# 5 Oxfordshire's Future Needs to 2040

*Chapter at a Glance*

This chapter identifies Oxfordshire's future needs to 2040 across the five OxIS Themes of Environment, Health, Place-Shaping, Productivity and Connectivity.

For each of the 25 sub-themes (needs) the strategic policy need and level of importance is identified, informed by a review of key national, County and District-wide policy and strategy documents as at July 2021. Where applicable, this is supplemented by key relevant data & evidence on specific future infrastructure needs based on population forecasts.

Further detail is also provided in this chapter on measurable evidential indicators which underpins the needs-based appraisal of schemes within Chapter 6. Needs to 2050 are covered in the forthcoming OxIS Stage 2 Report

## 5.1 Oxfordshire's Future Needs

### 5.1.1 OxIS Themes

The Future Oxfordshire Partnership (formerly Oxfordshire Growth Board), in partnership with the six Oxfordshire local authorities and key strategic partners, have agreed five OxIS Themes (see Figure 5-1). These themes are consistent with emerging policies being developed across Oxfordshire, including the Local Transport and Connectivity Plans.

The purpose of the five OxIS Themes is to provide a structural framework for the identification of future infrastructure needs to 2040 to support sustainable, clean, healthy and inclusive growth in Oxfordshire.


*Figure 5-1: OxIS Themes*

### 5.1.2 Identifying Needs

Oxfordshire's future needs have been identified by adopting a robust and comprehensive process involving:

- Strategic Needs Review
- Evidence Base Review
- Thematic Stakeholder Engagement Workshops

#### *5.1.2.1 Strategic Needs Review*

Key legislation, policies and strategies applicable to Oxfordshire were reviewed to ascertain the strategic needs to 2040. As well as discipline specific documents, this also included overarching key cross-theme policy documents, such as Oxfordshire's Strategic Vision for Long Term Sustainable Development, District Local Plans and the Local Authority's Corporate Plans.

***Oxfordshire's Strategic Vision for Long-Term Sustainable Development***

Oxfordshire's Strategic Vision, which has been prepared on behalf of the Future Oxfordshire Partnership (formerly Oxfordshire Growth Board), provides an overarching ambition for what the county should look like by 2050 and forms a core element of identifying Oxfordshire's future needs to 2040.

The Strategic Vision has been informed by extensive discussions with the people of Oxfordshire as well as feedback from key stakeholders who wanted to see a different approach to creating places; one that reflects environmental, social and economic wellbeing with the aim of creating communities that are more inclusive, resilient, happier, healthier and greener.

The strategic aspiration by 2050 is to ensure Oxfordshire has achieved:

- **Carbon Negative:** has already achieved carbon neutral status by 2040 and moving towards a carbon negative future by 2050
- **Enhanced Natural Environment:** Richer natural environment with more biodiversity
- **Improved Wellbeing:** people will have improved physical and mental health
- **Globally Competitive Economy:** generating high quality and knowledge-based employment by utilising its strengths in its world-class universities and innovation assets
- **Healthier and Happier People**
- **Inclusive:** tackling deprivation, discrimination and disadvantage
- **Protects Heritage**
- **Sufficient & Suitable Homes:** to meet the needs of the growing population
- **Transformed Sustainable Transport Connectivity**
- **Diverse and Vibrant Communities**

#### *5.1.2.2 Evidence Base Review*

The strategic needs were further refined through the analysis of detailed evidence and datasets. This provided further clarity in relation to the specific needs, including geospatially, across the county.

#### *5.1.2.3 Thematic Stakeholder Workshops*

A series of thematic workshops and targeted engagement forums were held with key subject matter stakeholders and infrastructure providers to verify and refine the future needs to 2040 as well as to agree the core measurable outcomes considered.

Table 5-1 provides a summary of the thematic workshops and attendees during the OxIS Stage 1 process.

| OxIS Theme | Workshop Topic | Workshop Attendees | |
|---|---|---|---|
| Environment | Environment Thematic Workshop | • OCC & District Climate Action Teams<br>• Environment Agency | • OCC & District Natural Environment Teams<br>• County Flooding Team |
| | Waste & Recycling Workshop | • OCC Waste Disposal Team | • District Waste Collection Teams |
| Health | Health Thematic Workshop | • Oxford University Hospitals NHS Foundation Trust<br>• Healthwatch Oxfordshire<br>• OCC Active Travel Team<br>• Active Oxfordshire | • OCCG<br>• Healthy Place-Shaping Team<br>• Sport England |
| Place-Shaping | Place-Shaping Thematic Workshop | • OCC Cultural & Community Services Team<br>• Communities First Oxfordshire | • OCC Community Safety Team<br>• OCC Road Safety Team<br>• OCC Active Travel Team<br>• OCC Healthy Place-Shaping Team |
| Productivity | Productivity Thematic Workshop (Business Support) | • OxLEP | • OCC Economic Development Team |
| | School Education Workshop | • County School Team | |
| Connectivity | Digital Connectivity Workshop | • County Digital Infrastructure & Strategy Team<br>• Openreach | • Virgin Media<br>• Zzoomm<br>• Airband |
| | Energy Connectivity Workshop | • County Energy Team<br>• Scotia / Scottish / Southern Gas Networks | • Scottish & Southern Electricity Networks<br>• Western Power Distribution |
| | Water Connectivity Workshop | • Thames Water | |
| | Transport Connectivity Workshop | • County Transport Team<br>• Stagecoach West<br>• Network Rail | • Oxford Bus Company<br>• Great Western Rail<br>• Chiltern Railways |

*Table 5-1: OxIS Stage 1 Thematic Workshops*

### 5.1.3 Future 2040 Needs by OxIS Theme

Through a robust evidence gathering process, including thorough engagement with multidisciplinary stakeholders, a review of key policies and strategies and a detailed analysis of the geospatial evidence base, these themes have been used as a framework to refine 25 outcome-led sub-themes. These sub-themes represent Oxfordshire's future needs for infrastructure investment to 2040.

These 25 needs, which are shown in Figure 1-2, underpin the needs-based appraisal component of the infrastructure scheme multi-criteria appraisal incorporated within Chapter 7.


*Figure 5-2: OxIS Outcome Led 25 Future Needs to 2040*

### 5.1.4 Need Priority Tier

Each of the 25 needs have been assigned a level of priority according to their relative importance to fulfil. All needs are equally important but in line with the recent guidance on Green Book business cases we have applied an ordering to ensure they can be tied together through a clear strategic narrative.

**What is the Green Book?**

The Green Book (HM Treasury 2021) is guidance prepared by HM Treasury which provide procedures for the appraisal and evaluation of interventions such as infrastructure schemes, programmes, and policies.

As indicated within Table 5-2, each need has been assigned at least one tier ranging from Tier One which is a basic legal requirement to Tier Four which is Oxfordshire District policy. Most needs are assigned multiple tiers.

| Need Priority Tier | Criteria |
|---|---|
| Tier One | Obligatory national legal requirement identified in existing legislation or statute |
| Tier Two | Identified in existing UK Government national policy or strategy |
| Tier Three | Identified in either adopted sub-national or Oxfordshire Countywide policy or strategy |
| Tier Four | Identified in adopted Oxfordshire District Council policy or strategy |

*Table 5-2: Future Need Priority Tier Criteria*

### 5.1.5 Relationship between Needs and Infrastructure Types

The future 2040 needs transcend and are applicable to multiple OxIS infrastructure types and are not intended to be treated in isolation (see Figure 4-1). A reference map which matches the OxIS infrastructure types against the applicable 25 future needs is provided in Table 5-3.

| Infrastructure Type | Baseline Context | Future Needs to 2040 |
|---|---|---|
| IF1: Energy | Section 4.2 | ✓ E1: Net Zero Carbon Emissions (see Section 5.2.1)<br>✓ C2: Secure Energy Supply (see Section 5.6.1.4)<br>✓ C4: Transport Connectivity & Performance (see Section 5.6.4) |
| IF2: Transport | Section 4.3 | ✓ E1: Net Zero Carbon Emissions (see Section 5.2.1)<br>✓ E5: Reduce Water & Noise Pollution (see Section 5.2.5)<br>✓ H1: Health Inequality (see Section 5.3.1)<br>✓ H2: Access to Spaces for Physical Activity (see Section 5.3.2)<br>✓ H4: Cleaner Air (see Section 5.3.4)<br>✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ PS2: Community Safety & Security (see Section 5.4.1.3)<br>✓ PS5: Inclusive & Integrated Active Travel (see Section 5.4.5)<br>✓ P5: Drive Economic Growth & Productive Employment (see Section 5.5.5)<br>✓ C4: Oxfordshire Transport Connectivity & Performance (see Section 5.6.4)<br>✓ C5: Sub-National Transport Connectivity (see Section 5.6.5) |
| IF3: Flood Alleviation | Section 4.4 | ✓ E2: Climate Change Impact Resilience (see Section 5.2.2)<br>✓ E3: Enhance Natural Environment & Biodiversity (see Section 5.2.3) |
| IF4: Education | Section 4.5 | ✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ P1: World Class Inclusive Education & Skills Development (see Section 5.5.1)<br>✓ P2: Reduce Oxfordshire's Socio-Economic Inequalities (see Section 5.5.2) |
| IF5: Digital | Section 4.6 | ✓ C1: Digital Connectivity (see Section 5.6.1) |
| IF6: Innovation | Section 4.7 | ✓ P1: World Class Inclusive Education & Skills Development (see Section 5.5.1)<br>✓ P3: Attract & Retain Talent in Oxfordshire (see Section 5.5.3)<br>✓ P4: Build a Global Business Innovation Ecosystem (see Section 5.5.4)<br>✓ P5: Drive Economic growth & Productive Employment (see Section 5.5.5) |

| Infrastructure Type | Baseline Context | Future Needs to 2040 |
|---|---|---|
|  IF7: Green & Blue | Section 4.8 | ✓ E1: Net Zero Carbon Emissions (see Section 5.2.1)<br>✓ E2 Climate Change Impact Resilience (see Section 5.2.2)<br>✓ E3: Enhance Natural Environment & Biodiversity (see Section 5.2.3)<br>✓ E5: Reduce Water & Noise Pollution (see Section 5.2.5)<br>✓ H1: Health Inequalities (see Section 5.3.1)<br>✓ H2: Access to Spaces for Physical Activity (see Section 5.3.2)<br>✓ H4: Cleaner Air (see Section 5.3.4)<br>✓ H5: Enhance Mental Health & Wellbeing (see Section 5.3.5)<br>✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ PS4: Socially Integrated Communities (see Section 5.4.4)<br>✓ C3: Secure Water Supply & Wastewater (see Section 5.6.3) |
|  IF8: Community & Cultural | Section 4.9 | ✓ H5: Enhance Mental Health & Wellbeing (see Section 5.3.5)<br>✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ PS3: Heritage & Culture (see Section 5.4.3)<br>✓ PS4: Socially Integrated Communities (see Section 5.4.4) |
|  IF9: Sport & Leisure | Section 4.10 | ✓ H1: Health Inequality (see Section 5.3.1)<br>✓ H2: Access to Spaces for Physical Activity (see Section 5.3.2)<br>✓ H5: Enhance Mental Health & Wellbeing (see Section 5.3.5)<br>✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ PS4: Socially Integrated Communities (see Section 5.4.4) |
|  IF10: Health & Adult Social Care | Section 4.11 | ✓ H1: Health Inequality (see Section 5.3.1)<br>✓ H3: Health Service Access (see Section 5.3.3)<br>✓ H5: Enhance Mental Health & Wellbeing (see Section 5.3.5)<br>✓ PS1: Local & Liveable Communities (see Section 5.4.1)<br>✓ P2: Reduce Oxfordshire's Socio-Economic Inequalities (see Section 5.5.2) |
|  IF11: Waste & Recycling | Section 4.12 | ✓ E1: Net Zero Carbon Emissions (see Section 5.2.1)<br>✓ E4: Waste & Recycling (see Section 5.2.4) |
|  IF12: Potable Water Supply & Wastewater | Section 4.13 | ✓ E2 Climate Change Impact Resilience (see Section 5.2.2)<br>✓ E5: Reduce Water & Noise Pollution (see Section 5.2.5)<br>✓ C3: Secure Water Supply & Wastewater (see Section 5.6.3) |
|  IF13: Emergency Services | Section 4.14 | ✓ H3: Health Service Access (see Section 5.3.3)<br>✓ PS2: Community Safety & Security (see Section 5.4.1.3) |

*Table 5-3: Reference map matching Infrastructure Types to Future Needs*

## 5.2 Environment Needs

*Environment Needs to 2040*

The Environment theme is primarily associated with addressing the climate emergency declared by OCC and the five District Councils by supporting the net zero carbon targets identified in the various Climate Action Frameworks and by the Future Oxfordshire Partnership (formerly Oxfordshire Growth Board). Through building resilience to the long-term effects of climate change, it also considers wider needs such as the restoration of biodiversity and the natural environment alongside defending against flooding and waste disposal to support the creation of sustainable communities.

The outcome-led needs within the Environment Theme are:

- E1: Net Zero Carbon Emissions (see Section 5.2.1)
- E2: Resilience to Climate Change (see Section 5.2.2)
- E3: Enhanced Natural Environment & Biodiversity (see Section 5.2.3)
- E4: Efficient Waste & Recycling (see Section 5.2.4)
- E5: Reduced Water & Noise Pollution (see Section 5.2.5)

Needs to 2050 will be covered in the forthcoming OxIS Stage 2 Report.

### 5.2.1 E1: Net Zero Carbon Emissions

*E1 Future Needs to 2040 for Net Zero Carbon Emissions at a Glance*

There is a strategic need to fulfil national legal obligations and the County-wide Climate Action Framework to achieve net zero carbon emissions in Oxfordshire by 2050, and the more recent Future Oxfordshire Partnership (formerly Oxfordshire Growth Board) target identified within Oxfordshire's Strategic Vision for net zero by 2040. There is also a need to achieve the carbon neutral target years, ranging from 2030 to 2050, identified in the five Oxfordshire District Council climate action strategies. The carbon emission inventory indicates a need to reduce emissions particularly reducing road transport tailpipe emissions (46% of total emission) and Oxfordshire's energy network emissions to 2040.

This includes urgently reducing carbon emissions within Cherwell and South Oxfordshire to enable their ambitions to achieve net zero carbon emissions by 2030. Primarily due to the presence of the M40, emissions originating in these Districts comprise the largest proportion (30% and 20% respectively) of total County emissions.

*E1 Key Affected Infrastructure*

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13: Emergency Services*

#### 5.2.1.1 Strategic Policy & Strategy Need

*E1 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Achieve net zero carbon emissions countywide by 2050 | Climate Change Act (2008)<br>Summary for Policymakers (The Intergovernmental Panel on Climate Change, 2019)<br>Oxfordshire Climate Action Framework (OCC, 2020) |
| Achieve net zero carbon emissions countywide by 2040, or earlier if possible, and by 2050 will be moving towards a carbon negative future. | Oxfordshire's Strategic Vision (Oxfordshire Growth Board, 2021) |
| Achieve 50% reduction in carbon emissions across Oxfordshire by 2030 | Oxfordshire Climate Action Framework (OCC, 2020) |
| Achieve net zero carbon emissions across Cherwell by 2050 | 2020 Climate Action Framework (Cherwell District Council, 2020) |
| Achieve net zero carbon emissions across Oxford City by 2040 | The Zero Carbon Oxford Charter (Oxford City Council, 2021) |
| Achieve net zero carbon emissions across South Oxfordshire by 2030 | Corporate Plan 2020-2024 (South Oxfordshire District Council, 2020) |
| Achieve net zero carbon emissions across Vale of White Horse by 2045 | Vale of White Horse Climate Emergency Advisory Committee Report (Vale of White Horse District Council, 2020) |
| Achieve net zero carbon emissions across West Oxfordshire by 2050 | Carbon Action Plan (West Oxfordshire District Council, 2020) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [Countywide Policy] | Need Tier 4 [District Council Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

The Climate Change Act 2008 (UK Legislation, 2019) legally obligates the UK to cut greenhouse gas emissions to 100% below 1990 levels by 2050. This is defined as Net Zero and means that by this point, all greenhouse gas emissions are required to be balanced with the amount that is removed from the atmosphere. This is a critical requirement identified within the 2018 Intergovernmental Panel on Climate Change Report to avoid the most catastrophic impacts of climate change by limiting global warming to 1.5°C.

Given the fundamental impact this has on current and future infrastructure requirements across Oxfordshire, a climate emergency was declared by OCC as well as the five Oxfordshire District Councils in 2019.

Leading by example, the Oxfordshire Climate Action Framework (OCC, 2020) commits OCC to be carbon neutral by 2030 for their major operational footprint. This involves:

- Converting all their fleet vehicles to alternative fuels
- Supporting digital connectivity to increase remote working
- Virtual meetings to reduce travel emissions

For people living across Oxfordshire, Oxfordshire's ambition to go above and beyond the legal requirement is reflected by the Future Oxfordshire Partnership (formerly Oxfordshire Growth Board) in Oxfordshire's Strategic Vision (2021) which aspires to achieve carbon neutrality by 2040 and *'a carbon negative future'* by 2050 (Guiding Principle 1).

### *Oxfordshire's Strategic Vision – Guiding Principle 1: We will reverse the impacts of climate change (Oxfordshire Growth Board, 2021)*

*'We will reduce the impacts of climate change by making climate action a top priority in our decisions. We will maximise opportunities through our plans, strategies and programmes, to reverse the impacts of climate change, demonstrating leadership in carbon reduction, developing nature-based solutions to help mitigate the impacts of climate change, championing more sustainable ways to improve connectivity and supporting emerging transformative technologies and sectors. Our aim is that Oxfordshire will be carbon neutral by 2040, or earlier if possible, and by 2050 will be moving towards a carbon negative future.'*

The Oxfordshire Climate Action Framework aims to cut carbon emissions by 50% (compared to 2008) by 2030 with the formal target of achieving net zero carbon county-wide by 2050, in accordance with the legal requirement.

The five district councils within Oxfordshire have also set their own targets, with most identifying more ambitious target years for the achievement of net zero. As summarised in Table 5-4, all of the Oxfordshire District Councils aim to become operationally carbon neutral by 2030; with the exception of South Oxfordshire where the target is 2025. The District Councils have also set ambitious targets to achieve net zero amongst the wider population, with the majority aspiring to achieve this by 2040.

| Local Authority | Source | Carbon Neutral Council Target Year (As an Organisation) | Carbon Neutral Target Year (For Local Authority Area) |
|---|---|---|---|
| OCC | Oxfordshire Climate Action Framework (2020) | 2030 | 2050 |
| Cherwell | Cherwell District Council Climate Action Framework (2020) | 2030 | No District Commitment |
| West Oxfordshire | West Oxfordshire Carbon Action Plan (2020) | 2030 | No District Commitment |
| Oxford City | Zero Carbon Oxford Charter (2021) | 2030 | 2040 |
| South Oxfordshire | South Oxfordshire District Council Corporate Plan (2020) | 2025 | 2030 |
| Vale of White Horse | Vale of White Horse Climate Action Framework (2020) | 2030 | 2045 |

*Table 5-4: Net Zero Target Years by Oxfordshire Local Authority*

The six Climate Action Frameworks identify that emissions need to be reduced across all sectors and offset (where appropriate). Identified climate action within the Oxfordshire Climate Action Framework includes:

- Reducing emissions from transport: achieved through prioritising digital infrastructure over road building, reducing single occupancy private car journeys, increasing walking and cycling, supporting electrification of the rail network and accelerating the uptake of electric vehicles
- Reducing emissions from buildings: supporting initiatives leading to retrofitting of homes and existing buildings and achieving net-zero and lower waste in new buildings and developments
- Reducing emissions from infrastructure and systems: supporting local renewable energy schemes and good design favouring zero-carbon connectivity
- Increase carbon emission absorption
- Maximse waste reduction and recycling: minimise the waste being produced through the adoption of more circular, local processes

### *Recently Published Pathways to a Zero Carbon Oxfordshire Report*

There is a report which has recently been published by the University of Oxford's Environmental Change Institute in partnership with the six Oxfordshire Local Authorities, OxLEP and key infrastructure providers. Once finalised, this will provide scenarios identifying possible pathways to eliminate carbon emissions across Oxfordshire by 2050. Key implications of this report will be reflected in the forthcoming OxIS Stage 2 Report.

#### 5.2.1.2 Evidence Base

| E1: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | Source |
| ✓ $CO_2$ Emissions | Department for Business, Energy and Industrial Strategy<br>National Atmospheric Emissions Inventory |

##### 5.2.1.2.1 Historical Emissions

Local Authority Carbon Dioxide ($CO_2$) Emission Estimate statistics from BEIS indicate that Oxfordshire's total carbon emissions have declined by 1,060 kt (~20%) between 2009 to 2018 (see Figure 5-3). This is despite the significant population and economic growth across the county that has occurred during this period.

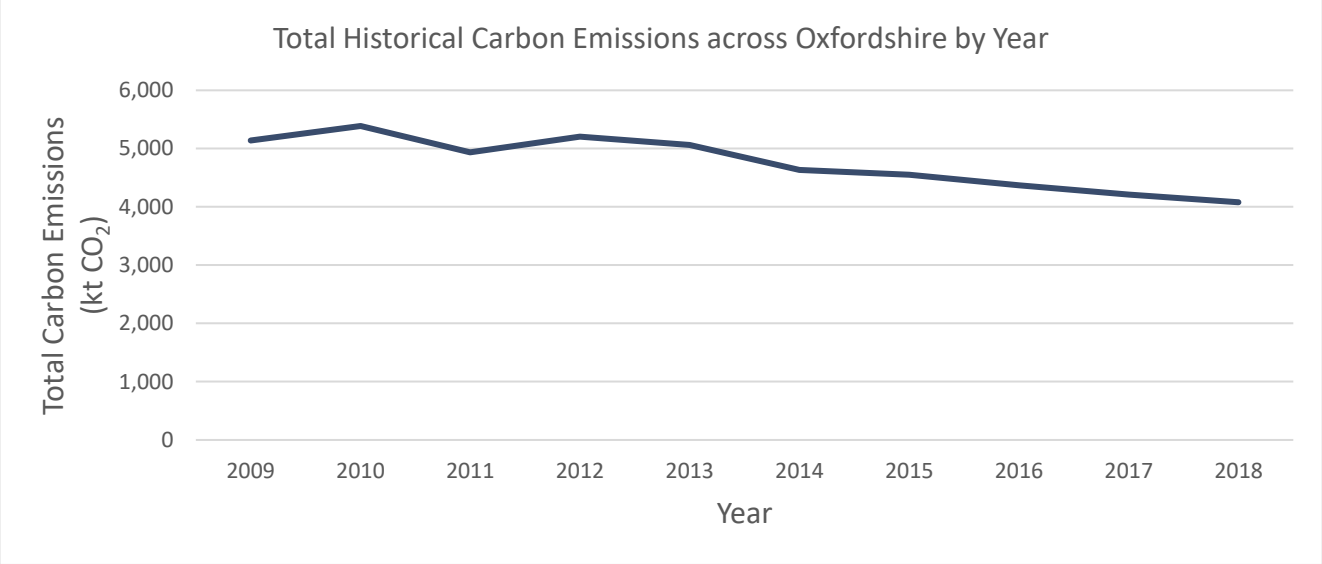



*Figure 5-3: Total Oxfordshire Carbon Emissions by Year (Note: Data from 2018 remains the most up to date available from BEIS) (BEIS, 2020)*

A similar trend can be observed across all districts (Figure 5-4).

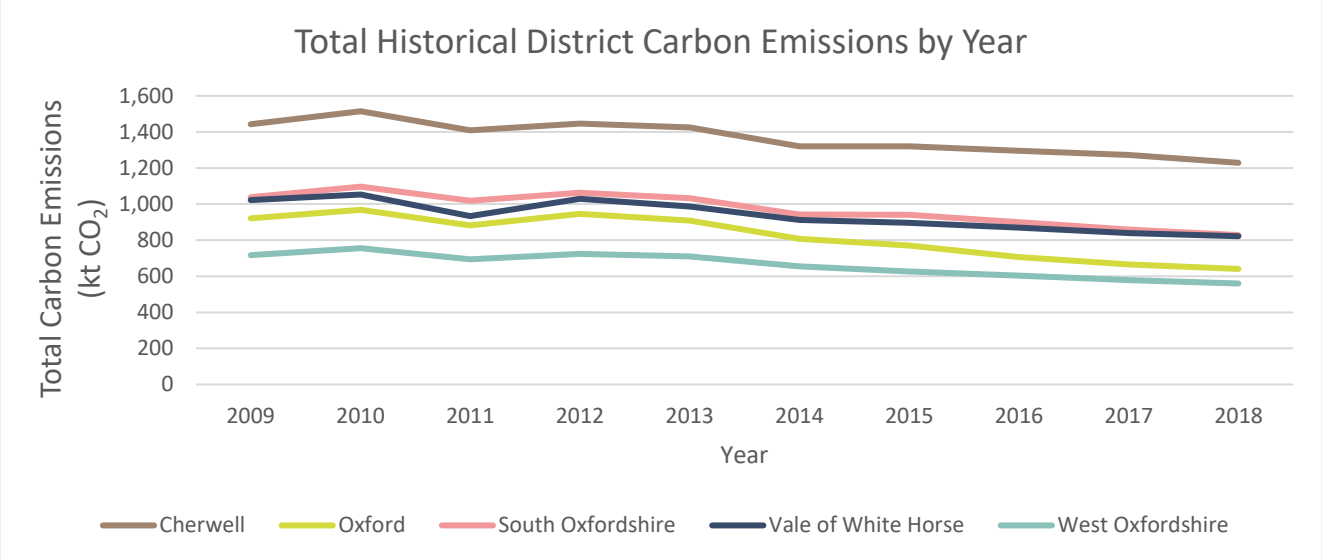



*Figure 5-4: Total District Carbon Emissions by Year (Note: Data from 2018 remains the most up to date available from BEIS) (BEIS, 2020)*

#### *5.2.1.2.2 Baseline Carbon Emissions*

The carbon emission inventories identify that Cherwell has the highest total $CO_2$ emissions and $CO_2$ emissions per person (see Table 5-5). Although Cherwell saw the greatest overall absolute reduction in emissions over the past decade, at 15% of total emissions, this was the smallest percentage reduction. Comparatively, Oxford City was able to reduce emissions by 30% over the same period. Taking into account the various District-specific carbon neutral target year, this highlights the particular need to reduce carbon emissions in Cherwell and South Oxfordshire.

| Local Authority | 2018 Total $CO_2$ emissions | | Reduction in $CO_2$ emissions 2010-2018 | |
|---|---|---|---|---|
| | Total (kt) | Tonnes per person | Total (kt) | % |
| Cherwell | 1229 kt | 8.2 t | 1,441 kt | 15% |
| South Oxfordshire | 828 kt | 5.9 t | 210 kt | 20% |
| Vale of White Horse | 822 kt | 6.1 t | 200 kt | 20% |
| Oxford City | 641 kt | 4.2 t | 280 kt | 30% |
| West Oxfordshire | 560 kt | 5.1 t | 156 kt | 22% |
| OXFORDSHIRE | 4,080 kt | | 2,287 kt | |

*Table 5-5: Estimated Carbon Emissions by Oxfordshire Local Authority (BEIS, 2020)*

The National Atmospheric Emissions Inventory data (2018) for estimated atmospheric carbon emissions also utilises the Greenhouse Gas Inventory and Air Quality Pollutant Inventory to estimate the atmospheric carbon emissions in Oxfordshire by source (see Figure 5-5). The data indicates:

- Atmospheric emissions are generally lower within more rural areas away from key transport corridors and over large areas of green space
- A greater need to reduce atmospheric emissions in urban areas (e.g. Oxford, Didcot, Banbury and Carterton)
- A need to reduce transport related emissions on the Strategic Road Network (e.g. the M40)

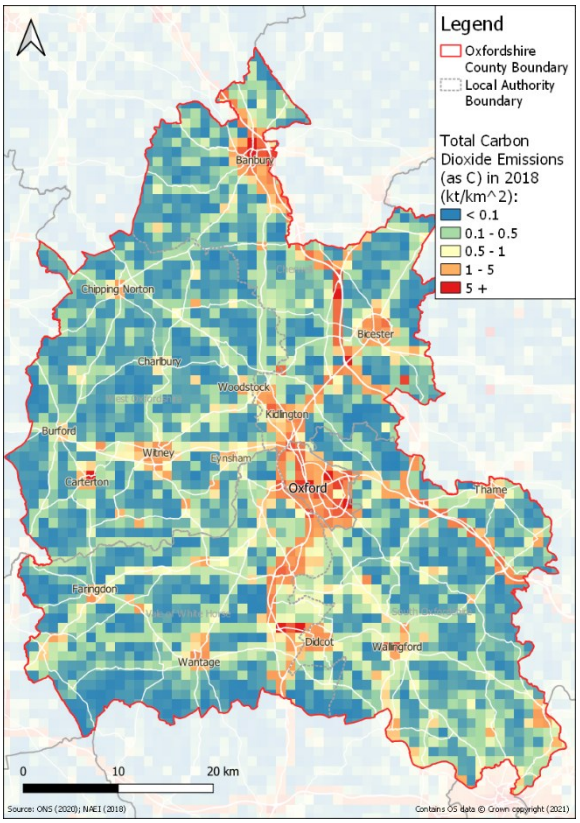



*Figure 5-5: Oxfordshire's Estimated Atmospheric Carbon Emissions (National Atmospheric Emissions Inventory, 2018)*

A detailed inventory review by sector (see Figure 5-6, Figure 5-7 and Table 5-6) indicates:

- There is a need for robust County-wide road transport decarbonisation. Transport is the largest contributor to $CO_2$ emissions in the County, accounting for around 46% (1,770 kt) of the total (see Figure 5-6). 'A' roads (834 kt), accounted for half of transport emissions and were the most significant contributor across all sectors. 'A' roads in Cherwell and Vale of White Horse (63% of all 'A' roads) and motorways in South Oxfordshire and Cherwell (28% of transport emissions) contribute the highest volume of carbon emissions by sector
- There is a need to decarbonise domestic and industrial energy supply by providing renewable energy supply across the county. The combined domestic sectors of gas, electricity and 'other fuels' amounted to 1,038 kt, with domestic gas contributing 59% of this, however, it is worth noting that the relative share of emissions from gas in the domestic sector is expected to decrease over the next nine years. This is due to the projected increase in electricity demand (associated with electric vehicles) coupled with the UK Government's target to cease domestic gas mains connections to new properties by 2025
- There is a need to reduce carbon emissions from industry and commercial electricity use which were also significant, at 551 kt, or 13% of Oxfordshire's 2018 carbon emissions
- Land-Use Change and Forestry (LULUF), which includes grasslands, croplands, forests and settlements removed a net 98 kt of carbon from the system in 2018. There is a need to increase carbon absorption rates

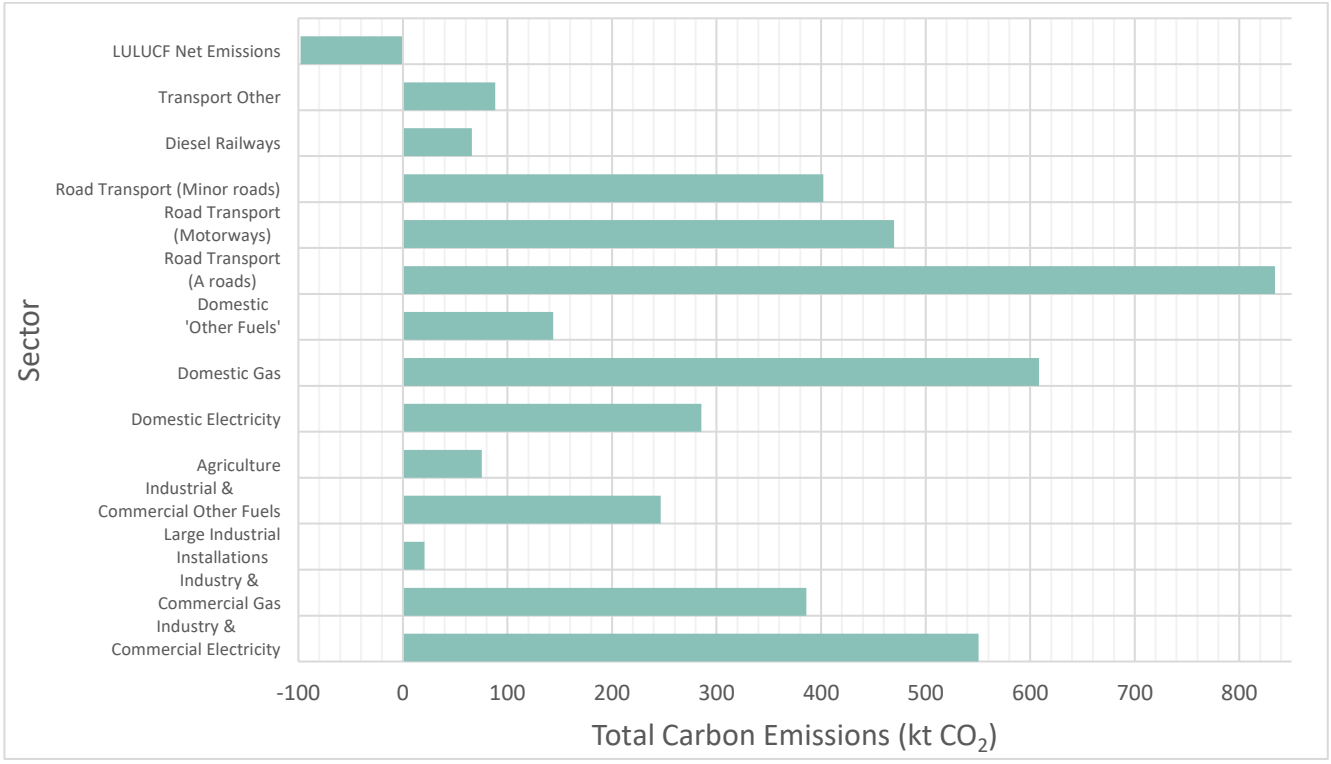



*Figure 5-6: 2018 Estimated Carbon Emissions in Oxfordshire by Sector (BEIS, 2020).*

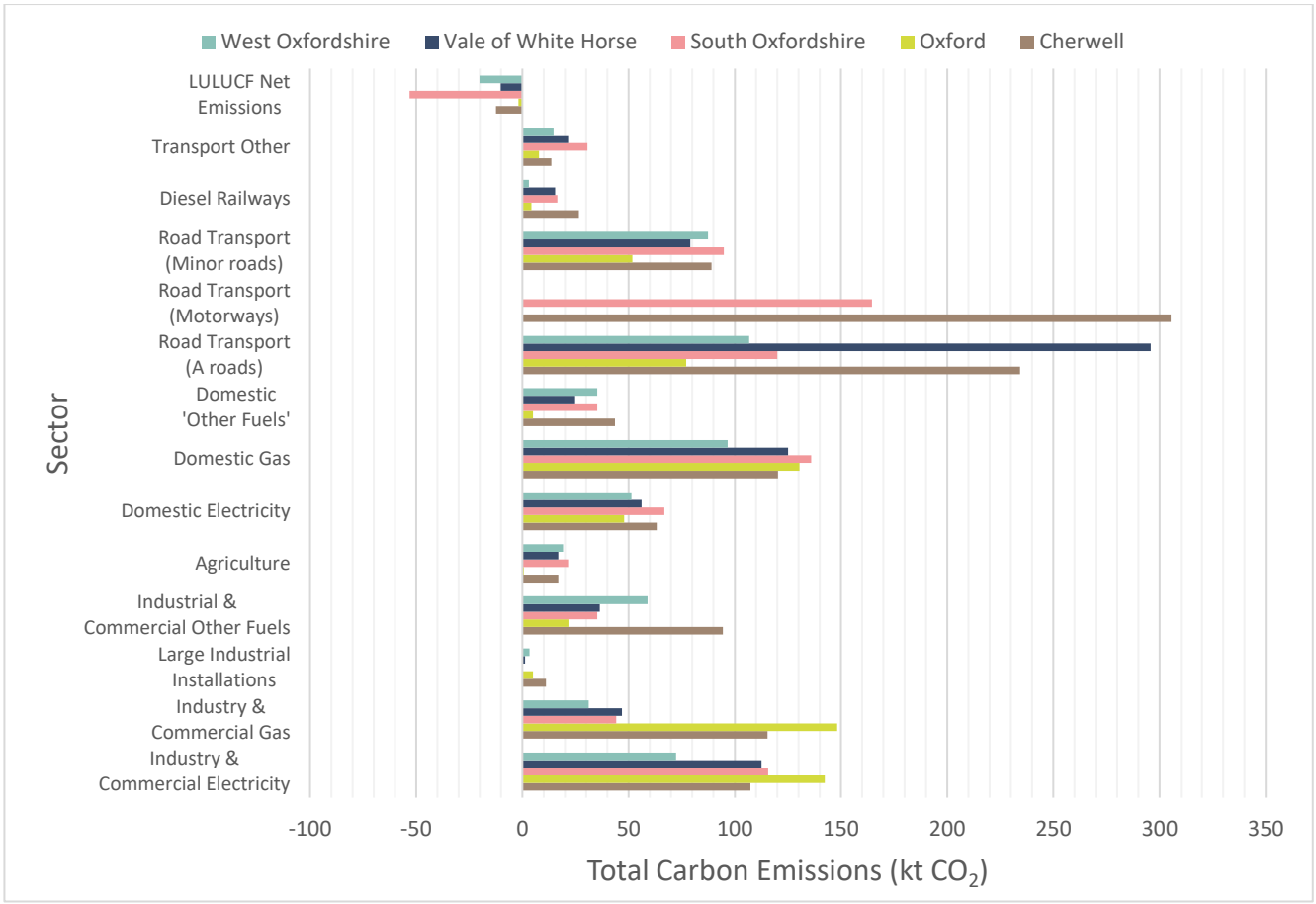



*Figure 5-7: 2018 District Carbon Emissions by Sector (BEIS, 2020).*

| | | Cherwell | Oxford City | South Oxfordshire | Vale of White Horse | West Oxfordshire | County-wide Total | Sector Total |
|---|---|---|---|---|---|---|---|---|
| Industrial & Commercial | Electricity | 107 (19%) | 142 (26%) | 116 (21%) | 113 (21%) | 72 (13%) | **551 (13%)** | 28% |
| | Gas | 115 (30%) | 149 (39%) | 44 (11%) | 47 (12%) | 31 (8%) | **386 (9%)** | |
| | Large Industrial Installations | 11 (55%) | 5 (25%) | - | 1 (5%) | 3 (15%) | **21 (0%)** | |
| | Other Fuels | 94 (38%) | 22 (9%) | 35 (14%) | 37 (15%) | 59 (24%) | **247 (6%)** | |
| Agriculture | All | 17 (22%) | 1 (1%) | 22 (29%) | 17 (22%) | 19 (25%) | **75 (2%)** | 2% |
| Domestic | Electricity | 63 (22%) | 48 (17%) | 67 (24%) | 56 (20%) | 51 (18%) | **285 (7%)** | 26% |
| | Gas | 120 (20%) | 131 (22%) | 136 (22%) | 125 (21%) | 97 (16%) | **609 (15%)** | |
| | Other Fuels | 44 (31%) | 5 (3%) | 35 (24%) | 25 (17%) | 35 (24%) | **144 (4%)** | |
| Transport | A Roads | 234 (28%) | 77 (9%) | 120 (14%) | 296 (35%) | 107 (13%) | **834 (20%)** | 46% |
| | Motorways | 305 (65%) | - | 165 (35%) | - | - | **470 (12%)** | |
| | Minor Roads | 89 (22%) | 52 (13%) | 95 (24%) | 79 (20%) | 87 (22%) | **402 (10%)** | |
| | Diesel Railways | 27 (41%) | 4 (6%) | 17 (26%) | 15 (23%) | 3 (5%) | **66 (2%)** | |
| | Transport Other | 14 (16%) | 8 (9%) | 31 (34%) | 22 (24%) | 15 (17%) | **88 (2%)** | |
| LULUCF Net Emissions | Forest | -18 (14%) | -3 (2%) | -63 (48%) | -18 (14%) | -28 (22%) | **-130 (-3%)** | -2% |
| | Croplands | 16 (21%) | 2 (3%) | 21 (28%) | 17 (22%) | 20 (26%) | **75 (2%)** | |
| | Grasslands | -22 (20%) | -2 (2%) | -31 (28%) | -26 (24%) | -28 (26%) | **-109 (-3%)** | |
| | Settlements | 12 (18%) | 1 (2%) | 21 (32%) | 16 (24%) | 16 (24%) | **65 (2%)** | |
| Total | | **1229 (30%)** | **640 (16%)** | **828 (20%)** | **822 (20%)** | **560 (14%)** | 4,079 | 100% |

*Table 5-6: 2018 Oxfordshire Carbon Emissions by Sector in kt $CO_2$ (BEIS, 2020).*

#### *5.2.1.2.3 Future Carbon Emission Pathways to 2040*

Given the infancy of the Oxfordshire Climate Action Framework and the Districts' own Climate Action Frameworks, future carbon reduction pathways to net zero remain are currently in development and subject to review through the emerging Pathways to a Zero Carbon Oxfordshire Report.

Taking account of the currently adopted target years for net zero (see Table 5-4), there is a need for some local authorities to decarbonise at a faster rate than others. This is applicable to South Oxfordshire (with a net zero target year of 2030) and Oxford City (with a net zero target year of 2040).

### *5.2.1.3 Typical Infrastructure Schemes to Meet E1 Needs*

The following typical infrastructure schemes could meet the E1 needs identified:

- Zero Carbon Emission Transport Zones (IF2)
- Electric Vehicle Charging Infrastructure (IF2)
- Active Travel Infrastructure (IF2)
- Zero Carbon Public Transport Infrastructure e.g. Railway Electrification (IF2)
- Zero Carbon Domestic Heating Infrastructure (IF1)
- Renewable Energy Generation Schemes (IF1)

### 5.2.2 E2: Resilience to Climate Change

*E2 Future Needs to 2040 for Resilience to Climate Change at a Glance*

The Met Office forecasts that the impacts of climate change will result in warmer temperatures and drier periods in summer and an increase in the frequency of extreme weather events including heavy periods of rainfall in winter by 2040. A series of national strategies, including the Climate Change Risk Assessment and the Environment Agency's National Framework for Water Resources identify this as a strategic need to plan resilient infrastructure which can cope with these additional pressures. This includes ensuring infrastructure can reduce flooding risk to communities and managing the impact of warmer drier periods on the public water supply and people's health.

From various Strategic Flood Risk Assessments and Water Cycle Studies produced by Oxfordshire's Local Authorities, the greatest need to improve resilience to flooding events is within Oxford, where around 16.5% of properties are situated within Flood Zone 2 or 3. Both the Vale of White Horse and South Oxfordshire also have a higher fluvial flooding risk than the rest of the county due to the presence of the River Thames.

*E2 Key Affected Infrastructure*

#### 5.2.2.1 *Strategic Policy & Strategy Need*

*E2 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Reduce impact of increasing heavy rainfall events and flooding frequency on Oxfordshire's communities | UK Climate Change Risk Assessment 2017 (HM Government, 2017)<br>The National Adaption Programme and the Third Strategy for Climate Adaption Reporting (DEFRA, 2018)<br>NPPF (MHCLG, 2019)<br>Oxfordshire Climate Action Framework (OCC, 2020)<br>District Local Plans (Various)<br>District Water Cycle Studies (Various)<br>Strategic Flood Risk Assessments (Various)<br>Oxfordshire's Strategic Vision (Oxfordshire Growth Board, 2021)<br>National Flood and Coastal Erosion Risk Management Strategy for England (Environment Agency, 2020) |
| Increase Oxfordshire's resilience to prolonged periods of drought | UK Climate Change Risk Assessment 2017 (HM Government, 2017)<br>The National Adaption Programme and the Third Strategy for Climate Adaption Reporting (DEFRA, 2018)<br>Meeting our future water needs: a national framework for water resources (Environment Agency, 2020)<br>Thames Water Drought Plan (Thames Water, 2017)<br>Oxfordshire Climate Action Framework (OCC, 2020) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

Met Office long term modelling indicates that the UK is likely to face increased risk of heavy rainfall events, prolonged periods of drought and more extreme summer temperatures by 2040 (Met Office, 2019) due to the impacts of climate change.

As a statutory requirement of the Climate Change Act (2008), the UK Government is required to produce a Climate Change Risk Assessment every five years to identify the key risks and mitigative action to reduce these impacts. The most recent Risk Assessment produced in 2017 identifies several key strategic needs to reduce risks arising from:

- **Flooding and coastal change** risks to communities, businesses and infrastructure
- **High temperatures** and risks to **health, well-being and productivity**
- **Shortages in the public water supply**
- **Impact to natural capital**
- Risks to domestic and international **food production and trade**
- **New and emerging pests and diseases**.

The subsequent National Adaptation Programme (2018) produced by the Department of Environment and Rural Affairs (DEFRA) identifies a strategic need to invest in infrastructure.

A key focus is upon measures intended to reduce the risk to communities from drought and flooding:

- **Reducing flood risk to communities:** through increased use of natural flood management solutions, investment in flood defences/alleviation and regulation through NPPF (MHCLG, 2019).
- **Reduce risk from high temperatures:** through investment in green infrastructure and health services
- **Reduce water supply shortages:** by increasing resilience of water supply and reducing water leakage
- **Reduce risks to natural environment:** through habitat restoration and improved water quality

This need for greater resilience to the impacts of climate change is also reflected in Oxfordshire's Strategic Vision.

The Environment Agency's National Framework for Water Resources (Environment Agency, 2020) identifies the strategic need to manage water resources more effectively to reduce the impacts from drought to ensure that people have access to a resilient water supply and does not result in increasing rates of unsustainable abstractions. This identifies that resilience to drought is required such that *'emergency drought order restrictions, such as providing water only at certain times of the day or through temporary taps in the streets are expected to be implemented no more than once in 500 years on average'* by the 2030s.

From an Oxfordshire perspective, the most recent Thames Water Drought Plan (Thames Water, 2017), which covers the period between 2017 and 2022, identifies the strategic need to ensure a resilient water supply and avoid the issuing of drought orders. Drought orders are restrictions on water use imposed by the Secretary of State ranging from Level One to Level Four. It is estimated that a drought order imposed over a period of six months is likely to result in costs of between £750 million and £1.7 billion to the economy.

The Environment Agency is also responsible for managing reducing flood risk to Oxfordshire's communities from the main rivers and reservoirs, particularly the River Thames. The National Flood and Coastal Erosion Risk Management Strategy for England (Environment Agency, 2020) identifies an overarching ambition to create climate resilient places and reduce the impact and risk of flooding to people's lives and livelihoods.

*National Flood & Coastal Erosion Risk Management Strategy Key Strategic Objectives*

- *'Strategic Objective 1.1: Between now and 2050, the nation will bolster its resilience to flooding and coastal change*
- *Strategic Objective 1.4: Between now and 2030 risk management authorities will use nature based solutions and improve the environment through their investments in flood and coastal resilience*
- *Strategic Objective 2.1: Between now and 2030 all new development will contribute to making places resilient to flooding and coastal change*
- *Strategic Objective 2.3: Between now and 2030 risk management authorities will support investments to manage flooding and coastal change that enables growth in a sustainable and climate resilient way*
- *Strategic Objective 2.8: Between now and 2050 risk management authorities will work with national infrastructure providers to contribute to more flood and coastal resilient places'*

OCC, as LLFA, alongside the District Councils, as planning authorities, have each produced their own Local and Strategic Flood Risk Assessments. These complement a series of Water Cycle Studies produced by the District Councils. These documents identify the strategic needs to manage flood risk in the context of both the future impacts of climate change and forecast allocated growth across Oxfordshire.

#### *5.2.2.2 Evidence Base*

*E2: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| Appraisal Dataset | Source |
|---|---|
| ✓ Number of properties in each flood risk zone | Environment Agency (2021) |
| ✓ Frequency of Drought Orders | Thames Water (2017) |

##### *5.2.2.2.1 Future Climate by 2040*

By 2040, climate change is predicted to result in more frequent and extreme rainfall events, increasing the frequency and severity (depth/hazard) of flooding from fluvial and surface water sources, in addition to causing soil and

riverbank erosion. The Environment Agency estimates that rainfall intensity in the future will increase by up to 40%. Milder, wetter winters are expected to cause increases in peak river flows that cause severe flooding. More frequent, intense storms in the summer are likely to increase incidents of flash flooding (Environment Agency, 2009), partially caused by the additional pressure this type of weather pattern places on the sewer system.

In addition to fluvial flooding, increased rainfall will also increase the likelihood and frequency of surface water flooding, particularly in areas that are already susceptible, in addition to impermeable urban areas. The effect of climate change on groundwater flooding is less certain. It is possible that milder, wetter winters will increase the frequency of groundwater flooding. However, warmer, drier summers may draw groundwater down to a greater extent to counteract the problem. Oxfordshire has already experienced weather extremes such as these. For example, 2020 featured the wettest October in 145 years following the sunniest May since records began (University of Oxford, 2020).

#### *5.2.2.2.2 Flood Risk*

*Flood Zones*

The NPPF assesses the probability of flooding from rivers by categorising areas within the fluvial floodplain into four zones. The risk of flooding is a function of the probability that a flood will occur and the consequence to the community or receptor as a direct result of flooding. The zones are based on river flooding each year:

- **Flood Zone 1:** Land with less than 1 in 1,000 chance (0.1% annual probability)
- **Flood Zone 2:** Land with between a 1 in 100 and 1 in 1,000 chance (1% to 0.1% annual probabilities)
- **Flood Zone 3a:** Land with a 1 in 100 or greater chance (greater than 1% annual probability)
- **Flood Zone 3b:** This is a functional floodplain. This land is where water has to flow or be stored in times of flood, or land purposely designed to be flooded in an extreme flood event (5% annual probability)

Historically, a series of significant fluvial and groundwater flooding events have occurred across Oxfordshire (Table 5-8). The most damaging flood within the last twenty years occurred in 2007 when around 1,500 properties were flooded. Since then, there have been several flooding events; including in 2020 when around 90 properties, mainly in West Oxfordshire, were damaged.

| | Year | | | | |
|---|---|---|---|---|---|
| | 2000 | 2007 | 2012 | 2014 | 2020 |
| **Number of Properties Flooded** | 69 | 1474 | 51 | 88 | 86 |

*Table 5-7: Oxfordshire Fluvial and Groundwater Flooding (data provided by Environment Agency, 2021)*

Flooding in Oxfordshire is a result of four different sources including:

- **Fluvial:** caused by high flows in rivers, such as the River Thames, exceeding the channel capacity, usually after a period of heavy rainfall
- **Pluvial:** surface water flooding, often short in duration after heavy rainfall events, as a result of water being unable to soak into the ground or enter drainage systems
- **Groundwater:** occurs in areas underlain by permeable rock and aquifers that allow groundwater to rise to the surface following prolonged periods of rainfall
- **Sewers:** Flooding from sewers normally as a result of rainfall exceeding the drainage system capacity, the sewer being blocked by debris or the system surcharging due to high water levels in receiving water courses. Thames Water holds records of flooding issues related to foul water sewers

As indicated in Table 5-8, most historic flood events in Oxfordshire are as a result of fluvial flooding. In addition, some flooding events have also occurred historically on the Oxford Canal in both Oxford City and Cherwell due to breaching and overtopping.

| Local Authority | Fluvial | Pluvial | Groundwater | Sewers |
|---|---|---|---|---|
| Cherwell | • In 2007, the District was severely impacted from fluvial flooding (e.g. Banbury and Bloxham)<br>• In 2014 widespread fluvial flooding, with hundreds of properties successfully protected | • An estimated 100 – 250 homes were flooded from surface water in the 2007 floods | • The clay geology of the area can result in flash runoff and a rapid response of fluvial networks to rainfall events<br>• Settlements most at risk include Bicester | • Kidlington has had frequent sewer flooding<br>• In 2020, Thames Water awarded £3 million to OCC for projects addressing sewer flooding in Cherwell and Vale of White Horse |
| Oxford City | • 2014 saw the most recent significant fluvial flooding event which resulted in the temporary closure of arterial transport routes into the City | • Mainly associated with urban land use which causes rapid run off rates, resulting in overflowing sewers | • In 2003, groundwater rising in alluvial gravels flooded properties in New Botley<br>• In 2007, approximately 190 homes in Hinksey Park were flooded from groundwater | • New Botley and Osney regularly affected, noting that the incidents were exacerbated by interaction with groundwater flooding |
| South Oxfordshire | • Dominated by the River Thames which frequently floods between Abingdon and Sandford-on-Thames, including in 2007 and 2014 | • Winter 2013/14 – Flooding occurred in rural communities including Chalgrove and Watlington<br>• 2014 to 2017 - incidents reported affecting the road network and urbanised residential areas of settlements including Didcot | • Higher risk along the River Thames<br>• The most notable event in winter 2000/1 saw some of the highest groundwater levels recorded affecting Henley and Thame<br>• In 2014, prolonged rainfall led to spring flow inundation | • Sewer flooding has most affected Chinnor, Brightwell-Cum-Sotwell and Henley on Thames |
| Vale of White Horse | • Several towns and villages, including Abingdon-on-Thames and Marcham at risk of fluvial flooding | • Concentrated on the eastern side of the district, however there are some spread out over the district<br>• These events all occur in the banks of bedrock made of clay, siltstone, mudstone, sandstone and limestone | • Historic incidents where the River Thames borders the district boundaries<br>• The most notable event in winter 2000/1 caused flooding in Cumnor and Botley | • Coleshill is the only area where sewer flooding has occurred |
| West Oxfordshire | • Largest area affected by flooding of the River Windrush and the River Thames<br>• In 2007, fluvial flooding of extensive areas<br>• In 2020, fluvial flooding caused damage to 75 properties | • In the July 2007 event, Brize Norton and Witney were the most significantly affected in the district | • Carterton, Witney, Eynsham and Woodstock have the greatest potential due to permeable geology | • Alvescot, Ascott-Under Wynchwood, Bampton, Botley, Coombe, Ducklington, Northmoor, Shipton-Under-Wynchwood and Standlake are frequently affected by sewer flooding |

*Table 5-8: Experience of flooding in Oxfordshire (data provided by Environment Agency, 2021)*

Table 5-9, which summarises the geology, topography and watercourses significant to the likelihood of flooding for each district, identifies that across the five districts, the most pressing future need is to reduce flood risk from fluvial sources: particularly the River Thames.

| Local Authority | Main Watercourses | Topography | Geology |
|---|---|---|---|
| Cherwell | • River Cherwell<br>• River Ray | The northern half consists of undulating hills. The southern half is flatter and is in the base of the river valley. | The geology consists mainly of clay with areas of silts and marlstone rock bed to the north east of Banbury. To the south west of Banbury there is a combination of Cornbrash, Northampton sand and clay. In and around Fritwell is predominantly Great Oolite limestone. |
| Oxford City | • River Thames<br>• River Cherwell | The city's topography is relatively flat. | The Geology in Oxford City consists of Jurassic Oxford Clay, Ampthill Clay, Corallian Limestone and sand. |
| South Oxfordshire | • River Thames<br>• River Thame | The topography is dominated by a ridge in the Chiltern Hills that rises to 250 m. Elsewhere, the land is mostly lower lying and flat. | Clay, silt and sand are present along the flood plain of the Thames and Thame. Diamicton is present in the Chiltern Hills. The bedrock geology varies considerably with location. |
| Vale of White Horse | • River Thames<br>• River Ock | The central and eastern parts of the District consist of lower lying land, between 48 m and 88 m. The southern border is dominated by a ridge reaching 250 m. In the west and north eastern corner of the district, the land is between 170 m to 210 m. | In the north west, oolitic limestone dominates. A band in the south east consists of clays, mudstone, siltstone and sandstone. In the south east there is a band of chalk. |
| West Oxfordshire | • River Thames<br>• River Evenlode<br>• River Windrush | West Oxfordshire has a varied topography ranging from the flat countryside of the Thames valley in the south to the higher undulating land of the Cotswold Hills in the north and west. | The geology of West Oxfordshire is dominated by 150-million-year-old Jurassic rocks, and comprises of limestones and clays. |

*Table 5-9: The major watercourses, topography and geology by district (data provided by Environment Agency, 2021)*

Currently, there are approximately 6,800 properties in Oxfordshire that are situated within flood zone 3 and have a 1% or higher annual risk of flooding (see Table 5-10).

Analysis of the data indicates:

- There is a greater need to reduce flood risk for properties situated in Oxford City which has the highest proportion of properties within Flood Zone 2 or 3 (17%). The ongoing Oxford Flood Scheme being progressed is intended to somewhat reduce this risk
- There is a more pressing need to reduce flood risk for properties within Vale of White Horse and South Oxfordshire given around 8% of dwellings are currently situated within Flood Zone 2 or 3. This is most applicable for properties situated around the OxIS Towns & Surrounds of Didcot and Wallingford, and Abingdon-on-Thames as well as the OxIS Rural Community of Berinsfield
- The need to reduce fluvial flood risk in West Oxfordshire and Cherwell is lower, primarily due to the remoteness of established settlements to the River Thames

| Local Authority | Flood Zone 2 | | Flood Zone 3 | | Flood Zone 2 & 3 | |
|---|---|---|---|---|---|---|
| | Households | Proportion of households | Households | Proportion of Households | Households | Proportion of Households |
| Cherwell | 2,100 | 3.2% | 1,000 | 1.6% | 3,100 | 4.8% |
| Oxford City | 6,100 | 11.5% | 2,700 | 5.0% | 8,800 | 16.5% |
| South Oxfordshire | 3,100 | 5.4% | 1,500 | 2.6% | 4,600 | 8.0% |
| Vale of White Horse | 3,400 | 6.3% | 1,100 | 2.0% | 4,500 | 8.3% |
| West Oxfordshire | 2,200 | 4.6% | 500 | 1.0% | 2,700 | 5.5% |
| OXFORDSHIRE | **16,900** | **6.1%** | **6,800** | **2.4%** | **23,700** | **8.5%** |

*Table 5-10: Properties in each flood risk zone by district (updated 04/03/2021 from data provided by Environment Agency)*

Developing on land within flood risk zones therefore presents flood alleviation challenges that require costly investment. NPPF sets a stringent Sequential Test to protect people and property from flooding which all local planning authorities are expected to follow.

The Sequential Test aims to steer new development to areas at the lowest probability of flooding (Flood Zone 1 and then 2). Only where there are no reasonably available sites in Flood Zone 1 or 2 should decision-makers consider the suitability of sites in Flood Zone 3.

As shown in Figure 5-8, some of Oxfordshire's future development is planned within high flood risk zones, particularly in Oxford City.

This indicates that growth in the following OxIS Towns & Surrounds are immediately adjacent to medium or high flood risk areas:

- Oxford City (e.g. sites to the west of the city
- Bicester (e.g. sites to the south and south east of the town)
- Abingdon-on-Thames (e.g. Culham growth sites)
- Berinsfield
- Eynsham
- South Cherwell area and Woodstock (e.g. particularly areas to the east of the A44)
- Didcot & Wallingford (e.g. Sites in Wallingford adjacent to the River Thames)

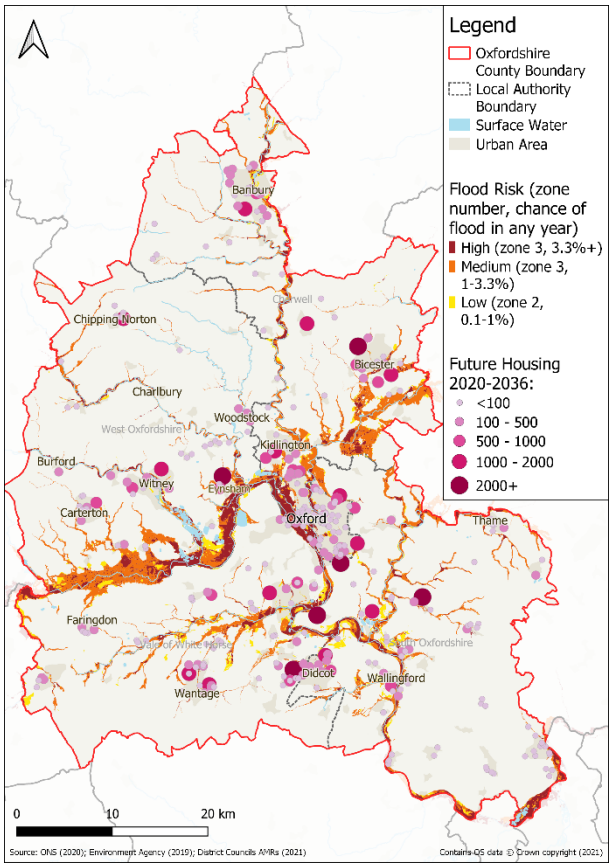



*Figure 5-8: New development locations and flood risk (Environment Agency, 2019)*

### 5.2.2.3 *Typical Infrastructure Schemes to Meet E2 Needs*

The following typical infrastructure schemes could meet the E2 needs identified:

- Sustainable Urban Drainage Schemes (IF3)
- River Flood Alleviation Schemes (IF3)
- Green Infrastructure Schemes (IF7)
- Potable Water Supply e.g. Reservoirs (IF12)

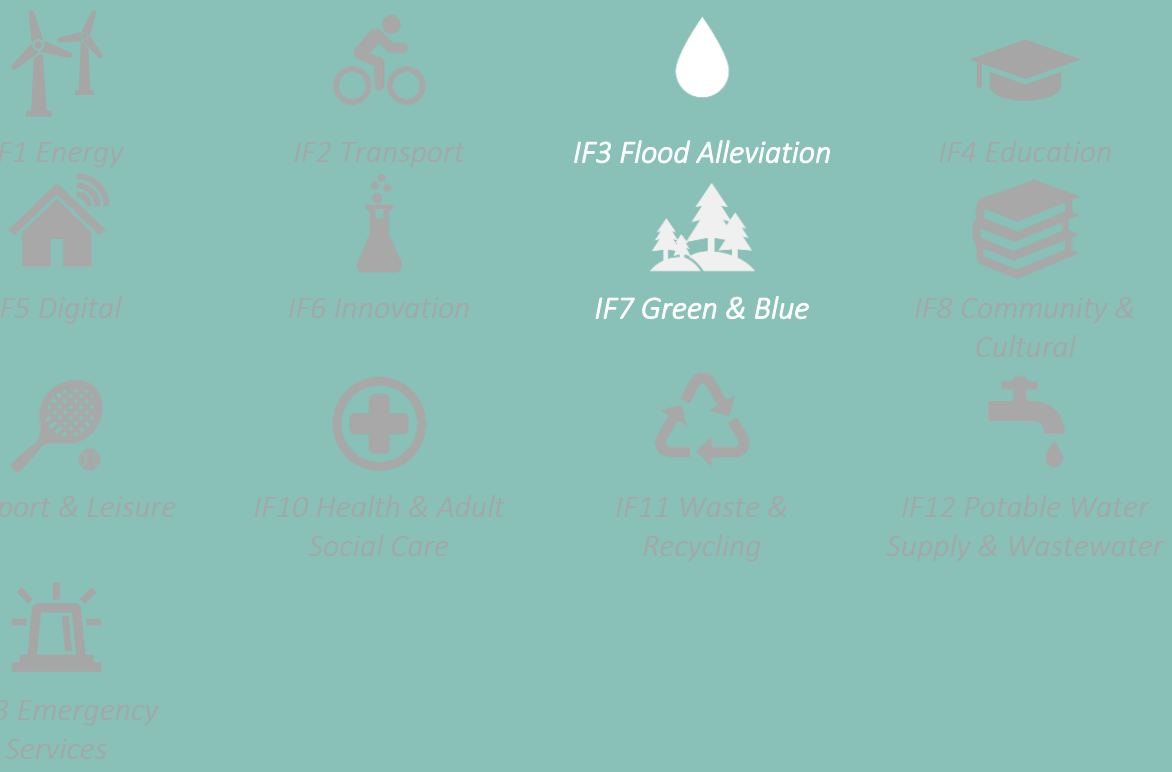
### 5.2.3 E3: Enhance Natural Environment & Biodiversity

*E3 Future Needs to 2040 for Enhance Natural Environment & Biodiversity at a Glance*

The UK Government's 25 Year Environment Plan (2018) identifies a need for a Nature Recovery Network rich in wildlife and biodiversity through the creation or restoration of 500,000 additional hectares of wildlife-rich habitat outside of protected sites by 2042. This sets the tone for the emerging Environment Bill (2020) which proposes to establish a mandatory requirement for biodiversity net gain and to embed connected Nature Recovery Networks.

Oxfordshire's Nature Recovery Network has recently been drafted by a partnership of local environmental stakeholders led by Wild Oxfordshire with local authority input, under the direction of the Biodiversity Advisory Group, although is yet to be agreed. The work establishes three recovery zones, with the overarching aim to create connected habitats and fulfil the wider aspiration for doubling the area of land well-managed for nature in the county by 2050. There is a further need to protect Oxfordshire's established areas of rich landscape quality, including its three Areas of Outstanding Natural Beauty.

*E3 Key Affected Infrastructure*



#### 5.2.3.1 Strategic Policy & Strategy Need

*E3 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Increase biodiversity and wildlife-rich habitat coverage and connectivity between Oxfordshire's emerging Nature Recovery Network | 25-Year Environment Plan (HM Government, 2018)<br>UK Environment Bill (2020)<br>NPPF (MHCLG, 2019)<br>State of Nature in Oxfordshire 2017 (Wild Oxfordshire, 2017)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>Natural Capital in Oxfordshire (Environmental Change Institute, University of Oxford, 2020)<br>District Local Plans (Various) |

| Need Tier 1 | Need Tier 2 | Need Tier 3 | Need Tier 4 |
|---|---|---|---|
| [UK Legal Requirement]<br>*Note pending status of Environment Bill.* | [National Policy] | [County-Wide Policy] | [District Policy] |

The UK Government's 25 Year Environment Plan (2018) identifies the key national strategic priorities for biodiversity and habitat enhancement to 2042 which aspires to *'leave our environment in a better state that we found it and to pass on to the next generation a natural environment protected and enhanced for the future'*.

*25 Year Environment Plan Goals*

- *'Clean Air*
- *Clean and plentiful water*
- *Thriving plants and wildlife*
- *A reduced risk of harm from environmental hazards such as flooding and drought*
- *Using resources from nature more sustainably and efficiently*
- *Enhanced beauty, heritage and engagement with the natural environment'*

A key strategic need of the Environment Plan is the establishment of a Nature Recovery Network which will involve the creation of an integrated ecosystem of places rich in wildlife and biodiversity and integrate this into the planning system in England.

*UK Government National Nature Recovery Network Goals by 2042*

- *'Restore 75% of protected sites on land (including freshwaters) to favourable condition so nature can thrive*
- *Create or restore 500,000 hectares of additional wildlife-rich habitat outside of protected sites*
- *Recover threatened and iconic animal and plant species by providing more, diverse and better connected habitats*
- *Support work to increase woodland cover*
- *Achieve a range of environmental, economic and social benefits, such as carbon capture, flood management, clean water, pollination and recreation'*

The recent Environment Bill (UK Parliament, 2020) sets out potential future legislation to deliver on the 25 Year Environment Plan in the planning process.

Under the Bill, it sets out strategic needs for nature and biodiversity which includes a mandatory requirement, beyond what is already included in NPPF, for all development sites to achieve biodiversity net gain (UK Parliament, 2020):

- Biodiversity gain in planning requiring development to deliver an improvement in biodiversity value, helping wildlife to thrive by improving habitats and creating new green spaces close to where people live (DEFRA, 2020)
- Biodiversity objective and reporting demonstrating at least a 10% gain in biodiversity value for new developments and a new requirement for local authorites to report on their obejctives, proposed actions and biodiversity gains
- Local Nature Recovery Strategies providing local spatial strategies for nature, demonstrating valuable existing habitats, specific proposals for improvements to habitats and nature recovery priorites
- Conservation through the use of covenants to allow landowners to create legally binding agreements to conserve land for future generations (DEFRA, 2020)
- Tree felling and planting requring local authorities to consult local communties before felling streets trees (DEFRA, 2020)

Alongside the mandatory requirement for a 10% biodiversity net gain in the delivery of development sites, the Environment Bill establishes a requirement for the creation of Local Nature Recovery Strategies which should provide a framework identifying strategic needs to improve biodiversity and local habitats. The Oxfordshire Local Nature Recovery Strategy has not yet been produced; however, Oxfordshire's Nature Recovery Network has recently been drafted by a partnership of local environmental stakeholders led by Wild Oxfordshire with local authority input, under the direction of the Biodiversity Advisory Group, although is yet to be agreed (Environmental Change Institute, University of Oxford, 2020).

This recovery network, which builds upon Wild Oxfordshire's State of Nature in Oxfordshire Report (Wild Oxfordshire, 2017), is proposes three zones, with the overarching aim that they all contribute to the recovery of nature across the county. The strategic aim is that these zones will fulfil the ambition amongst Oxfordshire's environmental organisations to achieve a 20% net gain in biodiversity throughout the county.

### *Oxfordshire's Draft Nature Recovery Network*

Oxfordshire's draft Nature Recovery Network establishes three zones:

- Core Zone: Key biodiversity assets such as designated sites, nature reserves and ancient woodland
- Recovery Zone: incorporating Conservation Target Areas and freshwater areas to connect habitats
- Wider Landscape Zone: covering the remainder of Oxfordshire including agricultural and urban areas

It should be noted that Oxfordshire's Nature Recovery Network remains in draft and remains subject to agreement by Oxfordshire's local authorities.

Subject to successful transition to legislation, there will be a requirement for the statutory outcomes of the Environment Bill (2020) to be reflected in future District Local Plans and Habitat Regulation Assessments which underpin these Local Plans and any other eligible plans or projects in Oxfordshire.

***Oxfordshire's Strategic Vision – Guiding Principle 4: We will enhance our natural environment (Oxfordshire Growth Board, 2021)***

*'Key sources of natural capital in Oxfordshire include biodiversity, water, soils, landscape character and tranquillity. Natural capital contributes to a wide range of social, economic and environmental services. It is a key reason why many people choose to live here, many businesses choose to locate here, and tourists choose to visit here. We will grow our natural capital through our plans, strategies and programmes, recognising the significant contribution natural capital makes to our quality of place, the health and wellbeing of our communities, and their value in building resilience to climate change, reducing flood risk, increasing biodiversity and boosting economic productivity. We will value Oxfordshire's countryside, our important habitats and species, our agricultural land, our parks and open spaces, the River Thames and our other rivers, canals, reservoirs, lakes, ponds, wetlands and aquifers. We will protect and restore our valuable habitats and species and improve resilience by creating ecological networks. We will improve the quality of our waterways and waterbodies and reduce levels of water stress in Oxfordshire. We will protect where necessary and seek new opportunities to add to and enhance our highly valued countryside, landscape and the greenspaces and environmental assets, including those areas within our city and towns that provide valued recreation space and vital green lungs.'*

#### 5.2.3.2 Evidence Base

*E3: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| Appraisal Dataset | Source |
|---|---|
| ✓ *Biodiversity and Wildlife-Rich Habitat Coverage in Nature Recovery Network Zones* | *Thames Valley Environmental Records Centre* |

Natural capital is the '*part of nature which directly or indirectly underpins value to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions*.' Together, natural capital provides ecosystem services, such as water purification and protection from flooding, that bring benefits to humans, such as clean water and air, supply of local food and equable climate (Natural Capital Committee, 2019).

Biodiversity is an essential component of natural capital. It measures the intrinsic value of species, depicting the variety of life, whereas natural capital measures the value of biodiversity to humans. More biodiverse ecosystems will deliver better services and be more resilient to environmental change (Environment Change Institute, 2020).

A simple proxy for biodiversity can be derived from DEFRA's biodiversity metric habitat distinctiveness scores, focusing on its value to humans (but therefore does not consider habitat condition or the presence of particular species) (Environment Change Institute, 2020). This biodiversity metric has been mapped for Oxfordshire in Figure 5-9 using an adjustment for the following nature designations, to gain higher scores where designations apply:

- Local, national and road verge nature reserves
- Special Areas of Conservation
- Local wildlife sites (including proposed)
- SSSIs and ancient woodlands

The map demonstrates the fragmented and sparse provision of semi-natural habitats in Oxfordshire.

By understanding the value of Oxfordshire's ecosystem services spatially, the land use planning process can by informed by the natural capital assets (Environment Change Institute, 2020):

- High value areas that should be protected from inappropriate development
- Identification of strategic networks of green and blue infrastructure which can form part of future Nature Recovery Networks
- Low value areas where there are opportunities to enhance the existing natural capital, with further work to identify any gaps

The draft Nature Recovery Network for Oxfordshire has been developed in line with the Government's commitment in its 25-Year Environment Plan (2018) to improve, expand and connect habitats, linking existing protected sites, to support wildlife and provide environmental, social and economic benefits to people (Thames Valley Environmental Records Centre, 2020).

As displayed in Figure 5-10, this draft Network identifies the following needs across Oxfordshire:

- There is need for biodiversity and habitat recovery within the vicinity of several OxIS Towns & Surrounds where future growth is planned including Oxford City, Bicester, Wantage and Grove and Abingdon-on-Thames (including Culham)
- There is a need for nature recovery around some OxIS Rural Communities including Eynsham (particularly habitats around the River Thames), Berinsfield and the West Vale Environs.
- There is a need to connect habitats to provide opportunities for nature recovery on strategic corridors, including through urban areas (e.g. River Cherwell Basin). A more joined up delivery approach is also vital for local people, including flood alleviation (see Section 5.2.2), urban cooling and improved accessibility to nature (see Section 5.3.2).

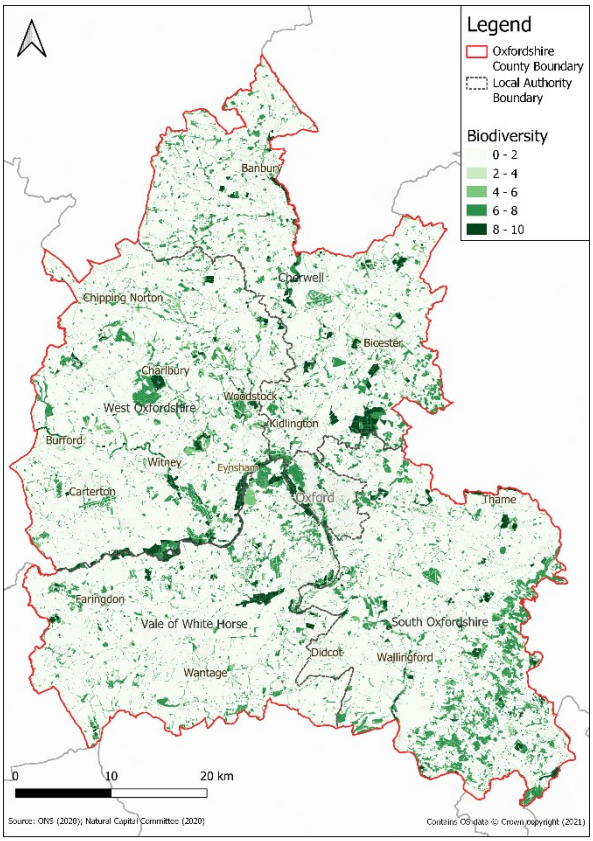



*Figure 5-9: Estimated biodiversity value of habitats in Oxfordshire, based on DEFRA biodiversity metric habitat distinctiveness scores (Environment Change Institute, 2020)*

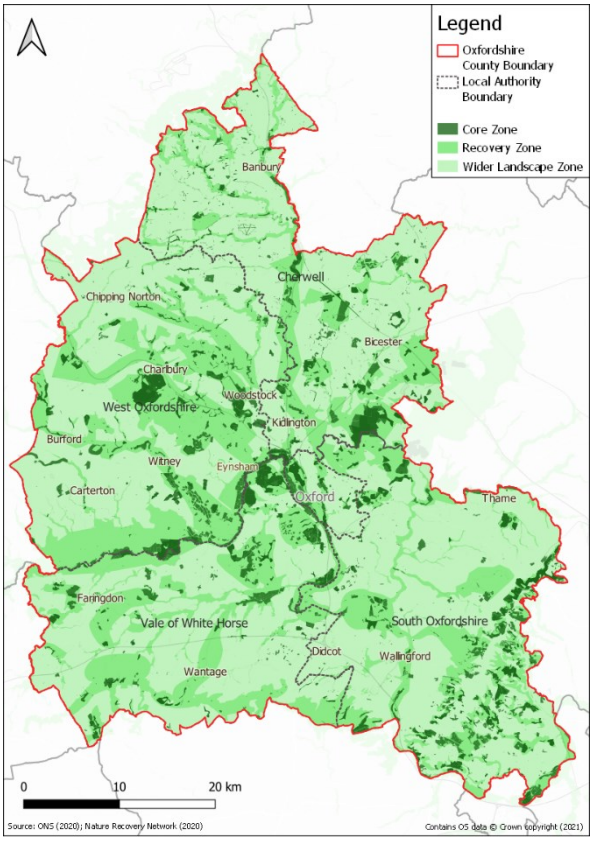



*Figure 5-10: Draft Nature Recovery Network for Oxfordshire (Thames Valley Environmental Records Centre, 2020).*

#### *5.2.3.3 Typical Infrastructure Schemes to Meet E3 Needs*

The following typical infrastructure schemes could meet the E3 needs identified:

- Strategic Nature Restoration Schemes (IF7)
- Community Woodland Schemes (IF7)
- Nature Reserves (IF7)
- Peatland Restoration (IF7)
- Wetland Ecosystem Restoration (IF7)

### 5.2.4 E4: Efficient Waste & Recycling

*E4 Future Needs to 2040 for Efficient Waste & Recycling at a Glance*

Oxfordshire's local authorities have a primary legal obligation to ensure continued safe and efficient waste collection and disposal services in accordance with the waste hierarchy. As identified in the Oxfordshire Resources and Waste Strategy, this is supported by fulfilling the strategic need to reduce household waste generation, increase the proportion which is recycled and embed more of a circular economy approach in the county, including a focus on reusing, repairing, and upcycling material and goods. This has shared benefits such as reducing carbon emissions.

In recent years, whilst waste sent to landfill/energy recovery has reduced despite population growth (attributed to the country-leading recycling rate), substantial future population growth by 2040 necessitates further infrastructure investment such as increased Waste Transfer capacity and a review of Household Waste Recycling Centre provision.

*E4 Key Affected Infrastructure*

#### 5.2.4.1 Strategic Policy & Strategy Need

*E4 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Ensure safe and efficient waste collection and disposal services in accordance with the waste hierarchy | Environmental Protection Act (1990)<br>25-Year Environment Plan (HM Government, 2018)<br>Our Waste, Our Resources (HM Government, 2018) |
| Household waste growth to zero per person per year | Oxfordshire Resources & Waste Strategy 2018 – 2023 (Oxfordshire Environment Partnership, 2019) |
| Increase household waste recycled to 70% by 2030 | Oxfordshire Resources & Waste Strategy 2018 – 2023 (Oxfordshire Environment Partnership, 2019) |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

##### 5.2.4.1.1 Our Waste, Our Resources: A Strategy for England

England has set ambitious goals with the Our Waste, Our Resources Strategy (HM Government, 2018) aiming to preserve the UK's stock of material resources by minimising waste, promoting resource efficiency, and moving towards a circular economy. The strategy sets out that waste is a costly misuse of natural capital and that prevention of waste occurring is the overarching principle. However, some waste is inevitable and does occur, at which point it needs to be managed in keeping with the waste hierarchy. Local Authorities have a critical role in managing waste and ensuring the recycling targets are met. The strategy sets a recycling rate of 65% by 2035 but also suggests a shift away from weight-based recycling rates in the long term to incorporate reuse and the circular economy into measurable statistics. As part of the 25-year Environmental Plan (HM Government, 2018) and the Resources & Waste Strategy (Oxfordshire Environment Partnership, 2019) several other key targets around waste and recycling have been set:

- To work towards all plastic packaging placed on the market being recyclable, reusable or compostable by 2025
- To work towards eliminating food waste to landfill by 2030
- To eliminate avoidable plastic waste over the lifetime of the 25-Year Environment Plan
- To double resource productivity by 2050
- To eliminate avoidable waste of all kinds by 2050

##### 5.2.4.1.2 Oxfordshire Resources and Waste Strategy 2018-23

The Oxfordshire Resources and Waste Strategy (2019) was developed through the Oxfordshire Environment Partnership (now the Oxfordshire Resources and Water Partnership) on behalf of all Oxfordshire's local authorities and focuses on Local Authority collected waste. The strategy aims to be bold and ambitious, maintaining Oxfordshire's position as a leader for recycling in England. The targets set by the strategy exceed national goals, with the aim to recycle or compost 70% of household waste by 2030. Research suggests that Oxfordshire could recycle up to 80% using current systems if used properly by households. Further increases may be achieved by changing collections.

#### 5.2.4.2 Evidence Base

| E4: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | Source |
| ✓ Waste Processing Capacity | OCC Dataset |
| ✓ Recycling (Reuse, Composting & Recycling Rate) | OCC Dataset |

By 2040, Oxfordshire's population is expected to grow to around 950,000 by 2040. Assuming that waste per household remains constant at circa 1.05 tonnes, this will mean around 130,000 tonnes more waste will be generated by residents at an additional cost to Oxfordshire Local Authorities of £16 million/year.

***Uncertainty of Long-Term Impact of COVID-19 on Future Household Waste Generation***

Whilst historically household waste generation rates have been falling despite a growing population, COVID-19 has been responsible for a significant increase in household waste generation during 2020 and 2021 due to an increased number of people working from home. There is uncertainty over the long-term future trends in household waste generation this will cause, however, it is likely that this increase will be sustained which will have implications for future waste infrastructure planning.

##### 5.2.4.2.1 Household Waste Recycling Centre

Current Household Waste Recycling Centre capacity modelling indicates that the existing size and location of these centres is not fit for purpose to serve housing growth and the associated predicted increase in waste arisings.

By law, any waste producer must prioritise waste minimisation and reuse in accordance with the waste hierarchy. There is currently limited capacity for reuse and repair operations at Household Waste Recycling Centres due to space restrictions, difficulty in in separating reuse items and contract agreements with operators.

The County's Household Waste Recycling Centre Strategy (Oxfordshire Environment Partnership, 2019) recommended:

- Reducing the number of centres from 7, to 3-4 larger
- Centrally locating sites to enable shorter travelling times to sites by most residents
- Creating more opportunity to reduce residual waste
- Allow capacity for increasing waste arisings
- Increasing the repair and reuse of items

However, the closure of these centres highlighted their importance in mitigating land pollution (fly tipping). As a result, a new Strategy will be produced by OCC over the next 12-18 months to determine future strategy, with a new Household Waste Recycling Centre serving Oxfordshire likely to be needed.

##### 5.2.4.2.2 Consumer Behaviour

Consumer behaviour strongly shapes the amount of waste produced and the amount that is recycled. Waste composition analysis by OCC shows that on average, 50% of the waste in a household's rubbish can be recycled.

Oxfordshire could reach recycling rates of up to 80% by ensuring current systems are properly used. The priority among the districts is to capture more of the material that can already be recycled, rather than to introduce new material collections. This means that new material reprocessing infrastructure is not needed. By increasing the percentage of waste that is recycled, savings of up to £3 million could be made each year, in Oxfordshire's waste management costs.

##### 5.2.4.2.3 Changes to Legislation

There are several potential changes to legislation that may impact future infrastructure needs within the county. The extended Producer Responsibility Scheme and Deposit Return Scheme are both set to roll-out in 2023, subject to consultation. The likely impact on Oxfordshire will be a reduction in recycling rate, increasing total collection costs to households by £16 million a year by 2040. An incinerator tax or levy is also likely to reduce the amount of waste produced per household.

#### 5.2.4.2.4 Reuse & Repair

Reuse and repair of items is central to promoting a circular economy for resources. There is a strong appetite to increase the number of projects focused on waste reduction through reuse and repair. Successful schemes in Oxfordshire include repair and community cafes, sharing platforms and food redistribution groups and form part of the Community Action Group Project Oxfordshire.

### 5.2.4.3 Future / Planned Infrastructure 2040

Oxfordshire is planning to be net self-sufficient for waste infrastructure, with the waste and minerals department ensuring there is not a deficit between waste produced and processing facilities. The Oxfordshire Waste and Minerals Local Plan: Part 2 – Site Allocations is currently being developed.

#### 5.2.4.3.1 District Level

Depots are needed to store vehicles and Waste Transfer Stations are used for the bulking of materials for recycling before they are sent to a third party for further sorting and processing.

If an authority is providing the service in-house, then it is assumed that they currently own the depot and Waste Transfer Stations in use. There may be a need for increased capacity (see Table 5-11). If an authority's service is outsourced, then the need will change as the contracts change.

Cherwell District faces pressure from population growth in Banbury and Bicester and requires a new depot and Waste Transfer Stations. However, high land prices mean securing space is a challenge.

| | Collection Provider | Current depot & Waste Transfer Stations nearing capacity and will require new sites |
|---|---|---|
| **Cherwell** | In house operations | Yes |
| **Oxford City** | Oxford Direct Trading Services (LATco) | No |
| **South Oxfordshire** | Biffa – contract ends 2024 | No |
| **Vale of White Horse** | Biffa – contract ends 2024 | No |
| **West Oxfordshire** | Ubico | No |
| **Household Waste Recycling Centres** | FCC and WS Recycling | Yes |

*Table 5-11: Summary of collection providers (OCC Dataset)*

### 5.2.4.4 Typical Infrastructure Schemes to Meet E4 Needs

The following typical infrastructure schemes could meet the E4 needs identified:

- Household Waste Recycling Centres (IF11)
- Waste Collection Depots (IF11)
- Repair & Reuse Product Exchange Hubs (IF11)

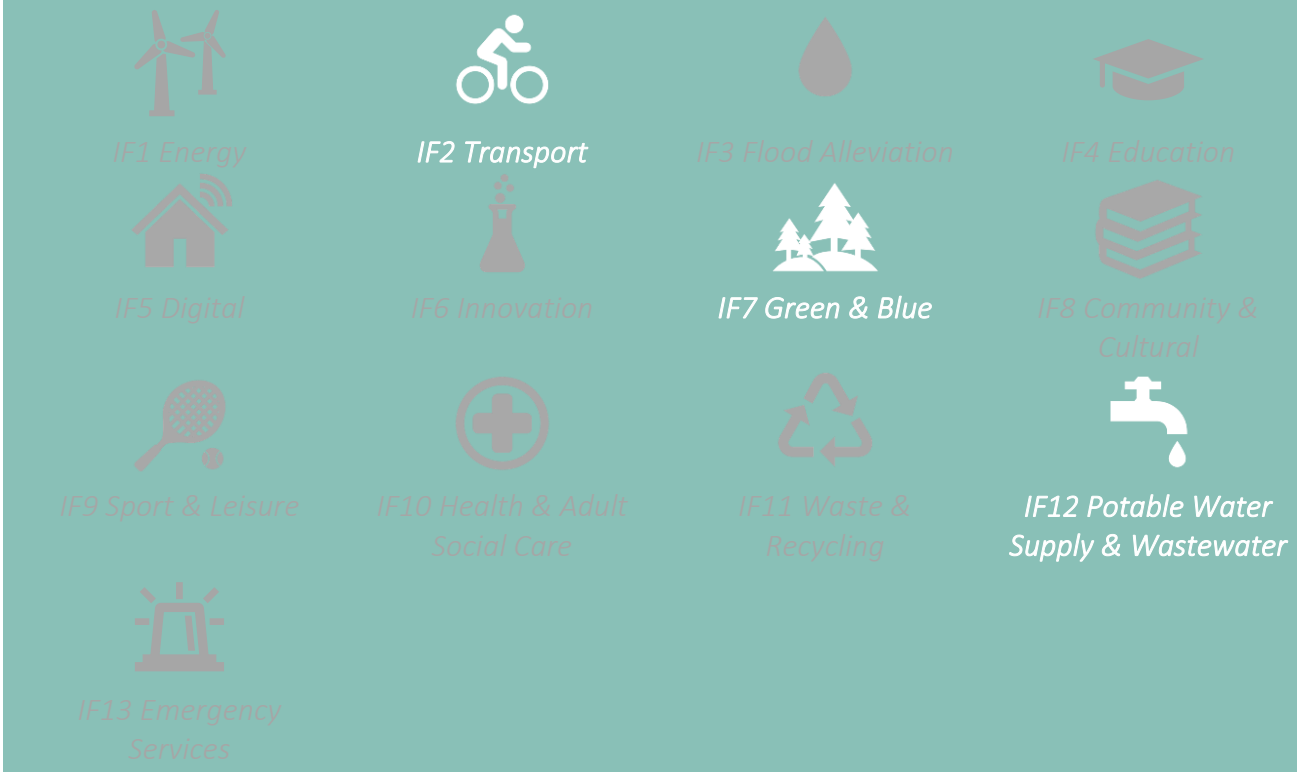
### 5.2.5 E5: Reduce Water & Noise Pollution

*E5 Future Needs to 2040 at a Glance*

**Water:** The UK Government's 25 Year Environment Plan (2018) identifies the key national strategic need for 'clean and plentiful' water by 2042. This includes exceeding water quality objectives identified in the Thames River Basin Management Plan (DEFRA, 2015). This strategic need is also reflected in the Water Cycle Studies and Local Plans produced by Oxfordshire's Local Authorities. As identified in the Thames Water Pollution Incident Reduction Plan (2020), a key need is to reduce sewage outfall incidents in Oxfordshire by 30% by 2025. There is also a need to improve water quality and to reduce water pollution incidents.

**Noise:** The strategic need, identified in the Noise Policy Statement for England (DEFRA, 2010) and NPPF (MHCLG, 2019) focuses on limiting the impact of additional noise generated through new development sites and improving people's health and quality of life. The strategic need to reduce and manage noise levels through the local planning process in Oxfordshire is established in the Adopted Oxfordshire Minerals & Waste Core Strategy (OCC, 2017) and reflected in the Districts' Local Plans. There is a need to reduce noise in Oxford City given it has been designated by DEFRA as a noise agglomeration area whist there is also a need to reduce environmental noise levels on key transport corridors.

*E5 Key Affected Infrastructure*



#### 5.2.5.1 Strategic Policy & Strategy Need

*E5 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Improve cleanliness in Oxfordshire's waterways | Water Environment (Water Framework Directive) Regulations (2003)<br>Water Resources Act (1991)<br>Environment Permitting Regulations (2010)<br>25-Year Environment Plan (HM Government, 2018)<br>Thames River Basin Management Plan (DEFRA, 2015)<br>Thames Water Pollution Incident Reduction Plan (2020)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>District Water Cycle Studies (Various)<br>District Local Plans (Various) |
| Limit adverse impact of noise or vibration from transport | Environmental Noise Regulations (England) (2006)<br>Noise Policy Statement for England (DEFRA, 2010)<br>NPPF (MHCLG, 2019)<br>Oxfordshire Minerals and Waste Core Strategy (OCC, 2017)<br>District Local Plans (Various)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021) |

| Need Tier 1 | Need Tier 2 | Need Tier 3 | Need Tier 4 |
|---|---|---|---|
| [UK / Legal Requirement] | [National Policy] | [County / OxLEP Policy] | [District Policy] |

##### 5.2.5.1.1 Water

The Water Framework Directive (WFD) provides a framework for the protection of inland surface waters, estuaries, coastal waters and groundwater. It requires the achievement of a 'good' qualitative and quantitative status for all water bodies. Whilst the UK is no longer part of the European Union, this requirement was transposed into UK law and implemented through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003.

Both the Water Resources Act (1991) and the Environment Permitting Regulations (2010) also sets out water pollution offences which aim to prevent and minimise the pollution of waterways; which is regulated and policed by the Environment Agency.

Alongside the restoration of biodiversity and habitats (see Section 5.2.3), the UK Government's 25 Year Environment Plan (2018) identifies the key national strategic need for *'clean and plentiful'* water with good ecological status by 2042. This includes reducing unsustainable abstraction and exceeding water quality objectives in key River Basins.

### *25 Year Environment Plan – Key Clean and Plentiful Water Ambitions*

*'Improving at least three quarters of our waters to be close to their natural state as soon as is practicable by:*

- *Reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies*
- *Reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans*
- *Minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters. We will make sure that potential bathers are warned of any short-term pollution risks'*

The Thames River Basin Management Plan (DEFRA, 2015), which implements the EU Water Framework Directive, identifies the strategic objectives of improving surface water quality for the entire River Thames Basin District (including rivers, lakes, groundwater, estuarine and coastal waterbodies). This aspires that by 2027, most water courses in the Thames basin will have achieved an ecological status or potential of good. A review of the Thames Water River Basin Management Plan is underway and is due to be published in draft later in 2021.

Locally, the strategic need to improve the quality of Oxfordshire's waterways is established in Oxfordshire's Strategic Vision (see Section 5.2.3). Thames Water have historically been responsible for some exceptional sewage overflows into Oxfordshire's waterways. Most of these incidents are caused by blockages in their waste sewer network or by misconnections in the sewer system. Their Pollution Incident Reduction Plan (2020) identifies the strategic need to reduce the occurrence of these incidents across their network by 30% by 2025.

Each of the Oxfordshire's District Councils have their own Water Cycle Studies which also identify the strategic need to manage and reduce pollution from wastewater and surface run-off. These underpin the various District Local Plan policies specifically to manage surface water, such as through SuDS.

#### *5.2.5.1.2 Noise*

Noise can impact health, wellbeing, productivity and the natural environment. The World Health Organisation (2011) identified environmental noise as the second largest environmental health risk to Western Europe after air quality.

The strategic need is identified in the Environmental Noise (England) Regulations (2006) which is national law (as part of implementing the Environmental Noise Directive) that requires regular mapping and action planning for reducing environmental noise. With most environmental noise caused by transport, this is reflected in guidance requiring action for road, rail and aviation noise and noise in large urban areas (DEFRA, 2019).

The national policy need priority is focused on managing and minimising the impact of additional noise generated through the delivery of new development sites. NPPF (MHCLG, 2019) states that development should not contribute to or be affected by unacceptable levels of noise pollution. Noise resulting from new development should be mitigated and reduced to a minimum to avoid it giving rise to significant adverse impacts on health and quality of life and areas of existing tranquil should be protected. This accounts for the Noise Policy Statement for England set in 2010 (DEFRA, 2010) and aims to promote good health and quality of life by managing noise through sustainable development (DEFRA, 2019).

### *Noise Policy Statement for England – Key Policy Aims (DEFRA, 2010)*

*'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*

- *Avoid significant adverse impacts on health and quality of life*
- *Mitigate and minimise adverse impacts on health and quality of life*
- *Where possible, contribute to the improvement of health and quality of life'*

In Oxfordshire, the Health Impact Assessment (Oxfordshire Growth Board, 2021) identifies noise as being one of the health priorities likely to be affected by proposed developments. Key strategic needs to address include:

- Noise pollution caused by construction traffic and traffic when operational

- Proximity to sources of noise, including transport, industrial uses or uses generating noise at night
- The inclusion of design measures including landscape design, tree cover and green infrastructure
- Proximity to Noise Action Important Areas and noise agglomerations

The strategic need to reduce and manage noise levels through the local planning process in Oxfordshire is reflected in various policies of the Districts' Local Plans (as directed by NPPF paragraph 170).

#### 5.2.5.2 Evidence Base

*E5: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| Appraisal Dataset | Source |
|---|---|
| ✓ Record of Water Pollution Incidents | Environment Agency National Incident Recording System (2019) |
| ✓ Transport Noise Levels | DEFRA (2017) |

##### 5.2.5.2.1 Water

The Environment Agency collects regular data on water quality in England's which indicates that rivers have generally improved over the last 20 years, but there are still areas of improvement needed and the quality of England's waters has is now flatlining (Environment Agency, 2020):

- Some of the worst pollutants (ammonia, phosphates and toxic metals) have been cut dramatically by up to 70% since 2008
- Serious pollution incidents have been cut by nearly two thirds since 2002 but, when considering all pollution incidents, they have steadily grown over the last five years (most of which are caused by water and sewage companies and farmers)
- Nitrate levels in rivers have increased in the last two years, causing some plants and algae to grow excessively, and taking oxygen out of the water and killing off other wildlife
- Storm overflows are occurring more frequently due to growth and climate change, putting more sewage into rivers than in the past

The Environment Agency uses a National Incident Recording System (NIRS) to log incidents, defined as "*a specific event, which is brought to our attention, and is within our areas of responsibility and which may have an environmental and/or operational impact*" (Environment Agency, 2011).

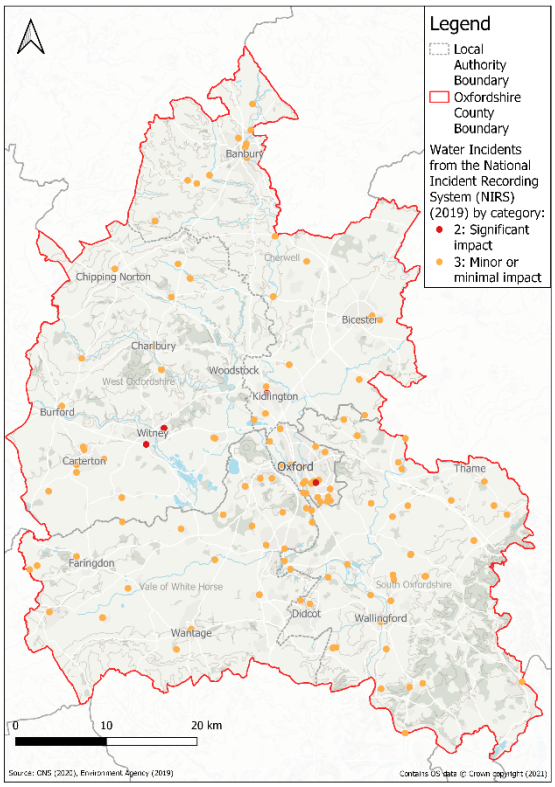



*Figure 5-11: Water Incidents in 2019 as reported in the NIRS (provided by Environment Agency)*

As mapped in Figure 5-11, the log reveals that there were 138 incidents reported in Oxfordshire in 2019 that had some level of effect on water quality. Four of the incidents were Category 2 and deemed to have a significant, but localised, effect on water quality. The remainder of the incidents (134) were Category 3 and had minimal effect on water quality. This indicates that there is a need to reduce incidents around Witney as well as within Oxford City.

#### 5.2.5.2.2 Noise

DEFRA is required to carry out Strategic Noise Mapping as part of implementing the Environmental Noise Directive (European Commission, n.d.) in areas where the population is greater than 100,000 (DEFRA, 2019). This indicates that there is a need to reduce noise levels in Oxford City and its immediate surrounding areas, which is the only noise agglomeration in Oxfordshire (see Figure 5-12).

Most environmental noise is caused by transport and economic analysis of noise impacts has estimated the annual social cost of urban road noise in England is £7 to 10 billion (DEFRA, 2014).

As indicated in Figure 5-13, which visualises transport noise levels across Oxfordshire, there is a need to reduce noise levels at the following locations:

- On the M40 which passes through both Cherwell and South Oxfordshire
- On the A34, between Didcot and Oxford
- On the A40
- On the A420
- On the A44
- Adajcent to key strategic railway lines

It is worth noting that noise pollution will reduce with the uptake of alternative fuelled vehicles such as electric cars and electrification of the railway. Increasing the mode share of active travel will also reduce the amount of noise generated by roads.

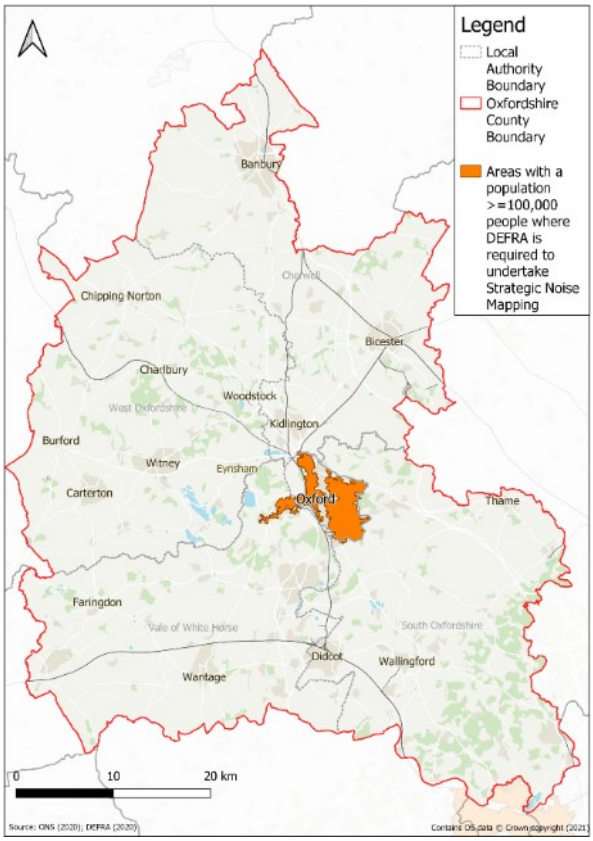



*Figure 5-12: Oxfordshire Noise Mapping Agglomerations (DEFRA, 2017)*

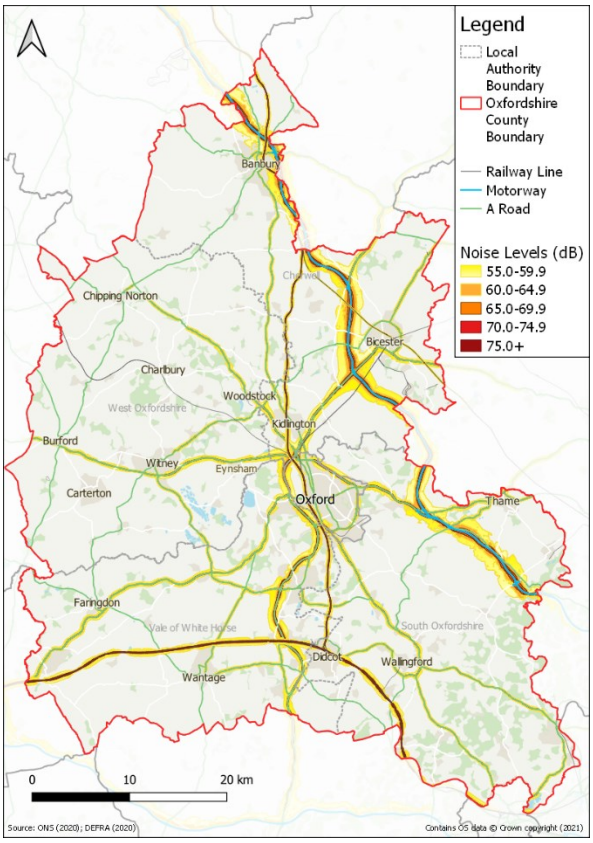



*Figure 5-13: Oxfordshire road and rail generated noise levels (DEFRA, 2017)*

#### 5.2.5.3 Typical Infrastructure Schemes to Meet E5 Needs

The following typical infrastructure schemes could meet the E5 needs identified:

- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- Electric Vehicle Charging Schemes (IF2)
- Wastewater Treatment Plants (IF12)
- Wetland Restoration Schemes (IF7)
- Sustainable Urban Drainage Schemes (IF12)

## 5.3 Health Needs

*Health Needs to 2040*

The Health theme is associated with improving the health outcomes of people throughout Oxfordshire through reducing health inequalities and supporting people to lead more active and healthier lifestyles.

The outcome-led needs within the Health Theme are:

- H1: Reduce Health Inequality (see Section 5.3.1)
- H2: Improve Access to Spaces for Physical Activity (see Section 5.3.2)
- H3: Improve Health Service Access (see Section 5.3.3)
- H4: Cleaner Air (see Section 5.3.4)
- H5: Enhance Mental Health & Wellbeing (see Section 5.3.5)

Needs to 2050 will be covered in the forthcoming OxIS Stage 2 Report.

### 5.3.1 H1: Reduce Health Inequalities

*H1 Future Needs to 2040 for Reduce Health Inequalities at a Glance*

Alongside a legal obligation, the strategic need to reduce health inequalities within Oxfordshire is set out within OCC's Joint Health and Wellbeing Strategy 2018 – 2023. This identifies a future need to shift the focus towards a more preventative approach to physical and mental health by addressing issues such as inequalities in opportunity or outcomes alongside inequalities in relation to health service access. This strategic need is also reflected within the Oxfordshire's Strategic Vision, Local Plans as well as the five District Council's Corporate Plans.

There is a need to address inequalities within specific urban areas, where healthy life expectancy can be less than 60 years of age. Many of these same places also rank in the 10% of the most health-deprived areas in the UK according to the Index of Multiple Deprivation. Most of the health-deprived places with Oxfordshire lie adjacent to areas identified for future growth which provides a future opportunity for infrastructure investment to address.

*H1 Key Affected Infrastructure*

#### 5.3.1.1 *Strategic Policy & Strategy Need*

*H1 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Reduce health inequalities across disproportionately impacted & vulnerable groups | Equalities Act (2010)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021)<br>Oxfordshire Primary Care Commissioning Committee Deprivation and Health Inequalities Paper (NHS Oxfordshire CCG, 2019)<br>District Corporate Plans (Various)<br>OCC Corporate Plans (Various) |
| Reduce difference in healthy life expectancy | Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

The need to address health inequalities is a core element of ensuring Oxfordshire becomes a healthier place by 2040. As well as being a statutory requirement for local authorities under the Equalities Act (2010), this strategic need is identified within both Oxfordshire's Strategic Vision (Guiding Principle 3) (Oxfordshire Growth Board, 2021) and Oxfordshire's Joint Health and Wellbeing Strategy 2018 - 2023 (Oxfordshire Health & Wellbeing Board, 2019).

***Oxfordshire's Strategic Vision – Guiding Principle 3: We will improve our overall health and wellbeing and reduce inequalities (Oxfordshire Growth Board, 2021).***

*'We will place overall health and physical and mental wellbeing at the forefront of our decision-making. We will seek to deliver a net increase in the health and wellbeing of people in all our place-shaping decisions and activities, reducing inequalities and helping to enhance the overall quality of life, health and happiness of existing and future residents, recognising the diverse needs within our communities. This will include providing public services to support excellent physical and mental health outcomes, homes to meet all people's needs, jobs to support livelihoods, enhanced access to public and private green spaces, better access to sustainable, inclusive and resilient active and low carbon transport and improvements in air quality. We have access to some of the greatest health care facilities and minds in the world in Oxfordshire and through working closely with the universities and health organisations, we will ensure we are leading on prevention and healthy place-shaping.'*

The Joint Health and Wellbeing Strategy prioritises tackling health inequality in Oxfordshire as *'essential'* and aspires to *'an absolute commitment to tackling health inequalities and shifting the focus to prevention'*. It identifies two key issues that are responsible for health inequalities relating to:

- **Inequalities in opportunity or outcomes:** concerning people who have a poor start in life, have lower healthy life expectancies or suffer from sustained periods of poor health
- **Inequalities in relation to healthcare service access.** It highlights four key priority areas to reduce future health inequalities in Oxfordshire:
    - **Identification of people and places experiencing poorer health outcomes** and providing targeted services and support (e.g. through new infrastructure investment)
    - **Working in partnership with multidisiplinary stakeholders to promote a greater level of wellbeing** across Oxfordshire (e.g. through green infrastructure investment)
    - **Aligning support with charitable sector organisations**
    - **Striving to achieve greater parity in funding across all areas** and ensure that changes to services do not adversely impact people with poorer health outcomes

This need to reduce health inequalities is further reflected within all the Corporate Plans produced by Oxfordshire Local Authorities. Spatial development plans and their supporting guidance documents across the County also advocate a *'healthy place-shaping'* approach to tackling health inequalities.

The Oxfordshire Health Impact Assessment (HIA) Toolkit, endorsed by the Future Oxfordshire Partnership (formerly Oxfordshire Growth Board) in January 2021, identifies that the HIA can be used to *'identify the health impacts of a plan or project and to develop recommendations to maximise the positive impacts and minimise the negative impacts, while maintaining a focus on health inequalities'.* This approach is also echoed by a committee paper published by the OCCG (2019) which emphasises the need to *'recognise and respond to the wider contributors to inequalities including socio-economic (such as housing and poverty), physical environment, lifestyle behaviours and healthcare factors.'*

The importance of the geospatial context in addressing health inequalities is also reflected in the District Local Plans, which include key priorities to:

- **Cherwell** – support healthy place-shaping, including securing an excellent transport system, inclusive communities and quality urban, rural and natural environments
- **Oxford City** – help contribute to healthier communities and reduce health inequalities through development by requiring a HIA for major development proposals
- **South Oxfordshire** – meet housing needs by delivering high quality, sustainable, attractive places and providing access to high quality leisure, recreation, cultural, community and health facilities. All strategic developments are required to produce a HIA with their planning application.
- **Vale of White Horse** - build healthy and sustainable communities which protect the environment and respond to climate change. All strategic housing in the Local Plan requires a HIA.
- **West Oxfordshire** – improve the quality of life of local communities and where the need to travel, particularly by care workers, can be minimised

#### *5.3.1.2 Evidence Base*

*H1: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| *Appraisal Dataset* | *Source* |
|---|---|
| ✓ *Healthy Life Expectancy* | *Public Health England* |
| ✓ *Indices of Multiple Deprivation – Health Domain* | *MHCLG* |

Health inequality can be described as both the differences in the status of people's health, as well as in the care that people receive and the opportunities that people have to lead healthy lives. The factors are linked, as the latter definition contributes to people's health status (King's Fund, 2020). The status of people's health is analysed here using life expectancy and indices of deprivation to understand the spatial inequalities in Oxfordshire.

#### *5.3.1.2.1 Life & Healthy Life Expectancy*

Life expectancy is a key measure in understanding the health status among a population and therefore a key measure in understanding health inequality (King's Fund, 2020). A Healthy Life Expectancy (HLE) is the expectation, at birth, of the average number of years an individual will live in self-assessed good health (ONS, 2018).

### *Oxfordshire Life & Healthy Life Expectancy*

Oxfordshire has both a higher life expectancy at birth (85 for females and 82 for males) than England (83 for females and 80 for males) (Public Health England, 2017-19) and a higher average HLE than England (72 years compared to 64 years for females and 68 years compared to 63 years for males) (Public Health England, 2016-18).

The differences in life expectancies within a county can reveal inequalities, with HLEs known to demonstrate wider inequalities than standard life expectancy measures (King's Fund, 2020). In the most deprived areas, people can be expected to spend a third of their lives in ill health; these populations are more likely to have multiple long-term health conditions at any one time, and more likely to develop them years earlier than in less deprived areas (King's Fund, 2020).

Figure 5-14 and Figure 5-15 show Oxfordshire's average HLEs by MSOAs for females and males, respectively. This shows a broad range of HLE ranging from 58 years of age in parts of Oxford and Banbury to 78 years of age in the North of Oxford. This broad range is also true for females (ranging from 58 to 78 years of age), but less so for males (ranging from 58 to 76 years of age) (Public Health England, 2015-19). The analysis indicates:

- HLE is generally higher in more rural areas of Oxfordshire than its urban areas
- There is a notable variation in HLE within Oxfordshire's urban areas with places such as Oxford, Banbury and Didcot where the HLE is less than 60 years of age. This contrasts with other parts of these urban areas where HLE can be more than 75 years of age
- Male HLE across Oxfordshire is lower than female, which is broadly in keeping with national averages

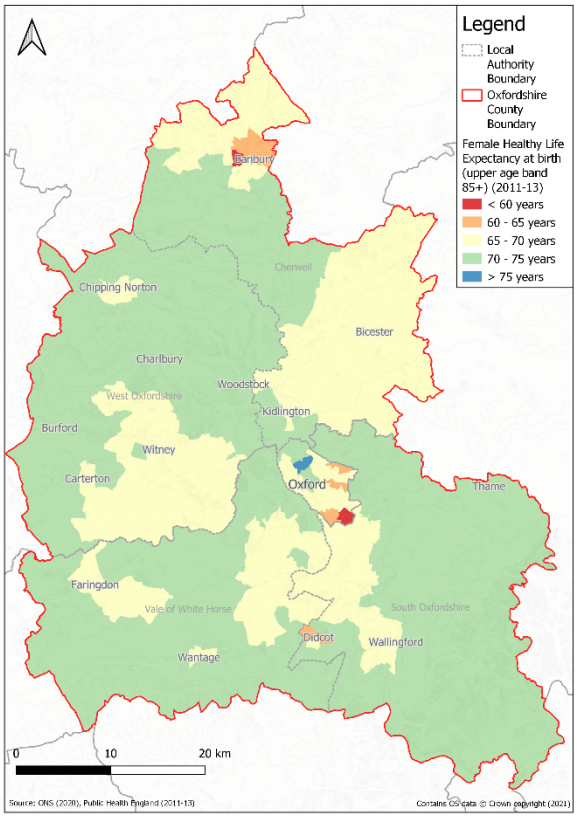



*Figure 5-14: HLE for Females in Oxfordshire (Public Health England for 2011-13)*

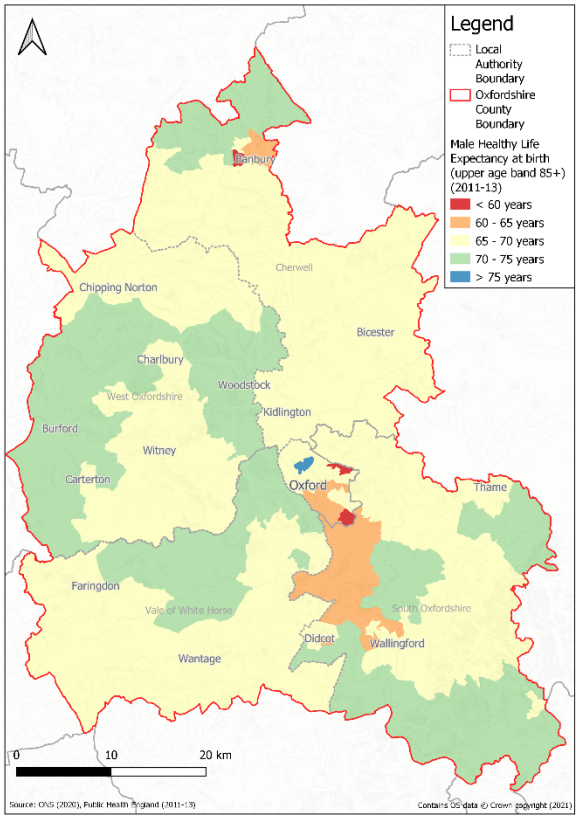



*Figure 5-15: HLE for Males in Oxfordshire (Public Health England for 2011-13)*

#### 5.3.1.2.2 *Indices of Multiple Deprivation – Health Domain*

Life expectancy is closely related to socio-economic circumstances, which can be measured by deprivation. The relationship is known as the 'social gradient in health' meaning that the gap in life expectancy can be as high as 9 years between the life expectancy of someone living in the least deprived area compared to someone living in the most deprived area (King's Fund, 2019).

***Indices of Multiple Deprivation***

English Indices of Multiple Deprivation (IMD) are published by the Ministry of Housing, Communities and Local Government (MHCLG) measuring the relative level of deprivation in small neighbourhoods (LSOAs) based on 39 indicators across seven domains. Deprivation is based on the lack of resources, instead of just a lack of income or financial resources (poverty) (MHCLG, 2019). Oxfordshire is in the top 10% least deprived local authorities in England, although it is important to consider inequalities within the county.

By considering how deprivation varies spatially (see Figure 5-38 in Section 5.5.2) we can understand inequalities across the county that can have an impact people's health.

Figure 5-16 displays the Health domain for LSOAs in Oxfordshire, colour-coded by the decile that the LSOA is in. The Health domain measures *'the risk of premature death and the impairment of quality of life through poor physical or mental health',* measuring morbidity, disability and premature mortality, and contributes 13.5% to the IMD (MHCLG, 2019). For example, the lowest decile (coloured red) contains the top 20% deprived areas in England based on the Health domain.

The evidence indicates that:

- The Cowley and Blackbird Leys area of Oxford has the highest concentration of health deprivation in Oxfordshire, with several areas being in the lowest decile of health deprived areas in England. This is also applicable for communities at the eastern and western extents of Banbury
- There are several towns within Oxfordshire, such as Wantage, where health deprivation across all areas is in the least deprived decile
- Most rural areas within Oxfordshire, particularly within South Oxfordshire and the Vale of White Horse, are in the top 20% of the least health deprived areas in England

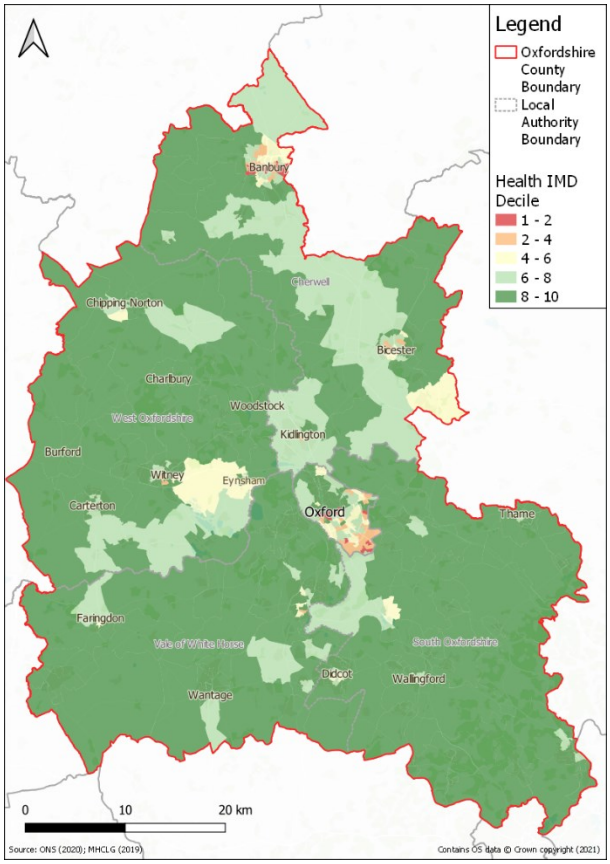



*Figure 5-16: MHCLG IMD Health using deciles (MHCLG, 2019)*

### 5.3.1.3 *Typical Infrastructure Schemes to Meet H1 Needs*

The following typical infrastructure schemes could meet the H1 needs identified:

- Active Travel Schemes (IF2)
- Zero Emission Zone Schemes (IF2)
- Primary & Community Healthcare Schemes (IF10)
- Social Care Schemes (IF10)
- Sport & Leisure Centre Schemes (IF9)
- Outdoor Green Space Schemes (IF7)

### 5.3.2 H2: Access to Spaces for Physical Activity

*H2 Future Needs to 2040 for Access to Spaces for Physical Activity at a Glance*

The need to improve physical activity rates is identified in a suite of national policies which identify physical inactivity as detrimental to physical and mental health. In an Oxfordshire context, the strategic need for improved access to spaces for physical activity is reflected within the Local Transport Plan (LTP4) (OCC, 2015), the Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) and the Rights of Way Management Plan (OCC, 2014).

Evidence collected by Sport England's Active Lives Survey (Sport England, 2020) identifies a need to increase physical activity levels within Oxfordshire's urban areas, particularly in more deprived communities. This includes south Oxford, Banbury, Bicester, and Kidlington where a third of adults do not meet activity recommendations. The evidence also indicates that there is a need to increase physical activity (such as walking and cycling) participation levels outside of Oxford City, particularly within more rural communities in Cherwell, West Oxfordshire, and South Oxfordshire, to build physical activity into people's everyday routines.

This includes building physical activity into people's everyday routines by investing in infrastructure such as dedicated sport and leisure facilities as well as high quality walking and cycling routes.

Accessibility mapping of green space identifies a need to enhance people's access to outdoor green space within the County (for example through Public Right of Ways). This is particularly the case within urban areas including Oxford City, where access to current green space is often restricted.

*H2 Key Affected Infrastructure*

*IF1 Energy*

***IF2 Transport***

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

***IF7 Green & Blue***

*IF8 Community & Cultural*

***IF9 Sport & Leisure***

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### *5.3.2.1 Strategic Policy & Strategy Need*

*H2 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Increase physical activity levels | National Infrastructure Strategy (HM Treasury, 2020)<br>Public Health England Strategy 2020 – 2025 (Public Health England, 2019)<br>Gear Change: A bold vision for walking and cycling (DfT, 2020)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021)<br>Oxfordshire Plan Topic Paper 5 - Strong & Healthy Communities (Oxfordshire Authorities, 2019)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015)<br>District Local Plans (Various) |
| Increase provision of and access to spaces for physical activity e.g. natural and green spaces, public rights of way and linear routes & sport facilities | Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021)<br>Oxfordshire Plan Topic Paper 5 - Strong & Healthy Communities (Oxfordshire Authorities, 2019)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015)<br>Oxfordshire Right of Way Management Plan (OCC, 2015)<br>Sport England's Active Design Guidance (Sport England, 2015) |

| Need Tier 1 | Need Tier 2 | Need Tier 3 | Need Tier 4 |
|---|---|---|---|
| [UK Legal Requirement] | [National Policy] | [County-wide Policy] | [District Policy] |

The places in which we live have a large impact on our behaviours; social, environmental and economic conditions vary in different places, some linked to deprivation, and therefore causing inequalities in our health. When considering environmental conditions, access to green space can encourage physical activity and provide improvements to mental and physical health.

People's behaviour is a major determinant of how healthy they are (King's Fund, 2020) and, as identified in Public Health England's 2020-25 Strategy (Public Health England, 2019), physical inactivity is one of the four key risks contributing to poor health today. Physical activity can reduce the risk of health issues and improve people's wellbeing, as well as bringing benefits to air quality and people's productivity at work. This is a principle also reflected in Sport England's Active Design guidance (Sport England, 2015).

The National Strategy for walking and cycling, Gear Change (DfT, 2020), emphasises the need to increase physical activity levels through increasing active travel participation. In this regard, it underlines the critical role that infrastructure investment in walking and cycling schemes can have in attracting more people to choose active modes as

a viable travel method. This includes investment in low-traffic neighbourhoods, "school streets" and improvements to the National Cycle Network, with a move away from the stop-start nature of previous cycling and walking funding and instead focusing on a long-term programme and budget for network development, similar to roads.

The National Infrastructure Strategy (2020) also reflects this need, outlining that *'infrastructure is a key driver of public health outcomes'* which includes ensuring good access to local green space.

In an Oxfordshire context, the need for improved access to spaces for physical activity is reflected within a suite of strategy documents. This includes the LTP4 (OCC, 2015), the Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021) alongside the Joint Health and Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019), which identifies the need to *'promote physical activity including active travel and promoting everyday physical activity'* as a key priority. This need is also reflected within the OCC Public Rights of Way Management Plan (OCC, 2015) as well as District Local Plans.

The Joint Health and Wellbeing Strategy identifies that:

- In 2019, Low Physical Activity caused 121 (2.2% of total) deaths and 676 years lived with disability (YLDs) in Oxfordshire, due to cardiovascular diseases, diabetes and kidney disease, and neoplasms
- Keeping children active can help to build confidence and social skills; develop coordination; improve concentration and learning; strengthen muscles and bones; improve health and fitness; maintain healthy weight; and sleep better
- 42% of children in Oxfordshire were not meeting the daily physical activity guidelines (2019/20)

#### *5.3.2.2 Evidence Base*

*H2: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| *Appraisal Dataset* | *Source* |
|---|---|
| ✓ *Physical Activity Levels* | *Sport England Active Lives Annual Survey* |
| ✓ *Access to Green Space* | *Thames Valley Environmental Records Centre; ONS* |

##### *5.3.2.2.1 Physical Activity Levels*

Physical inactivity is responsible for 1 in 6 deaths in the UK (DfT, 2020). It contributes directly to increased obesity, high blood pressure and high cholesterol, which in turn increases the risk of around 20 chronic health conditions including forms of cancer, coronary heart disease and Type 2 Diabetes (DfT, 2020). Recent evidence also identifies that those overweight with a BMI of between 35 to 40 increased a person's chances of dying from COVID-19 by 40% (Mahase, 2020). There is also a clear correlation between levels of physical inactivity and mental health, including cutting depression levels by around a third (Public Health England, 2019).

In addition to direct health outcomes, there is a well-developed evidence base quantifying the impact that levels of physical inactivity can have on economic output and public spending on healthcare services which is estimated to cost the NHS around £8.2 billion annually (DfT, 2020).

***Health Benefits of Regular Physical Activity (Public Health England, 2019)***

- Reduced all-cause mortality by 30%
- Reduced risk of Cardiovascular disease by up to 35%
- Reduced risk of Type 2 Diabetes by up to 40%
- Reduced risk of colon cancer by 30%
- Reduced risk of breast cancer by 20%
- Reduced levels of depression by up to 30%
- Reduced hip fractures by up to 68%
- Reduced risk of dementia by 30%

Evidence collected by Sport England's Active Lives Survey (Sport England, 2020) (see Table 5-12 and Figure 5-17) for the period May 2019 to May 2020 identifies that whilst Oxfordshire has higher physical activity levels among adults (16+ years of age) than the national average (70% active compared to 63% in England), there is still room for improvement with 12% of Oxfordshire fairly active (between half an hour and 2 and a half hours of activity a week) and 18% of Oxfordshire inactive (less than 30 minutes of activity a week). The table shows where the data has changed significantly compared to the same period in the previous year, demonstrating an improvement for the number of inactive residents in West Oxfordshire whilst England has seen a significant increase in this category.

The Sport England Active Lives survey results can be analysed across different age groups (see Table 5-13) (Sport England, 2020), showing the youngest age group (35-54 years) out-performing other age groups at both a county and national level. Oxfordshire has generally higher levels of physical activity and lower levels of inactivity across every age group when compared to England. Oxford tends to have higher levels of activity than at a county level. However, despite this positive relative performance against national averages, 25% of adults and 42% of children in Oxfordshire still do not meet the recommended levels of daily physical activity.

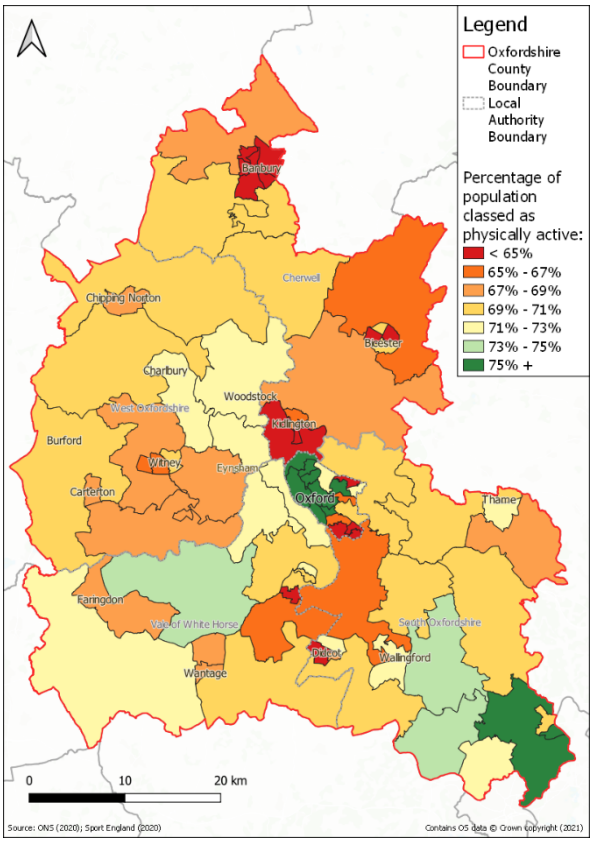



*Figure 5-17: Activity levels in Oxfordshire*

| Local Authority | Inactive (< 30 minutes a week) | Fairly active (30 to 149 minutes a week) | Active (150+ minutes a week) |
|---|---|---|---|
| Cherwell | 24.7% | 8.7% | 63.9% |
| Oxford | 13.4% | 7.8% | 76.4% |
| South Oxfordshire | 15.0% | 10.2% | 71.4% |
| Vale of White Horse | 16.5% | 11.1% | 69.1% |
| West Oxfordshire | 19.5% (Significant decrease) | 9.7% | 67.7% |
| OXFORDSHIRE | **17.7% (Significant decrease)** | **12.4%** | **69.9%** |
| England | **25.5% (Significant increase)** | **11.7%** | **62.8%** |

*Table 5-12: Physical activity levels of adults (16+) during May 2019 to May 2020 with comparison to the year before (Sport England, 2020)*

| Local Authority | 16-34 years of age | | | 35-54 years of age | | | 55-74 years of age | | | 75+ years of age | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Inactive | Fairly active | Active | Inactive | Fairly active | Active | Inactive | Fairly active | Active | Inactive | Fairly active | Active |
| Cherwell | - | - | 72.9% | 23.1% | 14.3% | 62.6% | 21.4% | - | 66.6% | - | - | - |
| Oxford | - | - | 81.2% | 13.7% | - | 80.2% | 13.9% | 16.4% | 69.7% | - | - | - |
| South Oxfordshire | - | - | 74.6% | - | - | - | 18.3% | - | 70.0% | - | - | - |
| Vale of White Horse | - | - | 80.4% | - | - | - | - | 20.1% | 63.4% | - | - | - |
| West Oxfordshire | - | - | 73.0% | - | - | - | 23.1% | 12.7% | 64.1% | - | - | - |
| OXFORDSHIRE | **13.8%** | **8.6%** | **77.6%** | **14.9%** | **13.0%** | **72.2%** | **18.9%** | **14.4%** | **66.6%** | **36.2%** | **17.5%** | **46.4%** |
| England | **20.1%** | **10.5%** | **69.4%** | **21.7%** | **11.9%** | **66.4%** | **27.2%** | **12.4%** | **60.5%** | **46.8%** | **13.0%** | **40.2%** |

*Table 5-13: Physical activity levels of different age categories during May 2019 to May 2020 (Sport England, 2020)*

#### *5.3.2.2.2 Access to Spaces for Physical Activity*

Evidence identifies that, for the majority of people, the easiest way to increase their physical activity levels is to build it into their daily routine by walking or cycling for shorter journeys or as a component of a longer public transport journey (Dr Lucy Saunders, Healthy Streets, 2021).

As well as the modes being used for travel to and from a destination or integrated into a trip, they can be used solely as a recreational activity.

Table 5-14 displays the proportion of residents walking or cycling for travel at least 3 days per week. Oxfordshire has higher levels of walking and cycling use than nationally. This is notable for cycling (8.5% compared to 3.1%) which is mostly attributed to Oxford (22%), followed by Vale of White Horse (7.4%). Walking for travel is mostly in line with the national average, but is lowest in Cherwell (20.2%) and highest in Oxford (35.6%).

The impact of the COVID-19 pandemic has exposed the vital role that access to outdoor green space has on people's health outcomes, including their levels of physical activity.

With restrictions on people's usual activities, including commuting, overall physical activity levels decreased (population classed as active dropped by 7%) and inactivity levels increased (population classed as inactive increased by 7%). But walking for leisure, cycling for sport or leisure and outdoor running or jogging, all increased during the start of the lockdown in March 2020 (Sport England, 2020), highlighting the importance for accessible outdoor green space

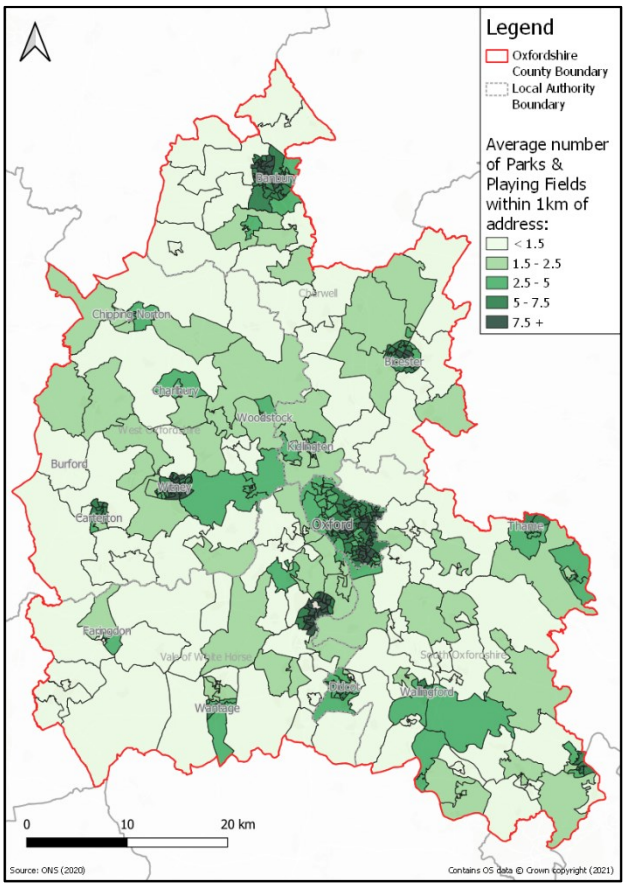



*Figure 5-18: Average number of parks and playing fields within a kilometre of addresses in Oxfordshire (ONS, 2020)*

As shown in Figure 5-18, Oxfordshire's urban areas have greater access to a higher number of parks and playing fields, correlating with the higher population densities in these areas.

As identified in evidence collected by Public Health England, access to good-quality outdoor green spaces is proven to lead to improvements in physical and mental health and lower levels of obesity. Within a local Oxfordshire context, people with good access to green space are 24% more likely to be physically active (OCC, 2020). 24.4% of residents in Oxfordshire use outdoor space for exercise or health reasons (Public Health England, n.d.).

| Local Authority | Percentage of adults walking for travel at least 3 days per week | Percentage of adults cycling for travel at least 3 days per week |
|---|---|---|
| Cherwell | 20.2% | 3.0% |
| Oxford | 35.6% | 22.0% |
| South Oxfordshire | 23.0% | 3.3% |
| Vale of White Horse | 24.4% | 7.4% |
| West Oxfordshire | 21.3% | 3.9% |
| OXFORDSHIRE | 25.3% | 8.5% |
| England | **22.7%** | **3.1%** |

*Table 5-14: Percentage of adults walking or cycling for travel at least three days per week (2018/19) (Public Health England)*

Within Oxfordshire, only 6.8% of residents have access to woodland, but in the wider South East region 19.8% have access, and nationally 16.8% (Public Health England, 2015). Access to outdoor green spaces, such as parks (see Figure 5-18) or private green space (see Figure 5-19), is worse in deprived areas than in affluent areas, contributing to health inequality. For example, those in the top 20% affluent areas have access to five times more green space than those in the bottom 20% (Commission for Architecture and the Built Environment, 2010). In addition, successive studies show that there is a strong correlation between access to green space and crime levels (Shepley, Sachs, Sadatsafavi, & Fournier, 2019).

According to ONS (2020), the average distance to Parks, Public Gardens or Playing Fields (greenspace) varies across Oxfordshire, with the greater distances in rural areas (as might be expected). By district, average distances to greenspace are lowest in Oxford City and greatest in Vale of White Horse (see Table 5-15).

| Local Authority | Average distance to Greenspace (m) April 2020 | Difference from England average |
|---|---|---|
| Cherwell | 440 | +55 |
| Oxford City | 290 | -95 |
| South Oxfordshire | 475 | +90 |
| Vale of White Horse | 533 | +148 |
| West Oxfordshire | 464 | +79 |
| England | 385 | |

*Table 5-15: Average distance to Greenspace (ONS, 2020)*

#### *5.3.2.2.3 Access Restrictions*

Evidence indicates that Oxfordshire's outdoor green spaces have varying levels of restrictions which prevent local people from being able to access them. Figure 5-20, which identifies the relative restriction level of green spaces, indicates that there are concentrations of facilities, particularly within Oxford City, that are not publicly accessible. The data also indicates that there is significant variation in terms of green space access across the County, particularly between rural communities.

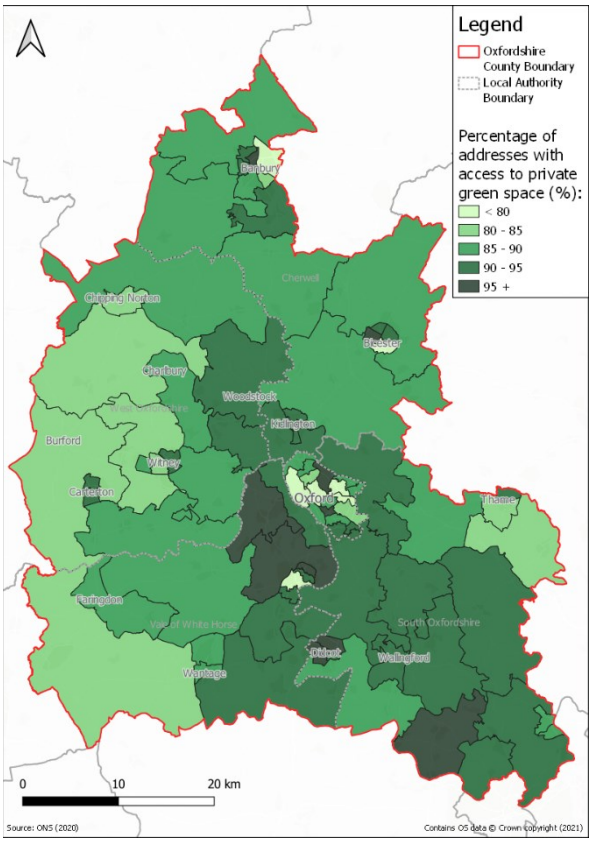



*Figure 5-19: Households with access to a private garden (ONS, 2020)*

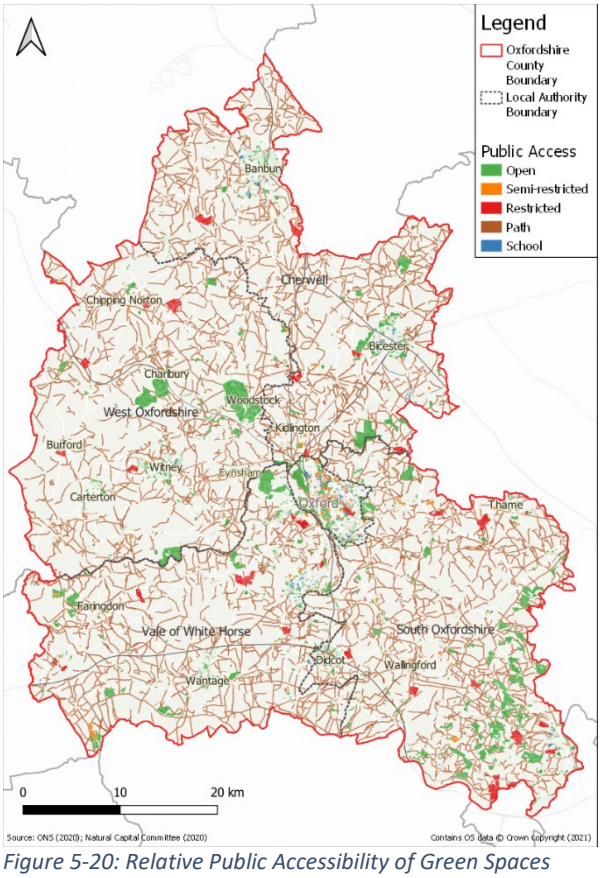



*Figure 5-20: Relative Public Accessibility of Green Spaces*

#### 5.3.2.2.4 Investing in Healthy Streets

The 10 Healthy Streets Indicators™ identify that investment in street-based active travel and urban realm infrastructure, such as ensuring that people feel safe and the street is easy to cross, can play a key role in creating an environment where people actively choose to walk and cycle as part of everyday life (see Figure 5-21). This approach has been adopted by many cities around the world, including by the Mayor of London.


*Figure 5-21: 10 Healthy Streets Indicators™ (Healthy Streets, 2021)*

### 5.3.2.3 Typical Infrastructure Schemes to Meet H2 Needs

The following typical infrastructure schemes could meet the H2 needs identified:

- Active Travel Schemes (IF2)
- Sport & Leisure Centre Schemes (IF9)
- Outdoor Sport Pitches (IF9)
- Community Woodland Schemes (IF7)
- Outdoor Green Space Schemes (IF7)
- Strategic Nature Restoration Schemes (IF7)

### 5.3.3 H3: Improve Health Service Access

*H3 Future Needs to 2040 for Improve Health Service Access at a Glance*

The NHS Long Term Plan (2019) and the Health Infrastructure Plan (2019) identify the long-term strategic need for an integrated approach to the NHS service model across primary, community and social care to prioritise 'out of hospital care'.

The Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) identifies the strategic need to tackle inequalities of accessing healthcare services given the underlying challenge that some people in Oxfordshire face of being unable to get to or use services. The Oxfordshire Primary Care Estates Strategy (OCCG, 2021) identifies a need to ensure resilient and accessible primary care services which reduce current pressure and can meet future demand.

Alongside the Care Act (2014), the Market Position Statement (OCC, 2019) identifies a need to meet future demand from Oxfordshire's ageing population through additional supply in extra care housing and care homes. Housing-based population projections also indicate there may be an additional 42,000 people aged 75 and over living in Oxfordshire by 2040. This triggers a need for around 1,700 additional extra care housing units and almost 3,000 care home beds.

There is a need to enhance the infrastructure so that primary care working with community health and social care can offer more locally integrated services and to enhance capacity and infrastructure of primary care throughout Oxfordshire.

*H3 Key Affected Infrastructure*

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.3.3.1 Strategic Policy & Strategy Need

*H3 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Ensure sufficient capacity of primary health services, community health & social care to meet future demand | Care Act (2014)<br>Health Infrastructure Plan (Department of Health & Social Care, 2019)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>Oxfordshire Primary Care Estates Strategy (OCCG, 2021)<br>Oxfordshire Market Position Statement: Extra Care Housing Supplement (OCC, 2019) |
| Reduce inequalities of health service access | Health Infrastructure Plan (Department of Health & Social Care, 2019)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

Access to all health services refers to the availability of services that are timely, appropriate, sensitive and easy to use for everyone (King's Fund, 2020). Sub-optimal service can mean certain groups are receiving less than optimal care, this contributes to poor outcomes and poor health status. Potential issues include (King's Fund, 2020):

- Real or anticipated discrimination or challenges with language
- Service availability and uptake (measured by GPs per head or rate of admission to elective care)
- Quality of care (measured by patient satisfaction rates)

The NHS Long Term Plan (2019) identifies the long-term strategic priorities for healthcare provision from a national perspective. Alongside an emphasis on preventative action, for example through increasing physical activity (see Section 5.3.3), it identifies the strategic need for a coordinated approach to the NHS service model.

*NHS Long Term Plan Strategic Priorities for Changes to the NHS Service Model*

- *'We will boost 'out-of-hospital' care, and finally dissolve the historic divide between primary and community health services*
- *The NHS will redesign and reduce pressure on emergency hospital services*
- *People will get more control over their own health, and more personalised care when they need it*
- *Digitally-enabled primary and outpatient care will go mainstream across the NHS*
- *Local NHS organisations will increasingly focus on population health and local partnerships with local authority-funded services, through new Integrated Care Systems (ICSs) everywhere'*

Key areas of focus concerning the strategic priority to boost *'out of hospital'* care include:

- Increased Primary and Community Care Investment: Increased proportion of NHS budget investment in primary medical and community health services to fund demand pressures

- Improved Community Care Capacity: Increased capacity and responsiveness of community and intermediate care services
- Establishment of Integrated Community-Based Healthcare: Establishment of Primary Care Networks (formed in Oxfordshire in 2019) as a means to promote better coordination between neighbouring GP practices
- Integration between Primary and Social Care Provision

The Health Infrastructure Plan (Department of Health & Social Care, 2019) identifies the UK Government's strategy for future investment in NHS facilities to meet future healthcare need. It identifies the strategic need to enhance health infrastructure to address inefficiencies, manage future demand and ensure high-quality patient care.

Whilst the plan identifies potential funding opportunities to enhance primary and community care provision, the strategic priorities of the plan are focused on upgrading existing or building new hospitals. Whilst no hospital sites are identified in Oxfordshire, upgrades to the Royal Berkshire Hospital in Reading are identified.

From a local perspective, the Joint Health and Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) identifies the strategic needs for healthcare service provision in Oxfordshire. The focus of the strategy is on prevention, such as promoting healthy place shaping, however, a key priority is *'improving the resident's journey through the health and social care system.'* To achieve this, the strategy identifies a strategic need to tackle inequalities of accessing healthcare services given the underlying challenge that some people in Oxfordshire face of being unable to get to or use services.

This strategic need to address the challenge of primary care access and capacity is also reflected within the Oxfordshire Primary Care Estates Strategy (OCCG, 2021). This identifies the pressures from a lack of capacity in the primary healthcare system, particularly where current facilities are not fit for purpose to meet current and future demand. It identifies that *'both population growth and the GP contract will increase pressure on primary care estates and unless new ways of working are more intensively adopted across the county and/or additional revenue and capital funding is obtained, OCCG may not be able to adequately fulfil its statutory duty to support patient services.'*

### *OCCG Primary Care Estates Strategy 2020 – 2025 – Identified Priorities for Future Investment in OxIS Towns & Surrounds and OxIS Rural Communities (OCCG, 2021)*

The Oxfordshire Primary Care Estates Strategy identifies several OxIS Local Areas of Focus for short term and medium-term future investment in primary care infrastructure to meet future demand because of forecast population growth from new housing. This includes:

- 1. Oxford City (including North Oxford)
- 2. Abingdon-on-Thames
- 3. Banbury
- 3. Bicester
- 7. Didcot & Wallingford
- 8. Wantage and Grove
- 12. Eynsham & Long Hanborough
- 14. South Cherwell area & Woodstock

Although not a planning authority, OCC have a statutory obligation under the Care Act (2014) to support Oxfordshire's District Councils and the private sector to ensure sufficient capacity of social care services and infrastructure. Through prioritisation of a home-based care model, the Oxfordshire Market Position Statement 2019 – 2022 (OCC, 2019) identifies several key areas of focus to meet future demand:

- Increasing Supply of Affordable Extra Care Housing (including those for social rent)
- Ensure geographical parity of additional care housing provision
- Deliver Adaptable homes
- Embed care housing a priority in planning policies such as Local Plans

### *Oxfordshire Market Position Statement 2019 – 2022 – Adult Social Care Vision (OCC, 2019)*

- *'Improve the satisfaction of people who use services*
- *Increase the number of people supported at home*
- *Improve the quality and sustainability of care providers in Oxfordshire*
- *Involve more local people and organisations in the development of services'*

As the organisation responsible for emergency ambulances in Oxfordshire, the NHS South Central Ambulance Service's identify a series of key future strategic needs in their Annual Plans (South Central Ambulance Service NHS Trust, 2020) including:

- Helping people access appropriate healthcare services based on individual needs
- Dispatching emergency ambulances timeously which fulfil targets
- Assisting people in their home by providing a mobile care service

#### 5.3.3.2 Evidence Base

| *H3: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Registered Patient to GP Ratio* | *NHS Digital (2020/21)* |
| ✓ *% People Within 15 Minute Cycle of GPs* | *DfT Journey Time Statistics (2017)* |
| ✓ *Number of* 'extra care units' *per 1,000 people aged 75 and over* | *OCC* |
| ✓ *Number of* registered care home beds *per 1,000 people aged 65 and over* | *OCC* |

##### 5.3.3.2.1 Primary & Community Care

According to the 2020 GP patient survey and as reported in the Joint Strategic Needs Assessment (Oxfordshire Insight, 2021), people in Oxfordshire rate their GP practice healthcare professional higher than national average; particularly when asked about GPs giving patients enough time. Patients in Oxfordshire are also more likely agree that there is enough support to help manage their long-term health conditions (79% compared to 77% nationally). This echoes the findings of a historical patient survey undertaken by Oxfordshire Healthwatch in 2017 (Oxfordshire Healthwatch, 2017).

Table 5-16 alongside Figure 5-22, provides an indication of the current number of GPs and registered patients across practices in each District, compared with the District population (excluding the one in Shrivenham) (NHS, 2021).

This indicates that there is a short term need to increase GP capacity in Cherwell, particularly Banbury and Bicester, Oxford City and Didcot given that many of the surgeries have over 2,000 registered patients per GP. This priority is also reflected in OCCG's Primary Care Estates Strategy (see Section 5.3.3.10).

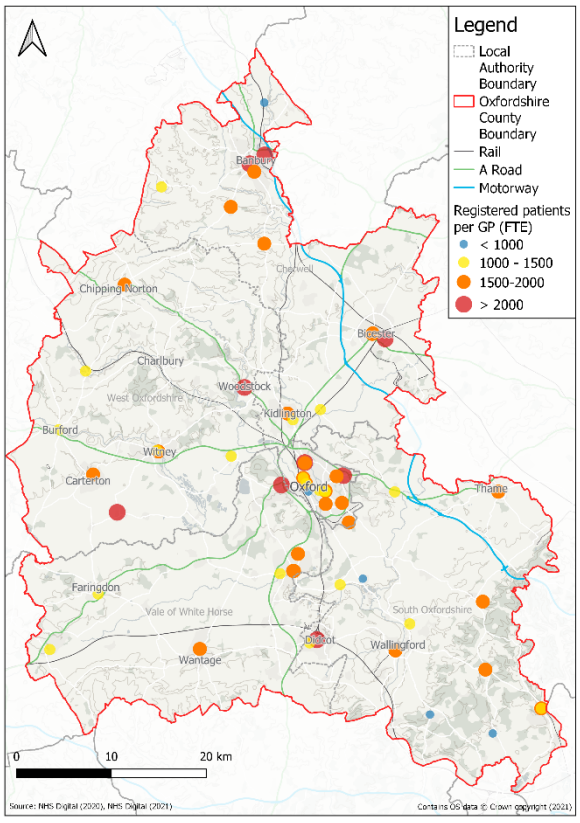



*Figure 5-22: Registered GP patients for every GP (FTE) by location (NHS Digital, 2021). Note: this uses data extracted from NHS Digital and therefore not all branch sites of the same GP surgery are shown.*

| Local Authority | Population (2019) | Number of GP Surgeries | Number of GPs (FTE) | Registered GP patients | Registered per GP (FTE) |
|---|---|---|---|---|---|
| Cherwell | 150,500 | 14 | 95 | 173,500 | 1,820 |
| Oxford | 152,500 | 19 | 129 | 219,200 | 1,690 |
| South Oxfordshire | 142,100 | 15 | 110 | 150,800 | 1,370 |
| Vale of White Horse | 136,000 | 9 | 77 | 126,900 | 1,640 |
| West Oxfordshire | 110,600 | 11 | 70 | 116,300 | 1,660 |
| OXFORDSHIRE | **691,700** | **68** | **482** | **786,600** | **1,640** |

*Table 5-16: Number of GP surgeries and registered patients (NHS, 2021) (NHS, 2020) (ONS, 2020)*

Active travel journey time accessibility to GP surgeries is modelled by the DfT periodically. The most recent 2017 evidence from Oxfordshire (shown in Table 5-17) (DfT, 2019) indicates:

- There may be a need to enhance the accessibility of GP surgeries in Vale of White Horse, with over a third of people currently living out with a 15 minute cycle proximity of their GP surgery and two thirds in excess of a 15 minute journey on foot or by public transport
- There may be a need to enhance the relative accessibility of primary healthcare services in South Oxfordshire, with the average journey time by active travel ranging from 15 to 20 minutes
- The active travel accessibility of Oxford City's GP surgeries is high and there is potential to promote this further

| Local Authority | Travel Mode: Cycling | | Travel Mode: Walk or Public Transport | |
|---|---|---|---|---|
| | Average Travel Time to Nearest GP | % of Users within 15 Minutes of GP | Average Travel Time to Nearest GP | % of Users within 15 Minutes of GP |
| Cherwell | 14 Minutes | 69% | 20 Minutes | 51% |
| Oxford | 9 Minutes | 97% | 11 Minutes | 76% |
| South Oxfordshire | 15 Minutes | 62% | 20 Minutes | 40% |
| Vale of White Horse | 17 Minutes | 60% | 21 Minutes | 33% |
| West Oxfordshire | 15 Minutes | 66% | 17 Minutes | 51% |
| OXFORDSHIRE | **14 Minutes** | **71%** | **18 Minutes** | **51%** |

**Notes:**
[1] *This journey time dataset was modelled by the DfT and dates from 2017*

*Table 5-17: Relative accessibility of GP surgeries by active travel and public transport (DfT, 2019)*

#### *5.3.3.2.2 Adult Social Care*

As identified in the Oxfordshire Market Position Statement (OCC, 2019), there has been a recent change in emphasis since OxIS-17 towards a greater need for *'extra care housing'* rather than the more traditional model of residential care homes.

This Extra Care Housing would provide the benefit of allowing vulnerable people greater opportunities for flexibility and independent living for longer. It also would reduce pressure on acute and community hospital infrastructure through delayed discharges.

***What is Extra Care Housing?***

Extra care housing is accommodation for older people and those with disabilities which permit residents rights to occupy self-contained dwellings (either through a rental agreement, shared ownership or private ownership). Extra-care housing often includes access to communal facilities (e.g. leisure facilities).

Specific agreements are in place to provide care or support services on-site. As opposed to residential care homes, extra care housing provides greater independence to occupiers as they are not obligated to receive care from a designated supplier (Housing LIN, 2015).

There are currently 874 units for extra care housing across Oxfordshire (OCC, 2021), with most located in Oxford City and Cherwell (see Table 5-21). Oxfordshire's need is identified by OCC as 25 *'extra care units'* per

1,000 people aged 75 and over, which accounts for an allowance for people with disabilities younger than this age (OCC, 2019). This indicates that there is a deficit of approximately 650 extra care housing units across the county.

Housing-based population projections provided by OCC indicate there may be an additional 42,000 people aged 75 and over living in Oxfordshire by 2040. Based on the projections identified in Table 5-19, this indicates:

- There is a need for approximately 1,705 additional extra care housing units across the county by 2040
- There is a short term need to urgently increase capacity in South Oxfordshire, particularly in places such as Didcot which currently has no provision
- There is a short-term need to increase extra care housing units in Vale of White Horse and West Oxfordshire which has a current deficit of approximately 200 units and 165 units, respectively
- There is a need to increase provision in Cherwell over the medium-term to keep pace with additional demand from an ageing population
- There is limited need to increase provision in Oxford

| Local Authority | Number of Current Extra Care Housing Units[1] | Estimated Number of People Aged 75+ (2019)[2] | Number of Extra Care Housing Units per 1,000 People Aged 75+ | Extra Care Housing Units Shortfall |
|---|---|---|---|---|
| Cherwell | 310 | 12,900 | 24 | 10 |
| Oxford | 230 | 9,100 | 25 | 0 |
| South Oxfordshire | 80 | 14,600 | 5 | 280 |
| Vale of White Horse | 130 | 13,100 | 10 | 200 |
| West Oxfordshire | 120 | 11,600 | 11 | 170 |
| OXFORDSHIRE | **870** | **61,100** | **14** | **650** |

***Notes:***

*[1] Data obtained from OCC and is correct as of 19/04/21*

*[2] Data obtained from 2019 mid-year ONS populaton estimates*

*Table 5-18: Number of Extra Care Housing units across Oxfordshire and Current Unmet Demand (OCC, 2021) (City Science Calculations)*

| Local Authority | Estimated Number of People Aged 75+ (2040)[1] | Required Extra Care Housing Units Needed[2] | Additional Extra Care Housing Units Required |
|---|---|---|---|
| Cherwell | 23,500 | 590 | 270 |
| Oxford | 12,800 | 320 | 90 |
| South Oxfordshire | 24,400 | 610 | 530 |
| Vale of White Horse | 22,800 | 570 | 440 |
| West Oxfordshire | 19,700 | 490 | 370 |
| OXFORDSHIRE | **103,100** | **2,580** | **1,700** |

***Notes:***

[1] Data obtained from OCC Insight Population Projections

[2] Data calculated based on the OCC assumption of 25 extra care units per 1,000 people aged 75 and over **(OCC, 2019)**

*Table 5-19: Number of future Extra Care Housing Units across Oxfordshire by 2040 (City Science Calculations)*

There remains a future need for residential care homes to cater for people living in Oxfordshire who are no longer able to live independently whether at home or in extra care housing.

In March 2019, there were around 5,300 registered care home beds for older people split across 116 care homes (OCC, 2019). This exceeds the OCC target provision for care homes of 41 bed per 1,000 people aged 65 or over which is marginally lower than the national average due to enhanced health levels in the county (OCC, 2019). Housing-based population projections provided by OCC indicate there may be around 200,000 people aged 65 and over living in Oxfordshire by 2040. This equates to a need for an additional 3,000 care home beds across the county (see Table 5-20).

| Local Authority | Estimated Number of People Aged 65+ (2040)[1] | Required Registered Care Home Beds [2] | Additional Registered Care Home Beds Required |
|---|---|---|---|
| Cherwell | 47,400 | 1,900 | N/A[3] |
| Oxford | 25,400 | 1,000 | N/A[3] |
| South Oxfordshire | 48,500 | 2,000 | N/A[3] |
| Vale of White Horse | 43,600 | 1,800 | N/A[3] |
| West Oxfordshire | 37,000 | 1,500 | N/A[3] |
| OXFORDSHIRE | 201,900 | 8,300 | 3,000 |

*Notes:*

*[1] Data obtained from OCC Insight Population Projections*

*[2] Data calculated based on the OCC target of 41 extra care units per 1,000 people aged 65 and over* **(OCC, 2019)**

*[3] Number of care home beds by District not available*

*Table 5-20: Forecast Care Home Bed need by 2040*

#### *5.3.3.3 Typical Infrastructure Schemes to Meet H3 Needs*

The following typical infrastructure schemes could meet the H3 needs identified:

- Active Travel Schemes (IF2)
- GP Surgeries & Health Centres (IF10)
- Community Hospitals (IF10)
- Extra Care Housing (IF10)
- Residential Care Homes (IF10)

### 5.3.4 H4: Cleaner Air

*H4 Future Needs to 2040 for Cleaner Air at a Glance*

The strategic need for cleaner air in Oxfordshire relates to a national legal obligation which identifies legal limits for air quality. These limits relate to Nitrogen Dioxide (NO2) and Particulate Matter (PM), comprising of both PM10 and PM2.5, which are the most harmful pollutants to health. The Clean Air Strategy 2019 (DEFRA, 2019) identifies the strategic need at a national level to fulfil these legal obligations rapidly, through achieving a 73% reduction in oxides of nitrogen (NOx) emissions and a 46% reduction in PM2.5 by 2030.

Despite recent improvements, particularly in Oxford City, there is a strategic need to revoke Oxfordshire's 13 Air Quality Management Areas as soon as possible by ensuring that NO2 emissions, primarily caused by road transport, are reduced below legal limits. The most pressing need to invest in infrastructure, such as sustainable transport, to achieve cleaner air is within OxIS Towns and Surrounds with annual NO2 emissions above legal limits, such as Banbury. There is also a key need to improve air quality in wider rural communities (e.g. Watlington, Marcham and Botley), which all have annual NO2 limits above legal limits.

*H4 Key Affected Infrastructure*

#### 5.3.4.1 Strategic Policy & Strategy Need

*H4 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Meet NO2 and PM10 air quality emission obligations | Environment Act (1995)<br>The Air Quality Standards Regulations (2010)<br>Clean Air Strategy (DEFRA, 2019)<br>District Councils Air Quality Action Plans (Various) |
| Eliminate the need for Air Quality Management Areas | Connecting Oxfordshire: Local Transport Plan (OCC, 2015)<br>Local Transport & Connectivity Plan Consultation (OCC, 2021)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

The need for cleaner air in Oxfordshire is a national legal obligation set out in both the Environment Act (1995) alongside the Air Quality Standards Regulations (2010) which identifies legal limits for air quality. These limits relate to Nitrogen Dioxide ($NO_2$) and Particulate Matter (PM), comprising of both $PM_{10}$ and $PM_{2.5}$, which are the most harmful pollutants to human health.

The UK is not currently compliant with the legal limits on $NO_2$ within many urban areas of the country and at a national level, 47% of all $NO_2$ emissions originate from transport (DEFRA, 2020).

*National Legal Limits on Air Pollutants*

- $NO_2$: Not to exceed 40 µg/$m^3$ average concentration over a year
- $PM_{2.5}$: Not to exceed 25 µg/$m^3$ average concentration over a year
- $PM_{10}$: Not to exceed 40 µg/$m^3$ average concentration over a year

The Clean Air Strategy 2019 (DEFRA, 2019) provides a future roadmap from a national perspective on how air pollution will be improved. In aspiring to fulfil legal $NO_2$ obligations *'as quickly as possible',* this strategy sets a future target of achieving a 73% reduction in $NO_x$ emissions and a 46% reduction in $PM_{2.5}$ by 2030 (based on 2005 base levels).

At county-wide level, this future strategic need for cleaner air is reflected within the LTP4 (OCC, 2015) as well as the Oxfordshire Strategic Vision 2050 (Oxfordshire Growth Board, 2021).

To achieve the National Air Quality Objectives and maintain human health, Oxfordshire's five District Councils are obligated under the Environment Act (1995) to monitor, review and assess the air quality in their area by measuring air pollution and trying to predict how it will change in future. If an objective is likely to not be achieved by the relevant deadline, an Air Quality Management Area (AQMA) is put in place alongside a Local Air Quality Action Plan.

As indicated in Table 5-21, there are a total of six Air Quality Action Plans throughout Oxfordshire covering a total of 13 Air Quality Management Areas (AQMA). Each of these Air Quality Action Plans identifies a future need for cleaner air within designated AQMAs through ensuring $NO_2$ pollutants are regularly less than legal limits. Actions to achieve this include promoting modal shift away from vehicles, introducing traffic management restrictions and increasing provision of electric vehicle charging infrastructure.

| District | Air Quality Action Plan(s) | AQMAs |
|---|---|---|
| Cherwell | Cherwell District Council Air Quality Action Plan (2017) | 4 |
| Oxford City | Oxford City Air Quality Action Plan 2013 – 2020 (2013) | 1 |
| South Oxfordshire | Air Quality Action Plan (2014) | 3 |
| Vale of White Horse | Air Quality Action Plan (2015) | 3 |
| West Oxfordshire | Air Quality Action Plan, Bridge Street, Witney (2010) | 1 |
| | Air Quality Action Plan, Horsefair and High Street, Chipping Norton (2008) | 1 |

*Table 5-21: Summary of Oxfordshire Districts' Air Quality Action Plans*

### 5.3.4.2 Evidence Base

| *H4: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *$NO_2$ Pollutants* | *DEFRA; District Council Monitoring* |
| ✓ *$PM_{10}$ and $PM_{2.5}$ Pollutants* | *DEFRA; District Council Monitoring* |

#### 5.3.4.2.1 Nitrogen Dioxide Pollutants

Evidence suggests that prolonged exposure to $NO_2$ can result in problems with people's airways which increases the chances of respiratory infections and allergens. It can also disproportionally impact the most vulnerable in society given that it can accentuate pre-existing respiratory problems for people with certain heart or lung issues, such as asthma (DEFRA, 2019). The majority of $NO_2$ emissions originate from transport, particularly road transport, alongside other sources such as combustion in industry.

***Health Impact of Poor Air Quality in Oxford***

Local evidence collated by Kings College London and identified within the 2021 Joint Strategic Needs Assessment (Oxfordshire Insight, 2021) indicates that every average year during days with high levels of pollution in Oxford there were:

- Six extra heart attacks outside hospital
- Four additional people admitted to hospital for strokes
- Five additional people admitted to hospital with cardiovascular disease

Alongside concentrated areas of $NO_2$ pollutants within Oxfordshire's AQMAs, geospatial data across the County (see Figure 5-23) indicates that urban areas such as Oxford, Abingdon, Didcot and Banbury alongside the M5 corridor also have higher levels of $NO_2$. In contrast, $NO_2$ levels within more rural areas of Oxfordshire are lower.

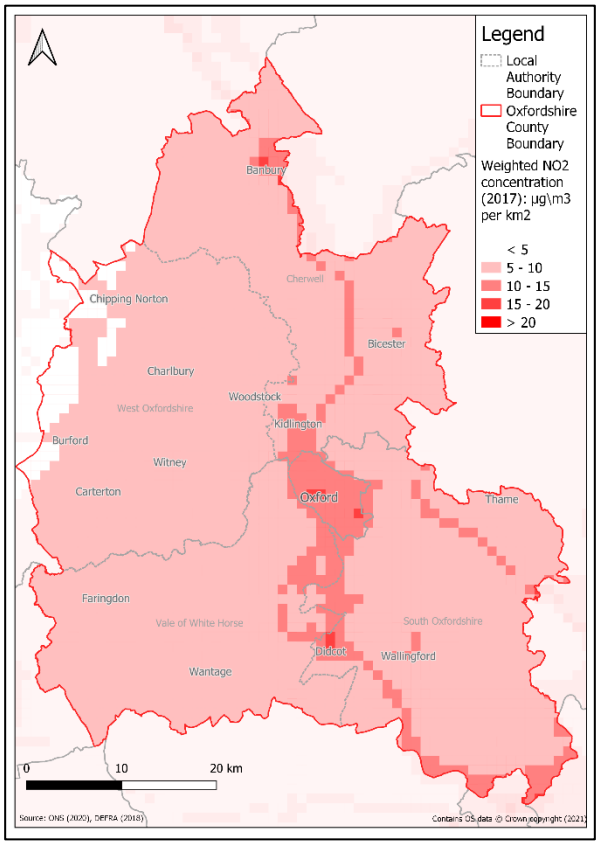



*Figure 5-23: Weighted Nitrogen Dioxide (NO2) concentration (ug/m3) per km2 in Oxfordshire (DEFRA, 2017)*

#### 5.3.4.2.2 Particulate Matter Pollutants

Evidence (DEFRA, 2019) indicates that Particulate Matter ($PM_{2.5}$) pollutants originate from a variety of sources including domestic wood and coal burning (38%), industry (29%) and road transport (12%). Local data across Oxfordshire (shown in Figure 5-24) indicates that $PM_{10}$ pollutants are generally evenly distributed across the County. The exception to this is key transport corridors and urban areas where levels are marginally higher whilst levels are lower in rural parts of Cherwell and South Oxfordshire.

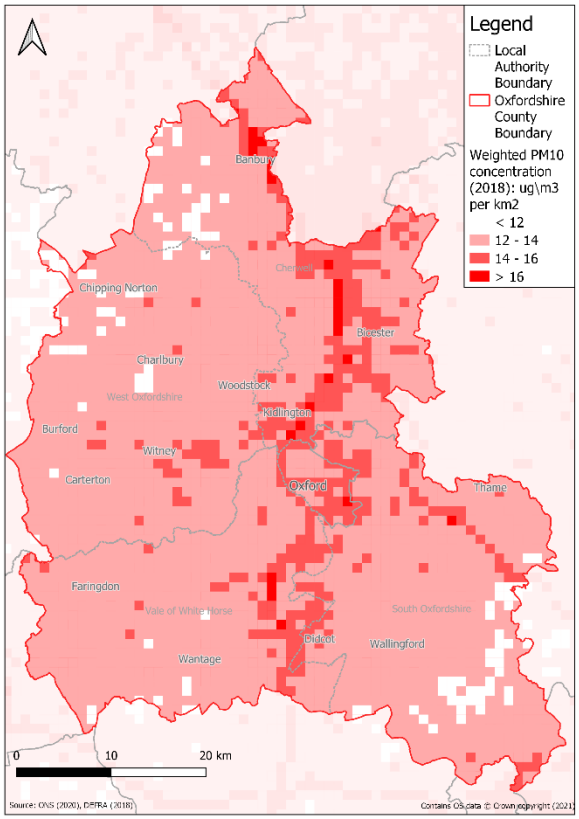



*Figure 5-24: Weighted Particle Matter 10 concentration (DEFRA, 2017)*

#### 5.3.4.2.3 Air Quality Management Areas (AQMAs)

As indicated within Table 5-22 and Figure 5-25, there are a total of 13 AQMAs in Oxfordshire due to exceeding legal limits on $NO_2$ emissions. Oxford City's AQMA is by the far the largest (as shown in Figure 5-25) and the AQMA in Banbury has the highest $NO_2$ levels with levels in excess of 70 µg/m$^3$.

Each AQMA is covered by an Air Quality Management Plan which identify actions to achieve emission reductions to remedy exceedances. Interventions in these areas include promoting modal shift away from vehicles, introducing traffic management restrictions, increasing uptake of electric vehicles and provision of associated charging infrastructure.

| Map Ref | Local Authority | AQMA Name | Declared or last amended | Annual $NO_2$ Levels[1] (µg/m3) |
|---|---|---|---|---|
| 1 | Cherwell | AQMA No. 1 Hennef Way, Banbury | 17/01/2011 | 72.1 (2019) |
| 2 | | AQMA No. 2 Banbury | 29/10/2014 | 36.4 (2019) |
| 3 | | AQMA No. 3 Bicester Road, Kidlington | 29/10/2014 | 32.5 (2019) |
| 4 | | AQMA No.4 Bicester | 09/10/2015 | 34.5 (2019) |
| 5 | Oxford City | The City of Oxford AQMA | 17/09/2010 | 36 (St Clement's)<br>24 (George St),<br>35 (High St),<br>31 (Cutteslowe) (all 2020) |
| 6 | South Oxfordshire | Henley AQMA | 01/01/2003 | 49 (2019) |
| 7 | | Wallingford AQMA | 28/03/2006 | 37 (2019) |
| 8 | | Watlington AQMA | 31/03/2009 | 40 (2019) |
| 9 | Vale of White Horse | Abingdon AQMA | 23/08/2006 | 32.1 (2019)[2] |
| 10 | | Botley AQMA | 29/04/2008 | 51.0 (2019)[2] |
| 11 | | Marcham AQMA | 15/06/2015 | 41.4 (2019)[2] |
| 12 | West Oxfordshire | Chipping Norton AQMA | 01/03/2005 | 41.4 (2019)[3] |
| 13 | | Witney AQMA | 01/03/2005 | 41.9, 44.8 (2019)[4] |

***Notes:***

*[1] Legal Limit is 40 µg/m$^3$ average concentration over a year*
*[2] maximum monitored/modelled concentration at a location of relevant exposure*
*[3] highest recorded value in Horsefair, Chipping Norton*
*[4] annual average at Bridge Street, Witney*

*Table 5-22: List of AQMAs in Oxfordshire by District (DEFRA, 2021) (Cherwell District Council, 2017) (Oxford City Council, 2021) (South Oxfordshire District Council, 2014) (Vale of White Horse District Council, 2020) (West Oxfordshire District Council, 2020)*

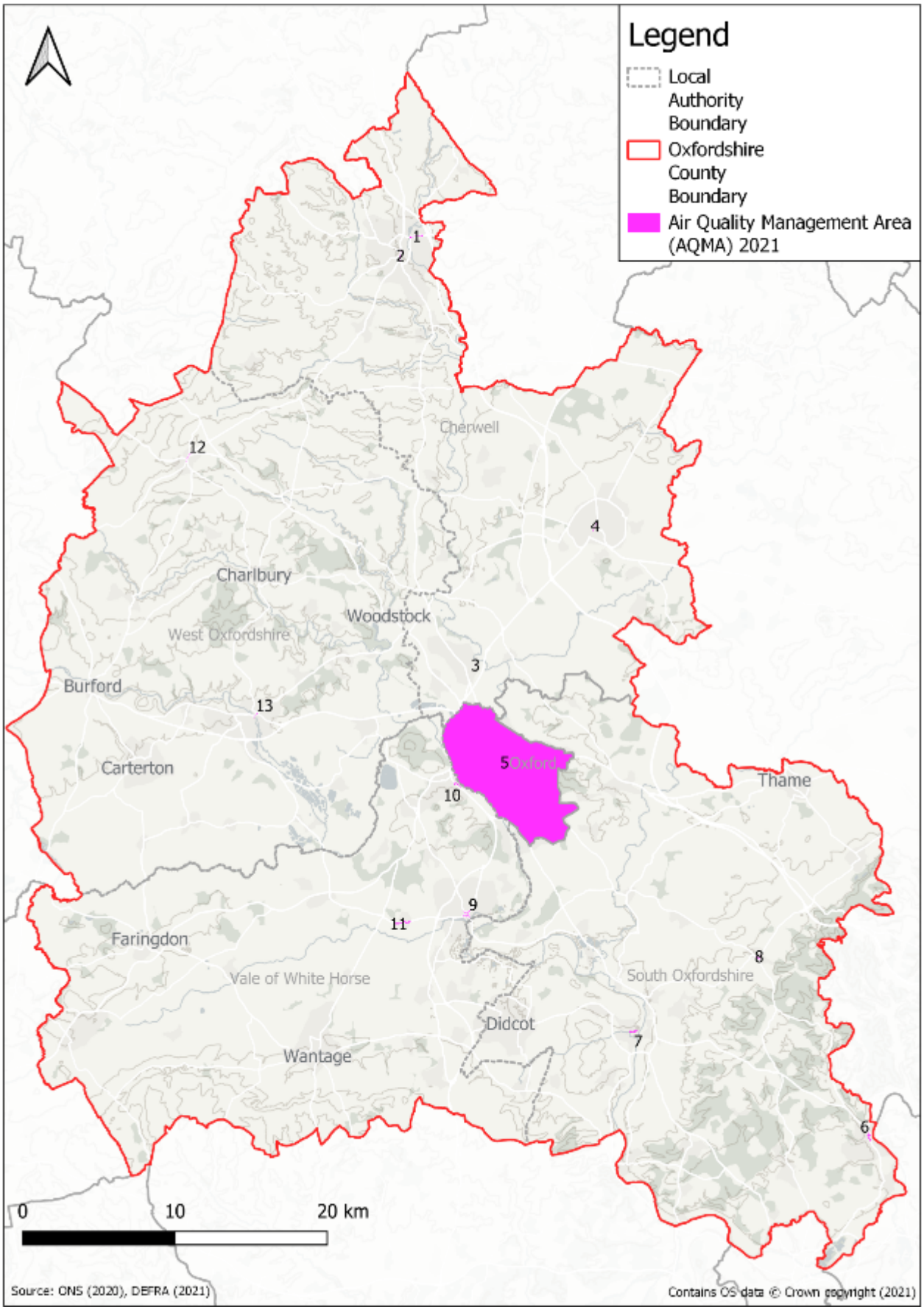



*Figure 5-25: AQMAs in Oxfordshire (DEFRA, 2020) [Note that shaded area in Oxford denotes full extent of AQMA. In all other cases, AQMA covers a smaller area and therefore the extent is not clearly visible]]*

#### 5.3.4.2.4 Potential Effect of Electric Vehicles

The future banning of the sale of petrol and diesel vehicles by 2030 and 2035 will accelerate reductions in $NO_2$ emissions across Oxfordshire given that electric vehicles do not produce these pollutants at the tailpipe. However, in contrast to the positive impact that electric vehicles have on reducing $NO_2$ emissions, recent evidence indicates that the future impact of electric vehicles is likely to result in a less material reduction in PM2.5 and PM10 (Harrison & Beddows, 2021) pollutants compared to internal combustion engine vehicles as a result of brake, tyre and road surface wear. This means that to the future focus of cleaner air needs may shift away from $NO_2$ towards Particulate Matter.

Source apportionment of emissions from other vehicles (in particular HGVs and buses) must also be considered in and around the AQMAs as these also have a strong influence on emissions. Oxford City is currently preparing a business case to replace its bus fleet with all-electric buses under the All Electric Bus Town Scheme and the government is currently consulting on ending the sale of new diesel buses but the full impact of these opportunities requires further detailed modelling.

#### 5.3.4.2.5 Air Quality Index

The Air Quality Index (DEFRA, 2021) is calculated based on pollutant concentrations (Nitrogen Dioxide, Ozone, Sulphur Dioxide, Particle Matter 10 and 2.5) averaged over specified periods, dependent on their short-term impacts to health. The Index can be forecast alongside weather and is impacted not only by expected pollutants but also dispersion by wind and removal by rain.

Although air pollution can have a range of effects on people, the Index is reported daily to provide advice to those most sensitive to air pollution, such as older people and those with lung or heart conditions, so they can plan any medication or activities. In the UK, it is not expected that the general population will be affected as the air quality index remains at relatively low levels (Index levels 1-3). However, it should be noted that the index is calculated for 12km grids, so does not account for very localised variations (for example increases due to roads) (Met Office, 2021). The Met Office provides the suggested health messaging for different index levels, ranging from 'Low' to 'Very High' (see Table 5-23).

| Air Pollution Banding | Index | Accompanying health messages for at-risk individuals | Accompanying health messages for the general population |
|---|---|---|---|
| Low | 1-3 | Enjoy your usual outdoor activities. | Enjoy your usual outdoor activities. |
| Moderate | 4-6 | Consider reducing strenuous physical activity, particularly outdoors. | Enjoy your usual outdoor activities. |
| High | 7-9 | Reduce strenuous physical exertion, particularly outdoors. People with asthma may find they need to use their reliever inhaler more often. Older people should also reduce physical exertion. | Anyone experiencing discomfort such as sore eyes, cough or sore throat should consider reducing activity, particularly outdoors. |
| Very High | 10 | Avoid strenuous physical activity. Older people should also reduce physical exertion. People with asthma may find they need to use their reliever inhaler more often. | Reduce physical exertion, particularly outdoors, especially if you experience symptoms such as cough or sore throat. |

*Table 5-23: Recommended Actions and Health Advice for different Air Quality Index Levels, adapted from DEFRA Daily Air Quality Index (DEFRA, 2021) (Met Office, 2021).*

Historic Air Quality Indices have been analysed for the South East using DEFRA UK-AIR data for 2020. The analysis shows that for the majority (83%) of the year, the Air Pollution Banding remains Low (Index level 2 or 3). For 50 days of the year, it is Moderate (Index level 4, 5 or 6), and for 8 days of the year the Index is level 7 (High). The highest Index level reached in 2020 was Index 8 (High) on the 9th of July.

#### *5.3.4.3 Typical Infrastructure Schemes to Meet H2 Needs*

The following typical infrastructure schemes could meet the H2 needs identified:

- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- District Heat Networks (IF1)
- Zero Emission Zones (IF2)
- Low Traffic Neighbourhoods (IF2)
- Electric Vehicle Charging Schemes (IF2)

### 5.3.5 H5: Enhance Mental Health & Wellbeing

*H5 Future Needs to 2040 for Enhance Mental Health & Wellbeing at a Glance*

The 2011 Mental Health Strategy alongside Public Health England's Prevention Concordat for Better Mental Health (PHE, 2020) identifies the strategic need to improve people's mental health at a national level. This emphasises the need to take a prevention-focused approach, impacting on the wider determinants of mental health and well-being, and increasing the impact on reducing health inequalities.

Oxfordshire's Strategic Vision (Oxfordshire Growth Board, 2021) identifies the need for happier, healthier and inclusive communities with a focus on prevention and healthy place-making for all. This is underpinned by a range of strategies including the Oxfordshire Mental Health Prevention Framework 2020 – 2023 (Mental Health Prevention Concordat Partnership Group, 2020) which identifies a need to address wider social determinants of mental health and the differences in opportunities for people.

The evidence indicates that there is a need to reduce levels of depression across Oxfordshire, with data identifying that around 12% of people over 18 have been diagnosed with depression in 2019/2020, which is marginally higher than the national average. Prevalence rates are higher for GP surgeries in some OxIS Towns & Surrounds (e.g. Abingdon-on-Thames, Bicester, Banbury, Carterton and Didcot) alongside the rural communities of Kidlington and Berinsfield which identifies there may be a greater need in these places.

There is also a need to reduce anxiety levels, particularly in Oxford City, Cherwell and West Oxfordshire. Rates in Oxford City are particularly high and are almost 20% above the national average.

*H5 Key Affected Infrastructure*

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

***IF7 Green & Blue***

***IF8 Community & Cultural***

***IF9 Sport & Leisure***

***IF10 Health & Adult Social Care***

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.3.5.1 *Strategic Policy & Strategy Need*

*H5 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Improve Quality of Life | No health without mental health: a cross government mental health outcome strategy (HM Government, 2011)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Suicide and Self-Harm Prevention Strategy 2020 – 2024 (Oxfordshire Public Health, 2020)<br>Public Health England Prevention Concordat for Better Mental Health (PHE, 2020)<br>Oxfordshire Mental Health Prevention Framework 2020 – 2023 (Mental Health Prevention Concordat Partnership Group, 2020)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) |
| Allow everyone in Oxfordshire the opportunity to achieve good mental health and wellbeing | Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Suicide and Self-Harm Prevention Strategy 2020 – 2024 (Oxfordshire Public Health, 2020)<br>Public Health England Prevention Concordat for Better Mental Health (PHE, 2020)<br>Oxfordshire Mental Health Prevention Framework 2020 – 2023 (Mental Health Prevention Concordat Partnership Group, 2020)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

Several local frameworks and strategies produced within the last three years, underpinned by Public Health England's Prevention Concordat for Better Mental Health (Public Health England, 2020), underline the strategic need to improve people's mental health and wellbeing in Oxfordshire.

A key theme identified across local strategic policy is the importance of cross-sector action and partnerships between organisations in order to deliver a tangible impact. This is reflected in national policy and is key to the Concordat which is intended to provide a focus across:

- Local Authorites
- the NHS
- Education settings
- Employers
- Public, Private, Voluntary and Social enterprise sector organisations

The Concordat (Public Health England, 2020) emphasises the need to take a prevention-focused approach, which has been shown to make a valuable contribution to achieving a fairer and more equitable society, impacting on the wider determinants of mental health and well-being, and increasing the impact on reducing health inequalities.

The theme of preventative actions to reduce mental health inequality are prevalent throughout local policies and strategies, which are summarised below.

#### *5.3.5.1.1 Oxfordshire Strategic Vision*

Oxfordshire's Strategic Vision (Oxfordshire Growth Board, 2021) identifies the need for happier, healthier and inclusive communities with a focus on prevention and healthy place-making for all. The following strategic priorities are identified to address this need:

- Homes to meet people's needs
- Jobs to support livelihoods
- Enhanced access to green spaces
- Better access to sustainable, inclusive and resilient active transport
- Better access to low carbon transport
- Improved air quality

The Vision also highlights the importance of cohesive communities that are supported and empowered to do things that matter to improve their health and well-being.

#### *5.3.5.1.2 Oxfordshire Mental Health Prevention Framework 2020 – 2023*

The three-year framework (Mental Health Prevention Concordat Partnership Group, 2020), highlights the need to address the wider social determinants of mental health and the difference in opportunities people have available to them. With this in mind, the future vision is that everyone in Oxfordshire has good mental health and wellbeing and, in order to achieve this, the framework sets out the need to:

- Increase people's knowledge, skills and confidence
- Targeted action and robust evaluation
- Support and advice for good mental wellbeing
- Working with partners across the system

#### *5.3.5.1.3 Oxfordshire Joint Health and Wellbeing Strategy (2019)*

The Oxfordshire Joint Health and Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) has a shared vision to tackle both physical and mental health inequalities equally through shifting the focus to prevention. A key component of the prevention focus is on a need to improve *'mental wellbeing for all'.*

#### *5.3.5.1.4 Oxfordshire Suicide and Self-Harm Prevention Strategy 2020 – 2024*

Oxfordshire's Suicide and Self-Harm Prevention Strategy (Oxfordshire Public Health, 2020) was developed in line with National Strategy recommendations, combined with Oxfordshire Public Health's local knowledge and identifies a strategic need to reduce suicide and self-harm behaviour across the County. Four action areas are set out in the Strategy:

- Suicide & self-harm safer communities: building resilience within communities, schools, local business and employers and grass roots projects and reaching out to groups who are potentially vulnerable within our community
- Suicide & self-harm safer professionals & work setting: ensure that professionals are upskilled so they feel confident asking about their colleagues' mental wellbeing and are able to recognise and respond to collegaues who are suffering from emotional distress
- Accessible support for those effected by suicide & self-harm: providing immediate accessible support for people bereaved by suicide
- Strong, integrated suicide & self-harm network: continue to create and reinforce relationships with other partners locally to enable sharing and collection of data and shared insight and knowledge

#### 5.3.5.2 Evidence Base

| H5: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | Source |
| ✓ Number of People Reporting Depression or Anxiety Symptoms | Public Health England |

Mental or personal wellbeing does not have one set meaning but it can be used to refer to people's feelings and how well people cope with daily life (Mind, 2020). Everyone has a mental health and wellbeing but addressing its problems can refer to addressing feelings of stress, anxiety, fear and panic, low mood, sadness and depression, loneliness, grief, such as after bereavement or loss, and anger (NHS, 2021).

One-in-four adults and one-in-ten children experience mental illness or mental health problems during their lifetime. These can range from more common problems, such as depression and anxiety, to rarer problems or disorders (Mind, 2017). The term 'mental health disorder' is used to refer to those who have a mental illness, a learning disability, or a personality disorder.

Mental health services can be accessed through the NHS, either through self-referral or referral from GPs, occupational health through employers, or through school or college (NHS, 2019). Self-help is also available to anyone online through the NHS or a variety of local organisations and charities.

A wide range of measures and frameworks have been developed over the past few decades, including questionnaires to assess the severity of particular mental health conditions and frameworks to assess broader aspects of people's lives (Collins, 2019). However, measuring outcomes in mental health services is often complex "with professionals and service users often having differing perspectives on the nature of mental illness and the role of services in addressing it" (King's Fund, 2019). Additionally, prevalence data relies on diagnosis, which is partly dependent on access to health services (Faculty of Public Health, n.d.).

##### 5.3.5.2.1 Personal Wellbeing

Personal wellbeing is measured through self-reported answers to four questions (ONS, 2018) to understand how people rate their personal wellbeing on an 11-point scale in different aspects of life. The questions allow respondents to reflect on their life and make a cognitive assessment, taking into account what the respondent finds important and based on their own preferences, and is able to capture both positive and negative experiences (or effects) over a short timeframe to capture day-to-day well-being (ONS, 2018).

It should be noted that the period covered in the latest data release includes the build-up to the national lockdown of the UK in response to the COVID-19 pandemic. A steep increase in anxiety and reduction in happiness during the first quarter of 2020 can be seen nationally, which may have been contributed to by the declaration of a public health emergency by the World Health Organisation as well as the UK leaving the EU, both by the end of January (ONS, 2020).

| Local Authority | Life Satisfaction | Worthwhile | Happy | Anxiety* |
|---|---|---|---|---|
| Cherwell | 7.70 | 7.82 | 7.39 | 3.18 |
| Oxford | 7.51 | 7.69 | 7.57 | 3.61 |
| South Oxfordshire | 7.88 | 8.21 | 7.67 | 2.89 |
| Vale of White Horse | 7.81 | 8.33 | 7.56 | 2.91 |
| West Oxfordshire | 7.56 | 7.88 | 7.61 | 3.16 |
| **Oxfordshire** | **7.70** | **7.98** | **7.50** | **3.16** |
| **England** | **7.66** | **7.86** | **7.48** | **3.05** |

*Table 5-24: Personal well-being estimates: mean scores (2019/20). *Estimate is only reasonably precise at a District Level with a co-efficient of variation of between 5 and 10% (as opposed to precise and less than 5% for all other data) (ONS, 2020)*

#### 5.3.5.2.2 Prevalence of Common Mental Health Illnesses

Figure 5-26 shows the number of patients over 18 years of age, as a proportion of total registered patients within each District, with a record of unresolved depression and/or anxiety on their patient record.

Compared to England, Oxfordshire (as well as each individual District) has a slightly lower proportion of prevalence of depression and/or anxiety. This should, however, be taken with caution as we do not know how many cases have not been recorded (due to the reliance of patients coming forward), results do not give an indication of the number of patients currently receiving any interventions (based on current records) (Public Health England, 2020).

Figure 5-26 shows recorded prevalence of depression in 2019/20 geographically by GP in Oxfordshire, demonstrating lower levels of proportional prevalence in Oxford City compared to other Districts.

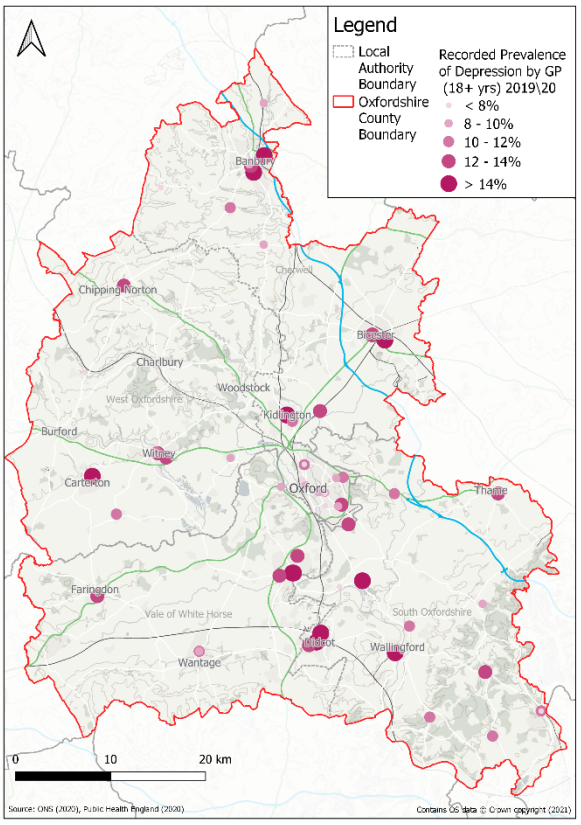



*Figure 5-26: Recorded prevalence of Depression by GP in Oxfordshire (2019/20) (Public Health England)*

| Local Authority | Proportion reporting depression or anxiety (18+ yrs) |
|---|---|
| Cherwell | 12% |
| Oxford | 12% |
| South Oxfordshire | 9% |
| Vale of White Horse | 13% |
| West Oxfordshire | 12% |
| OXFORDSHIRE | 12% |
| England | **14%** |

*Table 5-25: Proportion reporting depression or anxiety by district in Oxfordshire, compared to county and national levels (2016/17) (Public Health England)*

#### 5.3.5.2.3 Inequalities in the prevalence of mental ill-health

Unlike the association between deprivation and life expectancy, determining inequality in mental health issues can be more challenging due to differing rates of recognition, reporting and diagnosis (King's Fund, 2020). However, some important patterns link mental health issues being more prevalent among a range of protected characteristics including sexual orientation, sex and ethnicity (King's Fund, 2020).

### 5.3.5.3 Typical Infrastructure Schemes to Meet H5 Needs

The following typical infrastructure schemes could meet the H5 needs identified:

- Active Travel Schemes (IF2)
- Sport & Leisure Centre Schemes (IF9)
- Community Woodland Schemes (IF7)
- Outdoor Green Space Schemes (IF7)
- Community Centres & Civic Space (IF8)

## 5.4 Place-Shaping Needs

***Place-Shaping Needs to 2040***

The Place-Shaping theme is associated with the creation of sustainable and resilient communities which provide a high-quality environment, reflecting the urban and rural dynamics of Oxfordshire.

The outcome led needs within the Place-Shaping Theme are:

- PS1: Creating Liveable Communities (see Section 5.4.1)
    1. Enable walking & cycling access to local service, amenities & employment
    2. Create diverse communities which reduce travel distance / travel need
- PS2: Improve Community Safety and Security (see Section 5.4.1.3)
- PS3: Heritage & Culture (see Section 5.4.3)
- PS4: Socially Integrating Communities (see Section 5.4.4)
- PS5: Making Active Travel Inclusive & Integrated (see Section 5.4.5)

Needs to 2050 will be covered in the forthcoming OxIS Stage 2 Report.

### 5.4.1 PS1: Local & Liveable Communities

***PS1 Future Needs to 2040 for Local & Liveable Communities at a Glance***

The need to create local and liveable communities is set out in both local and national planning policy to ensure communities are safe and healthy. The need for easy access to social, recreational and cultural facilities is also highlighted and encouraging reduced travel or a shift to travel by sustainable transport through providing key services and facilities within local reach of residents.

In Oxfordshire, large rural parts of the county, particularly across Vale of White Horse and South Oxfordshire, are defined by Indices of Multiple Deprivation as being in the top 10% deprived Lower-layer Super Output Areas associated with barriers to housing and services. With new development coming forward, careful planning and place-shaping is required to adhere to policy by creating liveable, local communities with access to local amenities and sustainable transport.

*PS1 Key Affected Infrastructure*

*IF1 Energy*



*IF2 Transport*

*IF3 Flood Alleviation*



*IF4 Education*

*IF5 Digital*

*IF6 Innovation*



*IF7 Green & Blue*



*IF8 Community & Cultural*



*IF9 Sport & Leisure*



*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.4.1.1 Strategic Policy & Strategy Need

*PS1 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Create local and liveable communities which reduce travel distance / travel need and enable walking & cycling access to local services. | NPPF (MHCLG, 2019)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Plan 2050 (Oxfordshire Authorities, 2019)<br>District Local Plans (Various)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015) |

| Need Tier 1 | Need Tier 2 | Need Tier 3 | Need Tier 4 |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |
| [UK Legal Requirement] | [National Policy] | [County-wide Policy] | [District Policy] |

##### 5.4.1.1.1 NPPF

At a national level, the need to create more local and liveable communities is established within NPPF (MHCLG, 2019) in its aim for *'promoting healthy and safe communities'*. Alongside the wider health needs (see Section 5.3) and community safety needs (see Section 5.4.1.3), NPPF identifies liveable communities as those which are able to provide local *'social, recreational and cultural facilities and services the community needs.'*

This includes an emphasis on ensuring communities have a diverse mix of local services, shared space and community facilities, including local shops, meeting places, sport venues, green space, cultural buildings, public houses and places of worship.

This need is complemented by NPPF's promotion of sustainable transport, in which it identifies that development should focus upon *'limiting the need to travel'* as a means to *'minimise the number and length of journeys needed for employment, shopping leisure, education and other activities.'*

##### 5.4.1.1.2 Strategic Vision for Oxfordshire & Emerging Oxfordshire Plan 2050

The Strategic Vision for Oxfordshire (Oxfordshire Growth Board, 2020) further reflects this need and sets an outcome for communities to be:

- Happier, Healthier & Inclusive: improving the health and happiness of residents, reducing inequalities and improved well-being
- Flourishing Communities: communities will be rooted and flourishing, with enhanced and lasting connectedness driven by individual and community action

To achieve these, the Strategic Vision sets out its guiding principles. A key guiding principle is to help people to help each other by aiding communities to be more cohesive and better able to adapt to change, based on being able to create and access high-quality services and infrastructure. This will allow communities to be supported and empowered to improve their health and well-being.

This need to create more local and liveable communities is also reflected within the emerging objectives of the Oxfordshire Plan 2050 (Oxfordshire Authorities, 2019) which aspires to improve people's access to local services.

It also mentions the need for a range of different housing options (including affordable housing) and economic policies that ensure the benefits of economic growth are shared widely throughout the community. An example is to address inequality of access to local services or public transport.

***Oxfordshire Plan 2050 – Liveable Communities Objective [Draft Objective 4]***

'To create sustainable communities by providing good access to employment, housing, open space, transport, education, services and facilities to meet identified needs and that respond to the challenges of climate change'

#### *5.4.1.1.3 District Local Plans*

Each of the District's Local Plan also places a strong emphasis on the need to create more liveable communities through delivering mixed, diverse and balanced communities. This is further supported by the Health Impact Assessment Tool.

***Oxford City Local Plan 2036 (Adopted 2020) (Oxford City Council, 2020)***

Oxford City's Local Plan sets a number of policies to support "a pleasant place to live, delivering housing with a mixed balanced community" and "providing communities with facilities and services and ensuring Oxford is a vibrant and enjoyable city to live in and visit". Achieving mixed and balanced communities requires planning for people's different needs with communities being accessible for all (Oxford City Council, 2020).

#### *5.4.1.1.4 Connecting Oxfordshire: Local Transport Plan*

The Local Transport Plan (OCC, 2015) also places an emphasis on place-based approaches to improving people's quality of life and creating more local and liveable communities as a means to reduce travel distances and demand. This includes an objective to:

***Improve public health and wellbeing by increasing levels of walking and cycling, reducing transport emissions, reducing casualties and enabling inclusive access to jobs, education, training and services***

Connecting Oxfordshire sets out 34 policies that OCC will adhere to in order to deliver the key goals of the LTP. Of most relevance to creating liveable communities which reduce both travel distance and therefore the attractiveness of walking and cycling to access local services are the following policies:

- Policy 17: seek to ensure through cooperation with the districts and city councils, that the location of development makes the best use of existing and planned infrastructure, provides new or improved infrastructure and reduces the need to travel and supports walking, cycling and public transport
- Policy 18: help reduce the need to travel by improving internet and mobile connectivity and other initiatives that enable people to work at or close to home
- Policy 19: encourage the use of modes of travel associated with healthy and active lifestyles;
- Policy 34: require the layout and design of new developments to proactively encourage walking and cycling, especially for local trips, and allow developments to be served by frequent, reliable and efficient public transport

#### *5.4.1.2 Evidence Base*

***PS1: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal***

| *Appraisal Dataset* | *Source* |
|---|---|
| ✓ *Indices of Multiple Deprivation – Geographical Barriers Sub-Domain [Distance to Primary School, Post Office, Supermarket / General Store and GP Surgery]* | *MHCLG* |

#### *5.4.1.2.1 Living Locally*

The concept of people *'living locally'* is not new but has gathered increased attention through the COVID-19 pandemic as awareness of the impact infrastructure investment plays in connecting people and places by walking and cycling has grown. Sustrans (2020) defines 'living locally' as a community in which 'it is easy for people to meet most of their everyday needs by a short, convenient and pleasant 20-minute return walk'. The Melbourne Plan 2017 – 2050 (Planning for Victoria, 2017), which places 20-minute neighbourhoods at the heart of its spatial planning process, identifies it as 'giving people the ability to meet most of their daily needs within a 20-minute walk from home, with access to safe cycling and local transport options.'

The generally agreed consensus across the broad range of resources is that a community *'living locally'* is one that:

- Has access to a range of supporting local services, amenities and local employment which suits its needs and makes it easier for people to walk or cycle
- Local services, amenities and local employment are easily accessible and inclusive for people walking and cycling within a 20-minute journey time

A journey time of 20-minutes is reflective of well-established research which identifies that people are for the most part, content to walk for around a mile (or 20 minutes) to access services (DfT, 2019).

#### *5.4.1.2.2 Oxfordshire's Accessibility to Local Services, Amenities & Employment*

Evidence at a national level indicates that it is usually quicker to access key services such as employment, education, healthcare, food stores and town centres by car (11 minutes) than it is public transport and/or walking (18 minutes) or cycling (15 minutes).

On average, only 8 of the 10 key services are accessible within an hour unless a vehicle is used. The difference in journey times between modes (the variance in accessibility) is greater for those living in rural areas (by 14, 30 and 26 minutes respectively by car, public transport and/or walking or cycle) than in urban areas (DfT, 2019).

A measure of accessibility can be self-containment; the degree to which people live and work in the same area. Oxfordshire's district-levels of self-containment, assessed using the 2011 Census and as reported by OCC (Oxfordshire Insight, 2014), are displayed in Table 5-26.

This indicates that Oxford City has the highest self-containment and South Oxfordshire the lowest. Whilst this could give an indication of the level of local commuting, some districts are comparatively larger and may therefore over-estimate the level of local commuting (20minutes) indicated by the District level of self-containment in isolation.

| | Self-containment of residents by District |
|---|---|
| Cherwell | 65% |
| Oxford City | 77% |
| South Oxfordshire | 55% |
| Vale of White Horse | 60% |
| West Oxfordshire | 65% |

*Table 5-26: Self Containment by District (Oxfordshire Insight, 2014)*

The IMD also measures the relative Geographical Access to Services which considers the road distance to facilities including post offices, primary schools, GPs and supermarkets (see Figure 5-27).

This dataset indicates that almost a quarter of all LSOAs in Oxfordshire are ranked in the top 10% of most deprived communities nationally for geographical access to these services. Within the county it can be observed that rural areas are more likely to have lower levels of access.

This is particularly true for the Vale of the White Horse where almost a third of LSOAs in the District rank in the lowest decile for access to services.

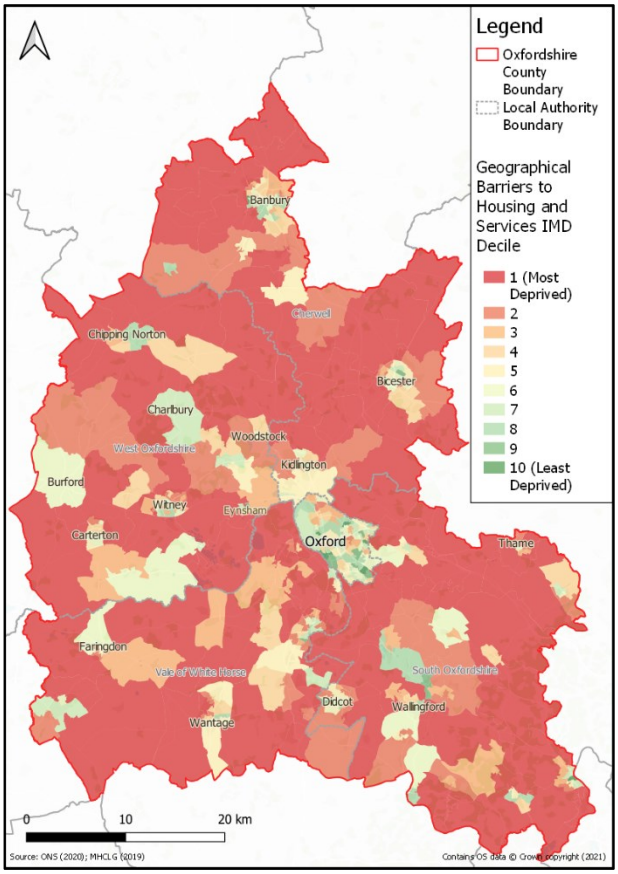



*Figure 5-27: IMD – Geographical Barriers to Services (MHCLG, 2019)*

#### *5.4.1.3 Typical Infrastructure Schemes to Meet PS1 Needs*

The following typical infrastructure schemes could meet the PS1 needs identified:

- Primary School (IF4)
- Secondary School (IF4)
- GP Surgery & Health Centre (IF10)
- Active Travel Scheme (IF2)
- Public Transport Scheme (IF2)
- Road Scheme (IF2)

### 5.4.2 PS2: Safe & Secure Communities

***PS2 Future Needs to 2040 for Safe & Secure Communities at a Glance***

Although the perception of crime given the context nationally is diminished, crime has been rising in Oxfordshire and with population growth predicted, measures need to be put in place now to minimise the risk to people's safety. Measures set out by Safer Oxfordshire Partnership, highlights the importance for infrastructure and the heathy place-shaping of communities to prevent crime. Theft and violence represent 80% of crimes in Oxfordshire and urban areas have proportionally higher levels of crime than the county's rural areas. This is further supported by Indices of Multiple Deprivation data, showing that Oxfordshire is home to a number of top 10% deprived areas (e.g. parts of Oxford, Banbury and Bicester) in England and Wales associated with crime, identifying a stronger need.

Analysis of road safety, another metric contributing to safe and secure communities, identifies a need to address the number of road collision casualties county-wide in Oxfordshire, particularly around urban areas with evidence suggesting walking and cycling issues are present.

***PS2 Key Affected Infrastructure***

*IF1 Energy*



*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*



*IF13 Emergency Services*

#### 5.4.2.1 Strategic Policy & Strategy Need

*PS2 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Reduce crime & the perception of crime occurring | Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Community Safety Agreement 2019/20 (Safer Oxfordshire Partnership, 2019)<br>District Community Safety Partnerships (Various)<br>Community Risk Management Plan 2017-22 (Oxfordshire Fire & Rescue Service, 2017) |
| Improve Road Safety through reducing road collision casualties | Road Traffic Act (1988)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Health Impact Assessment Toolkit (Oxfordshire Growth Board, 2021) |
| Maintain and enhance emergency vehicle response times | Community Risk Management Action Plan 2020-2021 (Oxfordshire Fire & Rescue Service, 2020)<br>NHS South Central Ambulance Service NHS Foundation Trust Annual Report 2019-20 (NHS SCATS, 2020) |

| Need Tier 1 | Need Tier 2 | Need Tier 3 | Need Tier 4 |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |
| [UK Legal Requirement] | [National Policy] | [County-wide Policy] | [District Policy] |

##### 5.4.2.1.1 Community Safety & Security

The Safer Oxfordshire Partnership, which is a group made up of Oxfordshire's six local authorities and key stakeholders including Thames Valley Police, Oxfordshire Fire & Rescue, and the Oxfordshire CCG, provides strategic direction to fulfil Oxfordshire's future need to create a safer place to live, work and visit. This strategic need is also reflected within the Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021).

The future strategic needs for community safety are identified on an annual rolling basis by the Safer Oxfordshire Partnership in their Community Safety Agreement. The most recent Community Safety Agreement (2019) identifies a vision focused on *'working together to reduce crime and create a safer Oxfordshire.'* The strategic future priorities, all of which are influenced by infrastructure, are:

- Supporting an Oxfordshire-wide approach to tackling serious and organised crime
- Protecting people from the risk of abuse
- Reducing harm from alcohol and drugs abuse
- Reduce re-offending
- Embedding healthy place-shaping within the planning process through:
    - Supporting creation of green spaces and infrastructure locally to support community wellbeing
    - Supporting communities' engagement in the planning of places and infrastructure
    - Re-orienting health care services and infrastructure to achieve wider health benefits

The Oxfordshire Safer Partnership works in tandem with the four wider District Community Safety Partnerships, all of which have their own locally specific plans to improve future community safety (summarised in Table 5-27).

| District Community Safety Partnerships | Community Safety Plan |
|---|---|
| Cherwell Community Safety Partnership | Cherwell Community Safety Partnership Plan 2017-2021 (Cherwell District Council, 2017) |
| Oxford Community Safety Partnership | Oxford Safer Communities Partnership Rolling Plan 2020-2021 (Oxford Safer Communities Partnership, 2020) |
| South and Vale Community Safety Partnership | South and Vale Community Safety Partnership, Rolling Plan 2020-21 (South and Vale Community Safety Partnership, 2020) |
| West Oxfordshire Community Safety Partnership | West Oxfordshire Community Safety Partnership (WOCSP) Action Plan 2018 – 2021 (West Oxfordshire Community Safety Partnership, 2020) |

*Table 5-27: Oxfordshire District Community Safety Partnerships & Community Safety Plans*

In addition, the strategic Community Risk Management Plan (2017-22) (Oxfordshire Fire & Rescue Service, 2017) alongside the annual Community Risk Management Action Plan 2020-21 (Oxfordshire Fire & Rescue Service, 2020) identifies the specific future strategic needs and priorities for the Oxfordshire Fire & Rescue Service through the 365alive vision. There are wider strategic needs identified by Oxfordshire Fire and Rescue, Thames Valley Police and the South Central Ambulance Service NHS Trust to achieve targets for emergency vehicle response times.

***365alive Vision 2016 – 2022 (Oxfordshire Fire & Rescue Service, 2020)***

- 6,000 more people alive
- 85,000 children and young people better educated to lead safer lives
- 37,500 vulnerable children and adults supported to lead more independent lives
- 20,000 businesses given support and advice

#### *5.4.2.1.2 Road Safety*

Alongside improving levels of community safety, improving road safety is recognised as a key requirement to support public health and wellbeing. The future strategic need for improved road safety across Oxfordshire is set out within Section 39 of the Road Traffic Act (1988) which obligates OCC as highways authority to *"prepare and carry out a programme of measures designed to promote road safety."* This means that OCC must carry out studies into collisions arising out of the use of vehicles and considering those studies must take such measures as appropriate to prevent such collisions occurring.

The future priorities for road safety across the County are identified in the Local Transport Plan (OCC, 2015). Key actions include:

- Maintaining transport infrastructure
- Highway engineering improvements
- Changing speed limits
- Supporting people to feel safer and secure when walking and cycling
- Delivering inclusive environments for people with mobility impairments

#### 5.4.2.2 Evidence Base

| PS2: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | *Source* |
| ✓ *Number of Recorded Crimes* | Thames Valley Police |
| ✓ *Perception of Crime & Anti-Social Behaviour Occurring* | Crime Survey for England and Wales |
| ✓ *Killed & Seriously Injured in Road Collisions* | Ft/ STATS-19 |
| ✓ *Number of collisions per billion vehicles per billion KM* | DfT/ STATS-19 |
| ✓ *Emergency Vehicle Response Time* | South Central Ambulance Service NHS Trust; Oxfordshire Fire & Rescue & Thames Valley Police |

##### 5.4.2.2.1 Community Safety & Security

A total of 43,469 crimes were recorded in Oxfordshire in the 12-month period between October 2018 and September 2019 (Safer Oxfordshire Partnership, April 2020). Of the major crimes recorded, this was comprised of:

- Theft: 19,500
- Criminal Damage & Arson: 4,800
- Robbery: 300
- Violence: 12,600
- Sexual: 1,600
- Other: 4,800

A geospatial breakdown identifying the relative density of where these crimes occurred is identified in Figure 5-28 and summarised by District in Table 5-28.

This indicates that:

- More crime generally occurs in urban areas, particularly in Oxford, Banbury and Bicester
- Less crime occurs in more rural areas
- Recorded crimes is generally rising throughout Oxfordshire, with the excepton of Cherwell

| Local Authority | Number of Recorded Crimes | | |
|---|---|---|---|
| | 2016 - 2017 | 2017 - 2018 | 2018 - 2019 |
| Cherwell | 10,100 | 10,600 | 10,000 |
| Oxford | 16,200 | 15,800 | 16,600 |
| South Oxfordshire | 6,100 | 6,300 | 6,700 |
| Vale of White Horse | 4,800 | 5,200 | 5,300 |
| West Oxfordshire | 3,700 | 4,100 | 4,800 |
| *Note:* Equivalent 2019 to 2020 data was not available at the time of publication | | | |

*Table 5-28: Summary of Recorded Crimes by Oxfordshire District (Safer Oxfordshire Partnership, April 2020) (data.police.uk, 2021)*

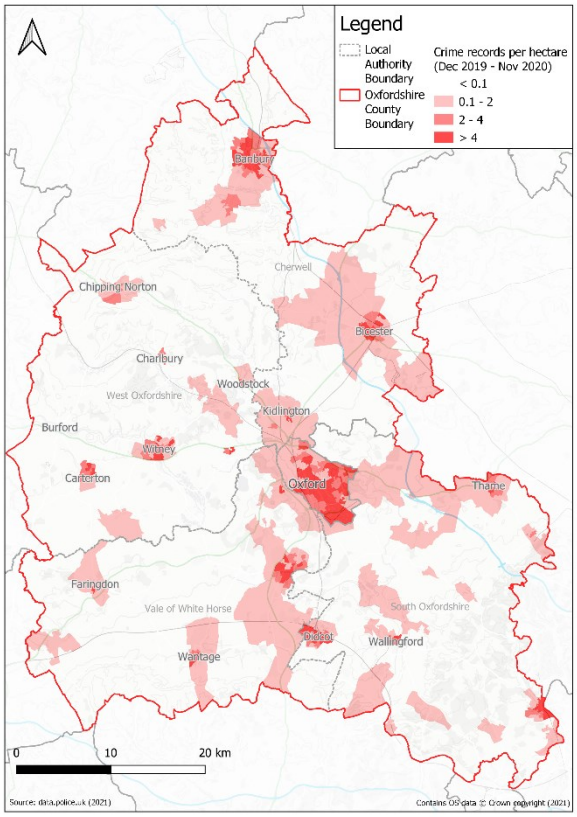



*Figure 5-28: Crime Rates in Oxfordshire (data.police.uk, 2021)*

Figure 5-29 additionally identifies the Crime Domain of the IMD across Oxfordshire, which measures the risk of personal and material victimisation to a local level. Those areas with higher risk are classified as more deprived, those areas with lower risk are classified as less deprived.

This indicates that there are parts of Oxford as well as to the south of Bicester and within the centre and west of Banbury which are in the top 10% most deprived areas for crime.

The most crime-deprived area within Oxfordshire is the Jericho and Osney area of Oxford (Safer Oxfordshire Partnership, April 2020). By contrast, rural areas of the County, particularly in the Vale of White Horse and West Oxfordshire are in the least 20% deprived areas.

Alongside the number of recorded crimes, people's perception of crime occurring and the relative feeling of safety within communities also plays an important role. Community perception of local crime and anti-social behaviour from the Crime Survey for England and Wales is identified in Table 5-29 and Table 5-30 for the Thames Valley Police area (constrained due to limited sample size).

Whilst the Thames Valley Police force area covers an expansive area beyond Oxfordshire, it indicates that the perception amongst people of anti-social behaviour and crime occurring within Oxfordshire is marginally lower than the national average. The evidence also suggests that people in Oxfordshire have more faith in the local authorities and Thames Valley Police in tackling crime than the national average.

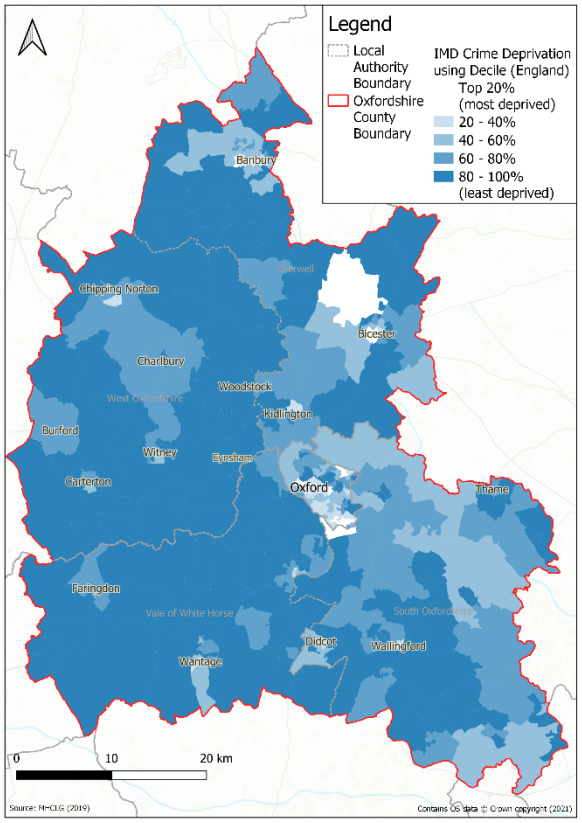



*Figure 5-29: IMD Crime Domain in Oxfordshire (MHCLG, 2019)*

| Anti-Social Behaviours | % of People who say there is a very / fairly big local problem | |
|---|---|---|
| | Thames Valley Police Area | National (England & Wales) |
| Perception of abandoned or burnt out cars | 1% | 2% |
| Noise neighbours or loud parties | 4% | 8% |
| People being rowdy in public places | 7% | 13% |
| People using or dealing drugs | 16% | 22% |
| Rubbish or litter lying around | 21% | 27% |
| Teenagers hanging around on the streets | 7% | 14% |
| Vandalism, graffiti & other deliberate damage to property | 6% | 13% |
| Perceived high level of anti-social behaviour | 3% | 7% |
| *Note:* The Thames Valley Police Area covers Oxfordshire, Buckinghamshire and Berkshire | | |

*Table 5-29: Perception of Anti-Social Behaviour Occurring (ONS, 2020)*

| Perception | % of People saying local council and police are dealing with anti-social behaviour and crime issues that matter in the local area | |
|---|---|---|
| | Thames Valley Policy Area | National (England & Wales) |
| Agree | 61% | 52% |
| No Opinion | 24% | 28% |
| Disagree | 15% | 20% |
| *Note:* The Thames Valley Police Area covers Oxfordshire, Buckinghamshire and Berkshire | | |

*Table 5-30: Perception of Local Council and Police to tackle crime and anti-social behaviour in local communities (ONS, 2020)*

#### 5.4.2.2.2 Road Safety

Figure 5-30, which shows the location of road traffic collisions from 2015 to 2019 categorised by severity, indicates that there are a high number of slight accidents all over the road network and serious and fatal accidents are evenly distributed within the County.

The centre of Oxford has a high concentration of collisions and is within the top 20% of collisions nationally (Figure 5-31). Other areas within the County with high collision numbers are Banbury and Witney, centred on the A roads passing through or near to the town centres.

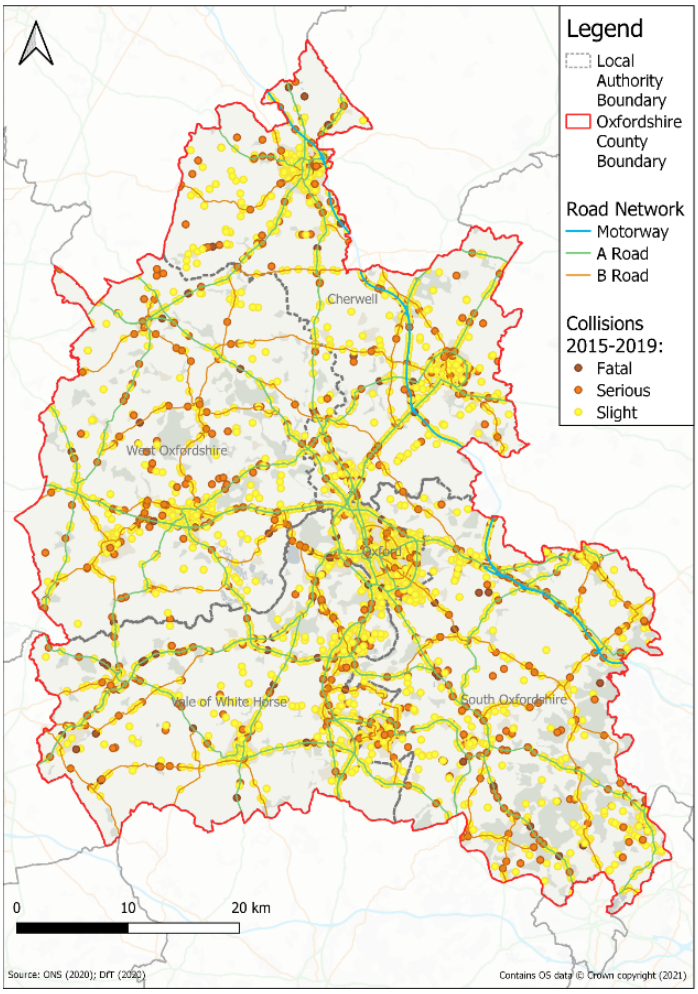



*Figure 5-30: Road Collisions in Oxfordshire 2015-2019 (DfT, 2020)*

#### 5.4.2.3 Typical Infrastructure Schemes to Meet PS2 Needs

The following typical infrastructure schemes could meet the PS2 needs identified:

- Active Travel Scheme (IF2)
- Road Safety Improvement Scheme (IF3)
- Fire Station (IF13)
- Police Station (IF13)
- Ambulance Depot (IF13)
- Outdoor Green Space (IF7)
- Community Centres & Hubs (IF8)

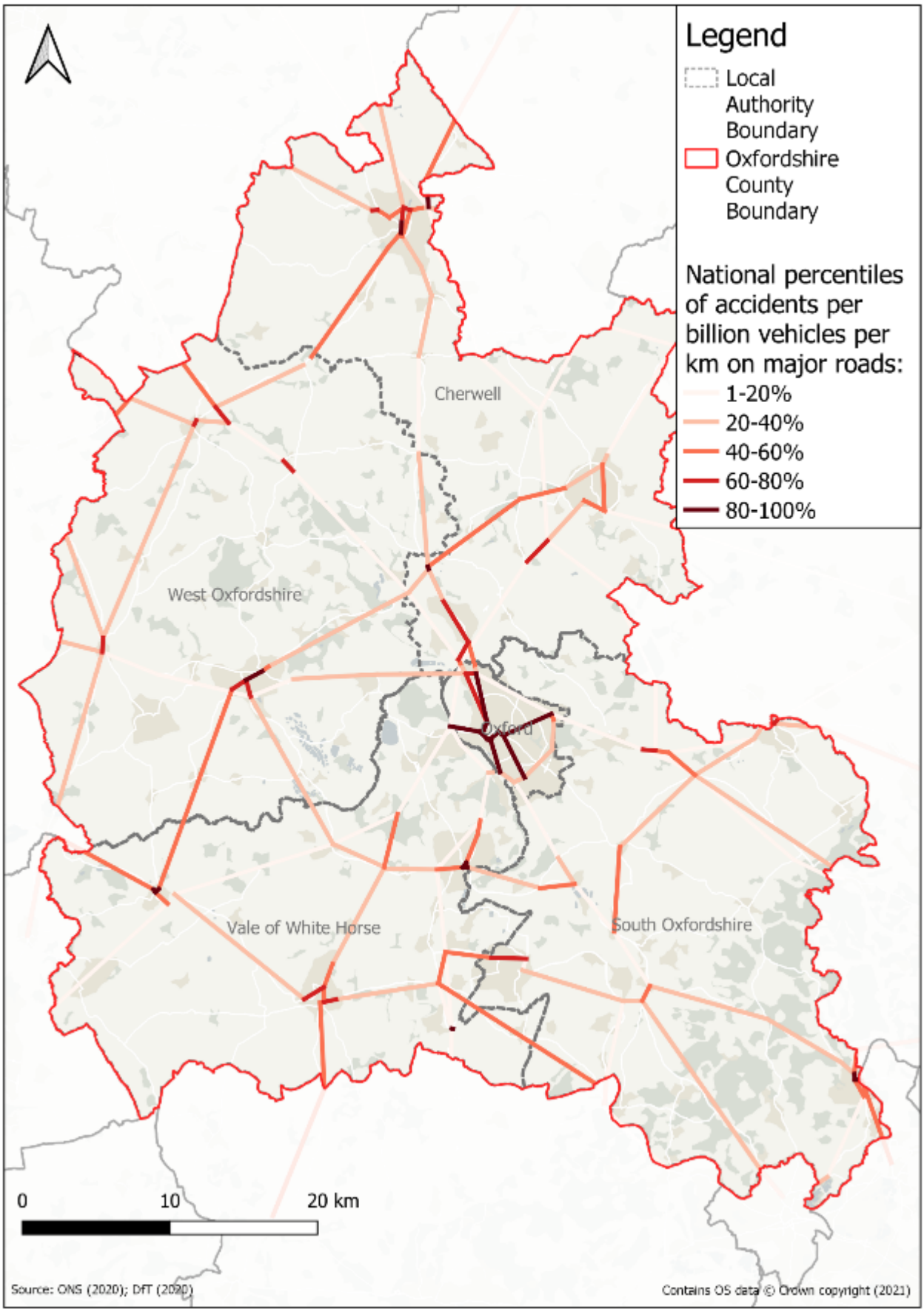



*Figure 5-31: National percentiles per billion vehicles per km on major roads through Oxfordshire (DfT, 2020)*

### 5.4.3 PS3: Resilient Heritage & Culture

*PS3 Future Needs to 2040 for Resilient Heritage & Culture at a Glance*

**Heritage:** As identified in the Historic England Corporate Plan (Historic England, 2020), Oxfordshire's Strategic Vision (OCC, 2020), NPPF (MHCLG, 2019) and the Oxfordshire Districts' Local Plans, there is a strategic need to protect and conserve the county's rich and varied heritage assets both from future development as well as the threats of climate change. Evidence from the Heritage at Risk Register (Historic England, 2020) indicates that there are 30 heritage sites in Oxfordshire at risk.

**Culture:** The Arts Council Ten 2020 – 2030 Strategy (Arts Council England, 2020) identifies the strategic need from a national perspective to improve community access to high-quality cultural experiences. This is complemented locally by Oxfordshire's Strategic Vision (OCC, 2020) and Arts & Culture Strategic Framework (OxLEP, 2019) which identify a strategic need for enhanced and more inclusive arts and cultural spaces across Oxfordshire.

The emerging Strategic Framework for OCC Libraries & Heritage Services (OCC, 2021) emphasises the need for such services to address increased demand from population growth, while Active Lives Survey (Arts Council England, 2018) and the Taking Part Survey (DCMS, 2020) indicate a need to improve use of public library services in specific parts of Oxfordshire. Data at a national level also suggests there may be a need to enhance cultural participation rates amongst lower socio-economic groups, those with disabilities and amongst the Black, Asian and Minority Ethnic community.

*PS3 Key Affected Infrastructure*

#### 5.4.3.1 Strategic Policy & Strategy Need

*PS3 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Ensure resilient cultural services and experiences across Oxfordshire which accommodate the demands from future growth and address inequalities | Arts Council Strategy 2020 – 2030 (Arts Council England, 2020)<br>Arts and Culture Strategic Framework (OxLEP, 2019)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>OCC Corporate Plan 2020-24 (OCC, 2020)<br>Strategic Framework for OCC Libraries and Heritage Services (Forthcoming)<br>Strategic Framework for OCC Libraries and Heritage Services Cabinet Report (OCC, 2021) |
| Protect and conserve Oxfordshire's heritage and historical assets | Historic England Corporate Plan 'Building the Future' 2020 – 2023 (Historic England, 2020)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>NPPF (MHCLG, 2019)<br>District Local Plans (Various) |

| ☒ | ☑ | ☑ | ☑ |
|---|---|---|---|
| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |

##### 5.4.3.1.1 Culture

Art Council England's identifies the national strategic needs from a cultural services perspective, such as museums and libraries. Their Ten Year 2020 - 2030 Strategy sets out the future strategic priorities as well as provide a framework for any funding or investment decision. It aspires that *'by 2030, we want England to be a country in which the creativity of each of us is valued and given the chance to flourish, and where every one of us has access to a remarkable range of high-quality cultural experiences'* (Arts Council England, 2020).

From an Oxfordshire perspective, Guiding Principle Five of Oxfordshire's Strategic Vision (Oxfordshire Growth Board, 2021) emphasises the strategic need to reflect cultural and heritage assets across the county.

***Oxfordshire's Strategic Vision – Guiding Principle 1: We will reflect our distinctive and diverse communities and places (Oxfordshire Growth Board, 2021)***

*'We will ensure that our plans, strategies and programmes reflect the unique and distinctive qualities of places within Oxfordshire, maximising opportunities to deliver the development needed, embracing innovation while enhancing our valuable assets and recognising the diversity of our city, towns and villages, the quality of the historic, natural and built environment, our rich internationally significant cultural and heritage assets, the importance of local identity and the needs of our diverse communities. While we are the most rural county in the South East, most of our population lives in our city, towns and villages. The diversity of our settlements, the synergy between urban and rural and the benefits both bring are critical to our success'*

In addition, the Culture and Visitor Economy Sub-Group of OxLEP prepared a Cultural Strategy in 2016 as well as the more recent Arts and Culture Strategic Framework in 2020 (OxLEP, 2020) identifies the strategic need for enhanced and more inclusive arts and cultural spaces across the county.

This framework also identifies a strategic need to enhance cultural provision, including arts centres and libraries, within a series of OxIS Towns & Surrounds including Didcot, Bicester and Witney.

***OxLEP Arts and Culture Strategic Framework – Five Aspirations for Oxfordshire's Cultural Spaces (OxLEP, 2020)***

- *'Contribute to the health and well-being of local communities and support people to lead fulfilling lives*
- *Facilitate community cohesion and promote social justice*
- *Contribute to educational provision in their communities, complementing the work that takes place in schools, colleges and skills providers*
- *Create opportunities for people of all ages to experience arts and cultural activities which provide enjoyment, the development of personal skills and creativity*
- *Be appropriately resourced to ensure that they are used effectively and secure the community benefits that are intended'*

OCC's Corporate Plan 2020-25 also identifies a strategic need to *'provide services that enhance the quality of life and protect the local environment';* of which a key component is the provision of library, cultural, museum and music services (OCC, 2020). A Strategic Framework for OCC Libraries and Heritage Services is currently in preparation by OCC to develop this further which intends to identify Oxfordshire's future needs in relation to libraries and museums. As noted in a committee report (OCC, 2021), the strategic future need for cultural services is to address increased demand from population growth across the county as well as the need to tackle inequalities.

#### *5.4.3.1.2 Heritage*

National policies and strategies establish a strategic need to protect and conserve-built heritage and historic assets both from future development as well as the threats of climate change. The Historic England Corporate Plan 2020 – 2023 *'Building the Future'* identifies the strategic need to *'improve people's lives by protecting and championing the historic environment'* through fulfilment of its strategic objectives. A key strategic activity is investment to reduce Heritage at Risk sites.

***Historic England Corporate Plan 'Building the Future' 2020 – 2023 – Key Strategic Objectives (Historic England, 2020)***

- *'Protect historic places and keep them for current and future generations*
- *Close the gap between arts, culture and heritage to bring heritage into mainstream cultural life*
- *Give people the skills, knowledge, confidence and motivation to fight for, look after and make the most of their historic environment*

NPPF seeks to protect historical assets through the planning process and identifies that '*plans should set out a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats*' (MHCLG, 2019). This is also reflected in local planning policy through Districts' Local Plans.

### *5.4.3.2 Evidence Base*

| PS3: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | *Source* |
| ✓ *Participation in leisure and recreational arts activities* | Arts Council England Active Lives Survey (2015-2017) |
| ✓ *Number of Heritage Sites at Risk* | Historic England (2020) |

#### *5.4.3.2.1 Culture*

According to the Active Lives Survey (Arts Council England, 2018), Oxfordshire has better than national average participation in leisure and recreational activities, (see Table 5-31), concluding that:

- Museums, galleries and creative, artistic, dance theatrical or music events, performances and festivals are engaged with well in Oxfordshire (78%) compared to nationally (70%) within a 12-month period
- Spending time doing a creative, artistic, theatrical or music activity or craft scores well across Oxfordshire but

is contributed mostly by Oxford with nearly half of the city's residents participating in a 12-month period

Despite this, the evidence indicates that there is a need to Improve use of public library services in some parts of Oxfordshire, particularly in Cherwell where patronage is less than the national average.

| Local Authority | Spent time doing a creative, artistic, theatrical or music activity or a craft | Attended an event, performance or festival with creative, artistic, dance, theatrical or music activity | Used a public library service | Attended a museum or gallery | Dance | Creative or artistic dance | Either attended an arts event, museum or gallery or spent time doing an arts activity |
|---|---|---|---|---|---|---|---|
| Cherwell | 34% | 53% | 29% | 50% | 18% | 4% | 71% |
| Oxford City | 49% | 67% | 43% | 75% | 28% | 8% | 84% |
| South Oxfordshire | 41% | 61% | 35% | 53% | 21% | 3% | 76% |
| Vale of White Horse | 42% | 59% | 37% | 59% | 22% | 5% | 79% |
| West Oxfordshire | 39% | 62% | 37% | 55% | 20% | 6% | 79% |
| OXFORDSHIRE | **41%** | **60%** | **36%** | **58%** | **22%** | **5%** | **78%** |
| England | **35%** | **52%** | **35%** | **47%** | **21%** | **5%** | **70%** |

*Table 5-31: Participation in leisure and recreational activities in the last 12 months by District compared to national and county levels from The Active Lives Survey (2015–2017) (Arts Council England, 2018)*

Further national evidence from the Active Lives Survey (Arts Council England, 2018) indicates that there are notable participation inequalities across demographic groups which may also be applicable to Oxfordshire. This suggests there may be a need to:

- Enhance participation rates amongst men given that females are more likely to participate in cultural activities
- Enhance participation rates amongst the NS-SEC 5-9 socio-economic group, including those who are Long-term unemployment. This group is far less likely to engage than those in the NS-SEC 1 to 4 socio-economic group
- Improve participation rates amongst those identifying as Black, Asian, Minority Ethnic (BAME); with the exception of public libraries where rates are generally higher compared to White British people
- Enhance participation rates amongst people with disabilities who are less likely to participate in events, performances and festivals or attend galleries and museums than those without (36% compared to 48% for museum and gallery attendance in the last 12 months, respectively)

The Taking Part Survey (DCMS, 2020) also highlight the need to address inequalities in cultural service access. The Survey finds 21% of adults that did not attend an arts event because of having a health problem or disability.

#### *5.4.3.2.2 Heritage*

Historic England collate data through their Heritage at Risk Register on Oxfordshire's historic buildings or assets that at risk of being lost, with the aim of identifying places, including buildings, parks and gardens, places of worship and Conservation Areas with the greatest future need for remediation.

This Risk Register (see Table 5-32) indicates that there is a total of 30 heritage sites across Oxfordshire at risk. The greatest need is in Cherwell, Vale of White Horse and West Oxfordshire (Historic England, 2020).

| Local Authority | Heritage Sites at Risk | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Buildings & Structures | Place of Worship | Archaeological Site | Park and Gard`ens | Battlefield | Wreck Site | Conservation Areas | Total |
| Cherwell | 2 | 2 | 3 | - | - | - | 2 | 9 |
| Oxford City | 1 | 2 | - | - | - | - | - | 3 |
| South Oxfordshire | - | - | - | 1 | - | - | - | 1 |
| Vale of White Horse | 1 | 2 | 5 | - | - | - | - | 8 |
| West Oxfordshire | - | 2 | 7 | - | - | - | - | 9 |
| **OXFORDSHIRE** | **4** | **8** | **15** | **1** | **-** | **-** | **2** | **30** |

*Table 5-32: Heritage Sites at Risk in Oxfordshire (Historic England, 2020)*

#### *5.4.3.3 Typical Infrastructure Schemes to Meet PS3 Needs*

The following typical infrastructure schemes could meet the PS3 needs identified:

- Library Scheme (IF8)
- Community Centre & Hubs (IF8)
- Cultural Attractions (IF8)

### 5.4.4 PS4: Socially Integrated Places

***PS4 Future Needs to 2040 for Socially Integrated Places at a Glance***

The need to maintain social interaction between people in communities helps fight loneliness and provides support networks, especially for people at vulnerable points. This is reflected in national Government policy which focuses on healthy place-shaping and connecting people through transport and digital infrastructure. With new developments planned, it is even more important that considerations are made to improve social cohesion through preventative measures in the county.

Loneliness is a well-established health risk and is associated with poor health and well-being. In Oxfordshire, pockets throughout the county (e.g. Didcot Park, parts of Oxford City and around Banbury) demonstrate high risks of loneliness; which has increased as a result of the COVID-19. There is an immediate need to address this, particularly in Vale of White Horse, Cherwell and Oxford City, where rates are highest. There is a need for investment in green space as this is proven to encourage social interaction and bring people together. (see need H2 in Section 5.3.2).

***PS4 Key Affected Infrastructure***

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.4.4.1 Strategic Policy & Strategy Need

*PS4 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Maintain & improve community social interaction and relationships between a wide range of people, including inter-generationally | A Connected Society: A Strategy for Tackling Loneliness (HM Government, 2018)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire Suicide and Self-Harm Prevention Strategy 2020 – 2024 (Oxfordshire Public Health, 2020)<br>Oxfordshire Mental Health Prevention Framework 2020 – 2023 (Mental Health Prevention Concordat Partnership Group, 2020) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

The strategic need to improve social cohesion and reduce loneliness within communities at a national policy level is identified within the strategy entitled *'A connected society: a strategy for tackling loneliness'* (DCMS, 2018).

*National Loneliness Strategy: Strategic Vision*

*'The Government's vision is for this country to be a place where we can all have strong social relationships. Where families, friends and communities support each other, especially at vulnerable points where people are at greater risk of loneliness. Where institutions value the human element in their interactions with people. And where loneliness is recognised and acted on without stigma or shame, so that we all look out for one another.'* (DCMS, 2018).

The national strategy emphasises the role that future investment in infrastructure can play in tackling loneliness and improving social cohesion. Several areas of focus are highlighted including:

- Maximising the potential of community space: for example through improving access to green spaces and improving investment in green infrastructure to help build social connections
- Investing in transport networks that connects people and communities: for example through delivering improvements to rural bus services
- Embedding a community focus into the planning and design of new housing sites
- Improving digital connectivity

This strategic need to improve social integration of communities is reflected within Oxfordshire-wide policies and strategies. For example, the Strategic Vision for Oxfordshire aspires by 2050 to create flourishing communities with enhanced and lasting connectedness driven by individual and community action, with emphasis on place-shaping, creating new homes which meet people's needs and form part of connected communities (Oxfordshire Growth Board, 2020). The need is replicated within the Joint Health and Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) which outlines that taking preventative action to address loneliness and improve social cohesion is a key driver to improving people's mental and physical health.

It outlines the importance for local friends and neighbours to support each other, particularly because of the aging population expected in the County in the future. This is also identified within the Oxfordshire Mental Health Prevention Framework. The Oxfordshire Suicide and Self-Harm Prevention Strategy 2020 – 2024 (Oxfordshire Public Health, 2020) also identifies people who are socially isolated to be particularly vulnerable within Oxfordshire.

### 5.4.4.2 Evidence Base

| *PS4: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Risk of Loneliness Aged 65+* | *Age UK / Cambridgeshire Insight (2019)* |
| ✓ *% of People Reporting Feeling Lonely Often / Always* | *ONS (2020/21)* |
| ✓ *Access to gardens and public green space* | *ONS (2020)* |

There is a well-established evidence base that loneliness is a significant health risk and is associated with poorer physical and mental health and lower wellbeing (particularly amongst older people), including depression and Alzheimer's disease (Age UK, 2020). There is also a wide array of research which identifies that people feeling lonely most or all the time are at a higher risk of developing wider physical and mental health issues such as coronary heart disease, stroke as well as increased risk of depression and anxiety (DCMS, 2018). Improved social interaction can also have wider economic benefits for society and is linked to increased economic productivity and reduced absenteeism (New Economics Foundation, 2017).

There are many factors that contribute to loneliness, the subjective feeling about the gap between a person's desire for social contact and their actual social contact, considering perceived quality of relationships (Age UK, 2020), not to be confused with isolation regarding being alone.

Four indicators can predict 20% of the risk of loneliness amongst those over 65 years of age (Marital status, Self-reported health status, Age, Household size). Supported by English Longitudinal Study of Ageing research and using data from the Census 2011 for the above indicators, Age UK have analysed the risk of loneliness by OA (2015) which is represented in Figure 5-32.

The analysis indicates that wards assigned as "Very High Risk" of loneliness and therefore have a greater need to improve social integration are:

- **Oxford City:** Northfield Brook, Cowley Marsh, Iffley Fields, St Clement's, Jericho & Osney, Barton & Sandhills, and Blackbird Leys
- **South Oxfordshire:** Didcot Park
- **Cherwell:** Bicester Town, Banbury Neithrop, Banbury Ruscote, and Banbury, Grimsbury & Castle

Levels of loneliness in Great Britain have increased since spring 2020, according to a recent survey (ONS, 2021) carried out by the Opinions and Lifestyle Survey (October 2020 to April 2021).

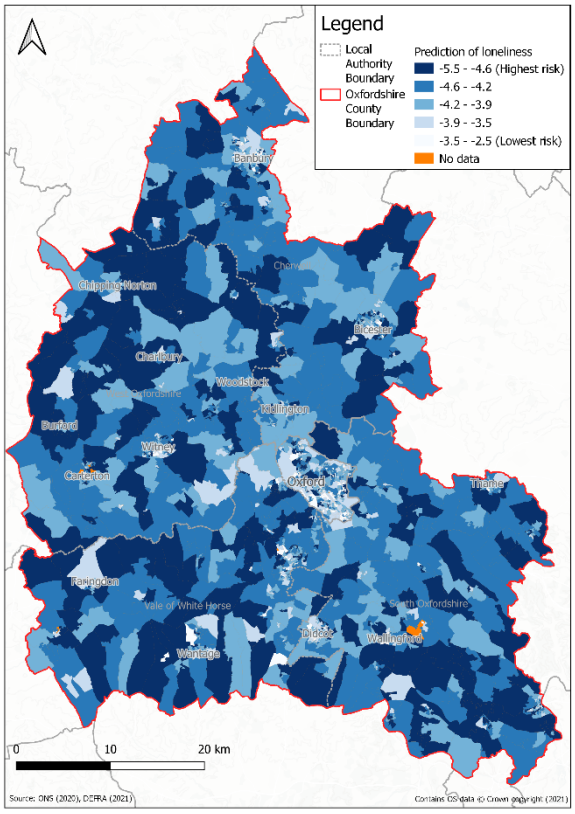



*Figure 5-32: Risk of loneliness (Cambridgeshire Insight, 2019)*

Table 5-33 shows the proportion of residents stating that they feel lonely "often" or "always" by District in Oxfordshire with the highest found in Vale of White Horse (10.3%). National trends showed that areas with higher concentrations of younger people (aged 16-24 years), areas with higher rates of unemployment, and areas not in countryside (urban, industrial or other types of areas) tended to have higher rates of loneliness during the study period that took place during COVID-19 national lockdown.

| District | Cherwell | Oxford City | South Oxfordshire | Vale of White Horse | West Oxfordshire | TOTAL |
|---|---|---|---|---|---|---|
| Proportion of people feeling lonely | 7.7% | 7.5% | 4.0% | 10.3% | 3.9% | 6.7% |

*Table 5-33 Levels of loneliness by District in Oxfordshire between October 2020 and February 2021 (ONS, 2021)*

Additionally, as outlined in Section 5.3.3 (and displayed in County access to green space in Figure 5-18), access to green space plays an important function in facilitating community integration and social interaction.

#### *5.4.4.3 Typical Infrastructure Schemes to Meet PS4 Needs*

The following typical infrastructure schemes could meet the PS4 needs identified:

- Public Realm & Streetscape Improvements (IF2)
- Outdoor Green Space (IF7)
- Leisure & Sport Centres (IF7)
- Community Centres & Hubs (IF8)

### 5.4.5 PS5: Inclusive & Integrated Active Travel

***PS5 Future Needs to 2040 for Inclusive & Integrated Active Travel at a Glance***

National policy ambitions demonstrate the strong need to reduce private vehicle journeys and replace these with walking and cycling journeys, to support several initiatives including reducing carbon emissions, tackling congestion and enhancing people's mental health and wellbeing. This is followed up by local policy at both a County and District level as, although active modal share in Oxfordshire, notably in Oxford, is good compared to the national picture, national and local targets are ambitious and require a step-change in behaviour.

There is good potential for further cycling take-up in Oxford, South Cherwell, Abingdon, Carterton, Bicester and Wallingford with delivery of the right cycling infrastructure whilst investment in the Rights of Way Network can support greater active travel in more rural areas. The needs link to previous sections as active travel relies on local & liveable (see need PS1 in Section 5.4.1) and safe & secure communities (see need PS2 in Section 5.4.1.3) to encourage and support walking and cycling journeys. For many reasons cycling is often seen as not being inclusive either by age, gender, disability or race, but the extent of this varies by region. For example, Oxford has a near 50/50 gender split for cycling, whereas Didcot is closer to only a third female.

***PS5 Key Affected Infrastructure***

*IF1 Energy*



*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*



*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.4.5.1 Strategic Policy & Strategy Need

*PS5 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Make walking and cycling in communities more attractive by increasing its safety, simplicity and accessibility for people of all ages | Gear Change: A bold vision for walking and cycling (DfT, 2020)<br>National Infrastructure Strategy (HM Treasury, 2021)<br>Connecting Oxfordshire: Local Transport Plan - Active & Healthy Travel Strategy (OCC, 2016)<br>Oxfordshire Joint Health & Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019)<br>Oxfordshire Mental Health Prevention Framework (Mental Health Prevention Concordat Partnership Group, 2020)<br>District Local Plans (Various)<br>Oxfordshire Climate Action Framework (OCC, 2020) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

##### 5.4.5.1.1 Nationally

Alongside the National Infrastructure Strategy (HM Treasury, 2020), the strategic need for increasing the attractiveness of walking and cycling at a national level is established in Gear Change (DfT, 2020) which aspires to see a future where 50% of all journeys in towns and cities are by active travel. It identifies that this is fundamental to addressing wider needs:

- Reducing carbon emissions (see Section 5.2.1)
- Addressing health inequalities (see Section 5.3.1)
- Improving physical activity (see Section 5.3.2)
- Cleaner Air (see Section 5.3.4)
- Enhancing people's mental health and wellbeing (see Section 5.3.5)
- Addressing socio-economic inequalities (see Section 5.5.2)
- Catalysing clean economic growth (see Section 5.5.5)
- Tackling congestion (see Section 5.6.4)

Gear Change (DfT, 2020) emphasises the need for investment in high quality and integrated active travel infrastructure as a key mechanism to attract more people to choose to walk and cycle.

*Gear Change Vision*

*'England will be a great walking and cycling nation. Places will be truly walkable. A travel revolution in our streets, towns and communities will have made cycling a mass form of transit. Cycling and walking will be the natural first choice for many journeys with half of all journeys in towns and cities being cycled or walked by 2030.'*

*Gear Change Objectives:*

- **Healthier, happier and greener communities:** through reducing the number of short journeys by car and improving peoples' health and quality of life
- **Safer Streets:** Fear of cycling is eliminated
- **Convenient and accessible travel:** active travel modes recognised as the most attractive way to travel by being affordable and allowing everybody to have opportunities to walk or cycle
- **At the heart of transport decision-making**

#### 5.4.5.1.2 Locally

From an Oxfordshire perspective, the need to improve active travel conditions is reflected across a suite of policy and strategy documents, ranging from those directly related to transport as well as climate change action and health.

OCC's Connecting Oxfordshire Local Transport Plan (LTP4) (2015) outlines the need for improving active travel conditions at a County level through fulfilling its strategic aim to '*reduce the proportion of journeys made by private car by making the use of public transport, walking and cycling more attractive*.'

- Policy 19 of LTP4, which commits to encouraging the use of modes of travel associated with healthy and active lifestyles, is particularly relevant.
- This ambition is reflected within the various Local Cycling and Walking Infrastructure Plans (LCWIPs) currently in production across Oxfordshire including Oxford, Bicester and Didcot.
- OCC is currently developing a Local Transport and Connectivity Plan which will replace LTP4. The emerging plan reinforces the importance of active travel in fulfilling the need to create a *'zero-carbon transport network'* as well as to promote active and healthy lifestyles.

The Oxfordshire Climate Action Framework (OCC, 2020) identifies that investment in active travel infrastructure is a core component of reducing carbon emissions and aspires that by 2050, walking and cycling will be seen as *'the new normal.'* The importance of active travel as a key pillar of climate action is also reflected within the District Councils' own Climate Action Frameworks.

From a health perspective, both the Joint Health and Wellbeing Strategy (Oxfordshire Health & Wellbeing Board, 2019) and Oxfordshire Mental Health Prevention Framework (2020 – 2023) (Mental Health Prevention Concordat Partnership Group, 2020) emphasise the need to enhance opportunities for active travel to improve everyday physical activity.

All the various Adopted Local Plans produced by Oxfordshire District Councils, as planning authorities, replicate the future strategic need to improve conditions for those walking and cycling in the delivery of new development sites. This includes the provision of routes alongside ensuring high quality cycle parking.

***Emerging Oxfordshire LCWIPs***

In addition to those already established in Oxford and Bicester, there are numerous emerging LCWIPs currently in production which will identify needs for walking and cycling infrastructure investment priorities in other OxIS Towns and Surrounds and OxIS Rural Communities. This includes future LCWIPs for places such as Banbury, Kidlington, Didcot and Abingdon.

#### 5.4.5.2 Evidence Base

***PS5: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal***

| Appraisal Dataset | Source |
|---|---|
| ✓ *Active Travel Mode Share* | *ONS Census* |
| ✓ *Active Travel Use Frequency* | *DfT National Travel Survey / Sport England Active Lives Annual Survey* |

There is wide breadth of research demonstrating the positive links that investment in active travel infrastructure has on carbon emissions, physical and mental health outcomes for people, improved air quality, addressing socio-economic inequalities and increasing economic output and productivity which are summarised in Table 5-34.

| Outcomes | Key Evidence Base |
|---|---|
| Reduces Transport Carbon Emissions | Cyclists have 84% lower CO2 emissions from all daily travel than non-cyclists (Brand, et al., 2021) |
| Improves Air Quality | Doubling cycling rates and the benefits this brings for cleaner air would prevent around 8,300 premature deaths nationally every year (DfT, 2020) |
| Improves Health Inequality | Regular physical activity proven to cut prevalence of chronic health conditions such as dementia, forms of cancer and cardiovascular disease, resulting in an overall reduction of all-cause mortality by 30%. (Public Health England, 2019) |
| Positive Contribution to Economic Output | Cycling contributes £5.4 billion to the UK economy annually (DfT, 2020) |
| Improves Mental Health and Wellbeing | Regular exercise proven to cut the risk of depression by 31% (DfT, 2020) |
| Improves Perception of Safety | The Oxfordshire Cycle Survey 2019 identified that issues relating to safety was the biggest barrier for over 60% of people to increasing cycling within Oxford |

*Table 5-34: Summary of Key Outcomes & Evidence Base of Increasing Active Travel*

Modal share data combining the 2019 National Travel Survey (DfT, 2020) and 2019/20 Sport England Active Lives Survey (Sport England, 2020) indicates that the proportion of people walking or cycling within a month in Oxfordshire is higher than the national average (of 81%). With specific regard to people cycling, it is much higher than the national average with 27% of people cycling at least once a month across the County which compares favourably against the equivalent national figure of 16% (DfT, 2020).

The County's high cycling rate is largely due to Oxford City which has amongst the highest levels of cycling nationally. Cycling rates within Oxfordshire's four remaining Districts are broadly comparable with the national average.

Figure 5-33, which shows the comparative rates across both walking and cycling between the Districts, indicates that the number of people regularly walking or cycling (at least five times a week) is much higher in Oxford (over 52%) than the other four Districts. Cherwell represents the lowest rate with only around 34% of people reporting they walked or cycled five times a week.

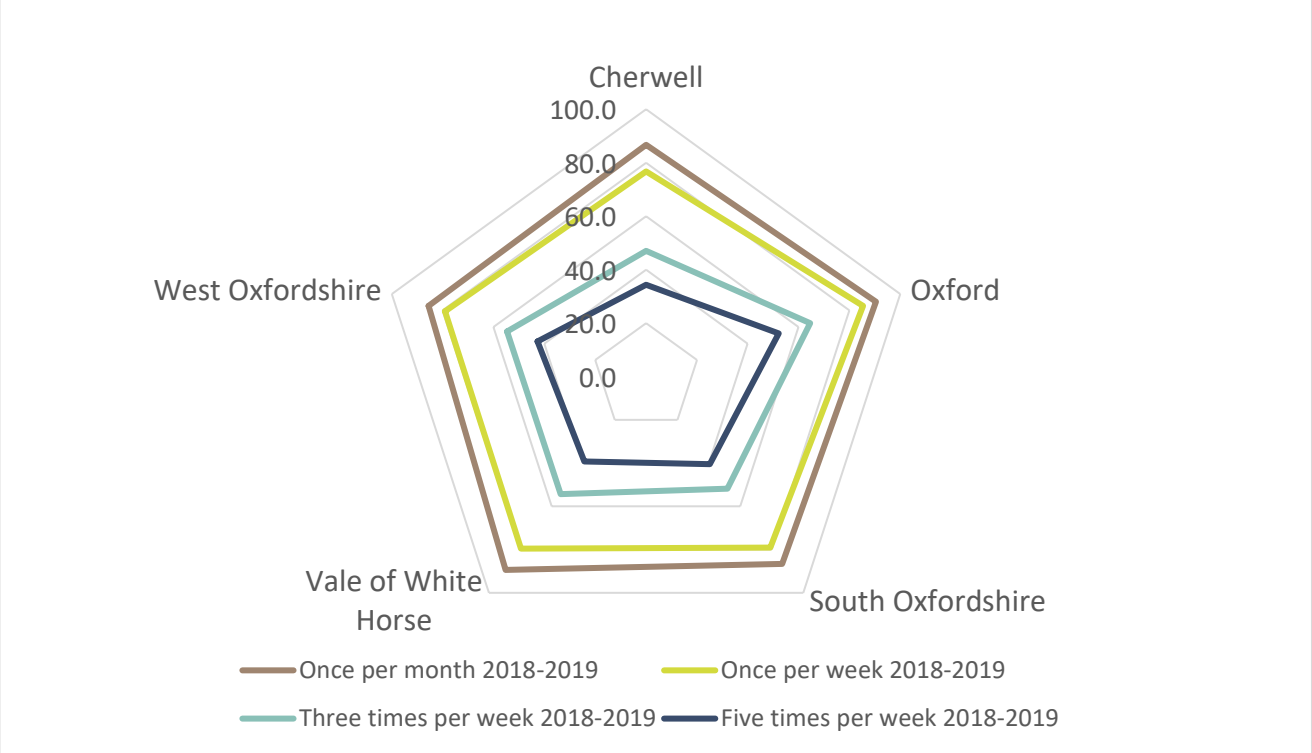



*Figure 5-33: % of people who do any walking or cycling by frequency (DfT, 2020)*

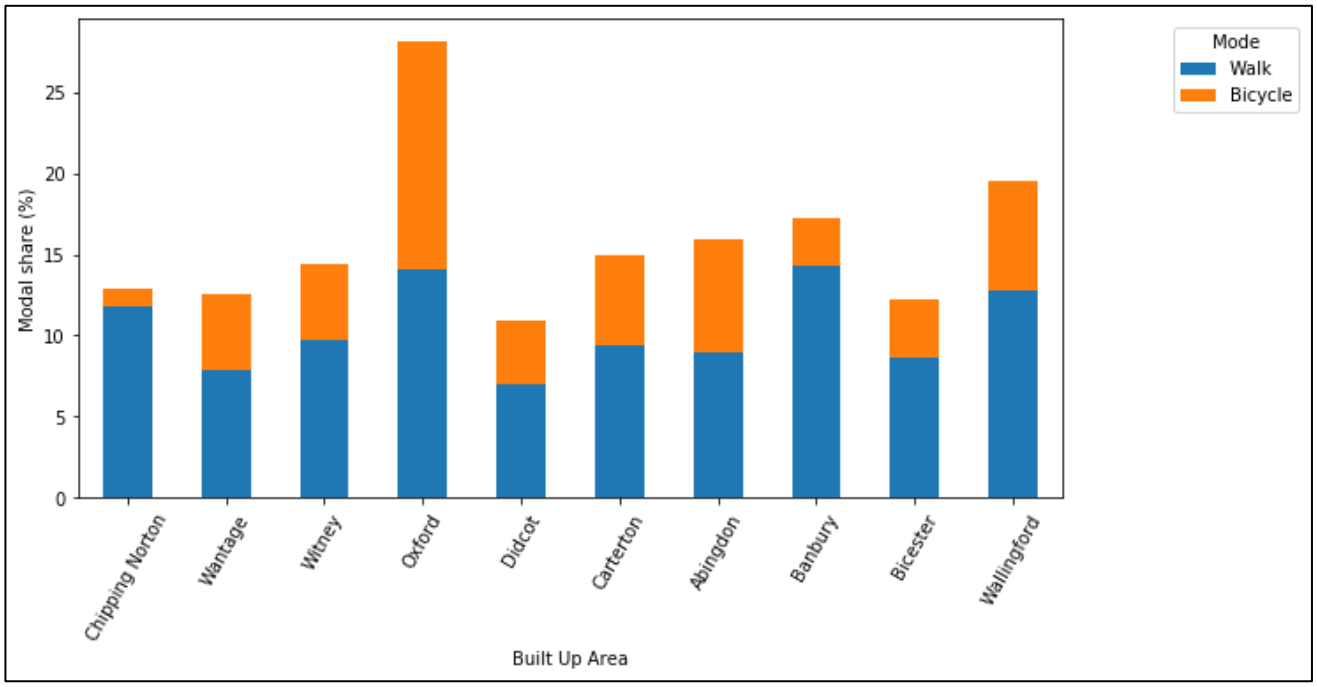



*Figure 5-34: Active Travel Commuting Mode Share (Adapted from 2011 Census)*

A modal share of active travel representing commuting data from the 2011 Census across all of Oxfordshire's built-up areas comparing walking and cycling is identified within Figure 5-34. This indicates there is a need to improve cycling rates in OxIS Towns & Surrounds such as Chipping Norton, Didcot, Bicester and Banbury.

#### *5.4.5.2.1 Future Potential for Cycling*

The Propensity to Cycle strategic planning tool (for England and Wales) as established in LCWIP Guidance, provides a mechanism to prioritise infrastructure investment priorities to understand where cycling is currently most popular (based on 2011 Census data) and where it has the greatest potential to increase (Propensity to Cycle Tool, 2021).

The outputs for Oxfordshire (see Figure 5-35), indicate that the greatest potential is around Oxford City as well as the towns of Abingdon, Carterton, Bicester and Wallingford. Higher propensity to cycle is also identified in rural communities such as Shrivenham and around Woodstock.

The Oxfordshire Cycle Survey (OCC, 2019) also contains evidence based on a survey of almost 4,000 people to inform future priorities for cycling investment.

This indicated that most people within Oxford favoured a more direct route to their destination whilst those who live outside of Oxford preferred a route which avoided main roads and high levels of traffic.

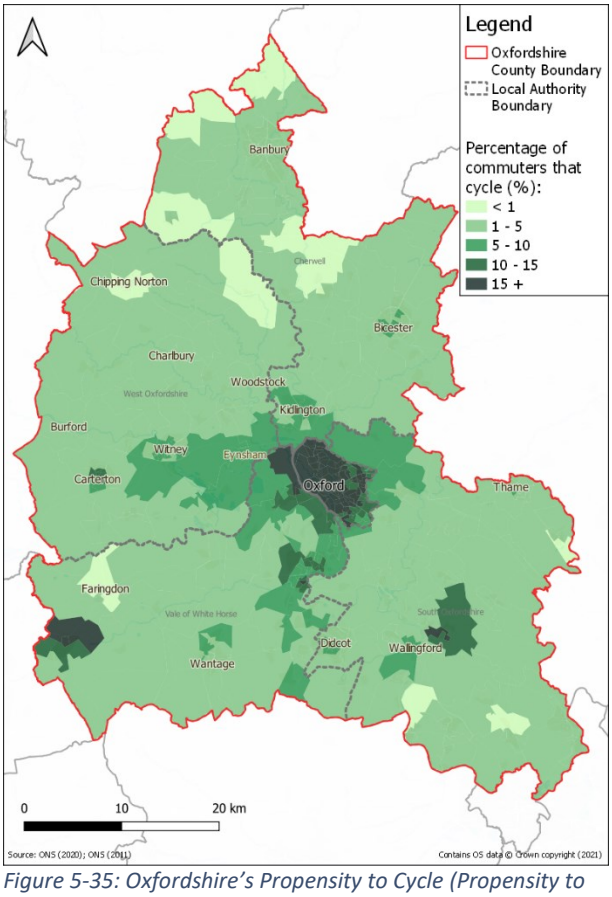



*Figure 5-35: Oxfordshire's Propensity to Cycle (Propensity to Cycle Tool, 2021)*

#### *5.4.5.2.2 Gender and Age Profiles*

The Oxfordshire Cycle Survey (OCC, 2019) was carried out to support the production of Oxfordshire's Local Cycling and Walking Infrastructure Plans and was hosted on Oxfordshire County Council's website from June to August 2019.

The survey received 3,754 responses with responders being located from Oxford City (68%), Didcot (12%), Bicester (6%) and 15% from the Rest of Oxfordshire (including 5% from Abingdon and 2% from Kidlington).This

survey was aimed at cyclists and as such the demographics of those who contributed to the survey can be used to infer the demographics of the population of cyclists in the county.

The gender ratio of cyclists was nearly equal in Bicester and Oxford with both having 51% male vs 46% female gender ratio, whereas Didcot and the rest of Oxfordshire had a gender ratio closer to one-third female, two-thirds male. In order to improve the inclusivity of cycling within the county, the cycling rates amongst women outside of Bicester and Oxford should be improved.

The age profile of respondents showed that cyclists within Oxford are younger with 8% of responders under the age of 25, this contrasts with only 2% in the rest of Oxfordshire. Oxford also had a lower proportion of people over the age of 55 (15%) than the rest of Oxfordshire (26%). An inclusive active travel network would see the age split of cyclists match the general population, to achieve this there would need to be an increase in the number of young people cycling outside of Oxford City and an increase in the number of older people cycling in the rest of the county.

#### *5.4.5.3 Typical Infrastructure Schemes to Meet PS5 Needs*

The following typical infrastructure schemes could meet the PS5 needs identified:

- Segregated Cycle Infrastructure Schemes (IF2)
- Inter-Town / Village Cycle Route (IF2)
- Streetscape & Public Realm Improvements (IF2)
- New Crossing Facilities (IF2)
- Low Traffic Neighbourhoods (IF2)

## 5.5 Productivity Needs

*Productivity Needs to 2040*

The Productivity theme is associated with supporting increased economic productivity within Oxfordshire, considering the needs of both citizens and business to achieve this.

The outcome led needs within the Productivity Theme are:

- P1: World Class Inclusive Education & Sills Development (see Section 5.5.1)
- P2: Reduce Oxfordshire's Socio-Economic Inequalities (see Section 5.5.2)
- P3: Attract & Retain Talent in Oxfordshire (see Section 5.5.3)
- P4: Build A Global Business Innovation Ecosystem (see Section 5.5.4)
- P5: Drive Economic Growth & Productive Employment (see Section 5.5.5)

Needs to 2050 will be covered in the forthcoming OxIS Stage 2 Report.

### 5.5.1 P1: World Class Inclusive Education & Skills Development

***P1 Future Needs to 2040 for World Class Inclusive Education & Skills Development at a Glance***

There is a statutory future need for Local Authorities, like OCC, to ensure every school-age child and young person can access suitable education, as well as sufficient early-years education and childcare provision for all children of four years and under. Oxfordshire's Pupil Place Plan 2019 – 2023 (OCC, 2019), which assesses the suitability of provision to meet future demand, identifies a strategic need for OCC to continue to offer a high percentage of parents a place at their first choice school. Future population projections indicate there is likely to be around an additional 12,000 primary school places and 10,500 secondary school places required by 2040.

The Special Educational Needs & Disabilities Sufficiency of Places Strategy (Oxford City Council, 2018), identifies a strategic need to address the deficit of OCC school places and to reduce the reliance on *'out of county'* provision and reliance on Independent providers. Future population projections indicate there may be a need for additional capacity for around 450 children with Special Educational Needs & Disabilities by 2040.

Build Back Better (HM Treasury, 2021) alongside the White Paper *'Skills for Jobs'* identifies a strategic need to upskill people to ensure employers' needs are met in the future and to guarantee a strong COVID-19 recovery. Oxfordshire's strategy, including the emerging OxLEP Local Skills Report and Plan (2021) as well as Oxfordshire's Economic Recovery Plan (OxLEP, 2021), identifies a productivity need to ensure provision of post-16 training and education.

***P1 Key Affected Infrastructure***

#### 5.5.1.1 Strategic Policy & Strategy Need

*P1 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Ensure sufficient school, childcare and early-years places to meet current & future demand | Education Act (1996)<br>Childcare Act (2016)<br>Education and Inspections Act (2006)<br>National Planning Policy Framework (MHCLG, 2019)<br>District Local Plans (Various)<br>Oxfordshire Children's & Young People's Plan 2018 – 2023 (Children's Trust Board, 2018) |
| Support the education of vulnerable children, including those with Special Educational Needs & Disability to meet current & future demand | Children and Families Act (Children and Families Act , 2014)<br>Special Educational Needs Sufficiency of Places Strategy 2018 – 2027 (OCC, 2018) |
| Build and develop skills and employment pathways as part of Oxfordshire's economic recovery from COVID-19 | Skills for Jobs: Lifelong Learning for Opportunity and Growth (Department for Education, 2021)<br>UK Government's Jobs Plan (HM Treasury, 2020)<br>Build Back Better: our plan for growth (HM Treasury, 2021)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>Oxfordshire Skills Strategy (OxLEP, 2016)<br>Forthcoming Oxfordshire Skills Strategy (OxLEP, 2021)<br>Oxfordshire's Economic Recovery Plan: The ERP Action Plan (OxLEP, 2021) |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

##### 5.5.1.1.1 Early Years and Childcare

The Childcare Act (2006) (UK Legislation, 2016) places a statutory obligation on OCC to ensure a sufficient level of childcare available for every eligible two, three and four-year-old. Whilst this does not obligate OCC to provide infrastructure directly (unless in exceptional circumstances), it requires them to work in collaboration with providers, ranging from childminders to nurseries, to ensure suitable capacity. The Oxfordshire Childcare Sufficiency Assessment (OCC, 2020) identifies the local strategic need to increase provision in places including:

- Over half of MSOAs in the County have no potential spare capacity for early years provision
- Two-year-old provision, particularly in Kidlington and Didcot, has needed support due to place unavailability.
- Parents, particularly in rural areas, have found difficulty in finding school pick-up's and drop-off's

This strategic need to increase provision is replicated within the Pupil Place Plan (OCC, 2019); particularly in places such as Thame and Wantage, but elsewhere additional capacity will be required in the future to meet increased demand for places created by housing developments and population growth.

#### *5.5.1.1.2 School Education*

Despite a range of changes to the make-up of schools over recent years, there is a statutory need for Local Authorities to ensure there are enough school places available for children and young people (including those with special educational needs).

***Key National School Education National Legislation:***

- **Education Act** (1996) requires local authorities to ensure that efficient primary, secondary and further education is available to meet the needs of their population
- **Education and Inspections Act** (2006) requires local authorities to increase opportunities and diversity for parents when selecting a school for their child to attend
- **Children's and Families Act** (2014) places a duty on local authorites and education providers to ensure sufficient places for children ages 0 – 25 with special educational needs

Paragraph 94 of NPPF (MHCLG, 2019) states that it is important that a sufficient choice of school places is available to meet the needs of existing and new communities, and that local planning authorities should take a proactive, positive and collaborative approach to meeting this requirement, and to development that will widen choice in education. This is reflected within the various District Local Plans in relation to setting out requirements for school provision.

From a local perspective, the Children and Young People's Plan 2018 – 2023 (Children's Trust Board, 2018) identifies a strategic need to improve the quality of young people's education throughout Oxfordshire. The Plan aspires to ensure the county becomes *'…a great place to grow up and have the opportunity to become everything you want to be*.'

***Children and Young People's Plan 2018 – 2023 (Children's Trust Board, 2018) - Key Strategic Aims***

- *'Enable children and young people to be well educated and grow up to lead successful, happy, healthy and safe lives*
- *Schools and universal services working together with local, targeted and specialist services is key to improving outcomes*
- *Shift the focus to prevention and early help through real partnerships and using resources effectively*
- *Support the most vulnerable, including children with Special Educational Needs and Disabilities, to make sure everyone has an equal opportunity to become everything they want to be – for too many of our children and young people outcomes are not good enough*
- *Deliver responsive services that place children, young people and families at the heart of what we do'*

The Pupil Place Plan 2019 – 2023 (OCC, 2019) provides further detail on the overarching framework to ensure there is sufficient capacity for primary and secondary school pupils across Oxfordshire. This places an emphasis on the following key strategic needs:

- **Popularity:** Ensuring that that OCC can offer a high % of parents a place at their first preference school
- **Local:** Prioritise local school development to allow children the option to walk or cycle
- **Quality:** Ensure good quality of provision through high attainment and improved educational outcomes

Alongside the Pupil Place Plan is the Special Educational Needs & Disabilities Sufficiency of Places Strategy 2018 – 2027 (OCC, 2018) which sets out the strategic need to ensure that Oxfordshire has enough school places to meet the needs of young people with special educational needs & disabilities. This identifies that there is a deficit of Oxfordshire school places and and sets out a need to reduce the reliance on *'out of county'* provision and reliance on Independent providers. By 2022, it forecasts that an additional 300 places may be required (relative to 2018).

#### *5.5.1.1.3 Employment Skills Development*

The UK Government's Jobs Plan (HM Treasury, 2020) alongside the Build Back Better: A Plan for Growth Strategy (HM Treasury, 2021) emphasises the strategic need to upskill people to ensure employers' needs are met in the future and to guarantee a strong recovery from the COVID-19 crisis. The Build Back Better Strategy acknowledges the success of higher education institutes, however, emphasises the need to upskill or reskill people currently in the labour market amongst the adult population, particularly:

- Technical Skills: focus on improving technical skills amongst adults in sectors which include manufacturing and construction
- Basic Digital Skills: including the ability to adapt to future changes including from automation

This strategic need has been developed further by the publishing of a White Paper '*Skills for Jobs: Lifelong Learning for Opportunity and Growth,*' (Department for Education, 2021) which sets out several reforms to post-16 technical education and training and places employers firmly at the heart of the skills system. This reiterates the skills need stating '*there are currently significant skills gaps at higher technical levels. We do not have enough technicians, engineers or health and social care professionals to meet the many vital challenges we face.'*

At a local level, Oxfordshire's Local Industrial Strategy (OxLEP, 2019) is a core strategy for the local economy relevant to all needs in this Productivity chapter which identifies the strategic need to make Oxfordshire a top three global innovation ecosystem by 2040. A key element of fulfilling this ambition is a strategic need to ensure that the county has a pool of world-class talent which are aligned to the requirements of businesses.

Infrastructure to support skills has been identified in the Oxfordshire Investment Plan. The Investment Plan uses Oxfordshire's pioneering spirit of discovery and innovation to take forward the ambitions set out in the Oxfordshire Local Industrial Strategy, translating its policy ideas and commitments into a transformational programme for action and delivery. The Investment Plan combines a suite of investment-ready opportunities with fully developed business cases and a pipeline of further opportunities. OxLEP has also identified the need for integration and closer partnerships of innovation assets to local education through dedicated STEM facilities.

OxLEP are also in the process of developing an updated Oxfordshire Skills Strategy *'OxLEP Local Skills Report and Plan'* (OxLEP, 2021) to support this ambition to replace the previous version (2016). This identifies that there is a dichotomy in Oxfordshire's labour market with skills shortages centred on higher value-added job role as well as labour shortages in lower-value job roles. The sets out three thematic priorities for skills in Oxfordshire:

- Cross-cutting skills priorities: Such as increasing apprenticeships and T-Levels, supporting clear career pathways for young people and adults and retaining graduates
- COVID-19 recovery and renewal: Supporting the business sectors, individuals and demographics most impacted by the COVID-19 pandemic to develop new skills, find work or retrain
- Sector Priorities: Including improvements to diversity and inclusion, meeting specialist employer needs, raising digital capabilities and addressing key labour shortages

This strategic need for reskilling people is also reflected within Oxfordshire's Economic Recovery Plan (OxLEP, 2021) noting the need to *'maximise investment made in Oxfordshire's skills and training infrastructure'*

*OxLEP Local Skills Report and Plan (OxLEP, 2021) – Key Skill Needs*

- Elementary Skills: including those consisting of routine tasks
- Improving Core Enabling Skills: Addressing skill gaps in Artificial Intelligence and Big Data, Business and Digital Skills as well as Soft Skills
- Upskilling Younger and Older People: Improving employment pathway opportunities for younger and older people most detrimentally impacted by the COVID-19 crisis.
- Enhancing Technical Skills: including an increased uptake of 'T-Level', vocational / technical courses and apprenticeships across the county
- Addressing Talent Retention amongst Younger People: improving housing affordability

#### 5.5.1.2 Evidence Base

| P1: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | Source |
| ✓ % of Parents getting their First Choice School | Department for Education |
| ✓ Special Educational Needs 'Out of County' Funded Places | OCC Education |
| ✓ % of Young People Not in Education Employment or Training | Department for Education |

##### 5.5.1.2.1 Early Years and Childcare

With an anticipated growth in the number of young children under the age of four by 7,640 (approximately 24%) by 2040, there is a need for early years provision to increase. OCC have a statutory obligation to monitor this regularly to ensure that there continues to be sufficient capacity.

##### 5.5.1.2.2 School Education

As noted in Section 5.5.1, there is a statutory requirement for OCC to ensure sufficient primary and secondary school places to meet future demand. Forecasting future school infrastructure needs is underpinned by the National Audit Office report Capital Funding for New School Places (2013) as well as the Oxfordshire Pupil Place Plan (OCC, 2019). Through this, OCC apply a spare capacity threshold of 10% across primary and secondary schools when forecasting future need. This includes a more detailed breakdown for primary schools across urban (8% spare places) and rural areas (12% spare places).

Based on population projections, an additional 5,000 children aged four to ten are forecast by 2031 and around 14,000 by 2040, relative to the same age band population estimates for 2019. As shown in Table 5-35, this equates to a need for around an additional 21 forms of entry by 2031 and 57 forms of entry in primary schools by 2040. This figure is only applicable to state run schools. It is recognised that these calculations are high level at this time. More detailed work will be undertaken by OCC as part of the Pupil Place Planning process which will take into account locations of development and its impact on school capacity at a more local level.

| Local Authority | 2031 | | | | 2040 | | | |
|---|---|---|---|---|---|---|---|---|
| | Projected population (4–10) [1] | Likely Pupils on OCC roll [2] | Extra Primary Places Required [3] | Extra Forms of Entry Need [4] | Projected population (4–10) [1] | Likely Pupils on OCC roll [2] | Extra Primary Places Required [3] | Extra Forms of Entry Need [4] |
| Cherwell | 14,900 | 13,200 | +1,300 | 6 | 17,200 | 15,200 | +3,300 | 16 |
| Oxford | 12,000 | 9,500 | -100 | -1 | 12,500 | 9,900 | +200 | 1 |
| South Oxfordshire | 13,800 | 12,000 | +1,300 | 6 | 17,700 | 15,400 | +4,700 | 22 |
| Vale of White Horse | 13,900 | 12,100 | +1,800 | 9 | 15,100 | 13,100 | +2,900 | 14 |
| West Oxfordshire | 9,700 | 8,900 | +100 | 1 | 10,800 | 9,900 | +1,100 | 5 |
| **OXFORDSHIRE** | **64,400** | **55,500** | **+4,300** | **21** | **73,300** | **63,200** | **+12,000** | **57** |

*Notes:*

*[1] Utilises OCC Population Projections by district*

*[2] Relative to 2019/20 Pupil Roll*

*[3] Applies same proportion of children aged 4-10 attending OCC schools. This equates to 86% of all young people in Oxfordshire, with the remainder either assumed to be home schooled, attending independent schools or attending out of county schools*

*[4] Assumes 210 pupils per FE. No account is made of current spare capacity below 90% so this likely represents an overestimation*

*Table 5-35: Expected state-funded primary school pupil places and capacity needs to support 2031 and 2040 population growth (City Science Calculations)*

An additional 12,000 young people aged 11 to 17 are forecast by 2031 and around 17,400 by 2040. As indicated in Table 5-36, this equates to a need for around an additional 35 forms of entry by 2031 and around 51 forms of entry in secondary schools. This figure is only applicable to state run schools.

Primary and secondary needs by school for 2040 is shown in Figure 5-36. This analysis assumes that schools are attended by school children in the same district and the same distribution of the population of children to the schools in the respective district remains the same as existing.

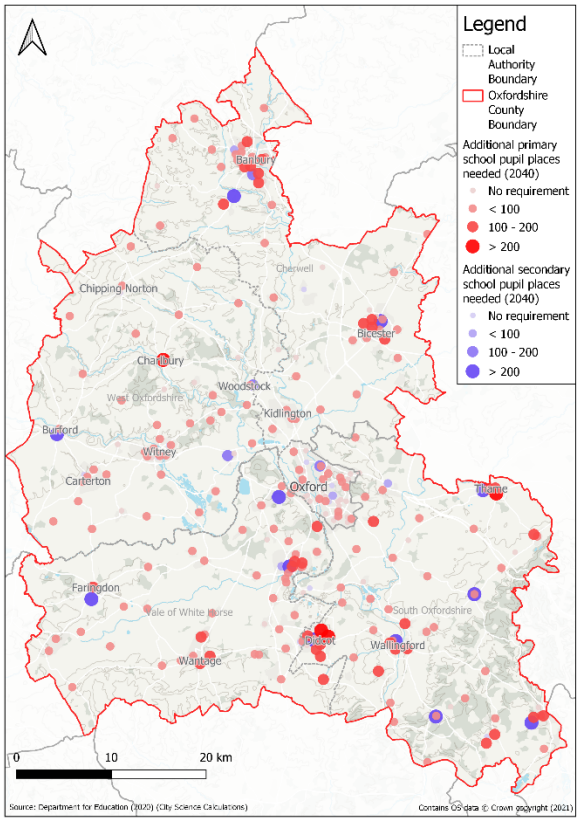



*Figure 5-36: State-funded primary and secondary school capacity needs, by number of additional pupil places needed, based on Oxfordshire Council population-led growth to 2040 and assuming 90% demand to capacity ratio (City Science Calculations)*

| Local Authority | 2031 | | | | 2040 | | | |
|---|---|---|---|---|---|---|---|---|
| | Projected population (11–17) [1] | Pupils on OCC roll [2] | Extra Secondary Places Required [3] | Total Extra Forms of Entry needed [4] | Projected population (11–17) [1] | Pupils on OCC roll [2] | Extra Secondary Places Required [3] | Total Extra Forms of Entry needed [4] |
| Cherwell | 15,100 | 8,400 | +1,500 | +7 | 16,300 | 9,000 | +2,100 | +10 |
| Oxford | 13,400 | 6,500 | +1,000 | +5 | 13,200 | 6,400 | +900 | +4 |
| South Oxfordshire | 14,100 | 10,200 | +1,700 | +8 | 16,100 | 11,600 | +3,100 | +15 |
| Vale of White Horse | 14,900 | 8,300 | +2,100 | +10 | 16,300 | 9,200 | +2,900 | +14 |
| West Oxfordshire | 10,000 | 7,300 | +1,000 | +5 | 10,900 | 7,900 | +1,600 | +8 |
| **OXFORDSHIRE** | **67,500** | **40,800** | **+7,261** | **+35** | **72,900** | **44,000** | **+10,500** | **+51** |

***Notes:***

*[1] Utilises OCC Population Projections by district*

*[2] Relative to 2019/20 Pupil Roll*

*[3] Applies same proportion of children aged 11-17 attending OCC schools. This equates to 60% of all young people in Oxfordshire, with the remainder either assumed to be home schooled, attending independent schools or left full time education (16+)*

*[4] Assumes 210 pupils per FE. No account is made of current spare capacity below 90% so this represents an overestimation*

*Table 5-36: Expected state-funded secondary school pupil places and capacity needs to support 2031 and 2040 population growth (City Science Calculations)*

#### 5.5.1.2.3 Special Educational Needs and Disabilities Provision

The Special Educational Needs & Disabilities Sufficiency Strategy for Oxfordshire (OCC, 2018) identifies the lack of special education needs school places and the need to reduce demand for independent and non-maintained specialist placements. This growing need for places is contributed by several factors (OCC, 2018):

- A growing population in the County, both due to an expected rise in births and housing growth
- The Children's and Families Act (2014) increasing the maximum age from 19 to 25 years
- A rise (faster than population growth) in demand in identification of those having social and emotional mental health needs and/or a diagnosis of Autism
- Real term reductions in school funding, meaning mainstream schools are less able to effectively educate pupils with Special Educational Needs & Disabilities at an early stage

Expected Special Educational Needs & Disabilities demand or pupil places are not published on a regular basis but using existing pupil numbers against existing and predicted population, expected Special Educational Needs & Disabilities pupil numbers can be predicted (see Table 5-37). It is forecast that by 2031 an additional 326 places may be required and by 2040 an additional 443 places.

| Local Authority | 2019/20 | | 2031 | 2040 |
|---|---|---|---|---|
| | Number of Special Educational Needs & Disabilities Pupils [1] | % of those Aged 4 – 25 [2] | Potential Additional Special Educational Needs & Disabilities Pupils [3] | Potential Additional Special Educational Needs & Disabilities Pupils [3] |
| Cherwell | 199 | 0.5% | +44 | +64 |
| Oxford | 433 | 0.7% | +44 | +43 |
| South Oxfordshire | 235 | 0.7% | +48 | +89 |
| Vale of White Horse | 213 | 0.6% | +99 | +131 |
| West Oxfordshire | 111 | 0.4% | +65 | +83 |
| OXFORDSHIRE | **1,191** | **0.6%** | **+326** | **+443** |

***Notes:***
*[1] Based on 2019 / 20 pupil roll data obtained from Department for Education* **(2020)**
*[2] Proportion of population relative to 2019 ONS Mid-Year Estimate*
*[3] Calculated Based on application of same proportions as 2019/20 to forecast population, but does not account for any current deficit of places*

*Table 5-37: Number existing facilities and pupils at Special Educational Needs & Disabilities schools and expected additional pupil numbers in 2040 (Department for Education, 2020) (City Science Calculations)*

#### 5.5.1.2.4 Skills Development

As identified in the emerging Local Skills Report and Plan (OxLEP, 2021) and Oxfordshire's Economic Recovery Plan (OxLEP, 2021), there is a need to upskill and retrain people across the county to align with the future needs of employers; particularly young people disproportionately impacted by the COVID-19 crisis. Recent evidence indicates that this crisis has increased the number of secondary schools in Oxfordshire reporting that young people are leaving formal education early which is increasing the number of people who are not in Education, Employment or Training (OxLEP, 2021). The most recent local dataset, which pre-dates COVID-19, (shown in Table 5-38) indicates that approximately 500 people aged 16-17 were not in in education, training or employment in Oxfordshire which is a lower rate than both the regional and national average.

| Area | Total Number Not in Education Training or Employment / Not Known [1] | | | Proportion Not in Education Training or Employment / Not Known or not known [1] | | |
|---|---|---|---|---|---|---|
| | Males | Females | Total | Males | Females | Total |
| Oxfordshire | 300 | 200 | 500 | 4.5% | 3.3% | 3.7% |
| South East England | 6,600 | 4,900 | 11,600 | 7.2% | 5.7% | 6.4% |
| England | 35,300 | 25,400 | 62,400 | 6.2% | 4.7% | 5.5% |

***Notes:***
*[1] Represents an average of December 2019, January 2020 and February 2020. This pre-dates the COVID-19 crisis*

*Table 5-38: People aged 16 – 17 not in employment, training or education (Department for Education, 2020)*

#### *5.5.1.3 Typical Infrastructure Schemes to Meet P1 Needs*

The following typical infrastructure schemes could meet the P1 needs identified:

- Early Years Education Facilities (IF4)
- SEN Schools (IF4)
- Primary Schools (IF4)
- Secondary Schools (IF4)
- Adult Education / Skills Centre (IF4)

### 5.5.2 P2: Reduce Oxfordshire's Socio-Economic Inequalities

*P2 Future Needs to 2040 for Reduce Oxfordshire's Socio-Economic Inequalities at a Glance*

Although most metrics indicate Oxfordshire has a high-performing economy, it is not delivering for everybody – as evidenced by a geographic disparity in Indices of Multiple Deprivation. The pockets of high deprivation occur in every district, but the most pressing need is in Oxford City, Banbury and Bicester. Furthermore, the recent reduction in productivity in these districts indicates a worsening situation.

There is need for highly targeted interventions so as to maximise impact for these communities. Forecasts of future inequality are difficult to make because the COVID-19 pandemic has disrupted pre-existing economic trends. Prior to the pandemic, housing affordability problems within the county (see need P3 in Section 5.5.3) were a key indicator of socio-economic inequality. However, in the short-term, the pandemic has only exacerbated this and also driven up youth unemployment – reducing this is another key need.

The aim to reduce socio-economic inequality is included in policies at both the County and District level within Oxfordshire, and is considered across multiple themes (e.g. climate action and industrial strategy).

Clearly, the issue is also related to other aims within Oxfordshire, such as the provision of world-class inclusive education (see need P1 in Section 5.5.1).

This interconnectedness to other aims, and across branches of government, gives rise to the need for a coordinated approach in order to maximise effectiveness. It should be noted that whilst the national Levelling Up Fund (HM Treasury, 2021) is currently available for regenerative infrastructure projects, all District Councils within Oxfordshire have been given the lowest priority to receive funds.

*P2 Key Affected Infrastructure*

#### *5.5.2.1 Strategic Policy & Strategy Need*

*P2 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Reduce socio-economic inequalities | Build Back Better: Our Plan for Growth (HM Treasury, 2021)<br>Levelling Up Fund (HM Treasury, 2021)<br>Oxfordshire's Strategic Vision (OCC, 2020)<br>Local Authority Corporate Plans (Various)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>Oxfordshire's Economic Recovery Plan: The ERP Action Plan (OxLEP, 2021) |

| ☒ | ☑ | ☑ | ☑ |
|---|---|---|---|
| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |

From a national perspective, the focus is on regional inequalities which are being addressed through the UK Government's 'levelling up' agenda set out in Build Back Better: Our Plan for Growth (HM Treasury, 2021). This aspires to *'tackle geographical disparities in key services and outcomes across the UK: improving health, education, skills, increasing jobs and growth, building stronger and safer communities and improve infrastructure and connectivity.'*

Through this, the Government has set out its intention to address regional inequalities through a programme of infrastructure investment that is expected to cover education, skills and R&D. For example, the Levelling Up Fund (HM Treasury, 2021) was announced at the 2020 Spending Review to support communities to improve local infrastructure. The Levelling Up Fund sits within a package of additional interventions including the UK Shared Prosperity Fund, the Towns Fund and the UK Infrastructure Bank. The fund will be awarded based on competitive bids with the first round of funding focusing on three themes: smaller transport projects that make a genuine difference to local areas; town centre and high street regeneration; and support for maintaining and expanding the UK's world-leading portfolio of cultural and heritage assets. While the funding is competitive, it aims to be targeted towards places in England, Scotland and Wales with the most significant need, as measured by an index that captures economic, transport and regeneration needs. The Index is reported on a scale of 1-3 with 1 being assigned to places judged to have the greatest need. All Districts in Oxfordshire have been assigned an index level 3 (lowest priority).

This strategic need to address inequalities is reflected within a wide suite of strategy documents in Oxfordshire. This includes Oxfordshire's Strategic Vision (Guiding Principle 3 – see Section 5.3.1.1) alongside the various Corporate Plans produced by Oxfordshire's Local Authorities.

Oxfordshire's Local Industrial Strategy fully recognises the local inequalities and aims to respond to this challenge by addressing inclusive growth opportunities for all of Oxfordshire's residents and businesses. To deliver inclusive growth it sets out to convene, through the Future Oxfordshire Partnership (formerly Oxfordshire's Growth Board), local leaders, academic experts, businesses and community organisations to form an Inclusive Growth Commission. This will consider how the county can ensure that the benefits of a world leading innovation ecosystem can be equitably shared and reach all communities, learning from other global ecosystems. The Local Industrial Strategy recognises that to deliver transformational growth in an inclusive and sustainable way will require all partners to consider how best to: encourage good quality employment across the whole economy; support progression for those in low-pay and low-skilled employment and, support workers to stay in employment when they are at risk of losing their jobs due to issues such as age, health or automation. The strategy also sets out to make Oxfordshire a more affordable, sustainable and inclusive place to live, reducing the levels of deprivation and marginalisation from the economy.

This strategic need is also reflected within Oxfordshire's Economic Recovery Plan Oxfordshire's (OxLEP, 2021) which sets out a series of objectives to tackle deprivation and inequalities in its target proposals.

***Oxfordshire's Economic Recovery Plan (OxLEP, 2021) – Target Proposal 2: Tackling Social Mobility and Economic Hardship Objectives***

- *'Create a more resilient skills and labour base*
- *Build capacity to deliver affordable food to Oxfordshire's most deprived communities through an increase in SOFEA's food larders from 10 to 35 sites across Oxfordshire*
- *Improve social mobility and reduce food poverty through targeted skills interventions that work to address long-term employment*
- *Combat digital poverty through targeted skills and finance support that is integrated into existing outreach activities in Oxfordshire's most deprived communities'*

#### *5.5.2.2 Evidence Base*

| *P2: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Indices of Multiple Deprivation* | *MHCLG (2019)* |
| ✓ *Indices of Multiple Deprivation – Income domain* | *MHCLG (2019)* |

##### *5.5.2.2.1 The Unequal Recession*

While it has only been just over a year since the publication of Oxfordshire's Local Industrial Strategy, the economic outlook has changed materially. The COVID-19 pandemic has led to the deepest global recession since World War II. In 2020, for example, 90 percent of countries experienced a decline in per capita income – the highest fraction in recorded economic history. Oxfordshire is at the forefront of the world's efforts to combat COVID-19, bringing cutting-edge science to bear in record time. But despite the scientific successes of 2020, the economic impacts have been far-reaching and are likely to reshape industries, working practices and investment decisions for many years to come. It is against this backdrop of profound economic uncertainty, that the productivity needs of OxIS need to be considered.

It is also impossible to ignore that many sectors and groups have been harder hit by the impacts of COVID-19 than others. As a result, the COVID-19 recession has been described as "the most unequal in modern history" with poorer segments of society impacted disproportionately by the immediate effects and likely to be hardest hit by the longer-term ramifications. To stimulate recovery, policymakers will need to pursue investment in physical and human capital, reallocate resources towards productive sectors and enterprises, and support for the development and adoption of new technologies with renewed vigour but will also need to pursue efforts to ensure inclusive growth and rebalance the equality impacts of the pandemic.

As the skills strategy attests, predicting the impacts of COVID-19 pandemic on Oxfordshire's labour market is highly challenging. Oxfordshire has seen a tripling in the Claimant and Alternative Claimant Count rate during the COVID-19 pandemic to 3.9%. Young people and the over 50's have been significantly impacted; Youth unemployment has increased and there has been a sharp rise in young people classified as 'not in Education, Employment and Training (NEET)' while older citizens have also been proportionally more affected than in previous economic recessions. Employers too - especially sectors such as hospitality, leisure, aerospace, transport, retail and many others, face an uncertain period of rebuilding lost trade and corporate finances creating an overhang of uncertainty that may impact the pace of re-hiring. The need to addressing inequalities between groups, sectors and different areas of the County has never been stronger.

#### *5.5.2.2.2 Pre-existing Inequalities – 'Oxfordshire's Economic Disparity'*

In many ways, it could be argued that Oxfordshire's economy is the envy of many regions both nationally and internationally. Oxfordshire has one of the strongest economies in the UK – before the COVID-19 pandemic (2018), the economy contributed £21bn Gross Value Added (GVA) annually to the UK exchequer. Over the past 10 years, Oxfordshire's economy has grown at an average of 2.6 per cent per year.

Oxfordshire is home to around 31,000 VAT registered businesses, including an exceptionally high concentration of technology-based businesses at the forefront of global innovation. Oxfordshire has one of the highest concentrations of innovation assets in the world with universities, science parks and facilities supporting a wide range of transformative technologies including fusion technology, autonomous vehicles, quantum computing, cryogenics, space, life sciences and digital health. The links between research and industry are strong – for example, Oxfordshire has the highest intensity of university spin out companies in the country.

Oxfordshire has a highly skilled workforce, with 51 per cent of the working age population educated to degree level or above. The county entered recession with an unemployment rate over 50 per cent lower than the UK-average, at 1.3 per cent compared to 2.7 per cent nationally. In fact, in 2019, Oxford had the highest employment rate (82.4%) of all UK cities (Centre for Cities, 2020). However, despite Oxfordshire's many strengths, the economy also has areas of weakness, most notably:

- Lower-than-average and unequal productivity growth
- Poor housing affordability
- Pockets of deprivation

Note that housing affordability is addressed in need P3 in Section 5.5.3.

#### *5.5.2.2.3 Jobs and Deprivation*

Figure 5-37 highlights the distribution of employment within Oxfordshire. As would be expected the highest levels of employment are located within Oxford City and the main towns and also to the south of the county spreading west from Didcot to Faringdon. The result of this distribution is inequality of access with Oxfordshire's rural communities reliant on connectivity to more urban areas or sites to the south of the County to access employment.

Figure 5-38 shows the Index of Multiple Deprivation for the whole of Oxfordshire whilst the income domain is represented in Figure 5-39. This shows that there is a need to address pockets of deprivation which are in the lowest decline of deprivation including in the following OxIS Towns & Surrounds:

- **Oxford City** (particularly the Cowley, Blackbird Leys and Barton area of the city)
- **Banbury**
- **Bicester**

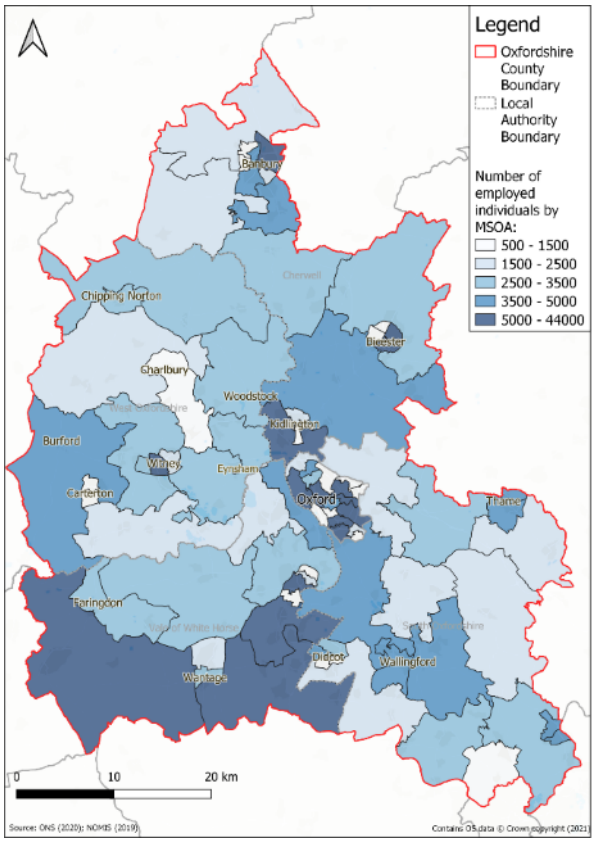



*Figure 5-37: Employment in Oxfordshire*

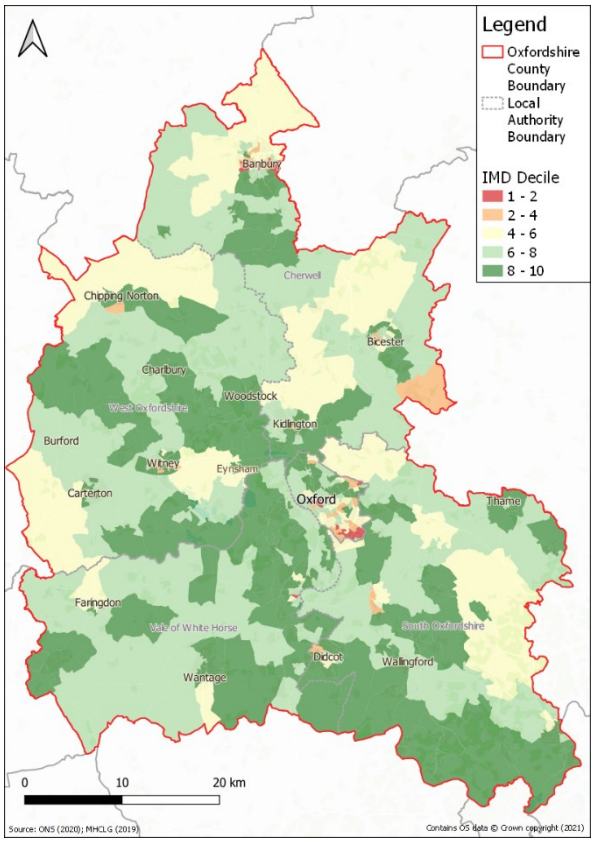



*Figure 5-38: Index of Multiple Deprivation*

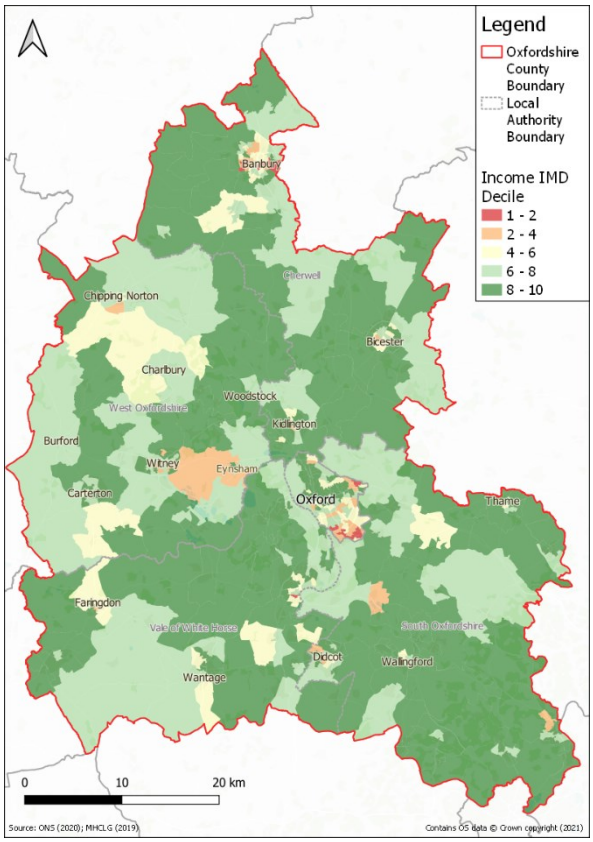



*Figure 5-39: Index of Multiple Deprivation, Income Domain*

### *5.5.2.3 Typical Infrastructure Schemes to Meet P2 Needs*

The following typical infrastructure schemes could meet the P1 needs identified:

- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- Early Years Education Facilities (IF4)
- SEN Schools (IF4)
- Primary & Secondary Schools (IF4)
- Adult Education / Skills Centre (IF4)
- Innovation Hub (IF6)
- Community Centre / Hub (IF8)
- Leisure / Sport Centre (IF7)
- Outdoor Green Space (IF7)
- GP / Health Centres (IF10)
- Community Hospitals (IF10)
- Extra Care Housing (IF10)

### 5.5.3 P3: Attract & Retain Talent in Oxfordshire

*P3 Future Needs to 2040 for Attract & Retain Talent in Oxfordshire at a Glance*

The Oxfordshire Local Industrial Strategy (OxLEP, 2019) has identified the scarcity of affordable housing within Oxfordshire as a key barrier to attracting and retaining talent. This is to the detriment of productivity targets and contributes to socio-economic inequalities within the county (discussed in P2). As such, there is a pressing need to provide a greater quantity of affordable housing.

Based on a review of evidence, the price of houses relative to earnings is greater in all districts of Oxfordshire than the English average – indicating poor housing affordability. The need is greatest in Oxford City which is the least affordable UK city for housing. There is also a need to address affordability issues in a series of wider towns including Banbury, Bicester, Carterton, Chipping Norton, Witney as well as in the vicinity of Kidlington, Yarnton and Woodstock.

This need in part, can be delivered by the 100,000 new homes planned within the Oxfordshire Housing and Growth Deal (MHCLG, 2018) by 2031.

Additionally, improving core infrastructure such as affordable and reliable transport connections between rural areas and service hubs will also contribute to increased housing affordability since it 'broadens' demand away from the hubs (see need C4 in Section 5.6.4).

*P3 Key Affected Infrastructure*

#### 5.5.3.1 Strategic Policy & Strategy Need

*P3 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Improve housing affordability | Town and County Planning Act (1990)<br>Planning Act (2008)<br>Localism Act (2011)<br>Planning for the Future (MHCLG, 2020)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>NPPF (MHCLG, 2019)<br>Oxfordshire's Strategic Vision (OCC, 2020).<br>Various District Local Plans |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

The UK Government has a manifesto pledge to *'continue to increase the number of homes being built'.* In 2020 a white paper was launched to reform the planning process, in part to address perceived shortcomings of the current approach. The current planning process is directed by a national framework underpinned by key legalisation such as the Town and County Planning Act (1990), the Planning Act (2008) and the Localism Act (2011) alongside national planning policies. Key national documents constituting Government policy and guidance are the NPPF and the Planning Policy Guidance. These documents must be considered when local development plans are prepared and NPPF also forms a material consideration in the determination of planning applications.

Additionally, the Planning for the Future white paper has several key aims to enhance the planning process, in particular through streamlining and modernising the planning process; improving outcomes on design and sustainability; reforming developer contributions; and ensuring more land is available for development growth where it is needed. The government's ambition is to deliver approximately 300,000 new homes every year. The White Paper proposes a standard, centrally assessed method for establishing housing requirement targeted on releasing the most land in the areas where affordability is worst, to stop land supply being a barrier to enough homes being built.

From an Oxfordshire perspective, the strategic need to address housing affordability is set out in Oxfordshire's Strategic Vision (Guiding Principle 6) and reflected within affordable housing policies of the various District Local Plans.

***Oxfordshire's Strategic Vision – Guiding Principle 6: We will deliver homes that meet the needs of current and future generations (Oxfordshire Growth Board, 2021)***

*'We will promote the development of new homes that will add to the vitality and vibrancy of our communities while positively contributing to our collective wellbeing. We will tackle the significant challenge of housing affordability in Oxfordshire by delivering more truly affordable homes both for rent and home ownership, and we will deliver homes that allow people to live healthily, happily and independently in their old age. The emphasis will be on place-shaping.'*

Oxfordshire's Local Industrial Strategy sits alongside the Oxfordshire Housing and Growth Deal, agreed with government in 2017, which sets out the commitment to deliver 100,000 new homes across the county before 2031, as well as improvements in necessary accompanying infrastructure.

The Local Industrial Strategy notes that housing affordability in Oxfordshire is among the worst in the country putting it at the root cause of deprivation in some areas. The Local Industrial Strategy identifies that housing affordability and the rising cost of living as causing a range of issues:

- Creating affordability challenges, making it more difficult to recruit, especially more junior staff. Similarly poor affordability makes it difficult to retain graduates and provide essential housing for key workers and low- and middle- income workers upon which the economy depends
- Acting as a barrier to creating the places and communities necessary to develop a thriving top three Global Innovation Eco-system in the County
- Detracting from Oxfordshire's quality of life

The Local Industrial Strategy notes that since housing affordability varies across the region, simply building more homes is unlikely to be enough. Housing needs to be in the right areas, and with advanced transport links to ensure residents can make the most of the economic opportunities the region offers.

#### 5.5.3.2 Evidence Base

| *P3: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Median House Prices* | *ONS (2021)* |
| ✓ *House Price to Earnings Ratio* | |
| ✓ *Indices of Multiple Deprivation – Wider Barriers Sub-Domain* | *MHCLG (2019)* |

#### 5.5.3.3 House Price Trends in Oxfordshire

One of the other key challenges experienced by Oxfordshire is the cost and supply of housing. Since 2010, median house prices in Oxfordshire have risen 43%, outstripping growth in average incomes by 28% (see Figure 5-40). As of June 2020, median house prices in Oxfordshire were 42% higher than the average in England with prices in Oxford city 60% higher than this comparator.

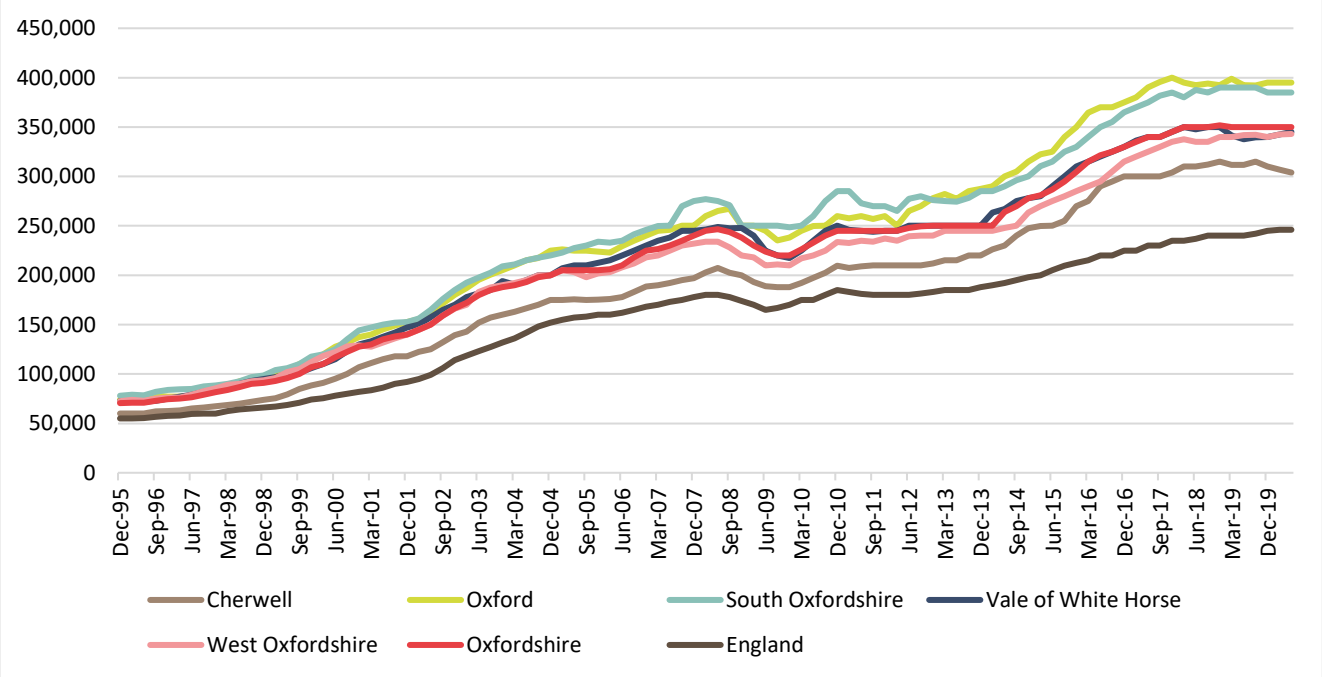



*Figure 5-40: Median House Prices in Oxfordshire*

Figure 5-41 shows the trend in the House Price to Earnings Ratio over time across Oxfordshire compared to the average in England. Since 2010, the House Price to Earnings Ratio has increased only modestly (by 6%), while in Oxfordshire, Oxford and Cherwell districts have seen house price growth exceed earnings by 32% and 40% respectively.

Given the existing tight labour market conditions, Housing costs place Oxfordshire at a significant disadvantage relative to competitor locations, restricting access to talent, business relocation and investment. It has been noted that Oxfordshire also needs to improve graduate retention numbers, for whom housing costs are likely to be significantly more impactful. Affordable housing is also a key need to support key workers and low- and middle- income workers upon which the economy depends.

The price of housing also affects land value in other sectors, for example by driving up the price for other uses. It has been noted that a lack of affordable and available business space is also constraining productivity and business growth in Oxfordshire.

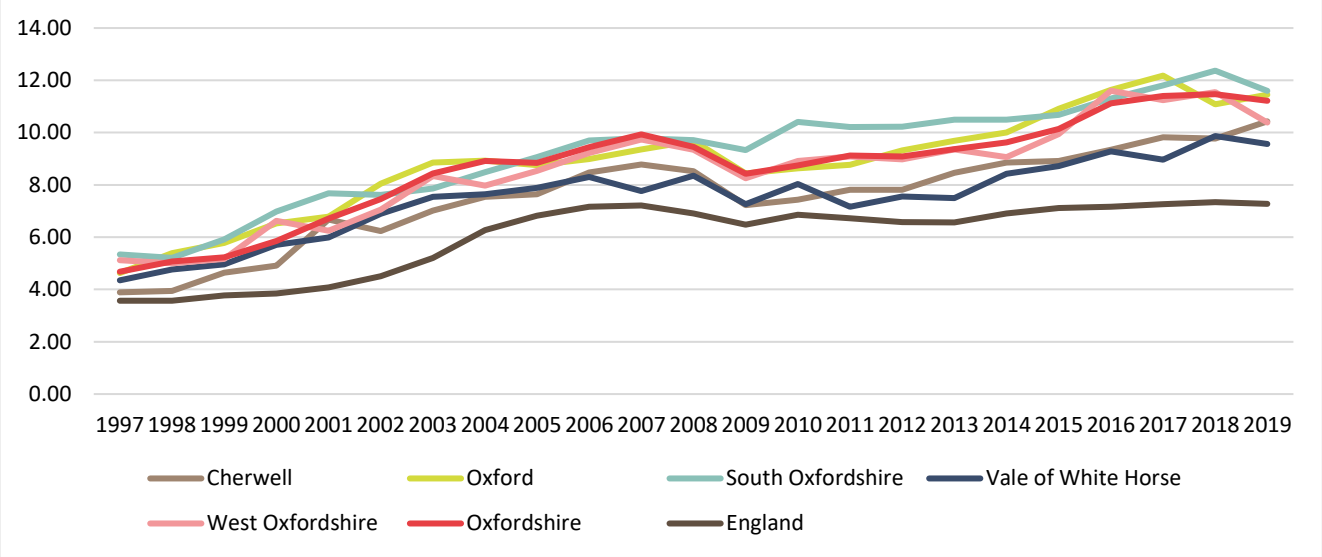



*Figure 5-41: House Price to Earnings Ratio*

Figure 5-42 presents the 'Wider Barriers to Housing and Services' sub-domain of the IMD for Oxfordshire. This specifically captures access to housing considering factors such as homelessness and affordability.

This shows that large parts of Oxfordshire, in particular urban locations, are among the most deprived areas in the country on this metric. The need is greatest in the following OxIS Towns & Surrounds and Rural Communities:

- Oxford City (most of which is located in the most deprived domain in relation to housing access in the country)
- Banbury
- Bicester
- Carterton
- Chipping Norton
- Witney
- South Cherwell area and Woodstock

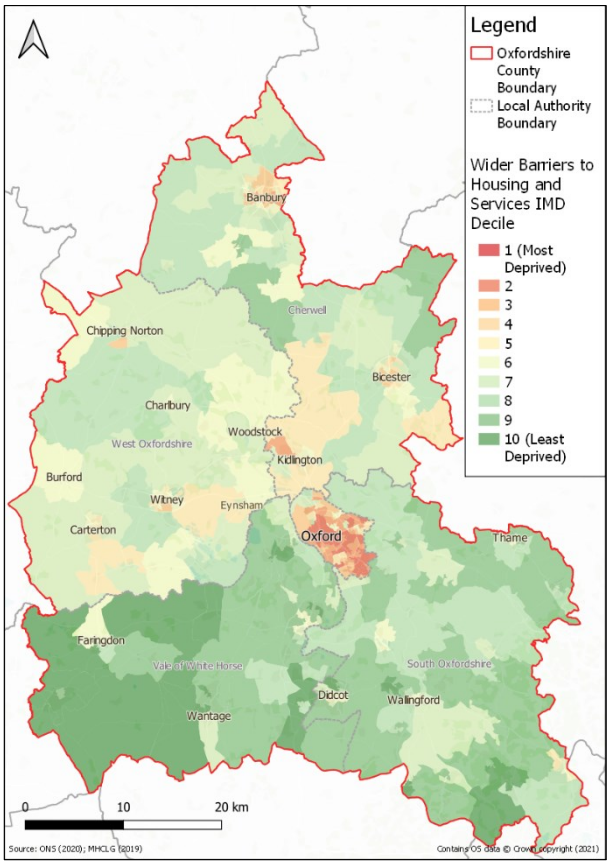



*Figure 5-42: Index of Multiple Deprivation, Wider Barriers to Housing and Services Sub-Domain*

#### *5.5.3.4 Typical Infrastructure Schemes to Meet P3 Needs*

The following typical infrastructure schemes could meet the P3 needs identified:

- Electricity Sub-Station Schemes (IF1)
- District Heating Schemes (IF1)
- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- Road Improvement Schemes (IF2)
- Flood Alleviation Schemes (IF3)
- Early Years Education Facilities (IF4)
- SEN Schools (IF4)
- Primary & Secondary Schools (IF4)
- Adult Education / Skills Centre (IF4)
- Innovation Hub (IF6)
- GP / Health Centres (IF10)
- Potable Water Supply Scheme (IF12)

### 5.5.4 P4: Build A Global Business Innovation Ecosystem

*P4 Future Needs to 2040 for Build A Global Business Innovation Ecosystem at a Glance*

Oxfordshire's Local Industrial Strategy (OxLEP, 2019) plans to build upon the world-leading science and technology clusters within the county and aims to position it as one of the top three global innovation ecosystems by 2040.

This strategy is aligned with national policy, aiming to promote sustainable economic activity in the wider region. There is a strong business case for the 2040 target, with forecasts estimating the return as an additional £23bn in Gross Value Added to the economy and 108,000 new jobs.

Critical to success will be ensuring that Oxfordshire provides citizens with a sustainable and affordable high quality of life. This will support the attraction and retention of the necessary world-class talent, and the skills development of existing citizens in order to fulfil the business needs – both of which have been discussed in P1 and P3 respectively.

Based on the above, there is also a need to nurture key industries by providing the infrastructure they need to thrive, including transportation, business accommodation, and support services. This will involve developing close partnerships with the county's businesses so that their needs can be assessed, and regularly reviewing the cutting-edge technologies under development. Current areas of focus are; the so-called 'Knowledge Spine' that ich extends from Bicester to Milton Park, and the region known as 'Science Vale UK' around Abingdon and Didcot.

*P4 Key Affected Infrastructure*

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

***IF4 Education***

***IF5 Digital***

***IF6 Innovation***

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.5.4.1 Strategic Policy & Strategy Need

*P4 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Make Oxfordshire one of the top three global innovation ecosystems by 2040 | Build Back Better: our plan for growth (HM Treasury, 2021)<br>Emerging Oxford-Cambridge Arc Spatial Framework (MHCLG, 2021)<br>Oxfordshire: A Trailblazer for the UK Economy (OxLEP, 2018)<br>Oxfordshire's Investment Plan (OxLEP, 2020) |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

The emerging Oxford-Cambridge Spatial Framework (MHCLG, 2021) recognises the region as a world leading economic area, underpinned by a high-quality environment, and knowledge-based economy. The opportunity for the region is recognised nationally by government and local partners, who have set an ambition to build a better economic, social and environmental future for the area with high-quality, well-connected and sustainable communities making the Oxfordshire-Cambridge Arc an even more beautiful place to live, work and visit. To achieve this ambition, the government plans, alongside local partners, to develop this spatial framework and to explore the creation of an Arc Growth Body.

Oxfordshire's Local Industrial Strategy sets out a bold vision of positioning Oxfordshire as one of the top three global innovation ecosystems by 2040, building on the region's world-leading science and technology clusters to be a pioneer for the UK in emerging transformative technologies and sectors. Forecasts developed pre-COVID identified the opportunity to unlock £23bn of additional GVA and 108,000 new jobs by 2040. While the COVID-19 pandemic is expected to have significant short-term impacts, the potential for Oxfordshire to return to growth is strong.

The Local Industrial Strategy (OxLEP, 2019) presents a long-term framework for future investment against which private and public sector priorities can be assessed. The strategy is grouped around five foundations of productivity:

- Ideas: Establish a globally connected and competitive innovation economy
- People: Develop a more responsive skills ecosystem creating better opportunities for all
- Infrastructure: Enable greater connectivity and accessibility especially across key growth locations
- Business environment: Become a powerhouse for commercialising transformative technologies
- Places: Develop Oxfordshire as a living laboratory to help solve the UK's Grand Challenges

The Local Industrial Strategy sets out the ambition for Oxfordshire to become one of the top three global innovation ecosystems by 2040. An innovation ecosystem is described as a complex system of interconnected resources and activities which are necessary for innovation to flourish. In a successful innovation ecosystem, innovations should be able to easily move from discovery through to application, commercialisation and scale-up. Development of an ecosystem naturally involves many actors and components. To support Oxfordshire's progress, the Local Industrial Strategy identifies six key characteristics of globally innovation ecosystems, based on an international comparator analysis, that are identified as being key to Oxfordshire's success (see Table 5-39).

| Iconic Brand | Liveable Place | Strong Financing |
|---|---|---|
| It is essential for a globally-leading innovation ecosystem to have a distinctive proposition and a strong vision that differentiates it from other ecosystems, around which citizens, businesses, leaders and investors can unite. | To attract people, business and investment, an innovation ecosystem needs to have thriving communities. These must be healthy, sustainable, provide a high quality of life and support both urban and rural living. They must be affordable, well connected and have a vibrant community and cultural offer. | Availability of finance is essential to creating and commercialising innovation, scaling spin-outs and investing in the talent and infrastructure necessary for innovation to flourish. Investment can come from a number of sources. |
| **Commercial Culture** | **Keystone Assets** | **Talent Proposition** |
| A strong commercial culture is an environment in which entrepreneurship, investment and innovation thrives. It covers broad factors such as regulation and competition, as well as cultures of collaboration and knowledge exchange that encourage innovation and commercialisation. | An innovation ecosystem must be anchored by national or international keystone assets – these can range from education institutes, national research facilities, world-class industry clusters and knowledge-intensive assets. | Talent is integral to the innovation ecosystem. A strong innovation ecosystem must have the ability to attract and retain world-class talent, as well as nurture the talent and skills of its own citizens, developing skills aligned to business need and across a number of sectors. |

*Table 5-39: Six Key Characteristics of a Global Innovation Eco-System*

#### 5.5.4.2 Evidence Base

| *P4: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Innovation Floor Space* | *Local Surveys* |

##### 5.5.4.2.1 Iconic Brand

Due to the exceptional scientific efforts that are helping us emerge from the pandemic, Oxfordshire's international reputation for science and innovation is as strong today as it has ever been. As the UK seeks to re-define its global position outside of the EU, research and innovation is a key cornerstone that the government will need to continue to grow. This is an area in which the UK already outperforms, having ranked first amongst its comparator countries by field-weighted citation impact continuously since 2007. The UK's citation impact remains over 50% higher than the world average and 30% higher than the EU 27 average. Since 2016, the UK has seen over half its publications result from international collaboration each year. Oxfordshire is a key contributor to this success with the international profile of the regional knowledge base rivalling that of any region in the world. This is highlighted by the breadth and depth of its research collaborations and truly global outlook.

Oxfordshire's international brand is naturally deeply interconnected with its continued leadership in key transformative technologies and grand societal challenges. This is naturally supported by infrastructure through the provision of research facilities, development of business clusters, providing connectivity to enable benefits of agglomeration and through the infrastructure supporting technology demonstrators and 'Living Labs'. To maintain its iconic brand, Oxfordshire will need to continue to lead the development of and demonstration of key break-through technologies, while also providing the facilities to strengthen commercial clusters across the County.

The Oxfordshire Local Industrial Strategy identifies a number of key sectors of focus such as clean technology, fusion technology, autonomous vehicles, quantum computing, cryogenics, space, life sciences and digital health but, since new technologies are continuously emerging, this list is unlikely to be exhaustive and will need to be routinely updated.

##### 5.5.4.2.2 Strong Financing

A strong financial eco-system is essential to foster the commercialisation of innovation, provide patient capital for research phases, seed capital for the first commercial steps and venture capital for scale-up and international growth. Section 5.5.5.4.1 summarises the mix of employment by sector in Oxfordshire noting that Oxfordshire also has proportionally fewer jobs in financial and insurance services compared to the average in England. This sector accounts for 3.4% of employment in England but only 0.6% in Oxfordshire. Evidence for the Local Industrial Strategy documents that Oxfordshire is home to two investment funds with a combined value of £1.4 billion (OxLEP, 2018), but also recognises the region needs to think more creatively about how to attract investors and different types of investment in order to secure the financing it needs.

Given the changes in working practices that have been accelerated through the COVID-19 pandemic, Oxfordshire has a strong opportunity, to attract workers away from larger cities to strengthen sectors such as financial services, but this will need coordinated efforts, facilities and appropriate digital infrastructure tailored to the needs of these sectors.

#### *5.5.4.2.3 Commercial Culture*

Evidence for the Oxfordshire Local Industrial Strategy notes that Oxfordshire has a strong commercial culture but identifies the need to improve enabling conditions for innovation, commercialisation, and scale-up of businesses. The Trailblazer for the UK Economy report identifies commercialisation as the stage where Oxfordshire has the greatest potential to capture good growth for the region and generate additional economic benefit for the rest of the UK (OxLEP, 2018). At this phase of development companies need access to diverse business space to suit their needs – this could include specialist co-working space for new businesses, grow-on space and specialist facilities to incubate new commercial clusters.

Oxfordshire's current economy is made up of 99% Small and Medium Enterprises with high levels of start-up /spin off businesses. To provide maximum support to these businesses to grow, a wider eco-system also needs to be in place to provide and accommodate enabling talent, such as in leadership, management, finance, legal and other commercial matters. Oxfordshire needs to ensure strong access to these essential commercial skills throughout the growth phases. For example, one of the Local Industrial Strategy's objectives is to enable the creation of more 'Unicorn' businesses (businesses valued at over $1bn) in Oxfordshire. Research shows that to deliver this, unicorns will need to hire rapidly into their leadership teams, with 53% of leaders having previous experience working in a VC-backed or publicly listed company (Notion Capital, 2019). Attracting experienced workers to support this growth will include providing a high-quality, affordable environment and a world-leading talent proposition. Critical commercial skills development will also need to be fostered locally, while ensuring that more commercial skills can be retained within the region. On this front, the skills strategy notes that over the last 3 years achievements in Accounting and Finance and Business Management have fallen sharply and Law achievements are minimal suggesting that more may need to be done to strengthen provision.

#### *5.5.4.2.4 Keystone Assets*

Oxfordshire has one of the highest concentrations of innovation assets in the world with universities, science parks and facilities at the forefront of global innovation. These assets make a significant contribution to the UK economy and the wider reputation of the Oxford-Cambridge Arc. For example, the Arc is home to the most productive life sciences clusters in Europe, which already compete internationally with other global leaders in San Francisco and Boston, Massachusetts. Other areas of specialism include space, satellite technologies and motorsport engineering. For example, 'Motorsport Valley' is a £6bn global cluster of automotive, motorsport and advanced manufacturing companies extending from Oxfordshire through Northamptonshire and beyond.

The majority of facilities are located along the so-called 'Knowledge Spine' that extends from Bicester down to Grove, Wantage and Milton Park in the south. The region around Abingdon and Didcot, known as Science Vale UK also covers two enterprise zones – the Harwell Campus, home to internationally recognised space, energy and health assets; and Milton Park and Didcot which homes a high concentration of life science and creative industries.

To support further development of keystone assets within Oxfordshire, OxLEP have, alongside the Local Industrial Strategy, developed the Oxfordshire Investment Plan. The Investment Plan builds on Oxfordshire's pioneering spirit of discovery and innovation to take forward the ambitions set out in the Local Industrial Strategy, translating its policy ideas and commitments into a transformational programme for action and delivery. Comprising both capital and revenue investments, the Investment Plan captures an extensive portfolio of projects to strengthen and support the development of a Global Innovation Ecosystem.

Capital projects from the Investment Plan collectively add 729,000 $m^2$ of new innovation and commercialisation floor-space and have been incorporated in OxIS.

#### *5.5.4.2.5 Liveable Place, Talent Proposition and Skills*

Due to their importance within the OxIS, the issues of liveable place, talent proposition and skills are addressed in detail in the following sections, respectively:

- Section 5.4: covers the core place-shaping themes
- Section 5.5.1: covers world-class and inclusive skills
- Section 5.5.2: focuses on the challenge of affordability in Oxfordshire

#### *5.5.4.3 Typical Infrastructure Schemes to Meet P4 Needs*

The following typical infrastructure schemes could meet the P4 needs identified:

- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- International Research Facility (IF6)
- Research & Development Lab space (IF6)

### 5.5.5 P5: Drive Economic Growth & Productive Employment

*P5 Future Needs to 2040 for Drive Economic Growth & Productive Employment at a Glance*

Economic growth and greater productive employment can raise the living standards of Oxfordshire's citizens, and is intertwined with many of the other themes within OxIS. For greatest overall success, there is a need for economic growth to support and be supported by other strategic goals. For example, the need to reduce socio-economic inequality (see need P3 in Section 5.5.3) or move towards a 'green economy' (see need E1 in Section 5.2.1 and C2 in Section 5.6.1.4). Fortunately, this is recognised in national policy and Oxfordshire's Local Industrial Strategy - which plans develop the county's economy as a knowledge-based innovation ecosystem by 2040 (see need P4 in Section 5.5.4).

Whilst the COVID-19 pandemic has disrupted this strategy and caused recession, our analysis shows that Oxfordshire is in a strong position to recover by the mid-2020's. Some forecasts predict that Oxfordshire's economy might increase £20bn by 2040, despite the pandemic (Cambridge Econometrics, 2021). However, to realise the potential, our evidence shows it will be critical for County and District Council investments to target promoting greater productive employment. Consequently, there is a need to deliver on the factors affecting productive employment – namely the provision of business infrastructure and services (see need C1 in Section 5.6.1 and C2 in Section 5.6.1.4), education (see need P1 in Section 5.4.1), talent-attracting living standards (see need P3 in Section 5.4.3) and transportation (see need PS5 in Section 5.4.5, C4 in Section 5.6.4 and C5 in Section 5.6.5).

*P5 Key Affected Infrastructure*

*IF1 Energy*

***IF2 Transport***

*IF3 Flood Alleviation*

***IF4 Education***

***IF5 Digital***

***IF6 Innovation***

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.5.5.1 Strategic Policy & Strategy Need

*P5 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Deliver productive economic growth | National Infrastructure Strategy (HM Treasury, 2020)<br>Build Back Better: our plan for growth (HM Treasury, 2021)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>Oxfordshire: A Trailblazer for the UK Economy (OxLEP, 2018) |
| Deliver employment growth | National Infrastructure Strategy (HM Treasury, 2020)<br>Build Back Better: our plan for growth (HM Treasury, 2021)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>Oxfordshire: A Trailblazer for the UK Economy (OxLEP, 2018) |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

#### 5.5.5.2 National Policy

The National Infrastructure Strategy (HM Treasury, 2020) recognises that high-quality infrastructure is crucial for economic growth, boosting productivity and competitiveness stating that "Well-developed transport and digital networks allow businesses to grow and expand, enabling them to extend supply chains, deepen labour and product markets, collaborate, innovate and attract inward investment. These 'agglomeration' effects are particularly powerful in city regions, where high quality infrastructure can play a substantial role in boosting productivity." To support growth in jobs and productivity, the National Infrastructure Strategy sets out the government's ambitions to:

- Level-up and strengthening the Union
- Decarbonise the economy and adapt to climate change
- Support private investment in infrastructure
- Accelerate and improve infrastructure delivery

Recognising the severe impacts of the COVID-19 pandemic, the strategy focuses on how infrastructure can drive the recovery both through stimulus effects in the short-term but also creating the conditions for long-term sustainable growth. The strategy also acknowledges the UK's productivity gap with major cities and regions in the UK having lower productivity compared to international competitors. It states that "towns and regions are held back by inadequate and out of date infrastructure, making it hard for people to get to work, run businesses and attract international investment."

The strategy also recognises that bold action is needed to transform the UK's infrastructure to meet net zero and climate change commitments. This energy transition can also have stimulative effects - by harnessing private investment and innovation as new technologies become available, the transition to a zero carbon economy will create new markets and opportunities. As a consequence, the government has an ambition to create two million green jobs by 2030 across the UK.

#### 5.5.5.3 Local Strategy

Oxfordshire's Local Industrial Strategy (OxLEP, 2019) sets out the regions vision to position Oxfordshire as one of the top three global innovation ecosystems by 2040, building on the region's world leading science and technology clusters to be a pioneer for the UK in emerging transformative technologies and sectors. Forecasts developed before the COVID-19 pandemic evidenced the potential for £23bn of additional GVA and 108,000 new jobs by 2040. While the COVID-19 pandemic has had significant short-term impact across the economy, the potential for Oxfordshire to return to growth is strong. The Local Industrial Strategy recognises that to successfully deliver on the vision, Oxfordshire will need to continue working with government to develop a resilient and responsive physical infrastructure, connecting all communities to future economic opportunities and ensuring the benefits reach all parts of the county.

#### 5.5.5.4 Evidence Base

| *P5: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Gross Value Added* | *Business Register & Employment Survey ONS (2020)* |
| ✓ *Gross Value Added / Job Filled* | |
| ✓ *Gross Value Added / Hour Worked* | |
| ✓ *Employment Level* | *ONS* |

##### 5.5.5.4.1 Productivity in Oxfordshire

The pursuit of productivity growth is a key policy objective of the national and local Industrial Strategies. Growth of productivity – a key measure of output per worker – is the single most important driver of lasting per capita income growth. Producing equal or more outputs for fewer inputs makes a region or country better off, increases wages and provides more money for welfare and social spending. However, even before the pandemic, productivity growth had been slowing around the world. In the years since the financial crisis, the UK's productivity has grown by only 0.4% annually compared to 2.3% annually before the crisis. Evidence from previous epidemics such as SARS, MERS, Ebola, and Zika suggest that the COVID-19 pandemic is also likely to have lasting impacts on productivity (Dieppe, 2020) through weaker trade, investment and unemployment. The aftermath of the COVID-19 pandemic is likely to see further challenges to key sectors such as real estate, manufacturing and hospitality, while the long-term fiscal impacts might provide further economic headwinds if support measures are unwound too quickly.

In Oxfordshire, in the ten years to 2018, productivity in real terms, as measured by GVA / hour worked actually fell by 1.1% compared to growth of 3.3% in the rest of England. GVA / hour worked has now dipped below the English average. Productivity measured as GVA / job filled performed slightly better over the same period (growth of 1.8%) but still underperformed the comparative picture in England (growth of 5.0%).The picture also varies significantly across the County with pockets of deprivation, wage disparity and variations in productivity. For example, Figure 5-43 and Figure 5-44 show that productivity in Oxford and West Oxfordshire both trail the regional and national averages with GVA / job filled closer to £45,000 compared to the national average of £57,000.

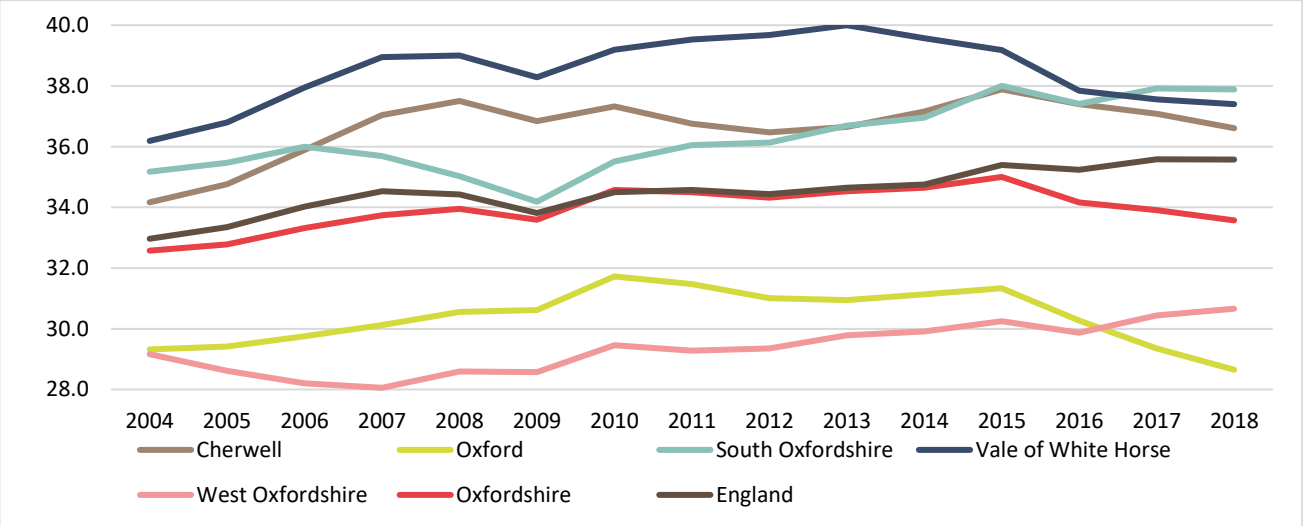



*Figure 5-43: GVA / Hour Worked by Local Authority in Oxfordshire (ONS, 2020)*

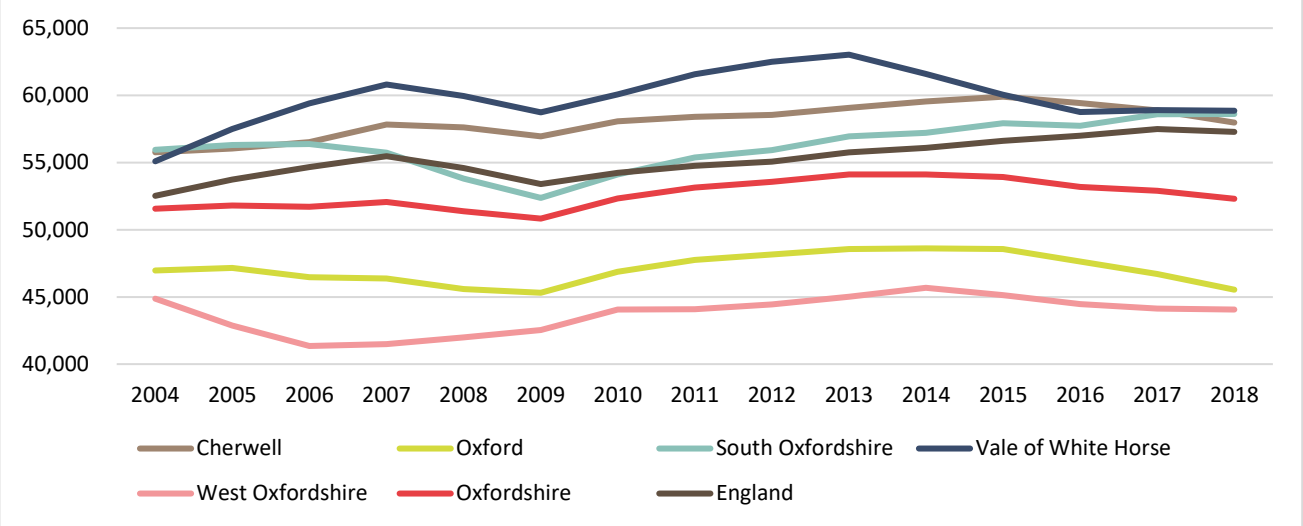



*Figure 5-44: GVA / Job Filled by Local Authority (ONS, 2020)*

Productivity also naturally varies across sectors, with the sectoral composition of each District distinctly different, leading to different levels of pre-existing resilience to the effects of the pandemic. Figure 5-45 shows that the share of wholesale and retail trade ranges between 9% (Oxford) to 20% (Cherwell) while all Districts are likely to be equally impacted by COVID-19's effects on the Accommodation and Food Services sector.

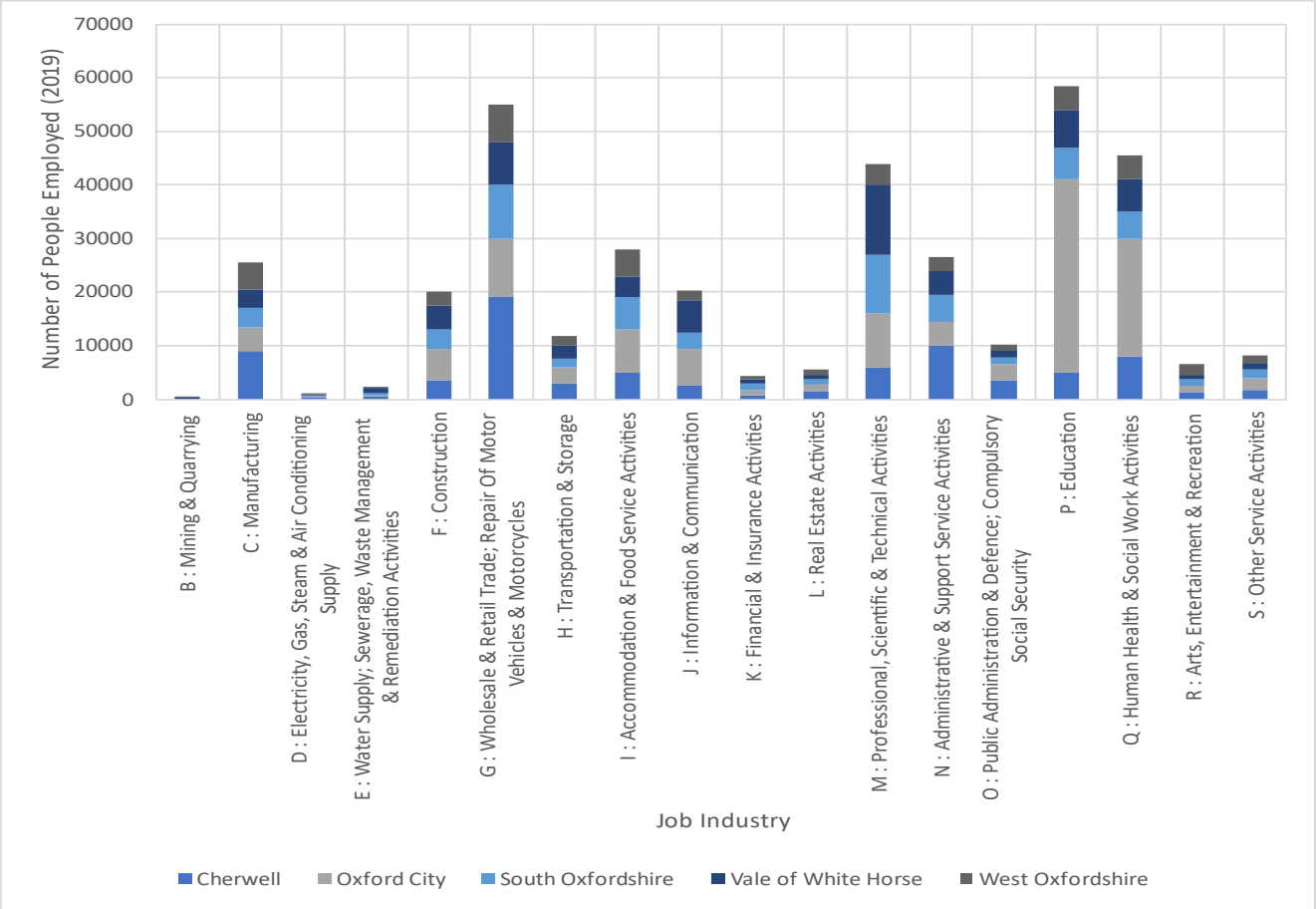



*Figure 5-45: Employment by Sector in Oxfordshire in 2019 (ONS, 2020)*

In terms of productivity, figures before the pandemic show that manufacturing, public administration, defence and real estate sectors in Oxfordshire were broadly more productive than the national average, while other sectors, such as financial services and construction were observed to be less productive.

Rather surprisingly, Oxfordshire also has proportionally fewer jobs in financial and insurance services compared to the average in England. Strengthening the financial sector is likely to be important to improve productivity more generally but also support investment in the local start-up and scale-up eco-system.

#### *5.5.5.4.2 The Opportunity Now*

Indicators covering GVA, productivity and employment have been covered in sections 5.5.1 to 5.5.5 setting out the economic context of Oxfordshire prior to the COVID-19 pandemic. Stage 1 of the OxIS update is being developed during a period of considerable global economic uncertainty caused by the ongoing evolution of both the COVID-19 pandemic and the necessary government responses to it. However, the opportunity to return to growth in Oxfordshire is strong if supporting policies can be adopted to both stimulate recovery and transform productivity in the region. Evidence from previous recessions over the past 50 years shows that the Oxfordshire economy has recovered more strongly than the UK average, and in some cases, has even exceeded pre-recession trend growth.

Oxfordshire's labour market is expected to recover quickly, eclipsing pre-COVID employment levels by 2023 (a year earlier than the rest of the country). By the latter half of the 2020s, employment growth will have settled at its pre-crisis trend (Cambridge Econometrics, 2021). Our initial high-level updates to the pre-COVID estimates indicate that a return to the transformational growth path could see Oxfordshire's economy grow by £20bn by 2040 (Figure 5-46). However, to achieve this, productivity growth will be key. In light of productivity weaknesses observed following previous pandemics (evidenced in section 5.5.2.2.1), investments targeting advancements in productivity will be more important than ever.

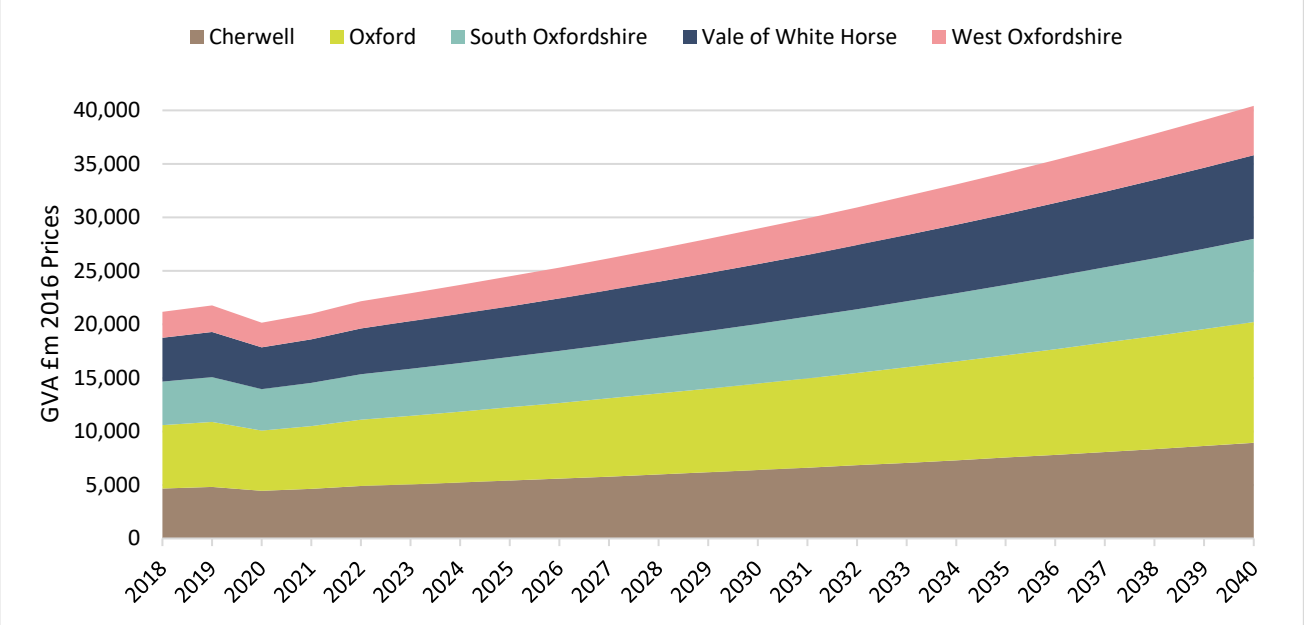



*Figure 5-46: Estimated Impact of Oxfordshire's Economy returning to Oxfordshire Local Industrial Strategy Scenario post COVID-19 (City Science estimates from (ONS, 2020))*

### *5.5.5.5 Typical Infrastructure Schemes to Meet P5 Needs*

The following typical infrastructure schemes could meet the P5 needs identified:

- Electricity Sub-Station Schemes (IF1)
- District Heating Schemes (IF1)
- Active Travel Schemes (IF2)
- Public Transport Schemes (IF2)
- Road Improvement Schemes (IF2)
- Adult Education / Skills Centre (IF4)
- Innovation Hub (IF6)
- Potable Water Supply Scheme (IF12)

## 5.6 Connectivity Needs

*Connectivity Needs to 2040*

The Connectivity theme is associated with ensuring that communities, particularly locations identified for growth, across Oxfordshire are connected both digitally as well as with wider utilities including clean and secure energy and water supply. It also involves improving transport connectivity and mobility between places, including seamless interchange across sustainable modes. The outcome led needs are:

- C1: A Digitally Connected Oxfordshire (see Section 5.6.1)
- C2: Clean Energy Supply Grid Capacity & Connectivity (see Section 5.6.1.4)
- C3: Secure Potable Water & Wastewater Capacity & Connections (see Section 5.6.3)
- C4: Improved Sustainable Transport Connectivity Across Oxfordshire (see Section 5.6.4)
- C5: Enhanced Strategic Transport Connectivity Into & Out of Oxfordshire (see Section 5.6.5)

Needs to 2050 will be covered in the forthcoming OxIS Stage 2 Report.

### 5.6.1 C1: A Digitally Connected Oxfordshire

*C1 Future Needs to 2040 for A Digitally Connected Oxfordshire at a Glance*

There is national focus on full-fibre connectivity and 5G mobile data and policy sets out the need to provide full coverage of full-fibre by 2033 to support economic growth, social connectivity and rural communities, alongside providing 4G to 95% of the country. These ambitions are mirrored in the Oxfordshire Digital Infrastructure Strategy (OCC, 2020), aligning with the need to facilitate productive economic growth and employment as well as supporting the delivery of more efficient cultural and health and social care and services and playing its part in replacing road journeys.

Oxfordshire currently has 16.5% of the county covered by full-fibre broadband, behind national averages although marginally higher than comparable neighbouring counties (thinkbroadband, 2021). Alongside addressing these coverage gaps, particularly in urban areas like Oxford City, there is a further need to increase the roll-out of full fibre to keep pace with future growth to 2033 of approximately 74,000 homes. There is a particular need to address coverage gaps in Bicester, Wantage & Grove, Grenoble Road, Northfield, Abingdon, Berinsfield and Heyford Park.

*C1 Key Affected Infrastructure*

#### 5.6.1.1 Strategic Policy & Strategy Need

*C1 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Enable full-fibre (giga-bit capable) broadband connectivity for every home and business across the County by 2033 | National Infrastructure Strategy (HM Treasury, 2020)<br>Planning for Gigabit Delivery in 2021 (DCMS, 2020)<br>Future Telecoms Infrastructure Review (DCMS, 2018)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2020)<br>Oxfordshire Digital Infrastructure Strategy (OCC, 2020)<br>Oxfordshire Local Industrial Strategy (OxLEP, 2019)<br>Oxfordshire Climate Action Framework (OCC, 2020)<br>Local Transport & Connectivity Plan (OCC, 2021)<br>District Local Plans (Various)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

##### 5.6.1.1.1 National

The move to cloud storage and applications, growth in video-on-demand, the convergence of Internet of Things and Artificial Intelligence have led to increasing demand for fast connectivity. The focus of the Department for Digital, Culture, Media & Sport (DCMS) has therefore moved from superfast broadband and 3G/4G to focus on full-fibre connectivity and 5G mobile data.

In lieu of the upcoming 2021 refresh of the National Digital Strategy, the National Infrastructure Strategy (2020) (HM Treasury, 2020) identifies the strategic future need for digital infrastructure from a UK Government perspective. Building on the foundations set by the Future Telecoms Infrastructure Review (DCMS, 2018), it identifies the need to provide full fibre ('Gigabit-Capable') broadband across the UK by 2033. The specific aim is to work with the industry to achieve 85% coverage by 2025 with a view to achieving as close to 100% as possible beyond that to 2033 as part of an ongoing £5 billion gigabit investment programme (DCMS, 2020).

It identifies that full fibre infrastructure is critical to:

- Drive economic growth (e.g. enabling home working through the COVID-19 pandemic)
- Socially connect communities (e.g. deployment to deprived communities)
- Support rural communities (e.g. through helping rural businesses innovate to help create jobs so young people are attracted and retained)

The programme will work with a broad range of commercial providers to ensure as many people across the UK are connected as quickly as possible, whilst retaining value for public money. It anticipates that the private sector will reach around 80% of all UK premises, however, the remaining 20% are likely to require government funding support through the programme.

The National Infrastructure Strategy also identifies a need to improve mobile connectivity between communities through continued increase in 4G and 5G network coverage. It details a plan for Shared Rural Networks (aiming to extend 4G mobile coverage to 95% of the UK) and an investment of £250 million to ensure resilient and secure 5G networks (enabled through full fibre infrastructure).

#### 5.6.1.1.2 County-Wide

Aligning with the Future Telecoms Infrastructure Review, the OCC Digital Infrastructure Strategy and Delivery Plan (2020) (OCC, 2020) identifies Oxfordshire's future digital connectivity needs.

***Oxfordshire's Digital Connectivity Future Aims (Oxfordshire Digital Infrastructure Strategy and Delivery Plan, 2020)***

- Full-Fibre Broadband Coverage Countywide to all current and new properties by 2033
- Enablement of 5G roll-out through achieving full-fibre coverage

The Strategy identifies that full fibre connectivity is key to:

- **Supporting the Global Business Innovation Ecosystem (see Section 5.5.4):** Supporting the Oxfordshire Local Industrial Strategy's vision to make Oxfordshire a global business innovation ecosystem which includes businesses with a skilled workforce such as aerospace, advanced motor engineering, life sciences and space technologies
- **Facilitating Productive Economic Growth and Employment (see Section 5.5.5)**
- **Reducing Carbon Emissions and Tackling Climate Change (see Section 5.2.1):** Full fibre infrastructure can support people to work from home and avoid the need to travel as well as support the deployment of innovative technology to optimise people's journeys
- **Supporting the delivery of more efficient health and social care services (see Section 5.3.3):** enabling remote healthcare delivery models which typically requries high digital capacity
- **Supporting delivery of more efficient cultural services (see Section 5.4.3):** (e.g. libraries)
- **Reduce Inequalities and the Digital Divide across the County:** enabling all people to learn, work and access goods online

These aspirations are replicated within the Strategic Vision for Oxfordshire (Oxfordshire Growth Board, 2020) which aspires to use full-fibre broadband connectivity as a springboard for the wider application of the Internet of Things (a network of physical objects which are connected to each other through internet connectivity) and connected autonomous vehicles. In the coming years, Internet of Things will transform modern day life, resulting in a better use of highways, safer cars, sustainable street lighting, traffic monitoring, air quality measurements, integrated public transport and remote health and social care capabilities (OCC, 2020).

The importance of fulfilling the need for full fibre broadband connectivity across the County is also reflected within the Oxfordshire Local Industrial Strategy (OxLEP, 2019). It notes that this is critical *'to enable connectivity between sites whilst preserving the natural environment, ensuring residents in Oxfordshire benefit from greater connectivity and digital technological advancements and that Oxfordshire remains competitive to other world-wide innovation ecosystems.'*

The Oxfordshire Climate Action Framework (OCC, 2020) alongside the OCC's emerging Local Transport and Connectivity Plan further emphasise the importance of enhanced digital connectivity to reduce transport carbon emissions. The Oxfordshire Climate Action Framework notes that OCC intend to *'prioritise digital infrastructure over road building; full fibre broadband across Oxfordshire will replace many journeys.'*

#### 5.6.1.1.3 Oxfordshire's Districts

As planning authorities, the Oxfordshire District's have their own digital infrastructure policy requirements within the various Local Plans. Specific policies vary according to the adoption date of Local Plans, however, most require new developments to provide full-fibre broadband infrastructure.

### 5.6.1.2 Evidence Base

| *C1: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Percentage of Premises with Access to Full Fibre (gigabit-capable) Broadband* | *thinkbroadband* |

#### *5.6.1.2.1 Coverage Gaps*

Around 16.5% of all premises within Oxfordshire currently have access to full-fibre broadband as of March 2021 (thinkbroadband, 2021).

Compared to January 2020, this represents an increase of approximately five percentage points. Oxfordshire remains behind the national average, however, is marginally higher relative to comparable counties such as Buckinghamshire and Warwickshire.

It also worth noting that there is significant coverage variation across Oxfordshire, with Oxford City having particularly low levels:

- Cherwell: 15.0%
- Oxford City: 1.57%
- South Oxfordshire: 24.45%
- Vale of White Horse: 20.01%
- West Oxfordshire: 31.52%

This is partly explained by a lack of available commercial subsidy in urban areas (relative to rural areas) as well as unique engineering challenges of digital infrastructure implementation in Oxford.

Ensuring that the full-fibre broadband rollout keeps pace with the future ambitious projected housing growth trajectory of approximately 74,000 homes within Oxfordshire over this period will be vital to achieving the ambition of 100% coverage by 2033.

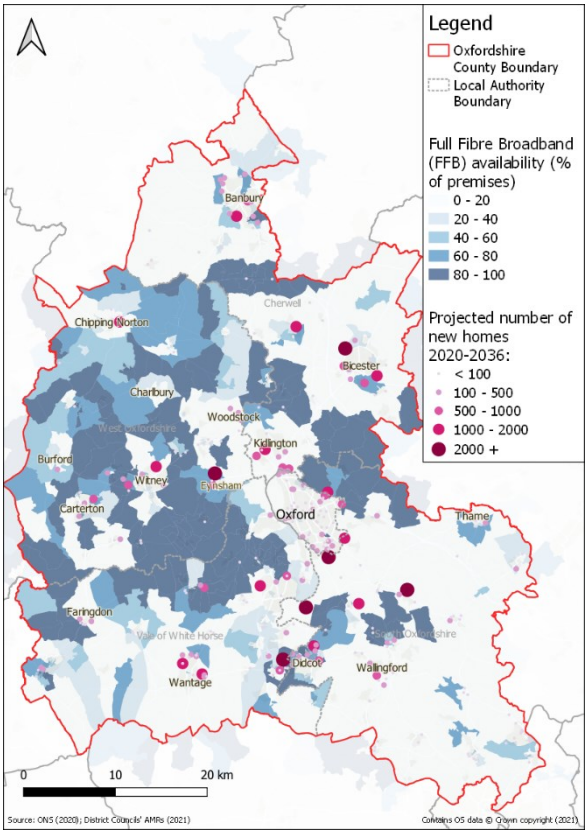



*Figure 5-47: Full Fibre Broadband availability alongside housing projections (Ofcom, 2020) (District Councils' AMRs)*

Figure 5-47, which illustrates the context between existing full fibre infrastructure coverage and projected housing growth, indicates that there is a need to address a significant coverage gap in the vicinity of strategic growth sites across the County. This includes the following OxIS areas of focus:

- Oxford City
- Bicester
- Wantage & Grove
- Grenoble Road & Northfield
- Abingdon & Surrounds
- Upper Heyford

### *5.6.1.3 Future Digital Infrastructure Investment*

Digital infrastructure in Oxfordshire is delivered by several commercial organisations. OCC, in partnership with the District Councils and OxLEP, provides strategic leadership to this investment but is not a digital infrastructure provider.

***Better Broadband for Oxfordshire Programme Success***

In 2014, only 69% of homes and businesses in Oxfordshire had access to superfast broadband. Driven by the Better Broadband for Oxfordshire programme led by OCC, an additional 90,000 connections have been added throughout the county, delivering superfast broadband to 98% of homes and businesses. Simultaneously, the installation of fibre connectivity increased average broadband speeds from 16 Mb/s to 44 Mb/s and resulted in 150,000 people in Oxfordshire choosing to upgrade their service.

To date, the programme has not only generated a business case for improving services but has also generated millions of pounds for reinvestment in full-fibre broadband connectivity, 5G and the wider adoption of smart enabled infrastructure in local planning.

DCMS estimates that approximately 80% of the required full-fibre infrastructure nationally will be viable for provision on a commercial basis, with the remainder requiring public subsidy to enable its implementation. DCMS estimates that the viability for full fibre infrastructure rollout from the commercial sector within Oxford City is more than 87%, whilst the viability across the remaining four Districts is between 65% and 87% (HM Treasury, 2020).

The UK Gigabit Delivery Programme aims to provide subsidises totalling £5 billion to target areas designated as being unviable for commercial rollout of full fibre broadband (DCMS, 2020). A formal consultation period, which ran in early 2021, identified the continuation of several intervention schemes led by Building Digital UK including:

- Gigabit Vouchers: Following the success of the Gigabit Broadband Voucher Scheme, DCMS aim to continue supporting telecoms providers' gigabit deployments. As part of the programme, the Gigabit Voucher Scheme offers vouchers towards the cost of installing gigabit-capable connections worth up to £3,500 for a business premise and £1,500 for a residential premise in rural areas
- Public Sector Hubs: To drive the availability of gigabit infrastructure and services into rural areas, the BDUK's existing Rural Gigabit Connectivity Hub Site Project has already procured a number of Public Sector Hubs. This enables local authorities to work with suppliers to reduce barriers for the commercial sector, resulting in the delivery of gigabit services to hard to reach areas
- Superfast Broadband Programme: From 2011 to 2017, the programme delivered superfast coverage to 95% of premises and between 2018 and 2019. Local authorities continued to carry out new procurements until December 2020. The UK Gigabit programme will continue to support local authorities with procurements which are underway, however the *'Outside In'* approach will be used for new procurements

This programme, which will launch in Spring 2021, will be used as a mechanism to assign UK government funding via a competitive market intervention procurement process to catalyse full fibre rollout in places regarded as uncommercial. Two procurement types have been developed:

- Smaller procurement areas: contracts for around 1,000 – 8,000 premises
- Larger procurement areas: contracts for around 40,000 – 80,000 premises, which have been formed through combining whole Openreach exchange areas, with the specific aim of driving competition amongst larger network providers and give the supply chain greater certainty over the requirement to scale up

As Figure 5-48 indicates, there are a total of three large procurement areas identified in Oxfordshire: covering all of Oxfordshire's Districts except for Oxford. Further detail on residual gaps in full fibre infrastructure provision will not be known until the conclusion of this procurement process.

A series of wider programmes coordinated by various UK departments aimed at stimulating investment in digital infrastructure also continue to run:

- **Businesses in Rural Oxfordshire:** Businesses in Rural Oxfordshire is a £6.3 million programme funded by DEFRA which is aimed at connecting as many rural businesses to full-fibre broadband as possible. In November 2019, BT and Airband were awarded contracts to collectively deliver full-fibre broadband to nearly 968 businesses in the most rural parts of the county. A further 907 residential properties will also be connected under the same contracts.
- **Shared Rural Mobile Network:** The Shared Rural Network is a £1 billion programme aiming to end poor rural mobile coverage by bringing 4G coverage to 95% of the UK landmass by 2026. The programme involves the UK's four mobile network operators who will extend their coverage by upgrading existing networks, and by working together on shared infrastructure and building new sites. The measures are expected to extend mobile coverage to an additional 280,000 premises and 16,000 km of roads as well as increase the numbers of operators available in each area.

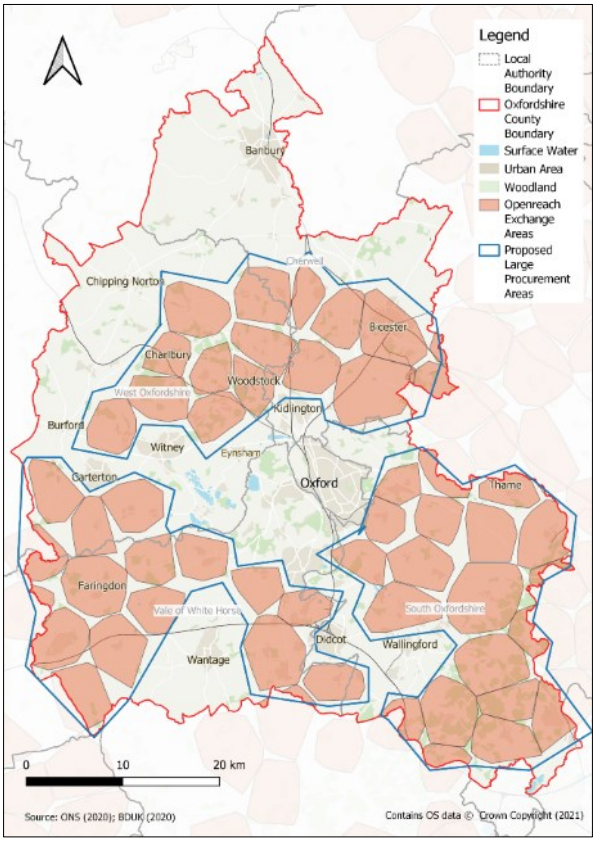



*Figure 5-48: Proposed Large Procurement Areas (DCMS, 2020)*

### *5.6.1.4 Typical Infrastructure Schemes to Meet C1 Needs*

The following typical infrastructure schemes could meet the P5 needs identified:

- Full Fibre Broadband Scheme (IF5)

### 5.6.2 C2: Clean Energy Supply Grid Capacity & Connectivity

*C2 Future Needs to 2040 for Clean Energy Supply Grid Capacity & Connectivity at a Glance*

The Government's Ten Point Plan for a Green Industrial Revolution sets the ambition for the UK's net zero carbon target for 2050 by minimising energy demand and moving away from fossil fuels. The Oxfordshire Energy Strategy (OxLEP, 2019) further establishes a need for a clean, modern and smart energy system as well as a need for flexibility in infrastructure planning to better align demand and local renewable supply.

Energy consumption analysis by District shows relatively consistent levels as well as consistent fuel type proportions over the past ten years, with bioenergy and wastes only partially replacing other traditional fuel sources. Oxfordshire's reliance on petroleum products and gas must reduce at a fast rate to meet national 2030 targets and clean energy goals. This need is exacerbated by the population growth expected in the county. Electricity consumption has, however, shown a reduction between 2008 and 2019 in all Districts showing efficiency gains. However, alongside population growth, other factors will result in a need to address electricity consumption (e.g. transition to electric vehicles and decarbonisation of heat). Targets for electric vehicle use raise specific concerns over the requirements for large scale investment in the electrical grid and network infrastructure.

*C2 Key Affected Infrastructure*

#### 5.6.2.1 Strategic Policy & Strategy Need

*C2 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Increase grid capacity to support planned growth | Ten Point Plan for a Green Industrial Revolution (HM Government, 2020)<br>Oxfordshire Energy Strategy (OxLEP, 2019)<br>Electricity Distribution Price Control Review (Ofgem, 2020) |
| Achieve 56% of electricity demand & 40% of heat demand from renewables by 2030 | SSEN Long Term Development Statements (Scottish and Southern Electricity Networks, 2020)<br>WPD Long Term Development Statements (Western Power Distribution, 2020)<br>SGN Long Term Development Statements (SGN, 2020) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

##### 5.6.2.1.1 Ten Point Plan for a Green Industrial Revolution

The UK has set a world-leading net zero target in order to limit the effects of global warming. Success will mean the UK is less exposed to flooding and heat risks and will preserve our prosperity and natural world (HM Government, 2020).

The Ten Point Plan for a Green Industrial Revolution (HM Government, 2020) has set out immediate energy related priorities that will enable the UK to work towards achieving net zero by 2050 through:

- **Transforming energy** to build a cleaner, greener future for the country, the UK's people and the planet
- **Supporting a green recovery** to grow the economy and support thousands of green jobs across the country in new green industries and leveraging new green export opportunities
- **Creating a fair deal for consumers** by protecting the fuel poor, providing opportunities to save money on bills, providing warmer, more comfortable homes and balancing investment against bill impacts

The UK is leading the transition to clean energy and how the UK produces and consumes its energy, is therefore at the core of the plan. Success will hinge on minimising energy demand and shifting away from fossil fuels for heat, industrial processes and electricity generation. Key sectors that need to focus on decarbonising are transport, domestic buildings, non-domestic buildings and industry.

##### 5.6.2.1.2 Oxford Energy Strategy (2020)

Leveraging on Oxfordshire's historic culture of innovation, Oxfordshire's Energy Strategy sets the vision for the county "to be at the forefront of energy innovation to foster clean growth" (OxLEP, 2019). Seeking to become one of the top three innovation ecosystems, it aims to deliver reduced emissions, cleaner air, lower energy bills, an enhanced natural environment, high-value jobs and commercial opportunities. The objectives, which extend to 2031 are to:

- **Secure a smart, modern, clean energy infrastructure** including increased electricity grid capacity to support planned housing, industrial and commercial growth, and changing energy requirements
- **Enhance energy networking and partnership working across Oxfordshire** to focus on the low carbon energy challenges and funding opportunities created through the Clean Growth Strategy and the Oxfordshire Industrial Strategy

- **Lead nationally and internationally to reduce countywide emissions by 50% compared with 2008 levels by 2030, and set a pathway to achieve zero carbon growth by 2050**. (Note: Although this target was in line with the national target set in the UK Climate Change Act to reduce emissions by 80% by 2050 against a 1990 baseline. However, in light of the revised national target to achieve a 100% reduction by 2050 against a 1990 baseline, the target must be updated)

The economic benefits of a low carbon transition in Oxfordshire will be realised by supporting ambitious and innovative clean generation projects across the county and supporting projects that reduce energy demand across all sectors and increase energy efficiency for domestic, industrial and commercial buildings.

In line with the strategy, Oxfordshire Local Authorities are enabling and delivering innovative energy and low carbon projects at the local level, such as the Bicester Eco Town and energy master-planning for Didcot Garden Town. This includes in August 2021, the county's first Zero Emission Zone, championed by OCC and Oxford City and supported by the Future Oxfordshire Partnership (formerly Oxfordshire Growth Board).

#### *5.6.2.1.3 RIIO-ED2*

Electricity Price Control Reviews are the critical process for network operators through which the regulator sets policy, performance mechanisms and allowable revenues that a licensee may receive over the license period. The first review to reflect the new RIIO (Revenue = Incentives + Innovation + Outputs) model for network regulation, was RIIO-ED1 which covered the period from 2015 to 2023. The next Price Control Review (RIIO-ED2) spans the period 2023 to 2028 with the majority of key evidence being collated throughout 2021. In effect, RIIO-ED2 will set the level of investment in the grid in Oxfordshire for the coming years.

A key objective of RIIO-ED2 is to support the delivery of net zero at the lowest cost to the consumer supporting both strategic investments and innovation. To ensure a consistent starting point for investment, Ofgem will be publishing a common set of forecast assumptions. These assumptions will not restrict Distribution Network Operators from seeking input from local, regional or stakeholders. Therefore, input from key stakeholders in Oxfordshire is encouraged throughout the process. However, it is important to note that investment proposals which are based on local engagement must be supported by justified projections of anticipated demand (Ofgem, 2020).

With draft business plans being required by July 2021 and final business plans by the end of 2021, there is a shortening window for local authorities in Oxfordshire to engage and present their evidence regarding the key grid constraints and investment priorities for their area. Moving forward there is a need for the OxIS to place importance on assessing and determining the likely grid impact caused by proposed infrastructure. This will enable the district councils to present the required evidence in future price control reviews.

#### *5.6.2.2 Evidence Base*

| *Appraisal Dataset* | *Source* |
|---|---|
| *Electricity Network Demand and Capacity* | *BEIS, WPD, SSEN* |
| *Renewable Electricity Demand and Capacity* | *National Statistics, Renewable electricity by local authority: 2014 to 2019, WPD, SSEN* |
| *% of Buildings with Renewable-Ready Heat* | *Non-Gas Map* |

#### 5.6.2.2.1 Energy Consumption

The latest data for Oxfordshire's energy consumption across industries is summarised in Table 5-40 in gigawatt hours.

| Fuel Type | Industrial & Commercial | Domestic | Transport | Public Sector | Agriculture | Total GWhs |
|---|---|---|---|---|---|---|
| Coal | 165 | 47 | — | 5 | — | 217 |
| Manufactured Fuels | 5 | 43 | — | — | — | 48 |
| Petroleum Products | 698 | 466 | 6,318 | 72 | 205 | 7,759 |
| Gas | 2,045 | 3,225 | — | — | — | 5,270 |
| Electricity | 2,341 | 1,214 | — | — | — | 3,555 |
| Bioenergy & Wastes | 121 | 456 | — | — | — | 577 |
| Total Fuels | — | — | — | — | — | 17,426 |

*Table 5-40: Oxfordshire Energy Consumption 2018 in Gigawatt Hours (BEIS, 2020)*

In line with the Oxfordshire Energy Strategy (OxLEP, 2019) to increase production and consumption of renewable energy, between 2009 to 2018, total fuel use remained fairly constant (decrease of 2%) with bioenergy and wastes partially replacing some more traditional fuel sources.

| Fuel Type | 2009 (GWh) | 2018 (GWh) | Diff (GWh) |
|---|---|---|---|
| Coal | 273 | 217 | -56 (-20%) |
| Manufactured Fuels | 49 | 48 | -1 (-2%) |
| Petroleum Products | 7,873 | 7,759 | -114 (-1%) |
| Gas | 5,454 | 5,270 | -184 (-3%) |
| Electricity | 3,663 | 3,555 | -108 (-3%) |
| Bioenergy & Wastes | 476 | 577 | +101 (+21%) |
| Total Fuels | 17,788 | 17,426 | -362 (-2%) |

*Table 5-41: Oxfordshire Energy Consumption by Fuel Type 2018 (BEIS, 2020)*

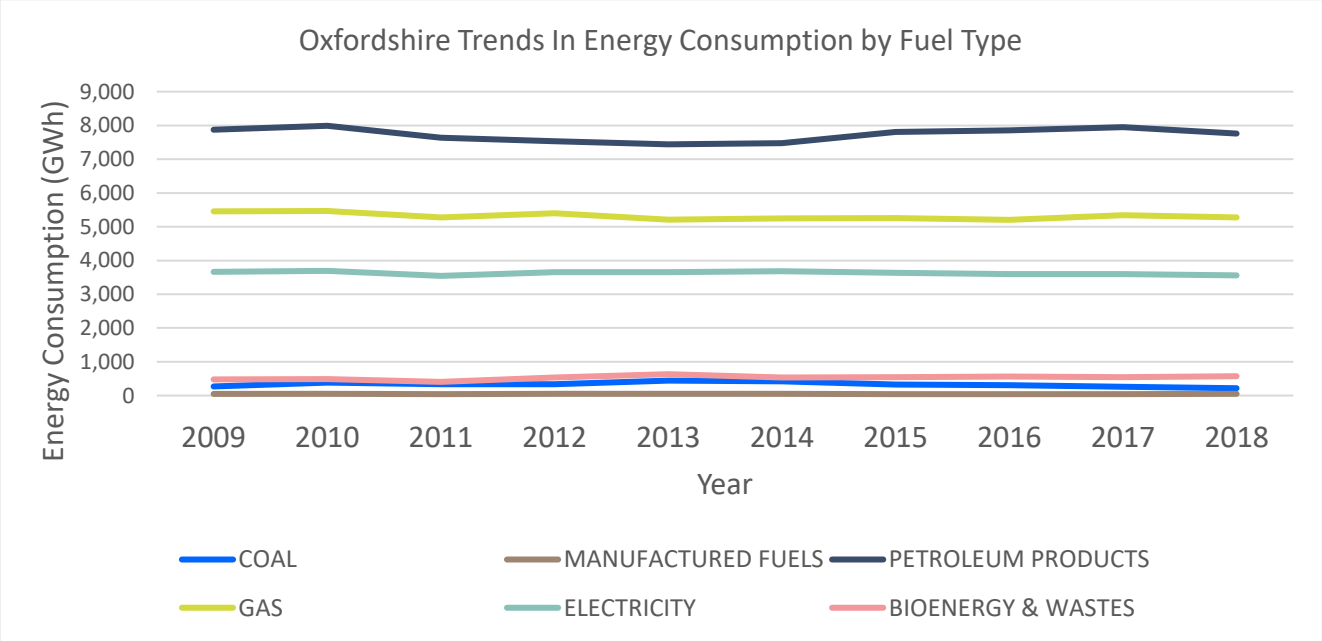



*Figure 5-49: Oxfordshire Trends in Energy Consumption by Fuel Type (BEIS, 2020)*

Overall, each district's energy consumption remained relatively consistent between 2009 and 2018. Over this period, Cherwell and Oxford City's total fuel use decreased by 185 GWh (4%) and 183 GWh (6%) respectively, suggesting that their energy strategies have been the most impactful in the county.

Energy consumption for Vale of White Horse and West Oxfordshire over the same period decreased by 15 GWh (0.4%) by 3 GWh (0.1%) respectively. South Oxfordshire was the only district to have an increased net energy consumption of 25 GWH (0.7%) (BEIS, 2020).

Analysing 2018 energy consumption by fuel type provides further information about the types of fuels used in each district.

- **Oxford City** consumes a relatively small volume of manufactured fuels compared to other districts but is the highest user of gas and electricity
- **Cherwell** consumes the highest volume of petroleum products, bioenergy and waste fuels
- **Vale of White Horse and South Oxfordshire** both rely heavily on petroleum products for a high proportion of fuel use and consume a similar volume of fuels across the board
- **West Oxfordshire** uses the least electricity and gas but has a relatively high dependency manufactured fuels

Overall, looking at the wider picture, it is clear that Oxfordshire's reliance on petroleum products and gas must reduce at a fast rate in order to meet 2030 targets and clean energy goals.

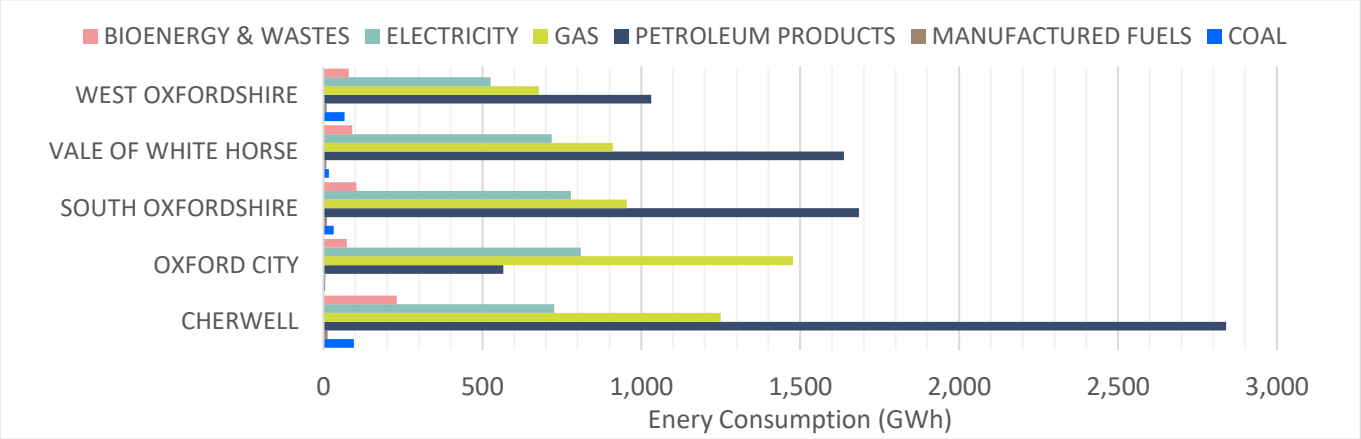



*Figure 5-50: 2018 Energy Consumption by Fuel Type (BEIS, 2020)*

#### *5.6.2.2.2 Electricity Network*

##### 5.6.2.2.2.1 Electricity Network Constraints

There are network capacity limitations on both the amount of embedded generation and demand load that the network can support under a given set of operating conditions. The primary causes of these constraints on the district network can be categorized as follows (Ofgem, 2017):

- **Voltage:** limits the additional load which can be accommodated without exceeding statutory limits
- **Thermal:** limits on the amount of additional load within the thermal ratings of the network assets
- **Fault Level:** limits on the network capacity to accept additional current which may occur following a fault on the network
- **Transmission:** limitations which may be due to a range of physical causes but limits the import or export to the transmission system

The implication of constraints on potential connections to the network can lead to significantly increased costs, delays, project size limitations and relocation. Approaches to dealing with network constraints involve physical improvements, such as network reinforcement or upgrade, or flexible curtailment approaches, such as Active Network Management, inter-trips and timed solutions.

Overcoming these network constraints are a dominant contributor to the level of funding required on the electricity network, both to support planned growth (demand constraints) and to achieving decarbonisation ambitions via the use of renewable generation sources (generation constraints).

#### 5.6.2.2.2.2 Electricity Demand

All Oxfordshire Local Authorities have seen a reduction in annual electricity consumption in both the domestic and non-domestic sectors compared with 2008 levels, with the exception of the Vale of White Horse and West Oxfordshire for non-domestic consumption (Figure 5-51 & Figure 5-52). This is despite growth in the number of domestic and non-domestic buildings between 2008 and 2019 (BEIS, 2020).

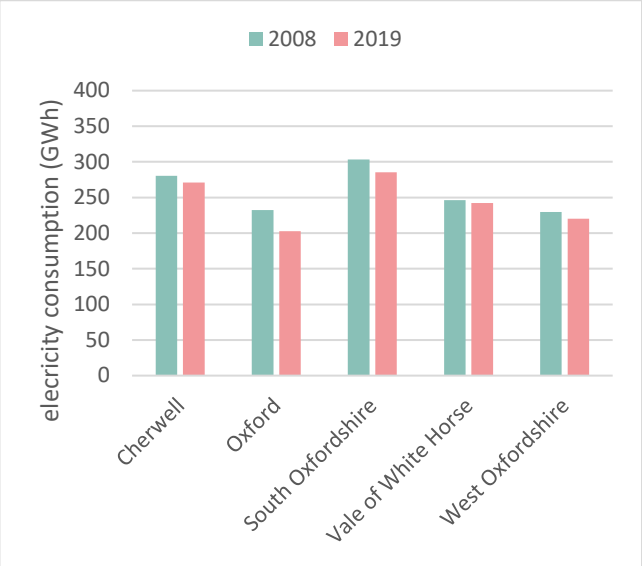



*Figure 5-51: Domestic annual electricity consumption (BEIS, 2020)*


*Figure 5-52: Non-domestic annual electricity consumption (BEIS, 2020)*

Additionally, efficiency gains can clearly be observed in the average annual electricity consumption by customer graphs (Figure 5-53 & Figure 5). It is also important note of the relative magnitudes of Oxfordshire domestic consumption, 1,221 GWh, and non-domestic consumption, 2,299 GWh, in 2019.

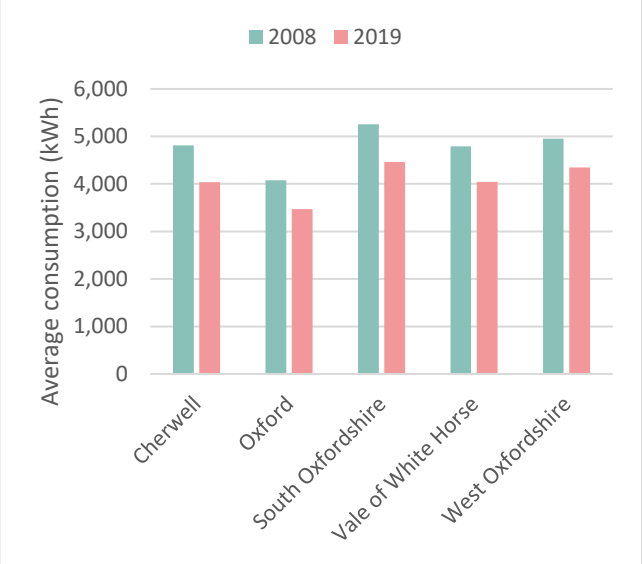



*Figure 5-53: Average annual electricity consumption per domestic customer (BEIS, 2020)*

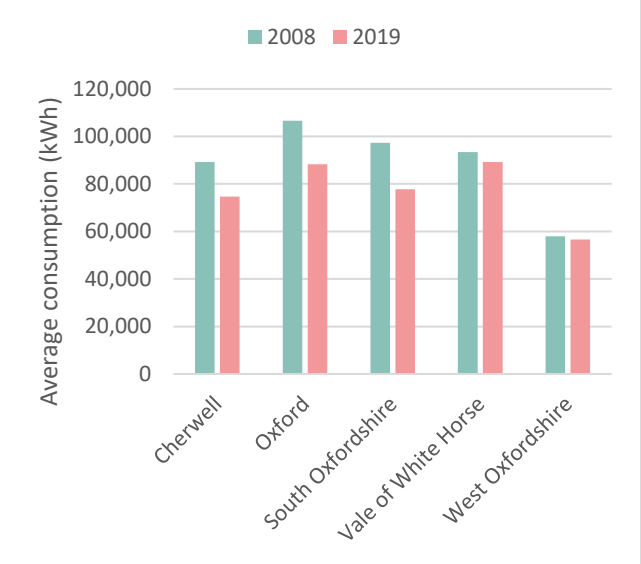



*Figure 5-5-54: Average annual electricity consumption per non-domestic customer (BEIS, 2020)*

However, this historical trend is not set to continue and the combination of three effects are projected to increase annual electricity consumption across the county out to 2030 and 2040. These are: continued growth in the number of domestic and non-domestic buildings; the transition to electric vehicles; and the decarbonisation of heat.

Importantly, for the electricity grid these factors will not only increase annual consumption, but will also increase peak demand, especially in cold weather periods where demand will also be influenced by increased space heating requirements, reduced efficiencies of air source heat pumps and reduced battery performance.

#### *5.6.2.2.2.2.1 Electricity Demand & Constraints*

Demand availability provides an indication of the network's capability to connect large-scale demand developments to major sub-stations. This shows constraints exist for both distribution (see Figure 5-55) and transmission (see Figure 5-56).

Constraints will likely require significant reinforcement to connect additional large-scale load developments to the network. Current demand constraints are not as widespread as generation constraints; however, demand is expected to increase with additional sub-stations becoming constrained (similar to the Epwell Primary Sub-Station).

EV uptake is set to scale up rapidly over the next decade. The rapidity of this growth and the ban on petrol and diesel vehicles from 2030 illustrates the urgent need for local authorities to plan and prepare suitable infrastructure. However, the focus on the electrification of transport in decarbonisation strategies raises concerns over requirements for large scale investment in the electrical grid and network infrastructure (RTPI, 2019).

Given that RIIO-ED2 process will set the level of investment in the grid until 2028, the outcome of the process will become an integral consideration in the planning of electric vehicle infrastructure. It is important that Oxfordshire districts create robust electric vehicle infrastructure plans and communicate them with SSEN and WPD to ensure that investment over this period is aligned to their decarbonisation objectives. There is some flexibility built into the RIIO-ED2 process to accommodate uncertainty around grid requirements, however the process is untested and is therefore likely to require continuous engagement throughout the period.

Scenario C of the Oxfordshire Energy Strategy (OxLEP, 2019) requires the 25% of the vehicle fleet and 50% of new vehicles to be electric by 2030. 30,000 new home charge points and 300 public charge points are assumed to be in place by 2030 to support this, leading to additional significant demand on the electricity grid. The level of peak demand, and hence impact on the electricity network, will be heavily dependent on the charging strategies adopted which is not currently considered in detail within the strategy (OxLEP, 2019).

A variety of strategies exist to help reduce peak demands on the grid. These include:

- **Reducing projected total demand** (e.g. retrofitting houses, building very energy efficient new homes, exploring alternative options such as biogas)
- **Flattening the demand peak** (e.g. constraint management zones, smart heating controls, flexible tariffs and smart appliances)
- **Reducing grid peak demand** (e.g. partially satisfying demand with on-site or local generation and storage)

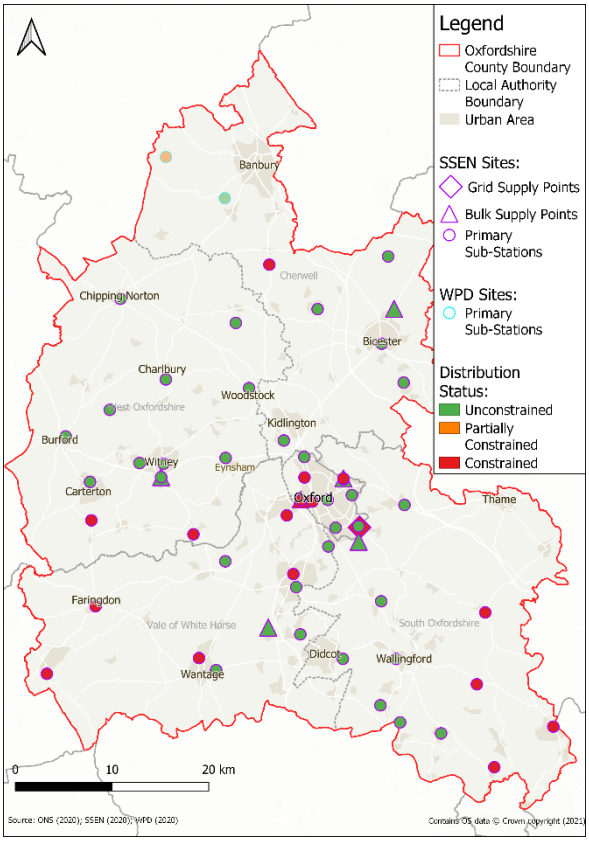



*Figure 5-55: Distribution constraints on the SSEN and WPD network (Scottish and Southern Electricity Networks, 2021)*

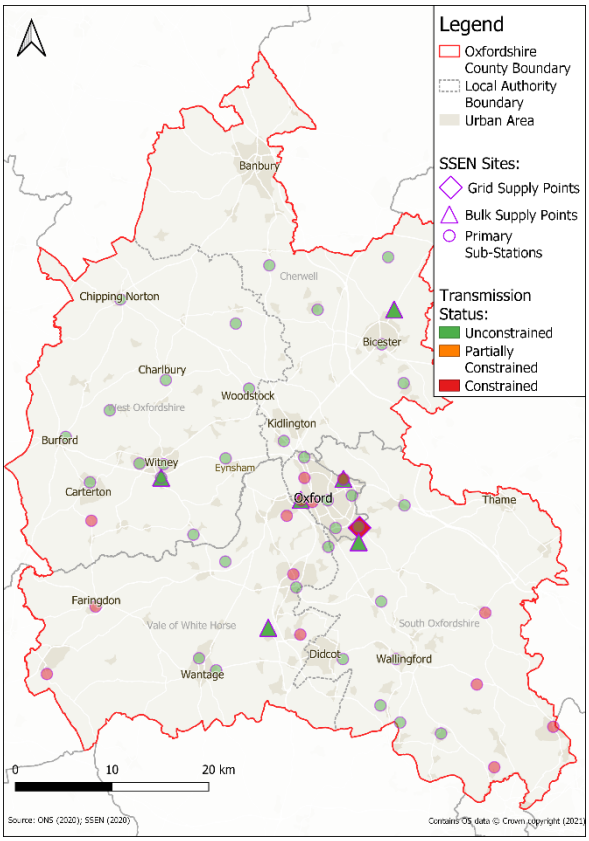



*Figure 5-56: Transmission constraints on the SSEN network (Scottish and Southern Electricity Networks, 2021)*

Both SSEN and WPD are trying to introduce network flexibility services, to avoid or reduce some of the costly reinforcement work normally required when the network is constrained. Both are part of the flexible power joint initiative which aims to control peak demand and allow additional capacity to be connected to the network (WPD, 2021).

- SSEN have already introduced extensive constraint management zones within Oxfordshire for which participants can potentially get paid for altering electricity demand and generation patterns within particular time periods of the day and year.
- WPD West Midlands have also introduced constraint management zones in more heavily constrained parts of their network. One of their zones operates over part of the northern Oxfordshire network.

Both Distribution Network Operators have plans to expand the number of constraint management zones in the future, attempting to choose the most economical method to approach constrained parts of the network at any given time. This may be through CMZ or network upgrades.

#### 5.6.2.2.2.3 Electricity Generation

The Oxfordshire Energy Strategy (OxLEP, 2019) states a strategic need of producing 56% of electricity demand from renewables by 2030. As of 2019 estimated annual electricity demand from domestic and non-domestic buildings was 3,520 GWh (BEIS, 2020), whilst annual generation from renewables across the county was ~533 GWh (BEIS, 2020). Neglecting transmission losses, this amounts to ~15% of annual demand being satisfied by renewable electricity generated within the county. To our knowledge, no plan is available as to how this 41% shift will take place.

Scenario C in the energy strategy estimates, ambitiously, that annual electricity demand in 2030 can be kept below ~3664 GWh by supporting growth in electricity demand end uses by a range of energy saving methods and by supplying future demand for heat by alternative sources other than electricity grid. Under such a scenario annual renewable generation within the country would need to increase nearly three-fold (from 2019 levels) to 2052 GWh by 2030. Renewable energy generation targets for 2040, under this scenario, are significantly more ambitious.

Generation availability shows the network's capability to connect large scale generation developments to major sub-stations. These sub-stations are deemed to be constrained if the network would require significant reinforcement if a 5MVA synchronous generator were added to the network in relevant locations. Figure 5-57 indicates that the majority of the SSEN Oxfordshire network is generation constrained meaning that large scale generation ambitions are likely to incur significant network reinforcement costs.

Both SSEN and WPD have introduced network flexibility measures within their constraint management zones to allow additional generation capacity to be connected to the grid, but with a range (daily and seasonal) controls on when embedded generators can supply the network.

With 56% of electricity demand to come from renewables within the Oxfordshire county boundary, significant reinforcement and upgrades are required.

An additional method to alleviate some of the future burden on the distribution networks is to introduce large levels of onsite and local energy generation and storage (e.g. roof top P.V. on domestic and non-buildings). This approach forms part of the Oxfordshire Energy Strategy. The difficulty, will be in the implementation, with the requirement that householders and businesses adopt onsite generation at scale.

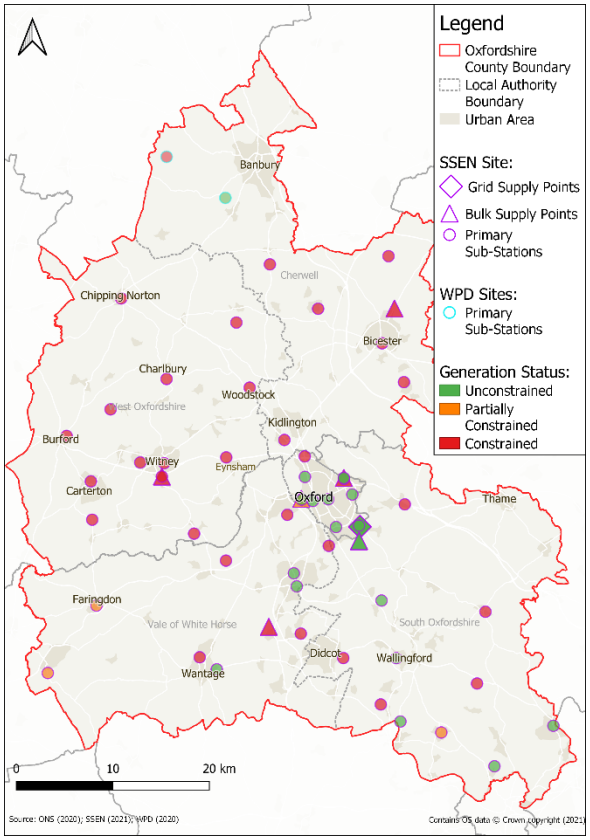



*Figure 5-57: Generation constraints on the SSEN and WPD network (WPD, 2021)*

#### *5.6.2.2.3 Gas Network*

##### 5.6.2.2.3.1 Gas Demand & Capacity Trends

SGN's latest forecast (which was released in 2020), covers a 10-year planning horizon and is the result of a detailed assessment of consumer behaviour, current UK Government legislation, and historic and projected economic trends (SGN, 2020). The main factors influencing the forecasts were:

- Detailed data assessment for Daily Metered (DM) customers to identify consumption patterns
- Increasing fuel prices (aligned with BEIS forecasts)
- Improvements to energy efficiency of new and existing housing stock based on current UK Government policy and including any firm indications of changes to policy
- The long term economic impact of COVID-19 (on both domestic heating behaviour and commercial and manufacturing outputs)
- Increasing customer awareness of environmental impact and subsequent behavioural changes
- The growth in embedded power stations which are increasingly being used as back-up for when renewable energy sources are unavailable

Domestic customers account for around two thirds of SGN's overall gas demand and, whilst customer numbers are expected to grow, thermal efficiency in homes and boilers, and the switch to electrical heat are expected to result in a net reduction in demand (SGN, 2020). For these reasons SGN predicts that by 2030, there will be a 3.9% overall reduction in annual gas demand and a 2.9% reduction in peak-day demand across all consumer groups in the network. Given that peak demand is a key driver for capacity requirements, it is not expected that SGN will need to invest in upgrades to increase capacity over the period, but investment will be needed to maintain the safety and quality of existing infrastructure.

The accuracy of the forecasts will be affected by how the UK meets its 2030 carbon reduction targets. In addition, the introduction of the Capacity Market mechanism by the UK Government (which ensures that electricity supply is able to meet demand as more renewable generation plants are introduced) (BEIS, 2019), has incentivised SGN to increase the number of embedded power stations connected to their network. Given the unpredictable nature of the mechanism's gas requirements, an enhanced understanding of the demand and supply will need to be developed to fully understand possible changes to peak demand.

The UK gas network is split into 13 Local Distribution Zones (LDZ). Oxfordshire is located within the South LDZ. Whilst gas demand is expected to fall for all other LDZs, in the South LDZ, the annual gas demand and peak-day demand is expected to increase by 0.84% and 0.27% per year to 2030 respectively (SGN, 2020). This is in contrast to the overall forecast and can be explained by an economic upturn in the local area. An upward trend of demand was seen in the South LDZ in 2018/2019, where an improvement in the local economy (leading to an increase in comfort level) coupled with lower energy efficiency (due to the reductions in boiler 2019 replacement rates) led to a 1.9% increase in annual domestic gas demand (SGN, 2020). The commercial sector in the South LDZ simultaneously saw a 2.3% increase due to a continuation of strong growth in commercial output combined with a reduction in gas prices (SGN, 2020). Looking to 2030, given that the peak demand is expected to rise, SGN will need to focus on infrastructure upgrades for the South LDZ (including Oxfordshire) to enable an increase in local capacity.

#### *5.6.2.3 Typical Infrastructure Schemes to Meet C2 Needs*

The following typical infrastructure schemes could meet the C2 needs identified:

- Renewable Energy Scheme (IF1)
- District Heating Scheme (IF1)
- Electricity Grid Capacity Upgrade (IF1)
- Electricity Substation (IF1)

### 5.6.3 C3: Secure Water Supply & Wastewater

*C3 Future Needs to 2040 for Secure Water Supply & Wastewater at a Glance*

Along with the unpredictability of water supply due to climate change, Oxfordshire's growing population and environment concerns around the pressure being placed on rivers and groundwater, there is an ever-increasing need to predict and manage the demand and supply of potable water to support growth in the region. This is why Thames Water has forecast a supply demand deficit in the Swindon & Oxfordshire Water Resource Zone by 2023. This need to reduce the deficit can be addressed through targeted infrastructure to support water efficiency, smart meters, reusing treated wastewater and carrying out water transfers.

In terms of wastewater, there is a need for targeted infrastructure investment, such as in the proximity of Carterton, to address current sewage outflow events to improve local water quality and support biodiversity restoration (see E2 and E5). Future population growth will further impact the efficiency of wastewater infrastructure and areas of high growth (e.g. Banbury, Bicester and Oxford) require wastewater treatment plant sites and connections to be upgraded.

*C3 Key Affected Infrastructure*

#### 5.6.3.1 Strategic Policy and Strategy Need

*C3 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Address and resolve the predicted water supply/demand deficit in the Swindon & Oxfordshire Region to cater for additional population growth and the impacts of climate change | Water Resources Management Plan (Thames Water, 2019)<br>25-Year Environment Plan (HM Government, 2018)<br>District Water Cycle Studies (Various)<br>River Basin Planning Guidance (DEFRA, 2014) |
| Ensure resilient drainage and wastewater services which reduce sewer flooding risks and cater for additional demand from population growth and climate change | Water Resources Management Plan (Thames Water, 2019)<br>Forthcoming Drainage and Wastewater Management Plan (Thames Water, 2021)<br>25-Year Environment Plan (HM Government, 2018)<br>District Water Cycle Studies (Various)<br>River Basin Planning Guidance (DEFRA, 2014) |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☑ | ☑ | ☑ | ☑ |

#### 5.6.3.2 Thames Water, Water Resources Management Plan

Thames Water' current plan to balance supply and demand for potable water in Oxfordshire is the Thames Water Resource Management Plan (WRMP19) (Thames Water, 2019). WRMP19 covers a 80-year period with the long-term approach taken to improve the resilience of future plans, with a legal duty to update the plans every 5 years. The Plan defines Oxfordshire as part of a water stressed zone, therefore planning and predicting for future water use is crucial to support growth in the region.

The Plan can be summarised into two key strategic needs for Oxfordshire:

- Demand Management by reducing the amount of water lost through pipe leaks, promoting water efficiency and installing smart metres in homes
- Increasing supply by sourcing new groundwater, reusing treated wastewater and sourcing water from other regions via water transfers

*Forthcoming 2024 Water Resources Management Plan*

Thames Water are currently in the process of updating WRMP19 to produce a new plan which is currently scheduled for draft publication in 2022, with finalisation in 2024.

#### 5.6.3.3 DEFRA'S 25-year Environment Plan

The 25-year Environment Plan (HM Government, 2018) provides important context to planning future water supplies and contributes to the targets set by Thames Water. The 25-year Plan aims to improve at least three quarters of the UK's waters to be close to their natural state (DEFRA, 2015) as early as possible.

The key strategic needs identified within the plan for water are:

- Reducing damage abstraction of water from rivers and groundwater
- Reaching or exceeding targets for rivers, lakes, coastal and ground waters that are specially potected, either for biodiversity of drinking water as per the River Basin Management Plan
- Minimising loss of water through leakage with water companies expected to reduce leakage by at least 15% by 2025

- Minimising the harmful bacteria in designated bathing waters by increasing wastewater treatement capacity

#### *5.6.3.4 Water Cycle Studies*

Water Cycle Studies are used to identify and quantify the capacity of all water-related infrastructure and the wider environment to support housing and commercial growth.

These studies are based on assessing four key factors:

- Environmentally, economically and licenced availability of water resources for abstraction and use
- Flood risk arising from further development (note that unlike Strategic Flood Risk Assessments, Water Cycle Studies consider a narrower view in relation to whether increased discharge from wastewater treatement works will increase flood risk).
- Sewerage treatment and disposal (subdivided into environmental and infrastructural capacity)
- Other environmental considerations and constraints to development

***Forthcoming Thames Water Drainage and Wastewater Management Plan***

Like all other water companies in England and Wales, Thames Water are currently in the process of producing their first Drainage and Wastewater Management Plan, which is scheduled for consultation in 2022 (Thames Water, 2020). When complete, this will identify the impact of growth and climate change on drainage and wastewater services. This will be used to identify areas of risk, with the final stage of the process identifying interventions, such as new infrastructure schemes. There is an opportunity for future iterations of OxIS to consider the implications of this plan once complete.

#### *5.6.3.5 Evidence Base*

| *C1: Summary of Measurable Outcomes Underpinning Needs-Based Appraisal* | |
|---|---|
| *Appraisal Dataset* | *Source* |
| ✓ *Swindon & Oxfordshire Supply Deficit* | *Thames Water* |
| ✓ *Wastewater Treatment Capacity* | *Thames Water* |

##### *5.6.3.5.1 Potable Water Supply*

In terms of demand, Thames Water faces an upward trend caused by a combination of the forecast population growth (see Section 3.4) and climate change in the Swindon & Oxfordshire Water Resource Zone. As indicated in the WRMP19 (see Figure 5-58), this will result in a baseline supply/demand deficit in Dry Year Critical Period (DYCP) conditions from 2022/23 which steadily grows.

This evidence indicates a need to address this supply deficit in the county by 2040. As WRMP19 indicates, this can be achieved through demand reduction measures (e.g. leakage reduction), however, beyond 2035 it is reliant on the implementation of a strategic water resource scheme.

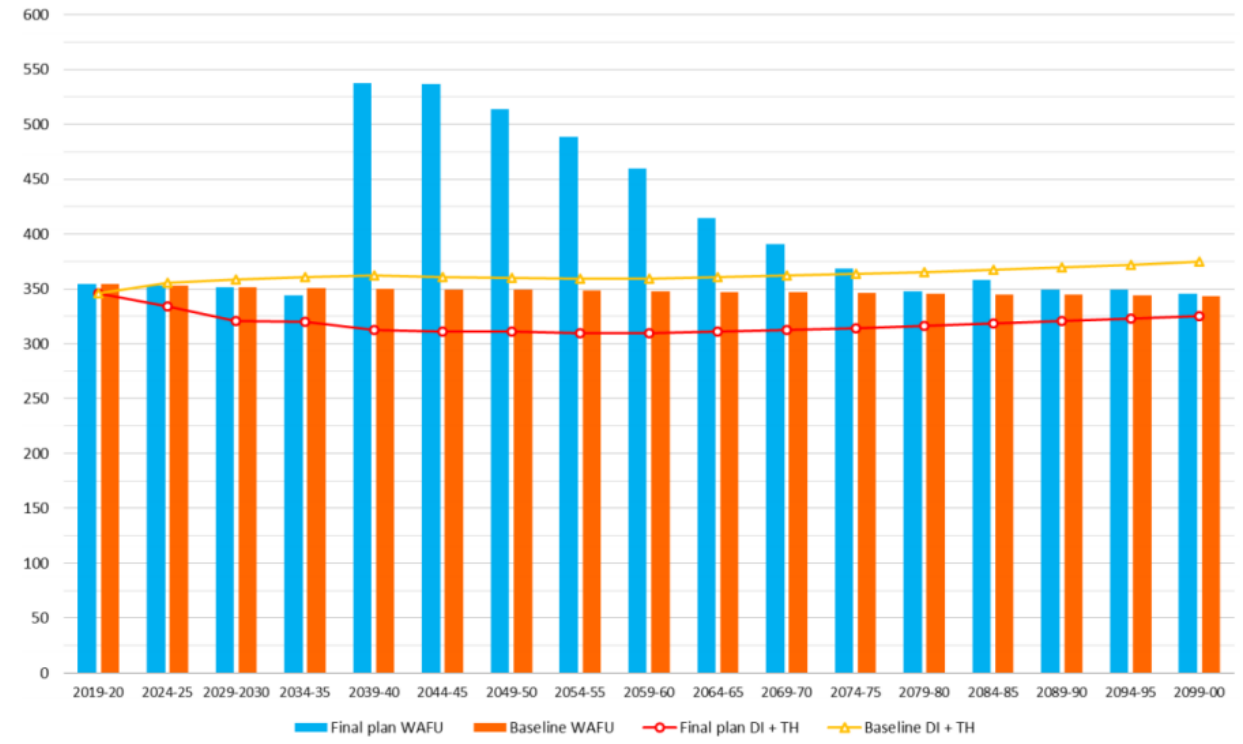



*Figure 5-58: Water Supply Projections, from Section 11 of the Water Resources Management Plan 2019 (Thames Water, 2019) [Note that Thames Water projections cover the period to 2100 in line with statutory requirements]*

#### 5.6.3.5.1.1 Short-term Demand Management 2020 to 2024/25

By the end of Asset Management Period 7 (AMP7), Thames Water aim to deliver circa 8.8 Ml/d benefits through its water efficiency campaign and 12.1 Ml/d benefits through reductions in household usage. This includes installing smart metres in 79% of households by 2025 and improving water efficiency through educating customers. Early results from Thames Water suggest that the installation of smart water metres can lead to a 16-20% reduction in water use. However, these findings are based on detached households and may not be representative reduction.

#### 5.6.3.5.1.2 Medium-term Demand Management 2024/25 to 2040/41

Once Thames Water's household smart meter penetration exceeds 90% (circa 2035), Thames Water will implement an incentive based financial tariff to reduce household consumption by 5%. Thames Water will also continue to work with customers to improve water efficiency. Further major reductions in water demand per household will require changes to national legislation on the water consumption of white goods and building regulations.

#### 5.6.3.5.1.3 Planned Future Infrastructure

The Thames Water Resources Management Plan (2019) and the Thames Business Plan 2020-25 (Thames Water, 2020) outline the planned infrastructure and additional initiatives required to address the supply-demand imbalance. They do not plan to implement any major infrastructure works between 2020-25. Instead, efforts will be made to reduce pipe leakage. Their 2020-25 Business Plan has committed to a 2024/25 leakage target of 509 Ml/d. This represents a 15% reduction against the 2019/20 target.

During AMP7 (2020-25) Thames Water are undertaking joint technical studies and optioneering into five potentially regionally significant regional resource developments, which are:

- South East Strategic Reservoir Option in collaboration with Affinity Water
- Severn-Thames Transfer
- Effluent Re-use in London
- Transfers to Affinity Water
- Transfers to Southern Water

The conclusions of this process will be identified in the upcoming Water Resources Southeast regional plan which is expected to be published for public consultation in early 2022. This will identify the relative impact on water supply, costs to build and operate, impact on carbon emissions and the potential for wider benefits to the environment and society for each option will be known and calculated.

*Southeast Strategic Reservoir Option*

The most notable potential scheme impacting Oxfordshire would be the South East Strategic Reservoir option located between Abingdon, Steventon and East Hanney in the Vale of White Horse. If this option is selected, this would potentially be able to provide an additional 294 Ml/d and would also supply part of the South East region including London.

#### *5.6.3.5.2 Wastewater*

As identified in Section 5.2.2, climate change is likely to make more extreme weather events (long dry summers and heavy rainfall in winter) more intense and frequent. This is likely to present a major challenge to existing infrastructure for wastewater treatment in future.

Population growth within Oxfordshire is likely to impact the efficiency of Thames Water's wastewater infrastructure with upgrades required to cope with population and housing increases. For example, urban creep results in a loss of permeable surfaces in urban areas, leading to rainwater entering the sewer network faster, reducing capacity and contributing to flooding and poor river quality.

In Cherwell, seven wastewater treatment works (Banbury, Bicester, Bloxham, Cassington, Former RAF Upper Heyford, Oxford and Woodstock) do not currently have sufficient flow capacity and/or have insufficient treatment processes to accept all future development proposed within the plan period.

##### 5.6.3.5.2.1 Future Infrastructure Needs

- Drainage and Wastewater Management Plan: Thames Water is currently producing their first Drainage and Wastewater Management Plan, for public consultation in 2022. The Plan aims to identify future catchment risks to Thames Water's drainage and wastewater treatments systems and develop solutions to address them
- Wastewater treatment plants: Oxfordshire has 97 wastewater treatment plants with 50 requiring upgrades to meet demand by 2050. Thames Water have outlined 19 of these sites will require upgrades between 2020-25 (Abingdon, Appleton, Bampton, Banbury, Benson, Bicester, Bloxham, Chinnor, Cholsey, Didcot, Drayton, Finstock, Henley, Islip, Kingston, Oxford, Tackley, Watlington, Witney). Planned infrastructure does not forecast new facilities being required, instead, upgrades and development of existing facilities is planned
- Anaerobic Digestion: Thames Water do not have any significant plans to expand Oxford's Anaerobic Digestion assets until 2040 with sludge still being transported to larger sites at Banbury, Dicot, Reading and Swindon

##### 5.6.3.5.2.2 Sustainable Urban Drainage Systems

Sustainable Urban Drainage Systems are a natural way of managing urban drainage, effectively slowing the rate at which rainwater enters drainage systems. They are increasingly becoming an important way of managing water flows. Examples include, reed beds, willow trees and enhancing natural catchment areas to minimise water runoff into wastewater systems. They are likely to impact placemaking in Oxfordshire, creating green spaces in urban areas while also impacting housing and concrete infrastructure.

Thames Water does not have any plans to implement Sustainable Urban Drainage Systems in their current plan, however, it is likely over the planning period of OxIS.

### *5.6.3.6 Typical Infrastructure Schemes to Meet C3 Needs*

The following typical infrastructure schemes could meet the C3 needs identified:

- Water Supply Transfer (IF12)
- Reservoir (IF12)
- Wastewater Treatment Plant (IF12)
- Sustainable Urban Drainage Systems (IF12)

### 5.6.4 C4: Improve Sustainable Transport Connectivity Across Oxfordshire

*C4 Future Needs to 2040 for Improved Sustainable Transport Connectivity Across Oxfordshire at a Glance*

The Government's priorities for transport are underpinned by the need to achieve net zero carbon emissions by 2050, reflected in a myriad of emerging national and county strategies, including the DfT's forthcoming Transport Decarbonisation Plan. They are directly relevant to Oxfordshire and these needs are met in county- and district-wide policy, identifying measures such as space reallocation, better, integrated, high-quality public transport and managing demand.

Although the rise in electric vehicles will tackle transport carbon emissions, it will not tackle the county's congestion or wider health & place-shaping needs. For most Oxfordshire residents, the car is the first choice; particularly in rural areas. With Oxfordshire's predicted substantial growth in both housing and employment, transport connectivity plays a vital role. For these needs to be met, whilst contributing to decarbonisation efforts, sustainable transport has a significant role to play. To deliver the need of improved sustainable transport connectivity across Oxfordshire requires a significant enhancement in public transport service reliability and connectivity between OxIS Towns & Surrounds.

*C4 Key Affected Infrastructure*

*IF1 Energy*

*IF2 Transport*

*IF3 Flood Alleviation*

*IF4 Education*

*IF5 Digital*

*IF6 Innovation*

*IF7 Green & Blue*

*IF8 Community & Cultural*

*IF9 Sport & Leisure*

*IF10 Health & Adult Social Care*

*IF11 Waste & Recycling*

*IF12 Potable Water Supply & Wastewater*

*IF13 Emergency Services*

#### 5.6.4.1 Strategic Policy & Strategy Need

*C4 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Enable greater choice and seamless interchange between sustainable modes for journeys across Oxfordshire | National Infrastructure Strategy (HM Treasury, 2020)<br>Decarbonising Transport: Setting the Challenge (DfT, 2020)<br>Gear Change: A bold vision for walking and cycling (DfT, 2020)<br>Ten Point Plan for a Green Industrial Revolution (HM Government, 2020)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015)<br>Local Transport & Connectivity Plan Consultation (OCC, 2021)<br>Oxfordshire Strategic Vision (Oxfordshire Growth Board, 2021)<br>Oxfordshire Rail Corridor Study (Network Rail System Operator Western, 2020)<br>Oxfordshire Electric Vehicle Charging Infrastructure Strategy (OCC, 2021) |
| Improve multi-modal journey time reliability and minimise end-to-end public transport journey times which accommodates future population growth | |
| Ensure a resilient road network fuelled by zero-carbon energy sources | |

| Need Tier 1 [UK Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County-wide Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☑ |

##### 5.6.4.1.1 National

Driven by the requirement to achieve net zero carbon emissions by 2050, the strategic need to rapidly decarbonise the transport network will underpin the UK Government's future priorities for transport infrastructure investment across all modes. The Transport Decarbonisation Plan, which as yet remains unpublished, is a key forthcoming strategy document which will set out the road map for concurrently reducing transport related emissions, whilst also improving transport connectivity through reducing congestion between communities in a sustainable way (DfT, 2020).

*Transport Decarbonisation Plan Priorities*

- Accelerating modal shift to public and active transport: supporting fewer trips made by car
- Decarbonisation of road vehicles: accelerating the transition to zero emission road vehicles
- Decarbonising how we get our goods: influencing future consumer demand and transforming 'last-mile' deliveries to develop an integrated, clean and sustainable delivery system
- Place Based Solutions: consideration of the locational context of carbon emissions
- UK as a hub for green transport technology and innovation
- Reducing carbon in a global economy

In advance of the Transport Decarbonisation Plan being published, the Ten Point Plan for a Green Industrial Revolution (HM Government, 2020), Gear Change (DfT, 2020) and the National Infrastructure Strategy (HM Treasury, 2020) provide an indication of the UK's Government's future key strategic priorities with direct relevance to transport connectivity Oxfordshire-wide. This includes:

- Supporting the realloaction of road space for local buses to tackle congestion, reduce carbon emissions and improve connectivity between communities

- Enhancing the attractiveness of active travel (see Section 5.4.5)
- Improving rail connectivity through opening new stations and exploring the potential of re-opening former lines
- Investing in maintenance & delivery of new local road schemes to improve connectivity between communities
- Significant investment in charging infrastructure to enable the ban of the sale of new petrol and diesel cars and vans nationwide by 2030 and the transition towards electric vehicles

#### *5.6.4.1.2 County-Wide Policy*

OCC's LTP4, Connecting Oxfordshire (OCC, 2015), identifies the strategic needs relating to enhancing transport connectivity in a sustainable way across the County. It has three key goals which are focused on growth, whilst protecting public health and the environment. To achieve the first goal, '*Support jobs and housing growth and economic vitality*', four future transport connectivity related future needs have been set:

- Maintain and improve transport connections to support economic growth and vitality across the county
- Make most effective use of all available transport capacity through innovative management of the network
- Increase journey time reliability and minimise end-to-end public transport journey times on main routes
- Develop a high quality, innovative and resilient integrated transport system that is attractive to customers and generates inward investment

The LTP4 identifies the following key measures to achieve this:

- Enhancements to road capacity to reduce congestion and minimise disruption and delays
- Reducing pressure on the road network influencing the planning process of growth sites to encourage sustainable modes, as well as improving capacity using existing road space
- Prioritising different types of journey through the use of space reallocation, additional road crossings, and changes to signal timings
- Changes to freight journeys through environmental weight limits for road through-traffic, changes to routing and distribution networks and improvement to rail freight
- Better, integrated, high-quality public transport for buses, coaches and rail through infrastructure to refine and expand network
- Managing demand by introducing traffic management restrictions (e.g. Workplace Parking Levies)
- Ensuring that everyone can participate in economic growth by improving connections and accessibility for all, particulary those with disabilites, or those without a car

The LTP4 predates the declaration of a climate emergency by the six Oxfordshire Local Authorities and therefore a new LTP, the *'Local Transport and Connectivity Plan'* (LTCP) is currently being prepared by OCC. This will provide a reorientation of transport connectivity priorities which align with the OxIS Themes and the need to achieve net zero carbon emissions, which is a core component of the Oxfordshire Climate Action Framework and the five District Council's Climate Action Frameworks.

***Emerging Local Transport and Connectivity Plan Draft Vision (OCC, 2021)***

*'Our Local Transport Plan Vision is for a net-zero Oxfordshire transport system that enables the county to thrive as one of the world's leading innovation economies, whilst supporting clean growth, protecting our rich and varied natural and historic environment and being better for health and wellbeing, social inclusivity and education.*

*Our plan sets out to achieve this by reducing the need to travel, securing high quality gigabit connectivity, and by discouraging unnecessary individual private vehicle use through making active travel, public and shared transport the natural first choice'*

The emerging Local Transport and Connectivity Plan will align with the ambitions identified in the Strategic Vision for Oxfordshire which aspires that by 2050 the way people move around Oxfordshire *'will be transformed, with greater connectivity and mobility in and between places in ways that enhance environmental, social and economic well-being'* (Oxfordshire Growth Board, 2020). With Oxfordshire's predicted substantial growth in both housing and employment, transport connectivity plays a vital role. For these needs to be met, whilst contributing to decarbonisation efforts, sustainable transport has a significant role.

#### 5.6.4.2 Evidence Base

| C4: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal | |
|---|---|
| Appraisal Dataset | Source |
| ✓ Sustainable Transport Mode Share | Census; National Travel Survey |
| ✓ Journey Time Variability by Vehicle | DfT |
| ✓ Journey Time Differences between Vehicles and Public Transport between OxIS Places | Open-Source Journey Planner |
| ✓ Proportion of Vehicles that are ULEVs | DfT |

##### 5.6.4.2.1 Transport Mode Choice

Commuting travel behaviour data captured in the 2011 Census (see Figure 5-59) indicates that in regard to mode choice, outside of Oxford City, OxIS Towns & Surrounds are more reliant on the car and less reliant on public transport than the national average (which includes London). Oxford City achieves this with 20% public transport mode share. All of the OxIS Towns & Surrounds have 15% or better active travel mode share with Banbury having the highest at 23%.

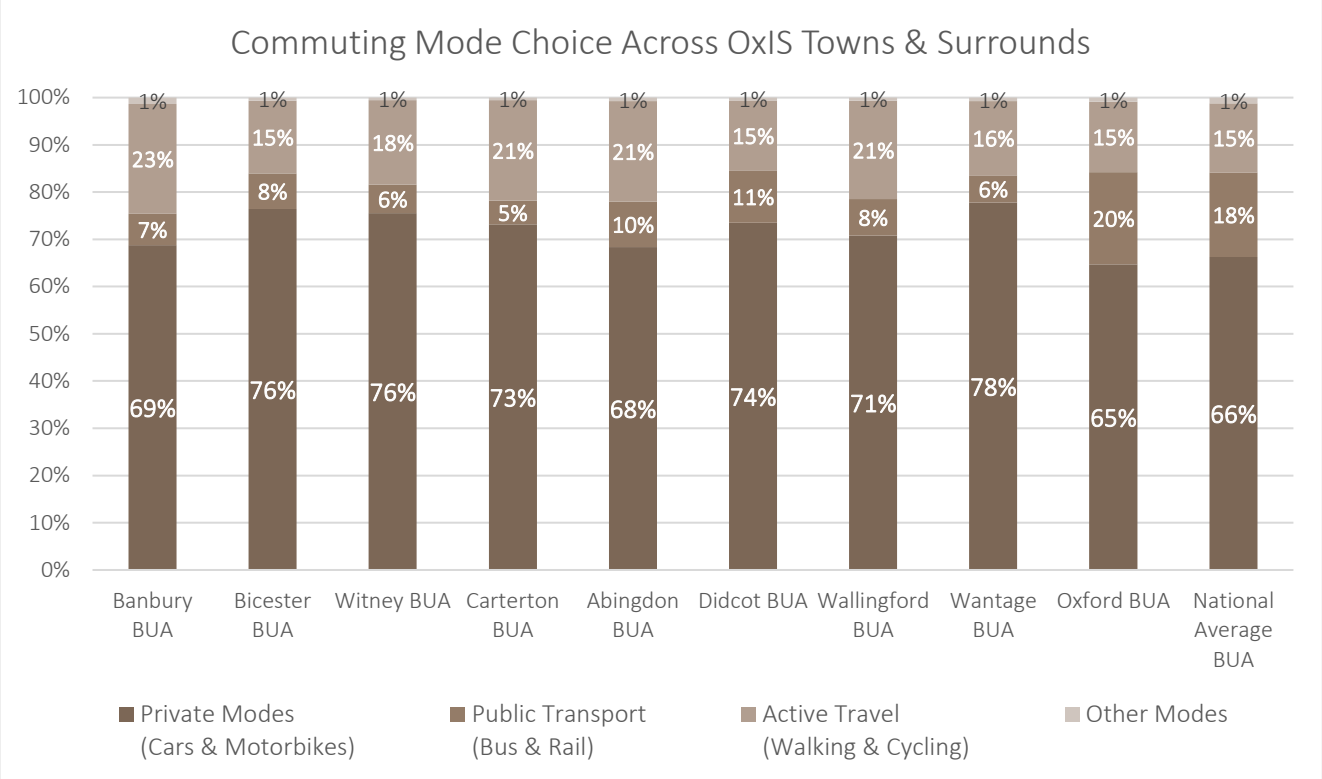



*Figure 5-59: Commuting Mode Choice Across OxIS Towns & Surrounds (ONS, 2011)*

Car ownership levels in Oxfordshire (derived from 2011 Census data) are relatively high in comparison to the rest of the UK (83% households owning at least one vehicle, compared to 74% in England) (OCC, 2021). Although this is not a direct and simple relationship with car use, car ownership does give an easy option of car use to these households. This shows that car ownership is low in Oxford City (64%), but much higher in the remaining Districts (80-90%). Nevertheless, mileage in the County has increased year on year, recently passing 4,000 million miles for the first time, making the top quartile of local authority mileage travelled in the England (OCC, 2021).

Over 57,000 people commute into Oxfordshire from outside of the County (according to 2011 Census) originating mostly from London, South Northamptonshire and Aylesbury Vale (Oxfordshire Insight, 2014). Oxford City in particular has a high level of commuters from outside the city, with only 54% of the people working in the city also living there (Oxfordshire Insight, 2014). Most of these external trips into Oxford City are made from Vale of White Horse (10,800 people). However, there are also a substantial number of outward commuting trips, with 48,000 Oxfordshire residents travelling outside the county for work.

Oxford City has high levels of sustainable transport mode share, with 25% of residents living and working in the city cycling to work, 25% walking and 20% using the bus (OCC, 2015).

70% of bus commuting trips in the county originated and/or ended in Oxford City (OCC, 2021). In the county as a whole, although bus usage has improved since 2010, bus journeys per head are still below the national average and bus costs are high (Oxfordshire Growth Board, 2020) due to particularly low levels of usage in the other Districts.

#### 5.6.4.2.1.1 Impact of COVID-19

The impact of COVID-19 on travel demand has been substantial, seeing a range of increases and decreases depending on the pandemic stage and variation between modes (see Figure 5-60).

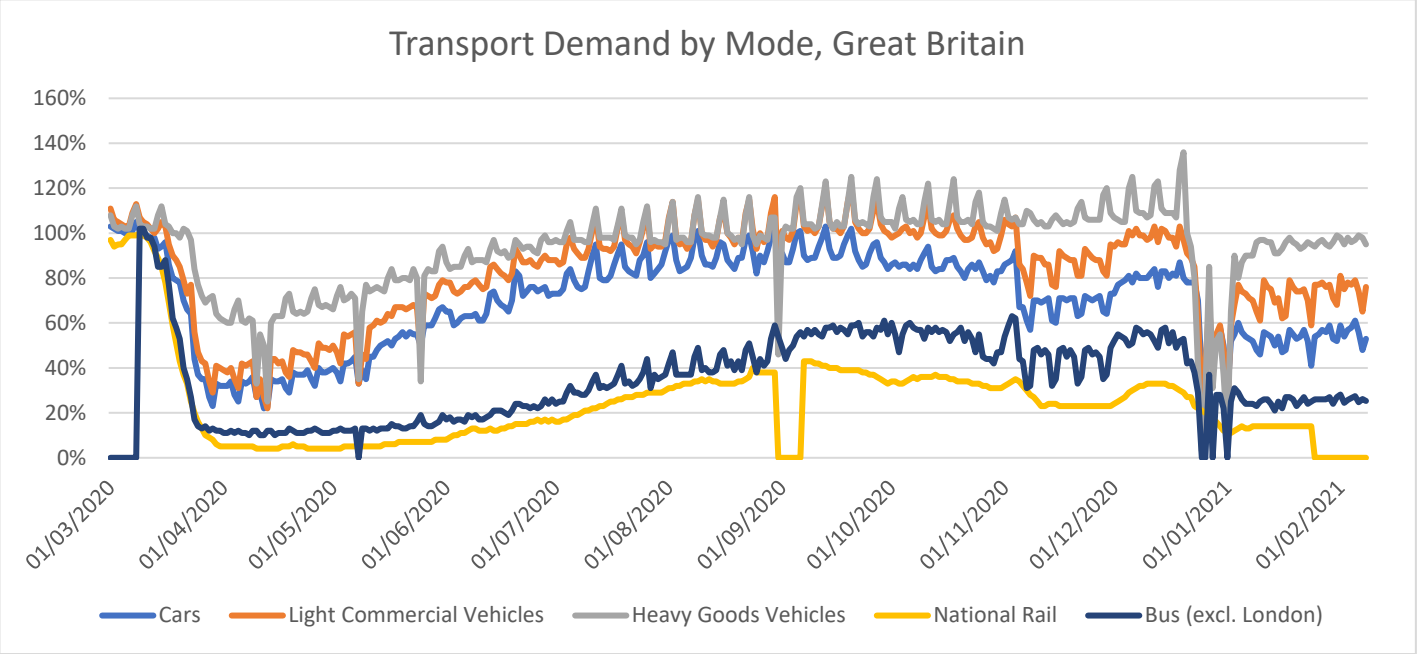



*Figure 5-60 Transport use since March 2020, Great Britain (DfT, 2021)*

It can be difficult to predict the impact of the pandemic on travel demand in the long term. In the short-term, many are staying home to comply with restrictions which has caused a huge shift in travel patterns, but there may be impacts of the pandemic that we will see affecting transport behaviour in the longer-term, such as working remotely or shopping online.

The pandemic has seen an increase of home working in the UK from 1.7 million to an estimated 20 million before and after the start of the pandemic (ONS, 2020). Currently, London and the South East are the most likely regions to work from home (ONS, 2020) but Oxfordshire has historically always had a higher than average home working proportions, with 13% of residents working from home during the 2011 Census (Oxfordshire Insight, 2012).

Unemployment levels have also risen due to the pandemic, impacting existing travel patterns further, with unemployment levels increasing by 10,845 or 163% in Oxfordshire between March and May 2020 (Oxfordshire Community Foundation, 2020).

#### *5.6.4.2.2 Multi-Modal Journey Times*

Transport connectivity and mobility is the relative ease in which people can travel between places to access goods and services across Oxfordshire. This considers both the overall journey time and its reliability by vehicular and public transport modes. A consideration of active modes to reach local facilities and amenities is considered in Section 5.4.1. Journey times across public transport and vehicular modes between the eight OxIS Towns & Surrounds have been analysed using open-source journey planners. The following key assumptions should be noted:

- Future committed transport schemes are not included in the analysis (e.g. public transport journey times are expected to be improved by the forthcoming A40 bus priority improvements and East West Rail scheme)
- To ensure a consistent analysis, a common time and date of 12:00 on 21/04/21 has been used across both public transport and vehicular modes. This was near the end of COVID-19 national lockdown. This excludes data for journeys originating at Chipping Norton (see Notes in datatables)

- The journey times have been measured from the centroid of OxIS places, however, this does not fully account for the door-to-door public transport journey time applicable for some larger places. The public transport journey times therefore represent a best-case scenario

| | | OxIS Towns & Surrounds (Destination) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oxford City | Abingdon* & Surrounds | Banbury | Bicester | Carterton | Chipping Norton | Didcot* & Wallingford | Wantage* & Grove | Witney |
| OxIS Towns & Surrounds | Oxford City | - | 23 | 1 | 15 | 33 | 35 | -5 | 31 | 29 |
| | Abingdon* & Surrounds | 13 | - | 6 | 29 | 44 | 54 | 22 | 18 | 36 |
| | Banbury | 9 | 10 | - | -19 | 55 | 23 | -5 | 32 | 46 |
| | Bicester | 32 | 48 | -15 | - | 34 | 55 | 8 | 29 | 48 |
| | Carterton | 28 | 58 | 36 | 39 | - | 57 | 41 | 57 | -1 |
| | Chipping Norton | 18 | 57 | 23 | 38 | 39 | - | 69 | 64 | 15 |
| | Didcot* & Wallingford | -15 | 21 | 25 | 9 | 60 | 72 | - | 34 | 20 |
| | Wantage* & Grove | 13 | 17 | 17 | 24 | 46 | 62 | 27 | - | 30 |
| | Witney | 15 | 45 | 18 | 42 | -1 | 17 | 24 | 36 | - |
| OxIS Rural Community | Berinsfield | 16 | 16 | 11 | 32 | 42 | 38 | 26 | 43 | 31 |
| | Chalgrove | 31 | 68 | 66 | 77 | 75 | 101 | 80 | 77 | 64 |
| | Eynsham* & Long Hanborough | 26 | 33 | -4 | -1 | 36 | 27 | 27 | 34 | 27 |
| | Grenoble Road* & Northfield | 19 | 44 | 60 | 68 | 63 | 76 | 40 | 52 | 47 |
| | South Cherwell area & Woodstock* | 26 | 42 | 30 | 8 | 48 | 14 | 23 | 55 | 42 |
| | Upper Heyford | 25 | 53 | 26 | 3 | 52 | 50 | 71 | 55 | 46 |
| | Faringdon* & Shrivenham | 14 | 50 | 35 | 53 | 104 | 90 | 36 | 4 | 37 |
| | Bayswater Brook | 12 | 35 | -2.5 | 16 | 31 | 45 | 56 | 10 | 19 |

***Notes: A positive value indicates that travel by private vehicle is faster. A negative value indicates that travel by public transport is faster.***
***Note that parking time is not included in the private vehicle journey times used.***
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

Table 5-42, which demonstrates the comparative differences between the modes, indicates that travel by private vehicle is generally quicker than public transport for journeys between the majority of OxIS Towns & Surrounds. This difference is more pronounced for places which are in more rural settings such as Carterton, Chipping Norton, Wantage and Grove and Witney. The exception to this is places which are located on the main rail corridor, including Oxford City, Banbury, Bicester and Didcot where rail journey times are quicker than by private vehicle. The table includes the time taken for any public transport interchange or walking time between services.

This data emphasises the strategic future need to improve the competitiveness of public transport journeys to improve its attractiveness and enable a greater choice for people travelling across Oxfordshire.

Oxfordshire's rural communities rely on connectivity to urban areas to access employment as well as goods and services not available locally.

| | | OxIS Towns & Surrounds (Destination) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oxford City | Abingdon* & Surrounds | Banbury | Bicester | Carterton | Chipping Norton | Didcot* & Wallingford | Wantage* & Grove | Witney |
| OxIS Towns & Surrounds | Oxford City | - | 23 | 1 | 15 | 33 | 35 | -5 | 31 | 29 |
| | Abingdon* & Surrounds | 13 | - | 6 | 29 | 44 | 54 | 22 | 18 | 36 |
| | Banbury | 9 | 10 | - | -19 | 55 | 23 | -5 | 32 | 46 |
| | Bicester | 32 | 48 | -15 | - | 34 | 55 | 8 | 29 | 48 |
| | Carterton | 28 | 58 | 36 | 39 | - | 57 | 41 | 57 | -1 |
| | Chipping Norton | 18 | 57 | 23 | 38 | 39 | - | 69 | 64 | 15 |
| | Didcot* & Wallingford | -15 | 21 | 25 | 9 | 60 | 72 | - | 34 | 20 |
| | Wantage* & Grove | 13 | 17 | 17 | 24 | 46 | 62 | 27 | - | 30 |
| | Witney | 15 | 45 | 18 | 42 | -1 | 17 | 24 | 36 | - |
| OxIS Rural Community | Berinsfield | 16 | 16 | 11 | 32 | 42 | 38 | 26 | 43 | 31 |
| | Chalgrove | 31 | 68 | 66 | 77 | 75 | 101 | 80 | 77 | 64 |
| | Eynsham* & Long Hanborough | 26 | 33 | -4 | -1 | 36 | 27 | 27 | 34 | 27 |
| | Grenoble Road* & Northfield | 19 | 44 | 60 | 68 | 63 | 76 | 40 | 52 | 47 |
| | South Cherwell area & Woodstock* | 26 | 42 | 30 | 8 | 48 | 14 | 23 | 55 | 42 |
| | Upper Heyford | 25 | 53 | 26 | 3 | 52 | 50 | 71 | 55 | 46 |
| | Faringdon* & Shrivenham | 14 | 50 | 35 | 53 | 104 | 90 | 36 | 4 | 37 |
| | Bayswater Brook | 12 | 35 | -2.5 | 16 | 31 | 45 | 56 | 10 | 19 |

***Notes: A positive value indicates that travel by private vehicle is faster. A negative value indicates that travel by public transport is faster.***
***Note that parking time is not included in the private vehicle journey times used.***
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

Table 5-42


| | | OxIS Towns & Surrounds (Destination) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oxford City | Abingdon* & Surrounds | Banbury | Bicester | Carterton | Chipping Norton | Didcot* & Wallingford | Wantage* & Grove | Witney |
| OxIS Towns & Surrounds | Oxford City | - | 23 | 1 | 15 | 33 | 35 | -5 | 31 | 29 |
| | Abingdon* & Surrounds | 13 | - | 6 | 29 | 44 | 54 | 22 | 18 | 36 |
| | Banbury | 9 | 10 | - | -19 | 55 | 23 | -5 | 32 | 46 |
| | Bicester | 32 | 48 | -15 | - | 34 | 55 | 8 | 29 | 48 |
| | Carterton | 28 | 58 | 36 | 39 | - | 57 | 41 | 57 | -1 |
| | Chipping Norton | 18 | 57 | 23 | 38 | 39 | - | 69 | 64 | 15 |
| | Didcot* & Wallingford | -15 | 21 | 25 | 9 | 60 | 72 | - | 34 | 20 |
| | Wantage* & Grove | 13 | 17 | 17 | 24 | 46 | 62 | 27 | - | 30 |
| | Witney | 15 | 45 | 18 | 42 | -1 | 17 | 24 | 36 | - |
| OxIS Rural Community | Berinsfield | 16 | 16 | 11 | 32 | 42 | 38 | 26 | 43 | 31 |
| | Chalgrove | 31 | 68 | 66 | 77 | 75 | 101 | 80 | 77 | 64 |
| | Eynsham* & Long Hanborough | 26 | 33 | -4 | -1 | 36 | 27 | 27 | 34 | 27 |
| | Grenoble Road* & Northfield | 19 | 44 | 60 | 68 | 63 | 76 | 40 | 52 | 47 |
| | South Cherwell area & Woodstock* | 26 | 42 | 30 | 8 | 48 | 14 | 23 | 55 | 42 |
| | Upper Heyford | 25 | 53 | 26 | 3 | 52 | 50 | 71 | 55 | 46 |
| | Faringdon* & Shrivenham | 14 | 50 | 35 | 53 | 104 | 90 | 36 | 4 | 37 |
| | Bayswater Brook | 12 | 35 | -2.5 | 16 | 31 | 45 | 56 | 10 | 19 |

***Notes: A positive value indicates that travel by private vehicle is faster. A negative value indicates that travel by public transport is faster.***
***Note that parking time is not included in the private vehicle journey times used.***
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*


*Table 5-42: Difference in quickest journey time minutes between private vehicle and public transport modes between OxIS Town centroids [Data Analysed 12:00 on 21/04/21].*

indicates that the competitiveness of public transport compared to the private car for these journeys is particularly low.

| | | OxIS Towns & Surrounds (Destination) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Oxford City | Abingdon* & Surrounds | Banbury | Bicester | Carterton | Chipping Norton | Didcot* & Wallingford | Wantage* & Grove | Witney |
| OxIS Towns & Surrounds | Oxford City | - | 23 | 1 | 15 | 33 | 35 | -5 | 31 | 29 |
| | Abingdon* & Surrounds | 13 | - | 6 | 29 | 44 | 54 | 22 | 18 | 36 |
| | Banbury | 9 | 10 | - | -19 | 55 | 23 | -5 | 32 | 46 |
| | Bicester | 32 | 48 | -15 | - | 34 | 55 | 8 | 29 | 48 |
| | Carterton | 28 | 58 | 36 | 39 | - | 57 | 41 | 57 | -1 |
| | Chipping Norton | 18 | 57 | 23 | 38 | 39 | - | 69 | 64 | 15 |
| | Didcot* & Wallingford | -15 | 21 | 25 | 9 | 60 | 72 | - | 34 | 20 |
| | Wantage* & Grove | 13 | 17 | 17 | 24 | 46 | 62 | 27 | - | 30 |
| | Witney | 15 | 45 | 18 | 42 | -1 | 17 | 24 | 36 | - |
| OxIS Rural Community | Berinsfield | 16 | 16 | 11 | 32 | 42 | 38 | 26 | 43 | 31 |
| | Chalgrove | 31 | 68 | 66 | 77 | 75 | 101 | 80 | 77 | 64 |
| | Eynsham* & Long Hanborough | 26 | 33 | -4 | -1 | 36 | 27 | 27 | 34 | 27 |
| | Grenoble Road* & Northfield | 19 | 44 | 60 | 68 | 63 | 76 | 40 | 52 | 47 |
| | South Cherwell area & Woodstock* | 26 | 42 | 30 | 8 | 48 | 14 | 23 | 55 | 42 |
| | Upper Heyford | 25 | 53 | 26 | 3 | 52 | 50 | 71 | 55 | 46 |
| | Faringdon* & Shrivenham | 14 | 50 | 35 | 53 | 104 | 90 | 36 | 4 | 37 |
| | Bayswater Brook | 12 | 35 | -2.5 | 16 | 31 | 45 | 56 | 10 | 19 |

***Notes: A positive value indicates that travel by private vehicle is faster. A negative value indicates that travel by public transport is faster.***
***Note that parking time is not included in the private vehicle journey times used.***
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-42: Difference in quickest journey time minutes between private vehicle and public transport modes between OxIS Town centroids [Data Analysed 12:00 on 21/04/21].*

### 5.6.4.3 *Journey Time Variability and Delay*

Delay on key A Class Roads Managed by OCC (see Figure 5-61) are greatest within Oxford City, as well as on the A4360 to Banbury, the A420 through Faringdon and the A338 through Wantage.

Journey time variability is another key measure of congestion, or capacity resilience, which refers to variation in times that individuals are unable to predict (either daily due to capacity, or from a non-recurring event such as those caused by collisions) or from public transport arriving later than timetabled (DfT, 2017).

Using the expected journey times derived using open-source journey planners, a proportional journey time variance can be calculated for vehicles. The variation is proportional to account for distance so, for example, a longer distance journey will be affected less by a 5-minute variance than a shorter distance journey. Although the journey times have only been calculated for private vehicle, the same journey time variability could also be applied to bus journeys since they use the same network.

The results of the journey time analysis for private vehicle (see Table 5-43) for OxIS Towns & Surrounds and Rural Communities, shows that journey times can vary up to over 80% (Kidlington and Cherwell rural villages to Oxford), with most journey times to and from Oxford showing the greatest variability. Journey with the least variability are from rural villages Upper Heyford and the South Fringe of Oxford, and to Chipping Norton.

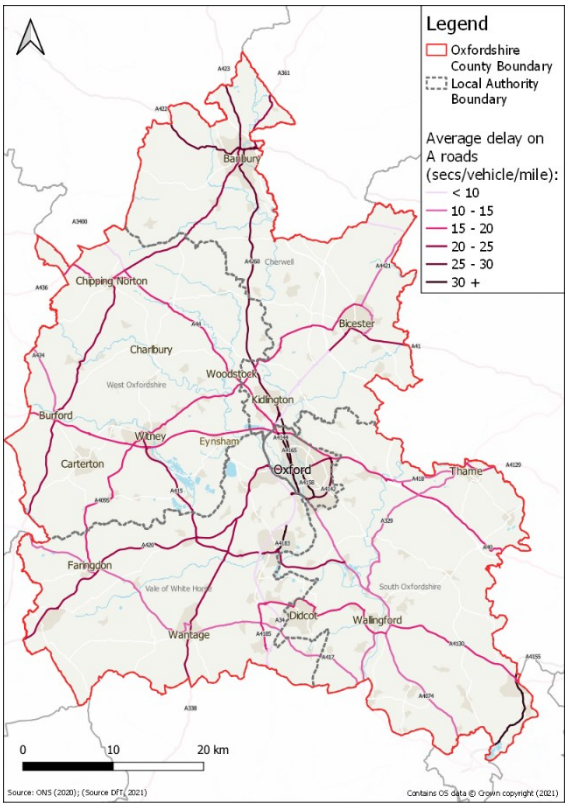



*Figure 5-61: Average Delay on key A Class Roads Managed by OCC in Oxfordshire (DfT, 2021)*

| | | Oxford City | Abingdon* & Surrounds | Banbury | Bicester | Carterton | Chipping Norton | Didcot* & Wallingford | Wantage* & Grove | Witney |
|---|---|---|---|---|---|---|---|---|---|---|
| OxIS Towns & Surrounds | Oxford City | - | **75%** | 57% | **82%** | 61% | 57% | 59% | 73% | 67% |
| | Abingdon* & Surrounds | **75%** | - | 38% | 67% | 67% | 57% | 67% | 50% | 43% |
| | Banbury | 57% | 38% | - | 59% | 44% | 36% | 44% | 44% | 50% |
| | Bicester | **82%** | 67% | 46% | - | 43% | 29% | 50% | 43% | 61% |
| | Carterton | 61% | 50% | 44% | 43% | - | 35% | 38% | 29% | 33% |
| | Chipping Norton | 57% | 38% | 36% | 29% | 35% | - | 33% | 44% | 0% |
| | Didcot* & Wallingford | 82% | 67% | 44% | 50% | 38% | 33% | - | 44% | 43% |
| | Wantage* & Grove | 54% | 50% | 44% | 50% | 29% | 33% | 33% | - | 50% |
| | Witney | 67% | 43% | 50% | 73% | 33% | 25% | 43% | 50% | - |
| OxIS Rural Communities | Berinsfield | 56% | 57% | 33% | 61% | 57% | 38% | 33% | 61% | 50% |
| | Chalgrove | 59% | 36% | 50% | 33% | 44% | 30% | 35% | 57% | 38% |
| | Eynsham* & Long Hanborough | **75%** | 46% | 67% | 46% | 30% | 25% | 50% | 50% | 60% |
| | Grenoble Road* & Northfield | 59% | 44% | 44% | 43% | 50% | 33% | 56% | 67% | 43% |
| | South Cherwell area & Woodstock* | **86%** | 56% | 54% | 71% | 43% | 36% | 46% | 73% | 36% |
| | Upper Heyford | 33% | 33% | 67% | 43% | 43% | 46% | 43% | 38% | 33% |
| | Faringdon* & Shrivenham | 57% | 43% | 36% | 50% | 46% | 33% | 43% | 30% | 33% |
| | Bayswater Brook | **75%** | 29% | 43% | 40% | 35% | 50% | 30% | 33% | 40% |

***Notes:*** *Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-43: Expected journey time variability by road between OxIS Towns & Surrounds and OxIS Rural Communities [Data Analysed 12:00 on 21/04/21]*

#### *5.6.4.3.1 Future Network Capacity*

The performance of a transport network here refers to the efficiency and effectiveness of the infrastructure. Performance can be evaluated using demand in comparison to capacity (i.e. congestion) which can be determined from a number of sources including journey time variance, speeds, and queue lengths. Transport network performance can be assessed for all modes but is widely analysed for road vehicles.

##### 5.6.4.3.1.1 Road Network Performance

Congestion occurs when demand exceeds capacity on the network. This not only impacts car journeys, but also buses, coaches, cyclists and pedestrians at junctions. In Oxfordshire, speeds on A Class Roads have decreased by 2% (since 2015) and average delays on the Oxfordshire's Strategic Road Network has increased by 1.2% (since 2017). Notable decreases to speeds have occurred on A4185 and A4130 (Oxfordshire Growth Board, 2020). This has not only increased delays and journey times for cars, but public transport reliability can also be affected. Excess waiting times (for frequent bus service) have been generally rising (Oxfordshire Growth Board, 2020). For non-frequent bus services, Oxfordshire remains below national and regional averages for proportion of services running on time (80%) (Oxfordshire Growth Board, 2020).

##### 5.6.4.3.1.2 Rail Network Performance

The current rail infrastructure has little further capacity and does not link key hubs within Oxfordshire (Network Rail System Operator Western, 2020). Passenger demand for rail travel has grown rapidly and above UK average, with journeys to and from stations in Oxfordshire increasing by 75% between 2008 and 2018 (compared to 44% nationally) (Network Rail System Operator Western, 2020). This, combined with the county's predicted substantial growth in housing and employment, requires capacity improvements and connectivity improvements to connect people and businesses (Network Rail System Operator Western, 2020).

Seven growth hubs have been identified as significant for rail support, consistent with the patterns of growth allocated in Local Plans:

1. Banbury
2. Bicester Village
3. Culham
4. Didcot Parkway
5. Hanborough
6. Oxford
7. Oxford Parkway

Using forecasts based on predicted growth, services expected to experience congestion include (Network Rail System Operator Western, 2020):

- Morning loadings between Radley or Culham and Oxford along the Oxford corridor stopping services from 2028
- Evening loadings at Oxford and Banbury from 2024
- Oxford to London Marylebone

#### *5.6.4.3.2 Zero Carbon Emissions Road Network*

As noted in Section 5.2.1, most of Oxfordshire's District Councils (except for Vale of White Horse and West Oxfordshire Council) aspire to achieve net zero carbon with their respective Districts by 2040.

Alongside the ban of the sale of new petrol and diesel vehicles by 2030 (HM Government, 2020), for this to be achieved, there is a need for a minimum of approximately 90% of all vehicles to be Ultra Low Emission Vehicles (ULEVs) across Oxfordshire by 2040 (assuming 100% ULEVs in Cherwell, Oxford City and South Oxfordshire and 75% in Vale of White Horse and West Oxfordshire).

This accelerates the need to provide sufficient vehicle charging infrastructure for ULEVs to maintain road connectivity in Oxfordshire by 2040. As of September 2020, there were approximately 5,200 registered ULEVs in Oxfordshire (Table 5-44) (DVLA, 2020). This represents a rise of over 300% since OxIS-17 was produced (Figure 5-63).

The proportion of ULEVs registered compared to the total number of registered vehicles are largely in line with the UK (0.7%) (Table 5-44). Geospatial data (see Figure 5-62) indicates that Ultra Low Emission Vehicle proportions in parts of Cherwell, particularly around Banbury and Bicester are significantly higher than the national average, whilst in rural parts of West Oxfordshire and the Vale of White Horse is substantially lower. The evidence also indicates that there is broadly a direct relationship between the density of chargers and the number of registered ULEVs.

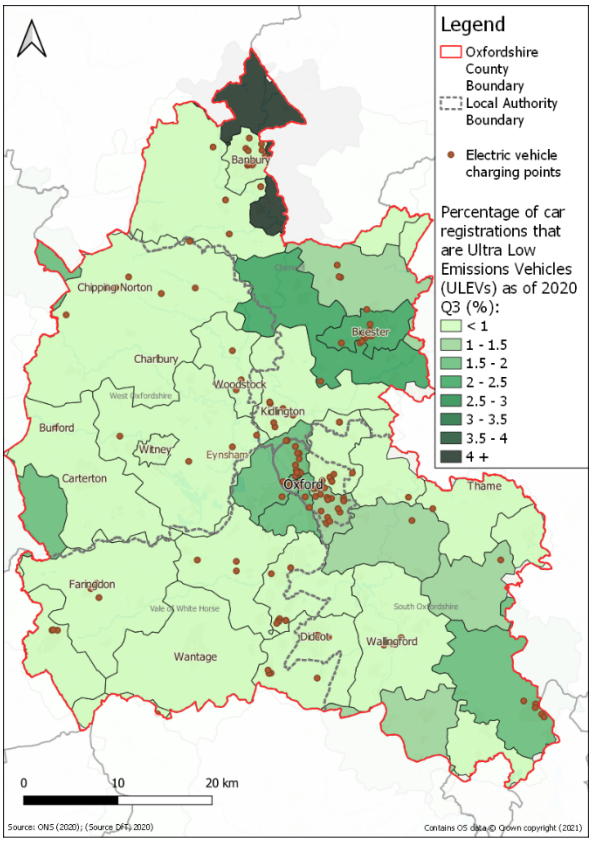



*Figure 5-62: Oxfordshire's proportion of Registered ULEVs (DVLA, 2020) (DfT, 2021)*

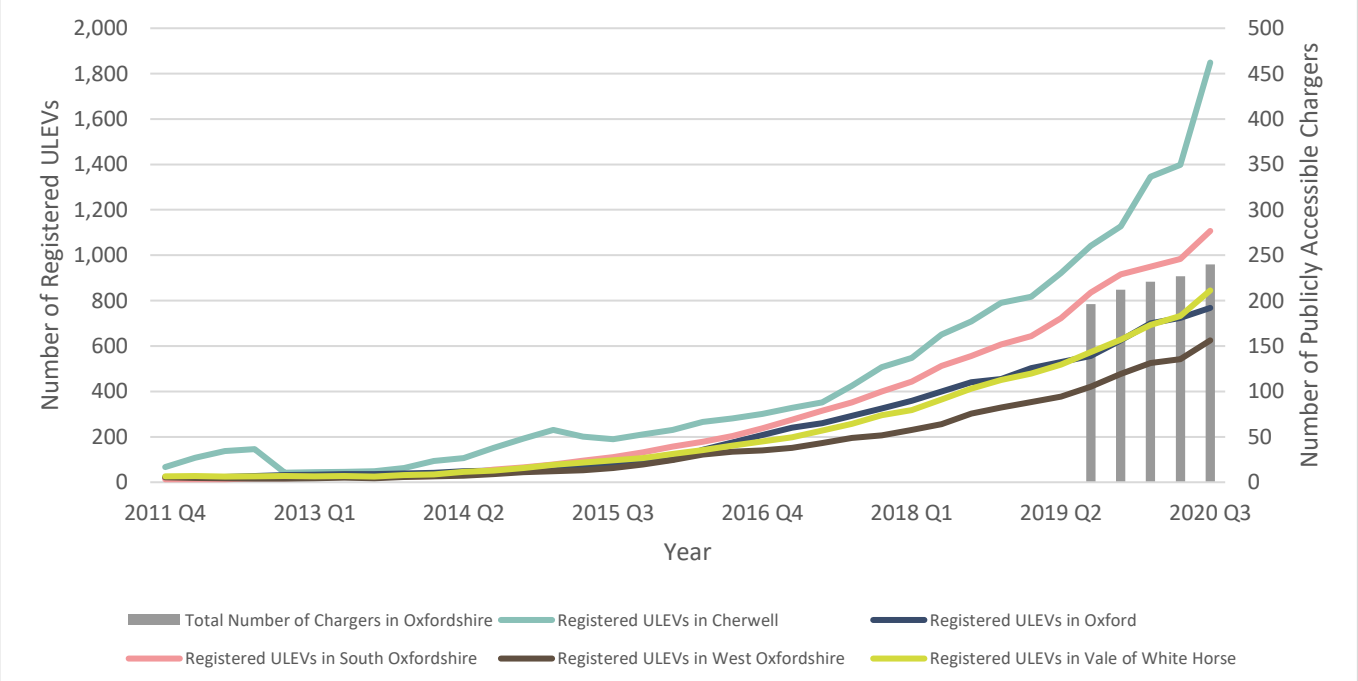



*Figure 5-63: Summary of Historical ULEV Registrations by Oxfordshire District Compared Against Number of Chargers (DVLA, 2020) (DfT, 2021)*

| Local Authority | Total Number of Registered ULEVs (Q3 2020) | Total Number of Registered ULEVs (Q4 2019) | Total Number of Vehicles Registered (Q4 2019) | Percentage of Registered Vehicles that are ULEVs (Q4 2019) | Ratio of Chargers to ULEV (January 2020) |
|---|---|---|---|---|---|
| Cherwell | 1,849 | 1,127 | 125,800 | 0.9% | 29.7 |
| Oxford City | 768 | 626 | 57,600 | 1.1% | 16.5 |
| South Oxfordshire | 1,107 | 916 | 103,700 | 0.9% | 10.0 |
| Vale of White Horse | 845 | 628 | 91,800 | 0.7% | 15.7 |
| West Oxfordshire | 625 | 477 | 79,600 | 0.6% | 19.1 |
| OXFORDSHIRE | 5,196 | 3,774 | 458,600 | 0.8% | |
| SOUTH EAST ENGLAND | 78,012 | 54,833 | 6,344,400 | 0.9% | |
| UK | 373,223 | 269,377 | 39,890,500 | 0.7% | |

*Notes:*

- *Comparable total vehicle registration data is not available by local authority for Q3 2020, common data at the beginning of 2020 has been used*
- *Ultra Low Emission Vehicles are those which emit less than 75g of CO2 for every kilometre travelled. In practical terms, this equates to fuel cell electric, battery electric and plug-in hybrid vehicles*

*Table 5-44: Summary of ULEV Registrations by Oxfordshire Local Authority (DVLA, 2020) (DfT, 2021)*

#### 5.6.4.3.2.1 Balancing Wider Needs with Population Growth

ULEVs offer numerous benefits, not least enabling Oxfordshire's decarbonisation needs to be met, however, it should be noted that vehicles, whether zero carbon or not, have several key drawbacks:

- ULEVs take up the same road space and therefore do not offer benefits to relieving congestion or improving journey time reliability (OCC, 2015)
- They do not promote the use of sustainable modes or tackle physical inactivity (see Section 5.3.2)
- Evidence indicates that ULEVs continue to emit particulate matter pollutants which is damaging to people's health (see Section 5.3.4)
- ULEVs are zero emission at the tailpipe only and may continue to result in carbon emissions and environmental impacts as a result of the wider lifecycle including from manufacturing and disposal

The future need for charging infrastructure in Oxfordshire needs to balance population growth against these wider competing needs.

#### 5.6.4.3.2.2 ULEV Uncertainties

There are significant uncertainties in forecasting future charging infrastructure requirements to support this transition to ULEVs for the following reasons:

- **Uncertainty of future traffic forecasts:** National traffic forecasts do not yet reflect the recent 2030 ban on the sale of new petrol and diesel vehicles. The latest Road Traffic Forecasts (DfT, 2018) using Scenario 7 (assuming ban of alternative fuel vehicles from 2040) predicts traffic growth of 19% by 2051 (2016 baseline)
- **Uncertainty of modal shift required:** In advance of the DfT's Transport Decarbonisation Plan, there is uncertainty on the degree of modal shift required to meet net zero carbon obligations
- **Uncertainty of ratio of chargers to vehicles:** There is no clear established consensus on the ratio of chargers to vehicles that will be required and the breakdown between rapid and slow chargers, however, the latest Climate Change Committee report (2020) identifies a national requirement of around 470,00 publicly available chargers by 2040 based on a forecast total of approximately 41,000,000 plug-in vehicles (ratio of approximately 87 ULEVs to one charger)
- **Uncertainty of car ownership:** A transition towards shared ownership models of car use would have a substantial impact on required charging infrastructure

- Uncertainty of off-street parking: The need for public charging infrastructure is diminished for those people with driveways who can provide their own private charging infrastructure. Projections by latest Climate Change Committee report assumes 70% of car owners have access to off-street parking to install their own charging facility (Climate Change Committee, 2020)
- Technological advancements: Improvements will impact on the quantum and nature of charging infrastructure required (e.g. battery capacity range, road induction charging)

In local policy, Oxfordshire Districts' Climate Action Frameworks set the pace for the need to provide charging infrastructure for all or nearly all registered vehicles within the next 20 years. In Cherwell, Oxford City and South Oxfordshire it would be expected that all vehicles are ULEV by 2040, in order to fulfil their carbon neutral targets by 2030 (Cherwell and South Oxfordshire) or 2040 (Oxford City). Vale of White Horse has a later carbon neutral target year of 2045, but it would still be expected that the majority of registered vehicles would have to be ULEV in order to fulfil this need. West Oxfordshire currently does not have a carbon neutral target date. This is supported by analysis presented in the Oxfordshire Electric Vehicle Infrastructure Strategy (OCC, 2021) suggesting that Oxfordshire's sales of registered vehicles will be 100% battery electric vehicles prior to or in 2035 but does not consider existing alternative fuel vehicles and their phasing out to reach carbon neutral targets.

Housing growth needs impact ULEV forecasts as it impacts the expected number of registered vehicles in the county. Assuming existing household car ownership levels, registered vehicle numbers would increase by 23% (or 69,000 homes) by 2040 in line with housing growth expectations. There is however little evidence on the impact of the ban of alternative fuel vehicles on car ownership and how external factors in this time period, such as the development of shared car ownership or local investment in walking, cycling and public transport, will be reflected in car ownership levels.

Assuming 91% of registered vehicles in Oxfordshire are ULEVs (calculated assuming 100% in Cherwell, Oxford City and South Oxfordshire and 75% in Vale of White Horse and West Oxfordshire based on Climate Action Frameworks as aforementioned) and assuming no overall change in total vehicle registrations compared to 2020 despite additional growth of 69,000 homes, there will be 415,000 projected ULEVs in Oxfordshire. This reduces to 375,000 chargers when it is assumed an overall reduction in total vehicle registrations by 10% compared to 2020 (despite expected growth). When comparing this to the number of publicly available chargers today (256) it is obvious that a large-scale implementation of charging points will be necessary by 2040. This scale is, however, also dependent on the ratio of chargers to the number of ULEVs and does not yet take into consideration the detailed breakdown of rapid and slow chargers.

Clear evidence on the ratios of chargers to the number of vehicles remains subject to debate. The Balance Net Zero Pathway, one of the five decarbonisation scenarios set out by the Climate Change Committee (2020), forecasts approximately one charger for every 87 ULEVs and builds on assumptions related to efficiency improvements because of technology changes. Oxfordshire Electric Vehicle Infrastructure Strategy (OCC, 2021) states, informed by a European Directive (European Council, 2014), that one charger is needed for every 10 vehicles (not including home chargers). The Strategy also identifies hotspots for predicted early mass EV adoption, based on demographics of those likely to uptake ULEVs and the logistics of providing charging points such has low driveway probability, in places including Oxford, Bicester, Henley-on-Thames and Witney. Climate Change Committee applies a ratio of 70% of car owners can install their own charge points off street. This does not, however, yet take into consideration the type of infrastructure required (e.g. rapid chargers).

At both a national and local level, a number of varying assumptions and forecasts for ULEVs lead to a range of possible future scenarios, adding to the complexity and uncertainty of forecasting charging infrastructure.

#### *5.6.4.4 Typical Infrastructure Schemes to Meet C4 Needs*

The following typical infrastructure schemes could meet the C3 needs identified:

- New Rail Station / Rail Capacity Improvements (IF2)
- Rapid Transit Scheme (IF2)
- Bus Priority Scheme (IF2)
- Electric Vehicle Charging Scheme (IF2)
- Road Capacity Improvement (IF2)

### 5.6.5 C5: Strategic Transport Connectivity into & out of Oxfordshire

*C5 Future Needs to 2040 for Strategic Transport Connectivity into & out of Oxfordshire at a Glance*

England's Economic Heartland's Transport Strategy identifies the ambition for people and businesses to be connected through the region and with international gateways, to support local economic growth, harness the globally renowned centres of innovation and improve the quality of life of its residents. Together with Oxfordshire's Local Transport Plan, they identify the need to improve Oxfordshire's public transport access with key destinations (e.g. London), transport interchanges (e.g. Heathrow) and key settlements (e.g. Birmingham and Reading). Currently many public transport journeys suffer from long travel times, delays from traffic congestion and multiple connections, further contributing to the use of private car for strategic journeys. Road journey times are also variable, not only impacting bus and private car but also strategic coach and freight journeys, particularly for journeys to and from Oxford City Centre.

There is a specific need to improve rail and road freight travel; demand is forecast to grow and Oxfordshire is key as it hosts a number of significant freight routes such as from the Port of Southampton to the Midlands. There will also be additional demand as a result of East West Rail, further indicating the need to cater for a greater number of freight journeys.

*C5 Key Affected Infrastructure*

#### 5.6.5.1 Strategic Policy & Strategy Need

*C5 Summary of Strategic Needs*

| Strategic Need(s) | Source(s) |
|---|---|
| Support the wider regional economy by connecting people and businesses to markets and opportunities | National Infrastructure Strategy (HM Treasury, 2020)<br>England's Economic Heartland Transport Strategy 2020 (England's Economic Heartland, 2020)<br>Connecting Oxfordshire: Local Transport Plan (OCC, 2015) |
| Enable the efficient movement of people and goods through the wider region and to / from international gateways | |

| Need Tier 1 [UK / Legal Requirement] | Need Tier 2 [National Policy] | Need Tier 3 [County / OxLEP Policy] | Need Tier 4 [District Policy] |
|---|---|---|---|
| ☒ | ☑ | ☑ | ☒ |

##### 5.6.5.1.1 England's Economic Heartland Transport Strategy 2020

Oxfordshire lies within England's Economic Heartland (EEH), which is one of the world's leading economic regions. Its success lies within the scientific, technological and innovative businesses, universities and research centres located within the region. The EEH brings together Local Transport Authorities in a strategic partnership which works with local enterprise partners to provide leadership on strategic infrastructure. This partnership created a Transport Strategy to set out its vision for the region and how it plans to realise it with regards to the transport network.

The vision of the EEH is a catalyst for this strategic transport connectivity need (C5), to realise sustainable growth opportunities and improve the quality of life and wellbeing for Heartland residents and businesses, by harnessing the region's globally renowned centres of innovation to unlock a world class, de-carbonised transport system (England's Economic Heartland, 2020).

The Transport Strategy (echoed by Connecting Oxfordshire (see Section 5.6.5.1.2)) sets out how the region will:

- Utilise the delivery of East West Rail as the catalyst for the transformation of the strategic public transport networks within the region
- Ensure that the freight and logistic needs continue to be met whilst lowering the environmental impact of their delivery

The policies set out in the Transport Strategy are guided by a set of key principles including:

- Supporting the regional economy by connecting people and businesses to markets and opportunities
- Ensuring the Heartland works for the whole UK by enabling the efficient movement of people and goods through the region and to/from international gateways

Within the Transport Strategy an investment pipeline is set out, outlining key infrastructure projects of significance for the region to improve strategic connectivity. These include:

- Improving access to strategic gateways such as Heathrow airport through public transport
- Improving connectivity east to west by realising the full capability of East West Rail
- Improving connectivity north to south by enhanching the rail connectivity between the West Midlands - Oxford and Didcot - Southampton

#### 5.6.5.1.2 Connecting Oxfordshire: Local Transport Plan

As discussed in previously, Connecting Oxfordshire was developed to ensure transport systems in the county are fit to support population and economic growth up to 2031. In order to achieve the previously discussed transport objectives the following measures, supported by multiple policies, have been set (OCC, 2015):

- Changes to freight journeys through environmental weight limits for road through-traffic, changes to routing and distribution networks, improvement to rail freight, and working together with cyclists to reduce HGV-involved collisions
- Air travel including improving connections with airports such as Heathrow and supporting the growth of London Oxford Airport

Those policies are that OCC will:

- Policy 02: Manage and, where appropriate, develop the county's road network to reduce congestion and minimise disruption and delays, prioritising strategic routes
- Policy 06: Support measures to reduce the number of Heavy Goods Vehicles travelling through the county, by promoting freight by rail and working to improve strategic roads
- Policy 09: Work with the rail industry to enhance the rail network in Oxfordshire and connections to it, where this supports the county's objectives for economic growth
- Policy 10: Support the development of air travel services and facilities that it considers necessary to support economic growth objectives for Oxfordshire

Alongside this, Connecting Oxfordshire will be delivered through a series of strategies and plans such as the:

- Freight Strategy: improving the movement of freight within and through Oxfordshire using suitable routes and with minimal impact on the environment
- Rail Strategy: supporting improvements to local and strategic national rail links, including railway electrification, East West Rail and direct rail access to Heathrow

Connecting Oxfordshire sets out funding sources and potential schemes to improve the strategic connectivity of the county. The report states that the UK Government is investing heavily in strategic transport infrastructure that will support Oxfordshire's economic development (OCC, 2015). When Connecting Oxfordshire was released, National Highways was developing a route-based strategy linking Southampton to the East Midlands which included improvements to the A34 and the development of an Oxford to Cambridge expressway; which has seen been cancelled.

#### 5.6.5.2 Evidence Base

*C5: Summary of Evidential Data Sources Underpinning Needs-Based Appraisal*

| Appraisal Dataset | Source |
|---|---|
| ✓ Expected journey times by Road to Key Settlements and International Gateways | Open-Source Planner |
| ✓ Expected journey times by Public Transport to Key Settlements | Open-Source Planner |
| ✓ Journey Time Difference between Vehicles and Public Transport to Key Settlements | Open-Source Planner |

#### 5.6.5.2.1 Connecting People and Businesses to Markets and Opportunities

Six key settlements outside key destinations outside of Oxfordshire have been identified for this analysis:

- Oxford
- Swindon
- Cheltenham
- Milton Keynes
- Reading
- London

As well as being identified as key settlements by EEH, these locations were selected because of their large populations and areas of employment.

As discussed in 5.6.4.2.1, journey times are a measure of accessibility and so to understand the accessibility of Oxfordshire with markets and opportunities outside of the County, journey times by road and by public transport have been analysed and compared. To enable comparison across journeys, departure time has been set at the same date and time (12:00pm on Friday 12th February). It should be noted that committed and forthcoming schemes are not included in the analysis, for example public transport journey times are expected to be impacted by the forthcoming East West Rail scheme but have not been considered in this analysis. East West Rail will play a significant role in enhancing sub-national connectivity across the Oxford-Cambridge Arc. Please note these presently also exclude strategic coach movements.

Analysis of journey times by public transport (see Table 5-45), show that there are a variety of journey times with key settlements due to the variation of distances and transport connections available. Didcot has some excellent accessibility with Oxford and Reading (direct rail connections in under 15 minutes). Cheltenham and Milton Keynes are the most difficult to access, with journeys taking over two hours with multiple connections and modes. Reading and London are well accessed, with links from multiple OxIS Towns & Surrounds in under an hour.

| OxIS Towns & Surrounds | Oxford | Milton Keynes | Swindon | Reading | Cheltenham | London |
|---|---|---|---|---|---|---|
| Oxford City | - | 94 (db) | 65 (r) | 22 (dr) | 125 (r) | 52 (dr) |
| Abingdon* & Surrounds | 34 (db) | 122 (b/r) | 51 (b/r) | 48 (b/r) | 118 (b/r) | 74 (b/r) |
| Banbury | 30 (dr) | 65 (r) | 80 (r) | 45 (dr) | 113 (r) | 71 (dr) |
| Bicester | 17 (dr) | 55 (db) | 76 (r) | 58 (r) | 138 (r) | 55 (dr) |
| Carterton | 61 (db) | 157 (b/r) | 120 (b/r) | 89 (b/r) | 93 (b) | 119 (b/r) |
| Chipping Norton | 57 (db) | 138 (b/r) | 139 (b/r) | 157 (b/r) | 146 (b) | 124 (b/r) |
| Didcot* & Wallingford | 14 (dr) | 146 (r) | 15 (dr) | 12 (dr) | 84 (dr) | 38 (dr) |
| Wantage* & Grove | 41 (db) | 136 (b/r) | 68 (b/r) | 55 (b/r) | 135 (b/r) | 81 (b/r) |
| Witney | 43 (db) | 138 (b) | 97 (b/r) | 64 (b/r) | 64 (db) | 94 (b/r) |

***Notes:*** *b = bus, r = rail, b/r = bus & rail, db = direct bus, dr = direct rail*
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-45: Journey time (minutes) by public transport from OxIS Towns & Surrounds to Key Settlements [Data Analysed 12:00 on 21/04/21 apart from that for journeys originating at Chipping Norton which was analysed 12:30 on 06/10/21].*

Comparing these journey time accessibilities (see Table 5-46), it is clear that London is best accessed by public transport, with many journeys more than half an hour quicker by direct public transport links. Journeys to Milton Keynes and Cheltenham are much quicker by car. Carterton, Chipping Norton and Witney generally have worse access to key destinations by public transport than by car, with journeys taking over an hour more by public transport with limited direct bus and rail connections. It should be noted, however, that public transport variability has not been considered, and public transport journeys do not always consider the full end-to-end journey.

| OxIS Towns & Surrounds | Oxford | Milton Keynes | Swindon | Reading | Cheltenham | London |
|---|---|---|---|---|---|---|
| Oxford City | - | 27 | 8 | -31 | 50 | -53 |
| Abingdon* & Surrounds | 13 | 50 | -2 | -2 | 38 | -31 |
| Banbury | 9 | 10 | -5 | -38 | 41 | -42 |
| Bicester | 32 | 10 | 6 | -10 | 58 | -43 |
| Carterton | 28 | 75 | 75 | 14 | 43 | 4 |
| Chipping Norton | 18 | 73 | 79 | 21 | 96 | 10 |
| Didcot* & Wallingford | -15 | 64 | -40 | -28 | -1 | -75 |
| Wantage* & Grove | 13 | 54 | 18 | 0 | 53 | -34 |
| Witney | 15 | 63 | 45 | -4 | 12 | -19 |

***Notes:*** *A positive value indicates that travel by* ***private vehicle is faster. A negative value indicates that travel by public transport is faster.***
***Note that parking time is not included in the private vehicle journey times used.***
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-46: Difference in journey times (minutes) between road and public transport [Data analysed 12:00 on 21/04/21 apart from that for journeys originating at Chipping Norton which was analysed 12:30 on 06/10/21].*

#### 5.6.5.2.2 Connections with the Region & International Gateways

Oxfordshire hosts significant freight routes between ports, terminals and markets across the country (e.g. Port of Southampton to the Midlands and London's Ports to South Wales), but is also the source and terminal for freight flows too (Network Rail System Operator Western, 2020). Freight is forecast to increase, even under "low growth" scenarios, and will be contributed to by additional freight demand flowing from the route options introduced by East West Rail (Network Rail System Operator Western, 2020).

There are five international airports within two hours of Oxfordshire by road: Birmingham, Bristol, London Gatwick, London Heathrow and Luton airports. Analysis of journey times to each of these airports by public transport from OxIS Towns & Surrounds (see Table 5-47), shows that only Birmingham Airport has direct public transport links with the county, providing a journey time of less than two hours for the majority of areas analysed. Bristol and Luton airports are not near any rail links and so are not accessible by rail, hence all journeys to those airports will contain some stages on a bus.

| OxIS Towns & Surrounds | Birmingham | Bristol | Gatwick | Heathrow | Luton |
|---|---|---|---|---|---|
| Oxford City | 57 (dr) | 168 (b/r) | 113 (r) | 95 (r) | 124 (b/r) |
| Abingdon* & Surrounds | 116 (b/r) | 144 (b/r) | 157 (b/r) | 122 (b/r) | 155 (b/r) |
| Banbury | 39 (dr) | 184 (b/r) | 134 (r) | 124 (b/r) | 152 (b/r) |
| Bicester | 84 (r) | 180 (b/r) | 125 (r) | 107 (b/r) | 159 (b) |
| Carterton | 133 (b/r) | 236 (b/r) | 180 (b/r) | 106 (b/r) | 201 (b/r) |
| Chipping Norton | 116 (b/r) | 197 (b/r) | 226 (b/r) | 157 (b/r) | 203 (b/r) |
| Didcot* & Wallingford | 105 (r) | 114 (b/r) | 102 (r) | 74 (r) | 120 (b/r) |
| Wantage* & Grove | 110 (b/r) | 161 (b/r) | 161 (b/r) | 118 (b/r) | 162 (b/r) |
| Witney | 109 (b/r) | 201 (b/r) | 152 (b/r) | 128 (b/r) | 166 (b/r) |

***Notes:*** *b = bus, r = rail, b/r = bus & rail, db = direct bus, dr = direct rail*
*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-47: Journey time (minutes) by public transport from OxIS Towns & Surrounds to nearby international airports [Data Analysed 12:00 on 21/04/21 apart from that for journeys originating at Chipping Norton which was analysed 13:00 on 06/10/21]*

Comparing these public transport accessibilities (see Table 5-48), all but three journeys are quicker by road with the majority being quicker by over 30 minutes. The only journeys which are quicker by public transport are the direct rail links to Birmingham Airport from Oxford and Banbury and the indirect rail link between Didcot and Gatwick. The largest difference between road and public transport is seen between Carterton and Bristol Airport with over two hours difference, this is due to the long and indirect route required via three buses and a rail link. As above (see Section 5.6.5.2.1), the variability of public transport journey times was not taken into account and public transport journey times do not consider the full end to end journey.

| OxIS Towns & Surrounds | Birmingham | Bristol | Gatwick | Heathrow | Luton |
|---|---|---|---|---|---|
| Oxford City | -16 | 48 | 13 | 35 | 39 |
| Abingdon* & Surrounds | 39 | 34 | 55 | 57 | 68 |
| Banbury | -9 | 54 | 29 | 54 | 67 |
| Bicester | 24 | 50 | 30 | 52 | 84 |
| Carterton | 46 | 134 | 70 | 31 | 99 |
| Chipping Norton | 55 | 91 | 106 | 83 | 111 |
| Didcot* & Wallingford | 18 | 4 | -3 | 7 | 28 |
| Wantage* & Grove | 23 | 59 | 51 | 43 | 60 |
| Witney | 24 | 91 | 42 | 61 | 74 |

***Notes:*** *A positive value indicates that travel by private vehicle is faster. A negative value indicates that travel by public transport is faster.*
*Note that parking time is not included in the private vehicle journey times used.*

*Where an OxIS area refers to more than one centre, the origin or destination of the journey has been taken as the centre of the location before the *.*

*Table 5-48: Difference in journey times (minutes) between road and public transport to nearby international airports [Data Analysed 12:00 on 21/04/21 apart from that for journeys originating at Chipping Norton which was analysed 13:00 on 06/10/21]*

#### *5.6.5.3 Typical Infrastructure Schemes to Meet C5 Needs*

The following typical infrastructure schemes could meet the C5 needs identified:

- New Rail Station / Rail Capacity Improvements (IF2)
- New Rail Corridor (IF2)
- Rapid Transit Scheme (IF2)
- Strategic Bus Priority Scheme (IF2)
- Strategic Road Capacity Improvement (IF2)