AtkinsRéalis

The Movement Strategy for Bath

October 2025

TECHNICAL APPENDIX A: EVIDENCE REPORT

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List of Acronyms

ABODS Analyse Bus Open Data Service.

AQMA Air Quality Management Area.

B&NES Bath & North East Somerset Council.

CAZ Clean Air Zone.

CCTV Closed Circuit Television (surveillance cameras for safety).

CRSTS City Region Sustainable Transport Settlement (funding from Central Government).

dB Decibels.

DEFRA Department for Food and Rural Affairs.

DfT Department for Transport.

EV Electric vehicle.

KM Kilometres.

LSOA Lower Super Output Area.

LTN1/20 Local Transport Note on cycle infrastructure design.

LTN1/24 Local Transport Note on bus priority measures.

MPH Miles per hour.

NHS National Health Service.

NTEM8 National Trip End Model version 8, used to forecast future travel demand.

ONS Office for National Statistics.

P&R Park & Ride.

PBCC Place Based Carbon Calculator.

PCN Penalty Charge Notice.

PCU Passenger car units.

RPZ Residents Parking Zone.

TAP Transport Action Plan.

TfL Transport for London.

UCL University College London.

WERTM West of England Regional Transport Model.

WPL Workplace Parking Levy.

1. Introduction

1.1 Background and purpose

Bath & North East Somerset Council (B&NES) is reviewing the existing transport network in the city of Bath to develop a Movement Strategy (hereby known as 'the Movement Strategy') for the city that meets the Council's core ambitions[1] to:

- Prepare for the future;
- Deliver for local residents; and
- Focus on prevention.

The scale of change required to decarbonise our transport system is considerable. The Department for Transport (DfT) set out the challenge in its Transport Decarbonisation Plan2, published in 2021. The Committee on Climate Change's (CCC) Progress Report to Parliament 20223 further highlights the key challenges and policy gaps to be tackled.

B&NES has set a target for carbon neutrality by 2030. The B&NES Climate Emergency Outline Plan identifies strategic priorities for action to achieve ambitious targets of a 25% reduction in kilometres travelled per person by car each year by 2030 and a 7% decrease in the total number of car journeys across the local authority area4.

This will require a fundamental shift in the way in which people travel, both now and in the future, addressing existing challenges while maintaining accessibility and positioning Bath for a sustainable, healthy, and prosperous future.

In contrast to the forecast-led paradigm of 'Predict and Provide'[5], B&NES is instead adopting the vision-led paradigm of 'Decide and Provide', in which a preferred future is decided, followed by a process to determine how B&NES will provide the means to help realise that future. 'Decide and Provide' approaches are now being adopted as part of mainstream transport policy nationally, regionally and district-wide. The development of a Movement Strategy for Bath is a central part of this process and will be key to shaping the mobility future for Bath.

B&NES' Journey to Net Zero[6] strategy sets the transport policy context for the city of Bath and was adopted by Cabinet in May 2022. The plan sets out the approach to reduce the environmental impact of transport in Bath, tackling the biggest challenge that our society faces: combatting climate change. It is also people-centric and will deliver for residents through the implementation of measures that will bring co-benefits including improving air quality, safety, health, and wellbeing. Other related policies to the Movement Strategy are detailed in **Error! Reference source not found.**.

The Movement Strategy provides a framework for delivering the Journey to Net Zero ambitions. It targets measures, specifically for the city of Bath, that will help to significantly reduce transport-related carbon emissions and deliver a transport network that is fit for the future. Journey to Net Zero highlights ambitions to prioritise active modes by delivering high-quality infrastructure and better places -where people will want to walk, wheel, and cycle, and to ensure that the public transport network is truly the first choice for motorised transport.

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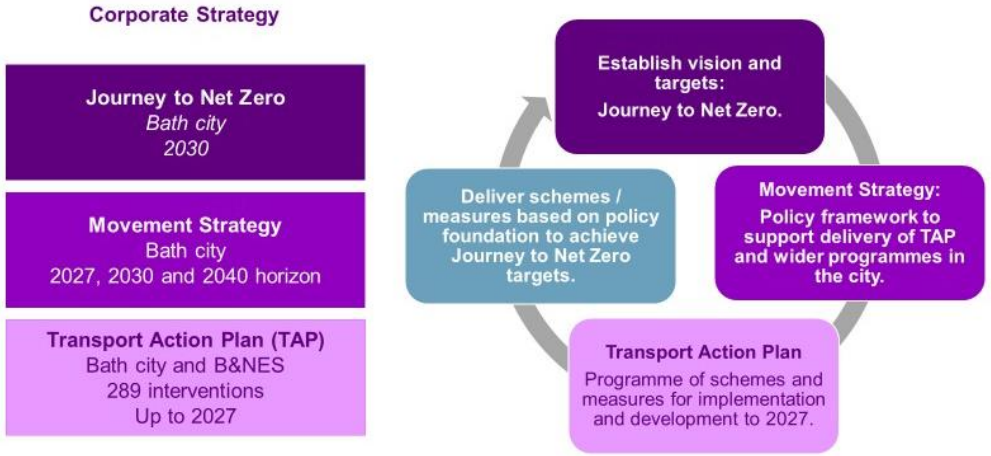
[1] Corporate Strategy 2023-2027 | Bath and North East Somerset Council (bathnes.gov.uk)
[2] Transport decarbonisation plan - GOV.UK (www.gov.uk)
[3] 2022 Progress Report to Parliament - Climate Change Committee (theccc.org.uk)
[4] While electrification of the car fleet is a critical component in transport decarbonisation, this will not happen at the pace needed to reduce emissions. It will also be important to reduce traffic, which will also support wider policy objectives, including encouraging healthier lifestyles and improving quality of place.

[5] "Decide and Provide" means deciding on the preferred future and providing the means to work towards that. "Predict and Provide" is a transport planning policy where traffic volumes are predicted and the road network is developed to support these predictions

[6] "Journey to Net Zero: Reducing the environmental impact of transport in Bath". Bath & North East Somerset. May 2022.

Aligned with this, the emerging Transport Action Plan (TAP) identifies the longlist of transport interventions over the next three years across three packages – Our Place, Our People, and Our Prosperity, outlining their decarbonisation potential, deliverability, and public acceptability, together with the status of the scheme, whether it is in delivery, being developed, or being investigated. The Movement Strategy will set a framework for delivering the TAP in Bath, to re-imagine how the city's transport network operates, assigning transport modes onto the most Suitable routes and prioritising sustainable travel. The full policy context is shown in Figure A1-1.

Figure A1-1 B&NES policy context



As well as setting the framework for delivering the TAP in Bath, the Movement Strategy provides a framework and baseline transport systems plan that will be used to guide scheme and development planning and delivery in the future, having a timeline well beyond 2027.

1.2 Scope

There are several phases in the development of the Movement Strategy. The work in this report forms the first two elements (highlighted in bold) of a wider process, as follows.

- Review of existing movement patterns and circulation of traffic around the city.
- Development of an outline Movement Strategy.
- Modelling of the likely impacts of the Movement Strategy and identification of infrastructure measures to support and mitigate impacts.
- Large-scale public engagement, likely to take several months.
- Development of a business case for implementation.
- Delivery and implementation, including monitoring and evaluation.

The geographical scope of the Movement Strategy covers the City of Bath, and surrounding locations, aligning with the scope of the Journey to Net Zero. The city of Bath is a dual designated World Heritage Site – for its hot springs, Roman archaeology, Georgian buildings and natural landscape setting, and as a Great Spa Town of Europe.

It is of regional and national importance and is one of the top ten most-visited UK cities by overseas tourists. The World Heritage Site Management Plan highlights transport as one of the five priority subject areas[7].

The road network of Bath is made up of A-roads, B-roads, residential roads, and local streets. The A36 and A4 (London Road) are designated as part of the Primary Route Network (PRN). This means if changes are made to these roads, they must still form part of a coherent and sensible network

[7] Bath World Heritage | Bath World Heritage Site

and require agreement with National Highways and/or the Department for Transport (DfT).

Furthermore, the A46 and the A36 east of the city centre form part of the Strategic Road Network (SRN). These are major A-roads managed by National Highways. The link between the PRN and SRN is the A4 London Road and Bathwick Street, highlighting their importance in connecting two key types of roads in the city.

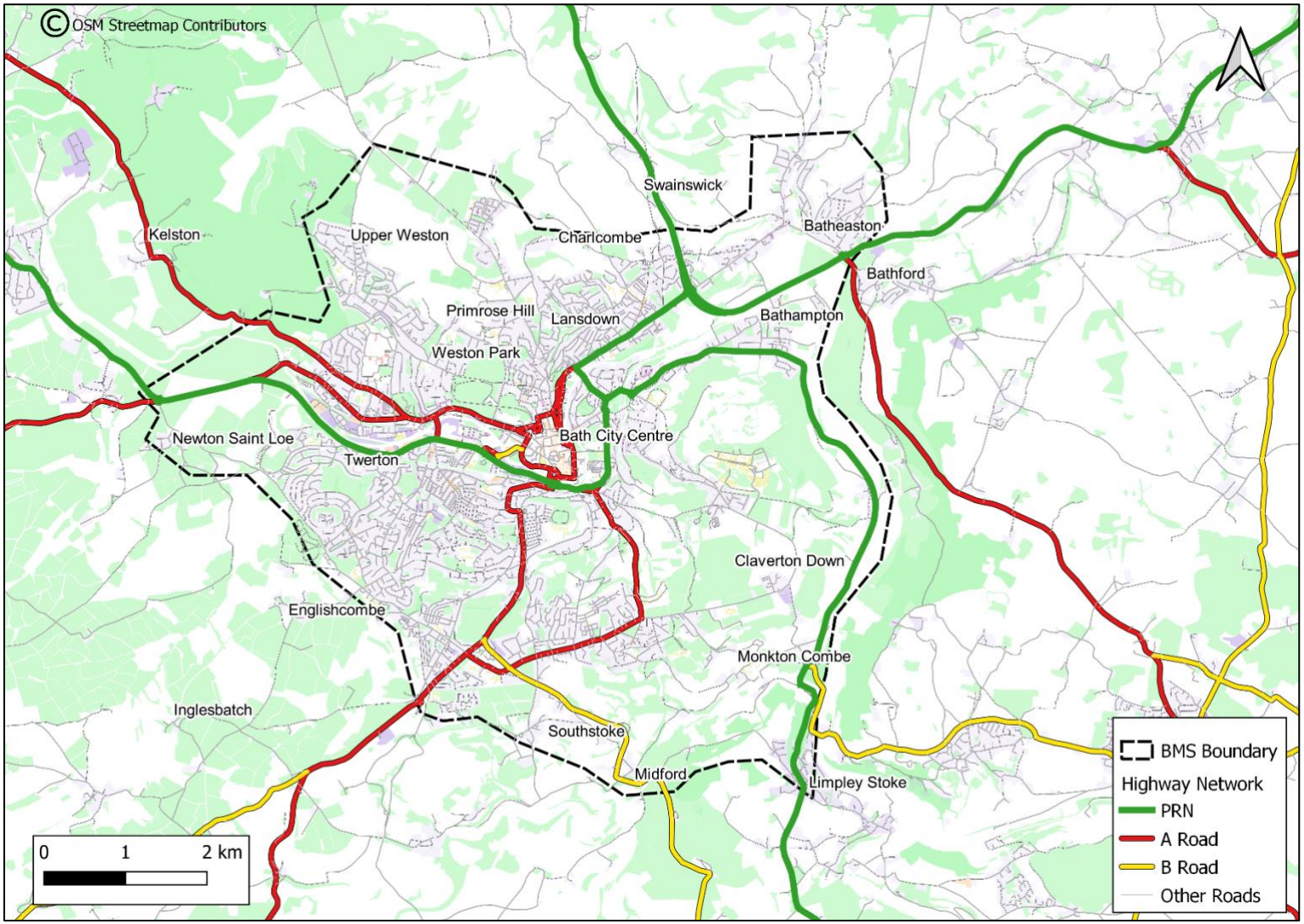
The geographical scope of the Movement Strategy is presented in Figure A1-2 (overleaf).

1.3 Structure of this report

The remainder of this report is structured as follows:

- Chapter 2: Objectives and vision;
- Chapter 3: Bath's existing transport issues;
- Chapter 4: Causes of Bath's transport issues;
- Chapter 5: Factors influencing Bath's transport demand;
- Chapter 6: Defining Bath's existing network;
- Chapter 7: Strategy approaches; and
- Chapter 8: Conclusions and next steps.

Figure A1-2 Geographical scope of the Movement Strategy



2. Objectives and vision

2.1 Objectives and lenses

The objectives of the Movement Strategy align with B&NES' goals to shift how people travel within the region, with a particular focus on reducing both the number, and length, of car journeys. The rationale is to reduce carbon emissions, aligning with B&NES' decarbonisation policies, and shift the focus away from cars onto walking, wheeling, cycling and public transport.

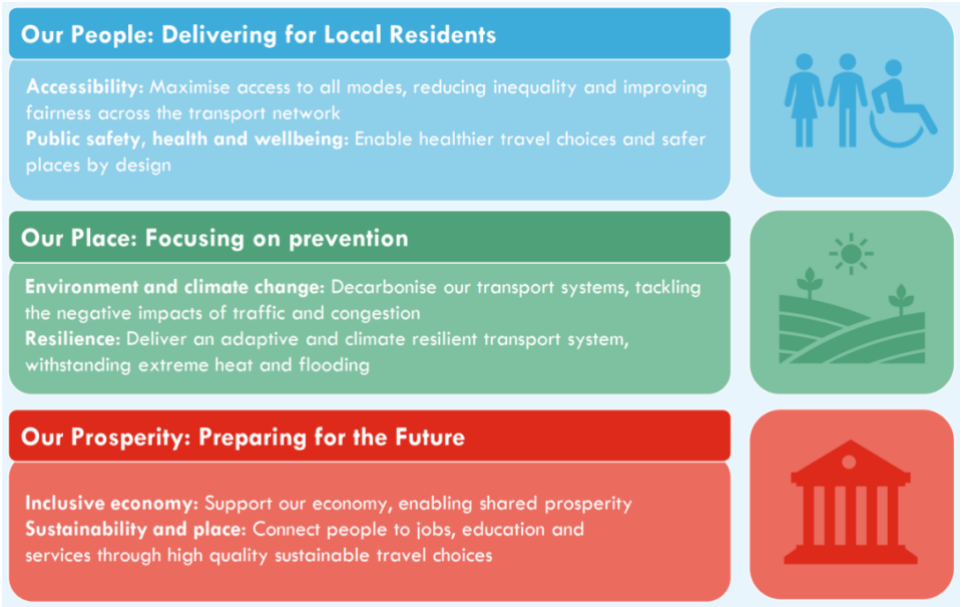
The Movement Strategy is being developed concurrently with the emerging Transport Action Plan (TAP) and the Movement Strategy therefore seeks to align with the TAP's objectives and vision statement.

The TAP, and the objectives of this Movement Strategy, shown in Figure A2-1, focus on three pillars – our people, our place and our prosperity.

This report reviews existing movement patterns in Bath through:

- Reviewing travel demand and patterns – volume and modes of travel;
- Congestion – affecting both vehicles (including private vehicles, freight and deliveries) and bus punctuality;
- Environmental factors that influence travel choices; and
- How people travel on key routes from origins to strategic destinations (e.g., city centre, universities and the Royal United Hospital).

Figure A2-1 TAP and Movement Strategy objectives



This review applies three lenses to build an in-depth understanding of travel movements and patterns for different trip types:

1. Trips within Bath: trips with an origin and destination within the study area (36% of total movements, Figure A2-2).
2. Trips to/from Bath: trips with an origin outside Bath and a destination within the study area (and vice-versa: origins inside Bath and destinations outside) (40% of total movements, Figure A2-3).
3. Trips through Bath: trips with origins and destinations outside the study area but using Bath's transport network (23% of total movements (Figure A2-4).

Figure A2-2 Illustration of scope of trips within Bath

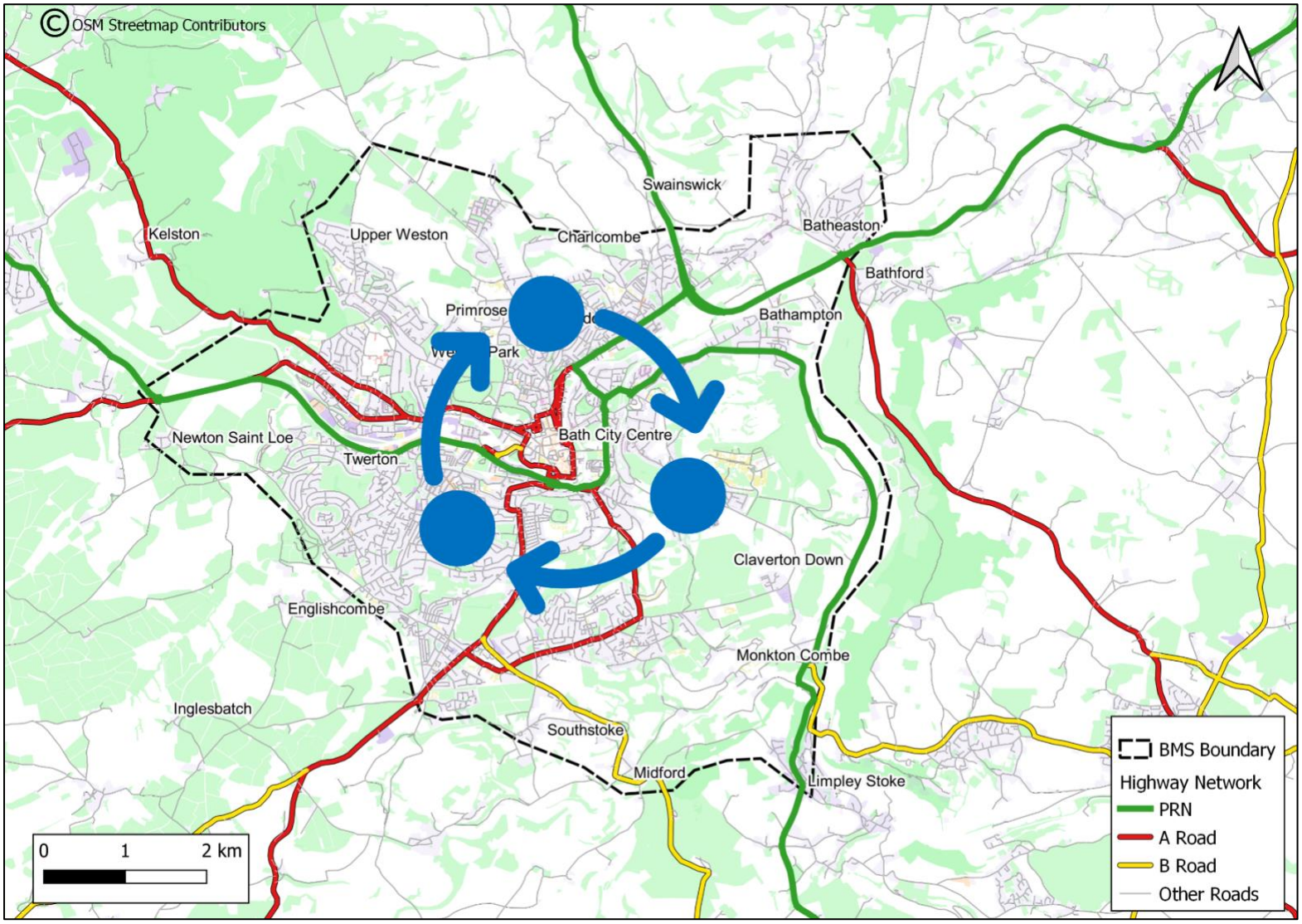


Figure A2-3 Illustration of scope of trips to/from Bath

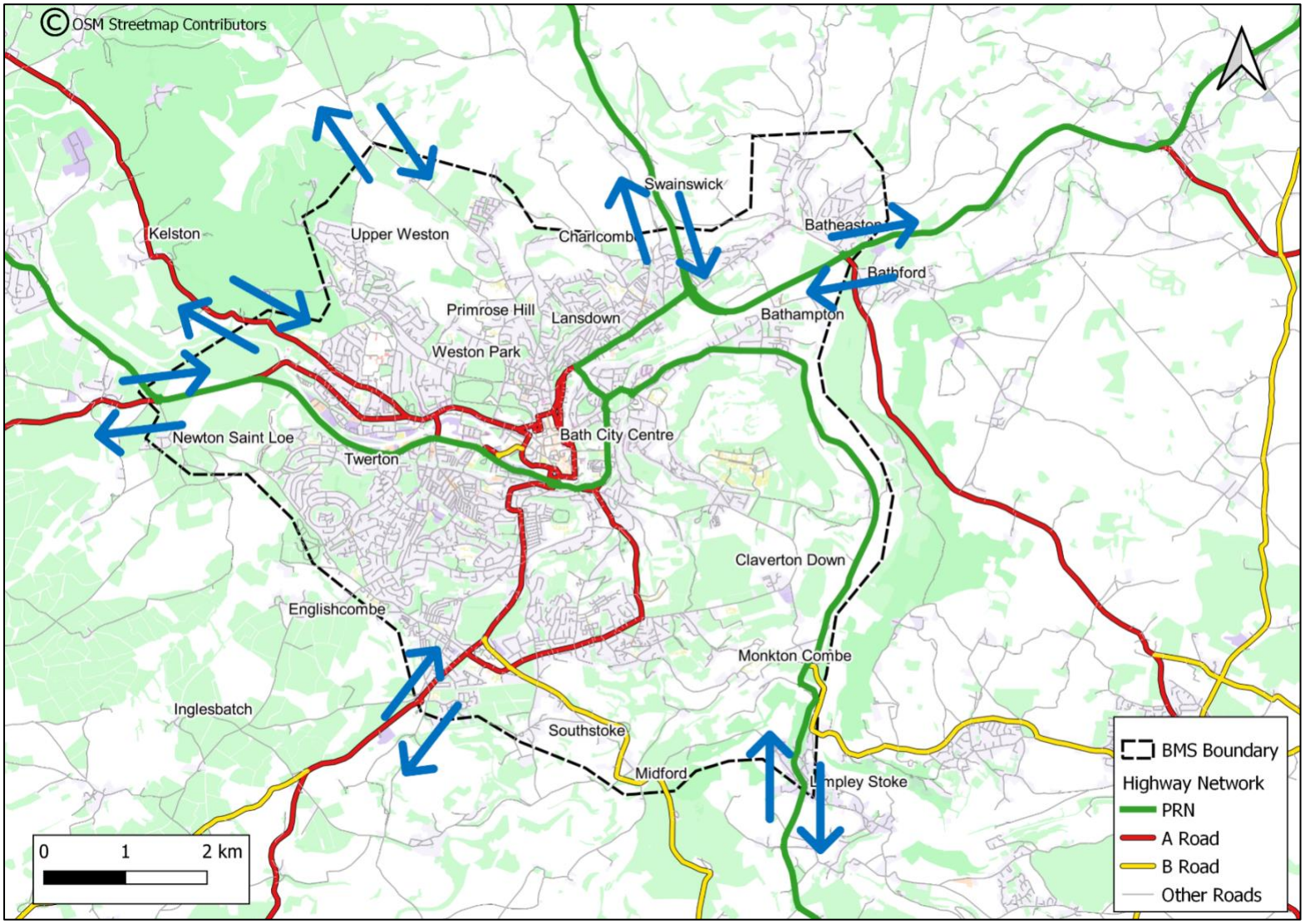
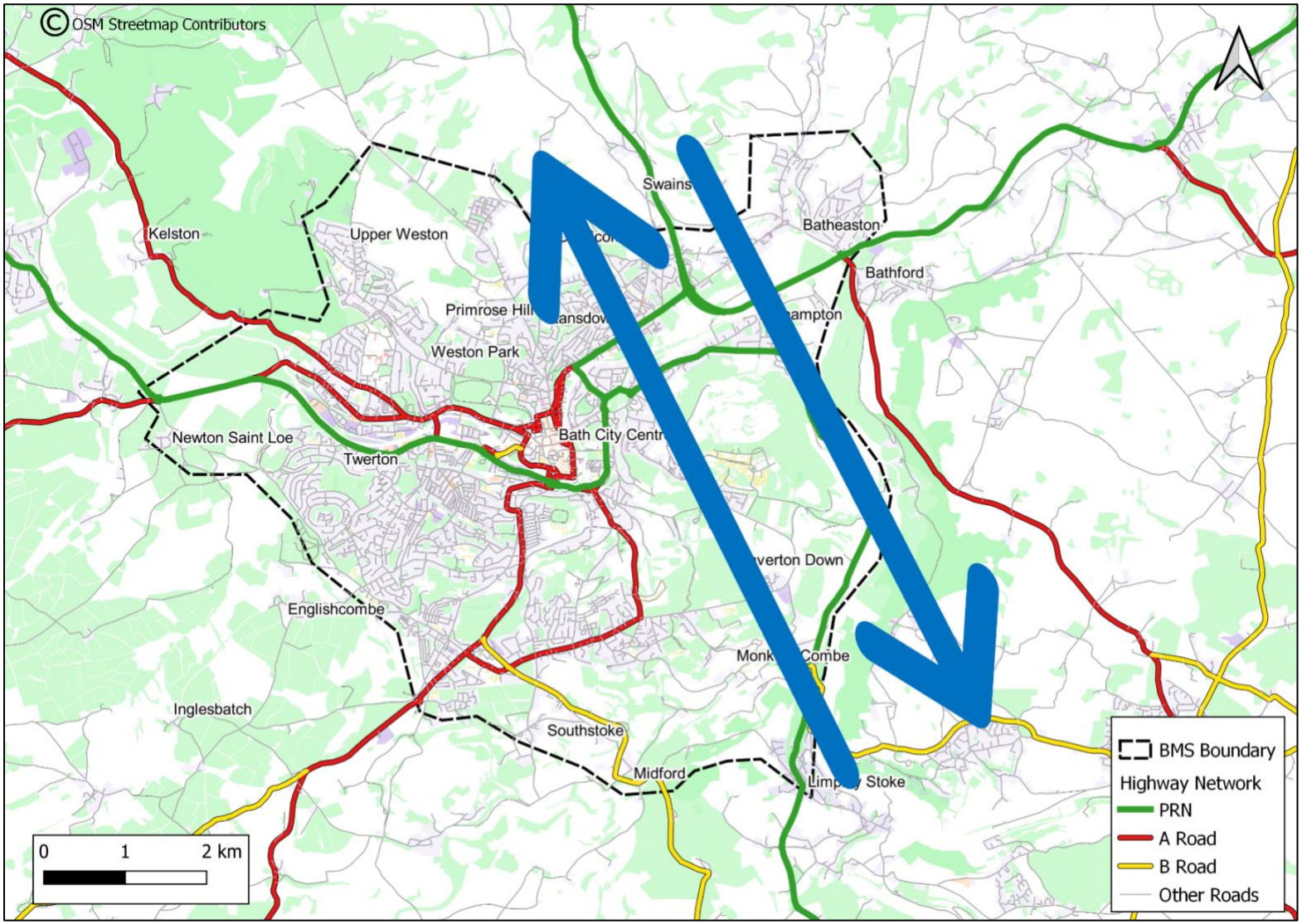


Figure A2-4 Illustration of scope of trips through Bath



Chapter 4 summarises existing movement patterns for each of the lenses. The Movement Strategy develops approaches to align with the vision and objectives through these three lenses.

The purpose of the Movement Strategy is to establish a framework for re-prioritising transport modes on links in the city. This will support the objective of reducing the kilometres travelled per person by car each year by 25%.

This Movement Strategy seeks to achieve this through:

a. Establishing the existing network hierarchy in Bath, demonstrating how the city's transport network is currently used against a classification of road and street types; and
b. Producing re-imagined network hierarchies that will contribute towards the decarbonisation targets of the Movement Strategy.

Bath's network has been categorised into eight different road and street types to show how the transport network operates at present and in shaping future approaches (Figure A2-5). The process to categorise Bath's road network is detailed in Chapter 6.

2.2 Meeting the needs of people

Although the main focus of the Movement Strategy is to explore prioritisation of transport modes and subsequent reallocation of road space within Bath, it is critical to recognise the needs of different people using the transport system in the city. These people include residents, workers and visitors to the city.

In particular, it is important to recognise the needs of people with disabilities, people in poor health, and older people with limited mobility. 17% of Bath residents are aged 65 and over, 16% are disabled, with 5% in bad health[8]. These residents are less likely to be able to walk or wheel long distances or to cycle.

However, it is also important to recognise that some people face significant barriers to access, caused by badly designed footways, severance caused by traffic, and pavement parking. Measures to improve walking, wheeling, and cycling should ensure that the needs of older people and people with disabilities are met.

In addition, residents identifying with protected characteristics defined in the Equality Act (2010) are less likely to use public transport due to a lack of availability, accessibility, safety and affordability[9]. Measures to improve bus services in the city should ensure that the needs of all groups of people are addressed, including improving accessibility and personal safety.

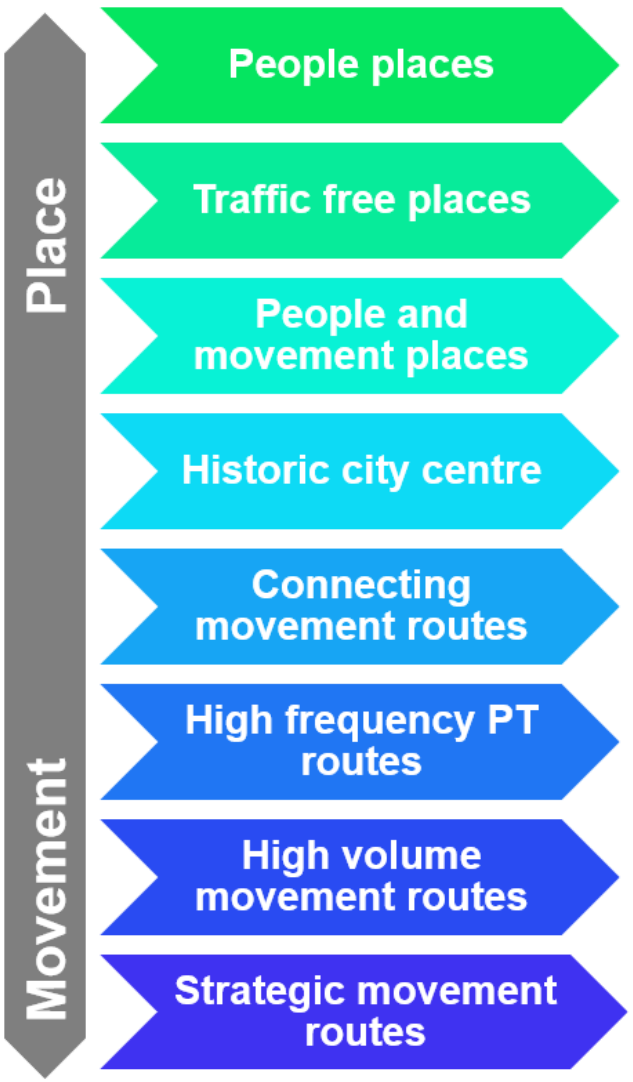
However, it is recognised that, for some people, personal car travel will be critical in meeting their day-to-day needs. The needs of these essential car users will be explicitly addressed in the development of the Movement Strategy.

The development of the Movement Strategy will, therefore, recognise the challenges faced by different user groups, to ensure that there is a decisive shift towards a fully accessible, inclusive transport system that meets the needs of all.

[8] Build a custom area profile - Census 2021, ONS

[9] FS13: Future of Transport - Equalities and access to opportunity - rapid evidence review (publishing.service.gov.uk)

Figure A2-5 Road network hierarchy



Neighbourhood areas, including residential streets that prioritise active travel	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Car and goods vehicles
Traffic free transport places facilitating active travel connections including along greenways	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes)
Mixed use places that serve the local community	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Car and goods vehicles
Destination people places that also facilitate high volumes of access movements	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Goods vehicles 5. Car and goods vehicles
Facilitate connecting movements	1. Bus 2. Walking and wheeling 3. Cycling (including e-scooters and cargo bikes) 4. Car and goods vehicles
Facilitate high volume movements, focused on public transport	1. Bus 2. Walking and wheeling 3. Cycling (including e-scooters and cargo bikes) 4. Car and goods vehicles
Facilitate high volume movements, excluding PRN and SRN	1. Car and goods vehicles 2. Rail 3. Bus 4. Cycling (including e-scooters and cargo bikes) 5. Walking and wheeling
Facilitate movement between the local and regional transport network	1. Car and goods vehicles 2. Rail 3. Bus 4. Cycling (including e-scooters and cargo bikes) 5. Walking and wheeling

2.3 Vision

The Movement Strategy is one of the key next steps along from the Journey to Net Zero and is also informed by the TAP. Figure A2-6 illustrates how the Movement Strategy will enable delivery of the ambitions of Journey to Net Zero through alignment with the TAP objectives.

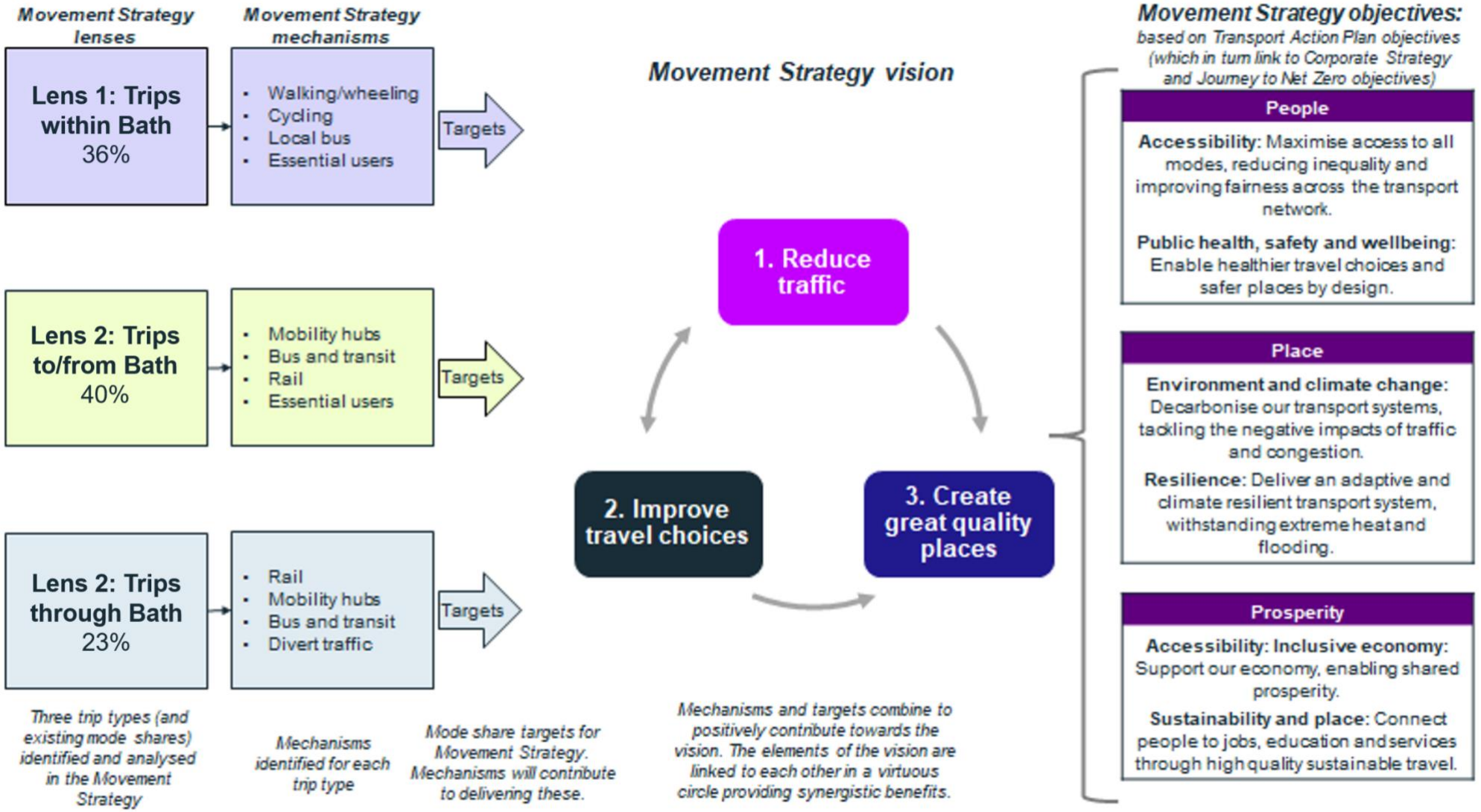
The three components of the Movement Strategy vision consist of reducing volumes of vehicular traffic, improving travel choices and creating great quality places.

All three components of the Movement Strategy vision work together, each one amplifying the benefits of the other two. Reducing volumes of vehicular traffic will help make walking, wheeling and cycling more attractive and improve the performance and reliability of bus services. Improving alternatives to the car will also encourage modal shift and reduce traffic, providing people with more and enhanced travel choices and enabling us to create better safer, more liveable places which are less dominated by traffic and put people first.

These, in turn, are aligned with the TAP objectives relating to our people, our place, and our prosperity.

Figure A2-6 also identifies the mechanisms through which travel behaviour can be influenced, for each lens, to reduce traffic, improve travel choices, and improve quality of place in the city.

Figure A2-6 Generating approaches in alignment with strategy vision and objectives



3. Bath's existing transport issues

3.1 Summary of previous work

This chapter contains an overview of previously completed work to understand the existing conditions and issues within Bath's transport network (Table A3-1). As this is a summary of previous work, this is not within the lens structure that has been developed as part of this commission, highlighted in Chapter 2.

Table A3-1 Summary of the existing issues within Bath

	Conditions	Issues
	2011 Census data showed that nearly 22,000 residents of Bath also worked in the city, while 12,000 residents commuted outside of the city. Overall, 45% of residents' journeys to work were by cycling, walking and public transport and 47% travelled by car (as driver or passenger). 8% worked from home or used other methods of transport[10]. 28,000 commuters travelled into Bath, with 75% of those who drive to work in the city doing so from outside of the city boundary. Car usage for those travelling in from outside of Bath was 53%. 2021 Census data shows that the proportion of Bath residents working from home has increased to 43% (above the national average of 31.5%), and that those driving a car or van to work has decreased to 28% (below the national average of 44.5%)[8]. Whilst these numbers show that Bath's travel behaviours are travelling in the right direction, these 2021 numbers are heavily caveated due to the COVID-19 pandemic. There is a heavy reliance on car travel within B&NES, causing **highway delays, congestion, traffic safety and air quality challenges, and increased carbon emissions** due to cars emitting the most carbon of all forms of personal transport per gram per km[11].	**Issue 1 – Congestion and delays for road users.**
	The A-roads within Bath provide east-west connectivity across the city and extend north-east and south-east, connecting the city to Bristol, Wiltshire and Radstock. This traffic passes through the city centre as there is no bypass or relief road for Bath. There is also a lack of north-south connectivity in Bath through these main A roads. Key A-roads (the A36 travelling from west of Bath to the south east, and A4 from the centre of Bath to the north-east) have been designated as part of the Primary Route Network (PRN). As these roads are	**Issue 1 – Congestion and delays for road users.**

[10] Journey to Net Zero. Journey to Net Zero (bathnes.gov.uk)

[11] Joint Local Transport Plan 4 2020-2036 (westofengland-ca.gov.uk)

	Conditions	Issues
	required for strategic journeys (those made using the PRN), they tend to carry heavier volumes of traffic, with extensive congestion.	
	The most frequent bus services are into and out of the city centre. There are at least, on average, 3.5 buses per hour (approximately 1 bus every 17 minutes) during the Monday AM peak hour. The south-east and north of the city have areas with less frequent bus services (between 0-2.5 per hour, approximately 1 every 24 minutes)[12]. Annual bus passenger surveys highlight that only 62% of respondents are satisfied with bus reliability and punctuality within B&NES.	**Issue 2 – Reliability and punctuality issues for bus services.**
	Users of Bath's Park & Ride sites tend to travel to the closest P&R site to their place of origin[13]. The P&R sites are located at Lansdown to the north of the city (878 spaces), Newbridge to the west (698 spaces) and Odd Down to the south (1,230 spaces)[13]. Prior to the pandemic, average Park & Ride bus ridership was sTable Athroughout most of 2019 with around 5,000 daily passengers, with a marked increase in people using the service in December. Park & Ride ridership is yet to return to pre-pandemic levels, with the average ridership in 2022 at 4,000 daily passengers[14].	**Issue 3 – Lack of high-quality alternatives to car trips.**
	Growth in patronage at Bath rail stations is in line with national trends for rail patronage growth and slightly lower than the level of growth seen at Bristol Temple Meads station (approximately 4.5% per annum)[13]. In 2016, a rail survey was taken to understand passengers' opinions on rail services from Bath Spa and Oldfield Park. Passengers were typically dissatisfied with the availability of seats (~70% of responses), frequency of services (~60% of responses), and punctuality of trains (~55% of responses)[13]. Additionally, there are no available direct north-south rail links from Bath Spa, with Bristol Temple Meads or Swindon as the required connecting rail stations.	**Issue 3 – Lack of high-quality alternatives to car trips.**

[12] Basemap | DataCutter
[13] Transport Delivery Action Plan
[14] Bath's Clean Air Zone Summary 2022 (bathnes.gov.uk)

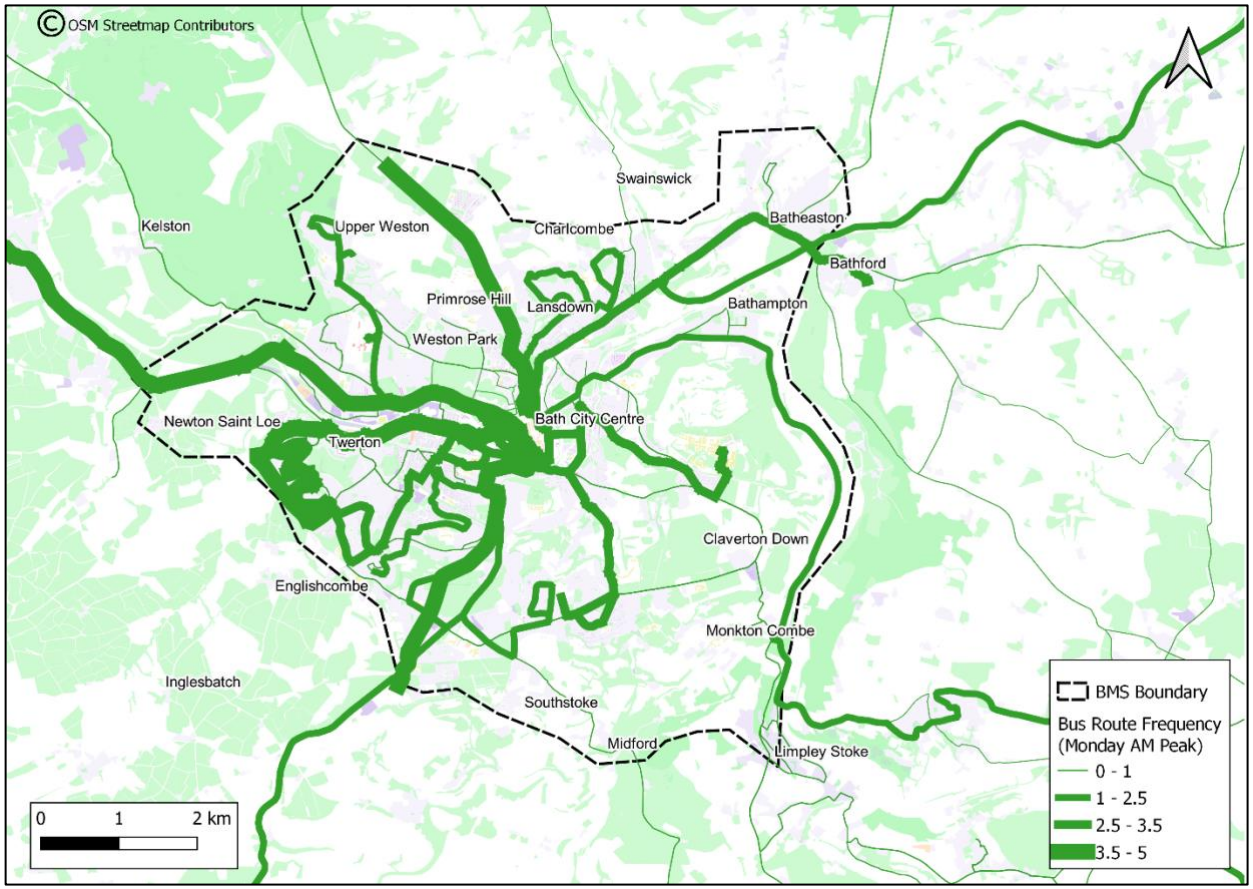
	Conditions	Issues
	2011 Census data show that walking to work in Bath is most popular in the city centre (38%-55% of commuters walk to work), and decreases with distance from the city centre (10%-18% of commuters living outside of the city centre walk to work)[13]. Cycling to work is more popular in areas with more shallow topography (9%-15% of commuters cycle to work) and in areas of green space. This is a greater modal share than in most of the city (overall 1-6% of commuters cycling to work). 2021 Census data shows that 17% of Bath residents walk to work (greater than the national average of 8%), and 2.6% of Bath residents cycle to work (greater than the national average of 2.1%)[8]. These proportions have decreased from the 2011 Census; however, this data is heavily caveated due to the COVID-19 pandemic.	**Issue 4 – Conditions for walk, wheel, and cycle are constrained by physical characteristics.**
	Many streets within B&NES are perceived to have safety issues, including high numbers of heavy vehicles. Air Quality Management Areas (AQMAs) continue to be in place within the city as nitrogen dioxide concentrations fluctuate above and below legal limits throughout a typical year[14]. Furthermore, the quality of the public realm is compromised by severance and noise caused by motorised traffic, particularly on the A roads within Bath where noise is typically above accepTable Alevels of 75 dB[15].	**Issue 5 – Safety, air quality and noise impacting the quality and continuity of the public realm.**

The previous work on Bath's transport network has provided a foundation for development of the Movement Strategy, which will build on the existing issues identified above in Table A3-1. Sections 3.2 to 3.6 provide further information on these critical issues.

[15] Extrium > England Noise and Air Quality Viewer

3.2 Existing bus services

Figure A3-1 Bus route frequency - buses per hour, Monday AM (0700-0900). (Routelines Q1 2023)[12]

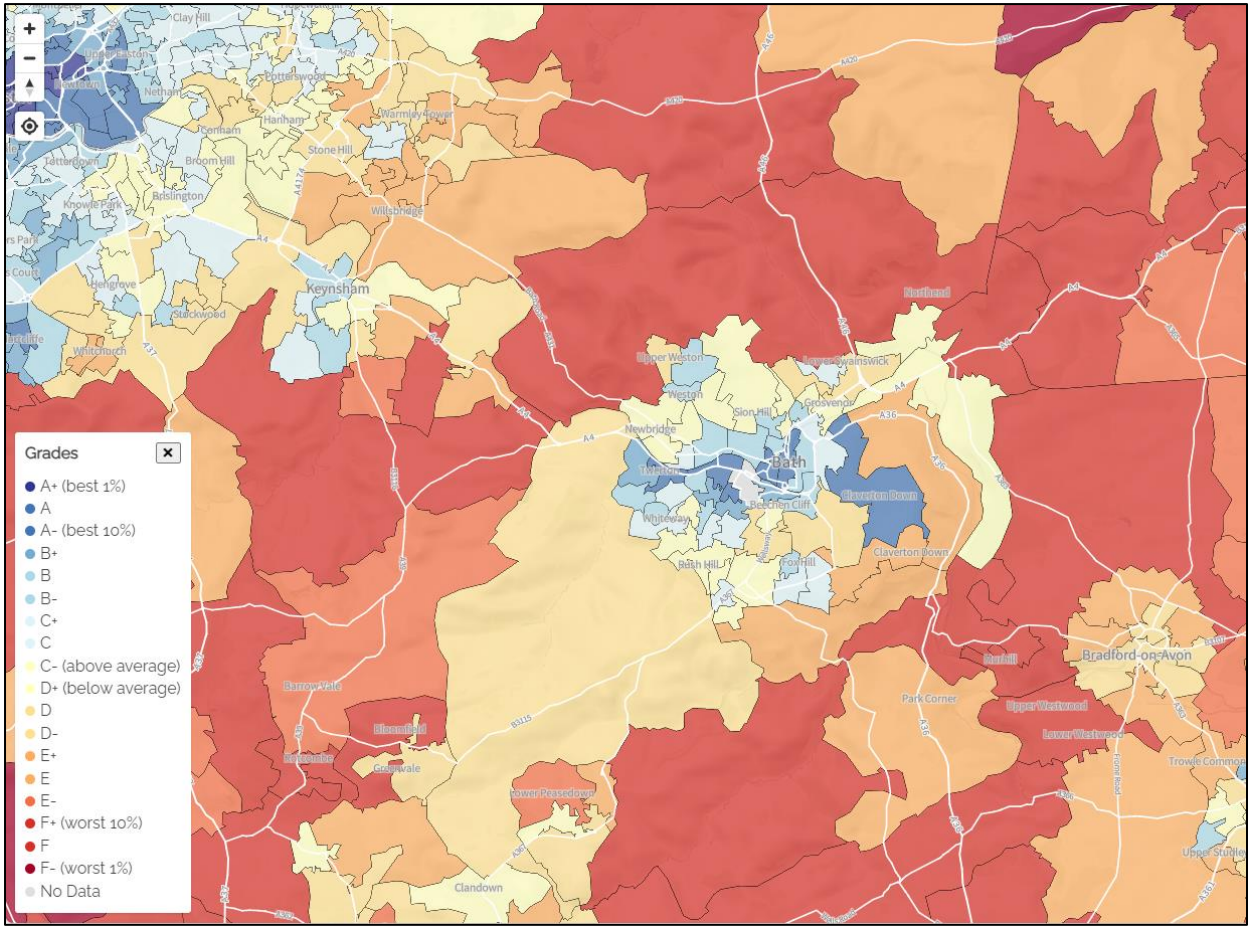


The frequency of bus services in Bath is highest travelling into and out of the city centre (Figure A3-1).

All routes passing through the city centre have a frequency of 3.5 buses per hour or better (approximately 1 bus every 17 minutes) during the Monday AM peak hours. The south-east and north of Bath contain areas that have less frequent services (between 0-2.5 per hour, approximately 1 every 24 minutes) in the same period. The bus route network is denser in the west of Bath than in the east of the city. Key bus corridors are located along Lansdown Road, Upper Bristol Road and in the residential area between Twerton and Newton Saint Loe.

3.3 Carbon emissions

Figure A3-2 Car emission grade by LSOA (A+ = low emissions, F- = high emissions) (PBCC,2021)[16]



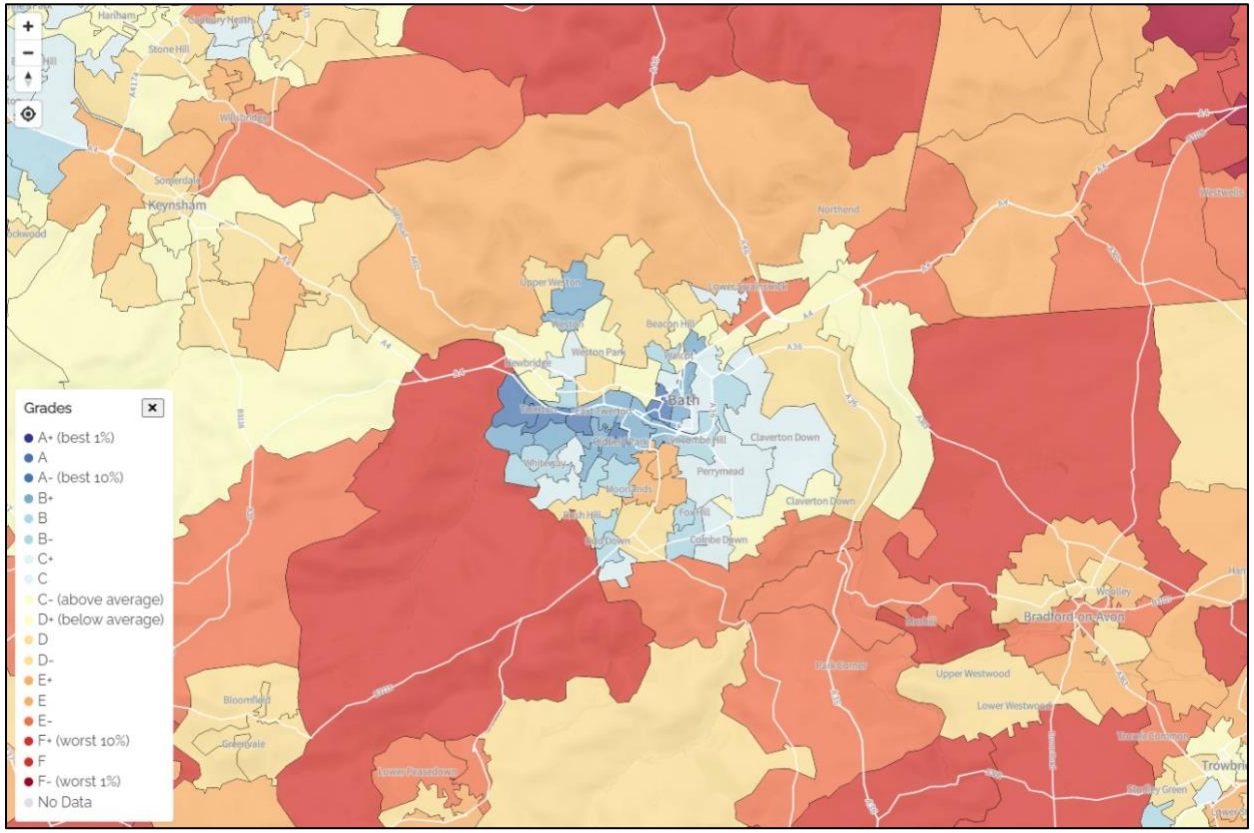
The Place Based Carbon Calculator (PBCC) estimates the average carbon footprint per person per year for each Lower Super Output Area (LSOA) in England. LSOAs are small geographical areas used in statistical analysis. Each has a population of about 1,500 - 3,000.

The tool takes a consumption-based approach to carbon footprints; this means that emissions are counted by the consumer of a good or service not the producer. This tool uses the best available data (including ONS mid-year population estimates for LSOAs, DEFRA emissions factors, average household income and other datasets) and research for each part of a person's carbon footprint. LSOAs are graded from A+ to F- compared to the average LSOA. The LSOAs representing the top 1% of the scoring criteria (emissions grade, kms driven per person etc) receive an A+, whereas the bottom 1% receive an F-.

The estimated average carbon footprint per person from driving cars is low in Bath city centre and typically increases with distance from the centre (Figure A3-2). The LSOA covering the A36 Warminster Road shows greater car emissions that the immediate surrounding LSOAs to the east and west.

[16] Morgan, Malcolm, Anable, Jillian, & Lucas, Karen. (2021). A place-based carbon calculator for England. Presented at the 29th Annual GIS Research UK Conference (GISRUK), Cardiff, Wales, UK (Online): Zenodo. **http://doi.org/10.5281/zenodo.4665852**

Figure A3-3 Kilometres driven per person grade by LSOA (A+ = less distance, F- = greater distance) (PBCC,2021)[17]



Furthermore, the distance travelled by car per person per year shows broadly similar patterns (Figure A3-3).

Kilometres driven per person are generally lower on the east-west corridor of Bath, rather than north-south. This could be attributed to Bath's topography, which is flatter on the River Avon corridor, with steep hills in both the north and south of the city. Additionally, a greater proportion of journeys within Bath are made up of walking and cycling, reducing the average km driven per person. However, there are also outlier LSOAs, including Lyncombe and Widcombe to the south of the river, as well as Batheaston. These areas have greater kilometres driven per person when compared to their immediate surrounding LSOAs.

This analyses analysis highlights a further Issue 6 – high levels of carbon emissions from transport in Bath.

[17] Morgan, Malcolm, Anable, Jillian, & Lucas, Karen. (2021). A place-based carbon calculator for England. Presented at the 29th Annual GIS Research UK Conference (GISRUK), Cardiff, Wales, UK (Online): Zenodo. **http://doi.org/10.5281/zenodo.4665852**

3.4 Congestion

3.4.1 Highway delay

Figure A3-4 WERTM observed highway delay (08:00-09:00)

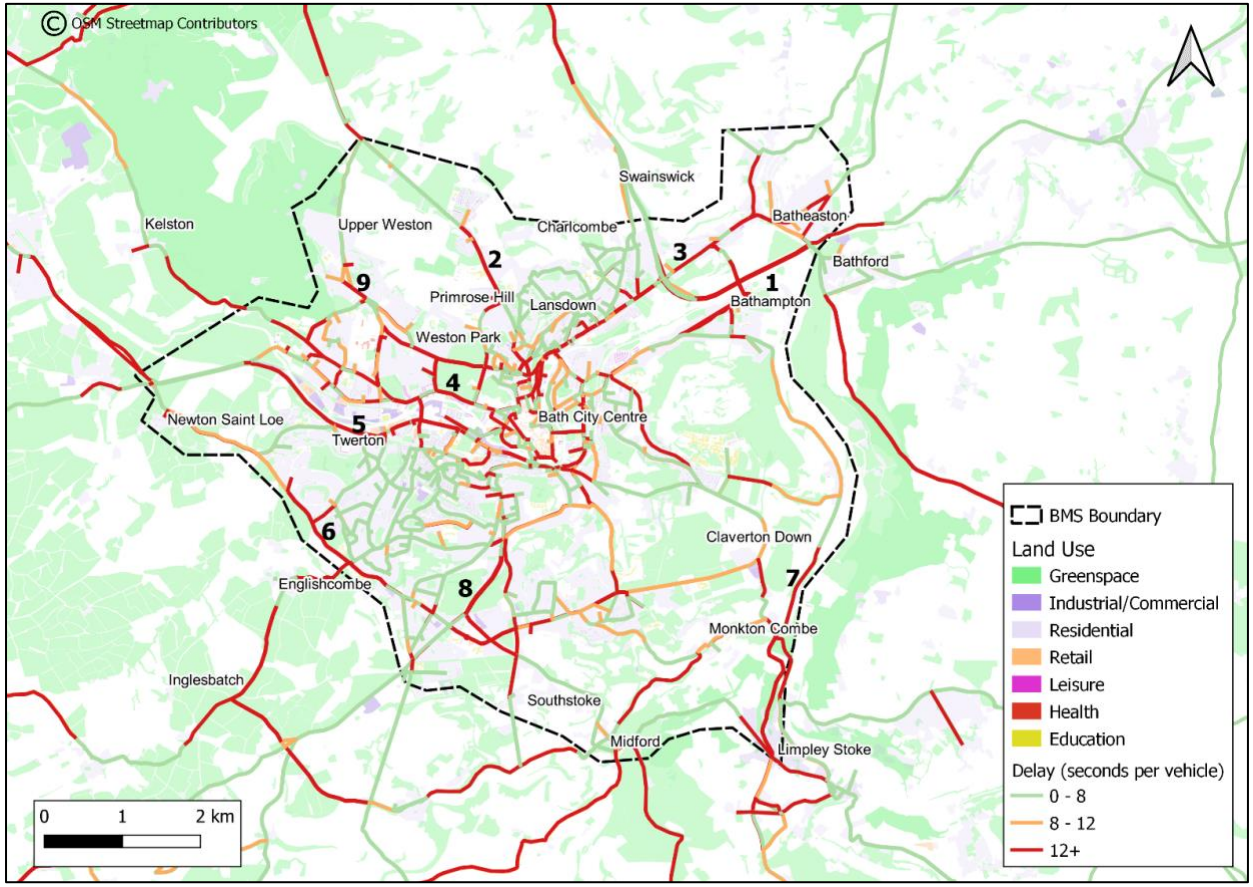


Figure A3-4 presents vehicle delays in the city, based on seconds per vehicle for the West of England Regional Transport Model (WERTM) base model year (2019), during the morning peak hour.

There are high levels of delay on:

- A4 Batheaston Bypass (1), Lansdown Road (2), High Street, Weston (9) and A4 London Road (3).
- Upper Bristol Road (4), Lower Bristol Road (5).
- Whiteway Road (6), A367 Wellsway (8) and A36 Warminster Road (7).

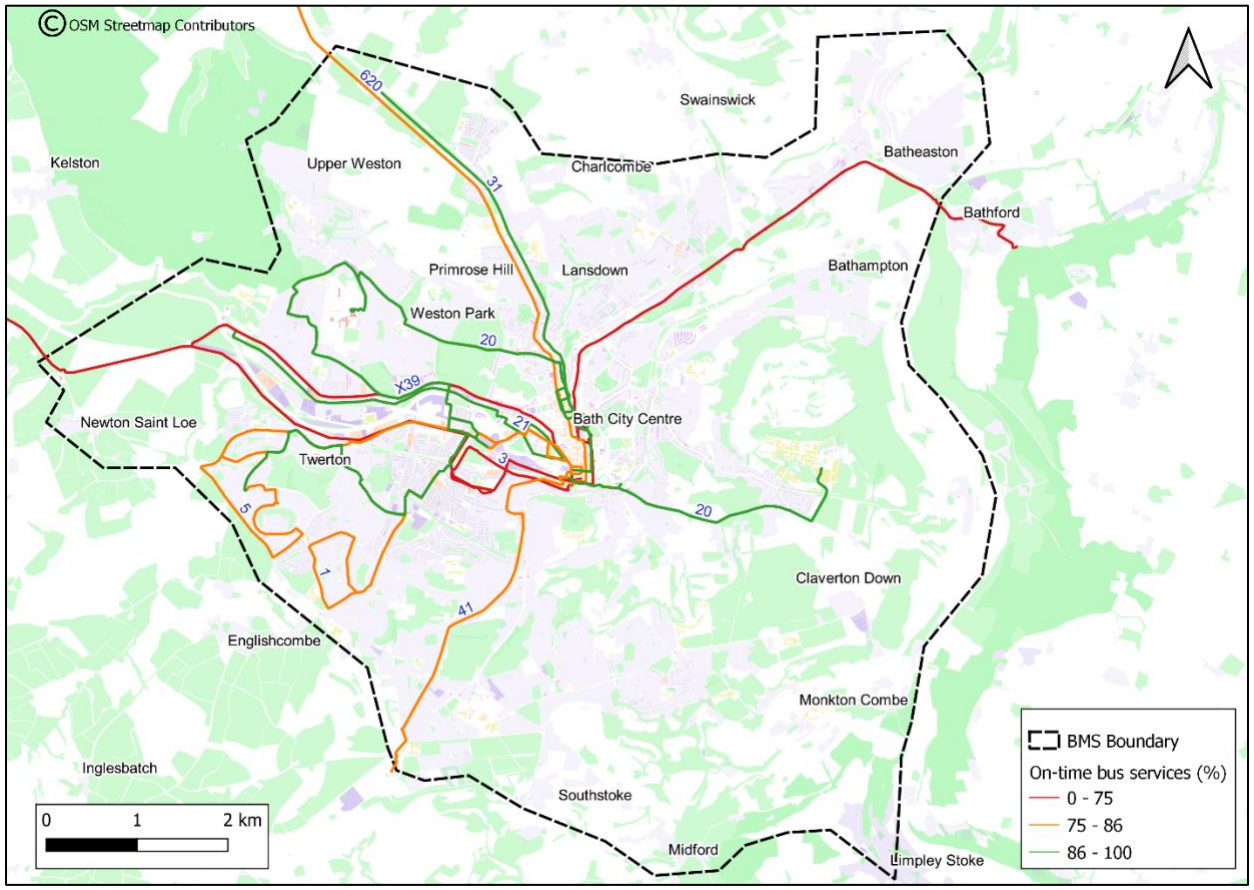
This further highlights Issue 1 – congestion and delays for road users.

It is important to note there is also an emerging roadspace challenge caused by the growing size of private vehicles (e.g. SUVs), which is posing increasing constraints to the use of street space in our towns and cities[18].

[18] Ever-wider: why large SUVs don't fit, and what to do about it (transportenvironment.org)

3.4.2 Bus punctuality

Figure A3-5 Bus service punctuality (ABODS, September 2023)[19]



The national average for bus punctuality within urban areas such as Bath is 86%[19].

Figure A3-5 presents the average punctuality over the two directions of travel (inbound and outbound where routes are not entirely circular) for the most frequent bus routes in Bath. This uses the Analyse Bus Open Data Service (ABODS) data from September 2023.

Bus boarding and alighting times are included within the punctuality data; however, this data can still be used to establish the high-level delays to bus services caused by congestion.

Certain routes (e.g. A4 London Road – the 3) experience much lower punctuality than the national average (<75%).

Only the 20, 21 and 31 routes perform better than the national average (Table A3-2). These are P&R services (21 and 31) or circular routes (20) which may appear to perform better for punctuality due to different stopping patterns and layover times when compared to radial services.

This highlights Issue 2 – reliability and punctuality issues for bus services.

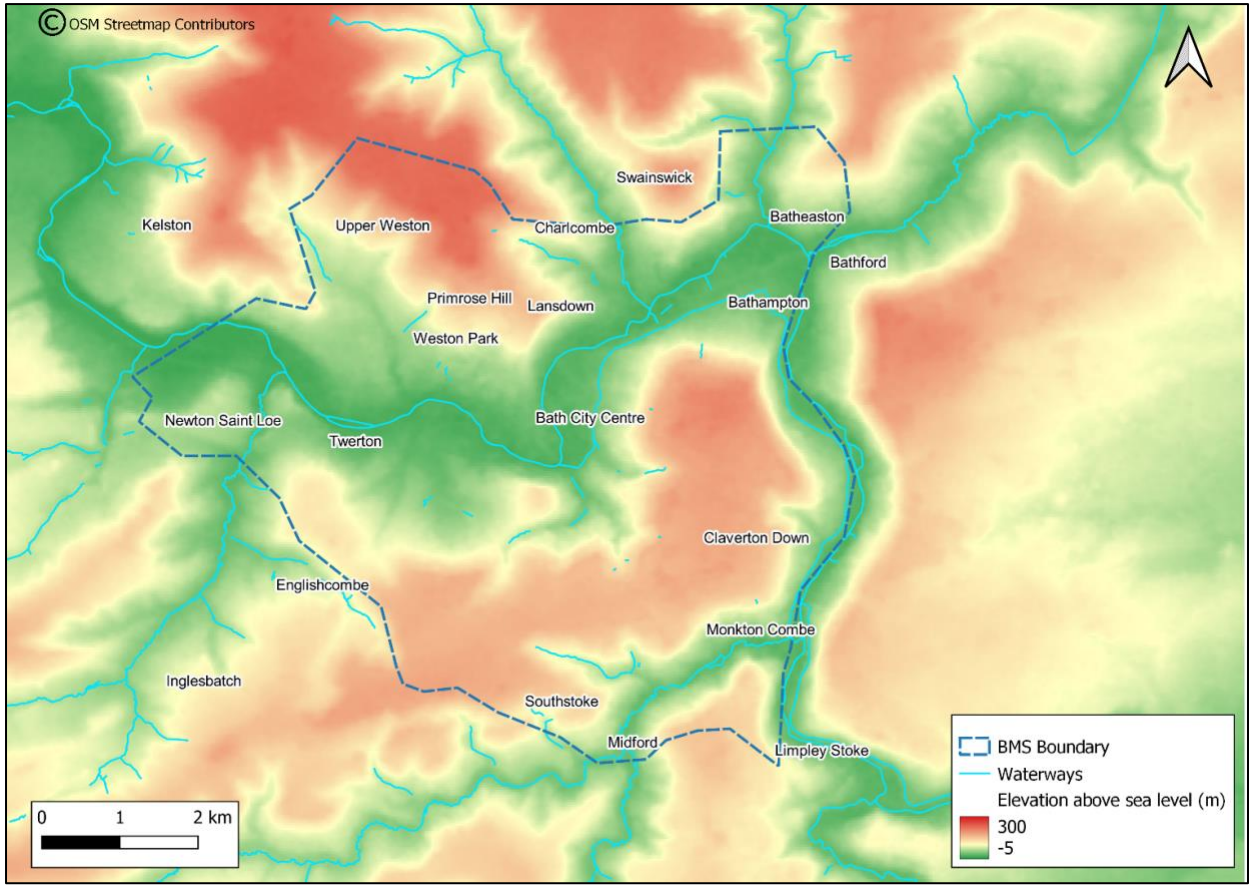
[19] bus09.ods (live.com)

Table A3-2 Bus service punctuality (ABODS, September 2023)

Service	Type of trip	Route	On-time	Late	Early	No data
5	Trips within Bath	Bath Bus Station - Bath Bus Station (Circular Route)	80%	14%	6%	6%
X39	Trips into Bath	Bristol Bus Station - Bath Bus Station	65%	25%	10%	5%
41	Trips within Bath	Odd Down P&R - City Centre, Southgate	85%	11%	4%	12%
21	Trips within Bath	Newbridge P&R - Westgate Buildings	93%	3%	4%	7%
31	Trips within Bath	Lansdown P&R - Queen Square	89%	7%	4%	10%
3	Trips into Bath	Bath Bus Station - Bath Bus Station - Hayesfield School (via Bathford)	60%	37%	3%	15%
1	Trips within Bath	Bath Bus Station - Bath Bus Station (Circular Route)	76%	15%	9%	15%
20	Trips within Bath	University of Bath - Twerton	89%	9%	2%	25%
620	Trips into Bath	Old Sodbury - Yate - Bath	81%	17%	2%	22%

3.5 Topography

Figure A3-6 Topography of Bath



The city of Bath has a varying topography (Figure A3-6). The River Avon runs from the south-east (Wiltshire), north to Bathampton, then through the city centre toward the north-west (Keynsham and Bristol). The land adjacent to the river has a flatter topography, but there are steep hills to the north and south, which define Bath's distinctive bowl geography.

These differences in topography significantly influence the attractiveness of walking, wheeling, and cycling in the city. Walking, wheeling, and cycling is more challenging around Upper Weston and Lansdown, and on the slopes from Claverton and Wellsway towards the city centre. Topography poses less of a constraint to walking and cycling on the east-west corridor through the city.

This highlights Issue 4 – Conditions for walking, wheeling and cycling are constrained by physical characteristics.

3.6 Summary of existing issues

Table A3-3 summarises the existing issues for Bath's transport network that have been detailed in this chapter, as well as the element of the Movement Strategy vision that seeks to address these issues.

Table A3-3 Summary of transport issues and Movement Strategy vision

Existing issues for Bath's transport network	Movement Strategy Vision
Issue 1 - Congestion and delays for road users.	Reduce traffic
Issue 2 - Reliability and punctuality issues for bus services.	Reduce traffic
Issue 3 - Lack of high-quality alternatives to car trips.	Improve travel choices
Issue 4 - Conditions for walking, wheeling and cycling are constrained by physical characteristics.	Improve travel choices
Issue 5 - Safety, air quality and noise impacting the quality and continuity of the public realm.	Create great quality places
Issue 6 - High levels of carbon emissions from transport in Bath.	Create great quality places

4. Causes of Bath's transport issues

The causes of the transport issues described in the previous chapter have been considered through different types of trip, which we have described as 'lenses'. These three lenses, and how they combine to cause Bath's transport issues, are explored in detail in the following sections:

- Lens 1: Trips within Bath (trips with an origin and destination within the city) – Section 4.1.
- Lens 2: Trips to/from Bath (trips with an origin outside Bath and a destination within the study area (and vice-versa: origins inside Bath and destinations outside) – Section 4.2.
- Lens 3: Trips through Bath (trips with origins and destinations both being outside of the city but that are likely to use Bath's transport network for the trip) – Section 4.3.

These present movement characteristics within the study area across the three lenses, reviewing key causes including traffic volume trends and origin-destination data extracted from the West of England Regional Transport Model (WERTM) base year (2019) model. This base year model has been validated and calibrated using primary (e.g. automatic traffic counts and face-to-face interviews) and secondary data sources (mobile phone data, Census data).

Data extracted from WERTM (Table A4-1) indicates that trips into / from Bath account for the highest proportion of daily demand by all modes (118,000) in the study area in the base year, with internal trips within the city accounting for a slightly smaller proportion.

Table A4-1 Travel demand and modal breakdown (all modes, daily, WERTM 2019)

Lens number	Total daily demand (all modes)	Walk	Cycle	Public transport	Car
Lens 1	107,000	48% *~51,000*	4% *~4,000*	10% *~10,000*	39% *~42,000*
Lens 2	118,000	1% *~1,000*	1% *~2,000*	19% *~22,000*	79% *~93,000*
Lens 3	69,000	<1% *~0*	<1% *~0*	14% *~10,000*	85% *~59,000*

All numbers are rounded to nearest thousand, percentages are rounded to the nearest integer value.

This shows the impacts of trip lengths on mode choice: there is a very high proportion of trips made on foot within the city, but a high proportion of trips made by car for trips to, from and through the city. Additionally, although walking is the most popular mode for trips within Bath – there is still high car demand for relatively short trips.

4.1 Lens 1: Trips within Bath

The first lens focuses on internal trips. These are trips with an origin and destination within the city.

4.1.1 Flows and mode choice

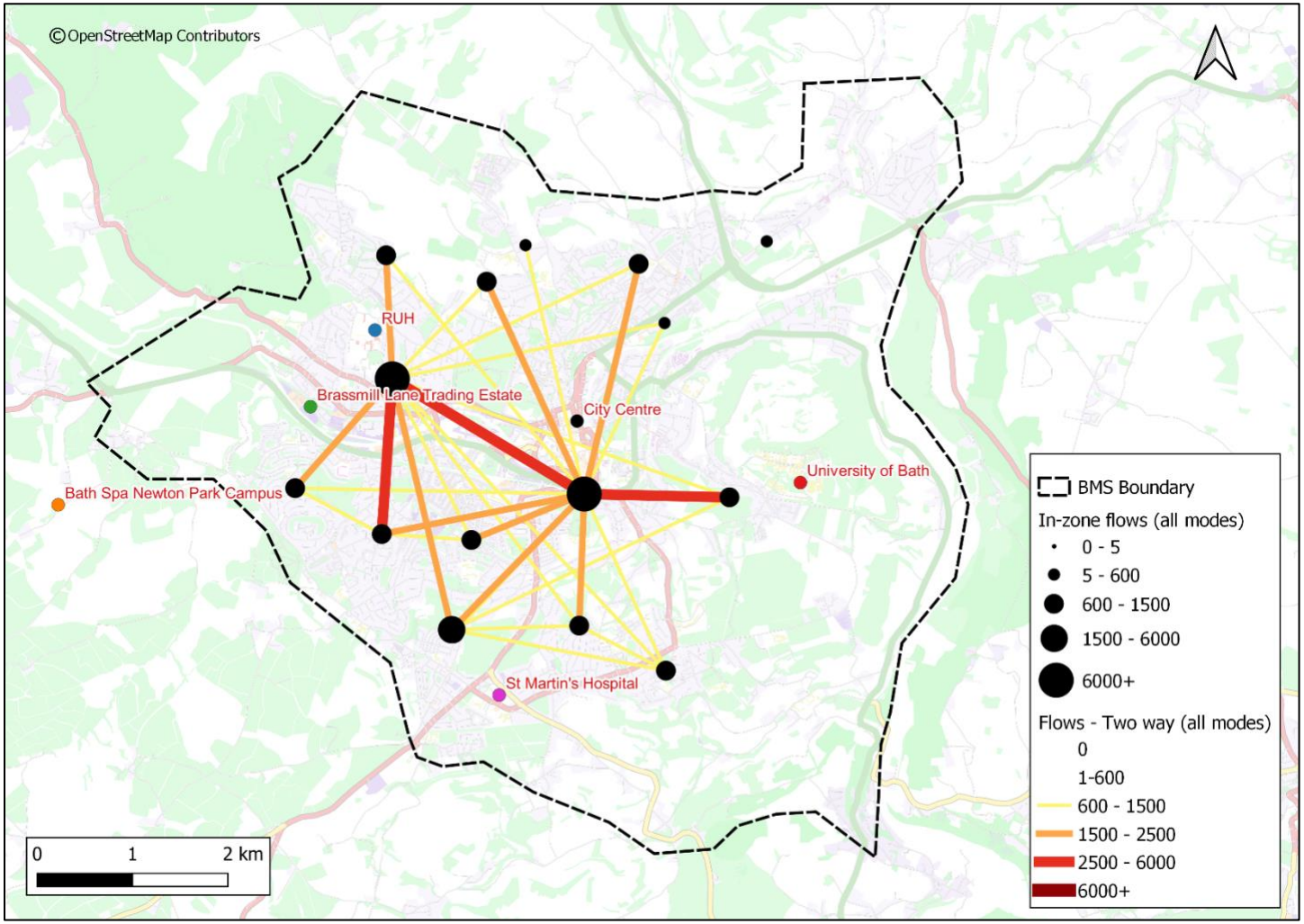
Analysis of internal trips by mode shows a reliance on car trips (39%), despite the short distance of these trips. Walking accounts for 48% of trips, 4% by cycling, and 10% by public transport as shown in Table A4-2.

Table A4-2 Modal breakdown of daily demand (WERTM, 2019)

Mode	Daily trips within Bath	Proportion
Car	41,569	39%
Cycle	4,150	4%
Public transport	10,434	10%
Walk	51,238	48%
All modes	107,392	100%

Percentages are rounded to the nearest integer value.

Figure A4-1 Daily two-way flow for internal trips (WERTM, 24-hour, 2019 base year)



Data has been extracted from WERTM for two-way flows (by all modes of travel) for internal trips – see Figure A4-1. The 2019 base model has been used because this is the most robust dataset available, providing a multi-modal overview of movements across the city.

There are high two-way flows of people within the city, exceeding 6,000 between the city centre and the area around the Royal United Hospital (RUH), University of Bath, and Oldfield Park.

This highlights the multiple competing travel demands (work, leisure, education, health) on Bath's road network. This demand is focused between distinct traffic generators (RUH, University of Bath, Bath city centre).

4.1.2 Destination analysis

WERTM has been used to identify key flows of traffic within the city using destination analysis. For this analysis, specific destinations are chosen. The vehicle flows to these destinations are extracted, showing the busiest links to access these destinations.

The following destinations within the Movement Strategy area were chosen for further analysis (Figure A4-2):

- Royal United Hospital (RUH);
- Brassmill Lane Trading Estate;
- St Martin's Hospital;
- Bath City Centre;
- University of Bath Campus; and
- Bath Spa Newton Park Campus.

These locations represent a range of travel purposes (business, health, education, leisure), and ensure that a wide area of the city was covered by the destination analysis. They also represent the key trip producers and attractors within Bath.

Figure A4-3 shows the combined flows to the six key destinations shown on the previous figure. The highest traffic flows are on:

- A4 London Road, north east of the city centre.
- Norwood and Convocation Avenues, on the entrance to the University of Bath.
- Combe Park and Crown Road, travelling north from the A431 towards RUH.

This shows that the city centre, University of Bath, RUH and St Martins Hospital all create high demand for vehicle trips on the main roads within the city. This analysis shows the key links that are used for journeys to and between Bath's key destinations, contributing to the high traffic flows shown in Figure A4-1.

Typically, city centre demand dominates the centre and north-east of Bath's roads. Demand to the University of Bath makes up most of the demand to the south-east of the city. St Martin's Hospital and Bath Spa Newton Park Campus contribute significantly to demand in the south and south-west of the city. Travel demand for the west of Bath's road network is strongly influenced by RUH, Brassmill Lane Trading Estate and Bath Spa Newton Park Campus.

This further highlights the multiple competing travel demands (work, leisure, education, health) on Bath's road network.

Figure A4-2 Key destinations chosen for destination analysis

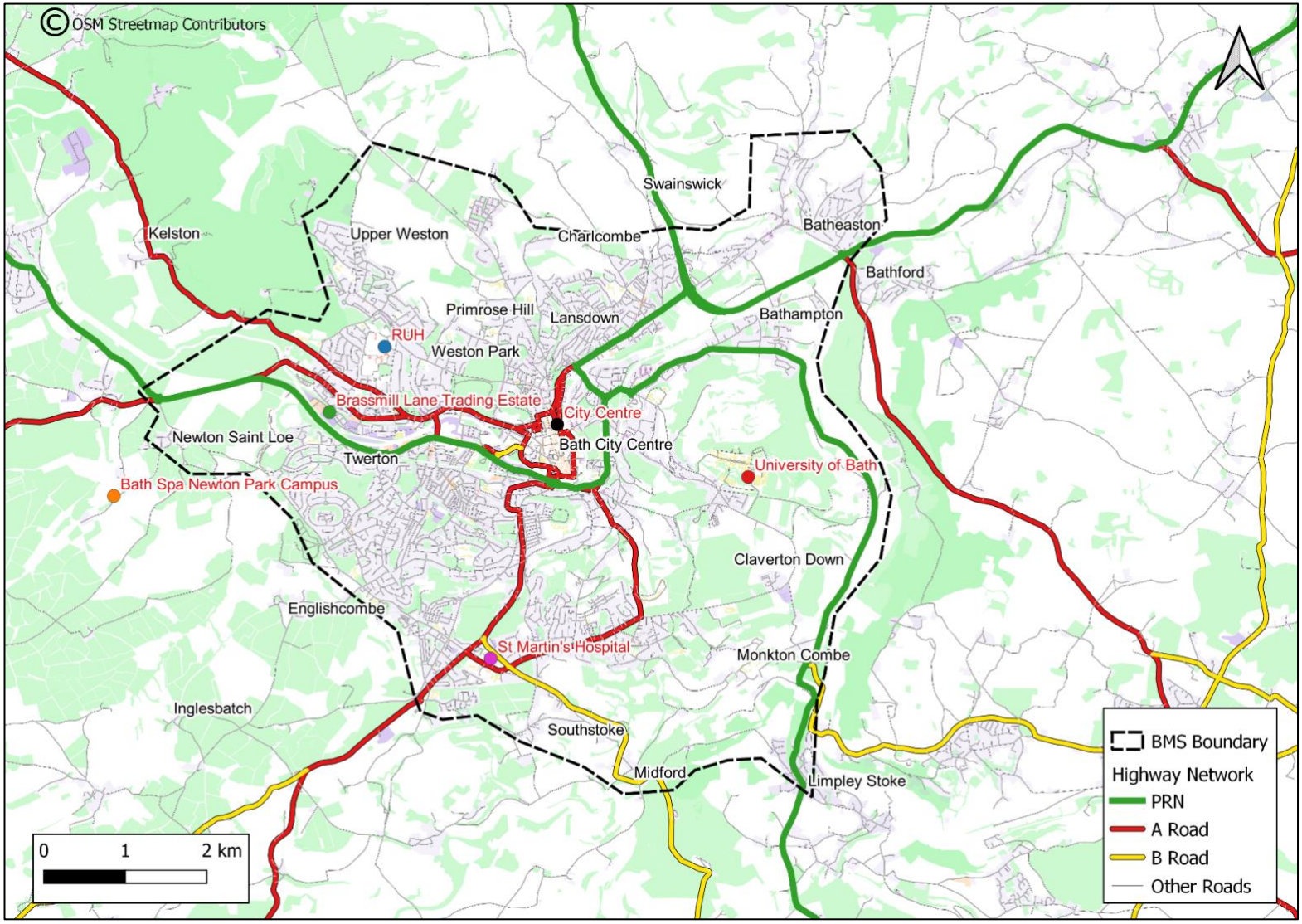
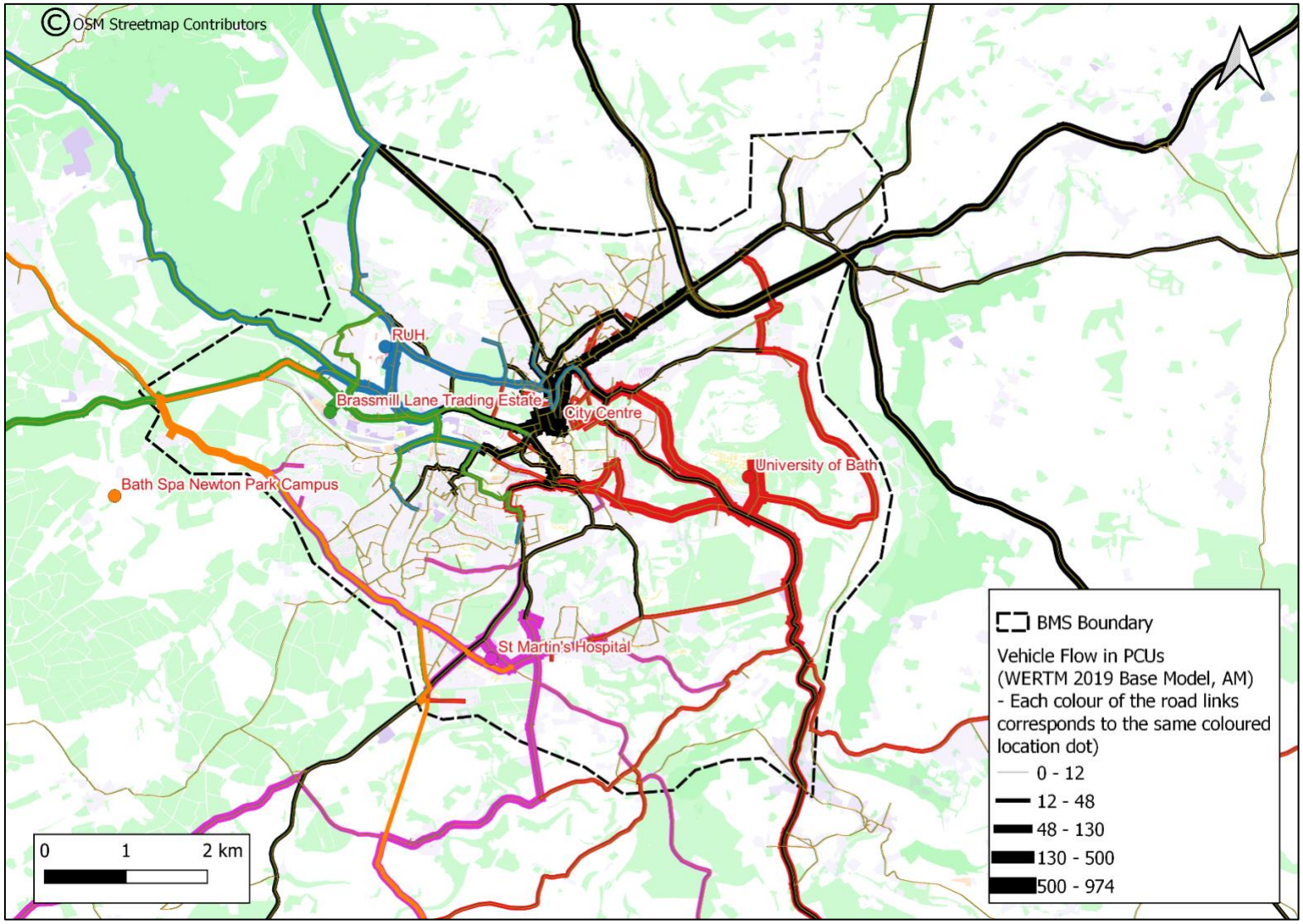


Figure A4-3 Combined destination analysis flows for all key destinations (WERTM, Weekday, 0800-0900)



4.2 Lens 2: Trips to/from Bath

The second lens of analysis focuses on trips with origins from outside of Bath and destinations within the city, and vice versa – trips with origins inside Bath and destinations outside the city. We have focused on links with the highest vehicle demand for trips into Bath, as well as highlighting the most common origins. Whilst this section focuses on Bath and the surrounding area, it should be noted that the city is a major tourism destination, generating trips from further afield outside of the peak hours analysed within this report.

4.2.1 Flows and mode choice

The breakdown of these trips by mode shows a high reliance on car trips (79%) (Table A4-3), with 19% of trips being made by public transport. Cycling and walking each have ~1% of the mode share.

Table A4-3 Modal breakdown of daily trips to/from Bath (WERTM, 2019)

Mode	Daily trips to/from Bath	Proportion
Car	92,878	79%
Cycle	1,525	1%
Public transport	22,374	19%
Walk	1,246	1%
All modes	118,023	100%

Percentages are rounded to the nearest integer value.

4.2.2 Select Link Analysis

Data have been extracted from WERTM and have been used to identify the origins and destinations of trips using key links in the city, using Select Link Analysis (SLA).

The following links were analysed using SLA (Figure A4-4):

- Toll Bridge Road.
- A46 Batheaston bypass.
- A4 London Road.
- A36 near Bathampton.
- A36 Warminster Road.
- Lansdown Road.
- A4 / A431 Newbridge Road and Newbridge Hill.
- A36 Lower Bristol Road.
- A367 Wellsway.

These links were chosen to represent key travel routes across the city. This section focuses on the SLA locations that show evidence of external trips travelling into Bath.

Figure A4-4 SLA locations

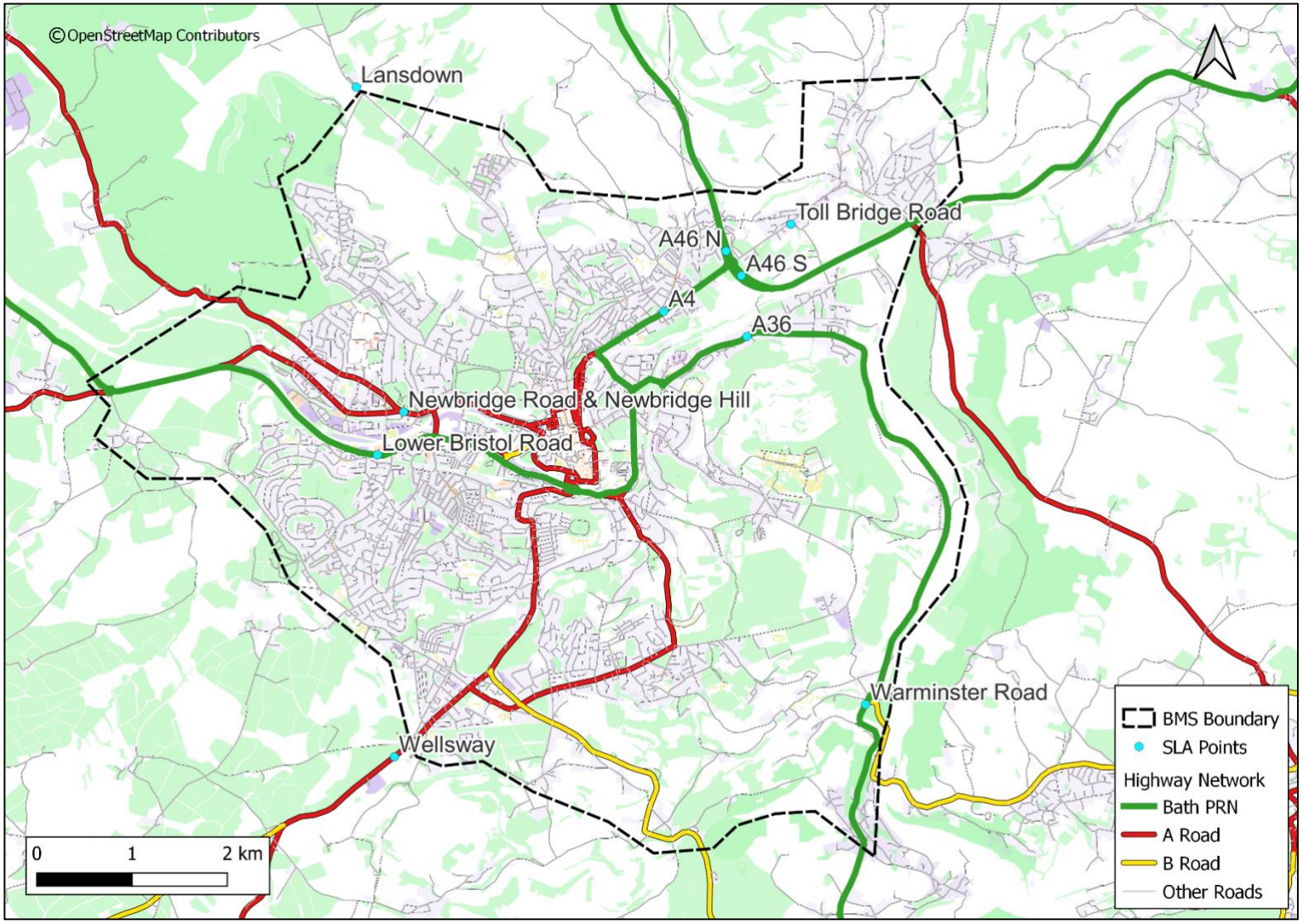
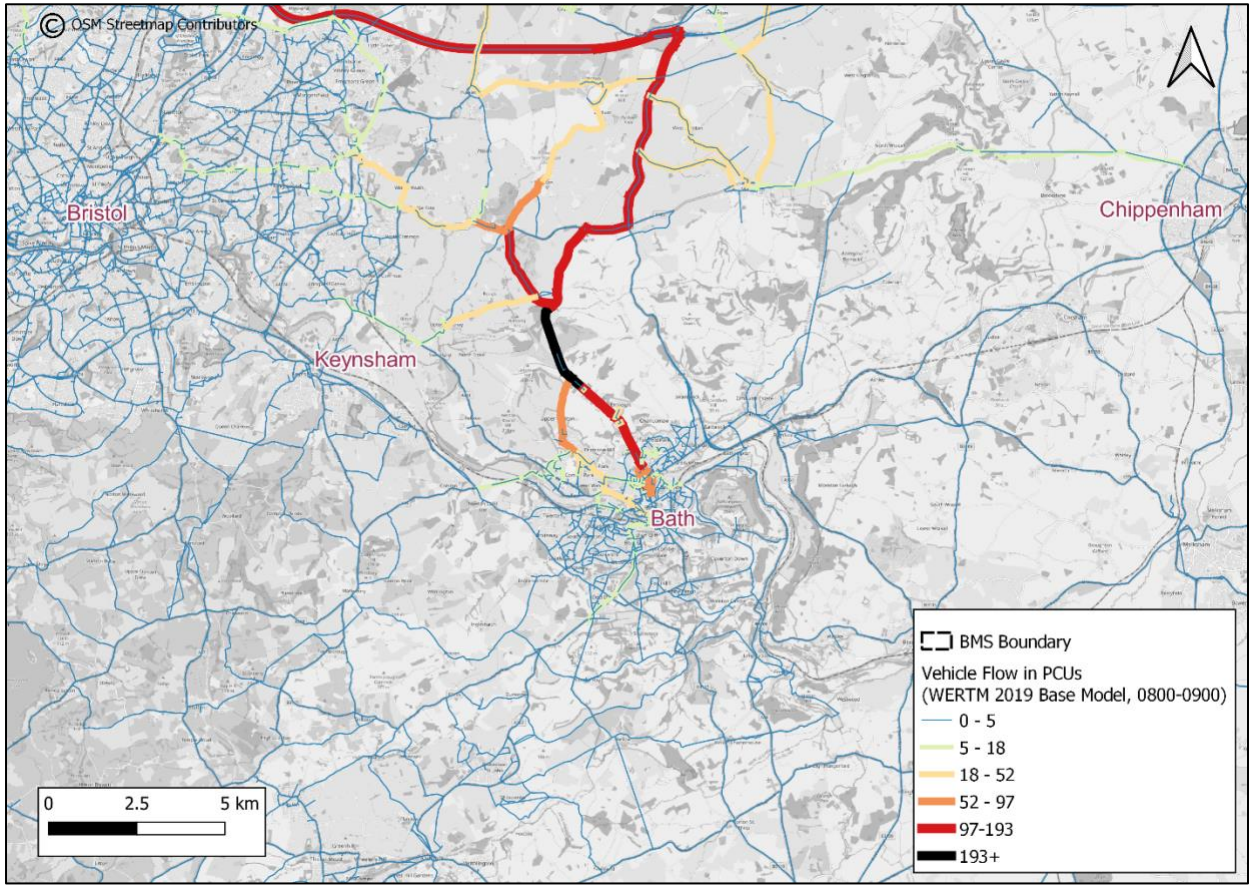


Figure A4-5 Lansdown Road SLA vehicle flow, southbound, AM, WERTM (2019)

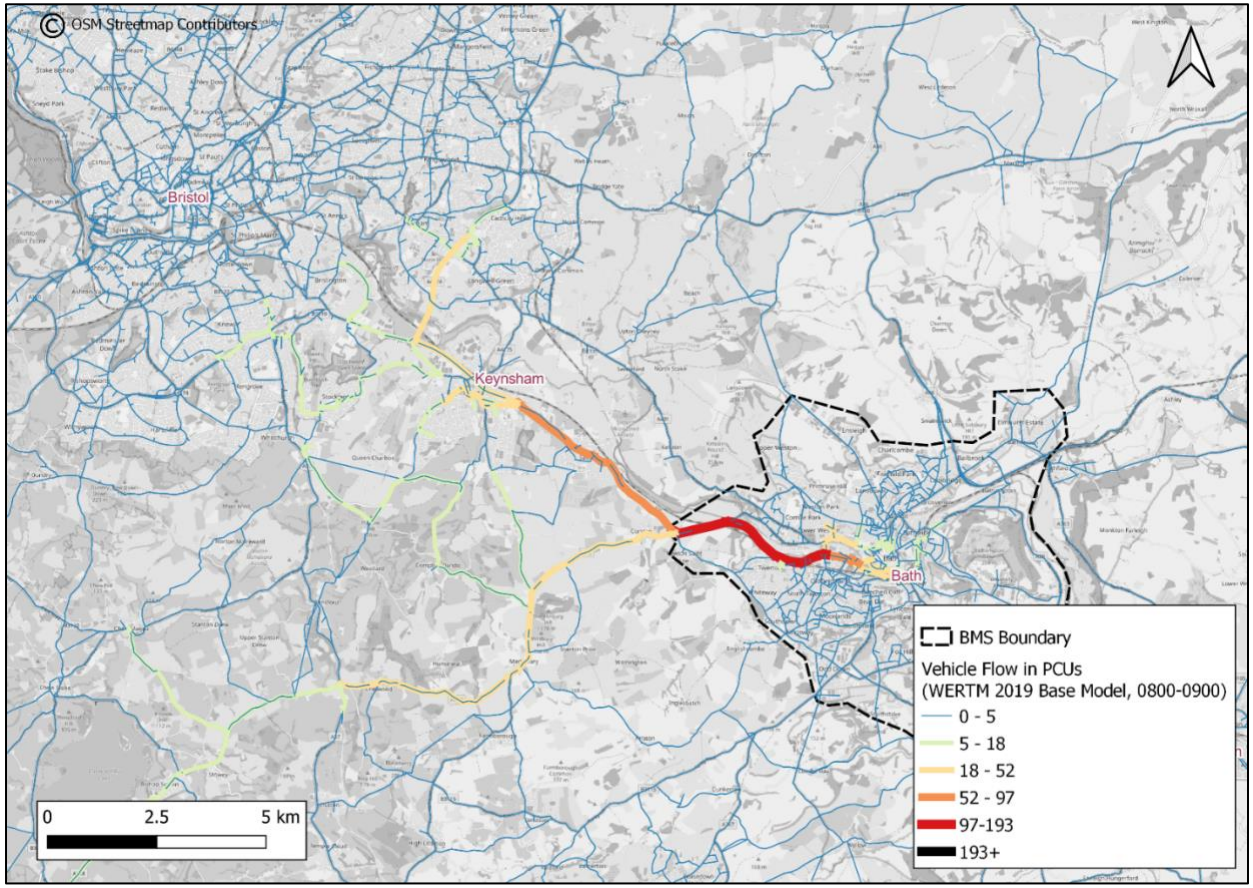


Lansdown Road is the main route into the city from the north. It is also served by the Lansdown Park & Ride site, just north of the edge of the built-up area.

Figure A4-5 shows that Lansdown Road and Lansdown Lane experience high car demand and traffic for trips into Bath. Most journeys using Lansdown Road originate from West and North Bristol, Yate and the East Fringe of Bristol. There are also multiple journeys travelling from as far north as Tewkesbury, and as far west as Cardiff and Newport.

The model indicates that there are relatively low flows of traffic from the east (e.g. Swindon and beyond). There are some moderate flows from Chippenham, suggesting that trips from Swindon use the A420 and roads through Wiltshire to travel to Bath.

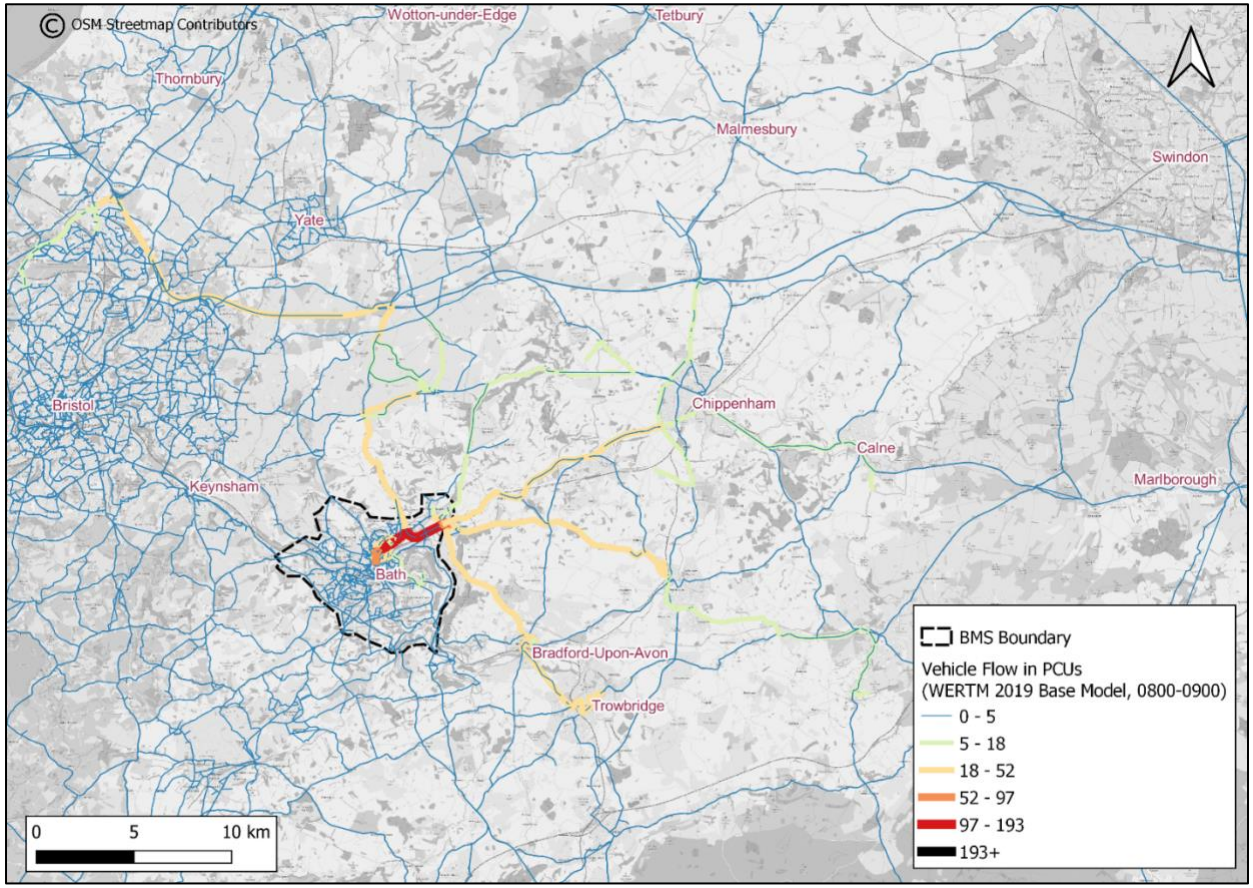
Figure A4-6 A36 Lower Bristol Road SLA vehicle flow, eastbound, AM, WERTM (2019)



The A36 Lower Bristol Road links Bath with places to the west, including South Bristol and Keynsham.

Figure A4-6 shows that Lower Bristol Road experiences high car demand and traffic for trips into Bath. The most popular journeys using Lower Bristol Road originate from the eastern suburbs of Bristol, Keynsham and rural areas of Bath & North East Somerset District.

Figure A4-7 A4 London Road SLA vehicle flow, westbound, AM, WERTM (2019)

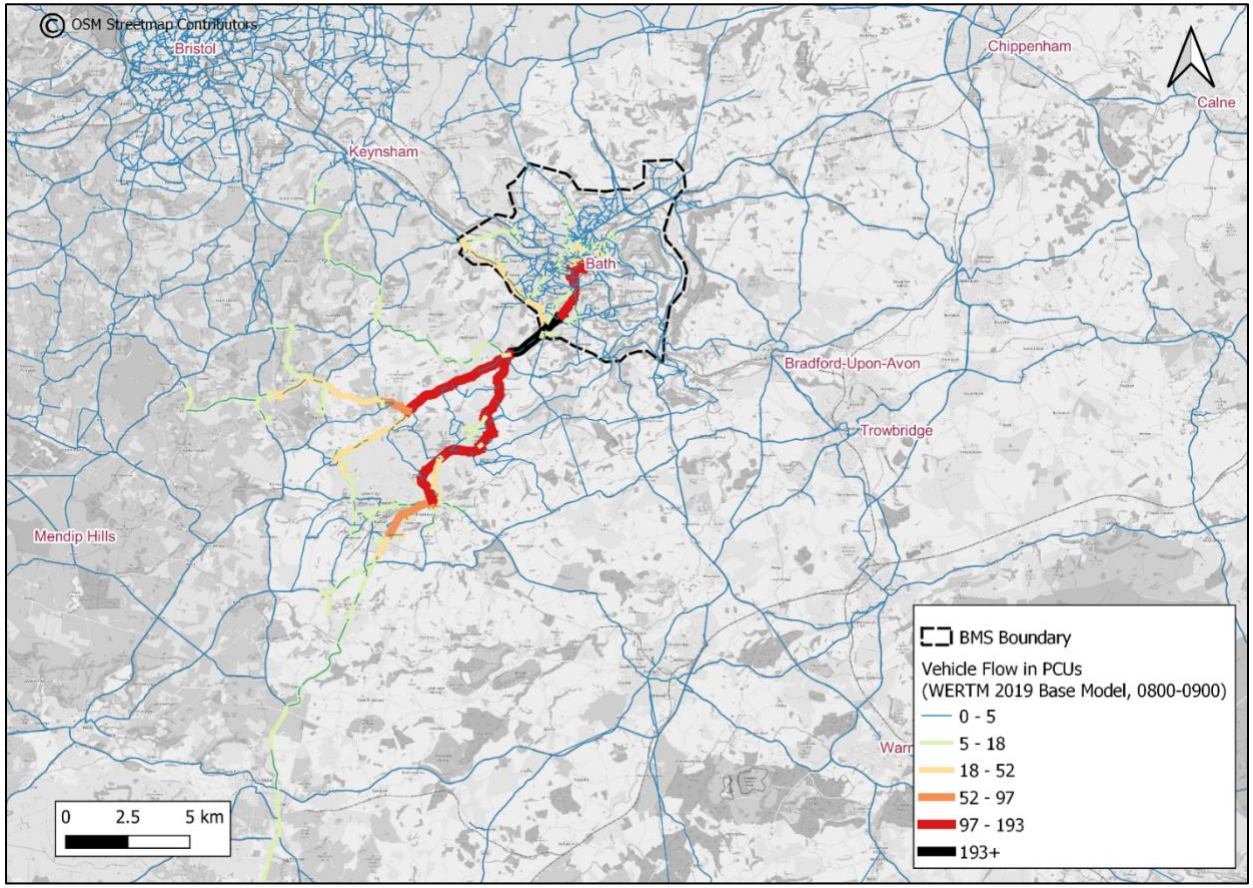


The A4 London Road links the city centre with places to the north, east and south east of the city.

The SLA shows that the A4 experiences high car demand and traffic for trips into Bath. The most popular journeys originate from Trowbridge, Bradford-on-Avon, Chippenham and North Bristol. Trips originating from North Bristol are likely to use M4 Junction 18 and A46 to travel to the east side of the city.

Figure A4-7 shows that London Road caters for trips from the south east (A363 from Trowbridge and Bradford-on-Avon), east (A4 from Chippenham, Bathford Hill and A365 from Melksham), and north (A46 from Tormarton).

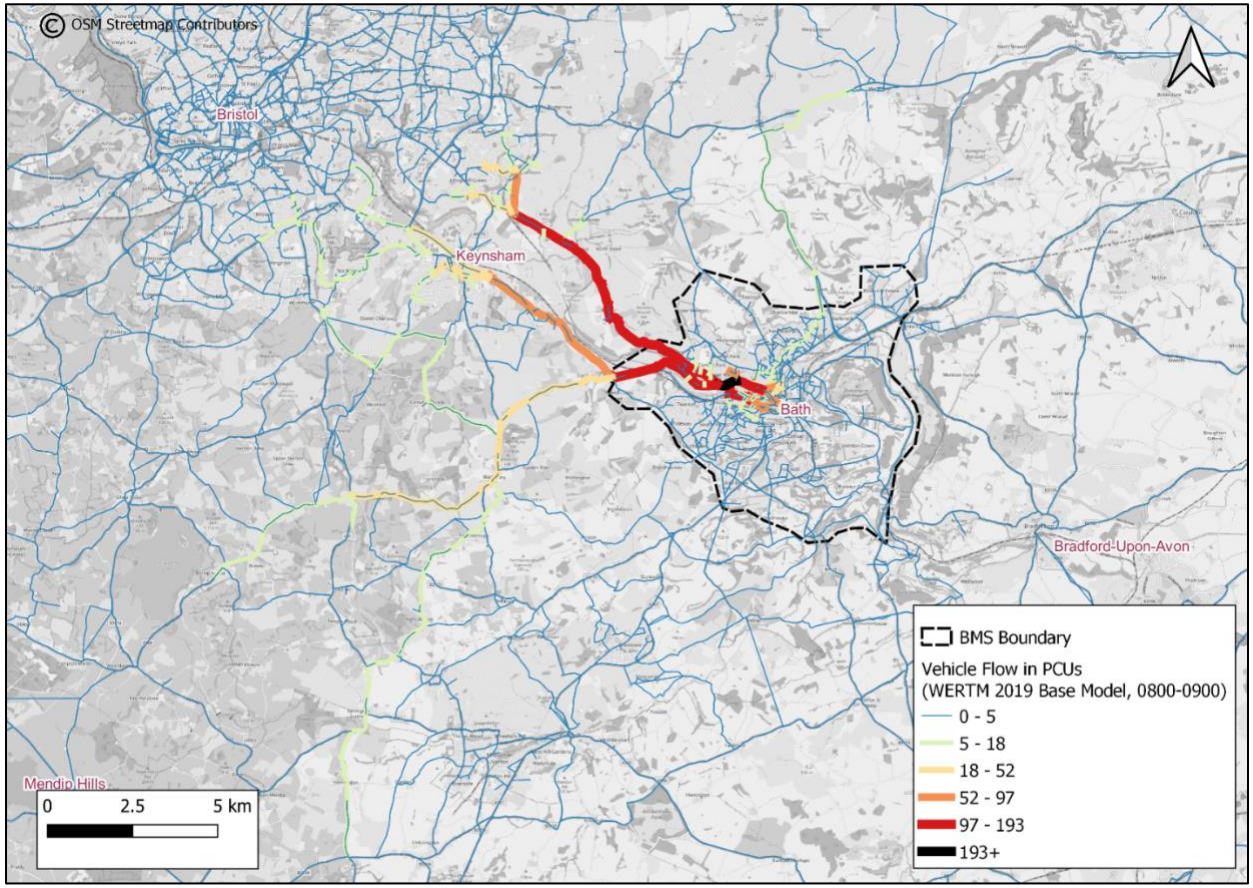
Figure A4-8 A367 Wellsway SLA vehicle flow, northbound, AM, WERTM (2019)



The A367 Wellsway connects to places including Radstock, Midsomer Norton, Shepton Mallet, and rural areas of North East Somerset.

Figure A4-8 shows that Wellsway experiences high car demand and traffic for trips into Bath. Wellsway caters for journeys from Radstock, Midsomer Norton, Paulton and the Mendips, together with longer-distance trips from Taunton and South Somerset.

Figure A4-9 Newbridge Road and Newbridge Hill, SLA vehicle flow, eastbound, AM, WERTM (2019)



Newbridge Road and Newbridge Hill (at the junction of the A4 and A431) connect to places to the west, including Keynsham, Oldland Common, and East Bristol.

Figure A4-9 shows that Newbridge Road and Newbridge Hill experiences high car demand and traffic for trips into Bath. The most popular origins include Oldland Common (via the A431 Kelston Road), Keynsham and Brislington (via the A4), and Marksbury (via the A39).

4.3 Lens 3: Trips through Bath

The third lens of analysis focuses on through trips. These are trips with origins and destinations both being outside of the city but are likely to use Bath's transport network for part of their journey.

4.3.1 Flows and mode choice

The breakdown of these trips by mode shows a high reliance on car trips (85%) (Table A4-4), with ~15% of trips taking place by public transport. Cycling and walking each have negligible mode shares, which is expected given the longer-distance journeys for through-trips.

Table A4-4 Modal breakdown of daily through trips (WERTM, 2019)

Mode	Daily trips through Bath	Proportion
Car	58,821	85%
Cycle	170	<1%
Public transport	9,845	14%
Walk	257	<1%
All modes	69,093	100%

Percentages are rounded to the nearest integer value.

4.3.2 Select Link Analysis

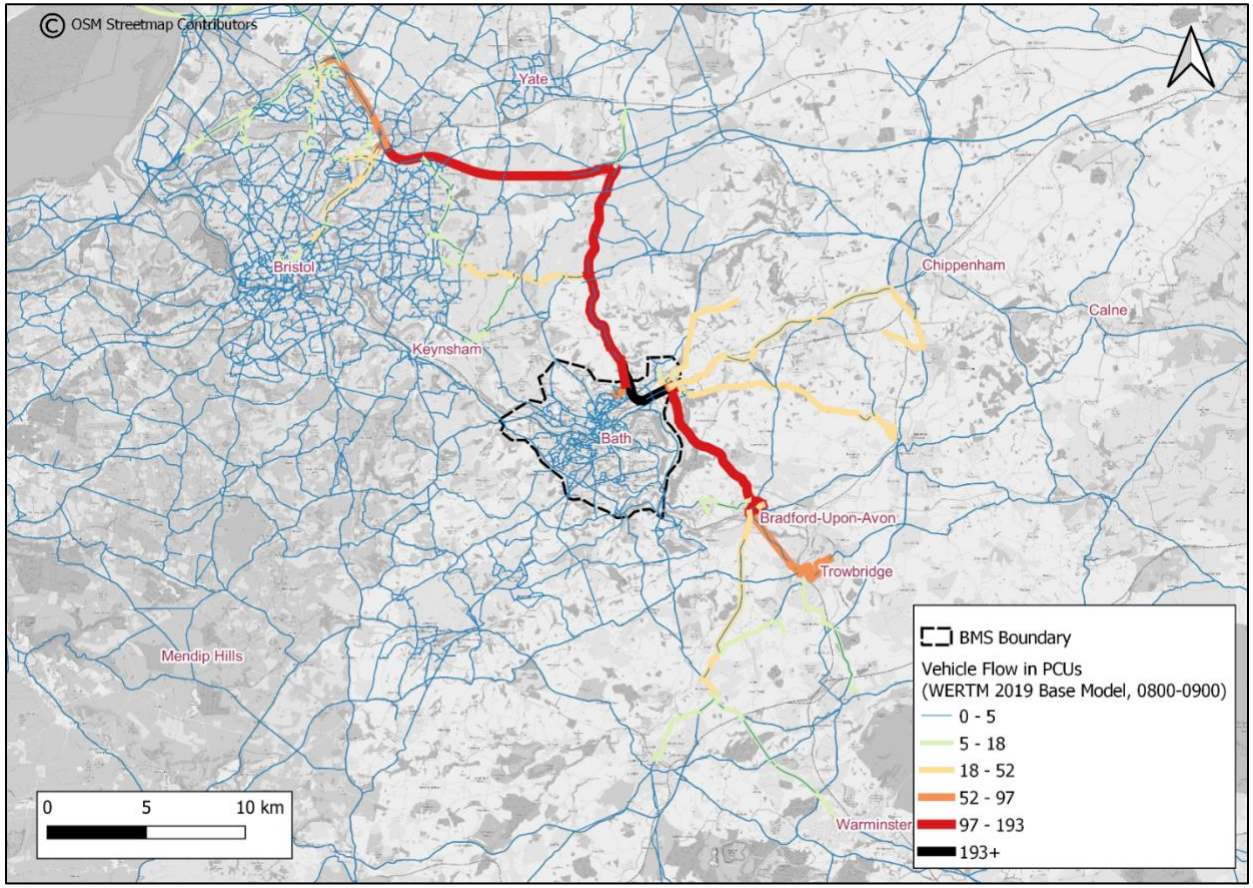
The description and explanation of SLA, as well as the points chosen for analysis, are shown above. This section focuses on the SLA locations that show evidence of trips travelling through Bath. Section 4.2 highlights that there is limited east-west traffic through Bath, for example, Lansdown Road is not commonly used for through trips from the A4 to the M4. This is due to the availability of alternative routes e.g. A420 Chippenham to East Bristol to the north of Bath, and the route from Newton St Loe to Midford to the south of the city.

However, there are limited alternatives to the A36 and A46 for north-south traffic to bypass the city. The M4 to Dorset Coast Connectivity Study highlights that the A36 through Bath is a key route between the Dorset Coast and the M4[20]. The analyses in the section are therefore focused on the routes providing north-south connectivity through the city:

- A46 Batheaston bypass;
- A36 Warminster Road; and
- Toll Bridge Road.

[20] mgConvert2PDF.aspx (wiltshire.gov.uk)

Figure A4-10 A46 Batheaston bypass SLA vehicle flow, northbound, AM, WERTM (2019)



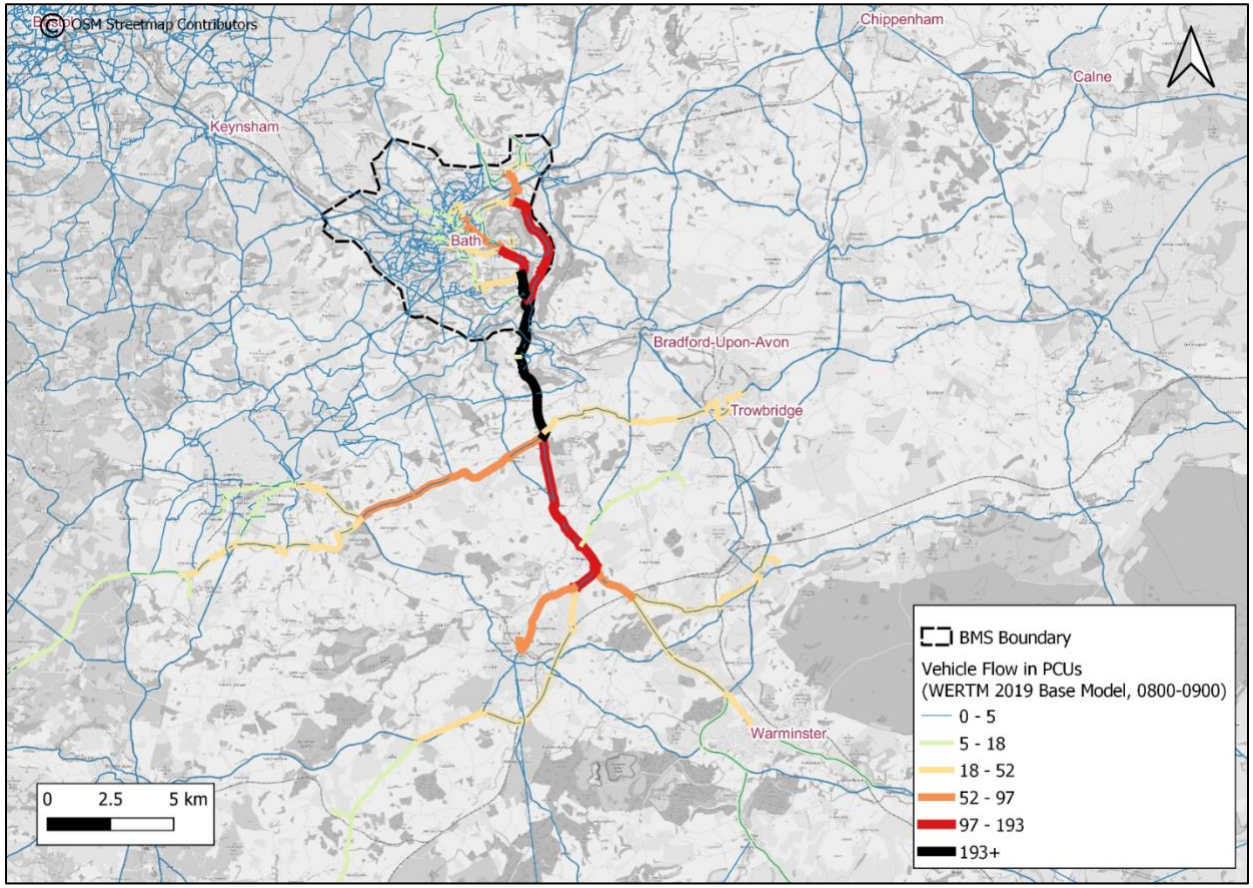
The A46 Batheaston bypass is the main road connection between Bath and the M4. It therefore plays an important role in connecting the city with the rest of the country. It also connects Wiltshire to the north, via the A363 from Trowbridge, and A36 from Warminster.

Figure A4-10 presents the origins and destinations of trips using the A46 northbound to travel through Bath. It shows significant numbers of trips from Trowbridge, Bradford-on-Avon, Wingfield and Rode (via the A363), A4 from Chippenham, A365 from Melksham, and Colerne.

Bristol and its North Fringe are by far the most popular destinations, using the M4 at Junction 18 (Tormarton), although some trips use the A420 to reach East Bristol.

The A46 Batheaston bypass therefore experiences high car demand and traffic for trips through the study area.

Figure A4-11 A36 Warminster Road SLA vehicle flow, northbound, AM, WERTM (2019)



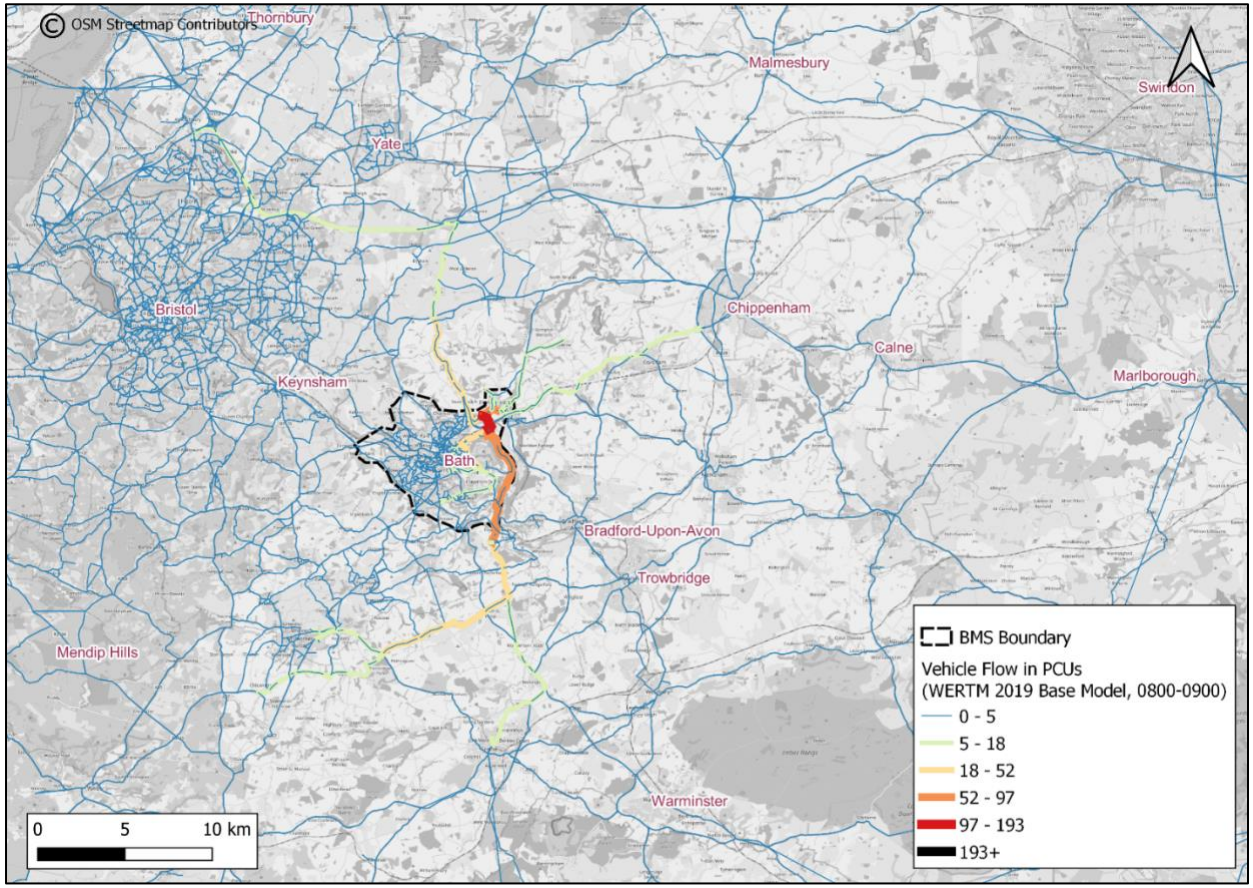
The A36 Warminster Road connects the city to the south east, including Frome, Warminster and Salisbury.

Figure A4-11 shows large numbers of trips from Radstock (via the A366), Frome and Nunney (via the A361), Trowbridge, Westbury and Warminster. There is also a small amount of longer-distance traffic from the Wylye Valley, Shaftesbury and beyond.

Most of the traffic using this route is heading towards the city centre or the University area around Claverton Down. There is also a modest amount of through-movement towards the north via Toll Bridge Road.

The southern section of the A36 Warminster Road therefore experiences modest car demand and traffic for trips through the city.

Figure A4-12 Toll Bridge Road SLA vehicle flow, westbound, AM, WERTM (2019)



Toll Bridge Road is a minor road, providing a river crossing to the east of the city. Despite the narrow bridge crossing (and payment of a £1 toll), the route is very popular for traffic between the north and south of the city.

Figure A4-12 shows a strong demand for travel from the A36 corridor (with traffic passing through the narrow High Street in Bathampton), towards the A4 and A46, with trips dispersing beyond the A46/A420 Cold Ashton Roundabout.

Toll Bridge Road therefore experiences high car demand and traffic for trips through the city, particularly when considering the minor status of the road.

4.4 Summary of causes

This chapter highlights two key causes for the transport issues presented in Chapter 2. These causes are:

- High car demand and traffic, especially for journeys into and through the city.
- Multiple competing travel demands (leisure, work, using local services e.g., hospitals and universities) and journey lengths (short trips within the city and longer trips into and through the city).

These causes result in the following transport issues:

- **Issue 1 – Congestion and delays for road users:** high and competing car demands and journey lengths constrain the network and cause congestion and delays for all traffic.
- **Issue 2 – Reliability and punctuality issues for bus services:** high vehicular traffic demands cause congestion and delays to bus services, impacting on their reliability and punctuality.
- **Issue 3 – Lack of high quality alternatives to car trips:** the delays to bus services reduce their attractiveness to potential users, and high traffic volumes also reduce the perceived safety and attractiveness of walking and cycling.
- **Issue 4 – Conditions for walk, wheel, and cycle are constrained by physical characteristics:** topographical constraints are a further constraint to the perceived viability of walking and cycling in some parts of the city.
- **Issue 5 – Safety, air quality and noise impacting the quality and continuity of the public realm:** high traffic volumes are impacting of perceived safety, air quality and noise across the city, with degraded public realm.
- **Issue 6 – High carbon emissions from transport in Bath:** resulting from high levels of demand for car travel for journeys within, to, from and through the city.

To further understand these causes, the root causes of the high levels of car demand are explored in the following chapter.

5. Factors influencing Bath's transport demand

Chapter 4 introduced the causes of Bath's transport issues, using destination analysis and Select Link Analysis to build detailed insights into the origins and destinations of traffic in the city. This vehicular flow data includes cars and other vehicle types, including light and heavy goods vehicles. Analysis of DfT Traffic Count data shows that HGVs typically make up ~3% of the vehicular traffic within Bath. In contrast, cars comprise a far more significant proportion of ~80%. This chapter therefore focuses on the factors influencing car demand for trips using Bath's road network.

5.1 Car parking availability

Bath contains several publicly available, off-street car parks within the centre, which are a mix of publicly and privately owned, long and short stay. There is high car park utilisation at peak times (80%+ capacity filled between 2pm and 5pm). Despite there being periods of high utilisation, overall, Bath car parks tend to operate at around 60% capacity, and at most times the availability of parking is not a restraint on car use.

Recent assessment of the total parking supply indicates that there is a total supply of approximately 19,000 spaces across the city, including B&NES-operated car parks, residential parking and privately-operated off-street parking, and the three Park & Ride sites.

Half of the available off-street parking locations in Bath have a maximum stay of up to 4 hours (1 or 2 hours on Claverton Street). This availability acts to stimulate trips for shorter stays within the city centre (e.g. for shopping or other leisure activities). In contrast, the remaining off-street parking locations have allowances for parking for over 6 hours. This availability acts to stimulate longer stay commuter traffic into the city centre.

Furthermore, Bath's off-street parking charges are lower when compared to other UK cities such as Oxford and Cambridge. These timing and pricing factors add to the availability of car parking within Bath, influencing demand for car travel for different travel purposes on Bath's road network.

Additionally, Bath does not have a ULEZ (Ultra Low Emission Zone) or CCZ (Congestion Charging Zone) and Bath's CAZ is class C, meaning that private, uncompliant cars are not charged for entering the Bath zone. The lack of restraints to private cars entering Bath combines with car parking availability to increase Bath's car demand.

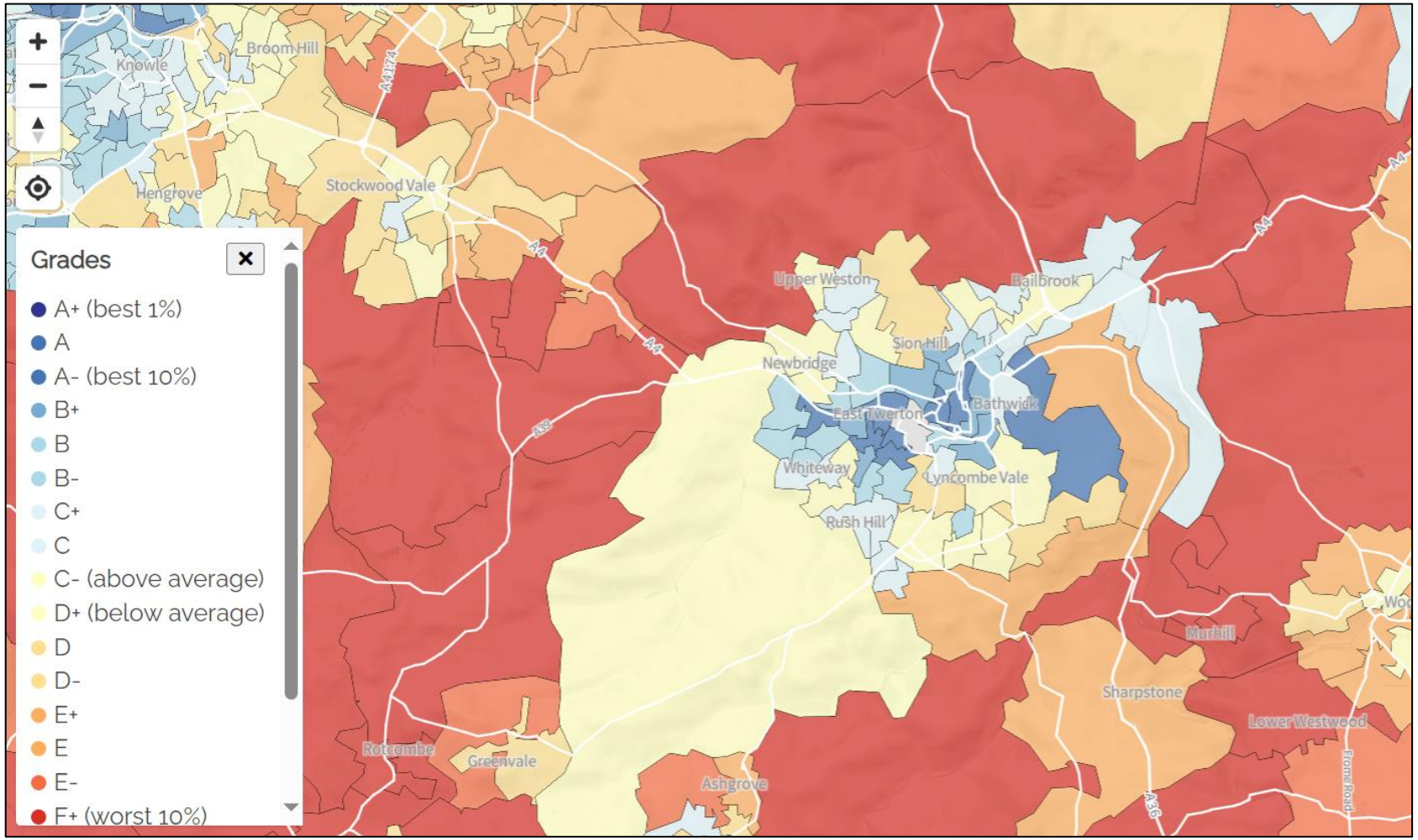
Further detail on parking supply in the city is provided in Appendix B.

5.2 Car availability

Figure A5-1 shows that, generally, there are more cars per person as distance increases from the city centre. Overall, most of Bath's households have a car. This is further supported by 80.1% of households in B&NES having cars or vans, greater than the national average of 76.5%[21]. Ownership of a car is a key factor in driving car use; the 'sunk' costs of car ownership, including depreciation, insurance and servicing, and the low relative costs of driving, mean that driving is often a more attractive choice than active travel or using public transport.

[21] Strategic Evidence Base – B&NES, 2022

Figure A5-1 Number of cars per person grade (A+ = less cars per person, F- = more cars per person) (PBCC, 2021)[22]



[22] Morgan, Malcolm, Anable, Jillian, & Lucas, Karen. (2021). A place-based carbon calculator for England. Presented at the 29th Annual GIS Research UK Conference (GISRUK), Cardiff, Wales, UK (Online): Zenodo. **http://doi.org/10.5281/zenodo.4665852**

5.3 Attractiveness of car journeys

A journey time comparison has been undertaken using TravelWest and Google Maps journey planners. The comparison looks at the difference in journey times using cars, bus, cycling or walking for travelling from the city centre to five key destinations. Table A5-1 presents the results.

Table A5-1 Journey time comparison (Google Maps journey planner and Travelwest journey planner, 2023)[23]

Journey	Time	Car	Walk	Bus	Cycle	Diff
Bath city centre to University of Bath	Tues AM	11.5	42	21	23	+11.5 - 30 mins
Bath city centre to University of Bath	Sat PM	14	42	25	23	+9 - 27 mins
Bath city centre to St Martin's Hospital	Tues AM	9.5	51	21	24	+14.5 - 42 mins
Bath city centre to St Martin's Hospital	Sat PM	11	51	21	24	+13 - 40 mins
Bath city centre to Bath Spa Newton Park	Tues AM	14	98	20	28	+14 - 84 mins
Bath city centre to Bath Spa Newton Park	Sat PM	14	98	30	28	+14 - 84 mins
Bath city centre to Brassmill Lane Trading Estate	Tues AM	10	43	15	11	+1 - 33 mins
Bath city centre to Brassmill Lane Trading Estate	Sat PM	10	43	15	11	+1 - 33 mins
Bath city centre to Royal United Hospital	Tues AM	13	37	19	14	+1 - 24 mins
Bath city centre to Royal United Hospital	Sat PM	13	37	18	14	+1 - 24 mins

Note: cycling journey times are based on uphill journeys. Downhill journey times would be faster.

The assumptions used within the journey time comparison include:

- The Tuesday AM time is based on departing after 8:00am on Tuesday 14th November 2023. The Saturday PM time is based on departing after 13:00 on Saturday 18th November 2023.[24]
- The location used in Bath city centre is 41 Stall Street. The location used at each destination is the top result on the Travelwest journey planner when the full destination name is typed in. This is a highly

[23] It is worth noting that micro mobility solutions, e.g. Tier (and the previous operator Voi), are well used in Bath as a modal choice. These modes are likely to provide journey times in between walking and cycling.

[24] These are both neutral time periods as detailed in TAG Unit M1.2 - Data Sources and Surveys (publishing.service.gov.uk)

accessible location by bus, it is worth noting that other locations, with lower accessibility, would give further advantage to the car.

- Google Maps provides a typical range of how long journeys take by car. The median of this range has been used.
- No wait time has been assumed at the bus stop.

Based on these indicative travel times, car is a more attractive option compared to using the bus, cycling or walking. The greatest differences between bus and car journey times are for journeys from Bath city centre to St Martin's Hospital, demonstrating the poor bus punctuality to the south of the city centre (Section 3.4.2). Cars are also currently given higher priority on the city's road network.

5.4 Summary of factors

This chapter has highlighted three key factors that influence the causes of Bath's transport issues presented in Chapter 3. These factors are:

- High car availability, especially outside of the city centre;
- Car parking availability within the city and the lack of restraints for cars entering the city; and
- The car is the most attractive and convenient option for travel as the city's streets have been adapted to current travel demands with car priority at the forefront.

These factors act to increase car demand within Bath's constrained transport network. A full summary of the issues, causes and influencing factors of demand on Bath's transport network is shown in Figure A5-2.

The following chapter will explore how Bath's transport network has been defined to inform the development of the Movement Strategy.

Figure A5-2 Summary of the issues, causes and influencing factors of demand on Bath's transport network

Existing issues for Bath's transport network	Causes of issues on Bath's transport network	Factors influencing demand on Bath's transport network
Issue 1 – Congestion and delays for road users.	High car demand and traffic, especially for journeys into and through the city.	High car availability, especially outside of the city centre.
Issue 2 – Reliability and punctuality issues for bus services.		
Issue 3 – Lack of high-quality alternatives to car trips.		Car parking availability within the city and the lack of restraints for cars entering the city.
Issue 4 – Conditions for walking, wheeling and cycling are constrained by physical characteristics.	Multiple competing travel demands, journey lengths and purposes on a constrained transport network.	
Issue 5 – Safety, air quality and noise impacting the quality and continuity of the public realm.		Car is the most attractive and convenient option as the city's streets have been adapted to current travel demands with car priority at the forefront.
Issue 6 – High levels of carbon emissions from transport in Bath.		

6. Defining Bath's existing network

6.1 Methodology

To define approaches to the Movement Strategy, a network hierarchy has been produced to outline the existing character and function of roads in the city. The methodology used to define the network hierarchy is based on a series of movement and place guiding principles (Figure A6-1), in which roads are assessed based on whether they have a high or low movement function and a high or low place function.

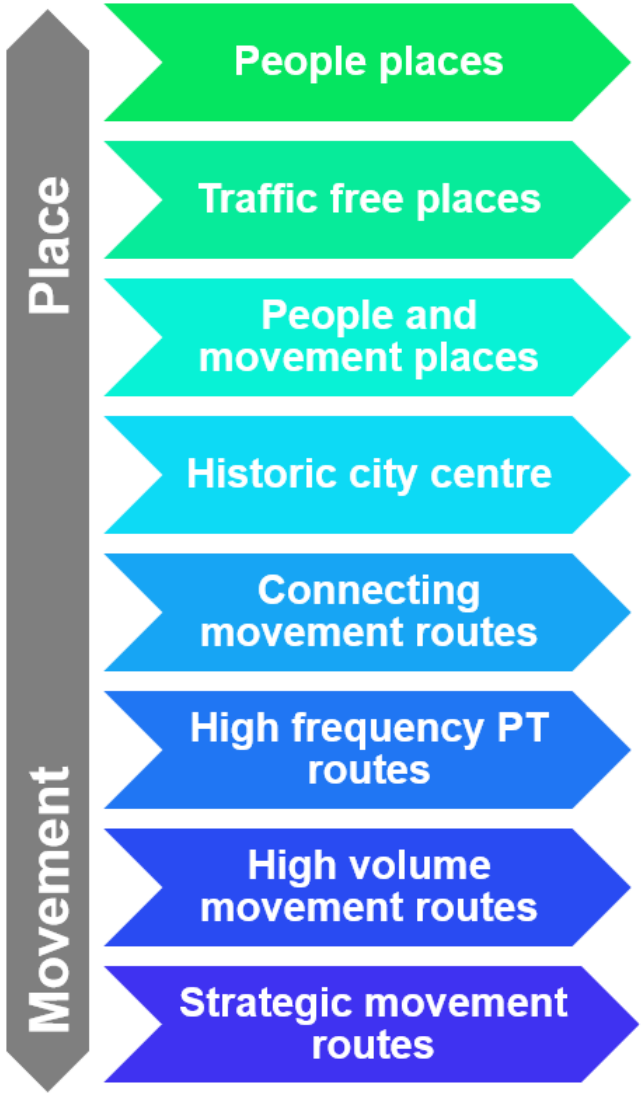
From this, a network hierarchy has been established to define road types based on their place and movement functions (Figure A6-2). The hierarchy establishes eight different road and street types, each containing a typology and a modal hierarchy which outlines which modes are prioritised. Bath's streets have then been classified into these different categories. This approach has used existing, robust data sources, local knowledge and professional judgement, as outlined in Table A6-1.

Figure A6-1 Movement and place guiding principles

Movement ⟷ Place

High movement, low place	High movement, high place	High place, low movement
What is the current hierarchy of modes? What do we want the hierarchy of modes to be?	What is the current hierarchy of modes? What do we want the hierarchy of modes to be?	What space is currently protected for place (footways, rest areas, seating, etc.)? What additional space can be protected?
Are there any existing modal conflicts? How can these be addressed (maximise 'people movement' rather than vehicle movement)?	What space is currently protected for place (footways, rest areas, seating, blue/green infrastructure)? What additional space can be protected?	What modes use the space and is access safe currently? What modes need to retain use of the space?
What other considerations are required? E.g. is there a need to reduce travel speed? A need to reconfigure corridor / reroute or prioritise certain modes/ identify a parallel route?		

Figure A6-2 Existing network hierarchy

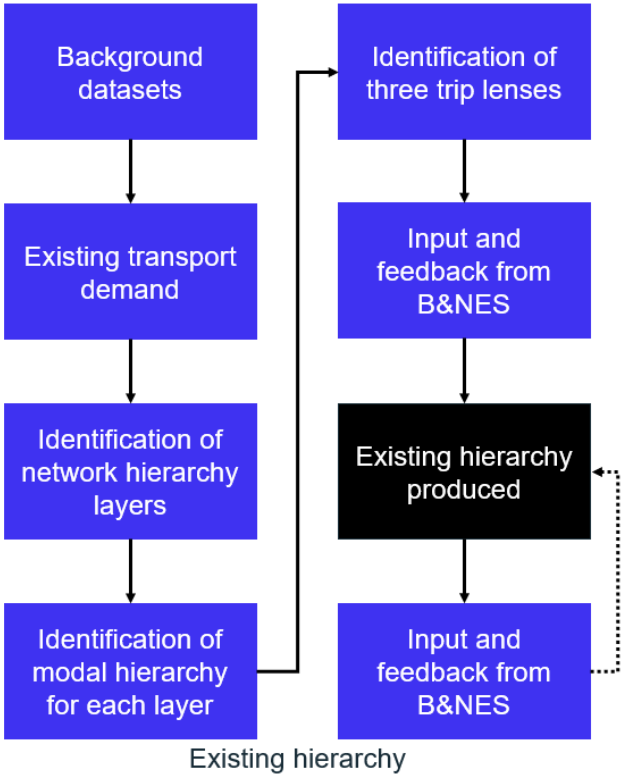


Neighbourhood areas, including residential streets that prioritise active travel	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Car and goods vehicles
Traffic free transport places facilitating active travel connections including along greenways	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes)
Mixed use places that serve the local community	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Car and goods vehicles
Destination people places that also facilitate high volumes of access movements	1. Walking and wheeling 2. Cycling (including e-scooters and cargo bikes) 3. Bus 4. Goods vehicles 5. Car and goods vehicles
Facilitate connecting movements	1. Bus 2. Walking and wheeling 3. Cycling (including e-scooters and cargo bikes) 4. Car and goods vehicles
Facilitate high volume movements, focused on public transport	1. Bus 2. Walking and wheeling 3. Cycling (including e-scooters and cargo bikes) 4. Car and goods vehicles
Facilitate high volume movements, excluding PRN and SRN	1. Car and goods vehicles 2. Rail 3. Bus 4. Cycling (including e-scooters and cargo bikes) 5. Walking and wheeling
Facilitate movement between the local and regional transport network	1. Car and goods vehicles 2. Rail 3. Bus 4. Cycling (including e-scooters and cargo bikes) 5. Walking and wheeling

Table A6-1 Methodology used to categorise the network hierarchy

Network level	Layer	Definition	Example	Methodology for categorisation
1	People places	Neighbourhood areas, including residential streets that prioritise active travel	e.g., Snow Hill area	Using existing data for land use to identify residential and greenspace areas.
2	Traffic free places	Traffic-free transport places facilitating active travel connections including along greenways	e.g., Bath River Line	Using data for existing greenways e.g., Bristol-Bath railway path.
3	People and movement places	Mixed-use places that serve the local community	e.g., Moorland Road	Using existing data for land use to focus on retail/mixed use areas that are not in the city centre.
4	Historic city centre	Destination people places that also facilitate high volumes of access movements	e.g., Union Street	Using existing LSOA boundaries and local knowledge to define Bath's historic city centre.
5	Connecting movement routes	Facilitate connecting movements	e.g., Lansdown Lane	Using local knowledge to identify connecting links and potential cut-throughs between other network levels.
6	High frequency PT routes	Facilitate high volume movements, focused on public transport	e.g., A4 London Road	Using existing bus route frequency data to identify high frequency routes.
7	High volume movement Routes	Facilitate high volume movement routes, excluding the PRN	e.g., Lansdown Road	Using WERTM model base year flows as a sense check in combination with local knowledge.
8	Strategic movement routes	Facilitate movement between the local and regional transport network	e.g., A367 Wellsway	Using WERTM model base year flows as a sense check in combination with local knowledge.

Figure A6-3 Summary of methodology to categorise existing network hierarchy



The methodology outlined in Figure A6-3 was used as the basis to define the existing network at this initial high-level stage, which has been refined further as the Movement Strategy has been developed.

6.2 Existing network

Figure A6-4 presents the existing network hierarchy.

The A4 London Road, A36 Lower Bristol Road and A36 Warminster Road are currently 'Strategic Movement Routes'. These form part of the Primary Route Network (PRN), and therefore form important components of the regional road network; DfT expects that these roads will be maintained in good order for all classes of vehicle traffic.

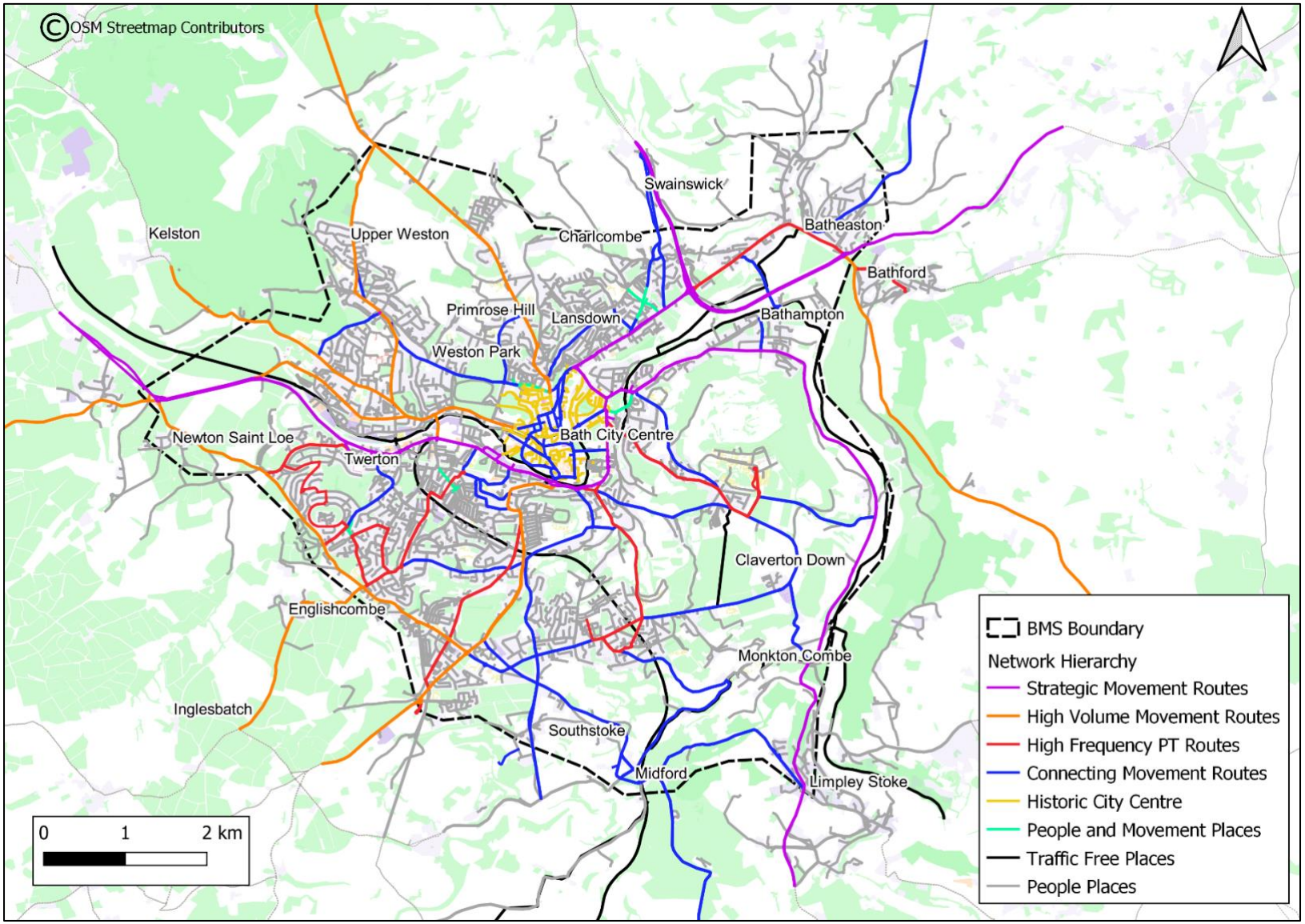
Parts of Bath's network form elements of the Key Route Network (KRN). The KRN covers a collection of locally important routes connecting the West of England, crossing local authority boundaries. KRN routes include A367 Wellsway, A36 Lower Bristol Road, Upper Bristol Road, Newbridge Road, Newbridge Hill and Cleveland Bridge.

The map also shows that:

- Routes through the city centre currently perform a movement function with 'connecting movement routes'.
- There are 'high volume movement routes', despite not necessarily being appropriate for the level of traffic e.g., Lansdown Lane.
- There is an existing network of traffic-free places and people places, including the Bristol-Bath railway path.
- High frequency public transport routes serve residential neighbourhoods in Bath, while other bus routes sit within the strategic movement routes and high volume movement routes, contending with vehicular traffic.

This understanding of the existing network hierarchy provides a platform to understand the opportunities and challenges in modifying the city's transport network. The vision set out in Chapter 1, which seeks ambitious decarbonisation through modal shift and reduced travel demand, sets the rationale for changes to the existing network. Furthermore, the understanding of travel modes and volumes, congestion, bus punctuality and environmental challenges (Chapter 3) provides evidence to inform options for making changes to the network hierarchy.

Figure A6-4 Existing network hierarchy

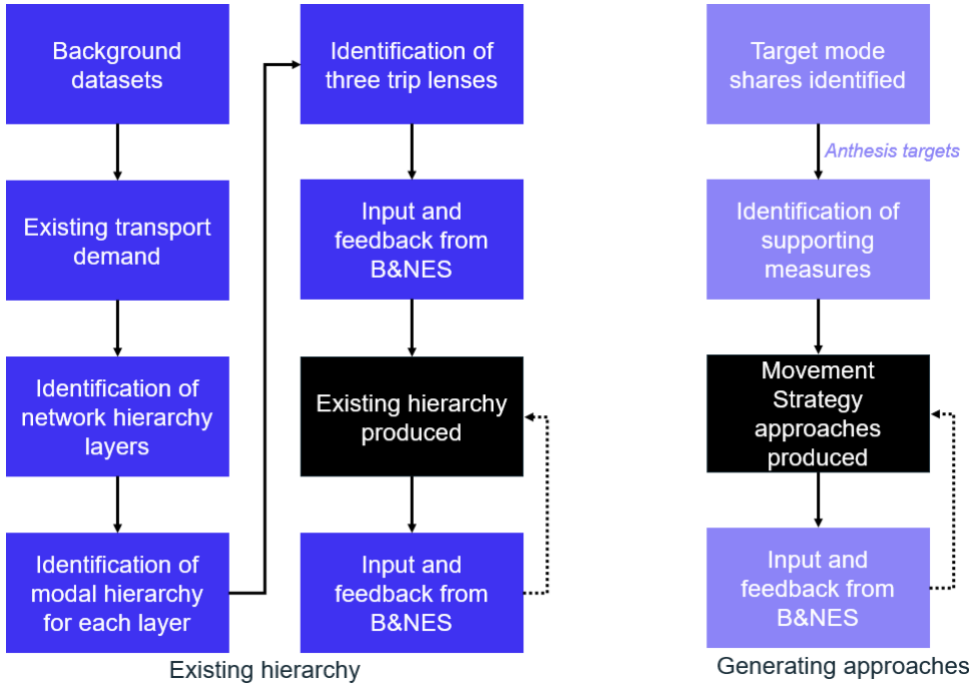


7. Strategy approaches

7. Strategy approaches

This chapter presents and assesses three strategy lenses, which all seek to achieve the vision and objectives of both this strategy and the wider Journey to Net Zero and TAP. The outcome of this chapter is to produce a re-imagined network hierarchy for the city relating to each of the three lenses along with a package of supporting measures. Approaches (one for each lens) have been generated following internal workshops and discussions with B&NES officers in an iterative process, which is outlined in Figure A7-1.

Figure A7-1 Methodology for generating the approaches



Targets have been identified to inform the generation of strategy approaches. Analyses and forecasting undertaken by Anthesis[25] for B&NES, documented in Journey to Net Zero, has resulted in a target for a 25% reduction in vehicle kilometres travelled per person within the B&NES local authority area. This overarching target has therefore been used to help shape the Movement Strategy.

[25] Climate Emergency Study Discussion Pack, September 2019. PowerPoint Presentation (bathnes.gov.uk)

7.1 Illustrative targets to achieve the vision

The existing mode shares for the three trip lenses have been reviewed. Based on the target for a 25% reduction in vehicle kilometres per person and the vision for the Movement Strategy, illustrative target mode shares targets for the Movement Strategy have been identified. These are shown in Table A7-1.

These illustrative targets are intended to frame the ambition of the Movement Strategy. They will be subject to testing and refinement, including transport modelling, as the Movement Strategy progresses.

These illustrative targets reflect the scope for mode shift in relation to the nature of the journey and recognising the different role of each mode for reducing car demand. For example, due to the shorter distances of trips within the city, it is expected there is a greater opportunity to increase walk, cycle and public transport mode shares. For journeys into the city, opportunities to increase mode share by walking and wheeling will be much more limited.

Table A7-1 Framing the Movement Strategy - illustrative mode share targets (% of trips)

		Walk	Cycle	Public transport	Car
Lens 1	Existing	48%	4%	10%	39%
Lens 1	Illustrative target	52%	8%	15%	25%
Lens 1	***% change***	***~10%***	***100%***	***50%***	***-36%***
Lens 2	Existing	1%	1%	19%	79%
Lens 2	Illustrative target	1%	3%	37%	59%
Lens 2	% change	***0%***	***200%***	***~90%***	***-25%***
Lens 3	Existing	0%	0%	14%	85%
Lens 3	Illustrative target	0%	0%	36%	64%
Lens 3	% change	***0%***	***0%***	***~160%***	***-25%***

Within city movements (Lens 1)

There is a strong culture of walking in the city, enabled by the high-quality urban environment and close proximity of local services in many places. However, there are numerous barriers, including narrow footways, pavement parking and traffic severance. These issues also affect wheeling. There is, therefore, scope to tackle these barriers and set a strong signal that walking and wheeling are desirable, particularly for local and shorter journeys. This will also strongly support local community cohesion and help improve the environment in local centres across the city.

There is an ambition to double cycling mode share, especially within the east-west corridor, which benefits from a more level topography. However, there is also scope to increase cycling more widely across the city, including the wider roll-out of e-bikes to help overcome the barriers caused by the hilly terrain in the north and south of the city. Further improvements to cycling infrastructure, including tackling gaps in the existing network, and servicing new corridors, will also play a critical role in enabling mode shift across the city.

Buses will play an important role for journeys where walking and cycling are not an option. This will require a step-change in service provision and quality across the network, to create a product that is attractive for current car users, and to cater for a large increase in demand. This will require expansion of bus priority across the city, to improve journey times, enhance reliability, and support the provision of higher-frequency services.

The proposed reduction in car mode split, from 39% to 25% of journeys in the city, will mean a change in emphasis towards the needs of essential users, for example, people with disabilities or older people with limited mobility. In addition to measures to encourage a shift to walking, cycling and buses, consideration should also be given to measures such as reducing car parking availability and/or increasing pricing, and lower traffic speeds, alongside re-allocating roadspace to other modes.

To/from city movements (Lens 2)

The primary focus of achieving mode shift from car for these journeys will be through a large increase in public transport (bus and rail) mode share, through shifting to public transport for the whole journey or interchange to public transport along the corridors or at edge of the city. Achieving modal shift for these journeys will be critical in reducing carbon emissions in the city and across the authority, as longer-distance journeys generate higher emissions.

Improved bus services will play a key role for journeys to and from the south-east (Bradford-on-Avon), south-west (Midsomer Norton, Radstock), and west of the city (Saltford, Keynsham, Bristol). This can be achieved by prioritising buses over general traffic on key routes to improve reliability, reduce journey times and support the ability to provide higher frequency services.

This will need to be supported by maximising interchange at the edge of the city and providing services to access key destinations, for example to the Royal United Hospital from Lansdown Park & Ride. Park & Ride schemes however, only impact trips into Bath rather than trips heading out of the city.

This should be supported by improved signage and travel information to direct travellers to the improved interchanges serving the city. For example, traffic from the M4 north of the city is signed along the A46 and into the city along the A4 London Road. Whilst signage is currently provided to the Park & Ride site at Lansdown, this could be improved, and a clearer signal given that Park & Ride is the optimal solution for travel into the city from the north.

Rail will play a key role by enabling mode shift on corridors to and from the west (Bristol and Keynsham), south-east (Bradford-on-Avon and Trowbridge) and east (Chippenham). This could be achieved by improving access to railway stations at the start and end of the journey.

In some cases, for journeys on the periphery of the city, there is scope to increase cycling, which could be achieved by prioritising cyclists on appropriate routes and provision of segregated cycle infrastructure where required. E-bikes and e-scooters can also play a role in addressing topographical challenges.

Alongside measures to encourage mode shift to public transport and cycling for journeys into the city, there is a need to address the drivers of car demand for journeys into the city, including car parking availability and pricing, as well as traffic speeds on radial routes.

Through city movements (Lens 3)

This lens has a strong focus on a large shift to public transport (primarily rail) for travel demand that crosses the city. For example, there is scope for a significant mode shift to rail for journeys between West Wiltshire (Westbury, Trowbridge, Bradford-on-Avon) and Bristol. This will require

investment by the rail industry in a wide range of incentives to enable this mode shift, including more reliable, more frequent and cost-effective rail services.

There should also be a strong emphasis on discouraging through-traffic from passing through the city. At present, the evidence indicates that there is limited east-west traffic passing through the city, which can instead use the A420 Chippenham – Kingswood Road north of the city. There is also limited through traffic from Midsomer Norton and Radstock, most of which heads towards the city itself.

The most significant problem is through-traffic from the north (A46) heading towards the A36 corridor and towns and West Wiltshire. Two options are available: the A36 towards Warminster, and A363 through Bradford-on-Avon. There is no direct connection between the A46 and A36, with traffic forced to use Cleveland Bridge or the toll bridge at the eastern edge of the city. The A363 avoids Bath but passes through the centre of Bradford-on-Avon.

The recent closure of Cleveland Bridge to heavy goods vehicles has highlighted the complexity of this challenge, with long-distance traffic diversions and increases in traffic on other parts of the network.

It is recognised by local, regional and national partners that an effective solution is required for this long-standing challenge. National Highways has recently completed the M4 to Dorset Coast Strategic Study, and it is understood that this recommended reclassification of the Strategic Road Network, in which longer-distance traffic would be re-routed onto the A350 corridor to the east.

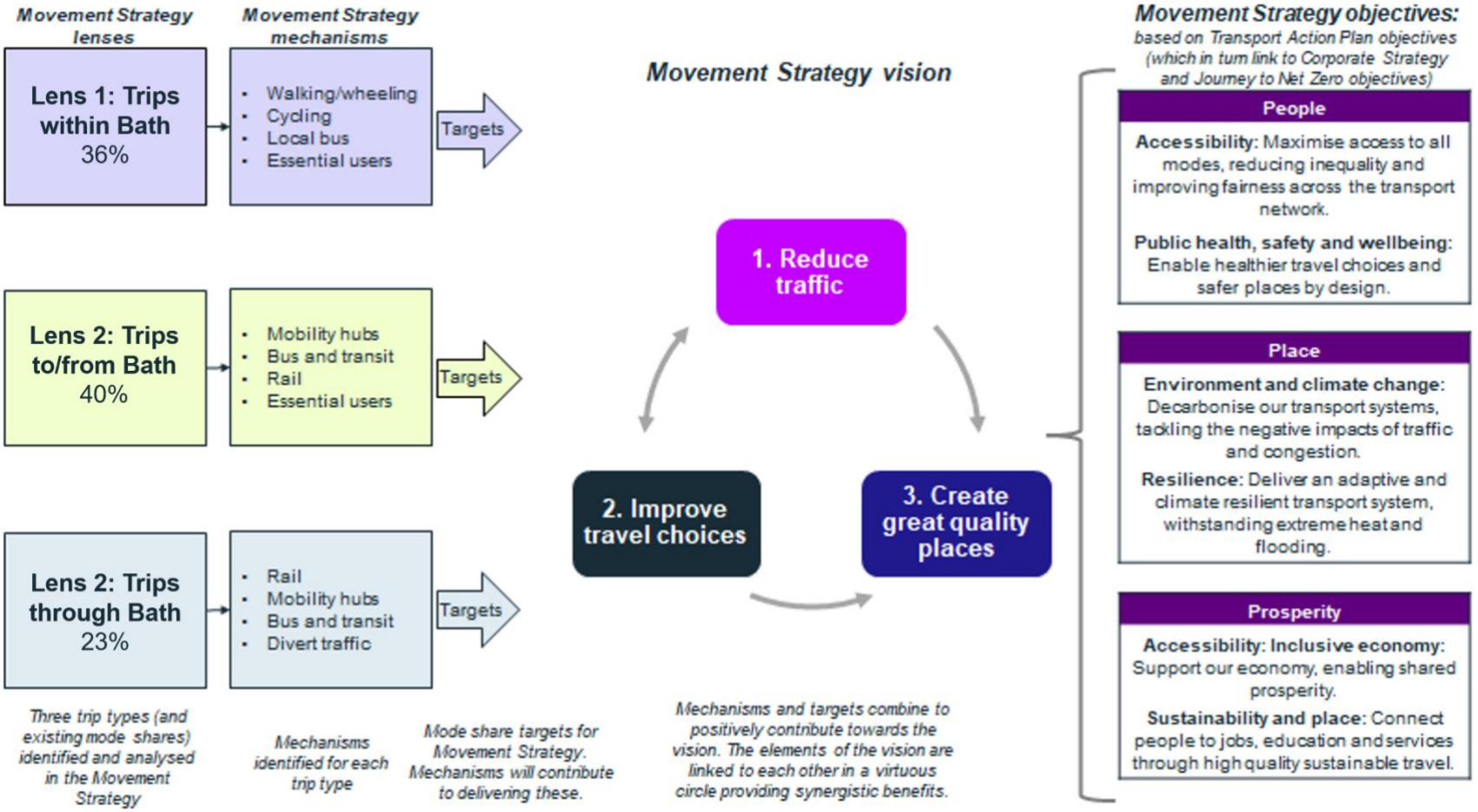
The Movement Strategy recognises that a number of stakeholders will need to come together to deliver these ambitions. B&NES, Bristol, South Gloucestershire and Wiltshire will play a key role in enabling the changes required to influence trips within and into the city. Meanwhile, National Highways, Network Rail and the wider rail industry will need to play proactive roles in addressing the challenges with through trips.

These illustrative targets are intended to frame the ambition of the Movement Strategy, and the following sections outline the approaches to achieving these targets.

7.2 Identifying the approaches

The three lenses that underpin the Movement Strategy, and their associated mechanisms to achieve the modal share targets, will support the vision and objectives. This relationship is shown in Figure A7-2.

Figure A7-2 Generating approaches in alignment with strategy vision and objectives



7.3 Movement Strategy approaches

Following the targets set out in Section 7.1, an approach to achieve the Movement Strategy's vision through each lens has been developed. Each lens is geared towards changing travel demand and meeting its mode shift targets. Enabling measures have been identified that will support meeting the mode shift targets.

- The Lens 1 (trips within Bath) approach seeks to facilitate increased levels of cycling and public transport, and reduced vehicle use for short-distance trips by Bath residents. The approach aims to enable modal shift through measures including liveable neighbourhoods, traffic-calmed streets, improved local public transport and shared mobility. See Figure A7-3.
- The Lens 2 (trips to/from Bath) approach aims to facilitate mode shift from the private car to public transport and cycling for people travelling into Bath. This approach will enable mode shift for these trips through measures including mobility hubs to facilitate interchange from private cars and reduced city centre parking capacity. See Figure A7-4.
- The Lens 3 (trips through Bath) approach seeks to reduce levels of through traffic and ensure that, if journeys are required, they take place using only the most suitable of Bath's roads. Supporting measures include enhanced modal interchange and signage to re-route traffic to other strategic routes beyond Bath. See Figure A7-5.

Each of these approaches includes:

- A reimagined transport network within Bath; and
- A toolkit of measures required to support the delivery of these approaches, shown in Table A7-2.

This toolkit has been developed based on the emerging TAP, the DfT's transport decarbonisation toolkit and successful case studies for encouraging modal shift, for example:

- The city of Bremen has a network of 43 mobility hubs which has been growing since 2003, contributing to taking 6,000 cars off the road network[26].
- In 2018, Amsterdam increased on-street parking pricing and regenerated 1,141 on-street parking spaces into public spaces. Traffic volumes fell 2-3% and on-street parking demand fell by 17%[27].
- The UK's first workplace parking levy in Nottingham contributed to car use dropping by 6.6% between 2010 and 2017, with public transport patronage increasing by 9.6% over the same period.
- After a Canadian council reallocated high street parking as bike lanes or cycle parking for a year, businesses benefited from increased footfall (20% increase), spend (16% increase) and increased frequency of return visits (13% increase)[28].

[26] CoMoUK Collection of mobility hub evidence_Sept 2022 (website-files.com)
[27] Reducing car use through parking policies: an evidence review (climatexchange.org.uk)
[28] Active travel: local authority toolkit - GOV.UK (www.gov.uk)

Table A7-2 Movement Strategy toolkit

Measure	Description	Intended impact	Target trip	Element of vision supported
Mobility hubs / interchanges and link & ride	Spaces designed to improve the public realm and enhance interchange for all by bringing together shared transport with public transport and walking, cycling and wheeling.	Encourage modal shift from the car to public and active transport	To/from	Reduce traffic
Car parking	Reduce on-street and off-street parking supply, demand and availability.	Encourage modal shift from the car to public and active transport	To/from, internal	Reduce traffic
Modal filters (access only)	Road design that prioritises specific modes of travel or vehicles	Reduce through traffic and encourage a sense of place on minor roads.	All	All
20mph city	Reducing vehicular speed limits across the city	Promote a sense of place on minor roads.	All	Create great quality places
Re-allocate roadspace	Convert road space currently used for cars to space which prioritises buses, walking, cycling and wheeling.	Encourage modal shift from the car to active and public transport	To/from, internal	All
Bus priority measures	'Soft' infrastructure measures which aim to encourage bus usage.	Improve bus services reliability and punctuality	To/from, internal	Reduce traffic, improve travel choices
Signage strategy	Overall plan for the routing of vehicular traffic within the city.	Encourage road traffic to use appropriate movement routes	Through	Reduce traffic
Liveable neighbourhoods	Safe, healthy, inclusive and attractive streets that promote walking, cycling and wheeling.	Encourage modal shift from the car to active transport, promote a sense of place.	To/from, internal	All
Access to rail/rail services	Improved access to rail services such as improving walk, cycle, bus access to stations within and beyond B&NES.	Encourage modal shift from the car to public transport	To/from, through	Reduce traffic, improve travel choices

Figure A7-3 Lens 1: Trips within Bath – potential concept approach

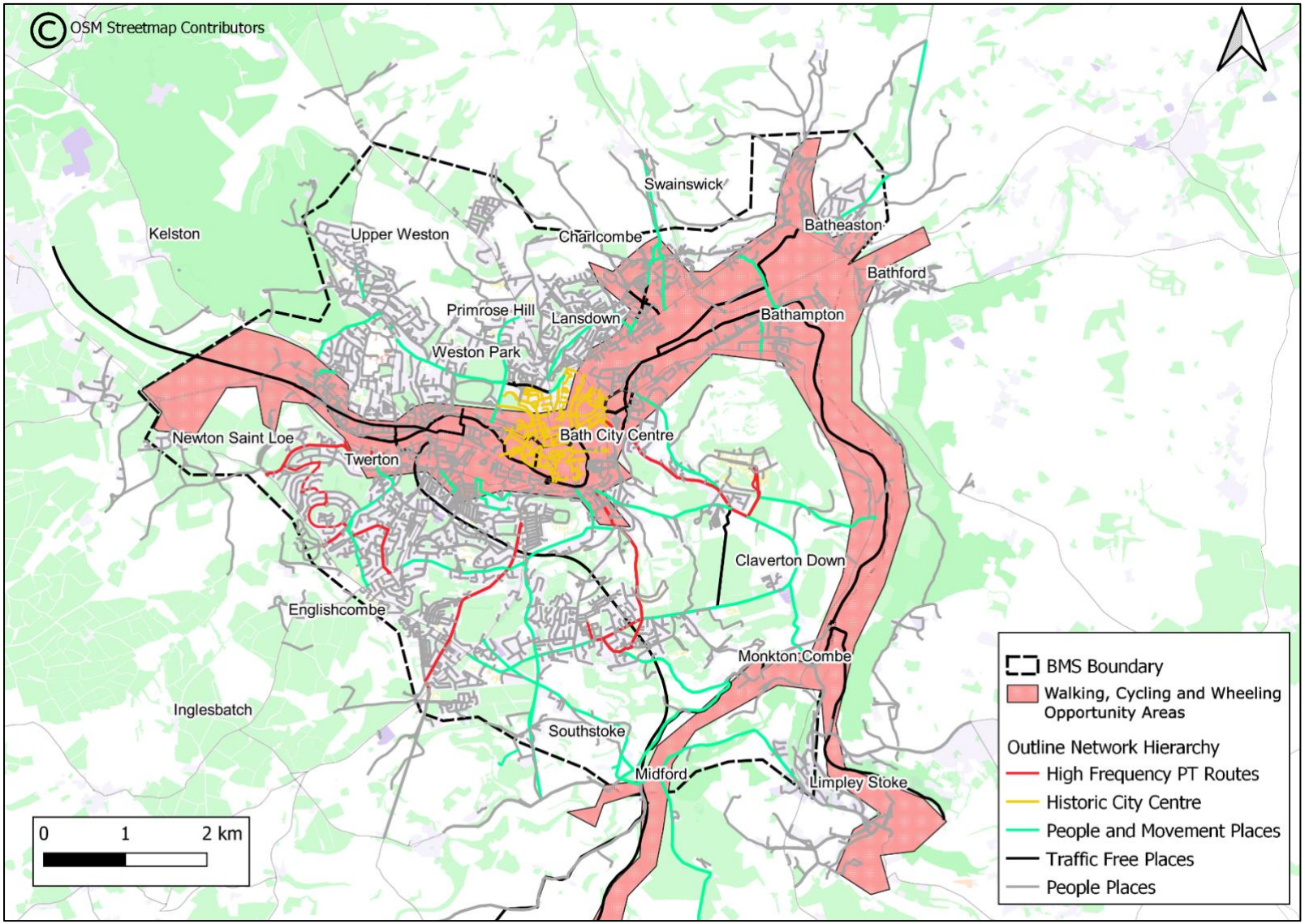


Figure A7-4 Lens 2: Trips to/from Bath – potential concept approach

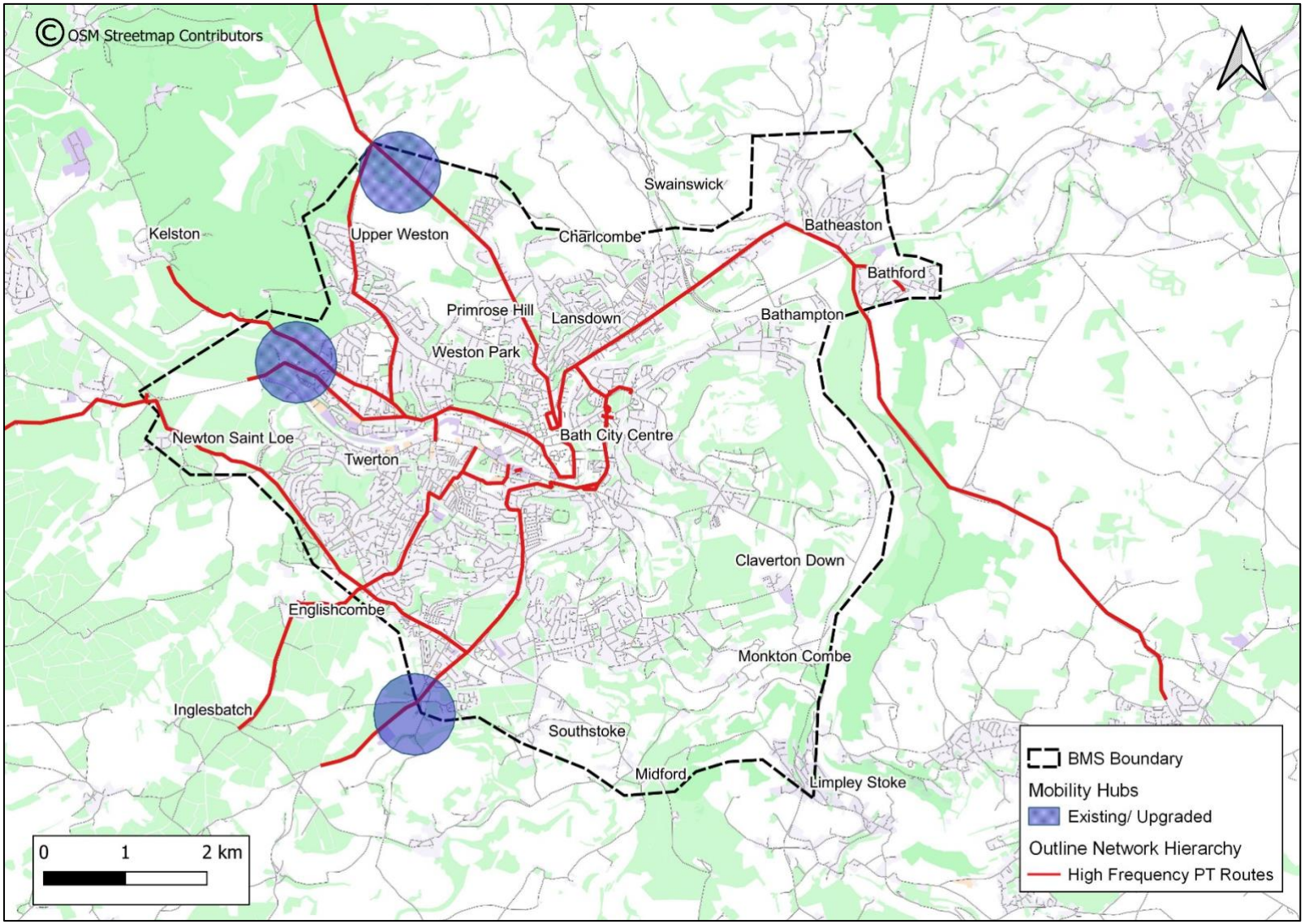


Figure A7-5 Lens 3: Trips through Bath – potential concept approach

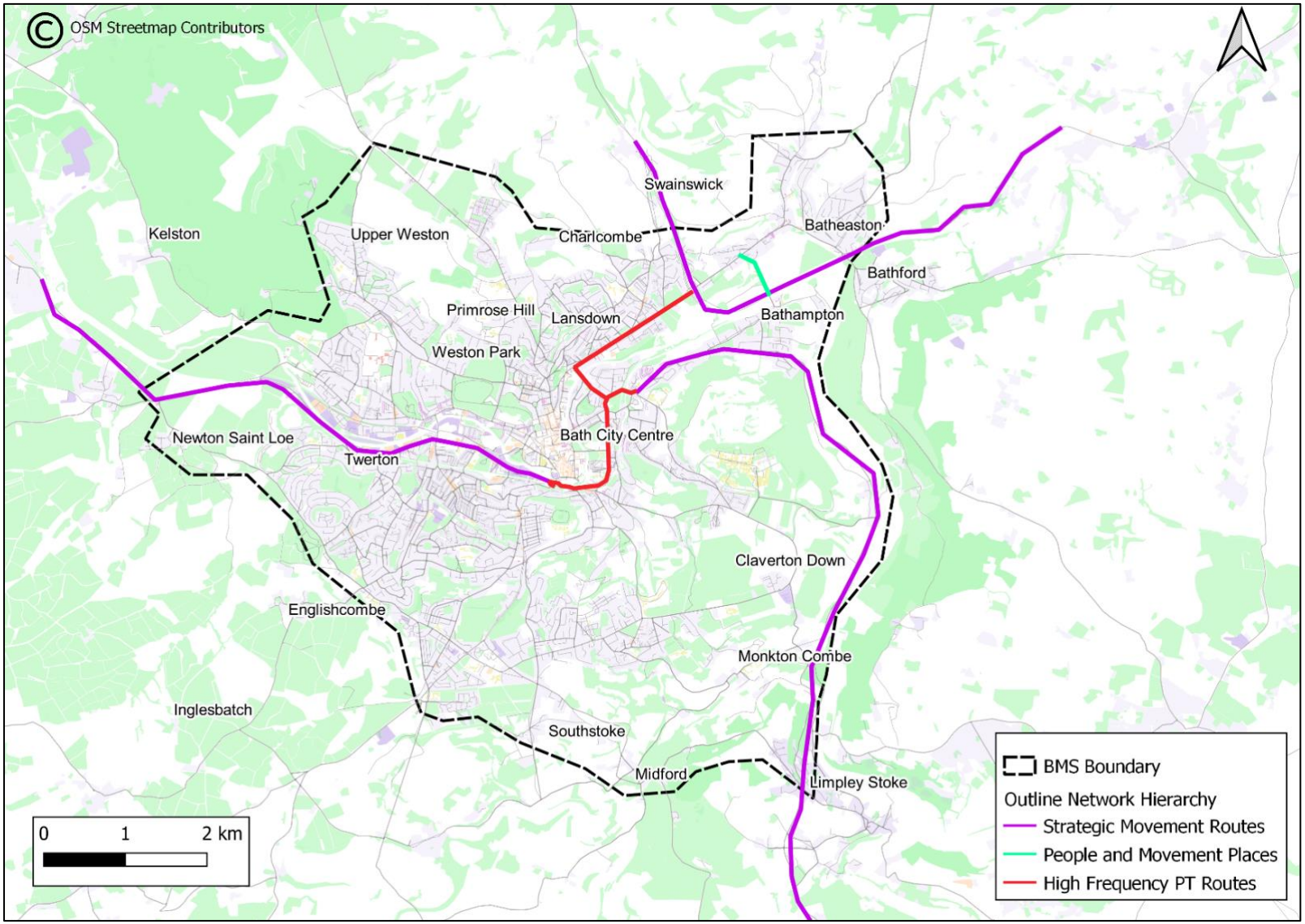


Table A7-3 demonstrates the redistribution of Bath's transport hierarchy across the eight different layers for the outline approaches, when combining a blended approach of all three lenses. It highlights a considerable increase in people and movement places and high frequency public transport routes, with a decrease in connecting movement routes and high-volume routes, both of which are focused on vehicle movement flows rather than catering for sustainable modes.

Table A7-3 Network hierarchy changes (percentage of overall network)

Network hierarchy level	Existing network	Outline approach
People places	54%	54%
Traffic free places	5%	5%
People and movement places	1%	13%
Historic city centre	3%	4%
Connecting movement routes	14%	0%
High frequency PT routes	6%	18%
Strategic movement routes	6%	5%
High volume movement routes	10%	0%

7.4 Application to key corridors

The application of the Movement Strategy would help to deliver significant changes to the transport network within Bath.

Lens 1 would deliver significant changes to local neighbourhoods, with a much greater emphasis on supporting the needs of local communities and creating streets for people. This would include a strong emphasis on improving conditions for walking and cycling as 'people places'.

However, all three lenses would require a new approach to the management of key corridors in the city, with a reclassification of these corridors to high-frequency public transport routes to cater more effectively for the needs of people travelling into the city. An integrated approach is therefore needed, to ensure that key corridors are effectively managed in the future.

Figure A7-6 shows these key corridors, which will be critical to the future success of the Movement Strategy. It is important to understand the constraints along these corridors, and implications for future choices for the Movement Strategy. Table A7-4 presents the existing and proposed classification of each corridor, discusses the key issues on these corridors and assesses the scale of the constraints, which include:

- Availability of road width to cater for a reallocation of road space;
- Topographic constraints (impacting the potential for active modes); and
- Constraints imposed by road designation.

Figure A7-6 Key corridors

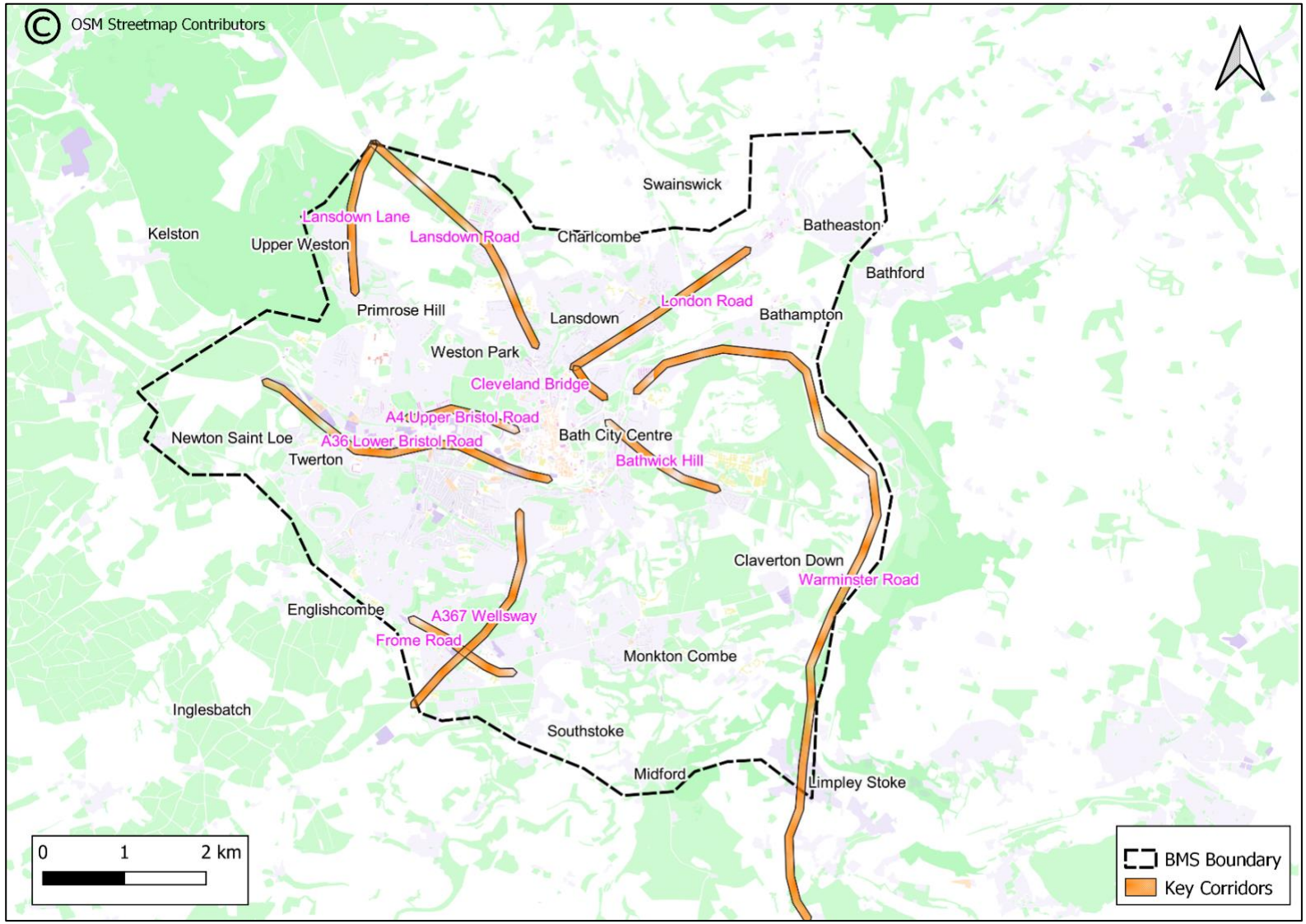


Table A7-4 Assessment of key corridors

Road	Existing hierarchy	Outline hierarchy	Route constraints	Trip type	Issues and priorities
A36 Lower Bristol Road	Strategic Movement Route	Strategic Movement Route	Medium	Within, to/from, through	Lack of continuous stretches of sufficient width for both a bus lane and a cycle lane. This road is PRN.
A4 Newbridge Road / Upper Bristol Road	High volume movement route	High frequency PT route	Low	Within, to/from	No significant physical barriers to redefining this key corridor as a high frequency PT route. Presence of on-street parking would need to be managed.
Combe Park / Crown Road / Lansdown Ln	High volume movement route	High frequency PT route	High	Within, to/from	Potential reduction of carriageway widths. Prioritisation of supporting measures which prioritise buses and walking, cycling and wheeling that are not limited by topography constraints.
Lansdown Road	High volume movement route	High frequency PT route	Medium	Within, to/from	Potential reduction of carriageway widths. Prioritisation of supporting measures which prioritise buses and walking, cycling and wheeling that are not limited by physical constraints.
A4 London Road	Strategic Movement Route	High frequency PT route	Low	Within, to/from, through	Potential reduction of carriageway widths. Prioritisation of buses, cyclists to be prioritised on parallel or offline routes.
Cleveland Bridge	Strategic Movement Route	High frequency PT route	High	Within, to/from, through	Carriageway widths are constrained over the bridge. Prioritisation of buses e.g. bus gates. Cleveland Bridge is a Grade II* listed structure.
A36 Warminster Road	Strategic Movement Route	Strategic Movement Route	Medium	Within, to/from, through	Lack of continuous stretches of sufficient width for both a bus lane and a cycle lane. This road is PRN and is SRN in places.
Bathwick Hill	High frequency PT route	High frequency PT route	Medium	Within, to/from	No continuous stretches of sufficient width for both a bus lane and a cycle lane. Steep gradient presents challenges for walking, wheeling, and cycling.

Road	Existing hierarchy	Outline hierarchy	Route constraints	Trip type	Issues and priorities
A367 Wellsway	High volume movement route	High frequency PT route	Medium	Within, to/from	Potential reduction of carriageway widths. Lack of stretches of sufficient width for both a bus lane and a cycle lane. Prevalence of on-street parking.
Frome Road	High volume movement route	High frequency PT route	High	Within, to/from	Potential reduction of carriageway widths. Prioritisation of supporting measures which prioritise buses and walking, cycling and wheeling that are not limited by physical constraints.

There are different types of choices to be considered for different routes. For example:

- **A4 Newbridge Road** is an important route into the city from the west, with a range of traffic movements, and is served by buses from Bristol and Park & Ride from Newbridge. The route is wide in many places, with extensive on-street parking. There is scope for reallocation of roadspace, including dedicated lanes for buses and future mass transit. The route becomes busier on the approach to the city centre (**Upper Bristol Road**), with right-turning lanes and on-street parking, which could pose greater constraints.
- **A36 Lower Bristol Road** forms part of the Primary Route Network (PRN). Whilst there is some scope for roadspace reallocation in places, there are pinchpoints and multiple demands, including walking, cycling, local bus services, on-street parking, and local and through traffic. There is some flexibility in how this corridor could be managed in future, although it will need to accommodate essential east-west movements across the city.
- **A4 London Road** also forms part of the PRN, catering for movement into the city from the east. The corridor is relatively wide, with significant lengths of inbound bus lanes, islands for right-turning traffic, and on-street parking. However, there are localised pinchpoints, with insufficient space for both bus lanes and continuous cycle lanes along the whole route. There is some flexibility in how this corridor could be managed, with potential removal of on-street parking to further improve public transport priority or enhance streetspace.
- **Cleveland Bridge** is also part of the PRN and is a critical component connecting the A36 and A4 London Road across the Avon. The bridge is Grade II* listed, narrow, with narrow footways, narrow carriageways, and no scope for segregation of buses and cyclists. The carriageway would therefore need to cater for a range of users while respecting the historic nature of the bridge, and options for changes in use are more limited.
- **Lansdown Lane** is a local route connecting the city to Weston, but is also important in serving Royal United Hospital, which has a wide catchment area, drawing traffic from both the south (Newbridge Hill) and the north (Lansdown). The Movement Strategy sets the ambition for this to become a high-frequency public transport route, including potential bus connections to Lansdown Park & Ride, to help reduce traffic demand. However, most of the route is very narrow, which will significantly limit options available for future treatment of the roadspace.

7.5 Assessment of approaches

The Movement Strategy approaches, set out in section 7.3 and Table A7-2, have been assessed to determine their contribution to the Movement Strategy objectives. The following process has been undertaken:

- The three lenses and the baseline (the existing network) has been given a score of 1-3 based on their level of contribution to the six objectives.
- A score of one is a minor positive contribution to the objective, while a score of three is a significant positive contribution to the objective.
- A cumulative score has been provided, to determine how well a combined approach contributes to the strategy's objectives.

Figure A7-7 Contribution to transport objectives

			Baseline	Lens 1	Lens 2	Lens 3	Cumulative
Movement Strategy objectives: based on TAP objectives	**1**	Accessibility: maximise access to all modes, reducing inequality and improving fairness across the transport network	x	2	2	1	5
	2	Public safety, health and wellbeing: enable healthier travel choices and safer places by design	x	3	2	1	6
	3	Environment and climate change: decarbonise our transport systems, tackling the negative impacts of traffic and congestion	x	2	3	2	7
	4	Resilience: deliver an adaptive and climate resilient transport system, withstanding extreme heat and flooding	x	2	2	1	5
	5	Inclusive economy: support our economy, enabling shared prosperity	x	2	3	2	7
	6	Sustainability and place: connect people to jobs, education and services through high quality sustainable travel choices	x	2	3	1	6

Key:

x Not consistent with objective

Larger numbers imply larger benefits against objectives.

Figure A7-7 demonstrates that the baseline does not contribute to the Movement Strategy and TAP objectives, based on the evidence presented in the previous chapters. Continuing a business-as-usual approach will mean that Bath's transport network continues to experience the issues set out in Section 3.6, which includes congestion to road users, an unreliable bus network, and high levels of carbon emissions from transport.

Lens 1 contributes to all six objectives, because the targeting of short-distance trips will ensure that neighbourhoods benefit from healthier travel choices and enhanced local accessibility through measures such as liveable neighbourhoods, traffic-calming, and shared mobility.

Lens 2 builds on Lens 1 and will contribute strongly to Objective 3 by enabling mode shift for trips to and from the city, which will help reduce carbon emissions and tackle wider environmental impacts, including pollution, noise and severance. Measures such as mobility hubs will enhance travel options for people entering Bath to connect to jobs, education and services.

Lens 3 builds on Lens 2, with its approach of reducing through traffic contributing towards objectives relating to transport decarbonisation, improved rail services supporting wider regional connectivity and productivity, and prioritising users contributing to the city's economy.

Cumulatively, the three lenses would strongly contribute to all six objectives and a combined approach would therefore deliver a transport network in Bath that seeks to improve accessibility, provide healthier travel choices, and provide connectivity and environmental benefits.

The delivery of the Movement Strategy could be phased, with early wins delivered through Lens 1 measures to encourage mode shift within the city, and medium-term delivery of Lens 2 measures for trips into the city.

Lens 3 measures will require agreement and co-operation with third-party delivery partners, including the West of England Combined Authority, National Highways and Network Rail, which will require greater investment and careful management of delivery.

7.6 Findings

One of the key outcomes from the assessment in Section 7.5 is to establish the contribution of the lenses to the transport objectives. This will set the overall direction for the future stages of the Movement Strategy. It highlights the cumulative benefits of delivering the three lenses as a combined approach.

The measures in Lens 1 have been identified as 'quick wins' which generally have a shorter timeframe for delivery (beginning in 2026) to continue Bath's journey towards meeting the TAP and Journey to Net Zero objectives. Lens 2 measures would be more medium term, with Lens 3 measures completing the Movement Strategy in the longer term, e.g., by 2040.

The delivery of all measures across the three lenses will be required to realise the full benefits of the Movement Strategy. Unlocking roadspace reallocation opportunities at key locations on the network will depend on addressing all types of trip: within, into, from and through the city. For example, more complex, longer-term measures (e.g., rail improvements and redesignation of strategic roads) can reduce the demands on the city's road network, unlocking the full potential of the quick-win short-term measures, e.g., mobility hubs and cycle lanes.

Park & Ride and mobility hubs will also reduce demand into the city, providing the opportunity to reallocate roadspace to non-car modes.

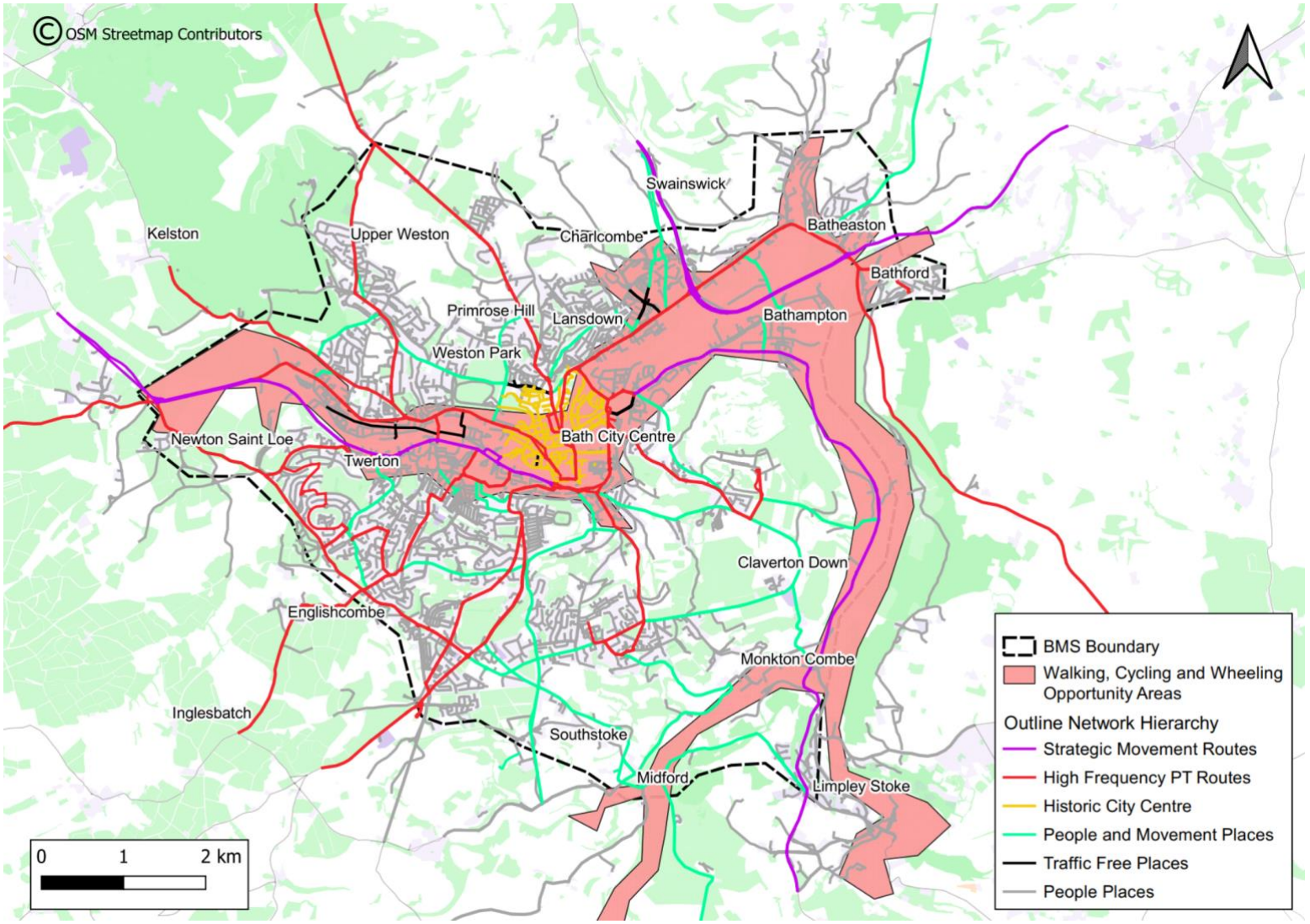
The deliverability of interventions will be a key aspect to be considered as the Movement Strategy progresses towards detailed feasibility, business case and delivery. Engagement with other delivery partners will be required for more complex measures.

In order to achieve the vision, a combined approach will be required. This high-level assessment of broad approaches will require further testing to analyse their impacts on the transport network. The overall approach combining all three options is presented in Figure A7-8 .

Furthermore, as referenced in Section 2.1, this combined approach will need to recognise the different travel needs and choices across different user groups. The following principles will need to be applied in the development, design and delivery of all measures:

- **Availability:** providing good quality public transport alongside active mode options allows people to be able to choose options that are most suitable for them.
- **Accessibility:** the accessibility and inclusive design of all modes of mobility, transport infrastructure and associated information is vital for all groups who wish to travel.
- **Affordability:** affordable transport increases opportunities to access a range of services and amenities, as well as participating in social activities.
- **Safety:** perceived and actual safety is of paramount importance in passengers' confidence and decisions to travel.
- **Pollution and air quality:** reducing pollution and improving air quality benefits all of society, particularly people who are more vulnerable to changes in air quality due to health conditions.

Figure A7-8 Combined Movement Strategy approach



8. Conclusions and next steps

Bath's transport network requires a considerable level of change to meet B&NES' ambitions to reduce carbon emissions from transport. The city needs to provide a platform for a fundamental shift in the way in which people travel, addressing existing challenges while positioning Bath for a sustainable, healthy, and prosperous future.

This strategy is the latest in Bath's journey to achieve net zero carbon by 2030. It provides an opportunity to establish a framework to re-imagine and re-prioritise modes of travel in Bath to achieve B&NES' decarbonisation target of 25% reduction in kilometres travelled per person by car each year.

This strategy has reviewed the existing transport network in the city to develop approaches to reimagine the city's network to meet B&NES' strategic priorities to:

- Tackle the climate and ecological emergency;
- Deliver for our residents; and
- Prepare for the future.

The objectives of this strategy align with the objectives of Journey to Net Zero and the emerging TAP. This report forms the starting point of the Movement Strategy, with a baseline review of the existing movement patterns and circulation of traffic around the city, and a high-level development of approaches for an outline strategy.

Further stages of work will now be required to develop the Movement Strategy. The next steps to build on this work include:

- Modelling of the likely impacts of the Movement Strategy and identification of infrastructure measures to support and mitigate impacts. This should involve two key themes – modelling changes in demand and their impact on the network, and modelling changes in the network and their impact on demand.
- A large scale full public engagement process to ensure public and stakeholder buy-in of the proposals.
- Development of a business case for implementation to ensure that the Movement Strategy is cost-effective, funded and deliverable.
- Delivery and implementation planning, including monitoring and evaluation of impacts to ensure that the envisaged benefits are realised.

APPENDICES

Appendix A. Policy review

A.1 National policy

A.1.1 DfT Transport Decarbonisation Plan (2021)[29]

In June 2019, parliament passed legislation requiring the government to reduce the UK's net emissions of greenhouse gases by 100% relative to 1990 levels by 2050. Doing so would make the UK a 'net zero' emitter.

Accelerating the shift to zero emission vehicles is one of the priorities in creating an environmentally sustainable economy. Coupled to a commitment to end the sale of new petrol and diesel cars and vans from 2030 (a decade earlier than initially planned), it forms one of the points in the Government's Ten Point Plan for a Green Industrial Revolution, published in November 2020.

The DfT published 'Decarbonising Transport: A Better, Greener Britain' in July 2021. The plan sets out in detail the actions required to significantly reduce emissions from transport in order to achieve carbon budgets and net zero emissions across all modes of transport in the UK by 2050 and covers commitments, timings and actions related to two main themes; 'Decarbonising all forms of transport' and 'Multi-modal decarbonisation and key enablers'.

The main themes are split into commitments including:

- Increasing walking and cycling: Aim to have half of all journeys in towns and cities cycled or walked with over £2 billion invested over the next 5 years in order to help make cycling or walking a natural first choice for many journeys;
- Increasing walking and cycling: Delivery of a world-class cycling and walking network in England by 2040;
- Delivering decarbonisation through places: Increase in active travel and public travel funding; and
- Delivering decarbonisation through places: drive decarbonisation and transport improvements at a local level by making quantifiable carbon reductions a fundamental part of local transport planning and funding.

The key aim of the Movement Strategy is to provide Bath with a coherent plan to review and alter traffic movements in the city, subsequently creating a framework to reallocate road space and ensure that vehicular traffic uses the most appropriate routes.

This aligns with the Transport Decarbonisation Plan because the Movement Strategy will aim to promote active travel and people places, reducing the need for travel by car and supporting transport decarbonisation.

A.1.2 Gear Change: Vision for Walking and Cycling (2020)[30]

Gear Change: a bold vision for cycling and walking was published in July 2020. This policy describes the plan of the UK Government to improve access to and quality of cycling infrastructure within the UK. The key points of the policy are:

[29] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarbonising-transport-setting-the-challenge.pdf

[30] Gear change: a bold vision for cycling and walking (publishing.service.gov.uk)

- Better streets for cycling and people (more and better-quality cycle routes, more 'school streets' to protect cycling children);
- Cycling at the heart of decision-making (increase in short term and long-term funding for improving cycling);
- Empowering and encouraging Local Authorities (increased funding for Local Authorities, as well as more powers and better assistance); and
- Enabling people to cycle and protecting them when they do (better access to cycling training and protection from bike theft).

Following publication of the vision document, DfT now expects consideration to be given to improvement of facilities for walking and cycling in all transport schemes that are seeking DfT or devolved funding from Mayoral Combined Authorities (MCAs). The Movement Strategy will aim to promote active travel and people places, reducing the need for the car and reducing carbon emissions in the transport network.

A.1.3 Plan for Drivers (2023)[31]

The 'Plan for Drivers' was released in October 2023. This policy presents an apparent step back from recent government policies that have prioritised decarbonisation by:

- Aiming to reduce the UK's dependence on cars.
- Promoting active travel infrastructure and demand.

The five priorities of the 'Plan for Drivers' are:

- Smoother journeys
- Stopping unfair enforcement
- Easier parking
- Cracking down on inconsiderate driving
- Helping the transition to zero emission driving

These priorities aim to improve the road network for drivers and suggest limiting the use of '15-minute neighbourhoods', 20mph speed limits and bus lanes. These measures do not support previous decarbonisation policies as described above and will represent a challenge to the Movement Strategy in terms of decarbonisation, place-making and improving the efficiency of the road network.

A.2 Regional policy

A.2.1 Joint Local Transport Plan 4 (JLTP 4)[32]

The JLTP 4 was published in March 2020 and outlines the plans for the West of England Region from 2020-2036. The document sets out how the region will meet the key challenges that will appear during this time period, focusing on the following key points:

- Transport is the largest contributor to carbon dioxide emissions in the West of England and travel demand is growing. There is therefore an increased need to improve the offer of more sustainable modes of transport in order to act against climate change and address poor air quality;
- The JLTP4 aims to ensure that transport is carbon neutral by 2030; and
- A main pillar of decarbonisation is to 'encourage and help people switch from cars to cycling, walking and public transport' by providing 'transformational alternatives such as a new mass transit network' backed up by demand management, 'possibly through congestion charging, emissions charging and workplace parking levy-type schemes'.

The key aim of the Movement Strategy is to provide Bath with a coherent plan to review and alter traffic movements in the city, subsequently creating a framework to reallocate road space and ensure vehicle traffic uses the most appropriate routes.

[31] Plan for drivers - GOV.UK (www.gov.uk)

[32] JLTP4-Adopted-Joint-Local-Transport-Plan-4.pdf (travelwest.info)

A.3 Local policy

A.3.1 Bath Delivery Action Plan (2020) & Journey to Net Zero (2022)

In March 2019, B&NES declared a Climate Emergency, which included a commitment to become carbon neutral by 2030. In April 2020, the Transport Delivery Action Plan Phase 1: Current and Future Report was published by B&NES, setting out the current and future situation for transport into, out of and around Bath, and the need for significant and focused improvements. The report looks at the ways in which people currently travel and provides the evidence base that underpins the consideration of future transport measures set out in this plan.

Combined, the Current and Futures Report and Journey to Net Zero transport plan identifies the challenges faced by Bath, in terms of transport now and in the future, and also the measures required to overcome these to support the realisation of the Council's core policy theme to tackle the climate and ecological emergency.

The vision of the Journey to Net Zero plan is:

"*Bath will enhance its unique status by adopting measures that promote sustainable transport and decision making, whilst reducing carbon dioxide emissions and the intrusion of vehicles, particularly in the historic core. This will improve the quality of life for local people, enable more economic activity and growth, while enhancing the special character and environment of the city.*"

The Movement Strategy will support this vision by improving the efficiency of the transport network and by promoting active and sustainable travel options to reduce dependency on the car.

A.3.2 Creating the canvas for public life in Bath (2010)[33]

'Creating the Canvas for Public Life in Bath – A Public Realm and Movement Strategy for Bath City Centre' was adopted as Council policy in March 2010 following an extensive consultation process and high levels of cross-party public and political support.

The Movement Strategy outlines the gradual decline of Bath's streets and spaces as a result of the increasing dominance of vehicular traffic and decades of under investment. This has resulted in a tired, cluttered and disordered city centre which is at risk of undermining Bath's success.

The Public Realm and Movement Strategy put forward an incremental plan to transform streets and spaces across the centre and create the canvas for a more animated and inclusive public life. It set out proposals to:

- Rebalance the movement hierarchy giving priority to pedestrians, cyclists and public transport;
- Refashion the public realm creating a lattice of connected streets and spaces and utilising high-quality materials, bespoke furniture and exceptional landscape and lighting design;
- Reveal the city through the introduction of a new multi-channel information and wayfinding system for all modes of movement;
- Reanimate the city centre through an imaginative and pioneering programme of public art, events and activities.

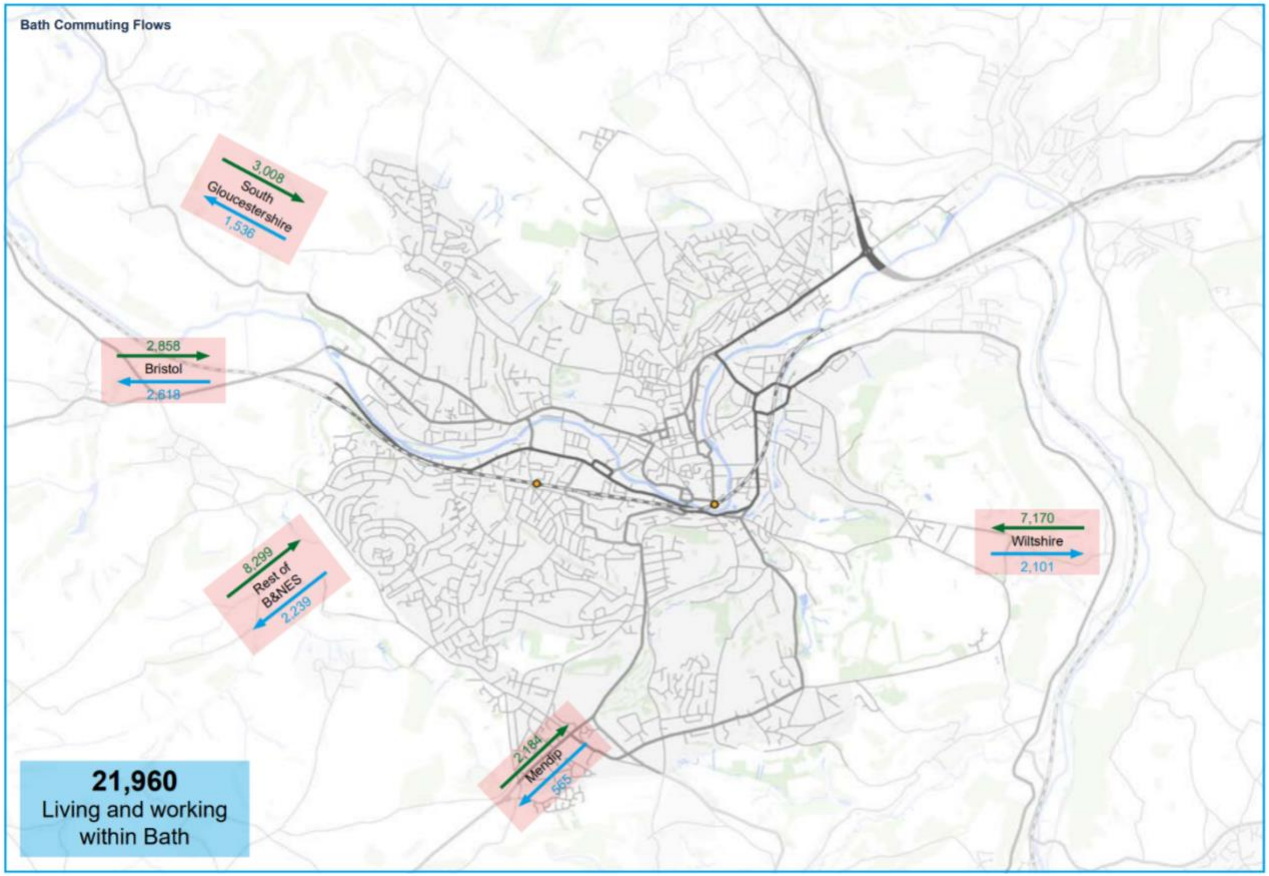
The Movement Strategy will provide a supporting framework by improving the efficiency of the transport network within Bath and by promoting active and sustainable travel options to reduce dependency on the car.

[33] Public Realm and Movement | Bathnes

Appendix B. Overview of movement within Bath

B.1 How people in B&NES travel[10,13]

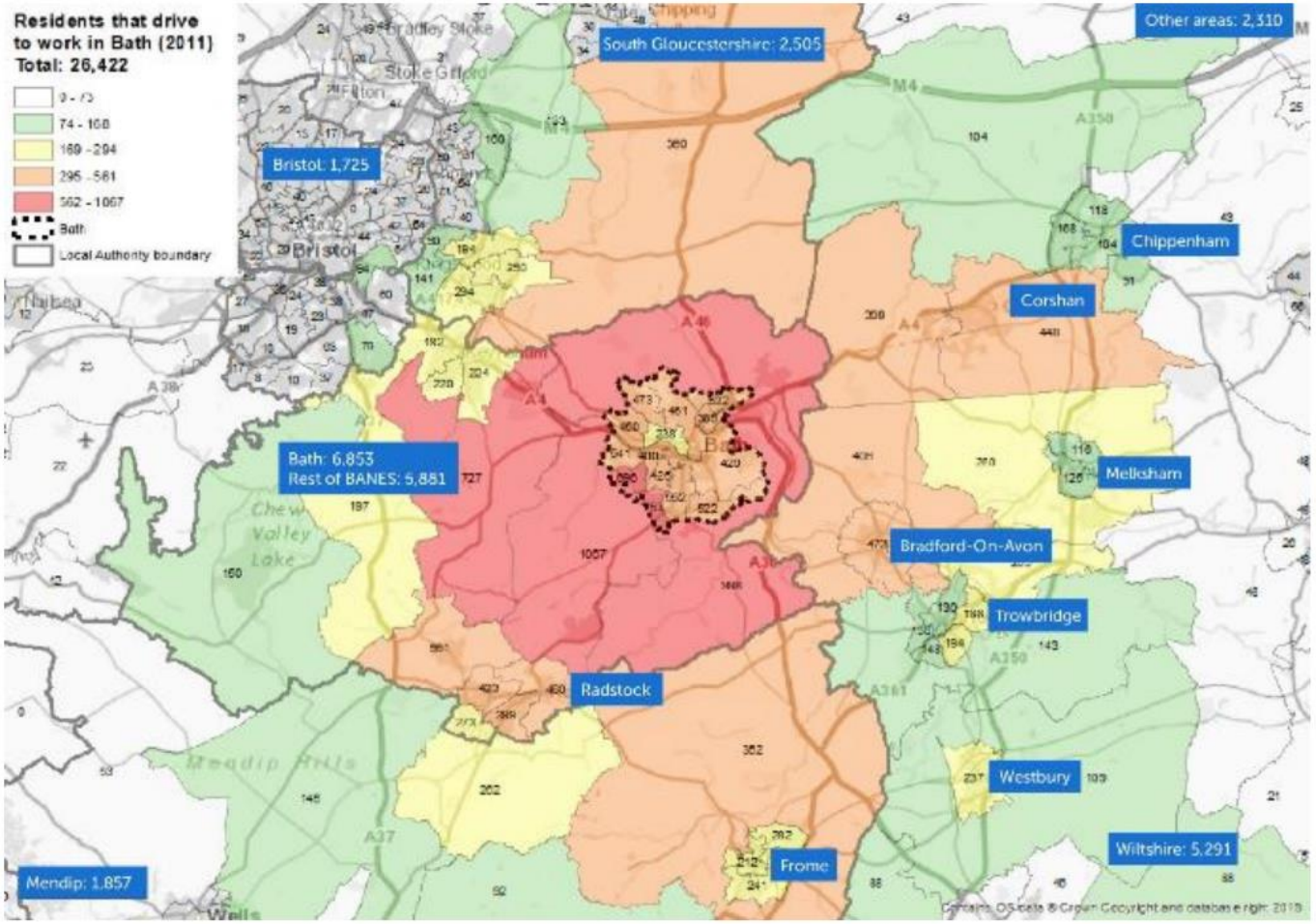
Figure A-1 Bath Commuting Flows[6]



To understand the existing transport conditions and issues within the City of Bath, it is essential to explore the key transport movements and associated modal choice.

Previous analysis of 2011 Census Data shows that approximately 20,000 residents live and work within the City of Bath. Over 28,000 commuters travel into the City from neighbouring Local Authorities (LAs) per day (Figure A-1). The Rest of B&NES, Wiltshire, South Gloucestershire and Bristol are the most common origins. Conversely, almost 12,000 residents of the City of Bath commute outwards per day, with the same LAs being the most popular destinations.

Figure A-2 Origins of residents that drive to work in Bath[13]



Of the residents that drive to work within Bath, 75% travel into Bath from outside of the city boundary. The majority of this traffic comes from rural areas surrounding Bath, particularly from the South, using the A367 corridor. Over 2,000 commuters come from South Gloucestershire, and over 5,000 from Wiltshire, showing the importance of having radial routes located across the city perimeter (Figure A-3.

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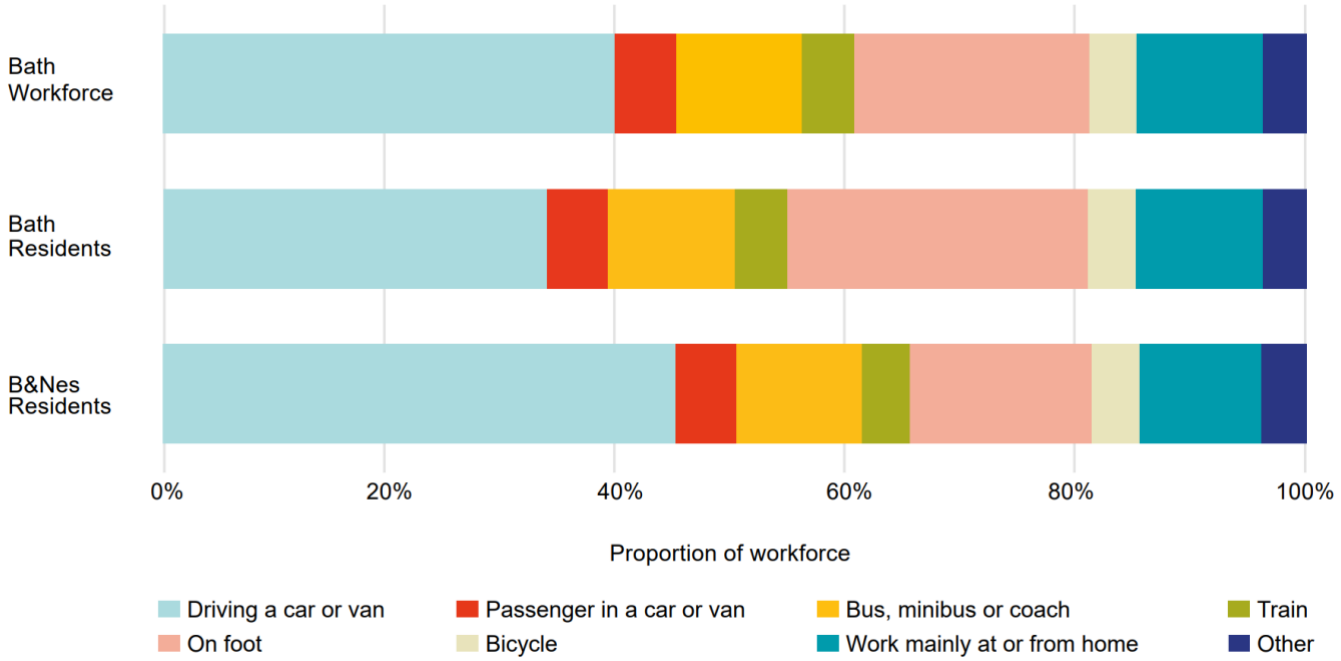
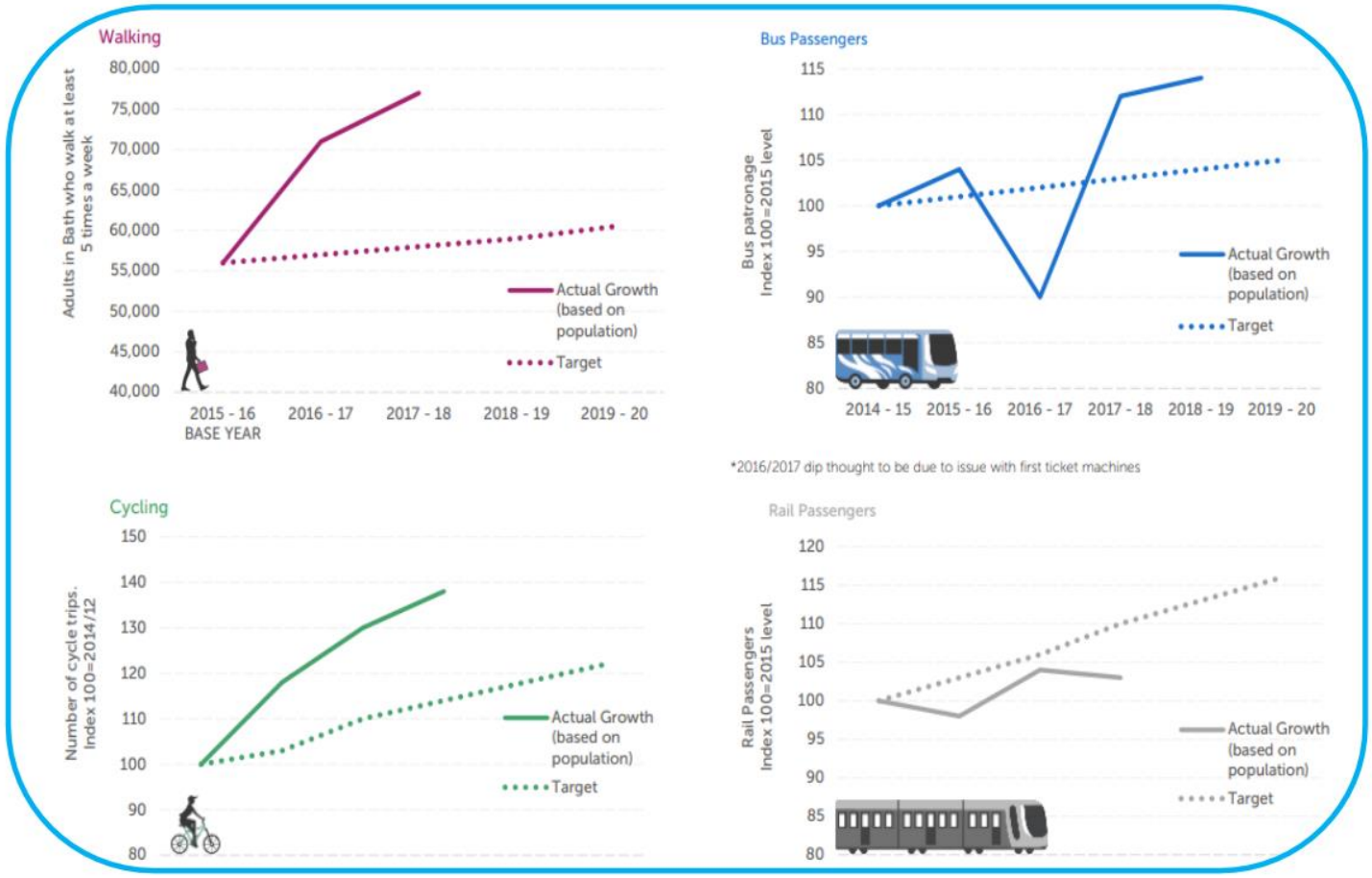
Figure A-3 Mode of travel (commuting) in Bath and B&NES[10]



For residents of Bath in 2011, 45% of journeys to work used sustainable modes and 47% travelled by car (as driver or passenger), with the remaining 8% of Bath residents working from home. However, when considering people who work in Bath but live elsewhere, the proportion of car usage increased to 53%. Car use was highest when considering the wider B&NES area where 60% of residents commute by car (Figure A-3).

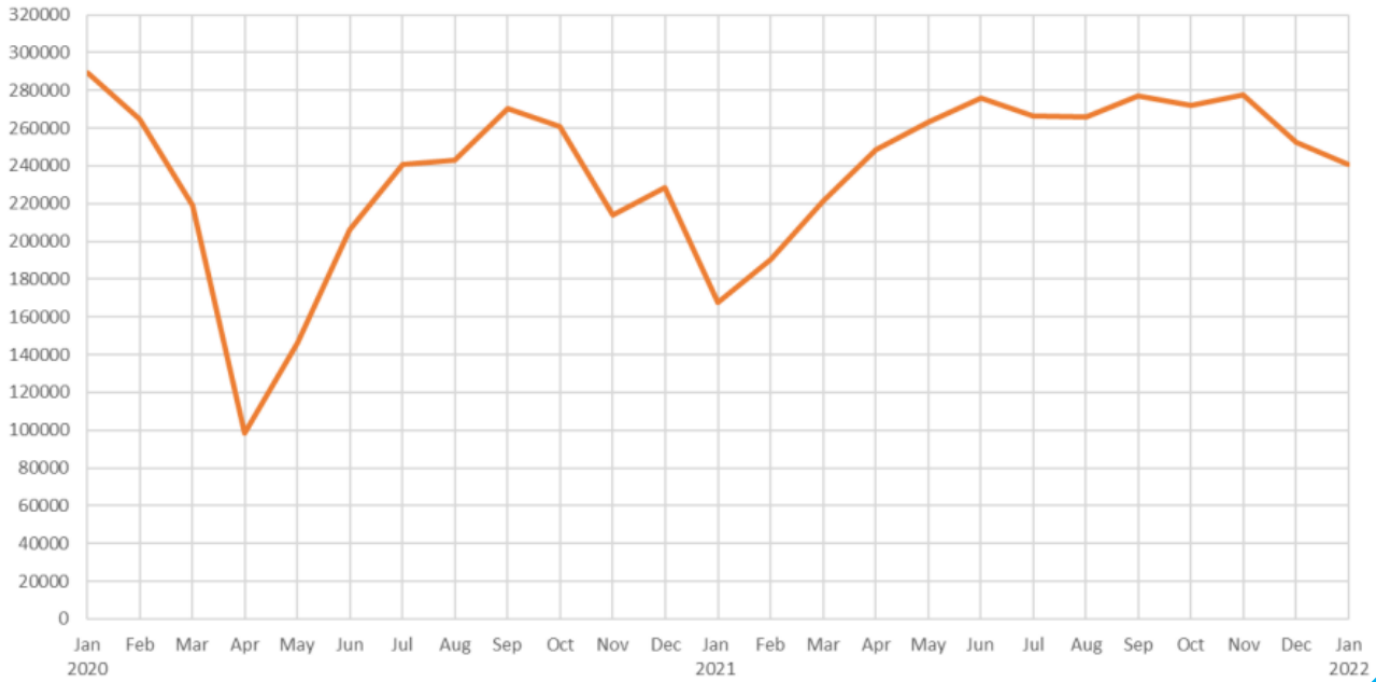
Figure A-4 Change in sustainable transport usage in B&NES (2015-2020)[34]



The Getting Around Bath Transport Strategy[34] set targets for increased use of bus, rail, walking and cycling by 2020. These targets have been exceeded for all modes but rail. There has been a rapid increase in the use of sustainable modes in the last 10 years in B&NES (Figure A-4). However, this still accounts for only a small proportion of overall travel.

[34] Getting Around Bath Transport Strategy, 2014

Figure A-5 Daily average traffic volume from 22 sites across B&NES[34]



Despite the increase in the use of sustainable modes, there is still a heavy reliance on car travel within the area, causing highway delays which are likely to be increased by up to 40% if no action is taken, costing the region £800m per year through congestion. This will also greatly increase carbon emissions due to cars emitting the most carbon of all forms of transport per gram per km[1].

These trends all existed prior to lockdowns associated with the Covid-19 pandemic. Ongoing monitoring across 22 different road traffic monitoring sites across B&NES showed marked reduction in travel during lockdowns, but that levels quickly returned to near previous levels[21] (Figure A-4).

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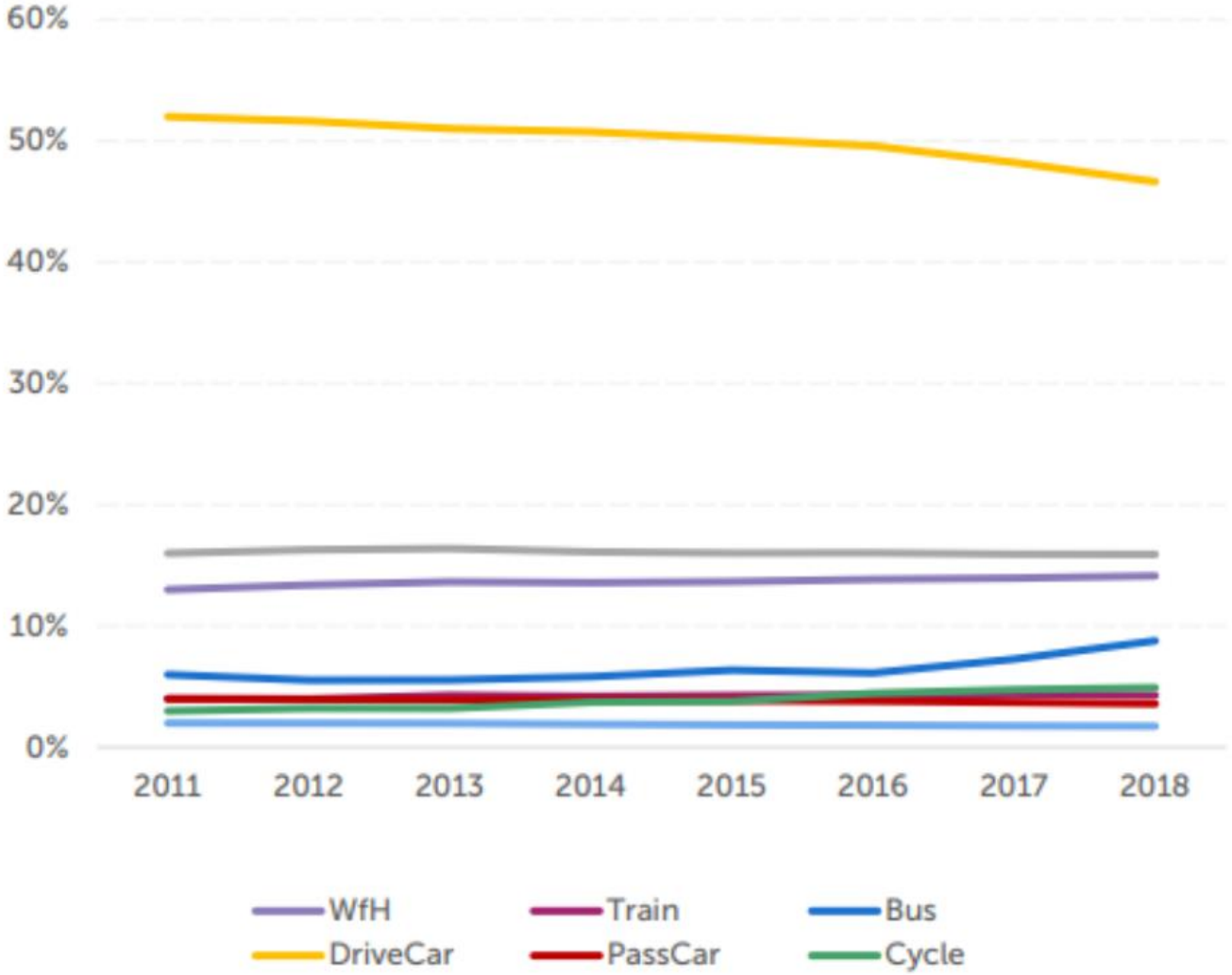
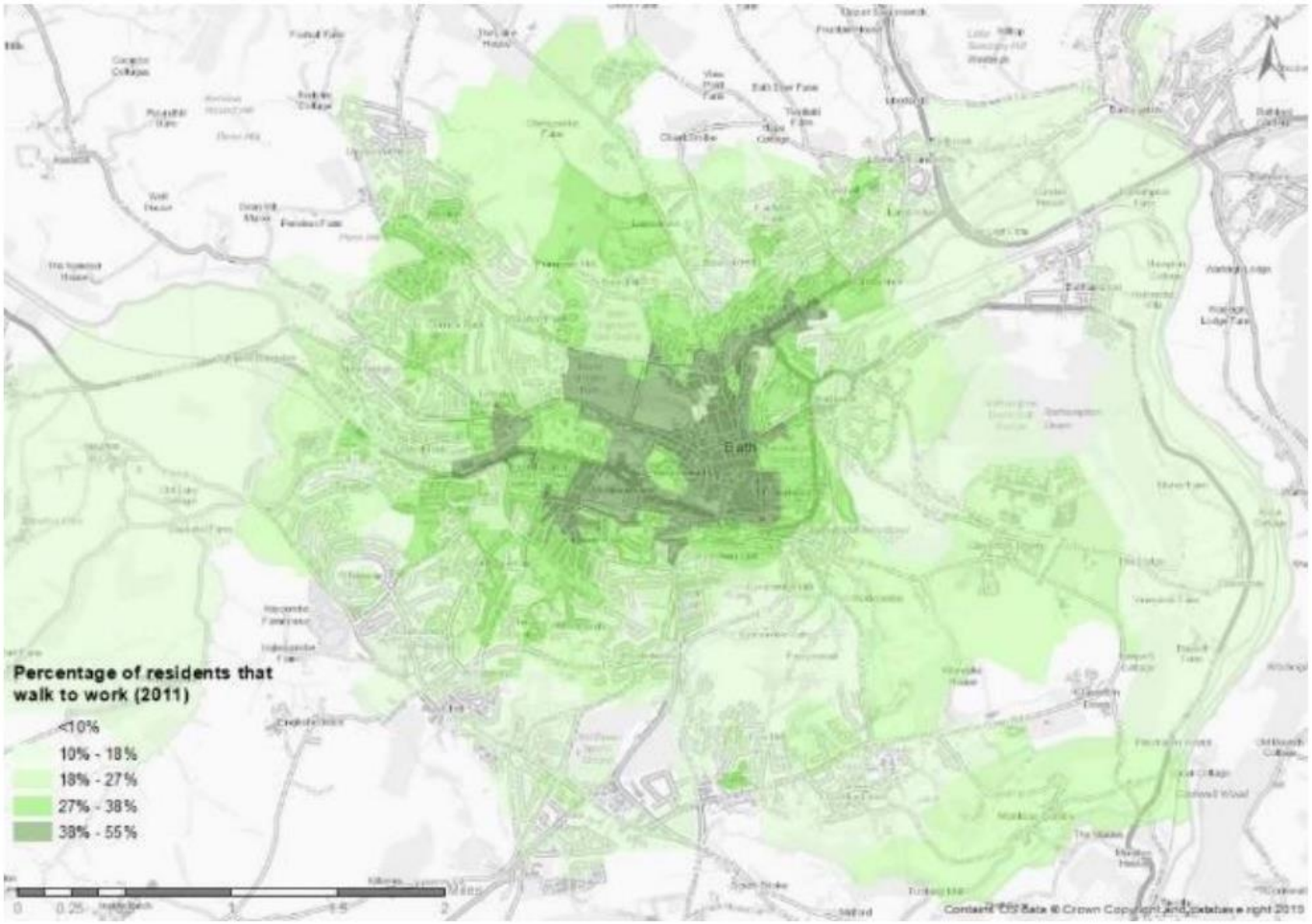
Figure A-6 Approximate method of travel to work - B&NES (2011-2018)[34]



Travel for work trends since 2011 have echoed those of overall use, with car use decreasing as public transport use has increased. These trends existed prior to lockdowns associated with the Covid-19 pandemic. The travel to work mode shares for Bath residents, Bath workforce and B&NES residents are assumed to have followed the same trends over this period

B.2 Walking, cycling and wheeling[13]

Figure A-7 Percentage of residents that walk to work in Bath (2011)



The proportion of journeys made on foot in Bath is high compared with other cities. The layout and size of Bath are conducive to walking and the streetscene is in many places of unsurpassed value. Walking is key to the activities that take place and could be even more widely adopted for short journeys within the built-up area. Walking is therefore of major importance. The percentage of residents that walked to work in Bath in 2011 was greatest in the city centre, and reduced with distance (Figure A-7).

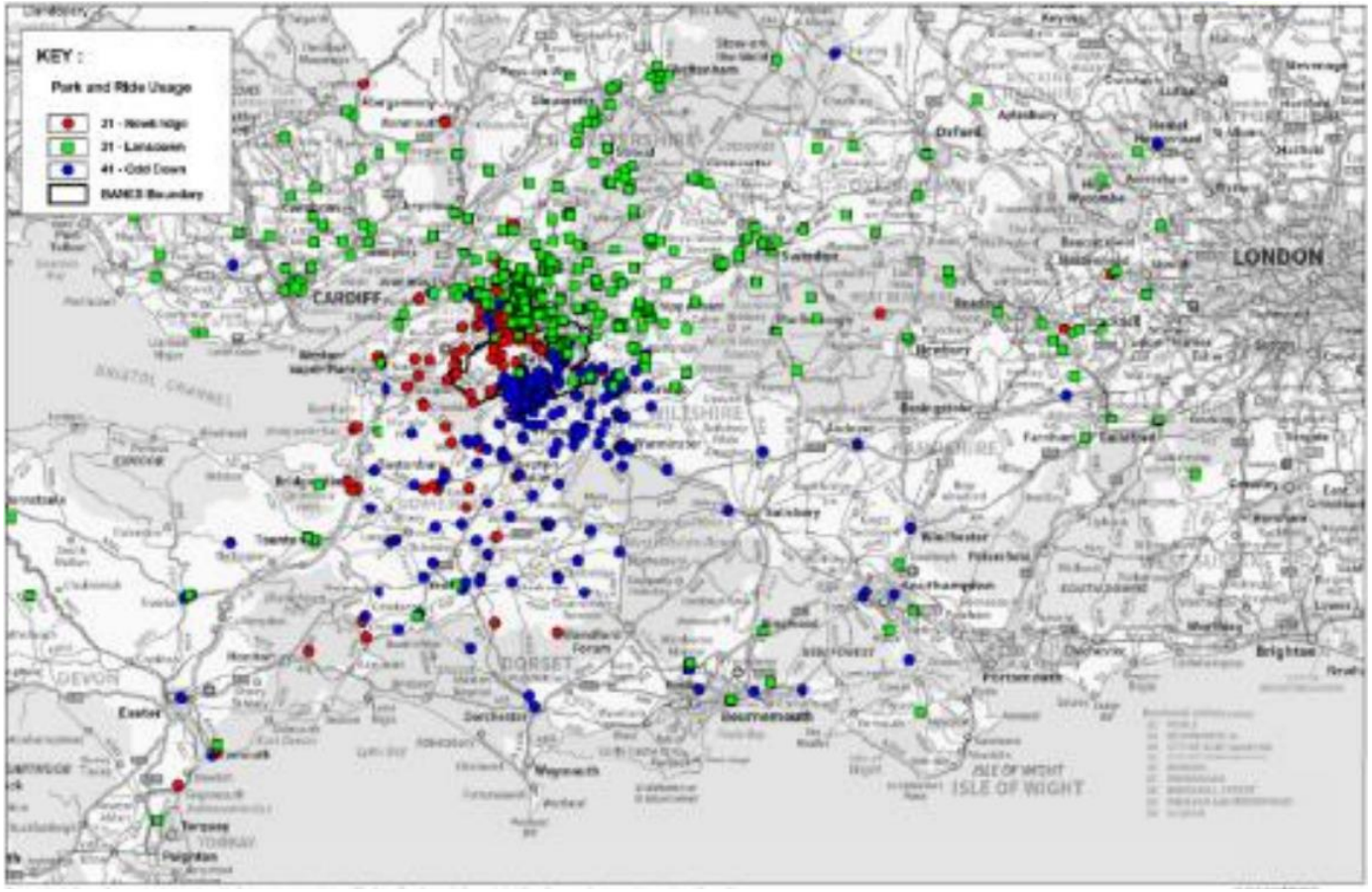
Figure A-8 Percentage of residents that cycle to work in Bath (2011)

Unlike walking, the percentage of residents cycling to work in Bath does relate to distance from the city centre. There are pockets to the north and south-east of the city centre, as well as to the west where cycling to work is most popular. These are in areas covered by the National Cycle Network, with proximity to greenspace and have favourable gradients for cycling (Figure A-8).

Despite this, many streets are perceived to have safety or security issues, including high numbers of heavy vehicles. AQMAs continue to be in place in the city as nitrogen dioxide concentrations are above legal levels. Furthermore, the quality of the public realm is reduced due to severance and noise caused by motorised traffic.

B.3 Park and Ride[13]

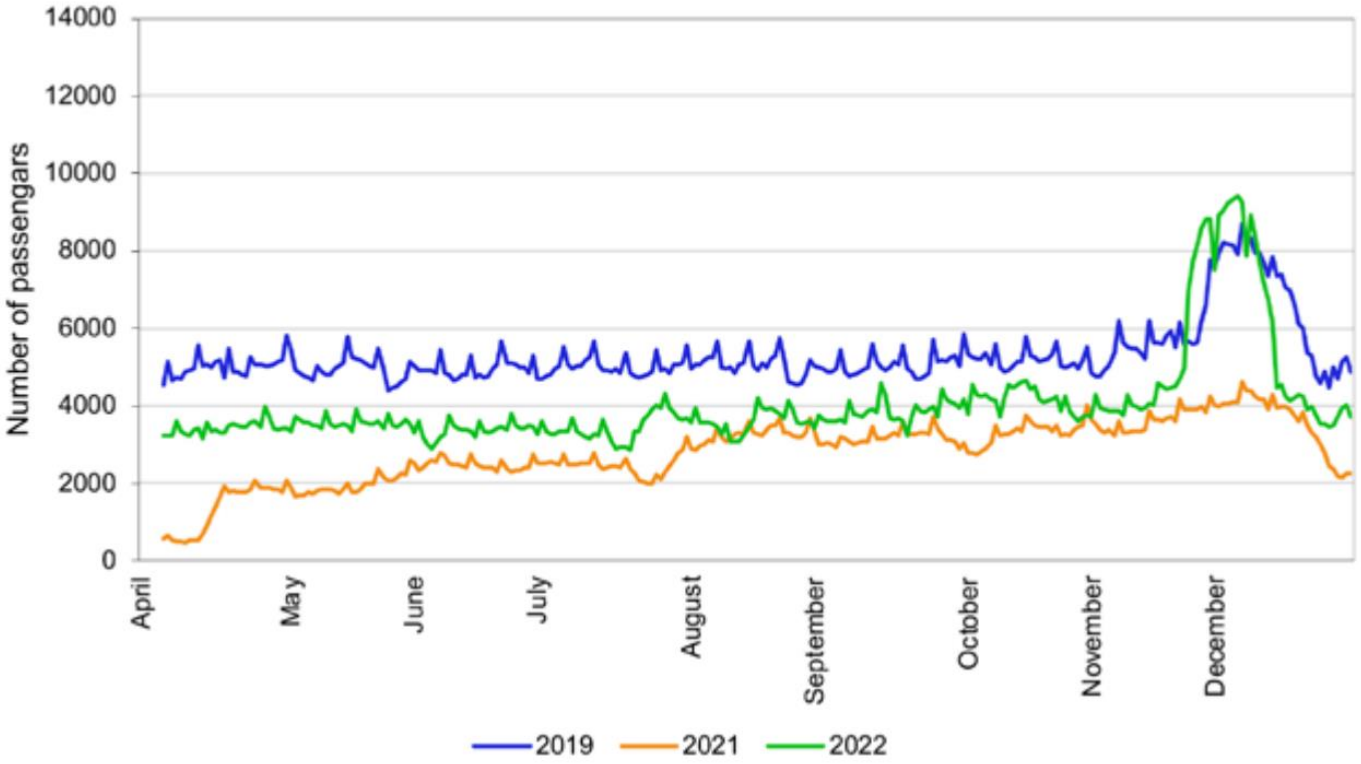
Figure A-9 Origins of Bath P&R passengers



B&NES Council undertook detailed surveys of Park and Ride (P&R) users in both 2009 and 2015. Users of the P&R sites tend to travel to the closest P&R site to their residence (Figure A-9). There are significant proportions of drivers arriving from the east of Bath who are using Lansdown and Odd Down P&R. This results in those wishing to use P&R from the east having to circumnavigate the city to travel to a P&R site. In addition, P&R demand from the east is likely to be suppressed due to the lack of a convenient facility, with many drivers choosing to park in the city centre instead.

The fundamental drivers for an affordable, direct public transport service from the east of Bath remain. The Council has previously examined the potential for provision of a P&R site to the east of Bath and concluded that there are no deliverable sites, meaning that alternative solutions to tackling these issues are now being explored.

Figure A-10 Total daily P&R passenger numbers for Bath sites



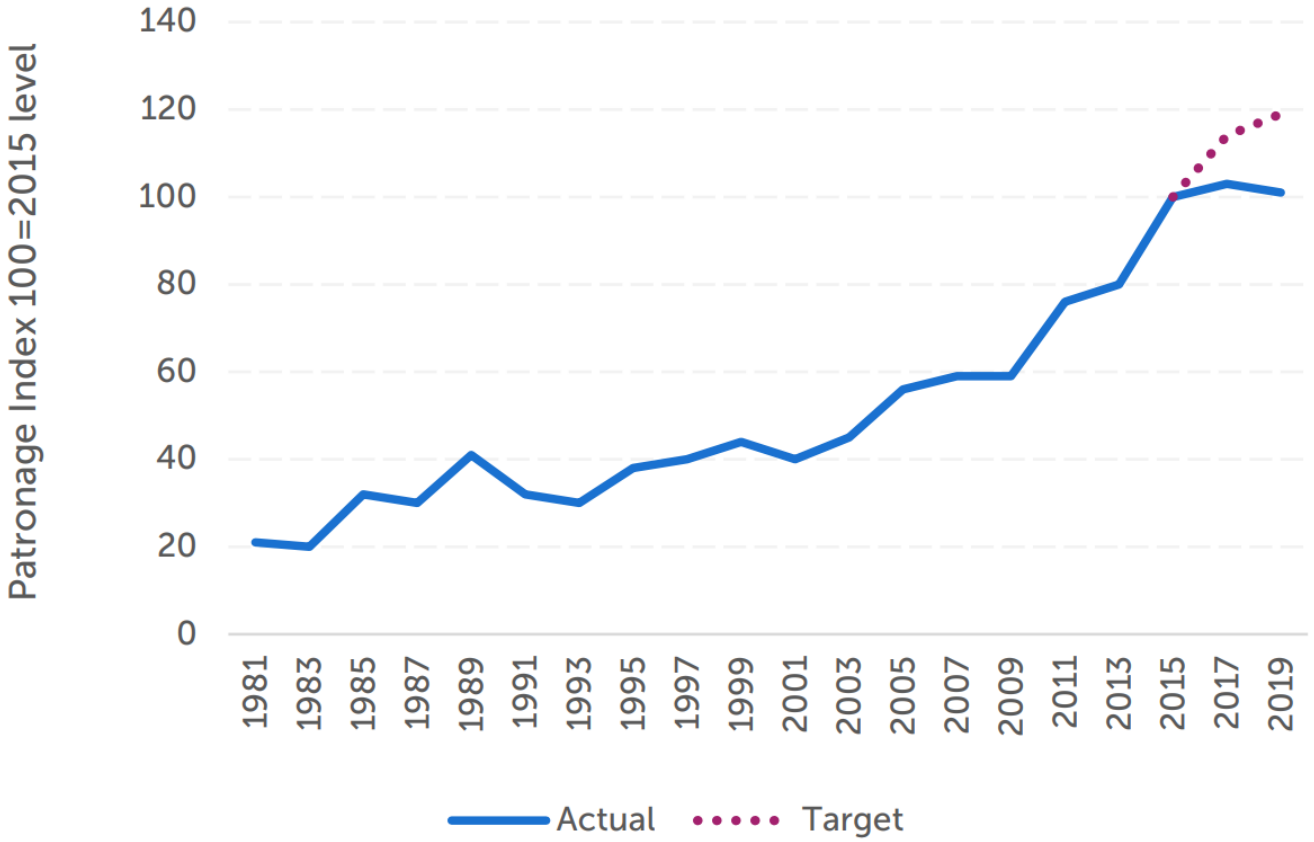
The key findings from the P&R ridership figures are as follows:

- Prior to the pandemic, the average Park and Ride bus ridership throughout most of 2019 with around 5,000 daily passengers, with a marked increase in people using the service in December.
- After the Covid-19 pandemic, Park and Ride bus ridership was clearly reduced with figures increasing slightly towards the end of the year but not returning to those pre-pandemic figures.
- For 2022, the Park and Ride bus ridership figures remain higher than 2021, however, they were largely below those figures seen in 2019. This is likely due to a change in working patterns as a result of the pandemic (Figure A-10).

Furthermore, annual bus passenger surveys highlight that only 62% of respondents are satisfied with bus reliability and punctuality within B&NES[13].

B.4 Rail[13]

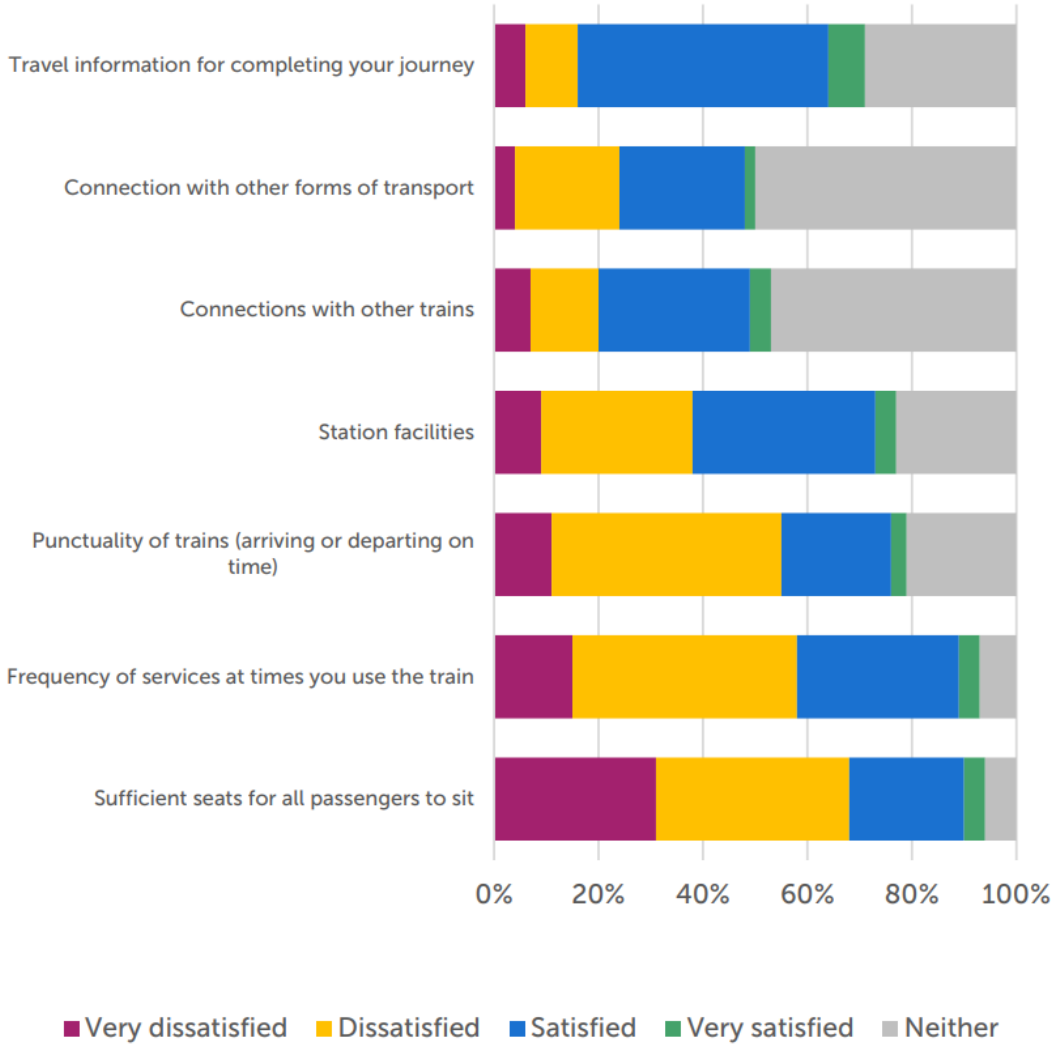
Figure A-11 Patronage at Bath Spa and Oldfield Park stations



Bath Spa station is the principal rail gateway to the city, with over 6 million station entries and exits recorded in 2017-18 (approx. 20,000 boardings and alightings per day), compared to just over 300,000 at Oldfield Park (approx. 1,000 per day). Usage of the stations in Bath grew significantly over the last decade, with an average of 3% growth per annum since 2008-09 at Bath Spa (3.5% per annum at Oldfield Park).

The latest figures from the Train Operating Company suggest that this growth continued into 2019/20 especially at Oldfield Park. Growth in patronage at Bath stations was in line with national trends for rail patronage growth and slightly lower than the level of growth seen at Bristol Temple Meads station (approx. 4.5% per annum growth) over the same period. However, there was a significant fall in demand during the Covid-19 pandemic (Figure A-11).

Figure A-12 Rail satisfaction survey, 2016 - Bath Spa and Oldfield Park



In 2016, a rail survey was taken to understand passenger opinions on the Bath and Oldfield park rail services (see Figure A-12). Passengers were typically dissatisfied with the availability of seats, frequency of services, and punctuality of trains, with higher levels of satisfaction for station facilities and travel information.

B.5 Highway and bus networks

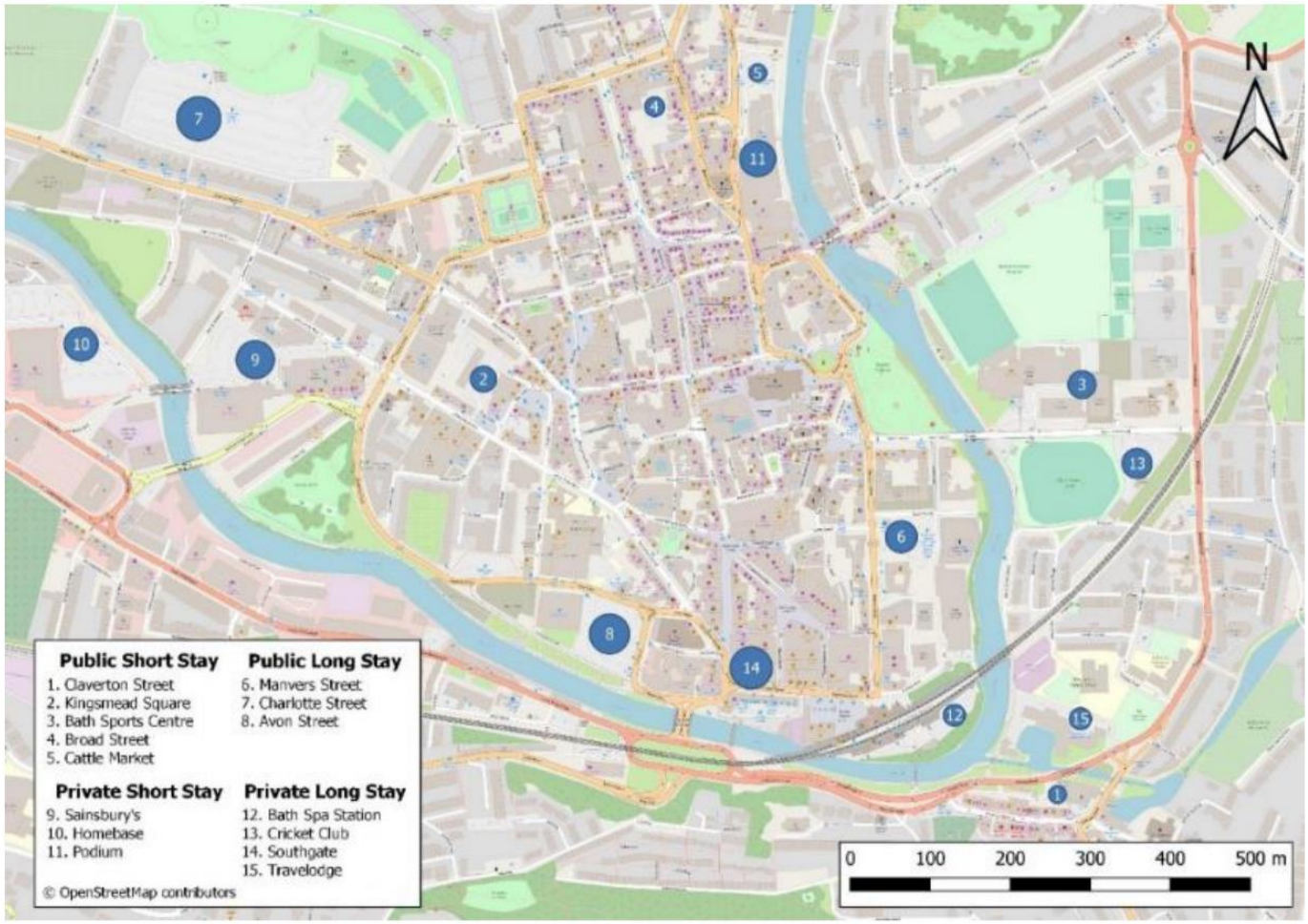
The highway network of Bath is made up of a mixture of A roads, B roads and residential roads. The A-roads provide east-west connectivity across the city, whilst also travelling north-east and south-east from Bath, connecting the city to Wiltshire. There is a lack of north-south connectivity in Bath through these main A roads. B-roads are located in the centre and south of the city.

Key A-roads (A36 travelling from west Bath to the south east of Bath and A4 travelling from the centre of Bath to the north-east) have been designated as part of the primary route network (PRN). This means that, if changes are made to these roads, they must still form part of a coherent and sensible network.

The frequency of bus services in Bath is greatest travelling into and out of the city centre. There are at least, on average, 3.5 buses per hour (approximately 1 bus every 17 minutes) during the Monday AM peak hours. The south-east and north of bath contain areas that have less frequent bus services (between 0-2.5 per hour, approximately 1 every 24 minutes). The bus route network is denser in the west of Bath than in the east of the city. Key bus corridors are located along Lansdown Road, Upper Bristol Road and A367 Wellsway.

B.6 Car parking[13]

Figure A-13 Off-street car parks within Bath city centre



Bath contains several publicly available, off-street car parks within the centre, which are a mix of publicly and privately owned, long and short stay. All of these car parks experience high levels of occupancy nearing capacity, particularly during the middle of the day and on Saturdays and during the Christmas period (Figures A-14 – A-17).

In terms of blue badge parking, there were 279 disabled bays in off-street car parks in Bath in 2020. The Council also provides 45 dedicated on-street spaces in Bath. It is expected that adequate consideration of this during the design of future schemes should ensure that opportunities to maintain and enhance levels of disabled access are maximised.

Figure A-14 Average occupancy of Avon Street car park[13]

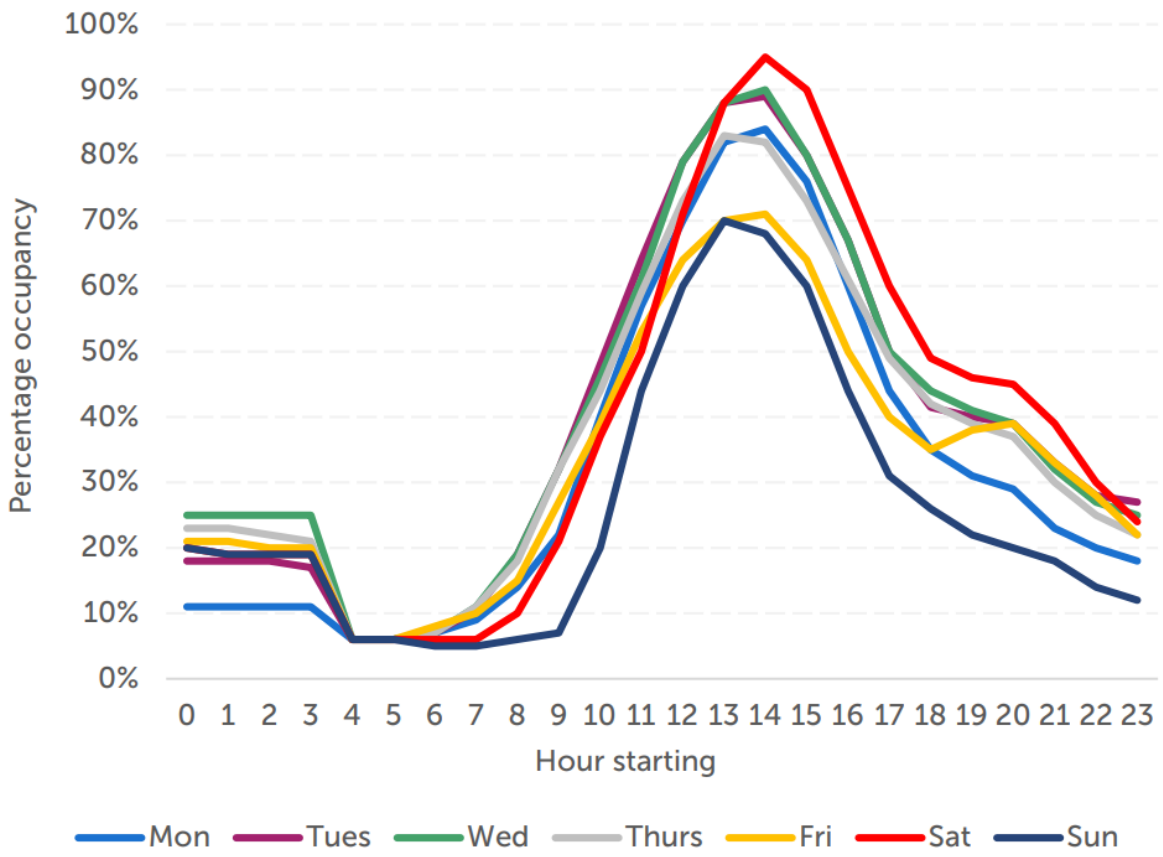


Figure A-15 Average occupancy of Manvers Street car park[13]

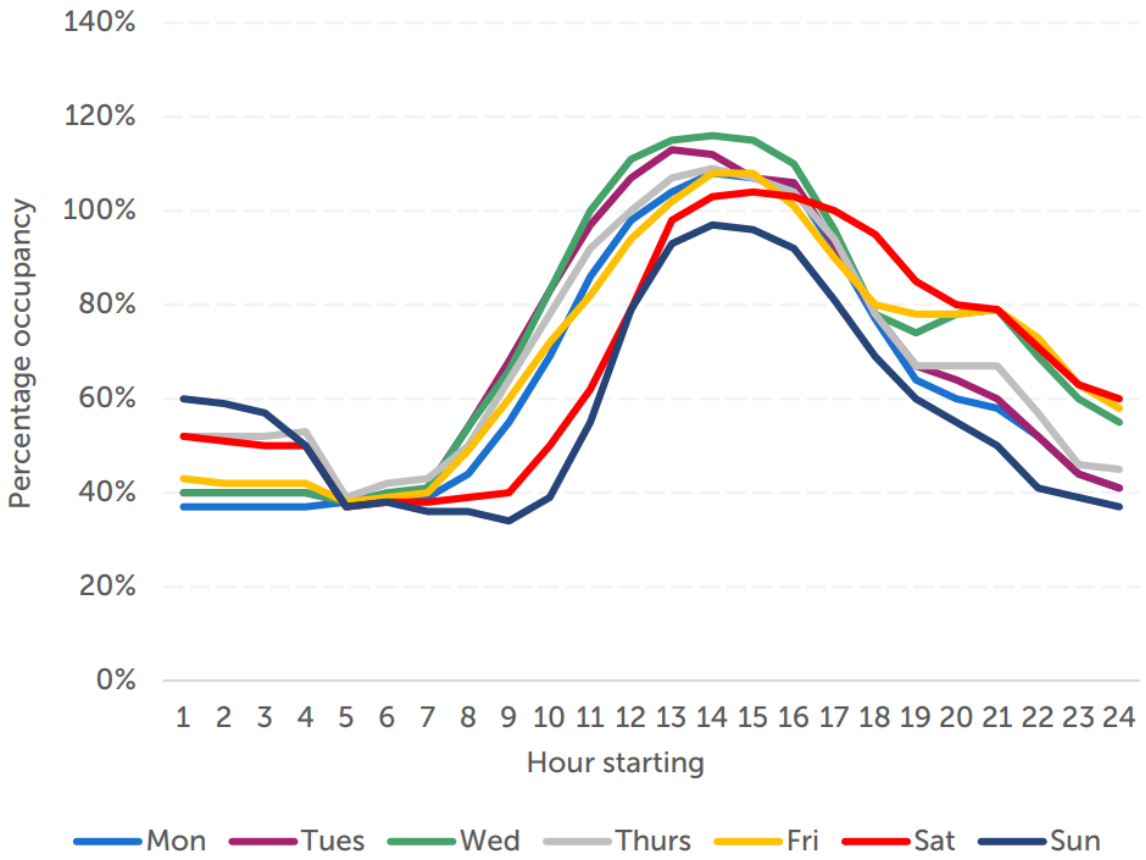


Figure A-16 Average occupancy of Southgate Street car park[13]

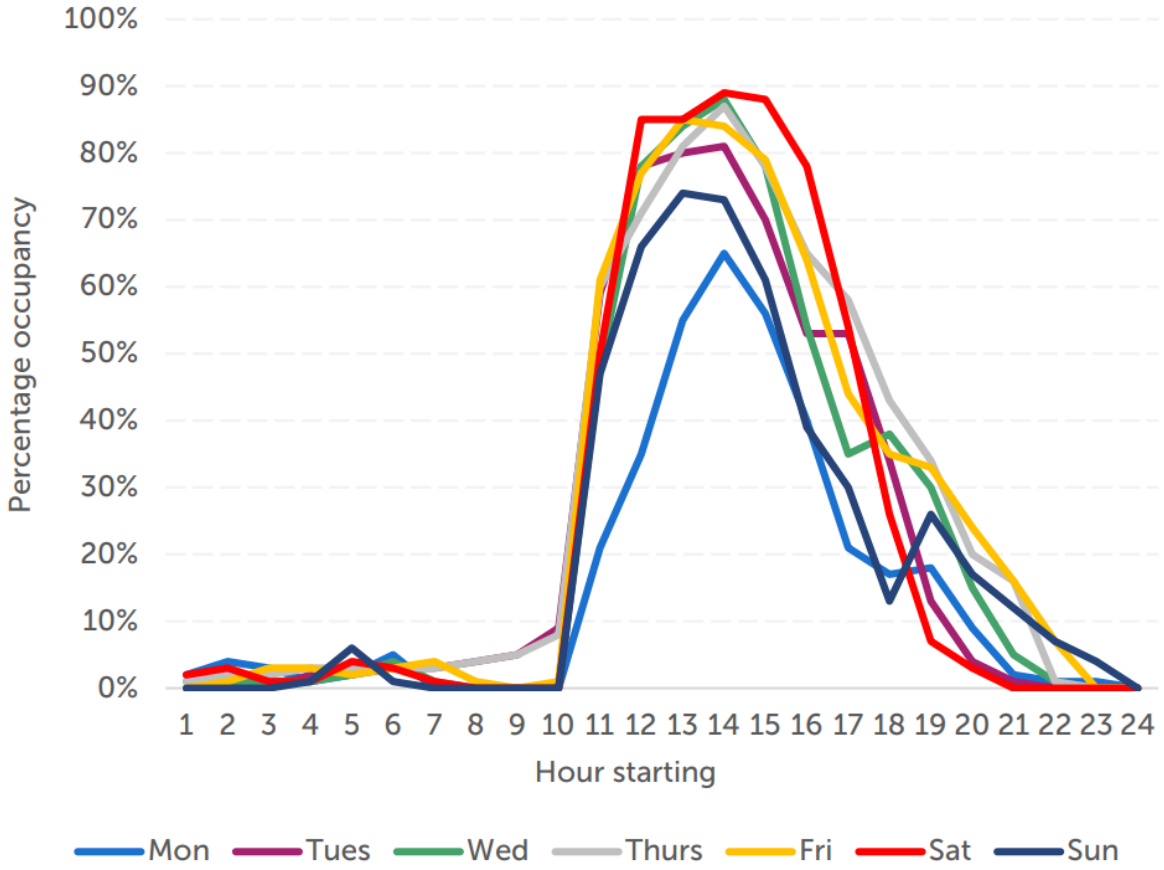
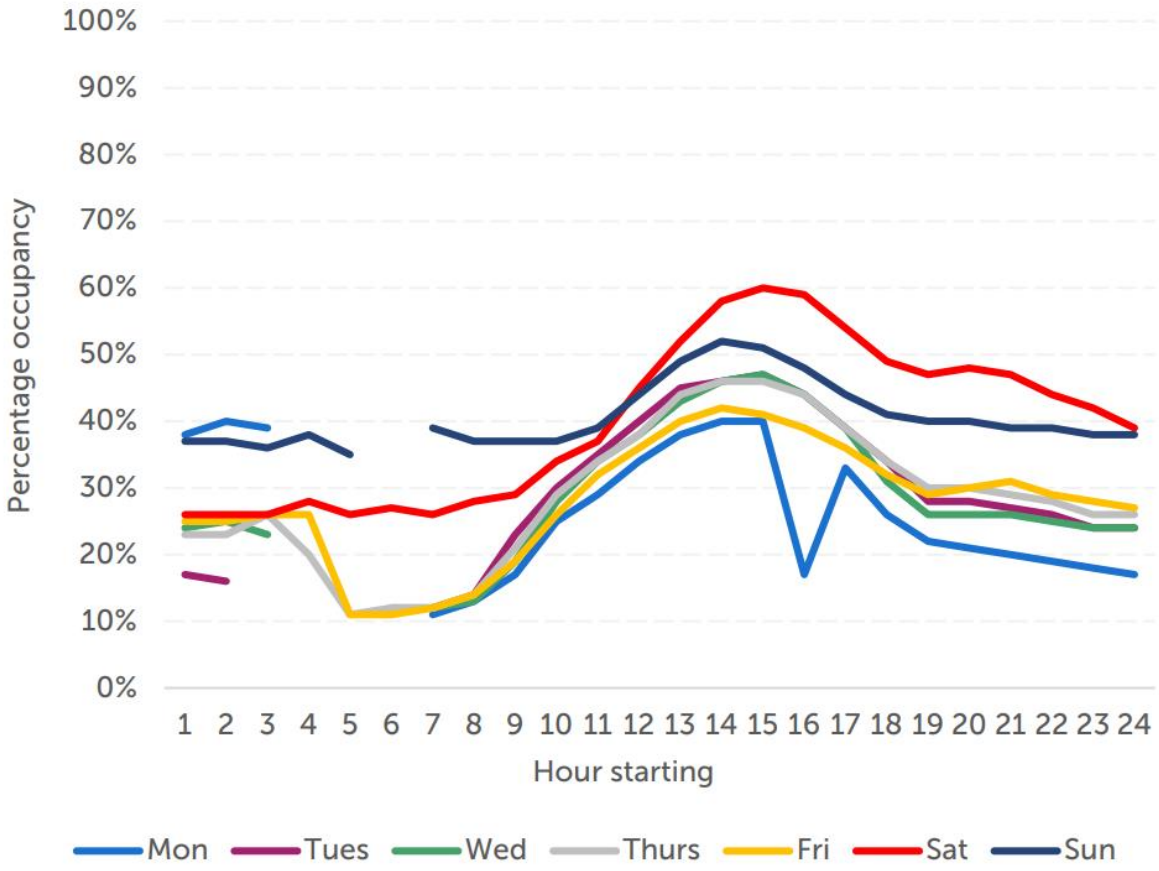


Figure A-17 Average occupancy of Charlotte Street car park[13]



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