The Heartland in Context

A summary of the England's Economic Heartland regional evidence base

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INTRODUCTION

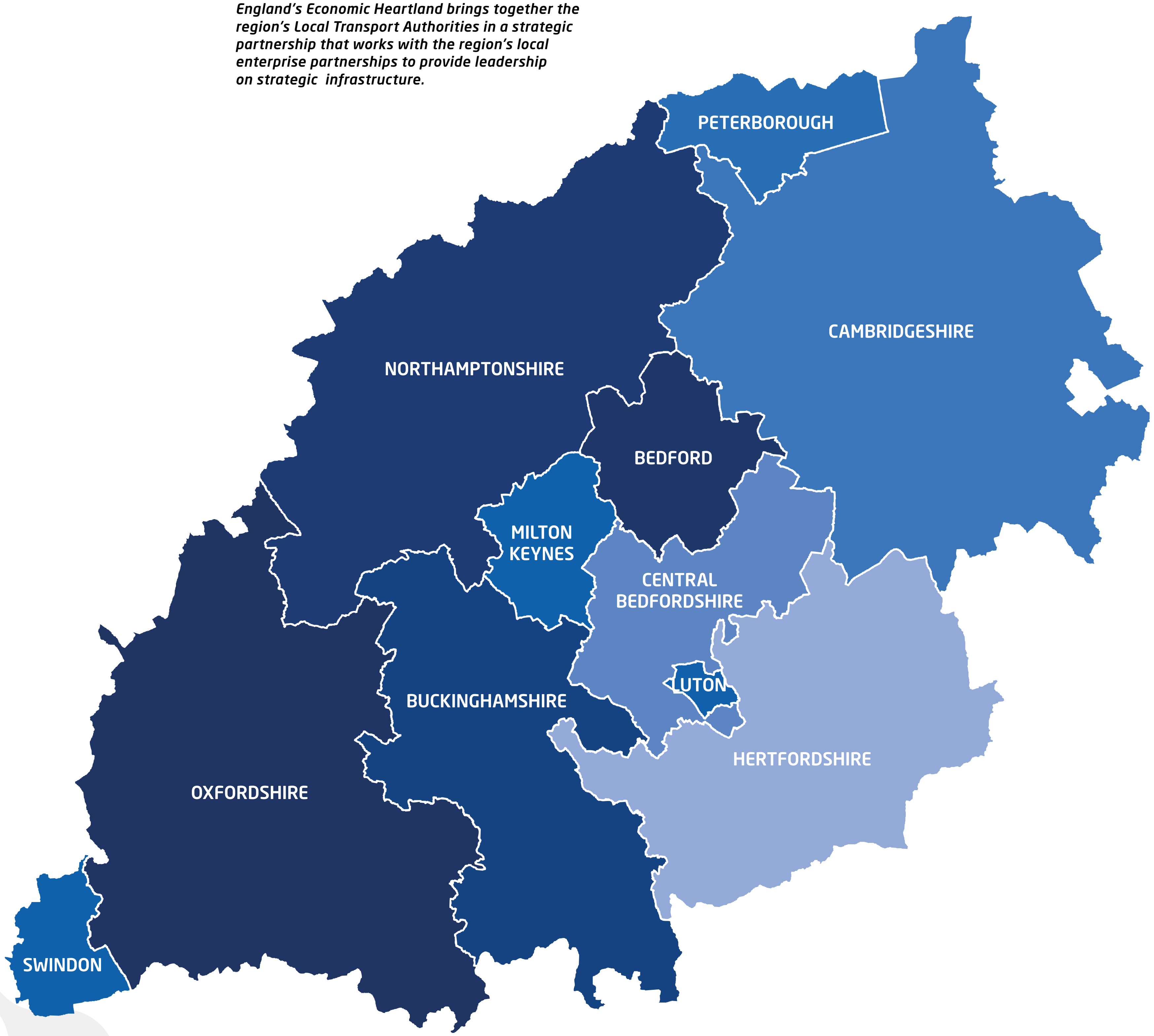
The Heartland forms a broad arc between London and the Midlands, from Swindon and Oxfordshire in the southwest through to Cambridgeshire in the east, and from Northamptonshire and Peterborough in the north down to Hertfordshire in the south.

Covering a total area of approximately 13,354 sqkm and home to over 5.1 million residents, it has a high performing economy, which is a net contributor to the Treasury.

This document summarises the Regional Evidence Base that has been used to inform and determine the priority areas for action in the Transport Strategy. It sets out the economic, demographic, geographical and environmental context for the Heartland, as well as including narrative on the transport system at a sub-regional level.

The main source for this data is the Office for National Statistics alongside other official Government data, for example from the Department for Environment, Food and Rural Affairs. Information on housing growth is based on Local Plans and has been provided by our partners. The latest available data has been used wherever possible; therefore the period in which the data applies fluctuates throughout the document, although the majority of ONS data relates to 2018 or 2019.

England's Economic Heartland brings together the region's Local Transport Authorities in a strategic partnership that works with the region's local enterprise partnerships to provide leadership on strategic infrastructure.



THE REGIONAL EVIDENCE BASE

The creation of a Regional Evidence Base ensures that the strategy, and our investment pipeline that will support delivery of the strategy, is founded on detailed and consistent baseline information.

This comprises:

- GIS-based databank (Projectview) – an EEH-managed database containing up to date information on adopted local plans and agreed economic plans. The databank is updated annually using information supplied by local planning authorities and local enterprise partnerships
- Policy Scenario Model – an EEH-commissioned regional model that is used to assess the relative implications of alternative future scenarios. The agent-based model has the ability to consider both alternative development scenarios (scale and distribution of future growth) and alternative policy scenarios; the model's back-casting ability enables the interventions required to achieve a particular outcome to be explored
- Population Segmentation – part of the output from a technical study linked with First Mile/Last Mile project, this provides insight into the behaviours of the region's residents in a way that complements this strategy's user-centred focus
- Pathway to Decarbonisation – making use of the National Infrastructure Systems Model (NISMOD) to inform the strategy's approach to de-carbonising our transport system.
- Passenger Rail Study – a baseline assessment of the Heartland's rail network and levels of service, providing an evidence-led review of existing rail infrastructure and identifying where strategic connectivity gaps exist.
- Outline Transport Strategy – the responses submitted provide insight on the key issues the strategy needs to address for our residents and businesses.

The databank in particular provides a consistent baseline for our region and in so doing ensures that the strategy complements and supports the work underway at the local level, or with the sub-regional growth boards.

All elements of the Regional Evidence Base are freely available to all EEH partners, including Government, its agencies and associated companies. Where new tools have been developed these have been designed to ensure ease-of-use by non-technical staff.

The scope and capability of the Regional Evidence Base continues to evolve in response to the needs of EEH and its partners, and in light of continuing changes in the national policy context.

A key part of the evidence in this document around the economic profile of the region comes from the Local Enterprise Partnerships within the region, most notably their Local Industrial Strategies (where these exist) and the Economic Vision for the Oxford-Cambridge Arc, published April 2019.

Other information on the profile of the Heartland can be found in the Integrated Sustainability Appraisal which accompanies the Transport Strategy. Journey time maps have also been produced for places of strategic interest, and are available on our website.

Engagement

In July 2019, EEH published its Outline Transport Strategy, marking the start of a conversation with the region's partners, communities, stakeholders and businesses.

The responses form an important part of the evidence base on which the strategy has been prepared, providing as they do insight on the key issues that our partners, stakeholders, residents and businesses see as needing to be addressed. A breakdown of key messages from the engagement can be found in the Draft Transport Strategy, and there is a full report on our website.

EEH has also created an Influencers Group to inform the development of the Transport Strategy.

The group consists of external stakeholders with expertise in the environment, place-making and sustainable transport, alongside a member of Milton Keynes' Youth Cabinet and a graduate civil engineer who was the winner of EEH's Vision 2050 competition. This competition encouraged the new generation of transport planners to give their vision on the future of the Heartland's transport system.

The EEH Influencers Group acted as a critical friend during development of the Transport Strategy, influencing both its policies and broader narrative. In doing so, it has helped to ensure the Transport Strategy considers a wide range of perspectives and avoids assumptions that in turn would have entrenched ill-informed policies.

Note on Local Government Reorganisation

On April 1, 2020, a new unitary Buckinghamshire Council came into existence, replacing Buckinghamshire County Council, and the district councils of Aylesbury Vale, Wycombe, Chiltern and South Bucks. The majority of Office for National Statistics (ONS) and other official data in this document was produced before these changes took place, and is therefore based on the former areas defined by the Buckinghamshire district authorities.

On April 1, 2021, two new unitary councils will be formed in Northamptonshire. West Northamptonshire Council will comprise the districts and boroughs of Daventry, Northampton and South Northamptonshire. North Northamptonshire Council will comprise the districts and boroughsof Corby, Wellingborough, Kettering and East Northamptonshire.

THE ECONOMY

At a glance

- The Heartland is an economic success story and plays a key role in the UK economy.
- It is characterised by highly productive, knowledge-intensive industries that make significant net contributions to the Exchequer.
- There are significant variations in economic performance across the region.

A world-leading region

England's Economic Heartland is one of the world's leading economic regions. Its success is founded on science and technological innovation, powered by a network of world-leading universities and research centres.

Its economic success benefits not only the region's residents, but the UK more widely, with the Heartland being a net contributor to the Treasury.

The Heartland is a strongly knowledge-intensive economy. It contains 11 diverse universities, including the Universities of Oxford and Cambridge, two of the world's greatest and most internationally recognisable centres of learning, and a network of cutting-edge science parks, research institutions, businesses and incubators.

The economic geography of the region includes the knowledge clusters of life sciences; creative and digital; aerospace and aviation; and advanced manufacturing.

See map on pages 10 and 11

Given the Heartland's geographical position within the UK, the logistics and distribution sector is also a critical part of the economy, worth £33bn in 2018 – 20% of its total,[1] compared with 18% across England. The Heartland sits within the Golden Triangle for distribution and Northampton, Daventry, and Milton Keynes along the M1 have become major distribution hubs, while the sector is also growing in Banbury and Bicester on the M40 corridor. Distribution is a major land user in the Swindon area and the town has recently seen substantial investment from national logistics specialist, db symmetry.

Economic performance

In 2018 the region's economy produced a GVA of more than £163bn.[2] This accounts for 10% of GVA in England (14% of English GVA outside of London), and 8.5% of UK GVA.[3]

Oxford, Cambridge, Milton Keynes, Northampton, Swindon, Peterborough and Luton are the region's major economic centres, all with economies of £6bn per annum or over (2018). The region also comprises a wider set of overlapping travel to work areas including those centred on Bedford, Aylesbury, High Wycombe, Watford and Stevenage.

At £31,568, GVA per head in the Heartland is above the English average. Milton Keynes, Three Rivers and Watford all have GVA per head above £50,000.[4]

GVA in the Heartland's 12 local planning authorities which are mainly rural (as defined by Defra, see Urban and Rural split below) amounted to £41bn in 2018, contributing a quarter of the Heartland's total GVA.

Between 2013 and 2018 GVA across the Heartland grew by 25% compared to the English average of 21% and the UK average of 20%.

See maps on page 12 and 13

There is a diverse range of economic growth rates (2013-2018) across the region's local planning authority areas. At 68.5%, Three Rivers' economy had the highest growth rate, with its economy jumping from £2.8bn to £4.8bn.

The fastest growing rural economy was South Cambridgeshire (39%) with a 2018 GVA of £5.5bn.

See map on page 14

Despite high levels of GVA across the Heartland, only 11 out of 37 areas are above the English average for GVA per hour worked[5] (£35.6). Three Rivers was the most productive area of the Heartland, at £58.9. Of the region's six biggest economies Swindon is the most productive, generating £49.4 per hour worked, while Oxford is the least productive, generating £28.7. In some cases this will be driven by a high number of hours worked on average in a given area, so although net GVA is high, productivity per hour is lower. In other cases, areas with relatively high labour productivity will be those with a major manufacturing site, a large utilities sector, or a focus on high-skill service sectors, reflecting the high labour productivity in these types of industries.[6].

See map on page 15

Jobs

In 2019 the region supported just over three million jobs.[7] 80% of the working age population were economically active, compared to the national average of 76%. The rate was highest in Daventry and West Oxfordshire (87%) and lowest in Luton (70%).

There are 250,000 enterprises[8] in the region. The number of enterprises in the Heartland grew by 28.3% between 2013-2019, ahead of the UK average of 25.4%.

The percentage of working people in the Heartland who were self-employed during 2019 was in line with the UK average of 15%, and highest in Buckinghamshire (18.1%) and Hertfordshire (17%)[9].

The ratio of jobs to residents aged 16-64 across the Heartland was 0.94 in 2019, compared to 0.87 across England. At 1.80, Watford had the highest jobs to residents ratio in EEH, while other key economic centres such as Oxford, Cambridge, Northampton, Milton Keynes and Peterborough also had ratios above one.

See map on page 16

Median weekly resident earnings in 2019 in the Heartland were £623, whilst workplace earnings averaged £591 (the English average for resident/workplace earnings was also £591). The difference between resident and workplace earnings in the Heartland is most likely explained by residents commuting out to high value jobs in London. At £716 per week, South Cambridgeshire offered the highest average weekly earnings to its workforce, while in the same county, Fenland (£458) offered the lowest.

See map on page 17

Skills

The region has some of the highest concentration of world-class research and innovation assets in the world. These include the two of three highest ranking universities in the world in Oxford and Cambridge,[10] which have been at the heart of the growth of the region's knowledge-intensive economy, along with nine further universities and a network of science parks, research institutions, businesses and incubators.

However, skills shortages remain a significant constraint on business growth, resulting in hard to fill vacancies and skills gaps in the existing workforce.

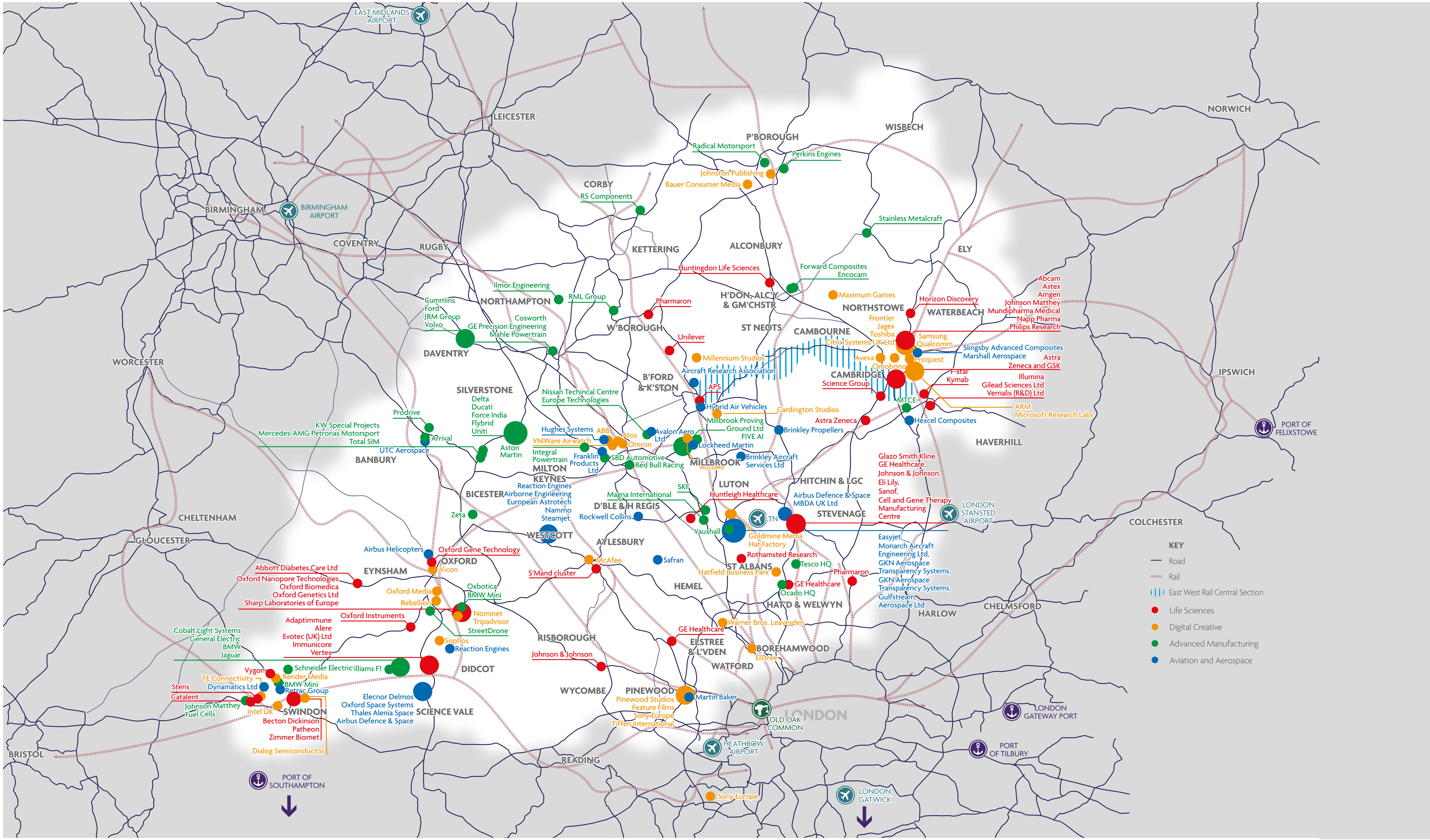
45% of the region's economically active population is educated to degree level or higher (NVQ4+), compared to 44% in the UK. This varies considerably across the region: 73% of the economically active population are educated to NVQ4+ in Oxford City, but conversely, only 27% in Broxbourne.[11]

1. Regional gross value added (balanced) by industry: local authorities by NUTS1 region, 2018. The G, H and I categories of the Standard Industrial Classification (SIC).
2. ONS Regional gross value added (balanced) by industry: local authorities by NUTS1 region
3. Regional gross value added (balanced) by industry: all NUTS level regions, published December 2019
4. GVA per head is a useful way of comparing areas of different sizes. However, it should not be used as a measure of productivity.

5. ONS Subregional Productivity February 2020. GVA per hour worked is considered by the ONS to be a more comprehensive indicator of labour productivity and the preferred measure at subnational level
6. ONS explanatory note
7. ONS: LI01 Local labour market indicators by unitary and local authority, released April 2020
8. ONS
9. ONS: Number of employees and self-employed by NUTS3, January to December 2019
10. Times World University rankings 2020
11. Databank: ONS Annual Population Survey (NOMIS September 2019)

// Key business clusters in the innovation ecosystem

Map created for Illustrative purposes only.



// Total GVA

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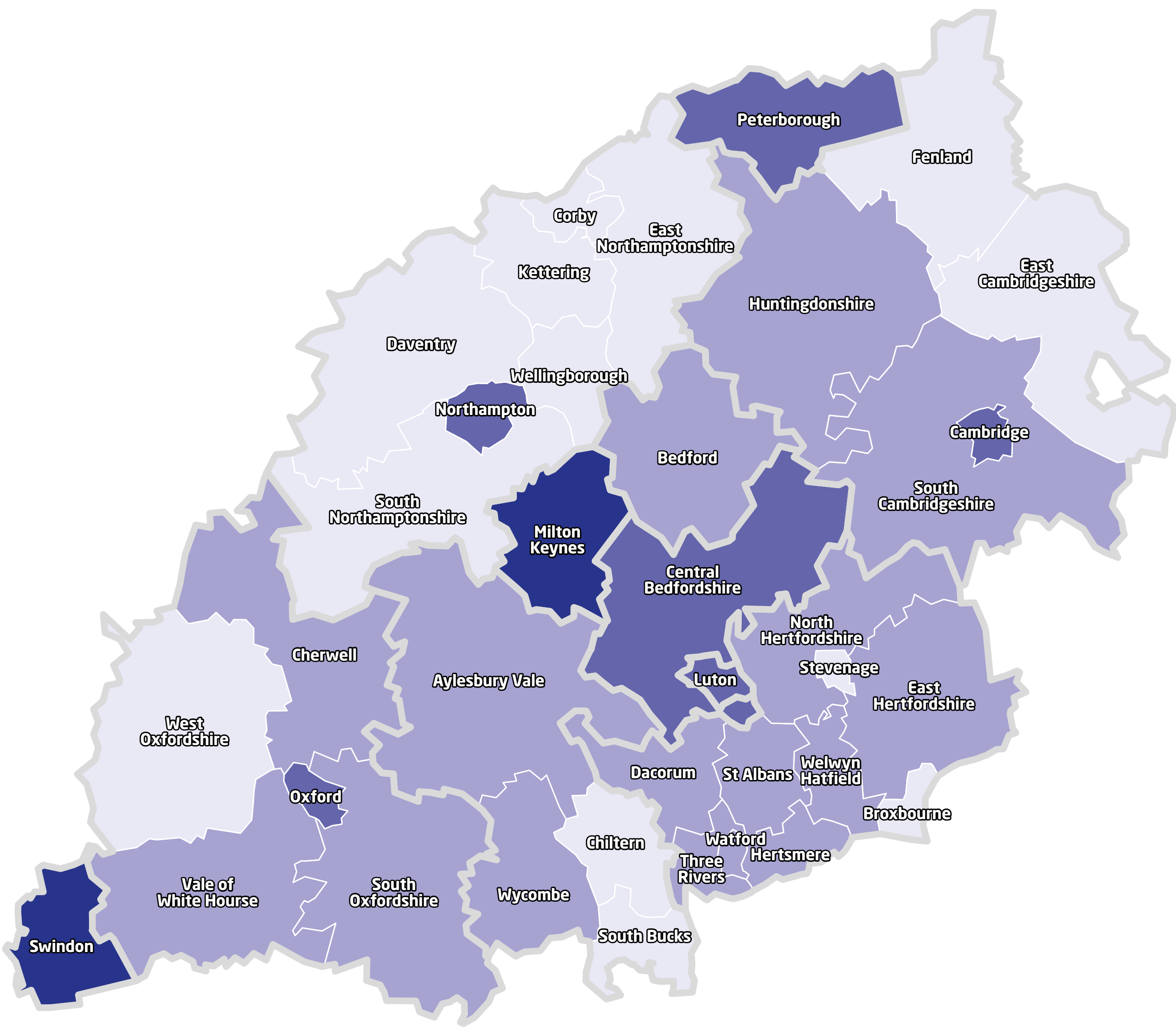

KEY:
Total GVA per planning authority area, 2018

- Upper tier authority boundaries
- More than £9bn
- £6bn-£9bn
- £3bn-£6bn
- Under £3bn

// GVA per head

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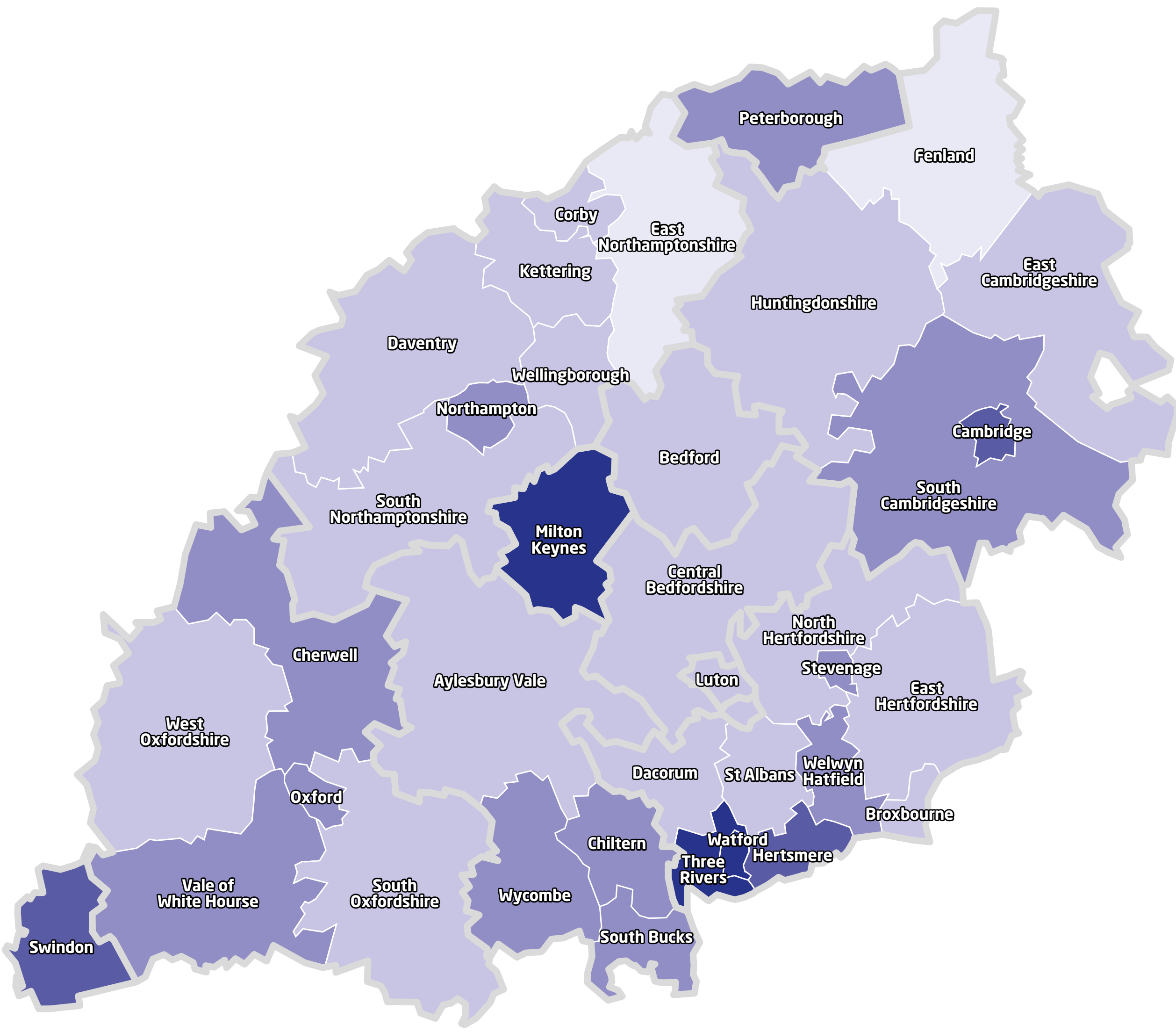


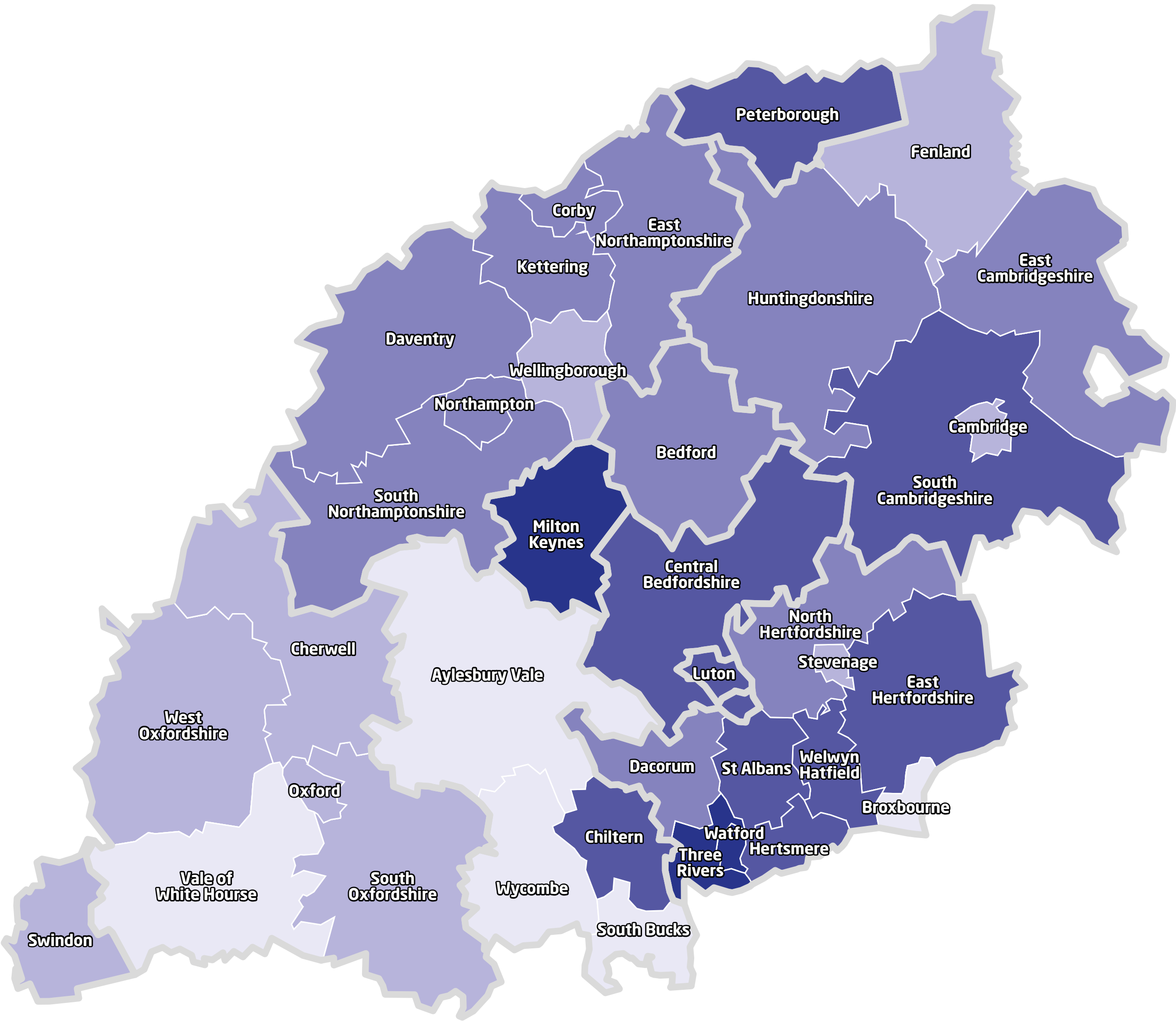
KEY:
GVA per head of resident population, 2018.

- Upper tier authority boundaries
- More than £50,000
- £40,000-£50,000
- £30,000-£40,000
- £20,000-£30,000
- Less than £20,000

The average across England is £29,356 and across EEH is £31,568.

// GVA growth

Map created for Illustrative purposes only.



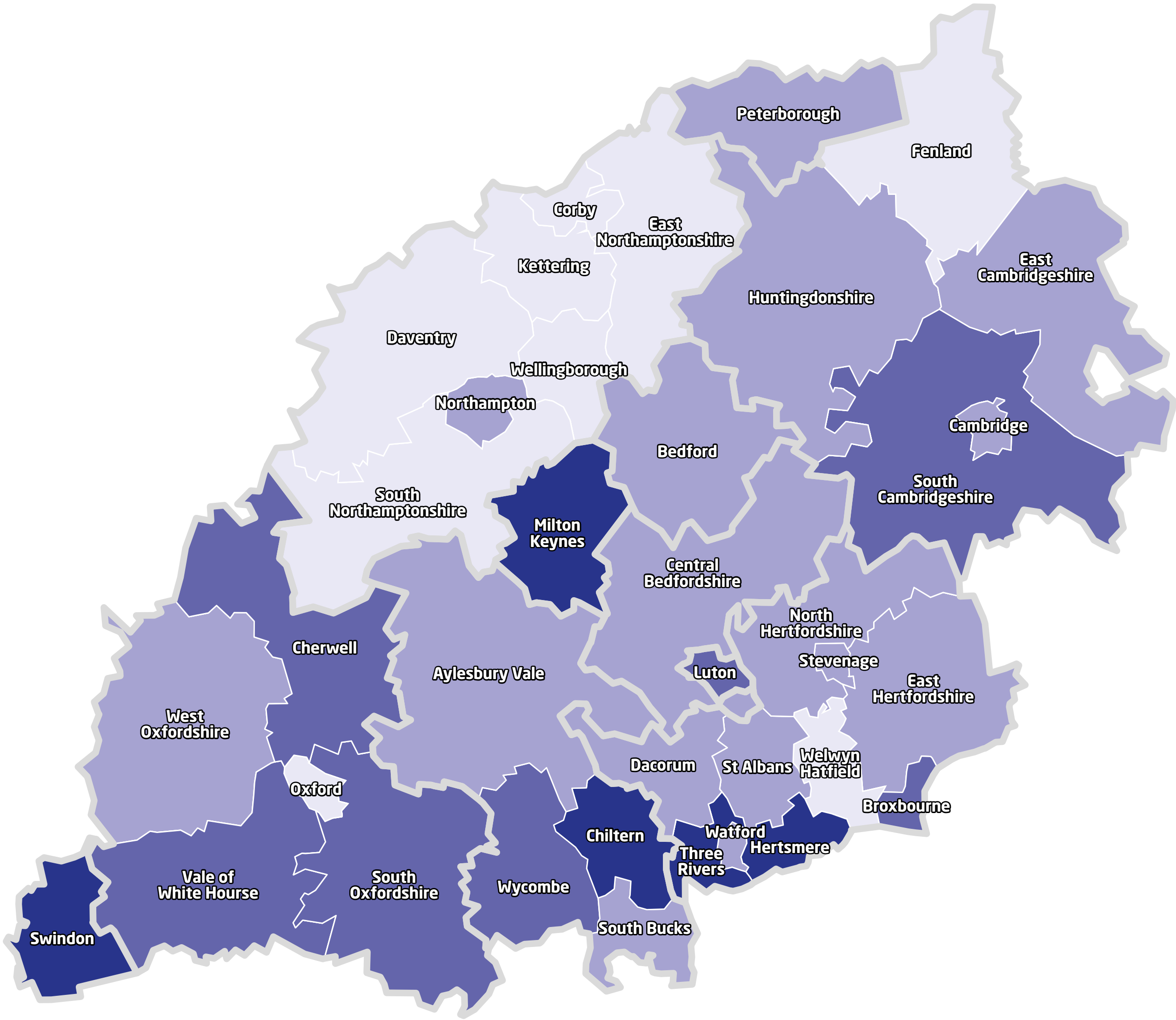
KEY:
Percentage growth in GVA by planning authority area, 2013-2018

- Upper tier authority boundaries
- Over 40%
- 30%-40%
- 20%-30%
- 10%-20%
- Under 10%

The growth rate across England is 21% and across EEH is 25%.

// GVA per hour worked

Map created for Illustrative purposes only.



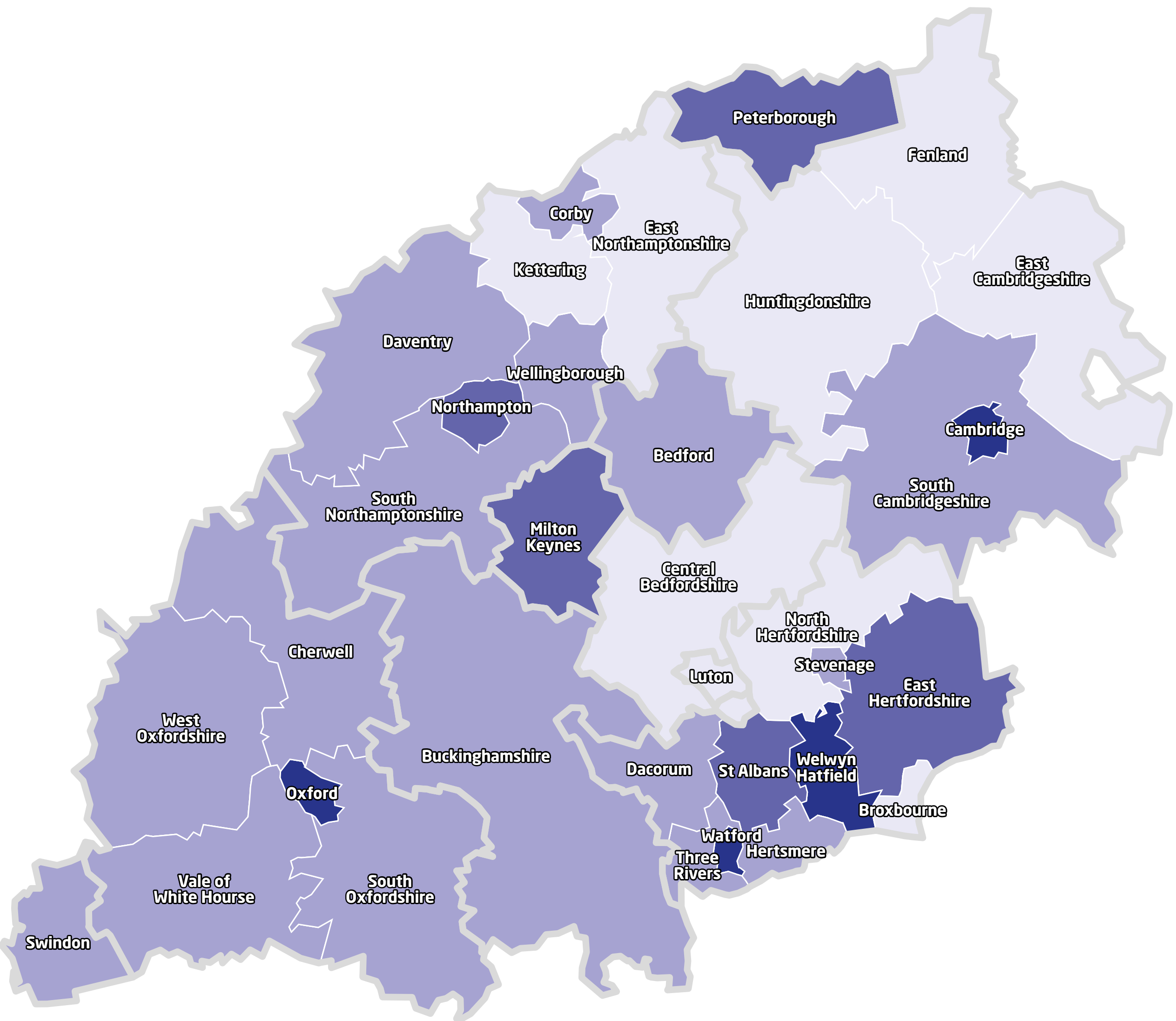
KEY:
GVA per hour worked by local planning authority area, 2018

- Upper tier authority boundaries
- Over £40
- £35-£40
- £30-£35
- Under £30

The average across England is £35.6 per hour and across EEH is £35.1

// Jobs density

Map created for Illustrative purposes only.



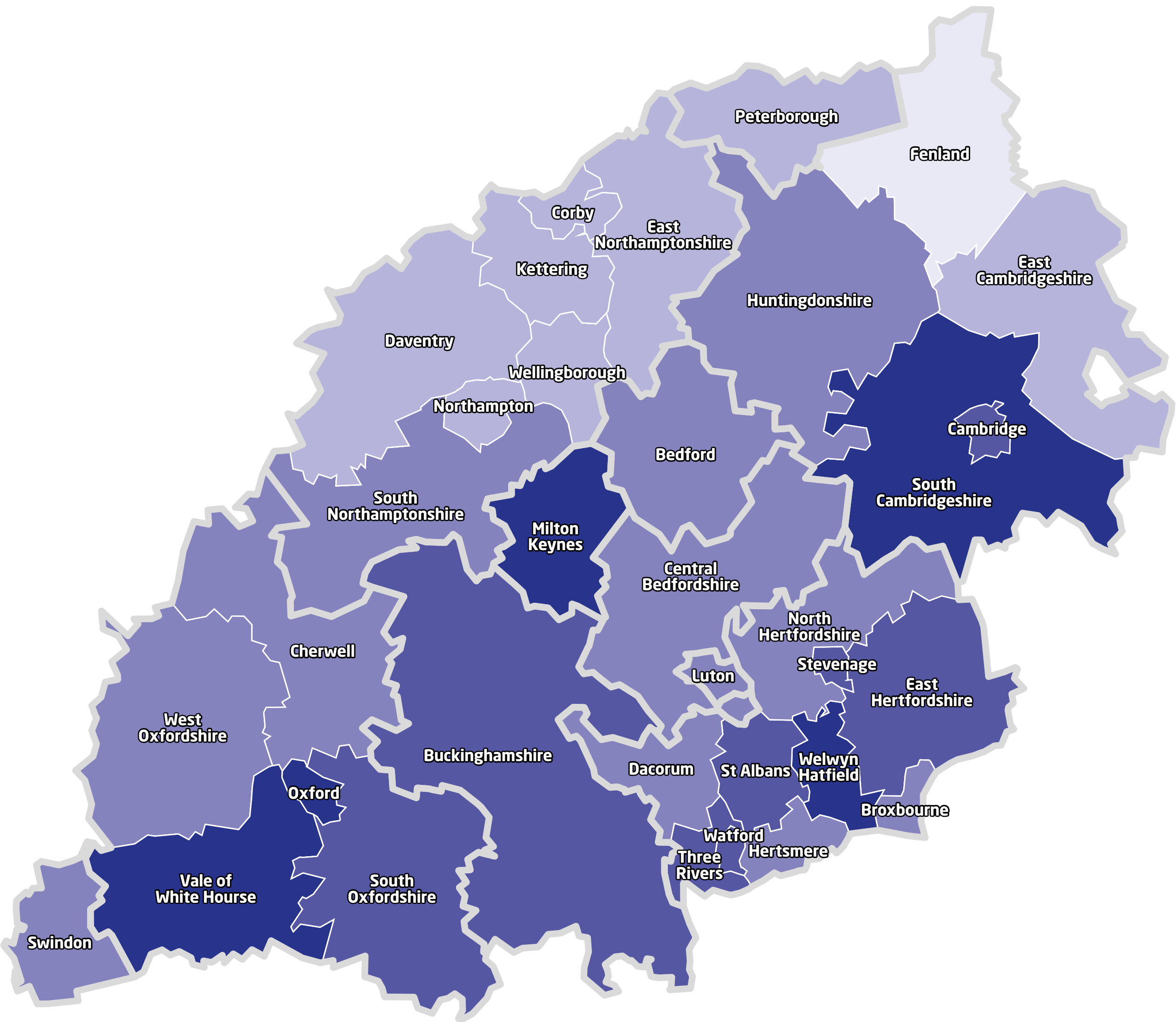
KEY:
The number of jobs per residents aged 16 to 64 in 2019.

- Upper tier authority boundaries
- More than 1.20
- 1.0-1.20
- 0.80-1.0
- 0.60-0.80

The EEH region had an average jobs density ratio of 0.94 compared to 0.87 across England.

// Workplace earnings

Map created for Illustrative purposes only.



KEY:
Median weekly workplace earnings of full-time workers, 2019.

- Upper tier authority boundaries
- More than £650
- £600-£650
- £550-£600
- £500-£550
- Under £500

Average workplace earnings across EEH were £591 – the same as across England.

PEOPLE

At a glance

- While the region is regarded as prosperous there are significant pockets of deprivation across the Heartland.
- The Heartland has a significant rural population.
- EEH's population segmentation work allows us to understand the different transport needs of consumers in the region.

The Heartland is home to 5.1m people, approximately 9% of the total population of England. Within the region approximately 48.7% of population are male and 51.3% female, comparable with the national rates, as is the marriage rate, with about half of the population married.[12]

The ethnic make-up of the region also closely resembles the national average. The population of the region is 84.3% white, 2.8% mixed ethnicity, and 12% black, Asian and minority ethnic (BAME).[13]

Luton is the most ethnically diverse place in the Heartland, where 38.9% of the population identify as BAME, 7.1% as mixed ethnicity and 1.5% as other. Conversely, Central Bedfordshire is the least diverse, with 3.9% identifying as BAME, and 1.9% as mixed ethnicity.[14]

The region has a lower proportion of the population classed as disabled compared to the national average. Fifteen per cent of people living in the region are disabled, with Peterborough having the highest proportion (16.7%), compared to the national average of 17.6%.[15]

12. Appendix I to the ISA
13. Appendix I to the ISA
14. Appendix I to the ISA
15. Appendix I to the ISA

Population Segmentation

Through its work to improve the first and last mile of journeys, EEH commissioned work to interrogate information held in the Experian Mosaic dataset to develop understanding of the characteristics of the region's population. This insight allows us understand the different transport needs of consumers in the region, and their preferences, so that future transport solutions can be tailored to their needs. Mosaic is a powerful cross-channel consumer classification system, often used by the private sector to target marketing campaigns.

The most prominent personas (names are from Mosaic) in the Heartland are 'Aspiring homemakers' (13%); Domestic Success (13%); and 'Prestige Positions' (12%).

Each persona offers insight into the opportunities and challenges for the region' transport system from the user perspective.

For example, aspiring homemakers (which make up to 28% of the population in places such as Marston Vale), are characterised as younger households, in full time employment, settling down in housing priced within their means, which may be in the suburbs. They are likely to have a need to perform escorted trips with children which may constrain mode choice. However, their homes are likely to be more suited to the introduction of private electric vehicle charging facilities (and cycle parking) and they are receptive to new technology and new transport modes.

The annex on page 56 at the back of this document includes information on the different personas in the Heartland, a description of their characteristics, and the implications these have for the transport system.

See annex on page 56

Urban and rural split

The region comprises a relatively low number of primary economic centres, a large number of small and medium sized market towns and large rural areas resulting in a diverse range of transport needs, opportunities and challenges.

The biggest population centres are Milton Keynes, Northampton, Luton, Swindon, Peterborough, Oxford and Cambridge, followed by a number of larger towns such as Bedford, High Wycombe, Stevenage, Watford, Aylesbury and Hemel Hempstead.

As of the 2011 census, just under two million people lived in the 15 most populated cities and towns in the Heartland, accounting for 41% of the total population.[16]

A quarter of the population live in rural areas, where (under Defra's definition), settlements contain fewer than 10,000 people. This is significantly higher than the England and Wales average of 18.5%.[17]

Defra's 'Local Authority Classification' method for measuring rural populations [18] identifies 'rural hub towns' ranging in population from 10,000-30,000 people and classes them as part of the rural population. Under this classification, 34% of Heartland residents live in 'rural or rural hub' areas, compared with 23% in England and Wales.[19] This would suggest that the Heartland has comparatively more people living in smaller market towns than in other parts of England and Wales. The combined population of the Heartland's rural hub towns at the 2011 census was 417,708 – nearly 9% of the EEH population.[20].

See map on page 22

Life outcomes

While the Heartland is considered a relatively prosperous region, there are significant variations in life outcomes within it.

The average life expectancy (at birth) across the Heartland region is 80.1 years for males and 83.6 years for females, higher than the national average (79.3 years for males and 83.2 years for females).[21]

Buckinghamshire has the highest life expectancy at 81.7 years for males and 85.1 years for females. However, the life expectancy for both males and females in Luton, Milton Keynes and Peterborough is lower than the national average.

There are also significant variations within local planning authority areas. For example, the life expectancy of boys in the Northfield Brook estate in Oxford is 75.5, almost 15 years lower than their peers in Oxford North – just six miles away.[22]

More than 800,000 people in the Heartland are currently living in the top third most deprived[23] planning authority areas in England, accounting for 15% of the total population. These five authorities (in order of most deprived) are Fenland, Luton, Peterborough, Corby and Northampton.[24]

See map on page 23

Thirteen of the Heartland's planning authority districts contain neighbourhoods (LSOAs) which are amongst the 10% most deprived nationally.[25] These are identified in the Places section. Maps showing deprivation at neighbourhood level can be found in Appendix D to the ISA.

Age profile

The Heartland's median age (mid-2017) is 39.2 compared to 39.8 across England. Between 2001 and 2017 the Heartland's median age increased by 6.8% compared to 5.2% across England.[26]

There are significant variations in age profile across the Heartland. Oxford has the youngest population in the United Kingdom (29.7 median), while Daventry has the Heartland's oldest population, with a median age of 45.3.

A different way of measuring the age structure in the Heartland is through the ratio of people of State Pension age compared to the working age population. Data here broadly mirrors the characteristics above, but also offers insight into future trends to 2043.[27]

The number of people of State Pension age per 1,000 people of working age in the Heartland is 290 compared to the English average of 295. By 2043 (and taking into account changes in pension age) this is forecast to be 365 compared to the national average of 372.38. West Oxfordshire is predicted to have more than 500 pensioners per 1,000 people of working age.

See maps on page 24 and 25

16. Databank
17. Databank: 2011 census table K5101EW
18. See https://www.gov.uk/government/statistics/2011-rural-urban-classification-of-local-authority-and-other-higher-level-geographies-for-statistical-purposes
19. Local Authority Districts ranked by rural and hub town (rural-related) populations 2011, using 2011 Rural Urban Classification
20. 2011 Rural-Urban Classification of Local Authority and other higher level geographies for statistical purposes
21. Anaemia QR Code
22. Oxfordshire County Council- Oxfordshire Insight: Oxfordshire wards inequalities pack
23. Deprivation is measured by the English Indices of Deprivation, which includes indicators such as income, employment, education, health and crime
24. Databank: English Indices of Deprivation, DCLG, 2019
25. English Indices of Deprivation 2019, File 10 Local Authority District Summaries (lower-tier), DCLG (IMD - Proportion of LSOAs in most deprived 10% nationally)
26. ONS Population Estimates: median ages for administrative, electoral and census geographies 2017
27. ONS Population of State Pension age, working age and old age dependency ratios by local authorities in England - Persons mid-2018 to mid-2043

Health and physical activity

The percentage of adults who are overweight or obese in the Heartland region is slightly lower than the national average at 61.7%, compared to 62% nationally. Lower levels of obesity are seen in Buckinghamshire, Cambridgeshire and Hertfordshire, which are all significantly better than the national average. Conversely, levels in Northamptonshire and Peterborough are significantly worse than the national averages.

The percentage of physically active adults varies across the Heartland region.[28] Higher levels than average are recorded in Oxford, Cambridge and parts of Hertfordshire and Buckinghamshire. Conversely, physical activity in Luton, parts of Northamptonshire, and Peterborough are significantly worse than the national average.

Poor air quality is a significant public health issue. There are around 80 Air Quality Management Areas in place across the Heartland to improve air quality, with the vast majority relating to theharmful impact of Nitrogen Oxides (NOx) caused by road traffic.

See map on page 26 and 27

Internet use

According to a representative survey carried out in 2019,[29] more than 300,000 Heartland residents over the age of 16 hadn't accessed the internet for at least the last three months. This equates to 7.4% of the adult population, compared to 9.1% in the UK.

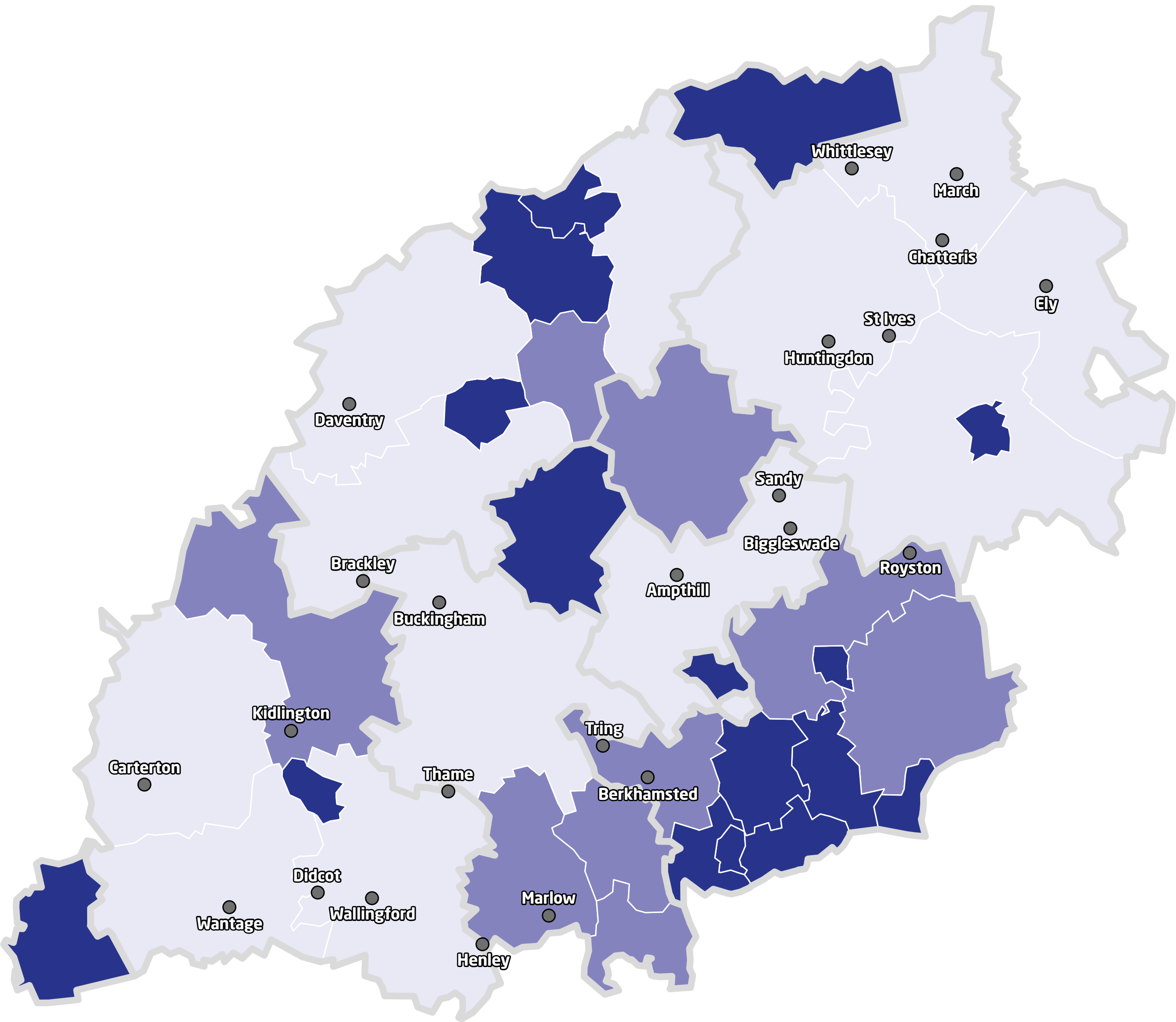
Peterborough (9.6%), and Buckinghamshire and North Northamptonshire (9.2%) are the only three areas of the Heartland to have non-internet use higher than the national average.

Swindon has the highest percentage of internet users in the Heartland, at more than 95%.

28. https://fingertips.phe.org.uk/profile/physical-activity/data#page/8/gid/1938132899/pat/6/par/E12000006/ati/201/are/E07000200/cid/4/tbm/1/page-options/ovw-tdo-0_map-ao-4
29. ONS Internet Users, 2019, published May 2019

// Rural/urban classification and rural hub towns

Map created for Illustrative purposes only.



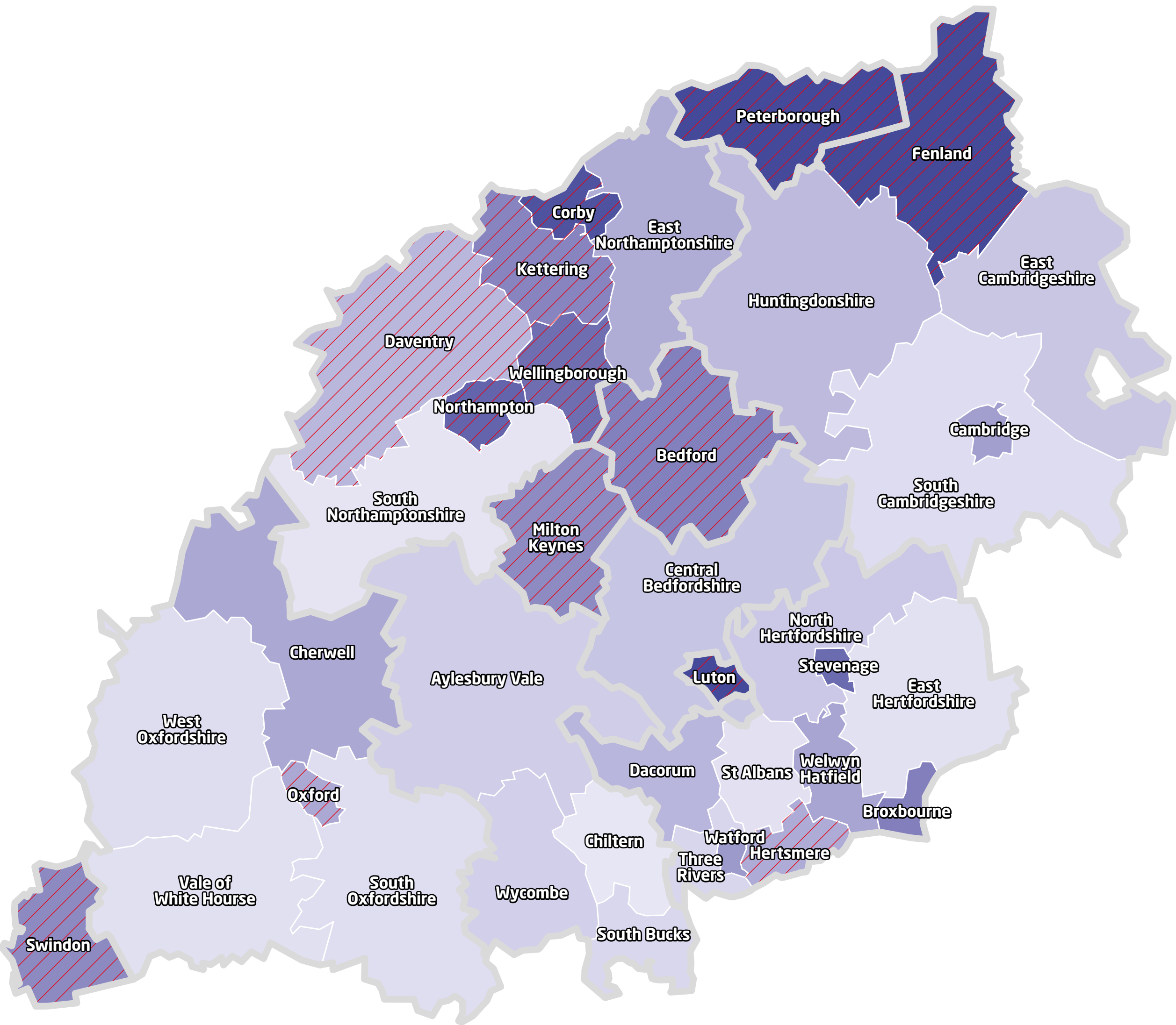
KEY:
Department for Environment, Food & Rural Affairs' rural/urban classification by local planning authority, and identified rural hub towns

- Upper tier authority boundaries
- Predominantly urban (more than 74% of population live in urban areas)
- Urban with significant urban (26% to 49% of population live in rural areas)
- Predominantly rural (more than 50% of population live in rural areas)

Places on the map have been identified by Defra as rural hub towns. Hub towns are built-up areas with a population of 10,000 to 30,000 (2011 Cens which support their rural hinterlands.

// Indices of deprivation by local authority

Map created for Illustrative purposes only.

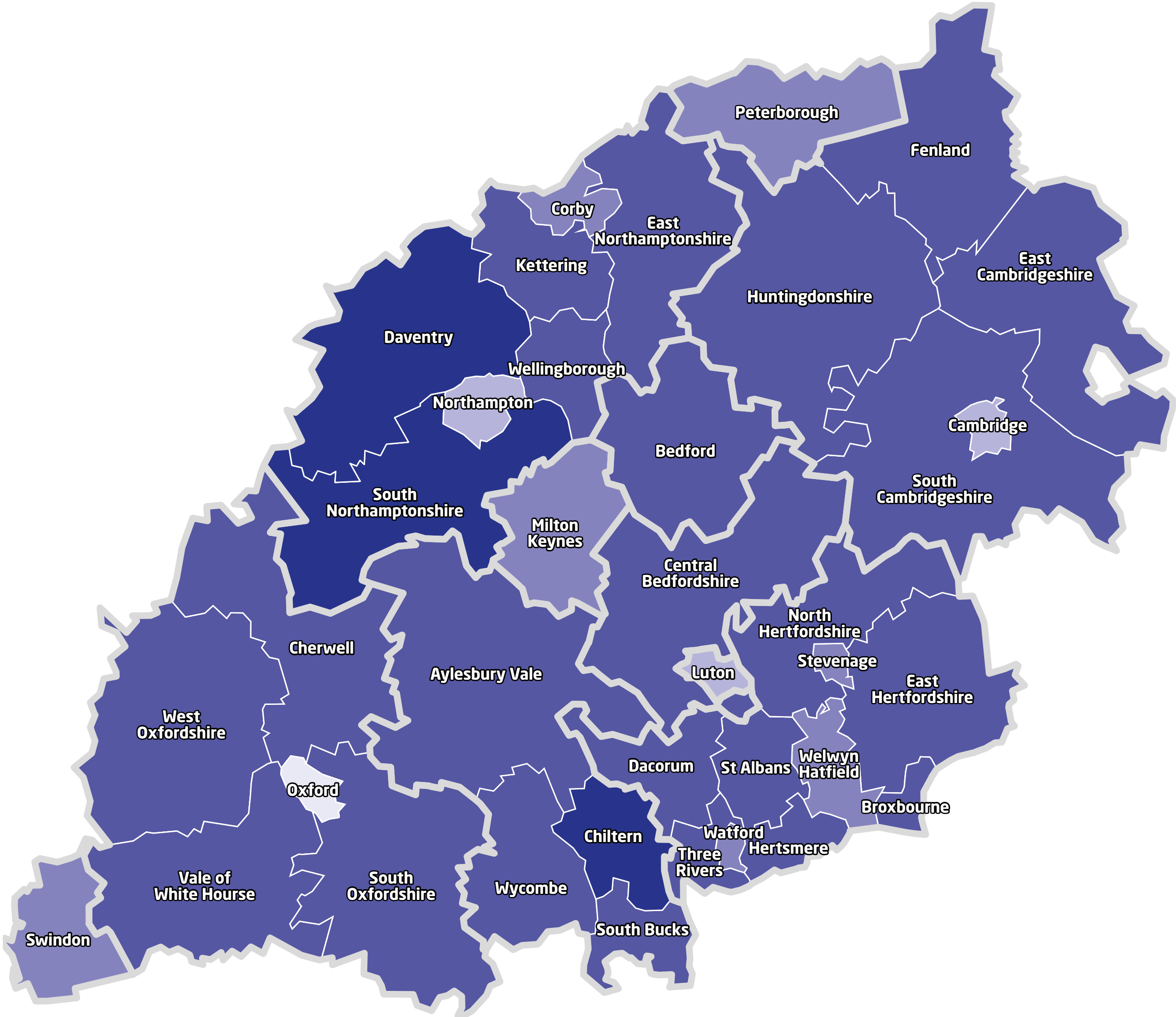


KEY:
Department for Communities and Local Government English Indices of Deprivation, 2019

- Upper tier authority boundaries
- Areas of highest deprivation
- Areas of lowest deprivation
- Includes neighbourhood(s) which are amongst the 10% most deprivednationally

// Median age in Heartland

Map created for Illustrative purposes only.



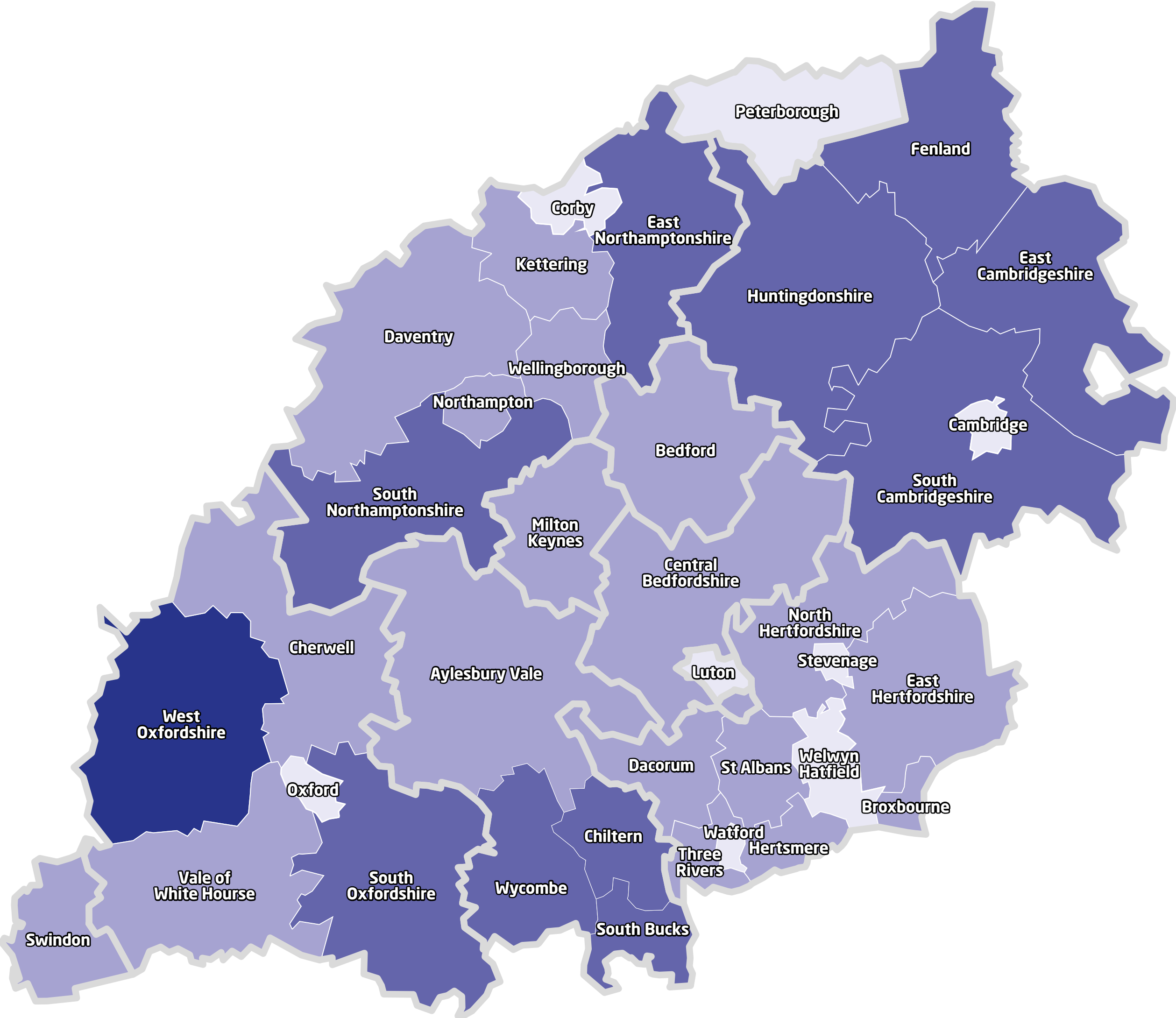
KEY:
Median age of planning authority areas in the Heartland, 2017

- Upper tier authority boundaries
- Under 30
- 30-35
- 35-40
- 40-45
- Over 45

The median age across England is 39.8 and across EEH is 39.2

// State pension ratios in 2043

Map created for Illustrative purposes only.



KEY:
The projected number of people of state pension age per 1,000 people of working age in 2043, by planning area. These projections account for the planned changes to State Pension age under existing legislation.

- Upper tier authority boundaries
- Under 300
- 300-400
- 400-500
- More than 500

The ratio across the UK is projected to be 372 by 2043, and 365 across EEH (the current 2018 ratios are 295 and 290 respectively).

Map created for Illustrative purposes only.

SWINDON
1 Kingshill Road, Swindon

VALE OF WHITE HORSE
2 Botley
3 Marcham
4 Abingdon

WEST OXFORDSHIRE
5 Chipping Norton
6 Witney

SOUTH OXFORDSHIRE
7 Wallingford
8 Watlington
9 Henley

CHERWELL
10 Banbury (x2)
11 Kidlington
12 Bicester

OXFORD
13 Oxford (city-wide)

SOUTH BUCKS
14 Area comprising the M4, M25 and M40 and adjacent land
15 Iver (parish-wide)

CHILTERN
16 Chesham

WYCOMBE
17 M40
18 High Wycombe
19 Marlow

AYLESBURY VALE
20 Aylesbury (x3)

MILTON KEYNES
21 Olney

NORTHAMPTON
22 M1
23 Northampton (x6)

FENLAND
24 Whittlesey (due to SO_2 emissions from the brickworks; Peterborough City Council has also declared same AQMA)
25 Wisbech (x3, of which two for SO_2 and PM_{10} are related to industrial emissions, one NO_2 related to road)

HUNTINGDONSHIRE
26 Huntingdon
27 Brampton
28 A14 Hemingford to Fenstanton
29 St Neots

SOUTH CAMBRIDGESHIRE
30 A14 (for both NO_2 and PM_{10})

CAMBRIDGE
31 Cambridge (city-centre-wide)

BEDFORD
32 Bedford (town-centre-wide)

CENTRAL BEDFORDSHIRE
33 Sandy
34 Ampthill
35 Dunstable

LUTON
36 M1 (x2)
37 Luton town centre

EAST HERTFORDSHIRE
38 Bishop's Stortford
39 Sawbridgeworth
40 Hertford

NORTH HERTFORDSHIRE
41 Hitchin (x2)

BROXBOURNE
42 Waltham Cross (x3, including one with PM_{10} emissions)
43 Cheshunt
44 Wormley

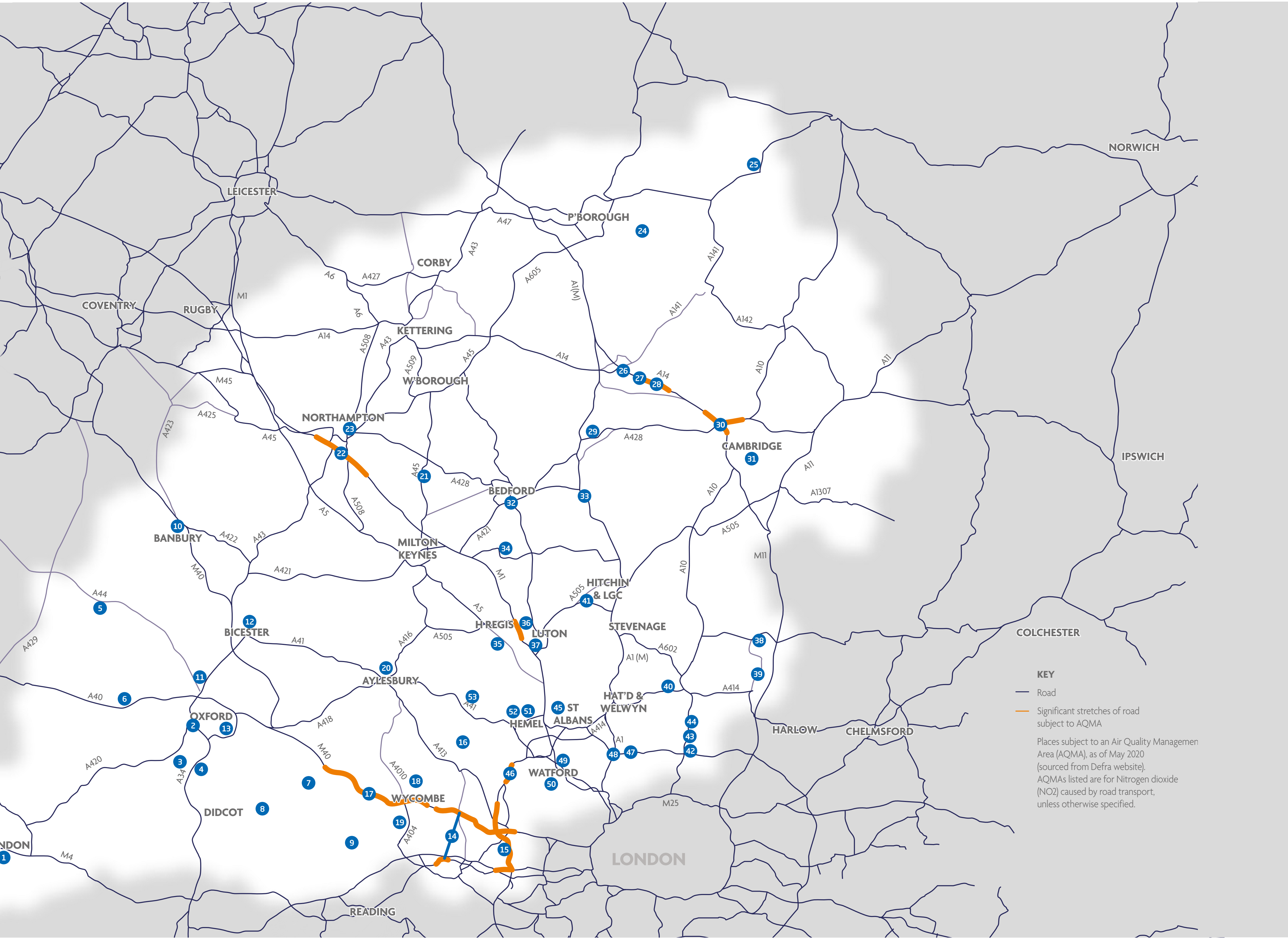
ST ALBANS
45 St Albans (x3, including two with PM_{10} emissions)

THREE RIVERS
46 M25 Chorleywood (x2, including one for PM_{10})

HERTSMERE
47 Potters Bar (x3)
48 South Mimms (x2)
49 Aldenham

WATFORD
50 Watford (x2)

DACORUM
51 Hemel Hempstead
52 Apsley
53 Northchurch



KEY
Road
Significant stretches of road subject to AQMA

Places subject to an Air Quality Managemen
Area (AQMA), as of May 2020
(sourced from Defra website).
AQMAs listed are for Nitrogen dioxide
(NO2) caused by road transport,
unless otherwise specified.

PLACES

At a glance

- EEH has identified places of strategic importance in the Heartland based on a number of factors.
- We also recognise the importance of strategic linkages to our neighbouring areas.
- Housing affordability is a significant issue across the region, which is undergoing transformational levels of housing growth.

A key input into the development of the strategy, EEH's Opportunities Mapping has been used to identify the following as being of strategic importance:

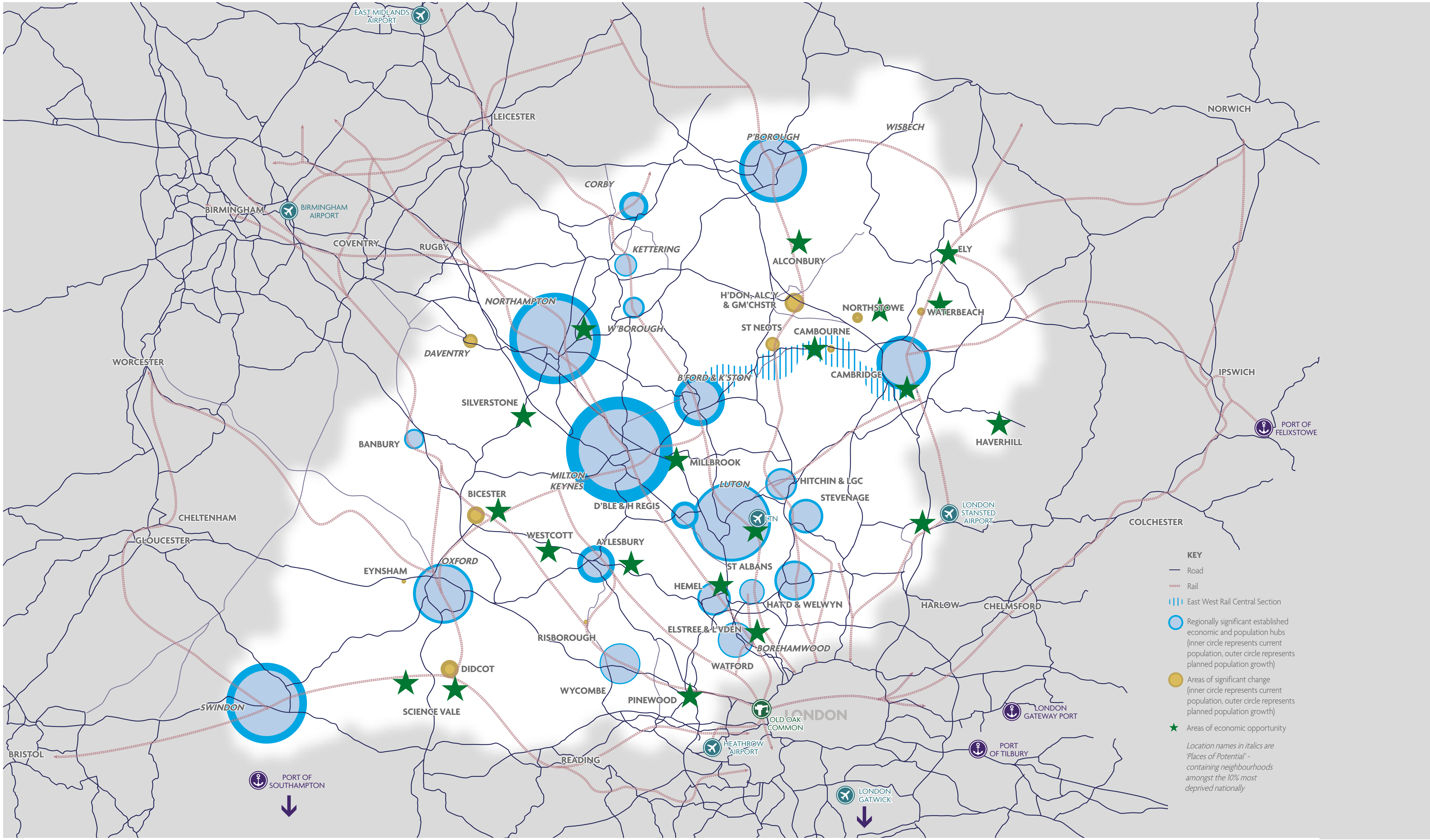
- Regionally Significant Hubs – our largest urban areas, centres of economic activity in their own right and where additional growth is planned
- Areas of Economic Opportunity – areas that form the focus of economic opportunities moving forward, a combination of existing centres of activity and new opportunities (including Enterprise Zones)
- Areas of Significant Change – existing urban areas where the scale of planned growth is significant relative to their size
- Areas of Potential – areas where intervention is required to improve social equality and access to opportunities. The places identified contain neighbourhoods within the 10% most deprived in England.

See map on pages 30 and 31

Place of strategic importance	Regionally Significant Hubs	Area of Economic Opportunity	Area of Significant Change	Area of Potential
Aylesbury	■			
Aylesbury Woodlands (Enterprise Zone)		■		
Banbury	■			
Bedford/ Kempston	■			■
Bicester		■	■	
Bishop's Stortford/ Stansted Airport		■		
Borehamwood				■
Cambridge	■			
Cambridge South		■		
Cambourne		■	■	
Corby	■			■
Daventry			■	■
Dunstable/ Houghton Regis	■			
Elstree Studios/ Leavesden Studios		■		
Ely		■		
Eynsham			■	

Place of strategic importance	Regionally Significant Hubs	Area of Economic Opportunity	Area of Significant Change	Area of Potential
Hatfield/ Welwyn Garden City	■			
Haverhill		■		
Hemel Hempstead	■			
Hertfordshire IQ (Enterprise Zone, Hemel)		■		
High Wycombe	■			
Hitchin/ Letchworth Garden City	■			
Huntingdon, Godmanchester and Alconbury		■	■	
Kettering	■			■
Milton Keynes	■			■
Millbrook/ Cranfield		■		
Northampton	■			■
Northampton Waterside (enterprise zone)		■		
Northstowe		■	■	
Luton	■			■
Luton Airport		■		
Oxford	■			■
Peterborough	■			■
Pinewood Studios		■		
Princes Risborough			■	
Science Vale/Didcot		■	■	
Silverstone		■		
St Albans	■			
Stevenage	■			
St Neots			■	
Swindon	■			■
Waterbeach		■	■	
Watford	■			
Wellingborough	■			■
Westcott		■		
Wisbech				■

Map created for Illustrative purposes only.



Place	Narrative
Southampton	Southampton is one of the UK's primary gateway ports, giving EEH businesses access to international markets. For example, a large percentage of cars and vans produced in the region are exported via Southampton.
Reading, Slough and wider Thames Valley	Reading – bordering South Oxfordshire and just 25 miles from Oxford – is a commercial centre in the Thames Valley region, with an economy worth more than £8bn in 2018. It is home to the University of Reading. Slough – bordering Buckinghamshire – is one of the most productive economies in the UK and also had an economy worth £8bn in 2018. Further afield, the EZ³ Enterprise Zone sites at Basing View and Longcross specialise in innovation, 5G communications, cyber security and sustainable technologies.
London	Unsurprisingly, London is the most significant external destination for commuters in the Heartland. It also contains the strategic London Gateway port, amongst others. Heathrow, just over the Buckinghamshire border, is the UK's only hub airport and a major contributor to the regional economy, directly employing 80,000 people. It is the third busiest airport in the world and responsible for more air freight than all other UK airports combined. Old Oak Common in west London – which will be a major interchange for HS2 and the Heathrow Express - is the UK's largest regeneration project, which aims to transform the former railway and industrial area into a new neighbourhood supporting up to 65,000 jobs and 25,500 new homes.
Harlow	Harlow has a £2bn economy (2018) and is situated in the Cambridge to London Innovation corridor. Its Enterprise Zone specialises in the ICT, Advanced Manufacturing and Life Science sectors.
Ipswich, Felixstowe and Suffolk	Ipswich has a £4.4bn economy (2018). Suffolk is home to several sites in the Space to Innovate Enterprise Zone which specialises in agritech, food and health, offshore energy, ICT and digital and creative sectors and the development of the Green Economy. Four of these sites are in Ipswich, and also at Suffolk Business Park in Bury St Edmunds. The Port of Felixstowe is Britain's biggest and busiest container port, and one of the largest in Europe.
Norwich and Norfolk	Norwich has a £4.2bn economy (2018). It is home to several sites in the Space to Innovate Enterprise Zone which specialises in agritech, food and health, offshore energy, ICT and digital and creative sectors and the development of the Green Economy. This includes two near Norwich and one in King's Lynn.
Leicester and Leicestershire	Leicester has a £8.3bn economy (2018). Leicestershire has two Enterprise Zones: MIRA Technology Park and the Loughborough and Leicester Science and Innovation. Loughborough University Science and Enterprise Park is one of the UK's largest science parks while the MIRA Technology Park is a world leading automotive research and development park. Market Harborough is on the border with Northamptonshire.
East Midlands Airport	East Midlands Airport accounts for 12% of all UK aviation freight (second to Heathrow).
Warwickshire and Coventry	Coventry and Warwickshire are home to brands such as Jaguar Land Rover, Tata and Aston Martin. A National Transport Design Centre is being built at Coventry University.
Birmingham	Birmingham is a key commuting destination for the northern part of the region. Located in the centre of the UK it is a key transport and logistics hub. The Birmingham City Centre Enterprise Zone comprises 26 sites across the city centre and is focussed on the ICT, Creative Industries and Digital Media sectors.
Wiltshire	Swindon is part of the Swindon and Wiltshire Local Enterprise Partnership, with an economy worth a total of £18bn, with a strong advanced engineering and high value manufacturing, ICT and visitor economy. It is home to several large businesses such as Siemens, Herman Miller and Knorr Bremse. In October 2019 Porton Science Park became one of the country's six new Life Sciences Opportunity Zones (LSOZ).
Bristol	Bristol has a £15bn economy (2018). Bristol Temple Quarter Enterprise Zone is focused on creative, high-tech and low-carbon industries and is based around Bristol Temple Meads railway station.

Neighbouring areas of strategic importance

EEH recognises the key strategic importance of the areas neighbouring the region. The table to the left identifies places considered to have key economic linkages to the Heartland.

Housing

Housing affordability is a major issue in many parts of the region. Between September 2014 and September 2019 median house prices in the Heartland grew by 36% compared to 19% across England and Wales.[32]Luton (52%), Stevenage (47%) and Corby (46%) experienced the highest housing price growth.

The ratio of median house prices to median annual resident earnings is 9.57, compared to a 7.40 average for England and Wales (as at September 2019). Three Rivers district was the least affordable place with a ratio of 15.16. Fenland (6.61) was the most affordable area in the Heartland.

See map on page 34

Nine of 37 local planning areas were significant net exporters of residents in 2018,[33] where there were more than net 500 residential moves out of an authority than into it. In particular, Oxford, Luton and Northampton had net outflows of more than 3,000 people.

See map on page 35

Between 2012 and 2018 the region's population grew by 5.5% (269,700 people) compared to the UK average of 4.3%.[34]

During this period, 23 of the 37 planning authority areas within the region experienced population growth rates higher than the average for England and Wales. In particular, Aylesbury Vale (12.3%), Corby (12.2%) and Central Bedfordshire (9.2%) experienced levels of population growth substantially higher than the average for England and Wales.

Conversely, 14 of the 37 local authority districts within the region had all experienced lower levels of resident population growth than the average for England and Wales. The slowest growing planning authority areas in the Heartland were Wycombe (1%), Oxford City (1.8%), Broxbourne (2.4%) and Cambridge City (2.6%).

The majority of current Local Plans of the 37 planning authorities in the Heartland cover a period from the early 2010s to the early 2030s.[35] Together, the current plans will deliver a total 535,000 new dwellings, increasing the region's existing housing stock by around 25%.

Local Plan growth equates to 27,822 new homes per year. If this level of planned growth was to continue until 2050, an additional 862,000 new homes would be delivered over the next 30 years.

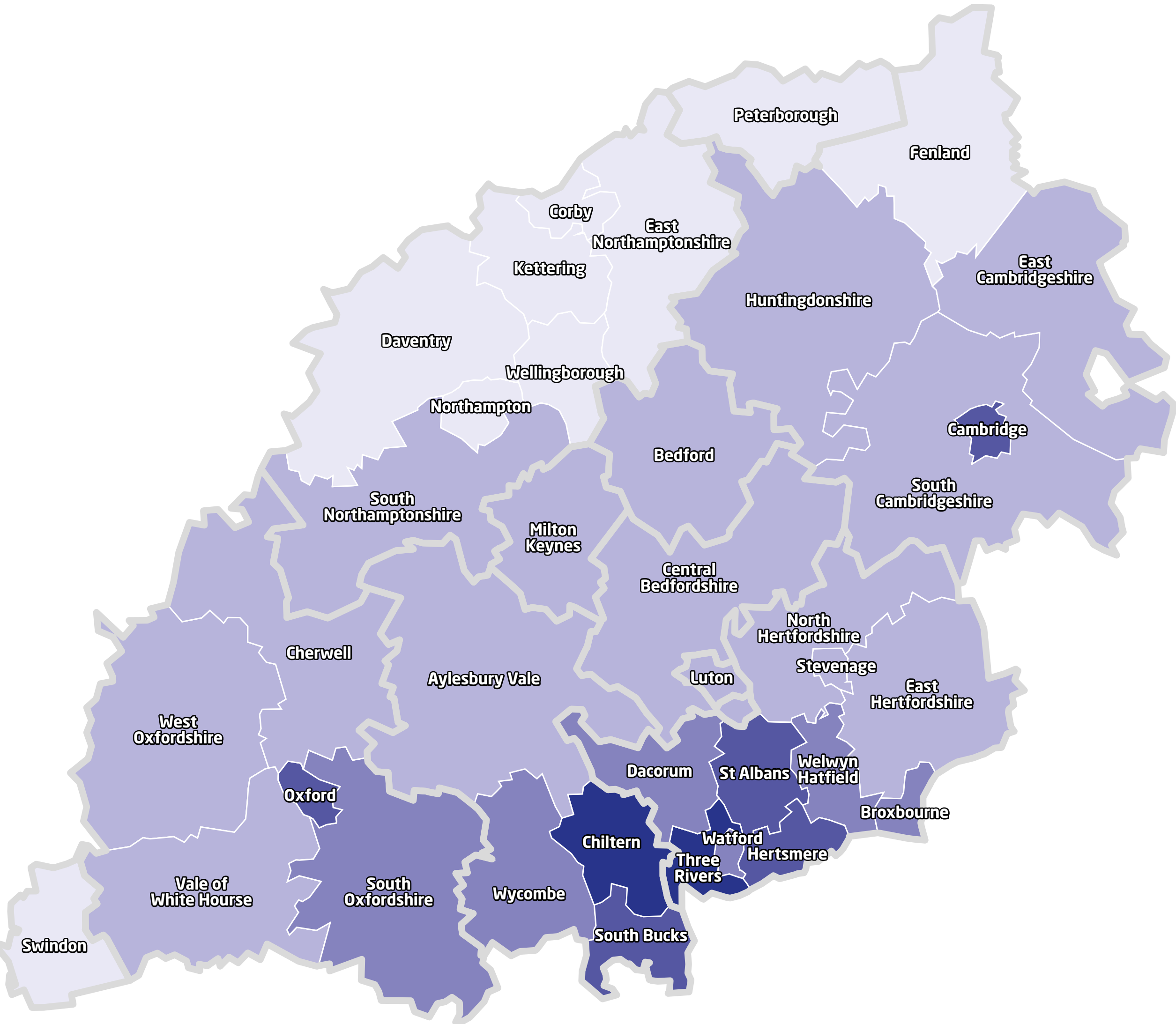
Across the Heartland, there are a total of 199 Local Plan sites that are each delivering over 500 dwellings.[36]

See map on pages 36 and 37

32. ONS Ratio of median house prices to median annual resident earnings 2014-2019
33. ONS Internal migration - Moves by local authorities and regions in England and Wales by 5 year age group and sex, year ending June 2018
34. Databank: ONS Annual Population Survey (NOMIS September 2019)
35. EEH Databank: South Bucks Local Plan covers from 2006-2026 and Dacorum from 2006-2031
36. EEH Databank

// Housing affordability ratio

Map created for Illustrative purposes only.



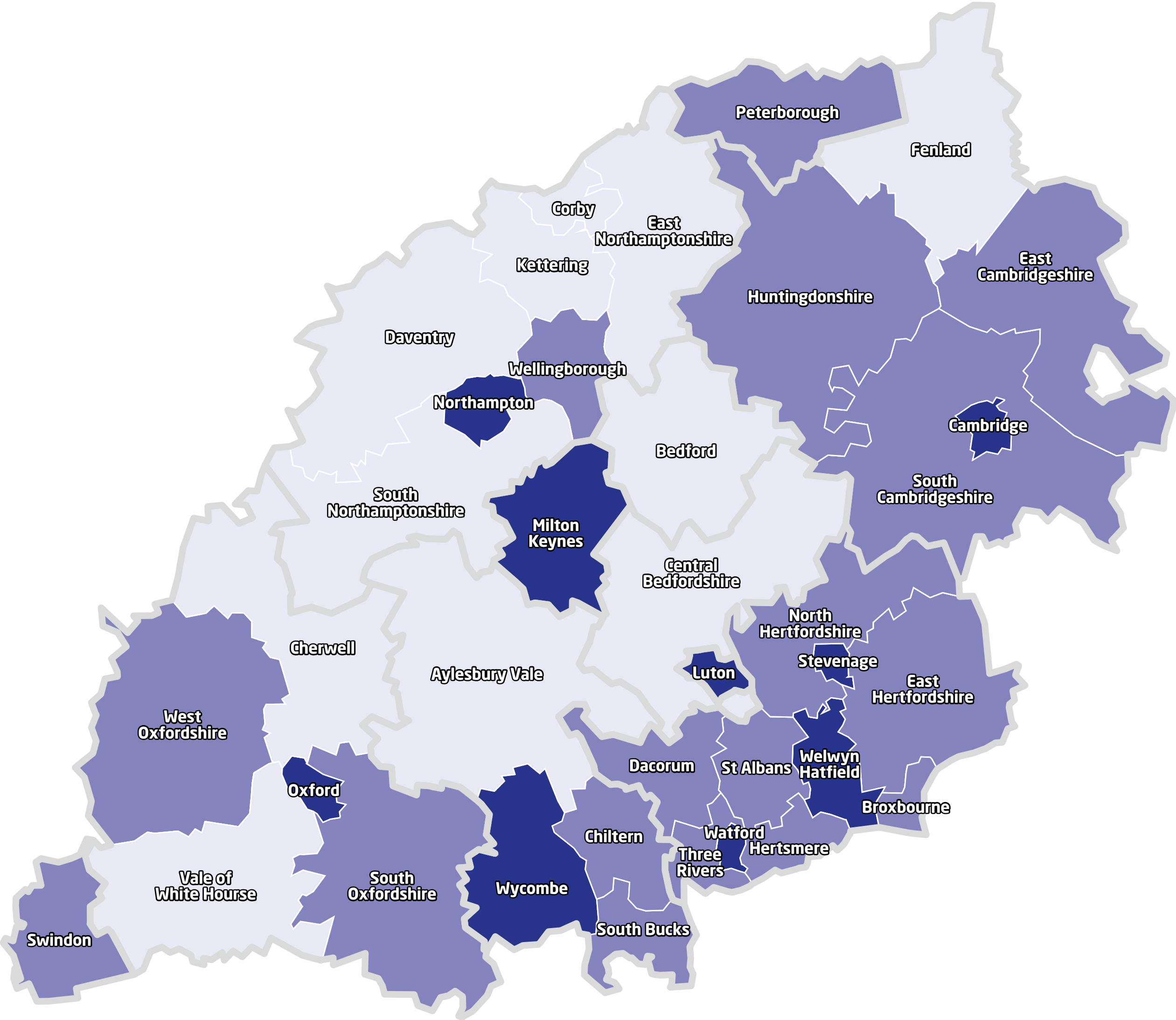
KEY:
Ratio of median house price (existing dwellings) to median gross annual residence-based earnings by planning area, 2019

Upper tier authority boundaries
6-8
8-10
10-12
12-14
14-16

The ratio across England is 7.57 and across EEH is 9.57

// Internal migration within Heartland

Map created for Illustrative purposes only.

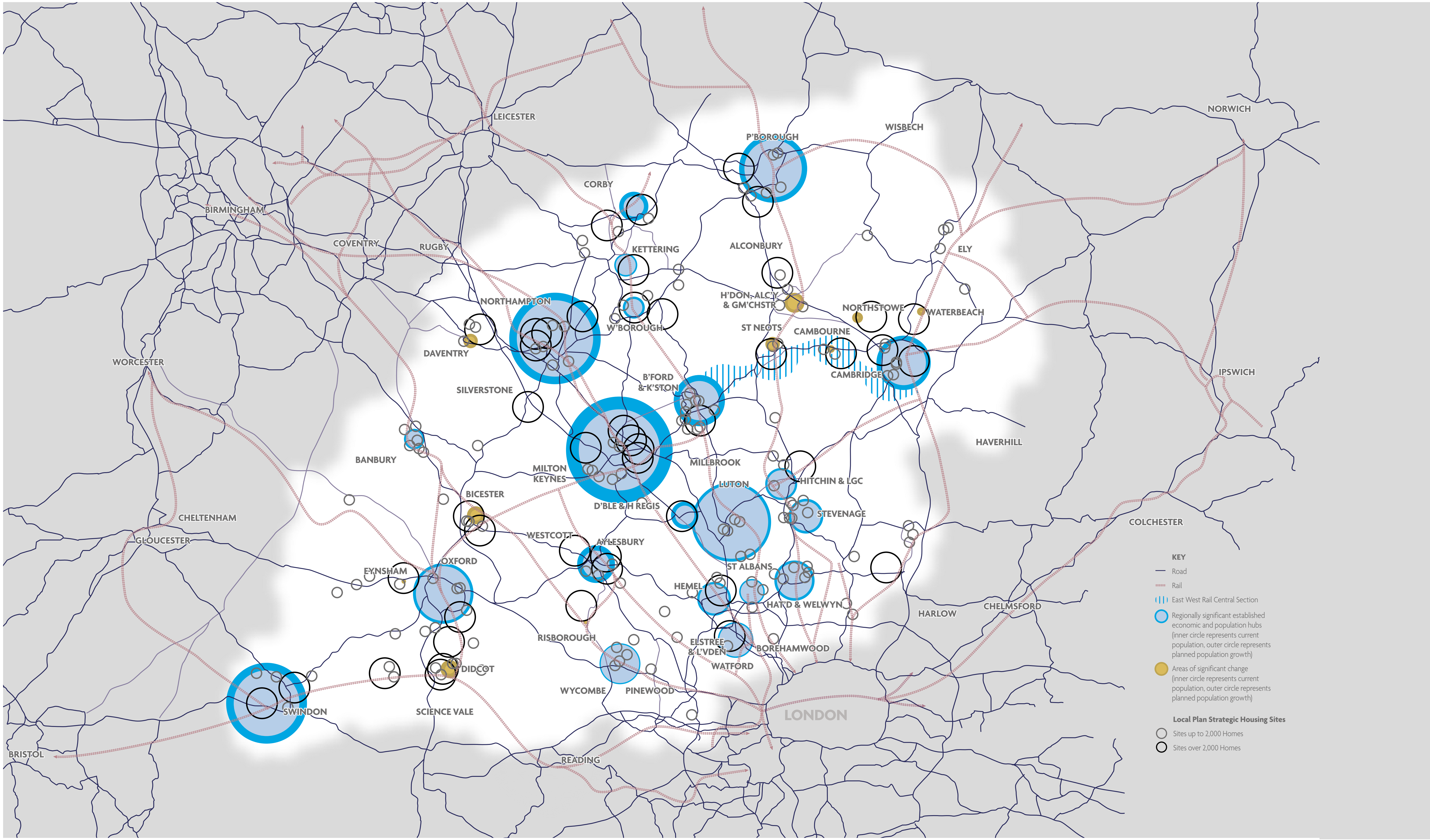


KEY:
Internal migration in 2018, defined as residential moves between different local authorities in the UK.
The statistics include all age groups and exclude any moves within a single LA and any international moves either into or out of the UK.

Upper tier authority boundaries
Significant net outflow of people to other local authority areas (more than 500)
No significant change
Significant net inflow of people from other local authority areas (more than 500)

// Local Plan sites

Map created for Illustrative purposes only.



NATURAL AND BUILT ENVIRONMENT

At a glance

- The quality of the Heartland's built and natural environment is an asset to the region.
- Areas of Outstanding Natural Beauty cover 10% of the region.
- Carbon emissions from transport are higher than the national average and increasing at a faster rate.

The Heartland covers approximately 10% of England's landmass.

Its natural and built environment is a key asset. Significant parts of the Heartland are designated Areas of Outstanding Natural Beauty or other protected designations, while the quality of its built environment – from modern and historic town and city centres to scenic rural villages – form a core part of the region's offer and attractiveness.

Around 10% of the Heartland is designated as Areas of Outstanding Natural Beauty.[37] The region contains the entirety of the Chilterns AONB, which covers 6% of the Heartland in Oxfordshire, Buckinghamshire, Hertfordshire and Bedfordshire. The North Wessex Downs AONB (south of Swindon) and Cotswolds AONB (west of Oxford) each cover around 2% of the Heartland.

In July 2018, the Chilterns Conservation Board submitted a request to Natural England for a review of the designation and requested that National Park status be considered. More recently, in 2019 the Glover Report, commissioned by Defra, made a strong recommendation that Chilterns should become England's next National Park.

Alongside the AONBs, there are extensive green belts encircling Oxford and Cambridge, and in Bedfordshire and Hertfordshire.

See map on page 40

There are numerous internationally designated sites within the region. These includes Ramsar sites, which are wetlands of international importance designated under the Ramsar Convention; Special Areas of Conservation (SACs), which are protected areas in the UK which make a significant contribution to conserving the habitats and species of wild flora and fauna; and Special Protection Areas (SPAs), which are protected areas for birds.

According to Natural England's Agricultural Land Classification, much of the agricultural land in the Heartland is rated as of good to moderate quality (grades 3a-3b). Land to the north east of the region between Peterborough and Cambridge, is of the best and most versatile in the region, rated very good to excellent (grades 1-2).

As part of the Environment Agency's Oxford to Cambridge Local Natural Capital Plan, a baseline assessment of natural capital is being completed across the Oxford-Cambridge Arc, in partnership with the Local Nature Partnerships The outputs of this assessment will include a fine scale map of the dominant habitats and land cover across the majority of the region.

The Environment Agency additionally intends to produce mapping of baseline ecosystem services provision across the majority of the region, however this will not be available until the second half of 2020.

Noise

There are several Noise Important Areas (NIAs) throughout the region, concentrated in and around the town and city centres and along major roads. Data from the England Noise Viewer shows that motorways, namely the M1, M40 and the M4 create significant noise with noise levels exceeding 55dB in areas within 1km of the source.

Areas affected are exacerbated along where major roads merge and in locations where airport noise is also recorded.

37. https://naturalengland-defra.opendata.arcgis.com/datasets/6f2ad07d91304ad79cdecd52489d5046_0/data

Carbon emissions

Total CO^2 emissions in the Heartland stood at 28,834kt in 2017, equivalent to 8% of the UK total. Carbon dioxide emissions have fallen at a slower rate than the national average – 17.4% compared to 21.7% between 2012-2017.[38]

Transport-related emissions are a particular challenge for the region, rising 10% between 2012-2017, compared to 5% nationally. In 2017 the Heartland's transport emissions stood at 13,507kt, equating to 47% of the Heartland's total carbon dioxide emissions, compared with 37% nationally. Emissions per capita are higher in areas containing significant parts of Strategic Road Network, although there is also a correlation between high emissions and high car mode spilt.

See map on page 41

Historic environment

The Heartland has a rich historical legacy dating back to ancient times. This is demonstrated by the high number of protected historic sites and buildings to be found in the region, and within the quality of its built environment.

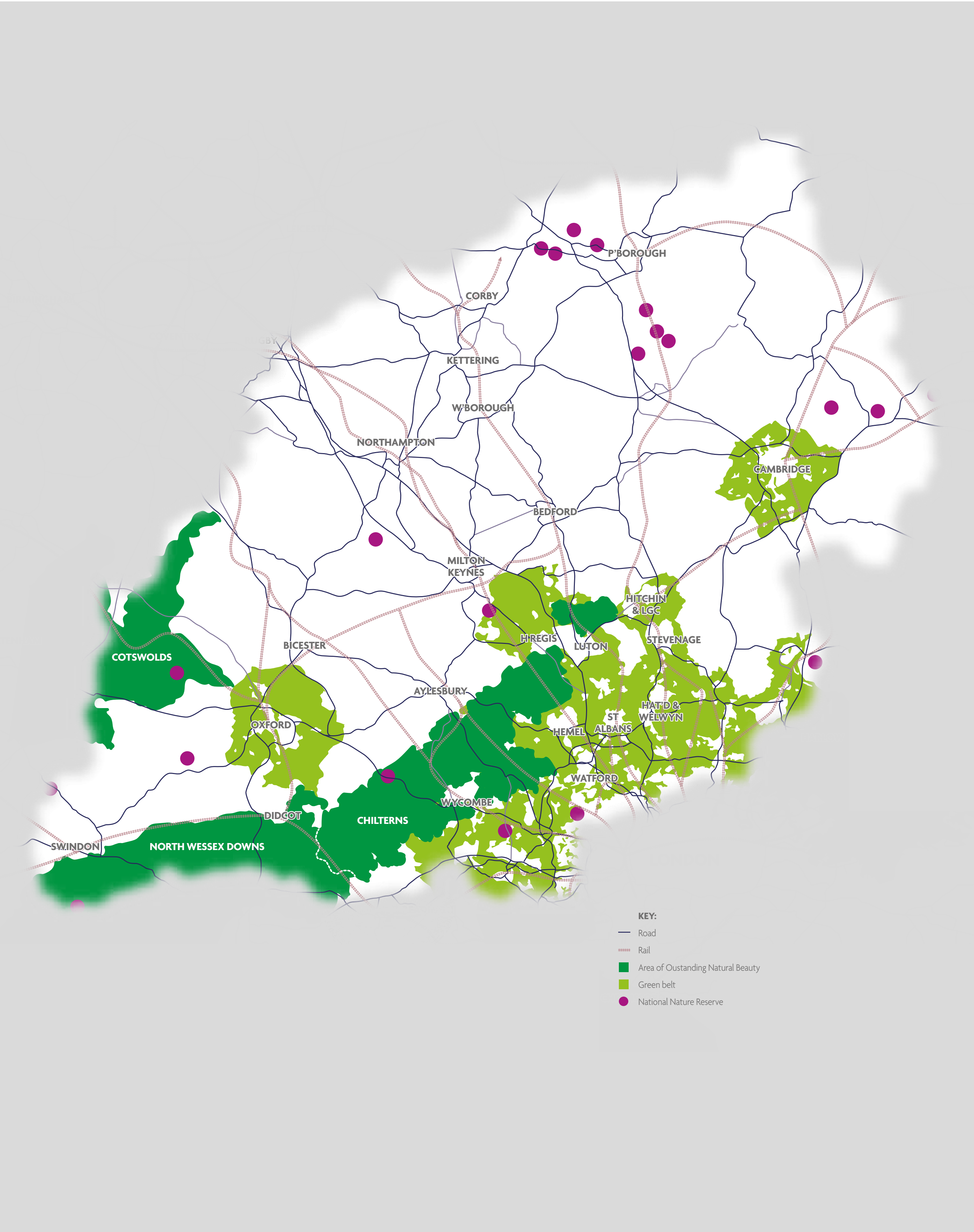
There are a number of designated assets throughout the region including:[39]

- One UNESCO World Heritage Site: Blenheim Palace, located in Woodstock, Oxfordshire
- Six registered battlegrounds: These are protected venues of battles which were crucial turning-points in English history. The Heartland's battlegrounds relate to the War of the Roses and English Civil War
- 25 English Heritage sites: including the popular Wrest Park gardens in Bedfordshire, Uffington Castle in Oxfordshire (site of the famous White Horse, the oldest chalk-cut hill figure in Britain) and Kirby Hall in Northamptonshire, one of England's greatest Elizabethan houses.
- 60 National Trust sites (approx): The majority of National Trust land is held 'inalienably', giving it special protection. With 471,000 visitors in 2018/18, Waddesdon Manor in Buckinghamshire is the most popular National Trust attraction in the Heartland, and the sixth most popular overall.
- 239 parks on Historic England's register
- 1,191 conservation areas: Oxfordshire, Cambridgeshire and Northamptonshire all contain 200 or more conservation areas. A breakdown of the numbers of conservation areas per local transport authority can be found in the ISA Report.
- 1,392 Scheduled Monuments: Scheduled monuments include Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites.
- 378,853 listed buildings: The biggest concentrations of listed buildings are found in the historic centres of Oxford and Cambridge, but there are also notable concentrations in all other built-up areas and in numerous smaller towns and villages covering the entire Heartland.

38. EEH Databank: BEIS UK Local Authority and regional carbon dioxide emissions national statistics
39. Information from ISA Scoping document

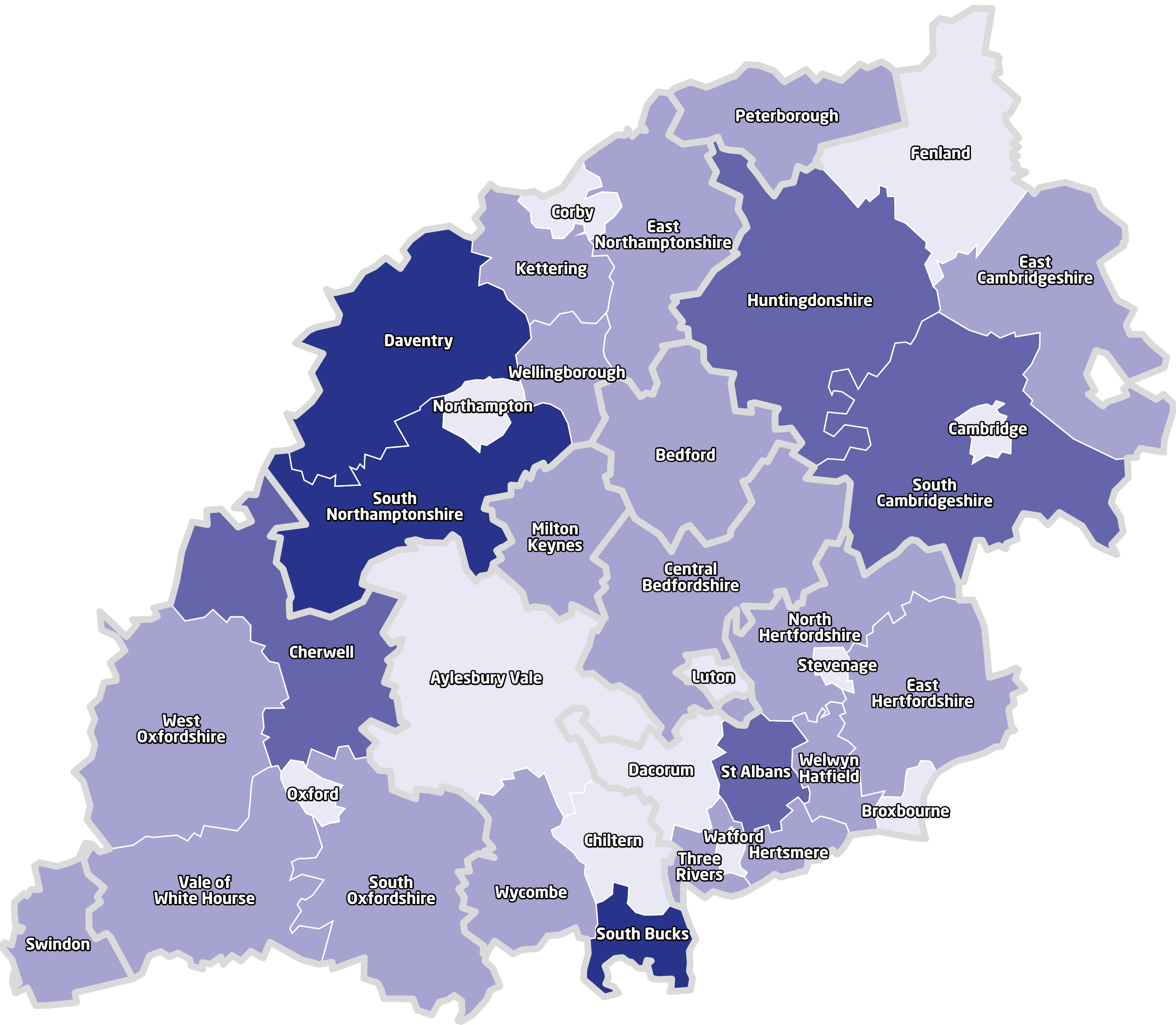
// AONBs, green belts and the national nature reserves

Map created for Illustrative purposes only.



// Transport carbon dioxide emissions per capita

Map created for Illustrative purposes only.



KEY:
Transport carbon dioxide emissions per capita, 2017 (in tonnes).

- Upper tier authority boundaries
- Under 2t
- 2-4t
- 4-6t
- 6-8t

Across the UK transport emissions per capita averaged 1.9t and across EEH 2.4t.

TRANSPORT AND ECONOMIC GEOGRAPHIES

Oxfordshire and Swindon[40]

Oxfordshire and Swindon's economy was worth nearly £31bn in 2018, nearly 19% of the Heartland total.

Oxfordshire is home to the University of Oxford, the world's top-performing university, and Oxford Brookes, which also has a campus at Swindon. The Oxfordshire 'Knowledge Spine' broadly runs from Bicester, through Oxford and into the Science Vale area in and around Didcot, which includes two enterprise zones.

Swindon – the second biggest single economy in the Heartland behind only Milton Keynes - connects the Heartland with the Western Gateway through Bristol to south-east Wales.

Swindon and Oxford are around 25 miles apart, and their respective economies are considered complementary. Economic analysis for the National Infrastructure Commission refers to a 'Greater Oxford-Swindon' area, 'specialising in scientific R&D, high-tech manufacturing and knowledge services'[41].

This is reflected by business interactions in the sub-region: MINI car parts made in Swindon are assembled at BMW in Oxford; Johnson Matthey's manufacture of fuel cells in Swindon draws on Oxford's higher education excellence; Oxford Brookes University delivers further and higher education in both cities and the Oxford University Bodleian Library's extensive purpose-built Book Storage Facility is located at Swindon.

Oxfordshire joins Cambridgeshire in being home a world-leading bioscience cluster, with an estimated 180 R&D companies and over 150 companies in associated industries. It has world-class R&D facilities, with four new innovation centres at the Oxford BioEscalator, the Begbroke Accelerator, Harwell Science and Innovation Campus and Culham Science Centre.

Swindon complements Oxfordshire with its significant bioscience strengths - pharmaceutical manufacturing employs eight times as many people as the national average[42]. Leading bioscience businesses in Swindon include Beckton Dickinson, Patheon and Catalent.

Oxfordshire and Swindon are part of an advanced manufacturing clustering with its foundations in 'Motorsport Valley', extending across much of the Heartland, including Northamptonshire, Milton Keynes, Bedfordshire and Buckinghamshire.

The RACE Centre at Culham Science Centre is a UK centre of excellence in robotics and autonomous systems, while Banbury, Bicester and Wantage also have strengths in the sector.

In Swindon, Honda UK will close its manufacturing plant by 2021, releasing approximately 3,500 members of staff. This is expected to provide the needed influx of skills to grow existing high value manufacturing businesses, as well as attract new investment into the area [43]. The Honda site is a highly attractive development opportunity for employment. The local ambition is for Swindon to be home to a concentration of high value manufacturing, R&D and industrial training. The business-led Swindon Hydrogen Hub seeks to promote commercial use of hydrogen technology in automotive and stationary applications.

The Harwell Science and Innovation Campus in Oxfordshire comprises over 90 space organisations employing nearly 1,000 people and is the largest space cluster in Europe. This strength is complemented by Westcott Venture Park in neighbouring Buckinghamshire.

Current Local Plans for Oxfordshire and Swindon make provision for around 125,000 new homes. This includes around 22,000 homes in Swindon, including 10,000 at the 'Eastern Villages' adjacent to the A420.

Average house prices in Swindon are below the national average. Housing affordability in Swindon complements the need for a greater range of housing in the Oxfordshire-Swindon corridor and the wider Heartland area. The ratio of median house price to median gross annual residence-based earnings is 7.02 in Swindon, compared to the Oxfordshire average of 9.97 (and 12.55 in Oxford).

In Oxfordshire, the districts of Cherwell, South Oxfordshire and Vale of White Horse include provision for more than 20,000 new homes each, most notably at Bicester and Didcot. To the west of Oxford, 2,200 dwellings are planned for the Cotswolds Garden Village near Eynsham. Further Garden Village developments are in the pipeline.

Oxford residents travel an average of 12.1km to work – the lowest in the Heartland. Swindon residents travel an average of 15.8km to work. Unsurprisingly, in the more rural districts surrounding Oxford the average travel to work distance is higher, with West Oxfordshire residents travelling 17.3km.

40. For the purposes of this pen portrait we have combined Swindon with the Oxfordshire Growth Board. Large parts of this narrative comes from the Transport Plans/ Strategies of the constituent transport authorities, the Arc Economic Vision, Local Industrial Strategies, alongside EEH data
41. Cambridge, Milton Keynes, Oxford, Northampton Growth Corridor by SQW/ Cambridge Econometrics for the NIC, 2016
42. Swindon and Wiltshire Emerging Local Industrial Strategy
43. Swindon and Wiltshire LEP Emerging Industrial Strategy

Swindon and Oxfordshire sit on the busy road and rail transport corridor between the south coast ports, the Midlands and the north and enjoys good links to London and the West Midlands via the M4 and M40. It is also well positioned for the M4/M5 axis affording connectivity with Bristol and the South West, also with key economies in Wales; Swindon sits at the fulcrum of the economic blocs of EEH and Western Gateway. However, the Swindon-Oxford area suffers a lack of connectivity to and from the east.

There are currently no direct rail services between Oxford and Swindon. This means that the rail journey between Oxford, to Swindon and beyond to the South West (such as Bristol and Cardiff) require an interchange at Didcot Parkway. Despite journeys being only 15 minutes for both connections between Oxford – Didcot and Didcot – Swindon, the lack of a direct connection results in a generalised journey time of 1 hour 19 minutes [44], reflecting a significant amount of time lost as a result of interchange.

Current investment in the electrification of the Great Western Main Line and in the introduction of a new fleet of Inter-city Express trains has resulted in journey times between Swindon and London of 49 minutes. However, faster, quicker and more frequent trains will add pressure on the Didcot to Swindon section of the Great Western Main Line, making it more difficult to accommodate regional and freight rail services alongside the inter-city express trains.

Western and Central Sections of East West Rail will deliver significant connectivity enhancements to destinations east of Oxford such as Milton Keynes, Bedford and Cambridge whilst bringing other important towns and cities within one change of train.

Oxford has the third busiest railway station in the Heartland, with total entries and exits in 2017-18 totalling nearly eight million, up more than 25% from 2012-13. Swindon and Didcot had footfalls of more than three million, and Banbury more than two-and-half million. Bicester Village's footfall grew 823% after it was redeveloped in 2015 with new services to Oxford and London.

In 2017-18 there were more than 20m passengers rail journeys made in Oxfordshire, a growth of 32% of the previous five years – the highest growth in the Heartland (Swindon grew 13% to 3.6m). Just over 40% of rail journeys in Oxfordshire and Swindon started and finished in the Heartland, far exceeding the regional average of 26%.

Existing road links between Swindon and Oxfordshire to London, Birmingham, Heathrow Airport and Southampton are currently used by a high volume of through traffic which can result in long delays to journeys by road.

The M40 carries the most traffic, particularly on the stretch between junctions 9 and 10, which links the A34 via the A43 to the M1 and carries over 100,000 vehicles per day. The A34 is a nationally important corridor connecting from the Midlands (via the M40) to the South Coast ports, with heavy volumes of goods traffic. It carries up to 70,000 vehicles per day and suffers from congestion, for example at major junctions around Oxford. This is exacerbated by the lack of alternative north-south routes for journeys both within and through the county.

The A40, which is a major through route linking Gloucester and London, intersects with three key radial routes to the north of Oxford, where it forms part of Oxford's ring road, causing serious delays and slow peak time speeds between Witney and Oxford. Much of the traffic using this route is accessing the large employment sites in the eastern arc of Oxford.

Swindon is connected to Oxfordshire via the A420, which forms part of the Major Road Network. However, bus-based public transport remains poor: with travel times between Oxford and Swindon often taking around 90 minutes by bus. The A420 suffers in places from congestion, particularly around the junction with the A419 in Swindon, and around Faringdon and Kingston Bagpuize in Oxfordshire.

In addition to its role connecting Oxford and Swindon, the A420 also caters for traffic moving east west through the Heartland region and beyond, reducing pressure on the M4 and the A34, which are key strategic routes of national importance. Improvements to the connectivity on the A420 corridor are likely to relieve pressures on the M4, particularly at junction 13.

Data from the 2011 census suggests that 60% of Oxfordshire residents and 68% of Swindon residents travel to work by car, van or motorcycle. High car ownership in Oxfordshire is reflected in the high proportion of journeys made by car, including a large number of short trips within the county's towns. Although 50% of journeys to central Oxford are by bus, most of the city's jobs are in the more outlying areas to the east of the city, which are less accessible by public transport.

44. EEH Passenger Rail Study, July 2020

Over 25% of Oxford residents who work in Oxford cycle to work, with a further 25% walking and 20% using the bus. Many people commute to Oxford by bike from nearby settlements, particularly Kidlington, Yarnton, Botley and Abingdon. Elsewhere, cycle routes along inter-urban routes are largely non-existent, the notable exception being the cycle track alongside the A40 linking Witney and Wheatley to Oxford. The speed of traffic using inter-urban routes without cycle facilities is a major deterrent to cycling.

Cycling levels in Swindon and smaller towns in Oxfordshire are generally much lower than in Oxford.

Hertfordshire[45]

Hertfordshire's economy was worth nearly £41bn in 2018, just under a quarter of the Heartland's total GVA.

The county stretches from the borders of Cambridgeshire and Essex in the east to Buckinghamshire in the west, while neighbouring London to the south.

The county shares economic synergies with the rest of the Heartland, particularly in the fields of life science, aerospace, green technology, creativity and logistics.

The eastern part of Hertfordshire is a key part of the Innovation Corridor which runs from Cambridge, through Stansted, Bishop's Stortford and Stevenage, onto Harlow and into London.

In Stevenage there is a major focus on cell and gene therapy which is also prominent in Welwyn Garden City and Hatfield. GSK has multiple sites in the county at Stevenage and Ware, Hatfield is home to Eisai and Welwyn Garden City is the base for Roche's UK Pharmaceutical business. Stevenage was also selected by the UK Cell and Gene Therapy Catapult as the site for its Cell and Gene Therapy Manufacturing Centre.

Hertfordshire also has a lineage in aerospace going back to the likes of British Aerospace in Hatfield: Stevenage is the primary base for the Airbus Defence and Space team.

There is major research competence in sustainable construction in the form of BRE in Watford and also a strong cadre of major construction businesses (including Willmott Dixon in Letchworth Garden City and Skanska in Rickmansworth). Rothamsted Research in Harpenden is a leader in agricultural technologies. The Hertfordshire IQ enterprise zone in Hemel Hempstead is focussed on focused on new enterprises with expertise in environmental technologies.

Hertfordshire is also home to Warner Bros Studios and Elstree Studios, both globally renowned for their state-of-the-art film and TV production, and located in close proximity to Pinewood Studios in south Buckinghamshire.

Current Local Plans for Hertfordshire make provision for around 100,000 new homes. Growth is most significant in the districts of East Hertfordshire, North Hertfordshire and St Albans, including to the east of Hemel Hempstead, and along the A1 and A1(M) corridor encompassing Baldock, Stevenage and Welwyn Garden City. 4,000 homes are planned in the Gilston area, north of Harlow.

Hertfordshire is polycentric in nature, and movement patterns in the county are complicated due to its numerous medium sized urban areas.

The proximity of Hertfordshire to London and the important role the county plays as a commuting base for workers to the capital is a very noticeable part of existing travel patterns. Indeed, currently some 118,000 Hertfordshire residents work in Greater London, and half (51%) travel by rail/tube.

Combined with longer distance commuters traveling through the county to access London, this means much of the county's rail network is at or approaching full capacity at busy times. The top Hertfordshire origins for this London commute are St Albans, Watford, Cheshunt, Harpenden, Welwyn Garden City, Hemel Hempstead, Borehamwood and Stevenage.

Hertfordshire's rail network spans a number of important arterial main lines that serve large commuting catchments into London. As these routes are predominantly arranged to serve London terminus the rail network is a series of discrete lines rather than a joined up system.

Fast and frequent rail services connect key economic nodes such as Watford, St Albans, Hatfield and Hertford and others that cut across the West Coast Main Line, Midland Main Line, East Coast Main Line and West Anglia Main Line.

Despite the fact many of these hubs are separated by short distances, the lack of east-west orbital connectivity by rail has seen this vacuum filled by an increasing number of car journeys on the M25 and A414.

With 8,321,014 entrances and exits in 2017-18, Watford Junction is the second busiest station in the Heartland, with its footfall growing 36% over the previous five years. More than 20 stations in Hertfordshire have annual footfalls of more than one million.

45. This narrative is based on large part on the description within Hertfordshire's Local Transport Plan 2018 -2031 and also information in EEH databank

A total of 72 million rail passenger journeys were made in Hertfordshire in 2017-18, accounting for more than 40% of all rail journeys made in the Heartland area. Of these 21% were for journeys which started and finished within the Heartland.

At the time of 2011 census, Hertfordshire residents travelled an average of 15.8km to work, below the Heartland average of 16.6km but above the England and Wales average of 15km. This varies from 13.1km in Watford to 19.4km in North Hertfordshire. Eleven per cent of residents travelled by train to work, significantly above the EEH (and England/ Wales) average of 5%.

A total of 62% get to work by car, van or motorcycle, which is below the EEH average, and in line with the England/ Wales average. Numbers of people walking (9%) and cycling (2%) to work are also lower than the national average, although walking rates vary considerably – 13% in Watford and only 5% in Three Rivers.

Hertfordshire households own an average of 1.37 cars, in line with the EEH average. East Hertfordshire, where 35% of households have two cars, has the highest number of cars per household at 1.51, while Watford has the lowest rate at 1.20.

North-south Major and Strategic Road networks include the A1, A10 and M1. The M1 carries high levels of freight, particularly from Junctions 21 and 21a where there M25 meets the M1.

The A1 corridor has significant movements between the towns along it, particularly between the northern towns (Letchworth Garden City, Hitchin) and Stevenage, and between Stevenage and the southern towns (Welwyn Garden City, Hatfield).

The M25 runs through Hertfordshire from Junctions 17 to 25, carrying high levels of traffic, including freight.

The A414 forms part of the Major Road Network and runs east-west across the county, linking towns between Harlow and St Albans.

The majority of trips along the corridor are by car, despite the parallel rail provision. In terms of east to west travel (which is notably weaker than north-south travel) the strongest flows are between towns in close proximity to each other; Hemel Hempstead, Watford and St Albans, along with Hatfield and Welwyn Garden City. Flows are less strong from the A1 corridor to the east, but there are still notable relationships between neighbouring towns.

This includes links between Hertford and Ware, and between these towns and Welwyn Garden City to the west and Broxbourne to the south. East-west travel is predominantly by car.

There are also notable flows from Luton and Dunstable into Hemel Hempstead, Harpenden, St Albans and Stevenage. In addition there are a considerable number of commuting trips coming into the county from the north London boroughs to destinations including Watford, Borehamwood and Cheshunt.

In the east of Hertfordshire, commuting patterns from Bishop's Stortford are predominantly to central London (by rail) and Stansted Airport (by car). Stansted Airport, which serves 27 million passengers per year and is the fourth busiest airport in the country, is just over the border in Essex, five miles from Bishop's Stortford. Movement is also seen between Harlow and adjacent areas in the south east and east of the county.

An extensive commercial bus network operates in the county. In addition to the bus network there are a number of express coach services that operate commercially and serve parts of the county. These typically operate on a less than hourly frequency and connect local towns to London, regional centres, airports and with the national coach network.

Buckinghamshire[46]

Buckinghamshire has an economy worth £15bn, making up 10% of the Heartland's total GVA.

Silverstone, on the Bucks/ Northants border, is the heart of the advanced tech sector in the region. It is home to 40 advanced manufacturing companies, testing facilities for materials and vehicles, the Silverstone circuits including the iconic F1 circuit, a rapidly growing enterprise zone, and the workforce training capabilities of the National College of Motorsport and a University Technical College. There are over 4,000 companies, employing 36,000 people, operating in this sector and based within a one-hour radius of Silverstone in 'Motorsport Valley'.

46. Large parts of this narratives comes from Buckinghamshire County Council's Local Transport Plan 4 2016-2036, the Arc Economic Vision, Local Industrial Strategies, alongside EEH data

Pinewood Studios in south Bucks is a centre of excellence for film and TV production and has hosted internationally renowned franchises including Star Wars and James Bond. There are over 250 businesses on the site and major expansion is currently underway. The National Film and Television School (NFTS) in Beaconsfield is the pre-eminent film, television and games teaching institution in the UK with alumni including multiple Oscar and BAFTA award winners.

The county contributes to the region's expertise in space through Westcott Venture Park, with particular strengths in upstream space – the manufacture of spacecraft and sending objects into space. Westcott is home to the National Propulsion Test Facility where the UK Space Agency is investing over £4 million to develop space propulsion engines, along with a 5G Catapult Centre and a new innovation and incubation centre. Westcott, which has enterprise zone status, is also home to a significant energy cluster: Buckinghamshire houses further innovation facilities focussed on lithium ion battery development.

Bucks' growing med-tech sector complements the life science sectors elsewhere in the region. The county is home to a number of global industry leaders in healthcare such as GE Healthcare, as well as national facilities such as the spinal centre in Stoke Mandeville.

The Woodlands enterprise zone site, just east of Aylesbury, has significant scope for stimulating increased employment in the agri-food and human health sectors, building on links to the Arla super dairy and complementing the agri-tech expertise in Hemel Hempstead, 15 miles away down the A41.

Current Local Plans in Buckinghamshire make provision for 47,000 new homes, with 30,000 planned for the former district of Aylesbury Vale in the north of the county. Growth is centred on Aylesbury, which has been given Garden Town status. Development sites in Aylesbury include 3,000 homes at Berryfields to the north-west along the A41 (and served by Aylesbury Vale Parkway station), Kingsbrook near the A418 (2,500 homes) and 3,400 homes on land to the south of the A41 to the east of Aylesbury. Elsewhere 2,300 homes are planned for Princes Risborough. In the south of the county there are a number of smaller sites of more than 500 dwellings planned around High Wycombe.

Buckinghamshire is polycentric in nature, with its two major population and economic hubs being Aylesbury in the centre of the county, and Wycombe in the south. In general, the county is a net exporter of labour, with more people leaving it for work than entering it.

London, which Buckinghamshire borders to the south, is a major draw for commuters, while substantial numbers of people – particularly from the north of the county - travel to work in Milton Keynes.

Data from the 2011 census suggests residents in Buckinghamshire travel an average of 17.6km to work, one kilometre higher than the regional average. Travel to work distances are particularly high in Aylesbury Vale (a largely rural area), at 19.2km.

The majority of journeys to work in Buckinghamshire are made by car. As of the 2011 census, 66% of residents got to work by car, van or motorcycle. Greater rail use occurs in the south of the county – in the South Bucks area, 8% of commuters use rail. Bus use is highest in the Wycombe area (4% of trips), while cycling and walking rates are below the regional average – and are noticeably lower in the south of the county. Indeed, even for journeys to work of less than 2km, only 12% of residents in South Bucks walk, compared to 20% in Aylesbury Vale.

The railway across the Chilterns is vital to the Heartland, carrying passengers to two of the country's major cities, Birmingham and London. Further south, Iver and Taplow's importance to the region's economy will grow by benefiting from faster journey times to Reading, Old Oak Common, Paddington and Heathrow by the introduction of Elizabeth line services and Western Rail Link to Heathrow.

The number of passengers accessing Chiltern services continues to grow and without intervention demand is forecast to outstrip supply. The West Midlands and Chiltern Route Study (2017) forecasts growth of 22% to 2023 and 76% to 2043. Relieving passenger overcrowding on trains to London Marylebone to meet this demand through extra carriages, longer platforms and other ancillary work at key towns along the route is in development.

At 13%, Buckinghamshire's growth in rail passenger numbers over the five years to 2017-18 is the joint-lowest in the Heartland. Of a total of 14 million journeys, 14% started and finished within the Heartland.

High Wycombe is the most used rail station in Buckinghamshire with three million entries and exits in 2017-18. The other most popular stations are also in the south of the county - Amersham (1.9m), Beaconsfield (1.6m) and Gerrards Cross (1.5m). Aylesbury recorded a footfall of 1.2m, while Haddenham and Thame Parkway, which also serves communities in Oxfordshire, recorded 905,000.

Buckinghamshire households have access to an average 1.59 cars, above the regional average of 1.36. 88% of households have access to at least one car, while 37% have two cars, significantly above the regional (31%) and England and Wales (25%) averages. Indeed, 11% of South Bucks' households have access to three cars, and 5% have four or more cars – the highest in the Heartland.

The M40 runs through the southern part of Buckinghamshire and onto Bicester and the north, while the south-western part of the M25 runs through south Buckinghamshire. Indeed, the 8.4kms between junctions eight and nine of the M25 is by some margin the busiest stretch of road in the entire Heartland, with more than 200,000 daily vehicle movements recorded.

Aylesbury has a number of radial Major Road Network roads which converge in the town centre, leading to low AM peak speeds. The M40 runs to the south of High Wycombe, with congestion around Junction 4a (M40/ A404) at peak times.

Improving north-south travel through Buckinghamshire is a key issue. Roads such as the A355 between Amersham and Beaconsfield, the A404 / A404 (M) between High Wycombe and Maidenhead, and the A413 from Amersham into London are particularly unreliable at peak times.

The county lies in close proximity to two airports – Heathrow to the south and Luton to the east. Improving connectivity to both airports is an ambition for Buckinghamshire Council.

Cambridgeshire and Peterborough[47]

Cambridgeshire and Peterborough area had a GVA of £26.5bn in 2018, 16% of the Heartland economy.

The Cambridge life sciences cluster is home to over 400 companies, with 15,500 people and contributing around £2.9bn annually to the UK economy.[48] It is underpinned by the presence of world-leading R&D at the University of Cambridge and the specialist research institutes, hospitals and businesses in the city, clustered in a number of science parks and with particular strengths in bioscience and pharmaceuticals.

The Cambridge Biomedical Campus combines world-class biomedical research, patient care and education on a single site with the University of Cambridge teaching hospitals.The Babraham Research Campus in Cambridge is another leading campus with over 60 organisations on site. Cambridge Science Park is home to over 100 businesses working on life-enhancing technologies, with planned further developments including the Bio Innovation Centre.

The expertise in high-performance manufacturing associated with Motorsport Valley extends into the Combined Authority area: In Peterborough, where this industry contributes 20% of the area's GVA, and Cambridge, which is home to a number of manufacturing companies based in Granta Park and in and around Huntingdon, alongside Amazon's drone development laboratory where their first drone delivery took place.

The creative industries are also particularly strong in Cambridge, which is home to a number of award winning games companies such as Jagex. It is also home to the Microsoft Research Lab, and is joined there by Google, Amazon and Apple. In Cambridge, the IT and digital technologies cluster is highly concentrated. Cambridge and Peterborough are also home strong publishing sectors, complementing expertise in Oxfordshire.

The Cambridgeshire and Peterborough area (and the wider east of England) is one of the most fertile soils regions in the UK. 38,000 people are currently employed in the agri-tech sector in the local economy. The sector complements the agri-tech strengths in neighbouring Hertfordshire.

Greater Cambridge and Peterborough are the biggest centres of gravity in the sub-region, attracting commuters from across the Heartland, and considerable inflows from Essex and Suffolk (Cambridge) and Leicestershire and Lincolnshire (Peterborough).

Growth has been uneven. The economy of Greater Cambridge has performed most strongly, with nearby market towns such as Ely and St Ives benefiting. However, further north the effects are not being felt. Wages are notably lower in the northern districts of Peterborough and Fenland than the southern districts of Cambridge and South Cambridgeshire.[49]

47. Large parts of this narrative comes from the Combined Authority Transport Plan, the Arc Economic Vision, Local Industrial Strategies, alongside EEH data
48. AztraZeneca and MedImmune (2018), Cambridge: driving growth in life sciences: Exploring the value of knowledge-clusters on the UK economy and life sciences secto
49. Cambridgeshire and Peterborough Local Industrial Strategy

Current Local Plans for Cambridgeshire and Peterborough make provision for 95,000 new homes. To the north of Cambridge, the sites at Northstowe and Waterbeach account for 18,000 homes. There is significant growth around Cambourne on the A428, and at St Neots, Alconbury and Peterborough along the A1(M). It is notable that Northstowe, Waterbeach, Cambourne and Alconbury are all part of the Cambridge Compass Enterprise Zone.

At a broad spatial scale, Cambridgeshire and Peterborough enjoys relatively good transport connectivity, with strong links to major cities, ports and airports outside the Combined Authority area, and good connections between major urban areas within it.

From Peterborough and Cambridge urban areas, London can be reached by rail in under an hour, Stansted Airport can be accessed on direct rail services, and the A14 and M11 provide good strategic connectivity, including for freight travelling to the ports of Harwich, Ipswich and Felixstowe on the East Coast. Both roads are relatively high carriers of road freight with more than 10,000 vehicles a day.

However, connectivity within the Combined Authority area is more variable, and urban areas benefit from significantly better transport network coverage than their rural counterparts.

Congestion also acts to limit the effectiveness of the transport network. For example, the average speed on all major roads entering Cambridge during peak is less than 60% of the 'free flow' speed. On average more than 20% of bus services within Cambridgeshire and Peterborough run late, in large part due to congestion.

The A1 forms part of the Strategic Road network, and runs north-south through the Cambridge and Peterborough area, carrying relatively high levels of freight.

The A47 between Peterborough and Wisbech, together with radial routes serving Cambridge, are all expected to see significant rises in congestion by 2041. Guyhuirn Junction currently shows slow AM peak speeds, the creation of a new larger junction has been committed for the RIS2 period. Congestion will also worsen in and around other urban areas, particularly Ely, Wisbech and Huntington.

Connectivity within urban areas, and between major towns, is generally of a good standard. Both Peterborough and Cambridge have high frequency urban bus networks which extend to surrounding major towns. Due to the small footprint of most towns and cities many residents are within walking distance of key services and amenities.

Despite good public transport within urban areas, wider public transport links within and across the combined authority area can be poor. For example, train services between Cambridge and Peterborough take approximately 50 minutes, despite being just 40 miles apart. There is poor provision of bus services outside the major urban areas of Cambridge and Peterborough cities. Rural access to key amenities and transport links in rural areas is also often poor.

Cambridge residents travel on average just 12.6km to work. However, with an average of 20.9km, Huntingdonshire residents travel the furthest distances of anywhere in the Heartland.

Cambridge enjoys the highest mode-share of cycling in the country (29% at the time of the 2011 census), and although it enjoys the lowest reliance on car for commuting in the Heartland, the car remains the most popular commuting method. However, Cambridge is one of only two places in the Heartland (the other being Oxford) where the average household car availability is less than one (0.91). The rate rises to 1.55 in South Cambridgeshire, where almost half of households own two or more cars.

At 15%, walking rates in Cambridge are the second-highest in the Heartland (behind Oxford), but the districts surrounding Cambridge all have far lower walking and cycling rates – at or in many cases below the regional average. In Peterborough, walking and cycling has a 17% mode share, 4% above the regional and national average.

Cambridge provides a good level of connectivity by rail to the south-east quadrant of the Heartland along the West Anglia Main Line and Great Eastern Main Line. Journey times into London King's Cross are fast meaning orbital connectivity across the region is generally achieved via interchanging with London.

Whilst direct connectivity to the Midlands does exist, services are infrequent and uncompetitive when compared with journeys by road. The hourly service linking Peterborough with Cambridge restricts the ability for northward travel from the city.

A number of schemes are being developed to improve capacity for both freight and passenger services along railway corridors in Cambridgeshire and east of Cambridge. Infrastructure interventions at Ely and along the line connecting Ipswich/Felixstowe are identified as key enablers in maximising rail freight bound for the golden triangle and forming the Eastern Section of the East West Main line.

There were 25m passenger rail journeys made in the Combined Authority region in 2017-18, the highest of any area outside of Hertfordshire. Growth in rail passengers over the previous five years was very strong at 20%. With a footfall of 11.5m, Cambridge Station is the busiest in the whole Heartland (conversely, Shippea Hill, to the east of Ely, is the least popular station in the Heartland, with only 276 passengers in a year).

The Central Area[50]

The Central area covers the South East Midlands LEP area of Northamptonshire, Milton Keynes, Bedford, Central Bedfordshire and Luton.

It has a combined economy of more than £50bn, around 30% of total Heartland GVA in 2018. The region has particularly expertise in aerospace, high performance engineering, digital and logistics.

Milton Keynes and Northampton are the key economic centres of gravity within the Central region, although Luton and Bedford are also important economic destinations.

Bedfordshire's Cranfield University is the nation's flagship research institution in the Future Flight aerospace sector deal. To complement this, Central Bedfordshire is the home to the Aircraft Research Association (ARA) which has a global client base, and aerospace manufacturers Lockheed Martin, Rockwell Collins, MBDA Missile Systems and Brinkley Propellers. Luton houses a cluster that specialises in aircraft manufacturing and maintenance, one of the top three hubs for business aviation services.

The Central Area also benefits from its proximity to the Midlands aerospace cluster, especially around Northampton, where several members of the Midlands Aerospace Alliance are based.

The Heartland's world-leading high-performance technology and motorsport cluster, centred in Northamptonshire, is a particularly unique concentration of industries that specialise in the design and manufacture of innovative technologies, engines and products, incorporating low carbon engineering and the application of lightweight materials and composites. Cosworth and Mahle Powertrain are located in the Northampton Waterside Enterprise Zone which is one of the largest in the UK.

Millbrook Proving Ground in Bedfordshire is now employing 5G technology to its CAV testbed, allowing innovative real-time connectivity and location trials. As such it is proving to be a key site for development of autonomous electric vehicles (EVs). Milton Keynes is another key cluster for future transport systems in the region, with Smart Cities innovation stimulated by the Connected Places Catapult. It is home to advanced EV charging infrastructure – with around 150 charging points - and an EV experience centre – the first in the UK.

Other testing sites stretching across the region include the Multi User Environment Autonomous Vehicle Innovation project at Cranfield; and Northampton's 1.5 mile route for fully autonomous vehicles between its town centre, Enterprise Zone, University Campus and Brackmills Business Park.

Milton Keynes has an emerging and growing creative and digital sector, with the second highest proportion of SMEs in high-tech and digital sectors in the UK.

In Milton Keynes, Northampton and Luton, the Central region has the three biggest settlements in the Heartland, with a combined population of around 700,000 people. High levels of planned growth are expected to place further pressure on transport infrastructure.

At peak times the larger settlements suffer from congestion, though driving into Milton Keynes is easier – coupled with relatively cheap car parking and the efficiency of the grid road network, the vast majority of incommuters rely on the private car to get to work – though it is recognised that this is unsustainable.

Current Local Plans in the Central area make provision for 170,000 homes. This includes 40,000 in Central Bedfordshire (the most of any Local Plan in the Heartland), 26,500 in Milton Keynes and 19,000 in Northampton. Luton's Local Plan has significant unmet need which is being fulfilled by Central Bedfordshire and North Hertfordshire.

Significant new housing developments include:

- To the north of Houghton Regis (7,000 homes)
- Milton Keynes' Western Expansion Area (6,500 homes) and the broad arc to the east of Milton Keynes, including 5,000 homes on land east of the M1
- The Wixams to the south of Bedford (more than 6,000 homes)

50. Large parts of this narrative comes from the Transport Plans/ Strategies of the constituent transport authorities, the Arc Economic Vision, Local Industrial Strategies, alongside EEH data

- The north-west of Northampton, including 4,000 homes near Upton Lodge
- East of Daventry, including 4,000 homes along Long Buckley Road
- The A509/A413 corridor encompassing Kettering, Wellingborough and Corby, including two sites of more than 4,500 homes each in Corby.

The Central area includes strong north-south road and rail links, providing good connectivity between the Midlands, Birmingham and the north, and London. The M1 passes from the Midlands through Northampton, Milton Keynes, Bedfordshire and Luton on its way to London via Hertfordshire, while the western part of the sub-region is in close proximity to the M40, and the eastern part in close proximity to the A1 and A1(M).

The M1 is a major carrier of road freight, in excess of more than 15,000 vehicles a day, with some major freight distribution hubs focussed around the M1.

The A5 provides another north-south strategic road link. The performance of the A5 shows variance in AM peak speed times, with slower times around junctions. The highest traffic flows on the A5 are through Milton Keynes.

The A6 corridor, which forms part of the Major Road Network, runs through the central region linking Luton, Bedford, Wellingborough and Kettering. It has relatively high traffic flows and displays varying performance in terms of peak hour congestion with slow speeds around junctions and on the approach to urban areas.

The West Coast Mainline stretches from Birmingham and the north, through Northampton and Milton Keynes through to Hemel Hempstead, Watford and London. The Midland Mainline serves communities in the eastern part of Northamptonshire, Bedford and Luton, on its way into London via St Albans.

For the most part, both main lines provide good levels of north/south connectivity whilst connecting important economic centres either to London or the Midlands.

Northampton is identified as an outlier for poorer levels of connectivity along the West Coast Main Line comparative to its place as one of the Heartland's established employment and population hubs. The capacity unlocked by HS2 presents an opportunity to recast the timetable in favour of enhancing the levels of service along the West Coast corridor, by doing so helping rebalance the regional economy.

Following the introduction of Thameslink services that operate through St Albans, Luton and Bedford, the Midland Main Line upgrade programme consisting of capacity enhancements and electrification from Bedford to Corby and Market Harborough will provide faster and more frequent local services for the region's key stations.

These line speed improvements will be tempered by the removal of inter-regional through services between London St Pancras and East Midlands cities that will no longer call at Luton/Luton Airport Parkway, Bedford and Wellingborough.

Whilst links between the two main lines exist between Bedford and Bletchley, journeys by rail along the Marston Vale Line remain an unattractive proposition for towns in the north of the Central Area.

East West connectivity is notably weaker at present, though this will be transformed (particularly for Milton Keynes and north Bedfordshire) by East West Rail, and the upgrade to the A428 Black Cat-Caxton Gibbet scheme. The A45 and A43 link the east and west of Northamptonshire, and connect the A14 to the M40 and onward links to Oxford and the south of England. There are a number of roads which form part of the Major Road Network, which run east-west in the Central region, including the A507, A428, A603, A505 and A45.

The Central region includes the Heartland's only major airport at Luton, carrying nearly 17m passengers in 2018, and recording growth of 74% between 2012 and 2018. The Luton Direct Air-Rail Transit (DART) which will transport passengers from Luton Airport Parkway Station to the airport, is due to complete in 2021, transforming surface access. East Midlands Airport and Birmingham Airport, and the international gateways in London are also within relatively simple reach.

The connectivity within the region and its central location have laid the foundations for a strong distribution sector (part of the 'golden triangle of logistics'). This is largely roads-based, but with large rail-served freight distribution sites at places such as Eurohub near Corby and the Daventry International Rail Freight Terminal, the largest rail freight centre in the UK. The logistic sector has significant potential to benefit from the innovation and new technologies developed across the region.

Milton Keynes is a self-contained city, with 78% of those who live in the borough working in the borough as well. 77% of these residents use a car to get to work on a daily basis despite there being 5,000 jobs which are readily accessible by public transport, cycling or walking.

According to the 2011 census data, the average distance travelled to work by residents is lowest in Northampton (13.7km). It remains under the EEH average of 16.6km in Luton, Milton Keynes and Bedford, but increases to 20.6km in South Northamptonshire – the second highest in the Heartland.

The number of people travelling to work by car/van is largely consistent throughout the sub-region, ranging between 70-80%, with Luton an exception at 64%. In Corby, 11% of residents travel to work as car/van passengers – the highest rate in the Heartland. At 13%, Luton also has the highest rate of people who walk to work. Cycling rates remain low, including in Milton Keynes (3%), despite having a unique cycle network.

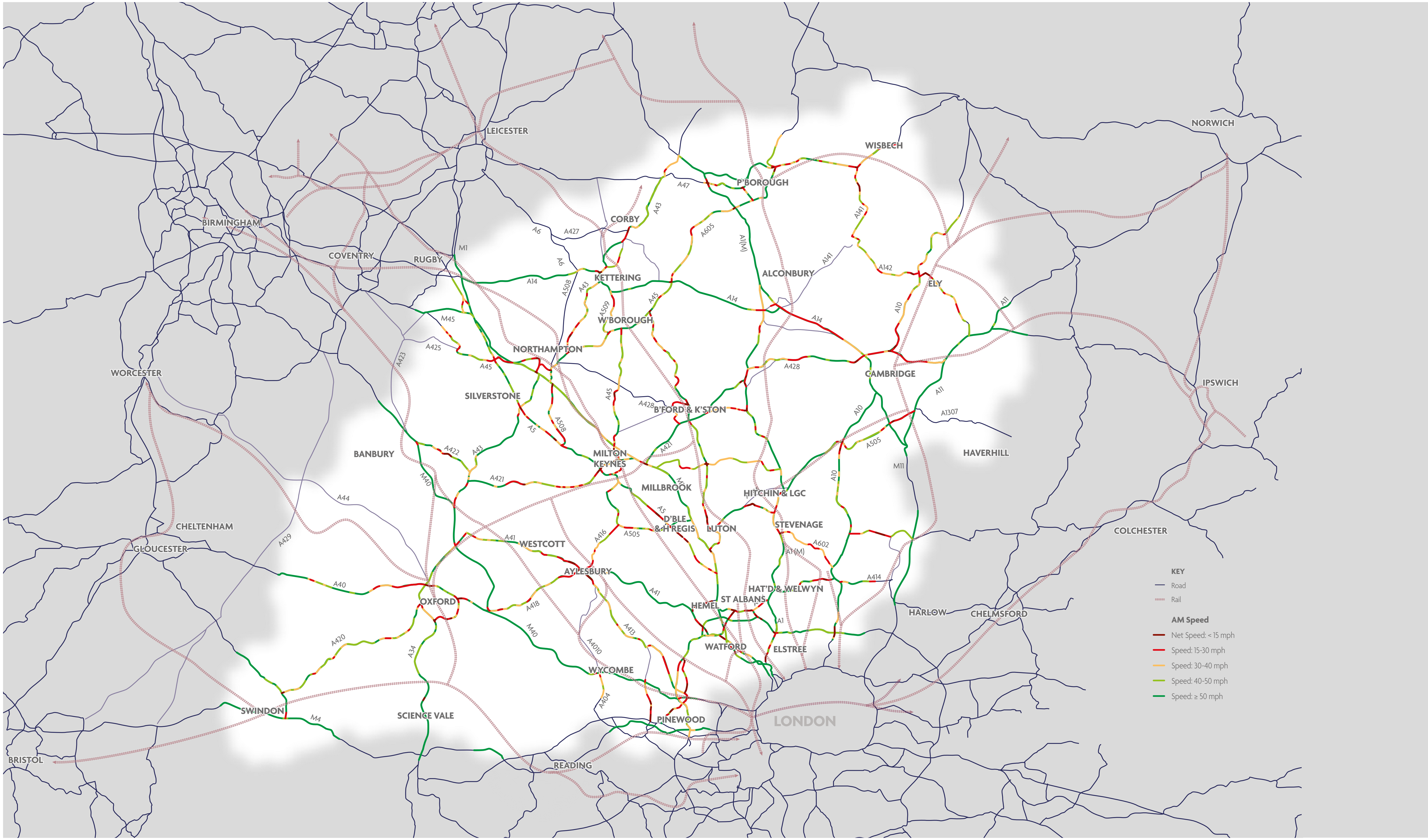
Around a quarter of households in Luton, Northampton and Corby don't have access to a car, but elsewhere car ownership is high. In South Northamptonshire, it is the joint highest in the Heartland, at an average of 1.68, with 40% of households owning two cars.

The Central region had more than 16m rail passengers in 2017-18, growth of 16% over the previous five years. Of these, 21% started and finished within the Heartland. The number of rail trips from Milton Keynes which ended in the Heartland decreased by 5.5% over previous five years.

Milton Keynes Central had the fifth highest footfall in the Heartland in 2017-18, with 6.8m entries and exits. Bedford Midland, Luton Airport Parkway, Luton and Northampton stations all recorded footfalls of more than three million.

// Road speeds and rail network

Map created for Illustrative purposes only.



// National Cycle Network

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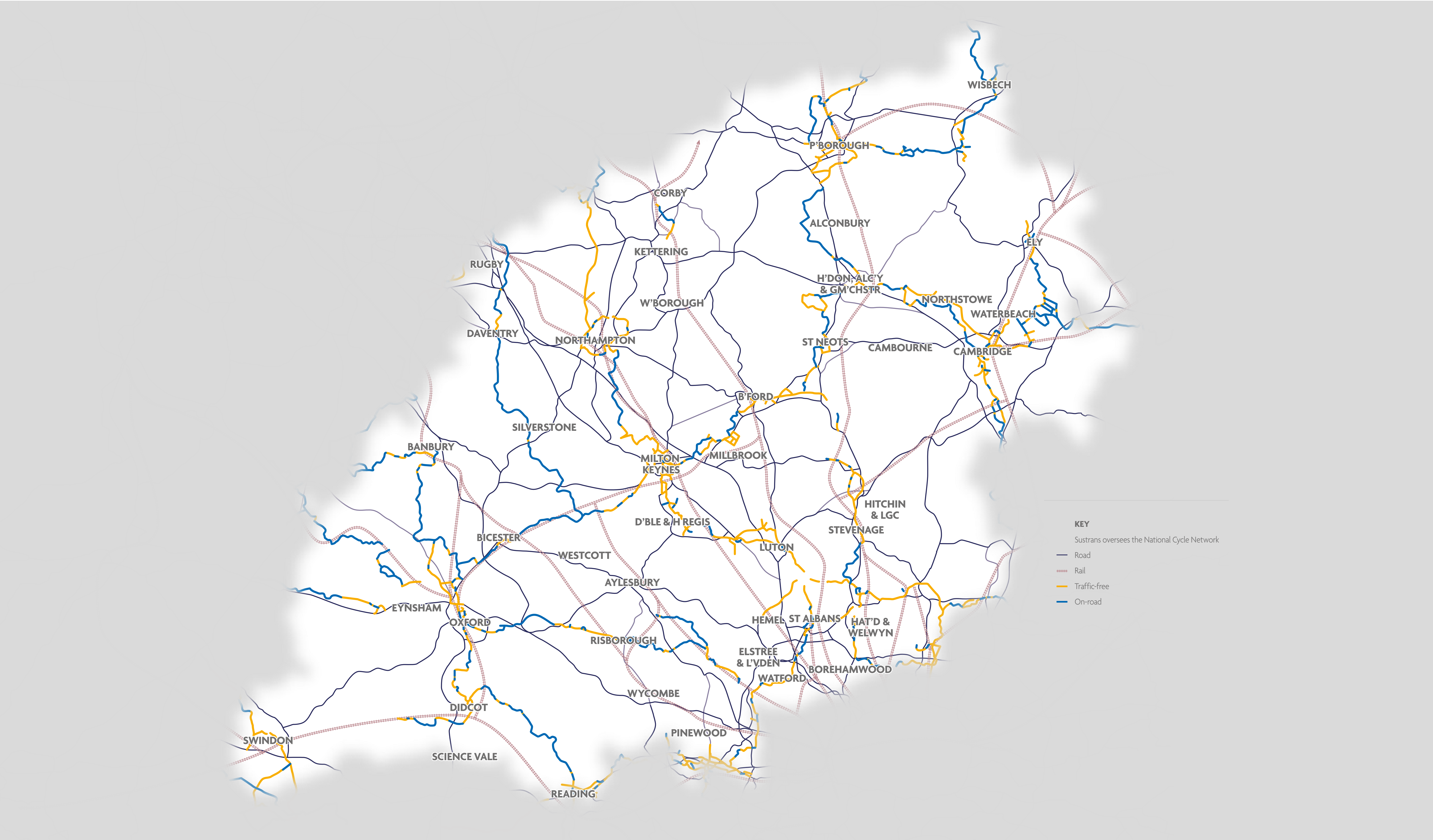
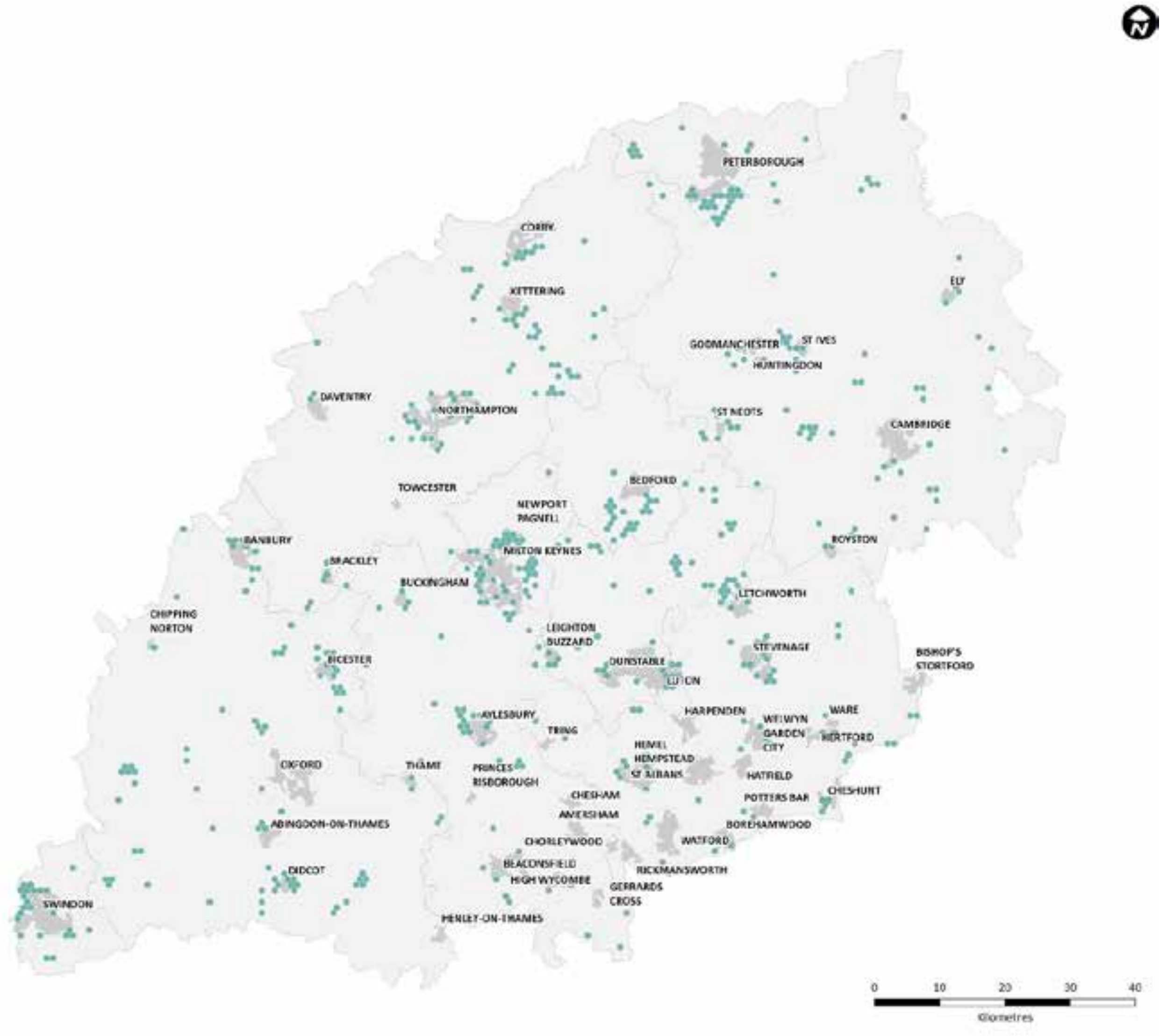


ANNEX: PERSONAS OVERVIEW

Aspiring Homemakers	
The Aspiring Homemakers persona make up 13% of the population of EEH but up to 28% in some towns in the Heartland such as Marston Vale. Aspiring Homemaker households are characterised as younger, in full time employment, settling down in housing priced within their means, which may be in the suburbs.	**Key challenges/constraints:** • a need to perform escorted trips may constrain mode choice • their persona displays a lower propensity for use of electric vehicles **Key opportunities:** • homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking • receptive to new technology/new transport modes • new movers provide opportunities for behaviour change

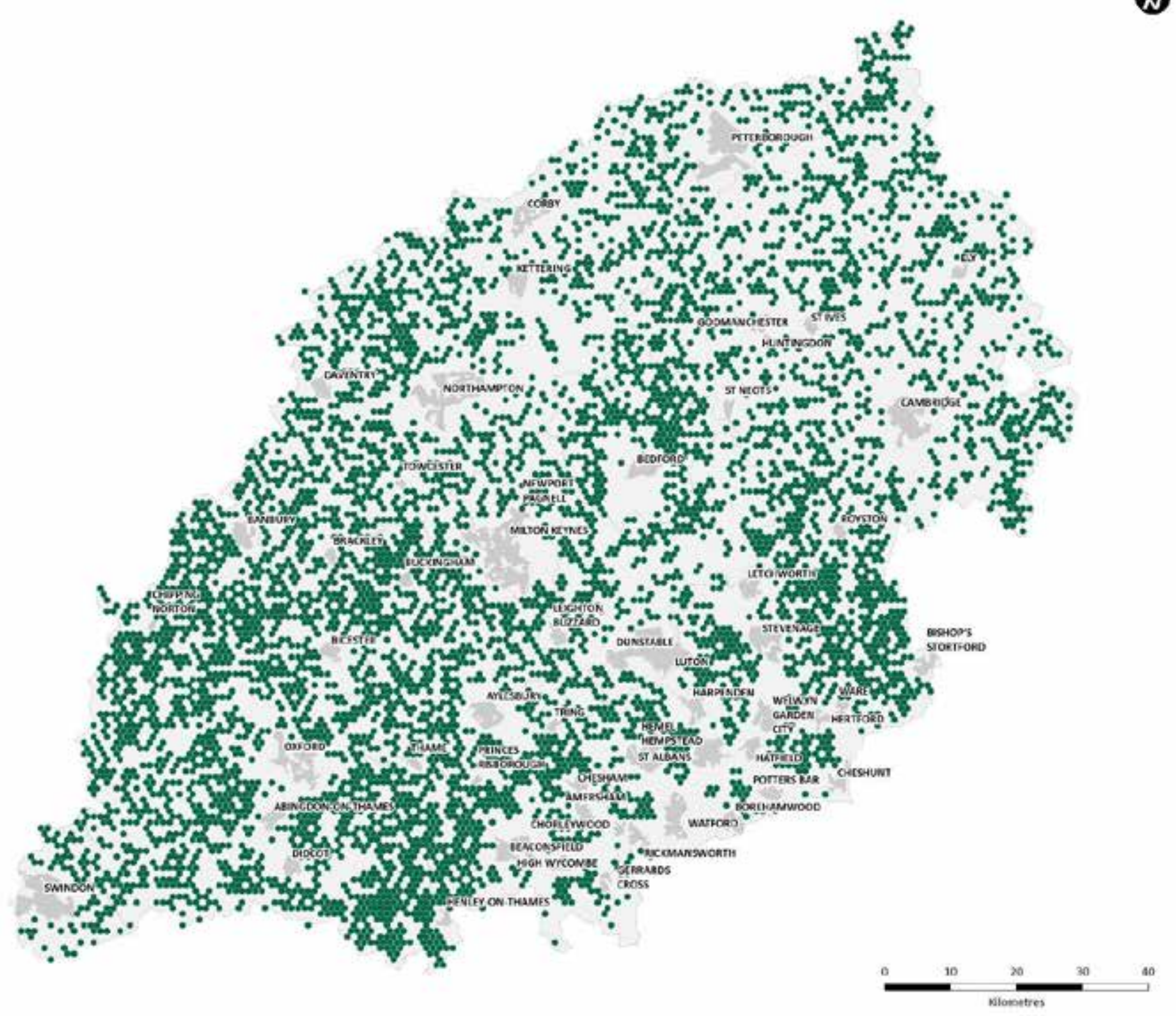


City Prosperity

City Prosperity persona make up only 2% of the population of EEH, but up to 25% in Cambridge. City Prosperity households have recently moved to live in the city centre and have well paid senior jobs. They are likely to be married couples, in managerial/senior positions, supporting students or older children, and are used to using online shopping and banking.	**Key challenges/constraints:** • homes less likely to be suited to introduction of private electric vehicle charging facilities/cycle parking • lower propensity for use of electric vehicles **Key opportunities:** • no children may make travel patterns more flexible • excellent access to key local facilities • regular users of online travel information • propensity to use shared transport options

Country Living

Country Living persona makes up 7% of the population of EEH, but up to 51% in some settlements such as Calvert. Country Living households are well-off home owners in a small rural town, enjoying the benefits of country life. They two cars but also have high internet use.	**Key challenges/constraints:** • poor access to key local facilities • lower propensity for embracing new technology • low propensity to use shared transport options **Key opportunities:** • homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking



Domestic Success

Those in the Domestic Success persona make up 13% of the population of EEH and are one of the most prevalent personas in many settlements except those of a more rural nature.

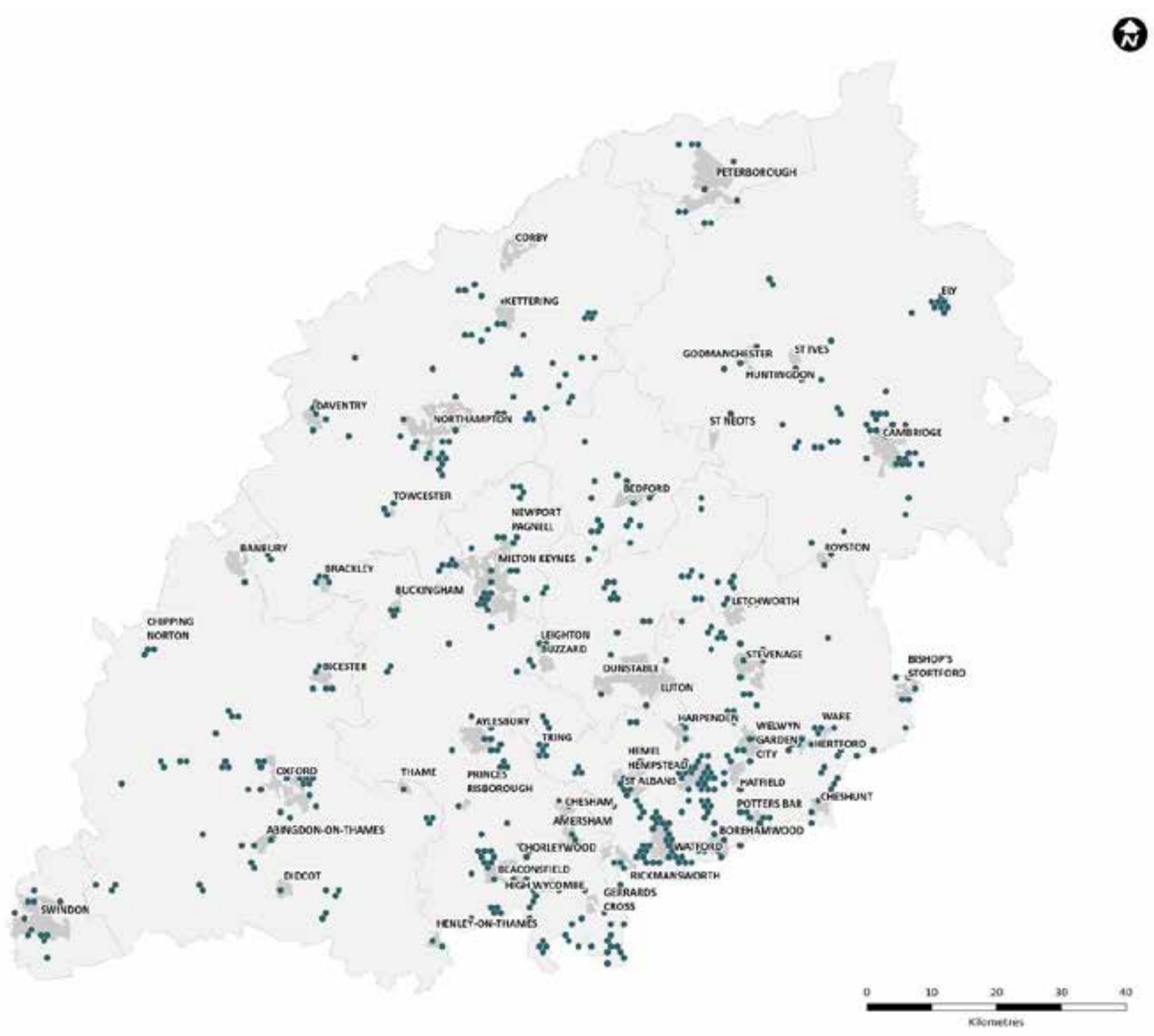
Domestic Success households are a thriving family who are busy bringing up children and following careers. They like to own new technology.

Key challenges/constraints:

- a need to perform escorted trips may constrain mode choice
- lower propensity for use of electric vehicles

Key opportunities:

- homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking
- regularly update their vehicle this provides opportunity to take advantage of technological change
- new movers provide opportunities for behaviour change



Family Basics

Those in the Family Basics persona make up 9% of the population of EEH and make up to 21% of the population of some towns in the Heartland such as Aylesbury.

Family Basics households are characterised as those with limited resources who must budget to make ends meet. They are likely to have children, limited resources and squeezed budgets.

Key challenges/constraints:

- a need to perform escorted trips may constrain mode choice
- lower use of online travel information
- do not regularly update their vehicle reducing opportunity to take advantage of technological change
- low propensity to use shared transport options

Key opportunities:

- homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking
- receptive to new technology/new transport modes

Rental Hubs

Those in the Rental Hubs persona make up 8% of the population of EEH, though in Cambridge and Oxford this is over 24%.

Rental Hubs households are characterised by educated young people privately renting in urban neighbourhoods. They are likely to be single or sharing accommodation, often in young neighbourhoods.

Key challenges/constraints:

- homes less likely to be suited to introduction of private electric vehicle charging facilities/cycle parking
- do not regularly update their vehicle reducing opportunity to take advantage of technological change
- lower propensity for use of electric vehicles

Key opportunities:

- no children may make travel patterns more flexible
- new movers provide opportunities for behaviour change
- excellent access to key local facilities
- receptive to new technology/new transport modes
- propensity to use shared transport options

Rural Reality

Those in the Rural Reality persona make up 8% of the population of EEH but up to 66% in some rural settlements such as Chatteris.

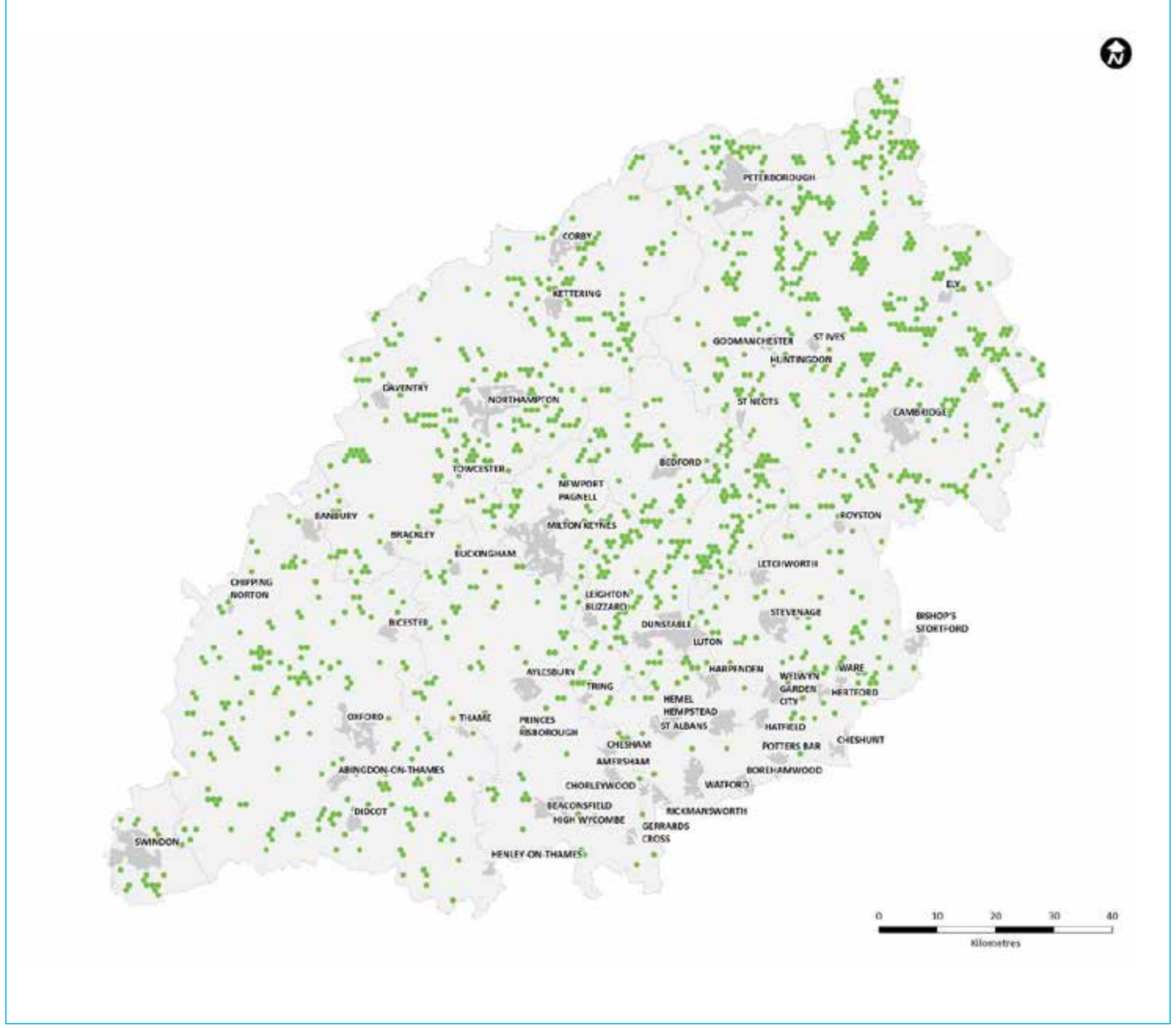
Rural reality households are characterised by householders living in inexpensive homes in village communities or outlying houses. They may experience slower internet speeds.

Key challenges/constraints:

- poor access to key local facilities
- low propensity to use shared transport options

Key opportunities:

- homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking



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Senior Security	
Those in the Senior Security persona make up 7% of the population of EEH, but up to 12% in some towns such as Swindon. Senior Security households are characterised by being elderly and who are enjoying a comfortable retirement. These more elderly households have lower mileage and less likely to take up new technology.	**Key challenges/constraints:** • length of residency may result in more entrenched travel behaviours • poor access to key local facilities • lower propensity for embracing new technology • propensity to embrace new technology • low propensity to use shared transport options **Key opportunities:** • no children may make travel patterns more flexible • homes likely to be more suited to introduction of private electric vehicle charging facilities/cycle parking

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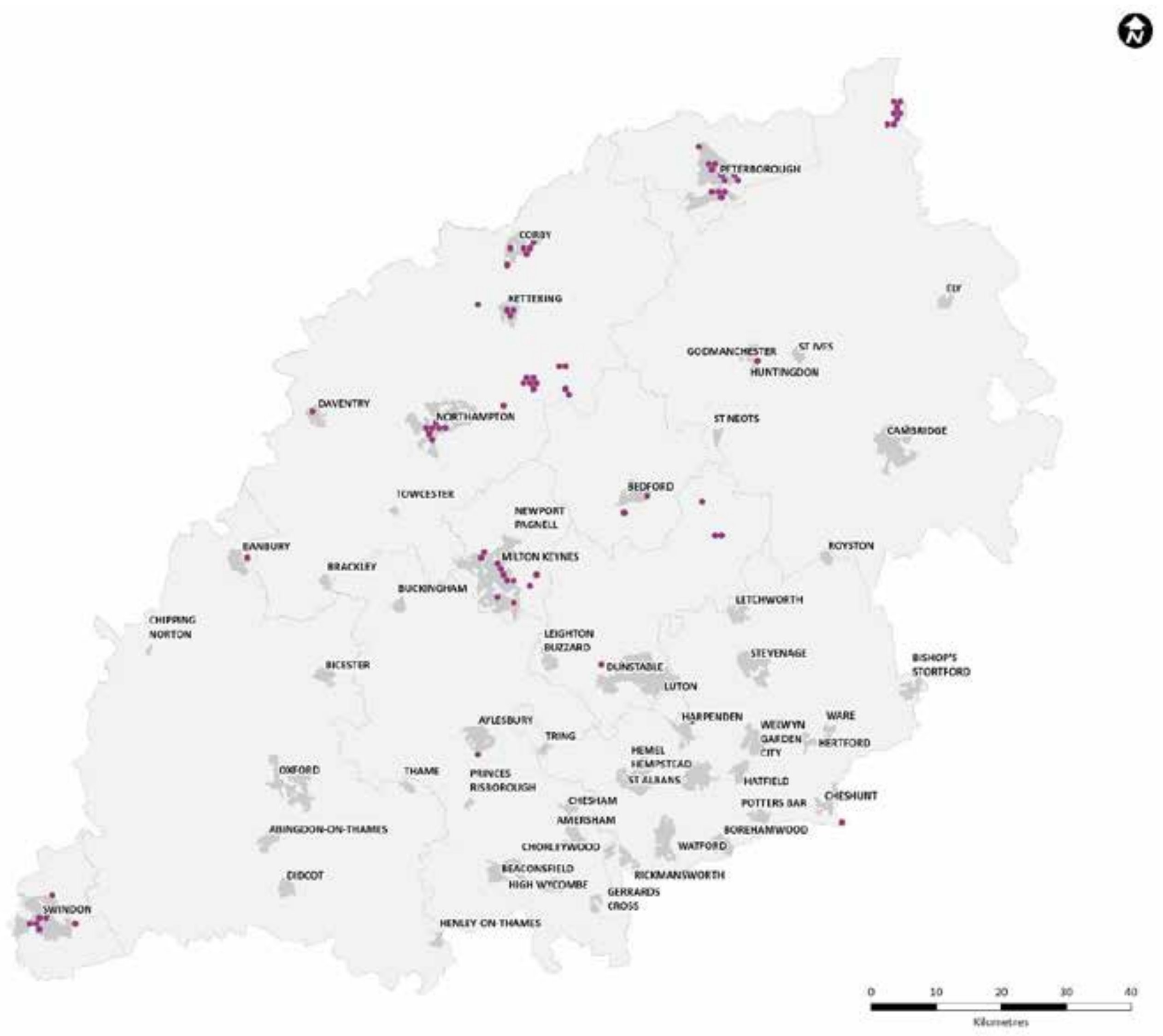
Transient Renters	
Those in the Transient Renters persona make up 7% of the population of EEH but over 14% in some settlements such as Milton Keynes and Northampton. Households are characterised by single people privately renting low cost homes, often in terraced housing, for the short term.	**Key challenges/constraints:** • do not regularly update their vehicle reducing opportunity to take advantage of technological change • low propensity to use shared transport options **Key opportunities:** • no children may make travel patterns more flexible • new movers provide opportunities for behaviour change • receptive to new technology/new transport modes



Urban Cohesion

Those in the Urban Cohesion persona make up 4% of the EEH population but up over 10% in some settlements such as Oxford and Bedford.

Households are characterised as residents of settled urban communities with a strong sense of identity. They are likely to be multicultural and reside in the suburbs. Younger family members are likely to have an interest in new technology.

Key challenges/constraints:

- do not regularly update their vehicle reducing opportunity to take advantage of technological change; Current trends indicate low take up of electric vehicles
- lower propensity for use of electric vehicles

Key opportunities:

- excellent access to key local facilities
- receptive to new technology/new transport modes.

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Prestige Positions

Those in the Prestige Positions persona make up 12% of the EEH population but over 25% in some settlements such as Calvert and Hardwick.

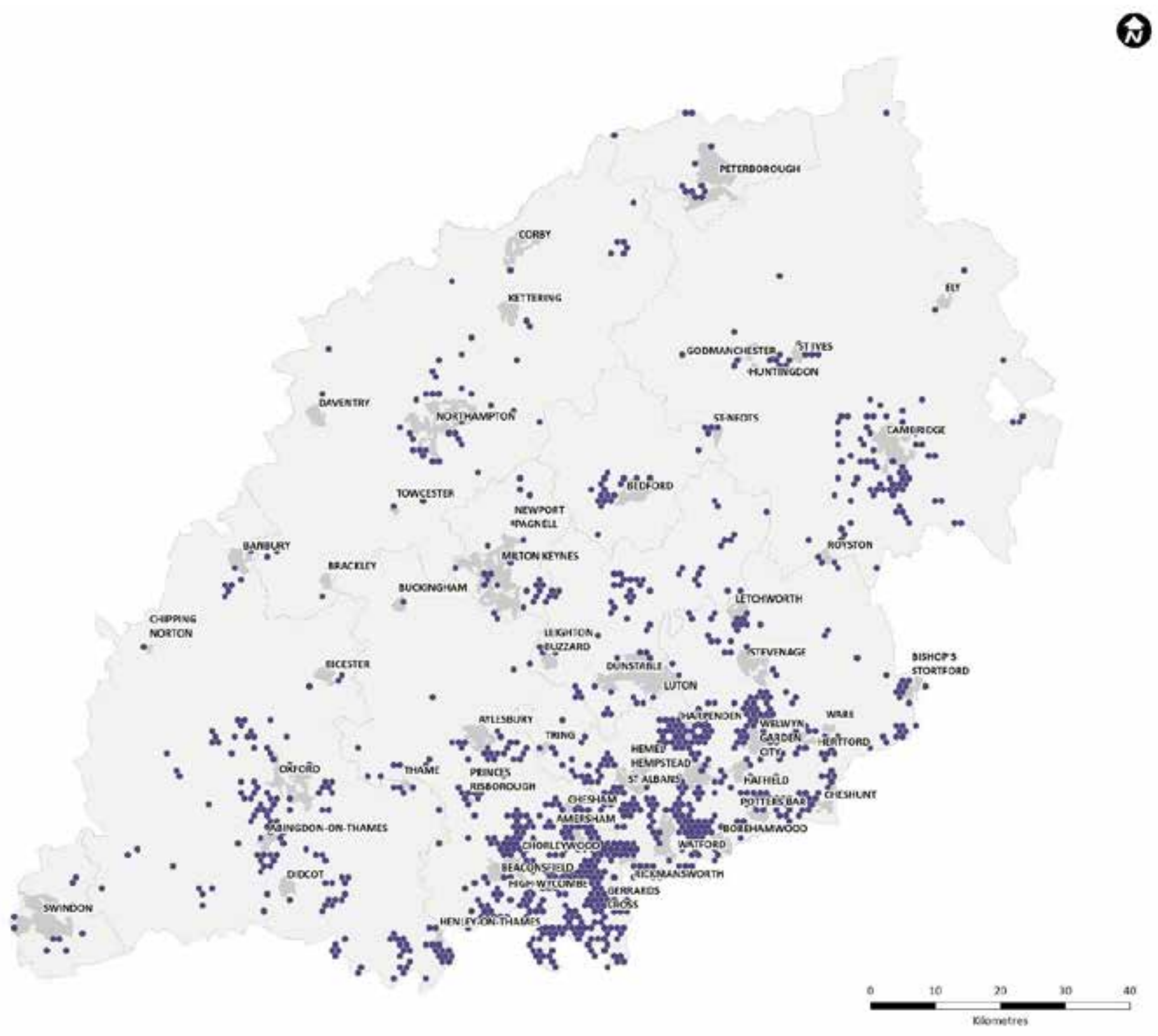
Households are characterised by living in a high value detached home, being employed in managerial or senior positions and supporting students/older children.

Key challenges/constraints:

- length of residency may result in more entrenched travel behaviours

Key opportunities:

- regularly update their vehicle this provides opportunity to take advantage of technological change
- propensity to use new fuel types (e.g. electric or hybrid)



Suburban Stability

Those in the Suburban Stability persona make up 5% of the EEH population, only raising to around 10% in settlements such as Sandy.

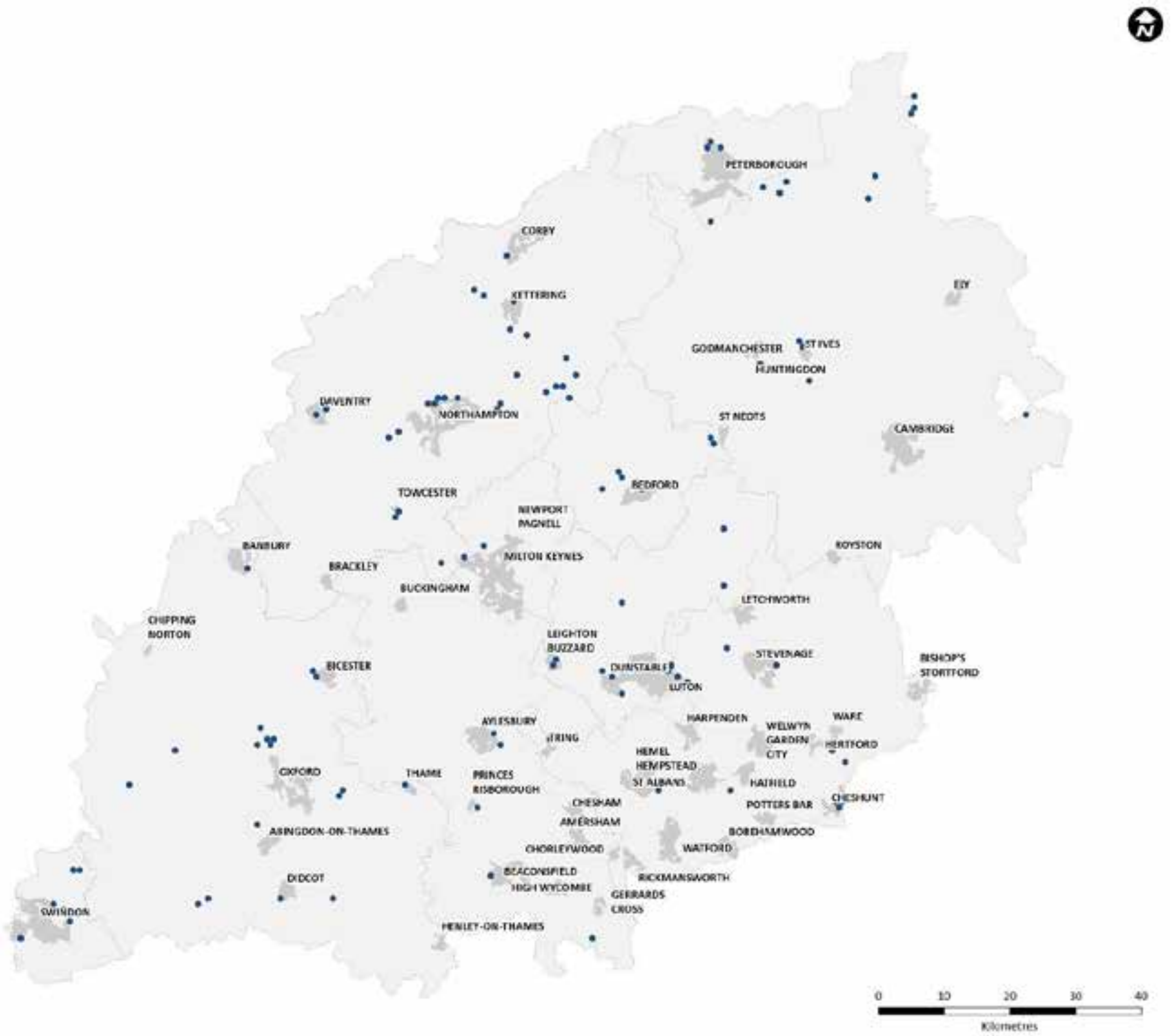
Households are characterised by living in a suburban mid-range home, which they've lived in for several years with older children.

Key challenges/constraints:

- length of residency may result in more entrenched travel behaviours

Key opportunities:

- regularly update their vehicle this provides opportunity to take advantage of technological change



Vintage Value

Those in the Vintage Value persona make up 4% of the EEH population with many settlements having this small proportion of this persona across the Heartland.

Households are characterised by people living alone, in small homes or flats, and on low income and need of support.

Key challenges/constraints:

- homes less likely to be suited to introduction of private electric vehicle charging facilities/cycle parking
- length of residency may result in more entrenched travel behaviours
- higher propensity for mobility difficulties
- low level of technology use

Key opportunities:

- no children may make travel patterns more flexible
- propensity to use new fuel types (e.g. electric or hybrid)

Modest Traditions

The Modest Traditions persona accounts for 2% of the EEH population but to 4% in some settlements such as Swindon and Milton Keynes. Families typically live in smaller terraced properties located in the outskirts of urban areas. They tend to be compose of couples with no children (or with children who have left home). They are quite likely to have access to a car.	**Key challenges/constraints:** • relatively low disposable incomes limit the choices available • lack of interest in new technologies • poor access to local shops and facilities mean they are required to travel to access services • above average incidence of mobility difficulties **Key opportunities:** • no children may make travel patterns more flexible

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Municipal Challenge

Those in the Municipal Challenge persona make up 2% of the EEH population but up over 3% in some settlements such as Swindon, Bedford and Oxford. Households are characterised by mature residents living in affordable suburban housing.	**Key challenges/constraints:** • homes less likely to be suited to introduction of private electric vehicle charging facilities/cycle parking • higher propensity for mobility difficulties **Key opportunities:** • no children may make travel patterns more flexible • good access to key local facilities • receptive to new technology/new transport modes

Get in touch

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