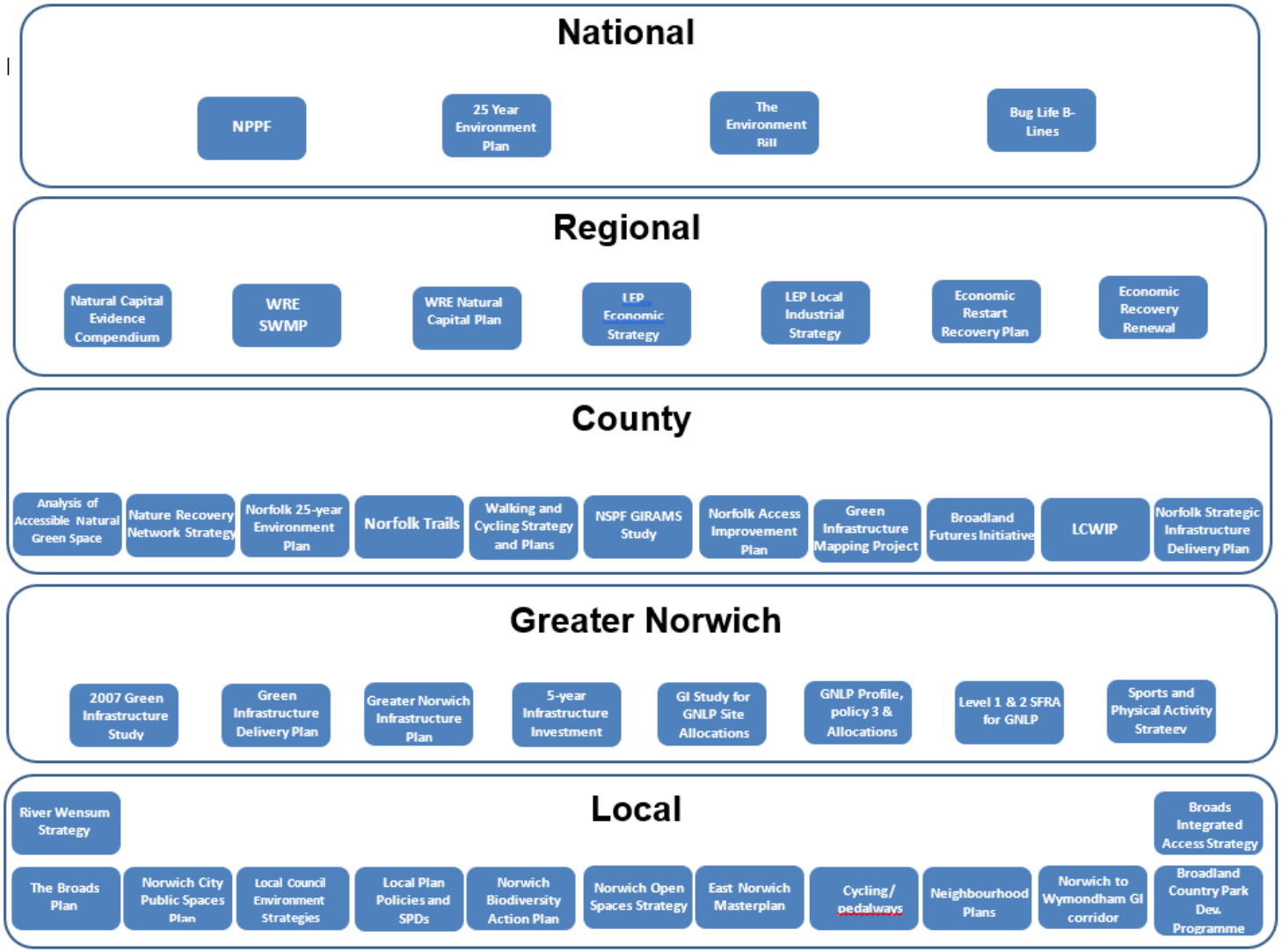
Lastly, details of Delivery Plans will be developed to support implementation of the Strategy.

Annex 1: Green Infrastructure Document Hierarchy

- **The Greater Norwich Local Plan** This plan identifies where growth is needed from 2018 to 2038, with Government targets leading to around 49,500 new homes being required. Currently under examination, the Plan is important because it also includes plans for new green spaces and additional infrastructure.
- **Physical Activity and Sports Strategy:** the recently approved Strategy includes work on active environments, including the provision of spaces and places which promote physical activity such as parks, open spaces and waterways.
- **Norfolk Green Infrastructure and Recreational impact Avoidance and Mitigation Strategy (GIRAMS):** This strategy, published in March 2021, introduces the requirement for new development to provide new/enhance existing GI and the payment of a tariff to mitigate the impacts of new housing development on Natura 2000 sites.
- **Norwich Biodiversity Strategy**, adopted in 2022, and associated development plan which set out the Council's response to redress the Biodiversity Emergency it declared in 2019, as well as delivering on the 2040 City Vision commitment of 'Protecting and maintaining our green and open spaces to improve biodiversity'.
- The **Broadland District Council's environmental strategy** contains a section on biodiversity and greenspace with commitments to enhance existing natural habitats by managing council owned greenspace

All districts are embarked in a process to mapping their biodiversity baseline to incorporate into their future biodiversity strategy.

A full list of relevant strategies and documents was provided in an earlier Scoping Report and summarised in Annex 1. The final Strategy will provide more details on each individual document.


National
NPPF
25 Year Environment Plan
The Environment Bill
Bug Life B-Lines
Regional
Natural Capital Evidence Compendium
WRE SWMP
WRE Natural Capital Plan
LEP Economic Strategy
LEP Local Industrial Strategy
Economic Restart Recovery Plan
Economic Recovery Renewal
County
Analysis of Accessible Natural Green Space
Nature Recovery Network Strategy
Norfolk 25-year Environment Plan
Norfolk Trails
Walking and Cycling Strategy and Plans
NSPF GIRAMS Study
Norfolk Access Improvement Plan
Green Infrastructure Mapping Project
Broadland Futures Initiative
LCWIP
Norfolk Strategic Infrastructure Delivery Plan
Greater Norwich
2007 Green Infrastructure Study
Green Infrastructure Delivery Plan
Greater Norwich Infrastructure Plan
5-year Infrastructure Investment
GI Study for GNLP Site Allocations
GNLP Profile, policy 3 & Allocations
Level 1 & 2 SFRA for GNLP
Sports and Physical Activity Strategy
Local
River Wensum Strategy
Broads Integrated Access Strategy
The Broads Plan
Norwich City Public Spaces Plan
Local Council Environment Strategies
Local Plan Policies and SPDs
Norwich Biodiversity Action Plan
Norwich Open Spaces Strategy
East Norwich Masterplan
Cycling / pedalways
Neighbourhood Plans
Norwich to Wymondham GI corridor
Broadland Country Park Dev. Programme

Annex 2: Details of technical methodology

- A full list of relevant strategies and documents was provided in an earlier Scoping Report and summarised in Annex 1. The final Strategy will provide more details on each individual document.

Spatial Reporting Units

Throughout this work, detailed spatial analysis is summarised to pre-defined spatial reporting units. These units have their own characteristics and pro's and con's, which are summarised in Table 5.

Table 5. Summary of spatial reporting units

Unit	Description	Pro's	Con's	Further Information
Address	Based on unique property reference numbers, classified by commercial or residential for easy filtering. Each point on the map represents an individual property, regardless of size.	Most granular level of analysis for demographic-related questions	Unsuitable for analysing natural spaces - only covers addressable locations/properties	AddressBase Plus | Data Products | Ordnance Survey
Postcode	Polygon areas based on the number of addresses contained therein (restricts number of addresses per postcode unit to <100, with 15 being typical). Polygons vary in size greatly, and some contain only a single property.	Most people know their postcode - i.e. good for social research methods.	Unaligned to other geographical boundaries such as wards (postcodes may intersect multiple). Subject to continuous change.	Code-Point with Polygons | Data Products | Ordnance Survey

Unit	Description	Pro's	Con's	Further Information
Output Areas (OAs)	OAs are based on a population threshold of 100-625 people, and 40-250 households. Originally from 2001 census data; where possible, OA boundaries were drawn to contain populations with homogenous characteristics, and around small, free-standing settlements.	Generally fit exactly within the boundaries of parishes/communities and wards Boundaries were created to enclose as compact an area as possible – retain spatial detail when summarising information.	Vary greatly in size between urban and rural areas Issues with retaining anonymity of personal data	Output areas - Office for National Statistics (ons.gov.uk)
Lower / Middle Super Output Areas	Built from groups of contiguous Output Areas and have been automatically generated to be as consistent in population size as possible. Lower: Population usually 1000-3000, mean 1500; 400-1200 households Middle: Population usually 5000-15,000 people; 2000-6000 households	Meaningful subdivision of Local Authority District areas. Consistent/comparable population sizes.	Unrelatable to the public – i.e. do not conform to real-life communities. Not named and may cut across real-life neighbourhoods. Large variation in geographical size.	Output areas - Office for National Statistics (ons.gov.uk)

Unit	Description	Pro's	Con's	Further Information
Hexagonal Grids	Tessellating hexagons provide an alternative to the typical square grid used in data anaysis	Can be altered to any size depending on requirements. Direct comparability between hexagons due to uniform size. Better model and represent connectivity, particularly useful in ecological data analysis.		Why hexagons?—ArcGIS Pro | Documentation

Annex 3: GI Framework Principles

This table (Table 6) outlines a set of guiding principles for the strategic planning and development of Green Infrastructure (GI). These principles emphasize the multifunctional nature of GI, the importance of partnerships, evidence-based planning, and the need for well-designed and accessible green spaces. They also stress the value of good governance, funding, monitoring, and evaluation in ensuring the successful implementation and management of GI projects.

Table 6: Guiding Principles for Green Infrastructure (GI) Planning and Development

Principles	At a strategic level, GI should
Why 1: Nature rich beautiful places	• Create and strengthen networks of habitats and reduce fragmentation • Help deliver Biodiversity Net Gain requirements • Contribute to cross species objectives such as pollinator strategies • Integrate with Local Nature Recovery Strategies and seek to contribute to the Nature Recovery Network • Help achieve targeted individual species recovery • Maintain and enhance geodiversity assets • Prevent and reduce soil degradation and loss • Be designed to deliver multiple benefits including landscapes that have a distinct sense of place
Why 2: Active and healthy places	• Reflect public health authority, health leads, health and wellbeing boards, or clinical commissioning group strategic priorities. • Help achieve area wide specific health targeting for particular illnesses and goals such an increase in social prescribing. • Align with health funding and support which can also deliver GI. • Align with active travel plans
Why 3: Thriving and prosperous places	• Be a central objective within plans and policies for new development and regeneration • Address gaps or pinch points where GI demand is not being met and development can contribute to the supply • Provide opportunities for investment from a broad range of businesses and investors • Enable opportunities for collaboration between Business Improvement Districts (BIDs), Local Enterprise Partnerships (LEPs), and other strategic economic bodies on integrating GI into economic plans and proposals

Principles	At a strategic level, GI should
	• Maximise economies of scale for projects through funding mechanisms which can pool resources for landscape or large-scale projects
Why 4: Improved water management	• Be based on an understanding of current and future catchment processes and needs and establish strategies for GI to respond to these needs at this scale • Contribute to the delivery of water management plans, including River Basin Management Plans, Drainage and Wastewater Management Plans and Surface Water Management Plans • Aim to reduce flooding risks identified in Strategic Flood Risk Assessments through nature-based solutions • Provide and improve water to create and connect new or enhance existing wetland habitats and watercourses • Protect and improve the quality of surface water and groundwater, including by reducing pressure on water infrastructure • Improve Climate Change Resilience of freshwater habitats and species
Why 5: Resilient and climate positive places	• Be developed in collaboration with key stakeholders to meet national climate change objectives • Take account of and be planned to respond to the long-term climate change projections in the area • Contribute to water and transport strategies, policies and plans
What 1: Multifunctional: GI delivers multiple functions and benefits	• Combing evidence from a broad range of sources • Highlighting how enhancements can be delivered across relevant strategies and delivery plans • Identifying inequalities in provision which need addressing • Bringing together expertise and ensuring that goals are shared by stakeholders • Being planned as network of features which work together in combination and across areas
What 2: Varied: GI includes a mix of types and sizes that can provide a range of functions and benefits to address specific issues and needs	• Aim to create variation in the types and sizes of spaces to meet strategic needs • Strengthen networks and their variety to create more interest for users • Maintain and enhance a mix of significant GI assets • Reduce the loss and degradation of habitats and geodiversity • Increase the diversity of habitats and species • Reduce the loss of and increase the variety of recreational facilities
What 3: GI connects as a living network at all scales, connecting provision of GI with those who need its benefits	• Achieve a measurable increase in ecosystem services through the creation, enhancement and connectivity of new and existing sites

Principles	At a strategic level, GI should
	• Identify and describe how investment will form an integrated network to provide multiple benefits, including for: active transport; wildlife; flood reduction; urban cooling; carbon storage; pollination and improvements in air and water quality at a strategic scale • Use up to date information on the quality and condition of open space and natural capital assets to establish connections across stakeholder interests that will make GI planning more effective and integrated • Be clear where and how GI needs enhancing, who it benefits and inequalities in provision which need addressing • Demonstrate how land allocation and regeneration priorities connect and contribute to the delivery of GI, show how and where the mix of GI functions and services are provided and relate to each other as part of a network • Provide strong policy protection for the existing GI network
What 4: Accessible: GI creates green, liveable places where everyone has access to good quality green and blue spaces routes and features.	• Aim to strengthen access networks and reduce fragmentation of green and blue infrastructure • Contribute to access policy such as green transport and active travel strategies • Help achieve targeted individual access objectives for different users • Maintain and enhance non-motorised routes • Provide data and evidence to promote the strategic planning of inclusive, safer and longer routes
What 5: GI should respond to an area's character	• Take account of landscape/townscape character assessments, historic landscape character assessments and the National Character Area profiles. • Aim to strengthen overall existing character, historic and landscape assets • Help achieve targeted enhancements in character in areas of poor quality
How 1: Partnership and vision. Partnership working, collaboration and stakeholder engagement; create a vision for GI	• Use a partnership approach to establish a long-term vision for how green infrastructure will address core challenges • Have an inclusive engagement and consultation strategy based on thorough stakeholder mapping • Aim to strengthen communication networks to build knowledge sharing and joint outcomes • Promote a GI approach to strategic outcomes in the policies of contributing organisations • Provide information which promotes sustained involvement of stakeholders
How 2: Evidence. Use evidence, sound science and good land use practices to underpin plans projects, programmes and policies.	• Evidence should be used to establish a baseline for quantity and provision of GI in an area • The current functions and benefits those assets are delivering should be identified • The priorities and needs of communities should be mapped • Evidence is developed to support conservation of assets currently providing important services • Enhancement of those assets that could deliver better services is evidenced

Principles	At a strategic level, GI should
	• Creation of new assets in areas of identified deficiency is supported by evidence
How 3: Plan GI strategically to secure GI as a key asset in policies to create and maintain sustainable places	• GI needs to be integrated with other strategies and the extent will depend on local needs and opportunities (Local plans, LNRS, health policies to address local inequalities, economic regeneration, infrastructure delivery plans)
How 4: Design GI to create beautiful, well-designed places	• Understanding the landscape setting and character of a place is a key part of good design, and essential to ensure that new GI responds appropriately to place. • Good landscape design principles should be practically applied suggesting a balance of hard and soft spaces based on the intensity of uses. • There should also be a strong relationship between GI design and sustainability, ensuring good practice in construction and that materials used minimise impacts and maximise benefits, particularly in terms of climate change.
How 5: Managed, valued, monitored and evaluated Establish good governance, funding, management, monitoring, and evaluation of GI.	• At a site level, governance bodies should include relevant stakeholders and representatives of local communities and users. This will ensure that the GI is responsive to local needs. • Involving local communities and local stakeholders in discussions on long term management • Creating an inventory of GI assets, including as part of a broader natural capital account, can be useful in recognising, communicating and analysing the quantity and value of GI. • Looking at funding from a multi-disciplinary perspective creates the potential to tap into a range of sources. • Benchmarks and standards can be used to further assess needs and monitor supply of GI functions. Evaluation of provision should also take account the future vulnerabilities of the assets where possible.

Annex 4: Accessible Greenspace Inequalities Additional Mapping

This Annex presents detailed maps depicting individual indicators that contribute to the Composite Inequalities score, including Household Density (Number of Residential Households per km^2), IMD Decile, and Size of Private Garden (m^2) per household, in relation to the corresponding ANGSt+ buffer zones.

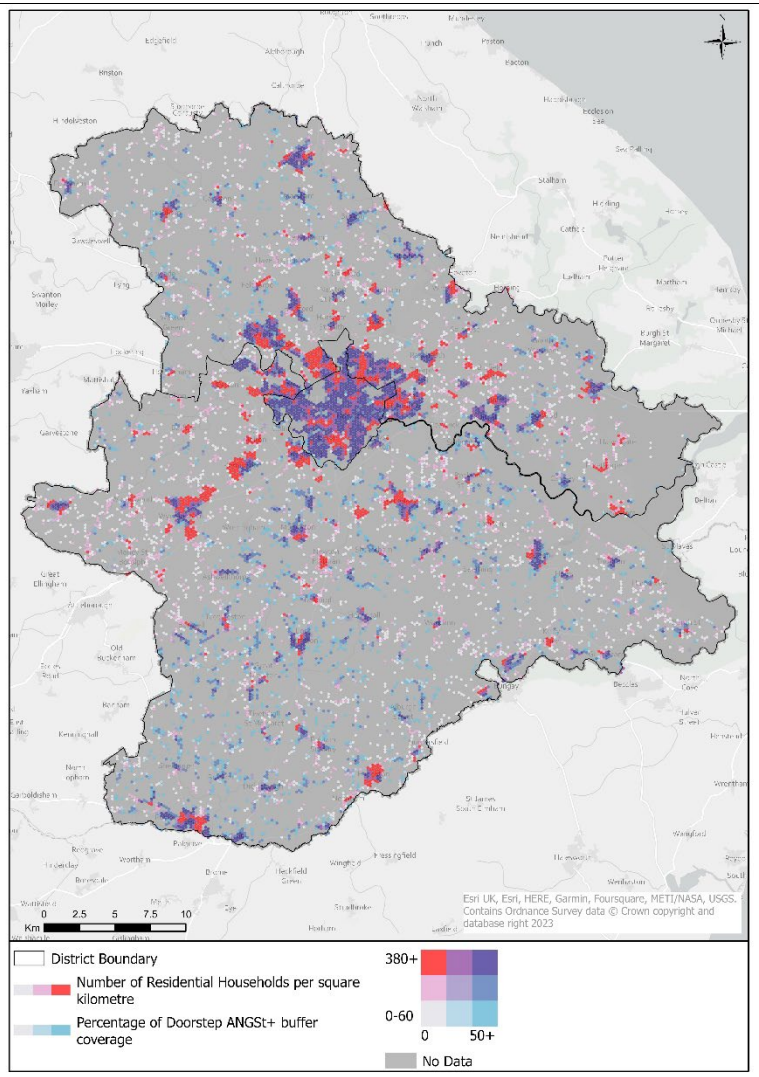


*Figure 53. Bivariate Analysis showing **Household Density per km²** against the Percentage of **Doorstep** ANGSt+ buffer coverage for a 200m hexagon tile.*

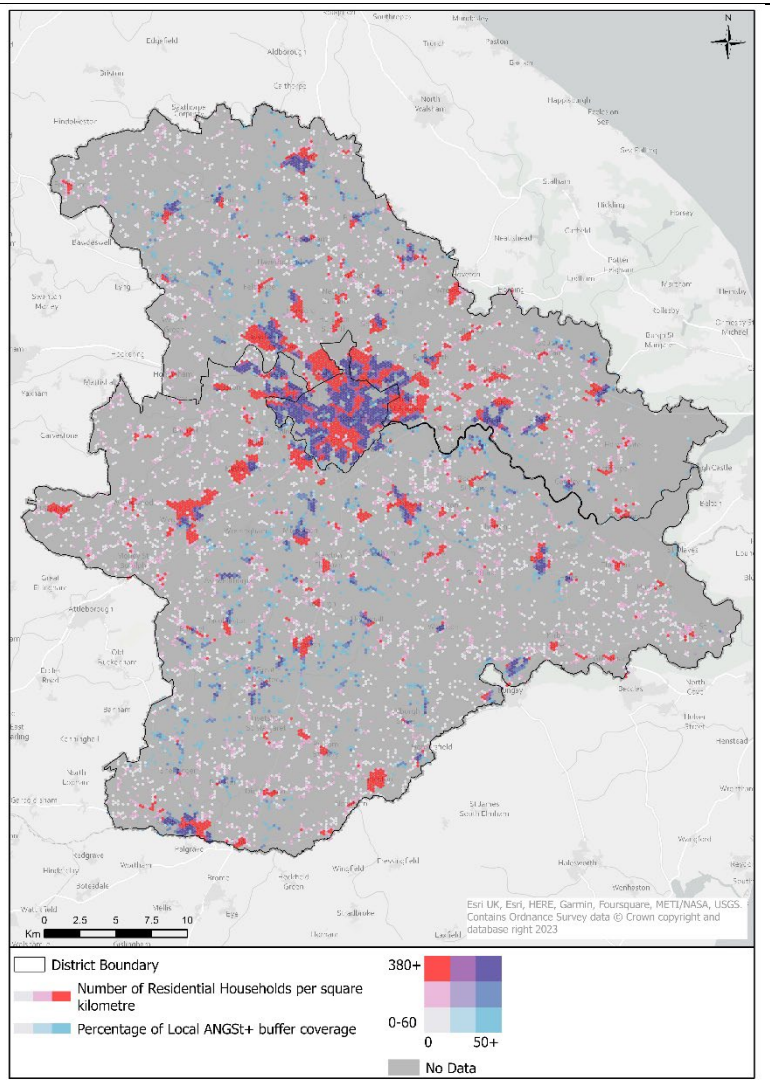


*Figure 54. Bivariate Analysis showing **Household Density per km²** against the Percentage of **Local** ANGSt+ buffer coverage for a 200m hexagon tile.*

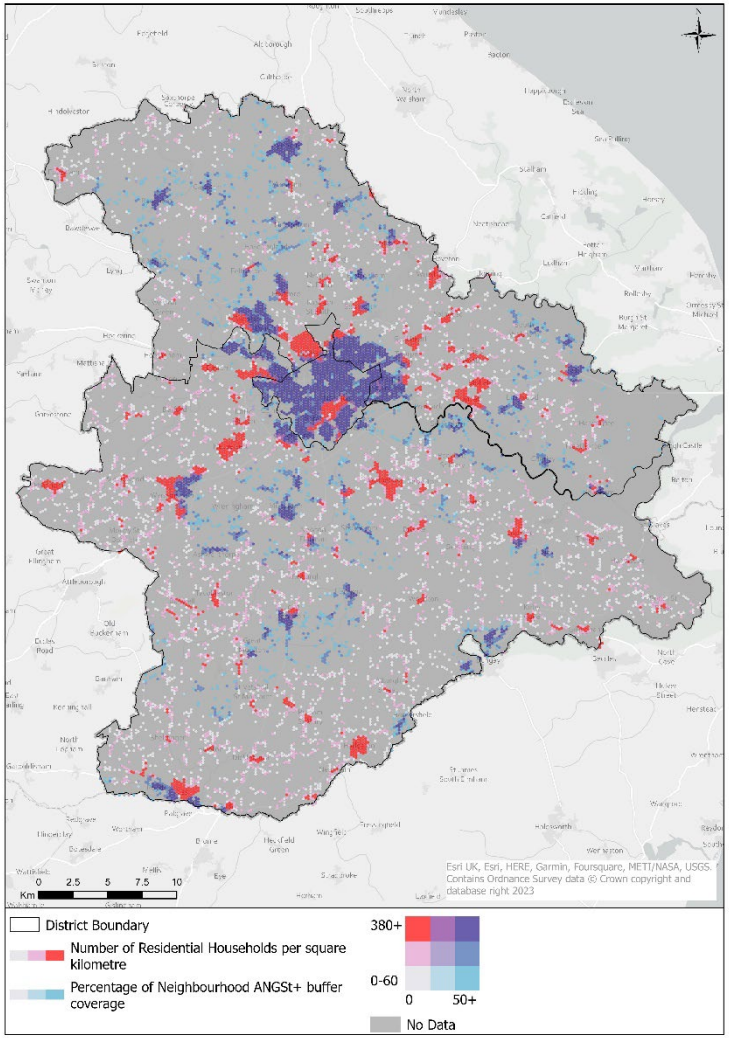


*Figure 55. Bivariate Analysis showing **Household Density per km²** against the Percentage of **Neighbourhood** ANGSt+ buffer coverage for a 200m hexagon tile.*

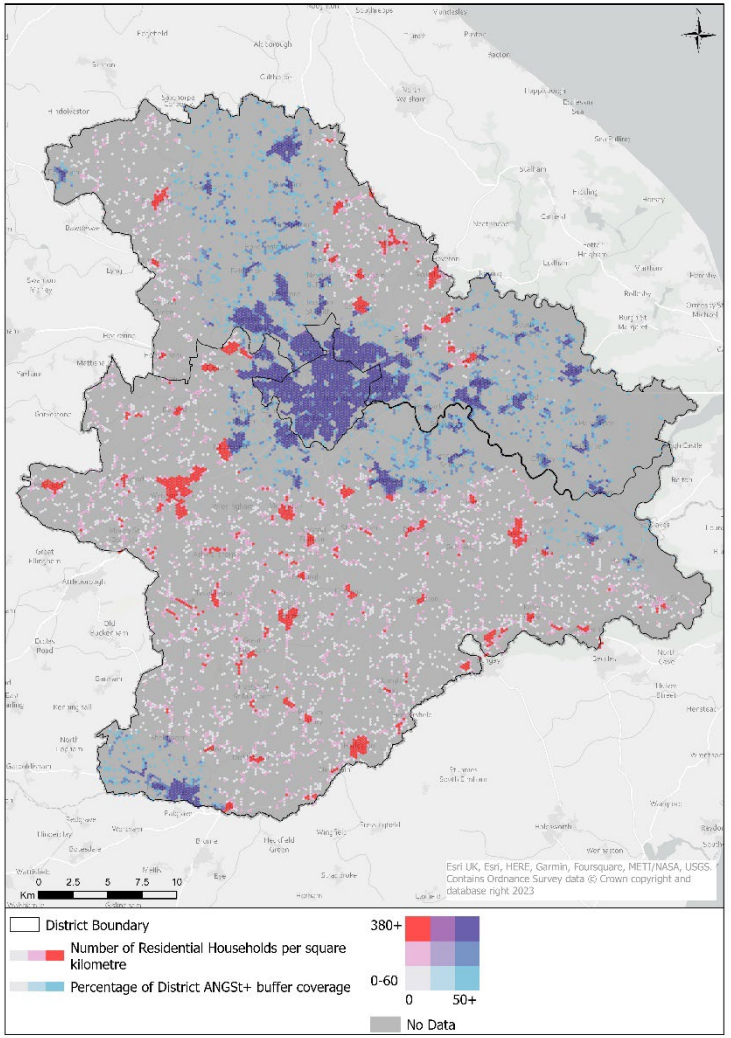


*Figure 56. Bivariate Analysis showing **Household Density per km²** against the Percentage of **District** ANGSt+ buffer coverage for a 200m hexagon tile.*

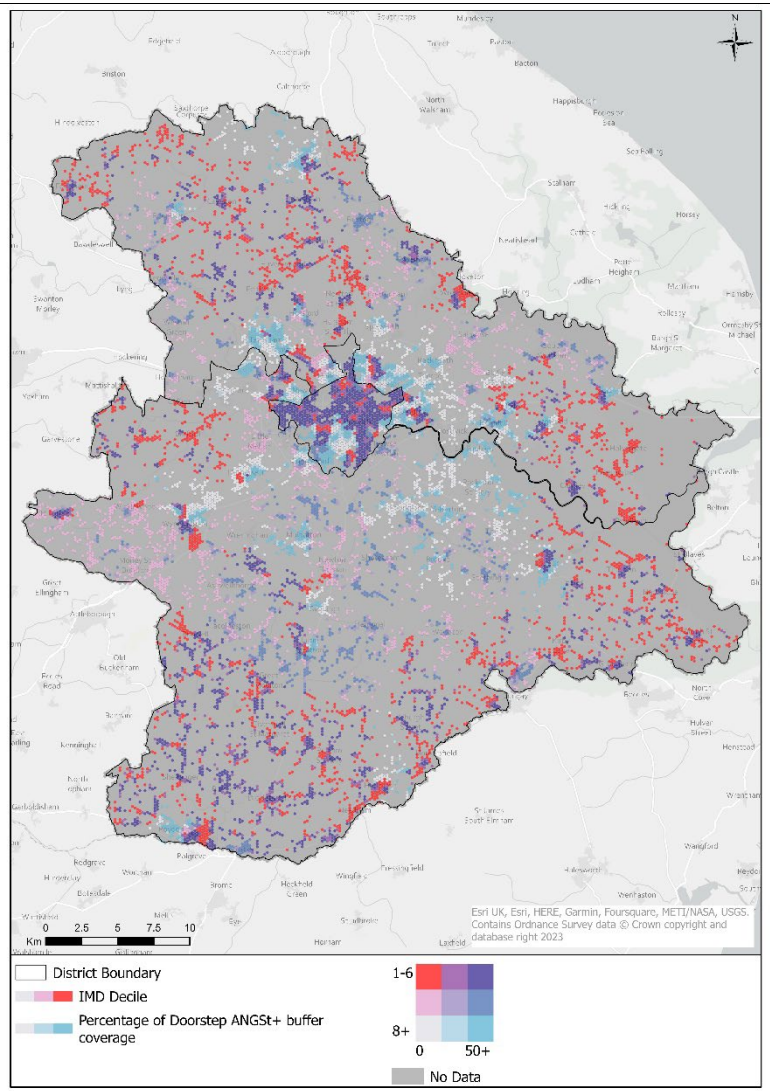


*Figure 57. Bivariate Analysis showing **IMD Decile** against the Percentage of **Doorstep** ANGSt+ buffer coverage for a 200m hexagon tile.*

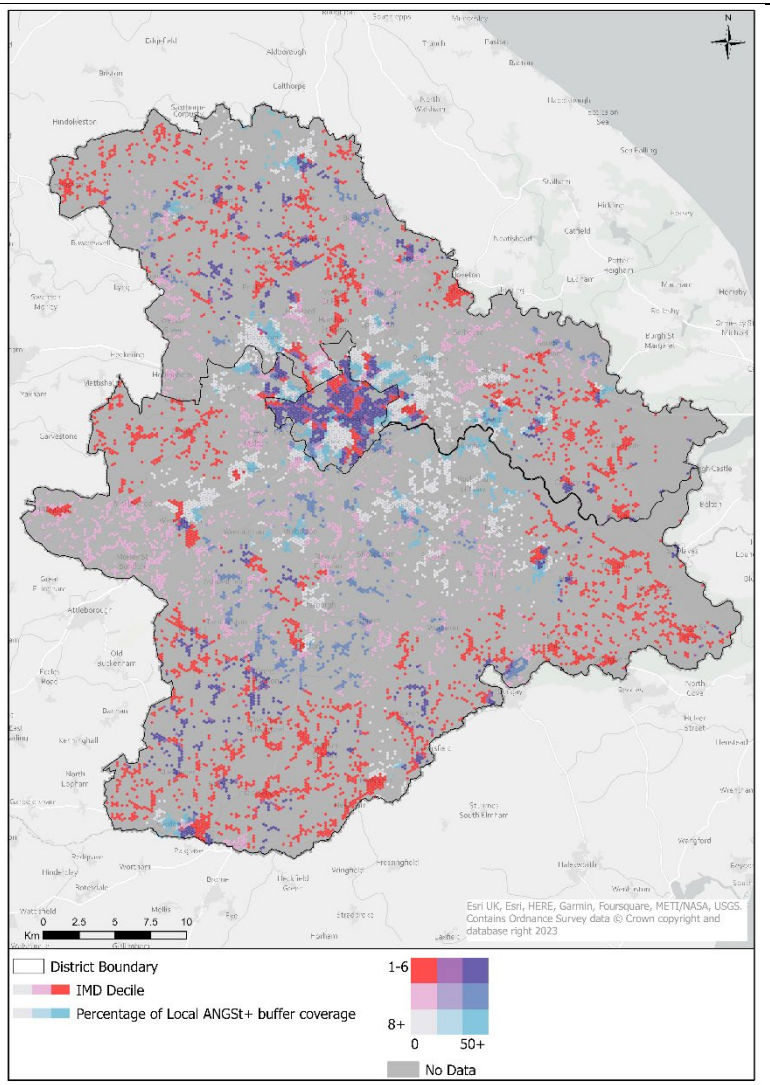


*Figure 58. Bivariate Analysis showing **IMD Decile** against the Percentage of **Local** ANGSt+ buffer coverage for a 200m hexagon tile.*

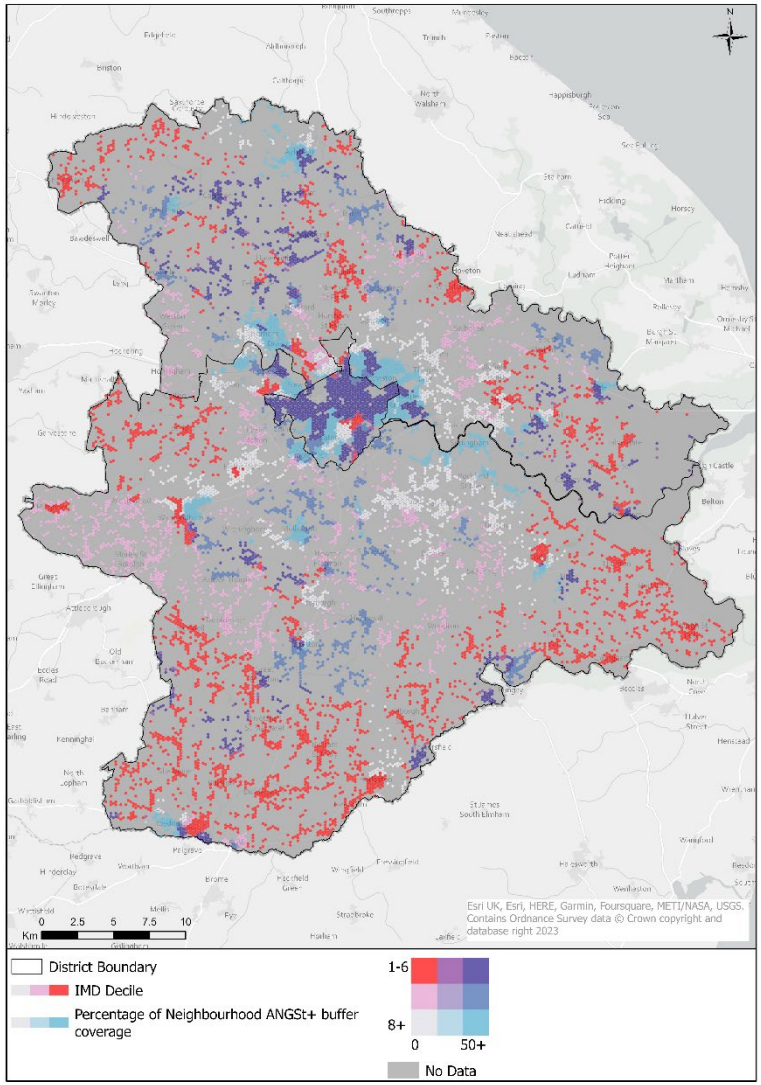


*Figure 59. Bivariate Analysis showing **IMD Decile** against the Percentage of **Neighbourhood** ANGSt+ buffer coverage for a 200m hexagon tile.*

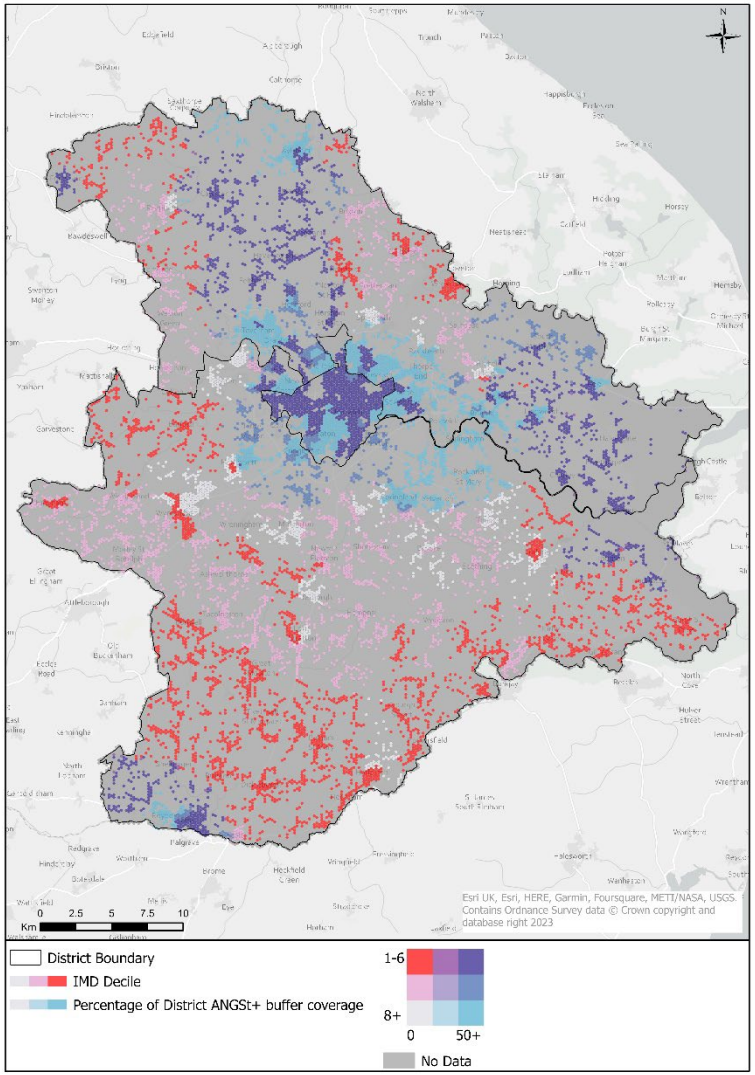


*Figure 60. Bivariate Analysis showing **IMD Decile** against the Percentage of **District ANGSt+** buffer coverage for a 200m hexagon tile.*

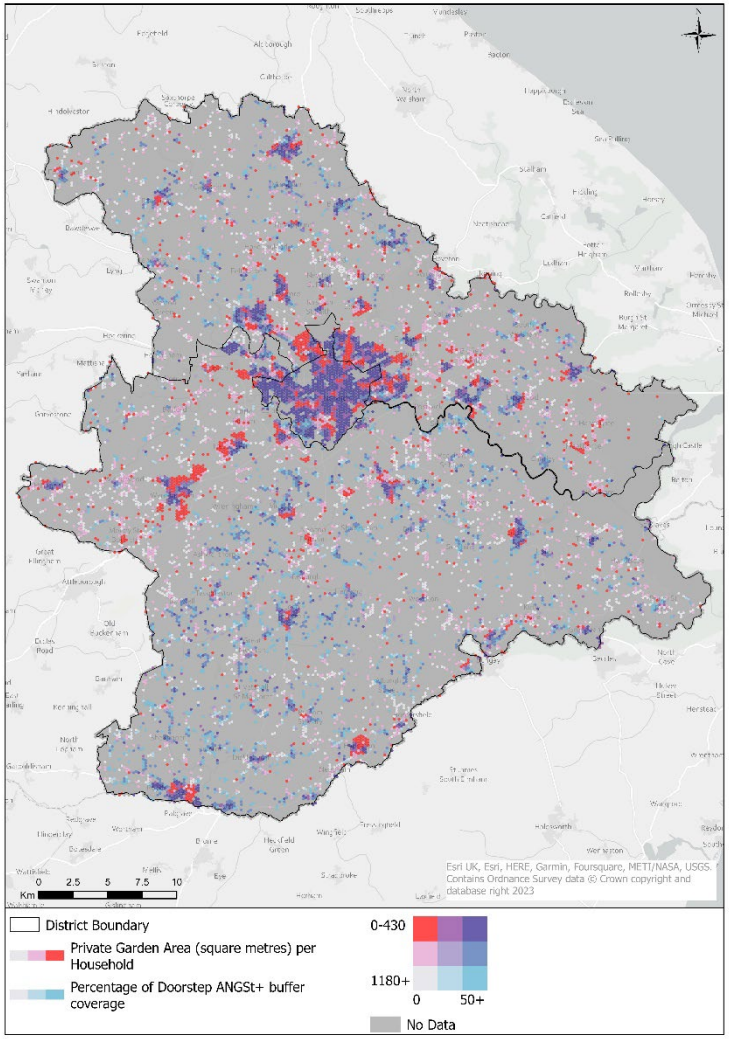


*Figure 61. Bivariate Analysis showing **Private Garden Area (m2) per household** against the Percentage of **Doorstep** ANGSt+ buffer coverage for a 200m hexagon tile.*

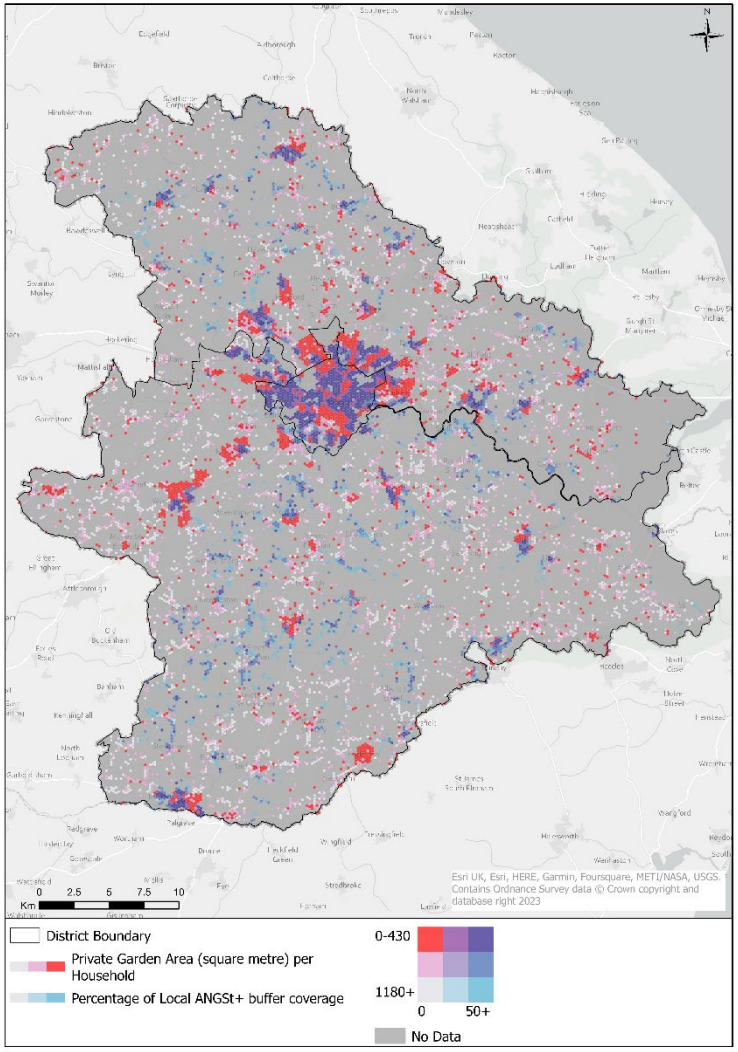


*Figure 62. Bivariate Analysis showing **Private Garden Area (m2) per household** against the Percentage of **Local** ANGSt+ buffer coverage for a 200m hexagon tile.*

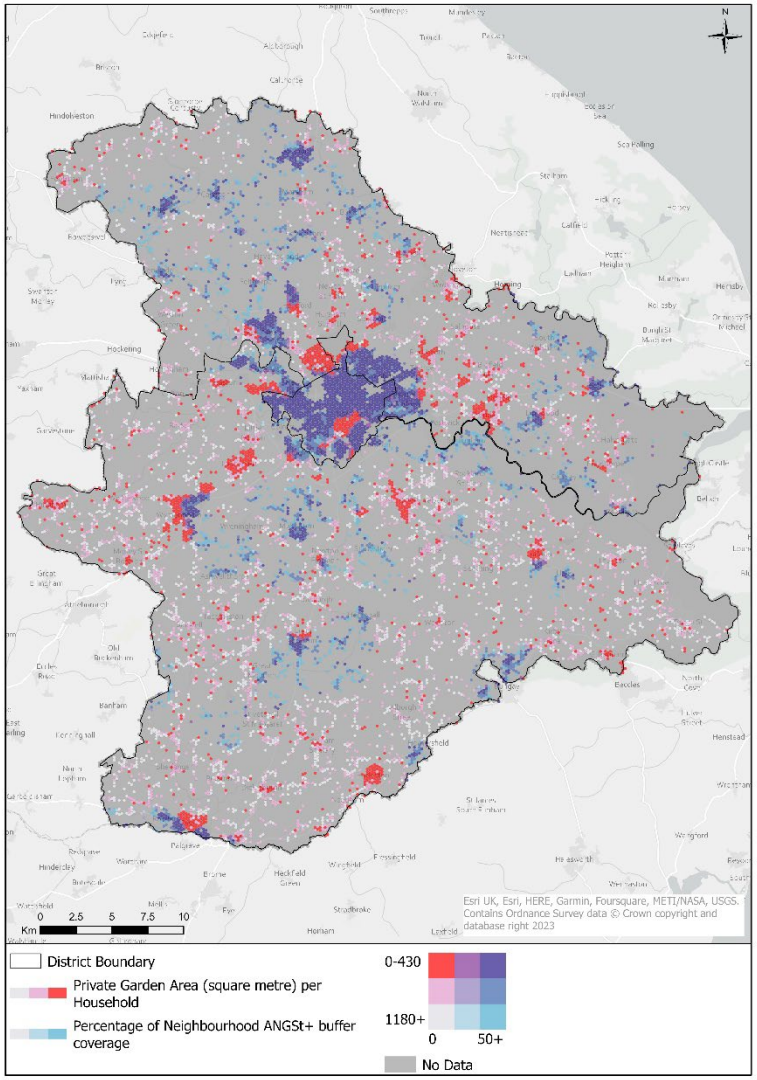


*Figure 63. Bivariate Analysis showing **Private Garden Area (m2) per household** against the Percentage of **Neighbourhood** ANGSt+ buffer coverage for a 200m hexagon tile.*

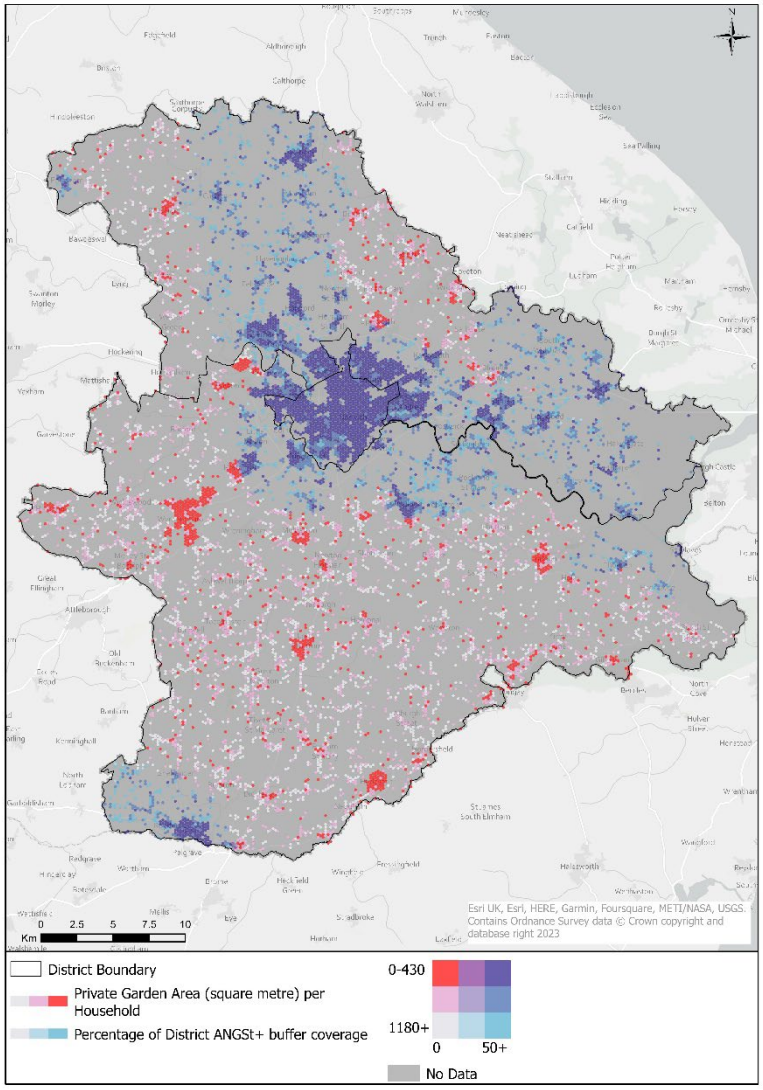


*Figure 64. Bivariate Analysis showing **Private Garden Area (m2) per household** against the Percentage of **District** ANGSt+ buffer coverage for a 200m hexagon tile.*

Annex 5: Limitations and Issues around the Inclusive Accessibility Index

As set out in section 4.2, there are multiple issues with the current version of the inclusive accessibility index. Many of the described limitations are related to the sparse availability of consistent data across the whole of Greater Norwich, and so will be difficult to address through further geospatial analysis alone. These issues could potentially be reduced through further external engagement and data collation from other existing sources and could be carried out collaboratively with other inclusive access work currently being undertaken by NCC and its partners. Inclusive accessibility should be an integral consideration of the final strategy, with a Geospatial analysis forming only a small part of this. The index should be further refined to make sure it presents clear information that is useful as a planning tool, but it cannot currently accurately quantify the overall quality of sites, and does not present a valid measure of overall individual experiences.

Issues identified through the review process by the Norfolk CC Accessibility Team are presented below. Table 4 also summarises the main limitations of the work to date, alongside general suggestions from the project team for how these could be addressed.

Feedback from Norfolk CC Accessibility Team:

- It was felt that the focus on accessibility being just mobility is problematic as it has the potential to miss opportunities to support other people. Not all environments can be made accessible to people with limited mobility, but could still be inclusive to people with other needs such as Dementia, Learning Disabilities, Sensory Loss or supporting Mental Well-being. Looking at an environments accessibility to be pan-disability is a much more inclusive approach. There are links to specific guidance with the index, but it was felt that for planners and others to be proactive, the index itself needs to represent a pan-disability approach to access.

- There were concerns about the metric for measuring accessibility (and some other areas) as access is not binary, so just saying that there is an accessible toilet or that there is an accessible carpark doesn't take account of some of the nuances around this. It was felt it could be easy for a planner to give a score of 1, where really a full access audit is needed. There are opportunities here to link to other initiatives and tools to give both the planners and others a more informed overview around accessibility. Perhaps conducting a comparison of scores given via the index for a sample of locations with the results of a full access audit may highlight the limitations of using this binary measure more clearly – it could work both ways, in that somewhere that scores a 1 may actually be quite lacking (owing to errors or date of the data used), or a location may score 0 but actually be – in part at least – quite accessible to a number of disabled people (e.g., if there is somewhere with trails, and a shorter loop of trail available is designed to be fully accessible,

but there is a barrier in the larger footprint that results in the location scoring poorly).

- There were concerns around the Safety element as safety can mean different things and that the data probably doesn't give an accurate picture for personal safety so it was questioned whether this is something that can be achieved at a strategic level or if it's something that needs to be flagged to planners to consider at a scheme level. Having a better understanding of what the expectation is around flagging safety concerns would help, i.e. would the planner need to do anything differently (think about additional lighting for instance) or would this just be something to flag for the end user?

- It was questioned if there could be some conflict here between different elements and whether certain areas may take priority over others, meaning that some elements might be missed more often due to priorities at any given time. What the index is trying to achieve is complex so it might be useful to think about how this would apply on a smaller geographical footprint than Greater Norwich to see how those principles would apply and whether additional priorities such as the need for affordable housing etc could compromise what the index is seeking to achieve.

- It was suggested that the Index would also benefit from looking at these issues from an urban vs. rural perspective as the environment and the needs of those living in it will differ. From a planning perspective this would also support looking at what may be achievable rather than trying to adopt a single approach to provision i.e. improving access in an urban environment may be physically easier when it comes to infrastructure and less costly as opposed to a rural environment.

- The question of how this Index would sit alongside section 3 of the existing strategy which covers environment was raised. It might be useful to include some commentary on that so the relationship is clear to those taking this further.

- Lastly, it was suggested that the issues raised regarding the availability and quality of data should be taken forward in a way that asks what benefit could be derived for Norfolk but developing better data sources if those areas covered by them are instrumental to good planning. The team were currently unclear how this would be achieved and noted the mention of resourcing going forward but given the amount of partners involved – it was asked if there was potential to 'pool' data to see what is held in-house already. This was suggested as something to speak to I&A about.

Table 7. Summary of current limitations to the inclusive accessibility index

Issue	Project Team Suggestion
Lack of data availability, with implications on the validity of judgements around site accessibility. The data can define where general facilities are present, but does not have sufficient detail to describe the accessibility and quality of these features.	The GNGI Strategy should set out key recommendations for obtaining more detailed and spatially complete sources of data. This could include new crowdsourcing projects, site audits, or pooling existing data from partners and organisations.
The 'Mobility' theme is restricted to consideration of only one aspect of disability. This has potential to miss opportunities for other people with different needs. A pan-disability approach is optimal for informing decision-making, but would require consideration of a large number of factors which are yet to be recorded in the data.	Consider the feasibility of mapping other factors identified through initial engagement and broadening the 'mobility' theme to account for wider disability related access needs. This will involve further data collection as set out previously. Develop a guidance document, which would give detailed advice and further information that cannot be described by a quantitative index, and illustrate 'best-practice' for a pan-disability approach.
Factors chosen within some themes, particularly to measure perceived safety, probably do not give an accurate picture of the individualised experiences of users. The strategy should consider which aspects of safety are most relevant to planners, as designing a metric to describe the varied experiences of end users is unrealistic.	Consult further with planners to determine factors they deem most informative to them. Construct a revised index showing the subset of key factors which can be quantified with available data, removing any which aim to describe overly broad aspects of user experiences.
Lack of integration with other projects that could provide additional information. Information from completed audits could be considered alongside the index in order to test its validity.	Continue to collaborate with teams working on site audits to share data and engagement opportunities. Identify opportunities to engage with other work going on within NCC and its partners, for instance the Norwich Kind City Map project, and others.
Possibility of a conflict of priorities, between different themes of the index and with external priorities around development etc.	Consider inclusive accessibility in all recommendations within the strategy, including the prioritisation of different opportunities, both for people and for biodiversity. Include guidance on the 'least restrictive access' principle that sets out best-practice for planners and officers to balance accessibility with conservation of natural heritage.

The index is applied equally to all areas of Greater Norwich, and does not consider differing needs and perspectives between urban and rural areas. Improvements to accessibility may be more feasible and have higher impact in urban areas, for example.	Consider a more detailed guidance document that could reference the differing standards for formal, informal, and wilder greenspaces set out by the Outdoor Accessibility Guidance. Incorporate inclusive accessibility into an analysis of multifunctionality that can identify different priorities between urban and rural sites.