

# **BRISTOL TRANSPORT STRATEGY**

**Tackling congestion and  
making Bristol a better  
place for all**

**Draft for consultation**

**July 2018**

## Foreword from Mayor

Bristol is a city of hope and aspiration, with many achievements to be proud of. We are also a city of two halves in terms of levels of deprivation. We are investing in opportunities in our city for it to continue to thrive, and we want to bring all of our citizens on the journey to success. We want everyone to be able to access opportunities and key services in an efficient and affordable way. Bristol's Corporate Strategy has four key themes and transport is a contributor to them all:

- Empowering and caring- we want to empower our communities to work with us to improve transport options to increase individuals' independence;
- Fair and Inclusive- we want to ensure people have access to learning, jobs and affordable homes and it is vital that good transport options are available to ensure no one is left behind;
- Well connected- we want to make sure our citizens are well linked by efficient and affordable transport options to jobs, services and each other;
- Wellbeing- we want to create healthier communities where citizens feel safe to walk or cycle and can breathe clean air.

Congestion is a major problem in Bristol that we need to tackle to get people moving around the city to access education, employment, health care, shopping and leisure facilities as well as visiting friends and family across the city and beyond. That is why in 2017 I set up the Congestion Task Group consisting of key stakeholder and influencers in the city to work with us to identify transport issues and solutions that are mutually supported. The Bristol Transport Strategy is a result of our partnership with the Congestion Task Group members and I fully support the ambition, vision and objectives of the Strategy.

## Foreword from Cabinet Member for Transport and Connectivity

In many ways, we have made huge achievements in transport in Bristol over recent years. We were the first Cycling City in the UK, which brought high levels of investment in cycling infrastructure and promotion and saw cycling figures double. We now have higher levels of cycling to work than Sheffield, Nottingham, Newcastle and Liverpool combined. We also have rising levels of public transport use in Bristol in a time when other cities across the UK are experiencing a decline in use. We are delivering a bus rapid transit scheme- MetroBus- that has included improved bus prioritisation measures to prevent MetroBus and other buses getting caught up in general congestion to improve reliability.

We still have challenges to tackle and transport congestion is a major contributor to these challenges. We will be developing thousands of new homes and jobs to accommodate growth in the city, which means there will be more people to move around on an already congested network. Realistic and affordable transport options in some parts of the city are still limited, resulting in poor access to jobs and opportunities. Bristol's poor air quality, mainly caused by pollutants from vehicle use, contributes to many early deaths a year. Many citizens still feel that it is not safe to walk or cycle in the city and journeys by non-motorised modes are unreliable due to levels of congestion.

I believe that delivering the objectives of the Bristol Transport Strategy will require continued partnership working with our citizens and stakeholders and working with the Congestion Task Group has begun this conversation. The Bristol Transport Strategy is the local voice for local people to achieve our vision together for improved and better connected transport.

Comment [JS1]: Yet to be agreed

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## Executive Summary

With a rich cultural heritage, prosperous economy, and world class universities, **Bristol is consistently ranked as one of the best places to live in the UK<sup>1</sup>**. However, as with other cities, we face **rising inequality and some of the most deprived areas in the country are located here<sup>2</sup>**. For Bristol to be an attractive place to work, live, and visit for everyone, it needs a transport network that supports the local economy, enhances the urban environment, and contributes to high-quality, people friendly places.

The city is experiencing the biggest investment in living memory with **around £800m already being invested in transport infrastructure to 2020**. This investment includes the first three routes of a MetroBus Rapid Transport network linking the city centre to the North Fringe and South Bristol. The MetroWest suburban rail scheme includes introducing a number of new cross city service and better timings. Cycle Ambition Fund programmes are helping to improve cycle infrastructure and transport investment linked to the Temple Quarter Enterprise Zone will provide sustainable transport access to new jobs.

This document looks ahead at the challenges that Bristol faces as a city, suggests a vision and objectives and outlines a number of aims and actions to ensure that sustainable travel becomes increasingly more convenient, reliable, attractive and cost effective.

### Challenges

The key transport challenges facing the city are:

- **Housing, jobs and regeneration:** Over 100,000 new homes and new jobs needed across the region by 2036<sup>3</sup>

- **Equality:** Bristol has some of the most deprived areas in the country, with a difference of 16 years in healthy life expectancy between the most and least deprived areas of the city<sup>4</sup>.
- **Health:** Physical inactivity contributes to 1 in 6 deaths and around 300 deaths a year are due to air pollution<sup>5</sup>.
- **Better places:** We need to tackle poor quality public space by creating high quality places and making better use of our streets
- **Reliable journeys:** Bristol has some of the worst congestion in the country, causing unreliable journeys for many people<sup>6</sup>.
- **Sustainable growth:** We need to support economic growth and accommodate emerging technologies while cutting carbon emissions.

### The Bristol Transport Strategy

Bristol will be a city of sustainable communities that combine housing, employment, retail, education, training and leisure functions, all linked by a strong public transport network. In order to tackle congestion and air pollution, our vision for Bristol is to be a well-connected city that enables people to move around efficiently with increased transport options that are accessible and inclusive to all. We will deliver an improved sustainable and resilient transport network that that supports Bristol's vibrant independent local centres and neighbourhoods and connects to an attractive and thriving city centre.

The use of technology to help us get around has increased rapidly and will continue to do so. Technology is helping people make their journeys door-to-door in a seamless way through measures such as journey planning tools, smart ticketing and mode sharing apps that allow citizens to access various modes of transport, reducing the need to own individual cars. We will embrace the use of technology that brings more efficient movement around our city and this is embedded throughout this strategy.

Journeys are made for many different purposes and to various points across the city; therefore it is not appropriate to identify just one target for

all trips across all parts of the city<sup>7</sup>. We have identified a number of objectives, outcomes and actions that seek to overcome the challenges we face and to meet our vision.

### City wide movement

A great deal of traffic that travels through the city each day is from surrounding areas to access employment sites in the centre of the city, which is a big contributor to congestion throughout the city. The road network is at capacity and will be placed under further pressure from planned housing and economic growth. Building more roads will not solve this issue. Apart from not having space available to do so, providing more road space for cars will mean more cars will add to overall congestion levels and will create more hold ups at already congested points in the city. We need to make changes the in the way we use our street space so that people and goods can move around the city more efficiently.

Working with neighbouring authorities is key to achieving our vision and tackling the regions transport challenges. Bristol City Council has been working with South Gloucestershire, Bath and North East Somerset, and North Somerset Councils on a Joint Transport Study (JTS)<sup>8</sup>, which will inform the emerging Joint Local Transport Plan that covers the West of England region. Our approach to enable efficient movement around the city, which has been fully evidenced through the Joint Transport Study is as follows:

- Manage the demand on the network to ease congestion.
- Enable people and goods to travel into and through the city more efficiently.
- Make space and improve safety for movement by sustainable modes.
- Encourage the use of sustainable modes and embed a sustainable transport ethos to help achieve our vision.

The outcomes we will seek to meet this approach are:

**Outcome #1 | Efficient movement of traffic around the city, with increased resilience of the network and minimised impacts of congestion and air pollution.**

**Outcome #2 | On and off street parking managed efficiently to encourage use of sustainable transport and tackle congestion, while providing options that support the city's 24 hour economy.**

**Outcome #3 | Reduced excess lorry and van travel in the city (especially during peak hours), working with industry to find cleaner alternatives for the movement of goods.**

**Outcome #4 | Public transport to be visibly integrated, convenient and reliable to enable people to move around the city in a more efficient way.**

**Outcome #5 | Walking to be safe, pleasant, accessible and the first choice for local journeys and combined with public transport for longer journeys.**

**Outcome #6 | Cycling to be safe, simple, accessible and convenient, either as an option for the whole journey or as part of a journey combined with public transport.**

**Outcome #7 | A resilient, safe and well-maintained network to enable continuous movement of people and goods, using smart technologies.**

**Outcome #8 | More people making sustainable and healthy transport choices by improving engagement with communities, schools and businesses.**

**Outcome #9 | New developments to be innovative in their approach to prioritise sustainable transport options and address the impact on the existing network.**

## City Centre

In central Bristol, we will deliver the **City Centre Transport Package** to make the city a more attractive destination and place to work and enjoy. The **regeneration of Temple Meads station** and transport schemes linked to the Temple Quarter Enterprise Zone will support growth in this area. Our outcome for the City Centre is:

**Outcome #10 | A city centre that is accessible by active and sustainable transport and attractive to live, work and visit, enhancing its status as the foremost shopping and cultural centre in the South West.**

## Corridors

Bristol has a number of transport corridors that carry large numbers of people from within the city and outside its boundaries to the city centre. Many of these corridors are local centres and high streets and have very limited space to expand to accommodate movements by multiple modes. We therefore have to be more radical in our thinking about how we can best move more people more efficiently along our corridors in mass transit modes, which could be located underground. Our outcome for corridors is:

**Outcome #11 | More efficient transport corridors to move the largest number of people in the space available.**

## Local Centres

Local centres provide a lifeline for many residents who live nearby providing key facilities, which means residents do not have to rely on a car for many every day needs. They are also places for people to meet and interact, and the influence of transport can have large impacts on creating a sense of place. Our outcomes for local centres are:

**Outcome #12 | Supported and enhanced local centres and high streets, recognising that they provide key services and facilities, and can also be transport corridors and destination points for visitors.**

**Outcome #13 | Reduced impact of motorised traffic on local centres creating better public spaces that are more accessible by walking, cycling and reliable public transport.**

## Neighbourhoods and residential streets

Bristol is made up of a number of neighbourhoods that each has its own identity and is where our citizens live. It is important that citizens feel safe and confident to walk and cycle in their neighbourhoods to access local services and connect to other parts of the city without relying on a car. Our outcomes for neighbourhoods and residential streets are:

**Outcome #14 | Key facilities and services increasingly accessible to all citizens without the need to rely on a car.**

**Outcome #15 | Safer places to live by working with citizens to design and deliver measures to improve movement and liveability in our neighbourhoods.**

## Funding and implementation

Local government is under increasing financial pressure with cuts in budgets and inconsistent funding streams. We will continue to work with developers to negotiate delivery of transport infrastructure identified in this strategy that benefits new developments. However, delivering the proposals set out in this document will require a step change in capital funding in the region, along with increases in revenue funding to help operate and maintain the new infrastructure. While new funding has been released through the establishment of the West of England Combined Authority, additional sources of funding will be needed, including consideration of workplace parking levies and/or road user charging.

## Introduction

With a rich cultural heritage, prosperous economy, and world class universities, **Bristol is consistently ranked as one of the best places to live in the UK**<sup>9</sup>. Sustained investment has resulted in large increases in sustainable travel across the city. Public transport use in Bristol has witnessed a rapid increase in recent years compared to decreases in the rest of the country, and more people now cycle to work in Bristol than in Sheffield, Nottingham, Newcastle and Liverpool added together<sup>10</sup>.

The city is experiencing the biggest investment in living memory with **around £800m being invested in its transport infrastructure to 2020**.

This investment includes:

- The first three routes of a MetroBus Rapid Transport network linking the city centre to the North Fringe and South Bristol.
- The MetroWest suburban rail scheme includes introducing a number of new cross city service and better timings.
- Cycle Ambition Fund programmes are helping to improve cycle infrastructure and transport investment linked to the Temple Quarter Enterprise Zone will provide sustainable transport access to new jobs.

We have a rising population and as such there is a need to provide around 100,000 houses and a similar number of additional jobs across the West of England by 2036. Whilst this will be a challenge it provides us with the opportunity to get things right at the planning stage and use development to fund new transport infrastructure.

However, as with other cities, we face **rising inequality and some of the most deprived areas in the country are located here**<sup>11</sup>. For Bristol to be an attractive place to work, live, and visit for everyone, we need a transport network that supports the local economy, enhances the urban environment, and contributes to high-quality, people friendly places. The

transport network needs to provide access to jobs, while minimising negative impacts such as congestion, poor health and air pollution, which are often concentrated in the most deprived areas of the city<sup>12</sup>.

Bristol's Corporate Strategy for the city contains the following themes:

- Empowering and Caring- empowering communities and individuals to increase independence;
- Fair and Inclusive- ensuring people have access to learning, jobs and affordable homes;
- Well Connected- linking people with jobs and each other;
- Wellbeing- creating healthier and resilient communities.

Each of these themes can be achieved by making access to increased transport options available to all our citizens<sup>13</sup>. Inequality across the city exists in part due to the lack of good quality transport options available to connect citizens to services. This strategy sets out objectives to ensure all citizens are able to get where they need to be to open up more opportunities and make sure no one is left behind.

The Bristol Transport Strategy looks up to 2036 and although we can plan for the known factors such as accommodating growth in housing and jobs, there are a number of unknown factors that could affect how people move around the city, such as the development of new technologies including driverless vehicles. We strive to keep ahead of emerging technologies to ensure the impact is to the benefit of all citizens and helps to overcome the challenges identified in this strategy.

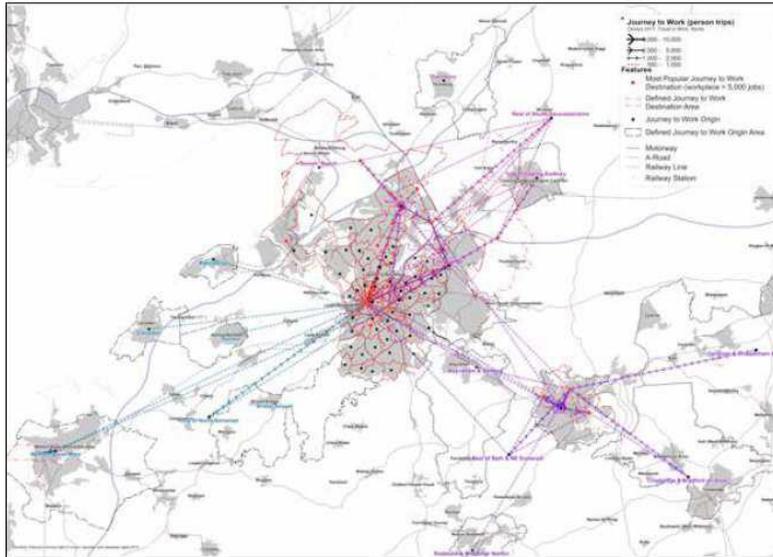
This document looks at the challenges that Bristol faces as a city, proposes a vision for the future and outlines a number of objectives to ensure that healthy and sustainable travel becomes increasingly more convenient, reliable, attractive and cost effective. Tackling our local transport challenges head on will help make us a happier, healthier and economically stronger city that attracts investment and affords a rising quality of life to all of our residents.



**(more photos on this page including metrobus and rail- will be the facing page to the intro)**

## How Bristol works

The way we look at transport in Bristol cannot stop at the boundaries of the city. Bristol is part of the wider West of England Combined Authority (WECA), which also contains South Gloucestershire and Bath and North East Somerset. Data on where people travel from to get to work shows that people travel from across the West of England to access employment in Bristol, with 90% of people both living and working in the West of England<sup>14</sup>.



Within the city boundaries, Bristol city centre is spread across a series of central focuses:

- The enterprise area and transport hub at Temple Quarter;
- The shopping focus of Cabot Circus and Broadmead;

- The leisure and heritage focus of the Harbourside;
- The historical and cultural focus of the Old City

The city centre is also home to regionally major hospitals the Bristol Royal Infirmary and the Bristol Children's Hospital, generating 24 hour movement from emergency vehicles, patients and staff.

(insert map to show where these areas are located and photos pointing to the areas on the map)



The city has two major watercourses flowing through it, which brings constraints in movement from one side of the city to the other as there are

limited options to cross them, contributing to bottlenecks at various points in the city centre.

Bristol has many major transport corridors that stretch from beyond the city boundary to the city centre. There is very high demand on these corridors and they transport thousands of people travelling from with wider area daily. The impacts are felt at a local level, however the strategic nature of these linking routes need a co-ordinated approach for improvements from our West of England colleagues and are therefore part of larger transport proposals in the emerging Joint Local Transport Plan (see Policy Context section for more details).

Bristol has a number of local centres that provide key services and facilities but are also destination points in their own right, attracting visitors from across the city such as Gloucester Road, Bedminster, Fishponds, Clifton and many more.

Bristol's neighbourhoods and residential streets are all designed differently as a result of the different eras in which housing has been developed. This ranges from narrow, Victorian streets where houses do not have off street parking to wide modern streets, shared spaces and home zones.

The way our city is laid out means that day to day travel patterns are varied and it is recognised that an approach to how we plan movement in and the city centre has to be different from how we plan movement in and between residential areas and local centres.

This strategy sets out our approaches in transport for the city as a whole, taking into account the differences in functions of areas across the city. As well as setting out outcomes and actions that apply to the complex range of movements around the city, we will set outcomes and actions for the following:

- **City Centre**- taking into account its multiple hubs, its changing function over time and the movements passing through and around the central area;
- **Corridors**- taking into account their dual role as corridors linking to the city centre carrying high volumes of movement, and local centres and destinations in their own right.
- **Local centres**- taking into account the importance of these areas for local trips and as destination points from further afield;
- **Neighbourhoods and residential streets**- taking into account the differences in design and functions across the city.



Label this diagram and include the named local centres

As transport movement does not stop at the city's boundaries, it is important that we work closely with our colleagues in the Combined Authority as well as neighbouring North Somerset to manage movement across the West of England. Throughout this strategy it will be made clear the objectives that we will manage in Bristol and those that will be managed in partnership with others on a wider scale.

## Bristol: Part of a global movement for healthy liveable cities

Leading cities are promoting sustainable and healthy transport, helping to unlock economic growth and improve the health and wellbeing of citizens.

**London** | The aim of London’s Healthy Streets Approach is to help create a vibrant successful city where people can live active, healthy lives. Key aims include 80% of trips to be made by foot, cycle, or public transport by 2041, along with the elimination of road deaths and carbon emissions. Key schemes include cycle super highways, and pedestrianisation of Oxford Street to increase footfall and help tackle air pollution. Shortly after opening, the east-west cycle superhighway carried 1,200 people per hour – a third of the throughput of the M32 in Bristol in just 3 meters of roadspace<sup>15</sup>.



**Manchester** | Is undertaking one of the largest transport network development programmes seen outside London over recent years, which includes development of Metrolink, one of the best modern tram systems in Europe. A renaissance of rail travel is well underway with major investment taking place around the central Manchester hub in particular. The city is also investing in bus priority schemes, and its Velocity programme aims to transform Greater Manchester into a cycle city by 2025<sup>16</sup>.

The GROW project in Manchester is aiming to transform the city centre, with a new public transport system and public spaces. Oxford Road will be transformed into a pedestrian friendly boulevard giving priority to buses, taxis and bicycles with ‘Dutch-style’ segregated cycle lanes. General through traffic will be prohibited between 6am and 9pm, 7 days a week.

**Nottingham** | Over the past decade Nottingham has built up a high quality integrated and efficient transport system. The Nottingham Line One tram now carries up to 10 million passengers per year, and a comprehensive integrated bus network carries over 60 million passengers per year (compared to around 35 million bus passenger trips a year in Bristol). Motor traffic dominance has been reduced in the city centre and high quality public spaces have been created<sup>17</sup>.

**Copenhagen** | Over the course of more than 50 years, Copenhagen has gradually transformed its city centre to an urban space where walking and cycling are the most used forms of transport. Copenhagen has seen wide-scale pedestrianisation, the reduction in traffic lanes and prioritisation of cycles, as well as a gradual reduction in parking spaces by 2-3% annually and incremental increases in parking costs, all of which has helped to change the transport culture of the city. Land made available by the removal of parking spaces has been transformed into public open space<sup>18</sup>.

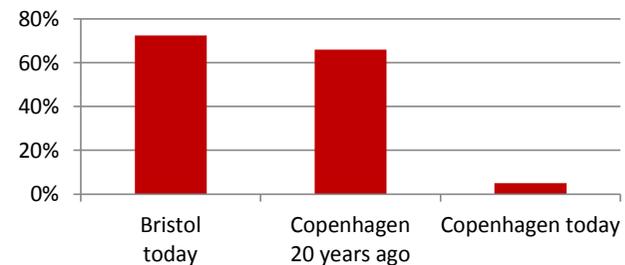


Figure X: People rating congestion as “bad” in Bristol and Copenhagen

## Policy Context

The Bristol Transport Strategy should be viewed in the wider context of national and regional transport policy as well as how it is framed by policy with indirect links to transport.

The Bristol Transport Strategy fills a policy gap that exists between the regional Joint Local Transport Plan (JLTP), which provides the transport strategy for the West of England region (more detail on this is on the following page), and specific mode, topic or area based strategies and plans. At the West of England regional level, we are also producing a Joint Local Cycling and Walking Infrastructure Plan (LCWIP) and a Joint Bus Strategy. These documents, due to be published in 2019 set the strategy for modes at the regional level, allowing the Bristol Transport Strategy and its subsequent mode specific strategies to outline the Bristol specific elements. This document provides the overall policy and strategy framework for transport in Bristol and informs and is informed by other Bristol led non-transport specific plans such as the Clean Air Plan and the City Centre Framework.

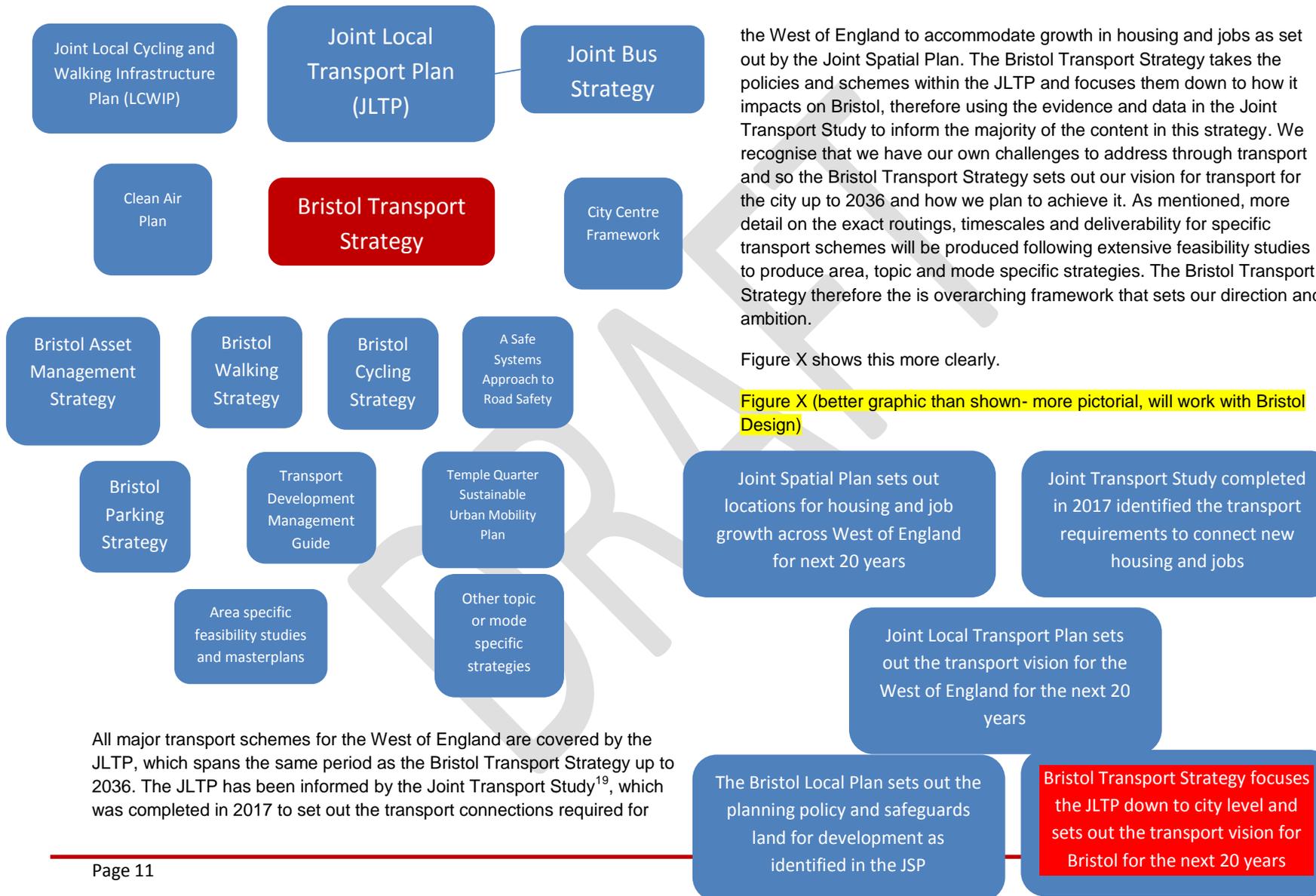
Under the Bristol Transport Strategy sits a number of mode, topic or area specific strategies and plans that will go into more detail for delivery. Some of these strategies are already published: A Safe Systems Approach to Road Safety (2015) and the Temple Quarter Enterprise Zone SUMP (2016). The Transport Development Management Guide is due to be published in 2018.

The Bristol Walking Strategy, the Bristol Cycling Strategy and the Bristol Parking Strategy are the next documents to be produced. Work will begin on these documents in early 2019.

Parts of the city will come forward at different times for development to accommodate housing and jobs. In order to ensure sustainable transport is embedded from the outset, we will produce detailed masterplans for

each area to include the transport requirements and to ensure alignment with strategic policies as set out in this strategy and the JLTP, as well as methods and timescales for delivery. This will involve detailed feasibility studies and designs, as well as collaboration with colleagues in planning, urban design, housing, economic development and more.

(Insert timeline to show period covered by each plan)



the West of England to accommodate growth in housing and jobs as set out by the Joint Spatial Plan. The Bristol Transport Strategy takes the policies and schemes within the JLTP and focuses them down to how it impacts on Bristol, therefore using the evidence and data in the Joint Transport Study to inform the majority of the content in this strategy. We recognise that we have our own challenges to address through transport and so the Bristol Transport Strategy sets out our vision for transport for the city up to 2036 and how we plan to achieve it. As mentioned, more detail on the exact routings, timescales and deliverability for specific transport schemes will be produced following extensive feasibility studies to produce area, topic and mode specific strategies. The Bristol Transport Strategy therefore the is overarching framework that sets our direction and ambition.

Figure X shows this more clearly.

Figure X (better graphic than shown- more pictorial, will work with Bristol Design)

All major transport schemes for the West of England are covered by the JLTP, which spans the same period as the Bristol Transport Strategy up to 2036. The JLTP has been informed by the Joint Transport Study<sup>19</sup>, which was completed in 2017 to set out the transport connections required for

# Challenges

## Challenges The issues facing our city that have transport implications



### Housing, jobs and regeneration

Over 100,000 new homes and new jobs needed across the region by 2036.



### Equality

Bristol has some of the most deprived areas in the country, with a difference of 16 years in healthy life expectancy between the most and least deprived areas of the city.



### Health

Physical inactivity contributes to 1 in 6 deaths in the UK, with 83% of children and more than a third of adults in Bristol not meeting recommended physical activity levels. Around 300 deaths a year in Bristol are due to air pollution.



### Better places

We need to tackle poor quality public space by creating high quality places and making better use of our streets to enable better point to point movement.



### Reliable journeys

Bristol's levels of congestion are among the worst in the country causing unreliable journeys for many people. This decreases the attractiveness of Bristol as a place to live and work and causes a drag on the local economy.



### Sustainable growth

We need to support economic growth and accommodate emerging technologies while cutting carbon emissions.



## Housing, jobs and regeneration

Due to growth in population and reductions in the number of people living in households, the Joint Spatial Plan (JSP) for the West of England sets out plans to accommodate over 100,000 much needed new homes and around 83,000 new jobs over the next 20 years. Around 32,000 new homes will be delivered in Bristol, and more across a range of sites beyond the green belt in neighbouring areas in the West of England. In terms of jobs, around 22,000 will be in Temple Quarter in the city centre and around 11,000 will be in the Avonmouth Severnside Enterprise Area, which spans the north western boundary into South Gloucestershire.

### Map of SDLs and Enterprise areas.

This development will create additional pressure on transport networks in Bristol. There are limited opportunities for significant highway capacity improvements in Bristol. As such, the overall approach is therefore to reduce traffic to create the right conditions to support growth in housing and jobs by improving connections into the city by public transport and by intercepting traffic travelling from further afield on the edges of the city. This will enable the city's roads to be restructured to support sustainable and healthy travel.

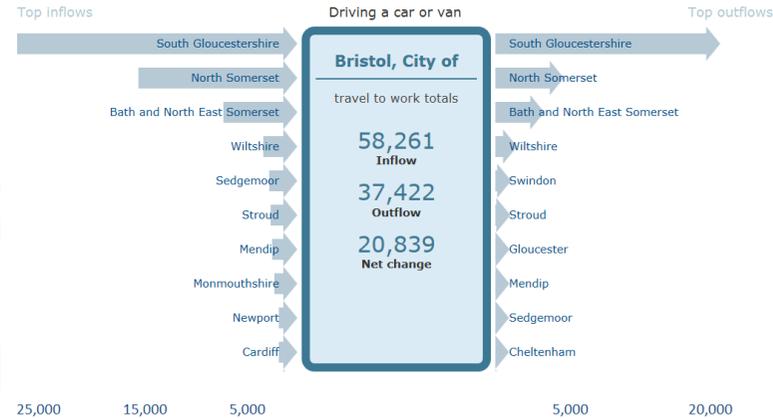
Due to the growth in housing and jobs planned in Bristol we would need to reduce the percentage of people commuting by car from:

**53%**

today to around:

**43%**

in 2036, just to maintain traffic at its current level (ref JTS).



**60%**  
of people driving to work in Bristol city centre do so from neighbouring areas, and over

**35,000**  
Bristol residents drive to workplaces outside of Bristol.

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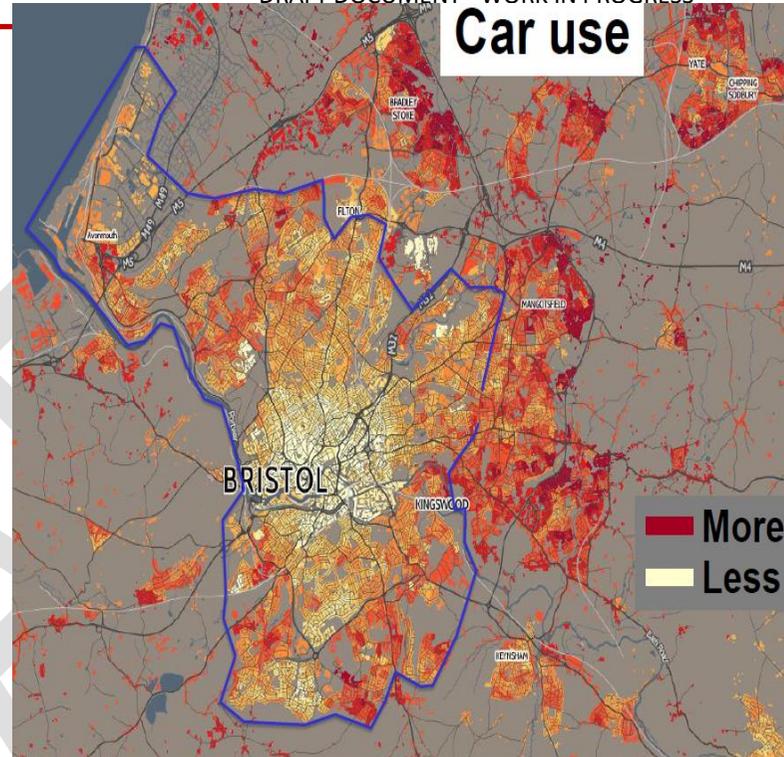
We cannot solve our transport issues alone and continuing to work effectively with our neighbouring authorities and the West of England Combined Authority is crucial to solving our transport challenges. Figure X shows that many areas with low walking, cycling, and public transport use within the West of England, are outside Bristol's boundary. While

travel patterns have become more dispersed over the last 20 years, the predominant travel movement in the region is still to/from central Bristol and the employment sites in the north at Filton Abbeywood and the surrounding areas<sup>21</sup>.

**The transport implications of this challenge are:**

- Increased housing and jobs means more people need to move around.
- This will create added demand on already congested transport network.
- Currently high levels of commuting by car to Bristol from outside the city boundary.

DRAFT DOCUMENT - WORK IN PROGRESS





## Equality

Transport can play a major role in tackling inequality. Residents in areas of high levels of deprivation have fewer opportunities to access jobs, health care, and green space. Residents in these areas encounter worse air pollution, a disproportionate level of traffic injuries, and live closer to major roads which sever their communities<sup>22</sup>. Poverty and deprivation also appear to be associated with a higher risk of excess weight in Bristol, and providing healthy travel choices can play a large role in tackling this<sup>23</sup>

People in the most deprived areas of Bristol are far less likely to own and drive a car, and far more likely to walk or get the bus than people in the least deprived areas. While the percentage of people cycling in the most deprived areas is lower than for other groups, for many people cycling is a lifeline to access jobs and services.

IMD 2015 Bristol	Don't own a car	Method of travel to work			
		Walk	Cycle	Bus	Car
10% Most deprived	20%	20%	6%	14%	44%
10% Least deprived	4%	10%	9%	5%	56%

Public transport is vital in enabling people to find and sustain employment. We need an inclusive transport system that caters for the rich and poor, young and old, and people with diverse mobility needs.

Around **40%** of jobseekers say that lack of personal transport, or poor public transport, is a key barrier preventing them from getting a job

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**We must consider the needs of all when planning transport interventions so that everyone can access wherever they need to go in a safe and efficient way. The access requirements of disabled citizens and visitors may be different for non-disabled citizens and we must therefore ensure transport options are viable for all.**

**The transport implications of this challenge are:**

- The negative effects of traffic such as poor air quality, road collisions and community severance tend to be higher in the most deprived areas of the city.
- Transport options are limited to some residents in most deprived areas of Bristol, resulting in poor connections to jobs and training.
- Access requirements are not the same for all, therefore we must consider the needs of all our citizens to have suitable and realistic options to get around.

Photo of wheelchair user accessing bus

## Health

**Physical inactivity** directly contributes to 1 in 6 deaths in the UK<sup>25</sup> and costs £7.4bn a year when the impact on the NHS, social care, absence from work and other factors are taken into account<sup>26, 27</sup>.

**Air quality** must also be improved with large areas of the city experiencing levels of pollution in excess of EU and UK health based objectives. Most of the pollution leading to breaches of these objectives is generated by transport. Emissions from vehicle exhausts and the generation of particulate matter from brake, tyre wear and resuspension of particles are both significant sources of pollutants that are harmful to health<sup>28</sup>. Exposure to poor air quality can discourage walking and cycling, however a study has shown that exposure to polluted air is worse for those travelling in a car than it is for those using sustainable transport<sup>29</sup>.

Finally, we must improve the feeling of **safety** on our streets and continue to reduce road collisions. Actual and perceived safety is still a big barrier to cycling in particular.

Method of travel to work 2011	Car/ Taxi	Public Transport	Cycle	Walk	Other	Work from home
English core cities average (exc. Bristol)	55%	22%	2%	12%	1%	7%
Bristol	53%	11%	8%	18%	2%	8%

Bristol has the highest proportion of people walking and cycling to work of any large city<sup>30</sup>. We need to build on this trend and tackle poor pedestrian environments in some areas including parts of the city centre.

### The transport implications of this challenge are:

- Walking and cycling can increase levels of physical activity and reduce air pollution but our citizens have to feel safe on our streets to do this.

- The message that walking and cycling can improve health, wellbeing and air quality needs to be more widely promoted.

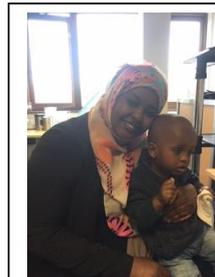
Around **51%** of Bristol residents report being obese or overweight

Around **300** deaths (8.5% of all deaths) each year in Bristol are attributable to air pollution

**8** people killed and **1,200** people injured on Bristol's roads in 2015

Only **30%** of residents rate cycling safety in Bristol as good or very good and **80%** support improving cycle safety

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*'I don't cycle because I am scared. The roads are quite busy with a lot of cars and sometimes it is not safe.'*  
- Sacdiyo Mohammed- Barton Hill



## Better places

Transport has a large role to play in making the city, and the city centre in particular, a more attractive destination and place to work and enjoy, enhancing its status as the foremost shopping and entertainment centre in the South West. With changes to consumer shopping habits and the increasing influence of internet shopping, Bristol needs to ensure its city centre is seen as an attractive place to visit and spend time in. The movement of people and goods is often the dominant function of our public areas and by changing how we move through an area can bring improvements to the public realm and air quality.

Many of our transport corridors are local centres and destinations in their own right, and transport improvements need to support and enhance these areas.

Around 76% of Bristol's residents reported being satisfied with their local neighbourhood as a place to live<sup>35</sup>, however, many neighbourhoods are dominated by motor traffic, and are poorly connected to each other.

Many neighbourhoods are multifunctional and act as local centres. By supporting and enhancing this we can encourage the development of a 'polycentric city' or a city that has multiple functioning centres, where facilities and amenities are available within a close distance to where people live, reducing the need to travel.

It must also be recognised that not all trips will be accessing the city centre or local centres and therefore we must enable point to point journeys across the city to allow citizens to get where they want to be.

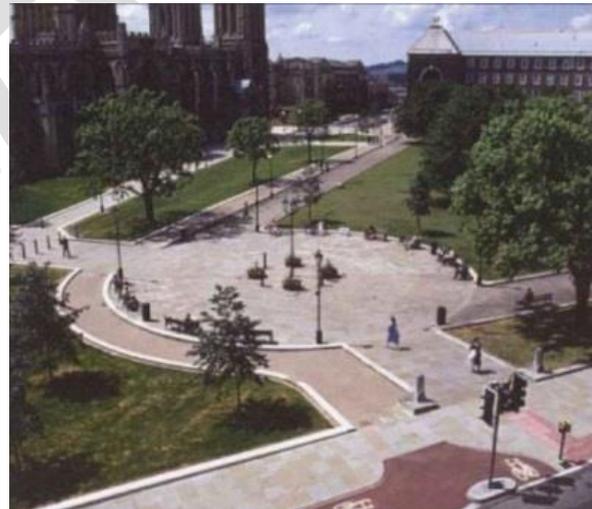
### The transport implications of this challenge are:

- The city has many differing functions that can be made better through transport improvements.
- Each function is different and therefore improvements must recognise these differences.

- There is a need to consider the entire point to point journey for all our citizens and visitors.



College Green- before, dominated by traffic (above) and after, the creation of improved public space (below) **need up to date photo**





## Reliable journeys

Congestion is an issue in Bristol, particularly at peak times, but increasingly throughout the day, making travel around the city slow and unreliable for many people. This decreases the attractiveness of Bristol as a place to live and work and wastes time, causing a drag on the local economy and contributing to poor health and poor quality public spaces. This is an issue for private cars, but also for buses, business and freight traffic that get caught up in congestion.

While building more roads may appear to solve some issues in the short term, it can cause an increase in motor traffic across the region by encouraging more car travel<sup>36</sup>. Due to our historic narrow road layouts and topographical challenges caused by hills and rivers, there is very limited space to provide additional highway capacity. Apart from not having space available to do so, providing more road space for cars will mean more cars will add to overall congestion levels and will create more hold ups at already congested points in the city. We must instead focus on moving the most people in the space we do have and improve the reliability of sustainable transport, freight and essential services.

Public transport use in Bristol is increasing fast and from a low base in 2011, with Bristol is now in the top ten cities for bus use in the UK<sup>37</sup>. However, we still need to make public transport faster and more reliable as this appears as the top way to increase usage<sup>38</sup>. Many citizens rely on public transport to get them to destinations on time, or to link with other modes of transport, such as to get to rail stations or the Airport.



*'I use the bus to get to Parkway Station and that has been frustrating at times as sometimes it doesn't even show up at all. There was one where I missed my train because of the bus.'* - Fred Wiffen- University of Bristol

Average speed on some bus routes is currently as low as **6mph** in peak periods with **80%** 'on time' in 2015/16

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It is therefore vital that timeliness of public transport is improved. The majority of public transport use is by bus and in order to improve reliability of buses we need to improve the resilience of our road and rail network and reduce congestion by encouraging people out of individual cars and on to vehicles that carry larger numbers of people. The use of technology to give accurate journey times and to enable seamless movement through smart ticketing and app based travel modes is increasing and we must embrace this.

The current transport network is very vulnerable. Often when major incidents occur on our roads or on the motorway network, vehicles are forced to find alternative routes through the city, which cannot cope with additional demand. This results in heavy congestion that make journey times unreliable for most modes. Maintaining a resilient network to avoid the economic costs of failures in the transport system is an important focus. Our highways are the Council's biggest asset at a total value of £5bn, requiring over £7m per year to maintain. These pressures will be increased due to the impacts of climate change which will increase the frequency of extreme weather events.

Our highways are Council's biggest asset at a total value of **£5bn**, requiring over **£7m** per year to maintain

40

**The transport implications of this challenge are:**

- High levels of congestion means journeys made by all motorised modes can be unreliable.
- Buses get caught up in traffic, causing buses to be late reducing the attractiveness of public transport.
- Transport network is vulnerable and incidents can cause the city to become severely congested.

Diagram showing how building more roads can lead to them filling up and buses caught in congestion.

**Sustainable growth**

Tackling all of the challenges listed so far will help support sustainable growth, with savings for the NHS, more reliable journeys, and better places to encourage people to come to Bristol. In addition, we also need to continue to reduce carbon emissions, adapt to climate change, and tackle the challenges raised by developments in technology that will impact on the transport network.

Road traffic is one of the largest sources of carbon dioxide emissions, which is contributing to climate change<sup>41</sup>.

To meet our target of **zero carbon by 2050**, we must rapidly reduce carbon emissions from transport, which currently represent **25%** of Bristol's total

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With more people living and working in Bristol, leading to significant increases in motor traffic, it will become progressively important and challenging to reduce the overall carbon footprint. Promoting sustainable

and healthy modes of transport is one of the main ways we can reduce transport emissions, along with the promotion of more efficient vehicles.

Bristol is a major freight origin and destination. Bristol Port is an international gateway and the Avonmouth / Severnside Enterprise Area is an important logistics hub, which benefits from proximity to the Port and direct access to the motorway network. This area is forecast to grow significantly, resulting in increased goods traffic in this area.

The Temple Quarter Enterprise Zone (TQEZ) is another area of planned employment growth, with 22,000 jobs to be provided over the lifetime of this strategy with a focus on digital and creative industries. Major investment has already been made in transport infrastructure to enable movement to the TQEZ by sustainable modes from across the West of England, providing opportunities of employment and enterprise for our residents. With Bristol Temple Meads at the hub of the TQEZ, which connects to major cities and towns, the West of England is opened up as a strong economic competitor to London and the economic powerhouses.

There are limited options to bypass Bristol City Centre, therefore the TQEZ experiences high volumes of through traffic, including freight vehicles, adding to an already heavily congested network. Freight movement around the TQEZ is currently mixed, due to the industrial sites in neighbouring St Philips Marsh, which generates HGV movements, and the contrasting digital technology sector in the TQEZ, which generates fewer HGV movements but still experiences high levels of small deliveries in vans. The increase in light goods vehicles is expected to rise across the whole city to service the needs of businesses and households as shopping habits change<sup>43</sup>.

Photo of Port and Avonmouth.

Photo of TQEZ

The transport strategy must also consider the needs of a more flexible workforce, more able to work from home, along with how the needs of an

ageing population can be met. New ways of traveling are being introduced at a rapid rate due to the rise in smart phone use and this must be embraced to enable more efficient movement around the city. Sharing modes of transport is no longer restricted to bus and rail, we can now share bikes, taxis and minibuses to get around, reducing the number of vehicles on our network.

Connected and autonomous vehicles (CAVs) are forecast to increase in around the period covered by this strategy<sup>44</sup>, which could have the potential to transform how we travel. It is too early to tell how this transformation will unfold, but as with all new technologies, there are likely to be both positive and negative impacts. CAVs could enable greater efficiency in how the road network is used for instance through shared smart taxis, which can also reduce the need for parking. However, they could also increase the number of vehicles on the road and increase congestion, and there would need to be an even greater emphasis on promoting public transport. These questions are already being considered with the ground-breaking VENTURER and FLOURISH projects, with the ambition for the West of England to become a European leader in the progressive roll-out of new technologies and new forms of mobility.

#### Photo of Venturer project

Finally, local government is under increasing financial pressure with cuts in budgets and inconsistent funding streams, particularly for active travel measures. We will continue to work with developers to negotiate delivery of transport infrastructure identified in this strategy that benefits new developments. However, delivering the proposals set out in this document will require a step change in capital funding in the region, along with increases in revenue funding to help operate and maintain the new infrastructure. While new funding has been released through devolution and the establishment of the West of England Combined Authority, additional sources of funding will be needed to deliver and maintain the proposals in this strategy.

**The transport implications of this challenge are:**

- Bristol is an economic hub with plans to expand and grow the economy of the city, but this will mean increases in movement to and from our enterprise areas of goods and people, increasing the pressure on an already congested network.
- The extent of emerging technologies in transport and how it can change how we move around and can increase efficiency in movement, however changes to how we move around in the future is relatively unknown.
- Funding for transport schemes that can deliver a step change in how people travel to achieve sustainable growth is inconsistent.

## Stakeholder engagement

This strategy has been informed by engagement with a wide range of stakeholders during consultation exercises over a number of years on various plans. Public consultation has helped to provide an evidence base to identify the issues people have with travel and transport in Bristol and what they feel the priorities for investment should be.

Examples of some of the strategies and projects that have included transport consultation are shown below (further details are available via the links):

A Good Transport Plan for Bristol	Temple Quarter Enterprise Zone, Sustainable Urban Mobility Plan	West of England Joint Transport Study	LSTF Attitudes to Sustainable Transport Survey
National Highways & Transport Public Satisfaction Survey	Bristol Resilience Strategy	20mph Rollout and evaluation reports	Bristol Bugbears
Local Transport Plans	Bristol Cycling & Walking Strategies	Greater Bristol Bus Network	Bristol Quality of Life Survey

The recurring transport challenges that have been raised by the public and stakeholders are:

- Congestion
- Public transport provision
- Parking



'I'll go into town on the bus but I've got friends in Downend and Horfield and just find that the services don't connect well enough. I don't find it all that easy.'- Tracy O'Brien- St George

Citizens and stakeholders are keen to see the following prioritised::

- Investment in public transport- buses and rail for improved reliability and punctuality
- Investment in walking and cycling to be better connected and safer

Consultations have also shown us that the public and stakeholders are keen to see more radical transport plans for the city, telling us to be more ambitious with our approaches.

### Congestion Task Group

This strategy has been produced in collaboration with the Congestion Task Group, which was set up in 2017 consisting of stakeholders from across the city. The origins of this strategy have been informed by strong evidence from transport studies as well as input from stakeholders that use and rely on the transport network daily.

### The Ongoing Conversation

Consultation on travel and transport in the city will continue throughout the development of the Bristol Transport Strategy and beyond. We will seek to engage with as wide a range of people as possible and look at innovative ways in which to gather the information necessary to create a plan that meets the needs of our citizens.

Delivering the objectives of the Bristol Transport Strategy will require continued partnership working with our stakeholders. We will continue to engage with citizens to ensure the strategy is the local voice for local people in a time when we will see Bristol develop and grow as part of the West of England region.

DRAFT

# The Strategy

## Vision

***Our vision for Bristol is to be a well-connected city that enables people to move around efficiently with increased transport options that are accessible and inclusive to all. We will deliver an improved sustainable and resilient transport network that that supports Bristol's vibrant independent local centres and neighbourhoods and connects to an attractive and thriving city centre.***

To achieve this vision, and to overcome our challenges, our city needs to continue the transition to increased use of sustainable modes of transport, such as walking, cycling and public transport.

We have housing and jobs growth planned for the city, which means more people commuting every day. For the city to maintain congestion at its current level with the planned growth (and not increase), the percentage of people commuting by sustainable transport would need to increase further and people commuting by car would need to reduce from 53% today to around 43% in 2036<sup>45</sup>.

Our ambition is to go further, as not every trip is for commuting purposes. We aim to reduce current levels of congestion and tackle the transport challenges we face, by increasing sustainable transport use for more journeys in line with leading liveable cities around the world.

As will be explored in the following sections, journeys are made for many different purposes and to various points across the city; therefore it is not appropriate to identify just one target for all trips across all parts of the city. How we contribute towards our vision will require measuring a number of factors, as outlined in the Monitoring section at the end of the strategy. To help achieve this vision and overcome the challenges identified, we have set out a number of objectives, which follow.

**Photos of liveable cities from across Europe**

## Objectives

The overall objectives of the strategy respond to the challenges raised.

The objectives are:



Provide transport improvements to accommodate increased demand from growth in **housing, jobs & regeneration** on an already congested network with complex movements from within and outside the city boundary.



Enable **equality** within an inclusive transport system that provides realistic transport options for all.



Create **healthy places**, promoting active transport, improving air quality, and implementing a safe systems approach to road safety.



Create **better places** that make better use of our streets and enable point to point journeys to be made efficiently.



Enable **reliable journeys** by minimising the negative impacts of congestion and increasing network efficiency and resilience.



Support **sustainable growth** by enabling efficient movement of people and goods, reducing carbon emissions and embracing new technologies

The objectives will be achieved by a number of outcomes and actions as detailed in the following sections of the strategy. Each outcome has the symbol(s) of the objective(s) as shown above to demonstrate how it contributes towards achieving the objectives. The How we will measure success chapter at the end of this strategy identifies the indicators we will measure and data we will collect to establish a baseline and report on how well we are meeting these objectives.

## Outcomes and Actions

The strategy begins by setting out outcomes and actions for the complex range of movement across the city as a whole. The 'How Bristol Works' section outlined the various functions of the city by area, which follow with outcomes and actions arranged by these functioning areas. These are:

- **City Centre**- taking into account its multiple focuses, its changing function over time and the movements passing through and around the central area;
- **Corridors**- taking into account their dual role as corridors linking to the city centre carrying high volumes of movement, and local centres and destinations in their own right;
- **Local centres**- taking into account the importance of these areas for local trips and as destination points from further afield;
- **Neighbourhoods and residential streets**- taking into account the differences in design and functions across the city.

The outcomes are set out, along with actions of how we will achieve the outcome. The actions begin with the following:

- **Explore**- we will investigate options to implement this action.
- **Enable**- we will work with partners to implement this action.
- **Deliver**- we will be directly responsible for implementing this action.

Some outcomes and actions are part of the emerging Joint Local Transport Plan for the West of England, but have an impact on achieving the Bristol Transport Strategy objectives. Where this is the case, it is stated that we will work with our West of England partners on implementation.

## City wide movement

Movements around the city are complex and made for many different purposes, including from home and various other points to work, school, health care, shopping, leisure, to visit friends and many more. The complexity of point to point movements around the city requires a range of approaches to enable such movement. This section sets out our objectives and actions to provide options to enable movement around the city in the most efficient and sustainable way.

A great deal of traffic that travels through the city each day is from surrounding areas to access employment sites in the centre of the city, which is a big contributor to congestion throughout the city. The road network is at capacity and will be placed under further pressure from planned housing and economic growth. As identified in the challenges, building more roads will not solve this issue. We need to make changes in the way we use our street space so that people and goods can move around the city more efficiently. Prioritising road space for buses does not necessarily slow down general traffic- in fact, buses carry more people so more people can move in one vehicle, helping to reduce congestion for all road users<sup>46</sup>.

As identified in our challenges section, the health of our citizens is directly related to transport, in particular exposure to air pollution. Increasing separation distances between citizens and the heaviest polluting vehicles even just by 1m can reduce the levels of pollution exposure and reduce health impacts. The more citizens walking and cycling in our city will improve air quality and increase levels of physical activity, bringing increased health benefits.

It is vital that our transport network across the city and beyond is resilient and by enabling movement of people and goods using fewer vehicles can reduce the vulnerability of the congested network. It is recognized that the car has a role to play for many journeys that are currently unrealistic by alternative modes, however our approach is to encourage those who can make a switch to alternative modes to do so to free up space on the transport network to reduce congestion and make alternative modes more efficient, encouraging more people to use them

### Street Space



Our approach to enable efficient movement around the city, which has been fully evidenced through the Joint Transport Study<sup>47</sup> is as follows:

(In a diagram)

- Manage the demand on the network to ease congestion.
- Enable people and goods to travel into and through the city more efficiently.
- Make space and improve safety for movement by sustainable modes.
- Encourage the use of sustainable modes and embed a sustainable transport ethos to help achieve our vision.

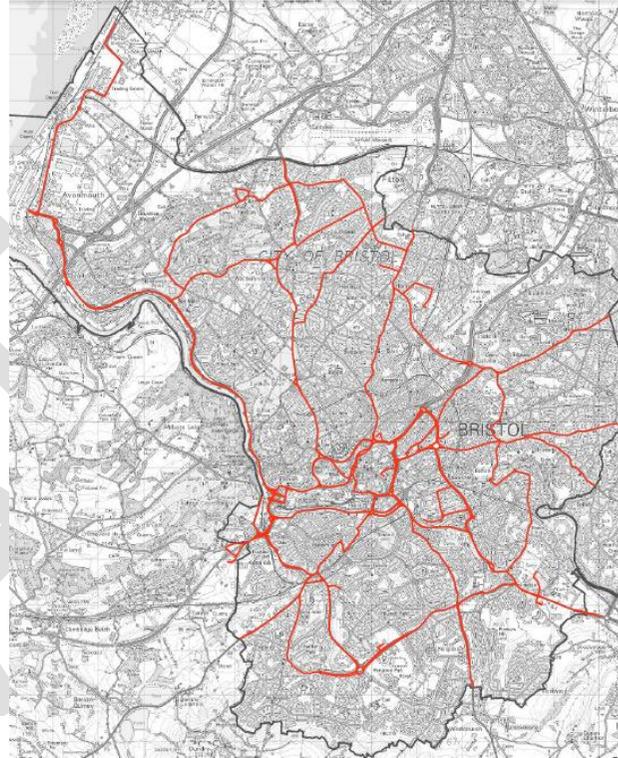
## Manage demand on the network to ease congestion:

**Outcome #1 | Efficient movement of traffic around the city, with increased resilience of the network and minimised impacts of congestion and air pollution.**



Along with our West of England partners, Explore, Enable and Deliver approaches to **managing the demand by vehicles on the transport network**. This could include measures such as managing parking provision or charging to drive in specific areas in order to improve air quality or charging to park to encourage those that can use alternative methods of transport to leave their cars at home. Funds raised through such schemes can then be reinvested in transport improvements. This is further detailed in the Funding section. It is vital that this is in conjunction with our West of England colleagues to avoid impact on competing commercial and business centres.

Along with our West of England partners, Deliver & Enable **improvements to network management** through a renewed traffic control centre, prioritising a 'resilient road network' to keep transport flowing. Work with neighbouring authorities and Highways England to manage transport across the region, and improve roadside information through increase use of new technologies, allowing data to be digitised and open to the public to update.



Resilient road network- label to explain what this is

Deliver & Enable continued use of our Code of Conduct to help **minimise the impact of all works that affect the highway**, and encourage greater compliance. Identify links between projects to minimise the number of times the road has to be closed for maintenance or to install new schemes.

Enable effective management of congestion associated with events, by working with partners to ensure **event management plans** are in place, encouraging initiatives such as the match day parking scheme for Ashton Gate.

Deliver a **Clean Air Zone** to improve air quality across the city and beyond by managing the movements of polluting vehicles (see box)<sup>48</sup>

### Clean Air Zones

Air pollution levels in Bristol exceed government standards and affect health, causing around 300 early deaths per year in the city. The government has proposed mandatory Clean Air Zones (CAZ) for six cities (excluding Bristol) to deal with the breaches. Bristol has been directed by central government to conduct a feasibility study to comply with air quality standards in the shortest time possible. The study will report in 2018.

Emissions from diesel vehicles are the dominant factor driving poor air quality. Historic central government tax incentives for diesel, based on benefits in terms of CO<sub>2</sub> emissions have driven a steep rise in the proportion of diesels in the UK fleet. Non-compliance with EURO test standards in real world driving conditions have contributed further to significantly higher emissions of nitrogen dioxide and fine particles than predicted.

Further work will be needed to determine the appropriate arrangements for a CAZ in Bristol, and will be consulted on separately to the Bristol Transport Strategy. The key decisions for Bristol in implementing a CAZ are:

- Determining the geographical extent
- Determining which classes of vehicles to include
- The level and nature of any charges
- Enforcement arrangements
- The timetable for implementation
- Mitigation and support for individuals and businesses affected by the scheme

Although there will be a separate consultation on Clean Air Zones, they will have an important effect on inner city movements and so need integrating into the Strategy.

Along with West of England partners, Deliver & Enable a **Joint Low and Zero Emission Vehicle Strategy**, including expansion of the charge point network and electrification of the Council's vehicle fleet, starting with 40 vehicles funded through the Go Ultra Low grant. Cars still have a role to play for many journeys until realistic alternative modes are available, therefore in order to manage the air quality impacts of car use, we will encourage the use of cleaner fuels, including electric vehicles.

**Outcome #2 | On and off street parking managed efficiently to encourage use of sustainable transport and tackle congestion, while providing options that support the city's 24 hour economy.**



Deliver & Enable the production of a new **Parking Strategy**, (to be completed in the near future and appended to this document), which will need to include extensive research on how parking spaces are used in the city and then look at:

- Off-street and on-street parking, including the role of privately operated car parks
- Parking standards for new development (included in Local Plan)
- Parking at transport interchanges, e.g. rail stations
- Park & Ride sites, and the potential to remove city centre parking as more Park & Ride sites are built
- Residents Parking Zones
- Charges and income

- Enforcement
- Parking information systems
- Disabled parking
- Cycle parking
- Car club and electric vehicle parking
- Bus stands, loading, taxi ranks, coach parking, motorcycle parking
- Maximising the use of kerbside space
- Consistent approaches across the West of England to avoid impact on competing commercial and business centres.

Explore **workplace parking levies** as a means to influence the supply and use of parking for commuters. A robust business case must be made before progressing the implementation of any scheme. A case study for this is included in the Funding section.

### Enable people and goods to travel into and through the city more efficiently:

**Outcome #3 | Reduced excess lorry and van travel in the city (especially during peak hours), working with industry to find cleaner alternatives for the movement of goods.**



Along with West of England partners, Deliver & Enable a **new Freight Strategy**, which will be part of the emerging Joint Local Transport Plan and will include the following actions among other measures:

Enable increased use of **Freight Consolidation** and micro-Freight Consolidation. Explore the use of sustainable transport hubs and Park & Ride sites as delivery hubs.

Deliver & Enable **appropriate loading arrangements** across the city, to including loading arrangements within neighbourhoods and residential streets. This includes ensuring loading bays are suitably located, have appropriate access times, and exploring new concepts such as virtual loading bays.

Enable & Explore measures to encourage the take up of **low emission and appropriately sized freight vehicles**, including micro consolidation and last mile logistics, as part of our Low Emissions Vehicle Strategy

Enable & Explore measures to encourage **shift of road freight to more sustainable modes of transport** where appropriate including the use of rail to stations around the city and for inter-city freight movements with onward connections by sustainable modes.

Enable a reduction in the negative impacts of freight in future developments through the use of **Construction Management Plans** and **Delivery Management Plans** through the planning system

Deliver **enforcement of unacceptable loading**, infringement or misuse of loading bays

Explore **emerging technologies** to assist in reducing freight traffic

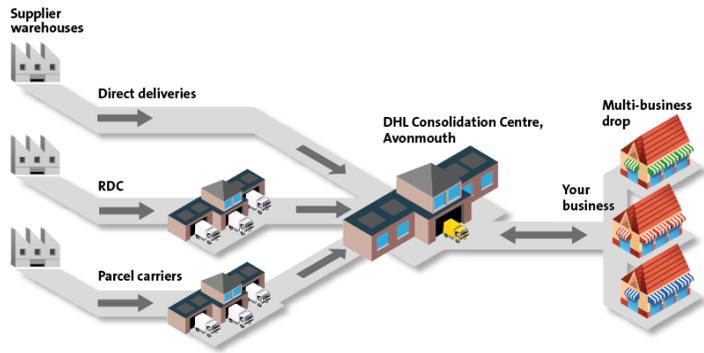


Fig X: Freight Consolidation

**Outcome #4 | Public transport to be visibly integrated, convenient and reliable to enable people to move around the city in a more efficient way.**



Along with our West of England partners, Deliver & Enable a **Joint Bus Strategy**, to help achieve continuing improvements to bus services in the region. The bus strategy will need to consider:

- Working with operators to make local buses more attractive, improving the speed and reliability of service by: increasing bus priority, integrated smart ticketing, and improved bus information
- Suitable sites for bus depots, particularly to the north of the city, which is currently a significant constraint on bus growth

- How to develop the bus network to better serve the 24 hour economy and poorly served areas of the city
- Investigating better interchanges between sustainable modes, such as cycling and rail stations
- Supporting the introduction of low emission buses
- Improving information and access to Demand Responsive and Community Transport.

### Case Study: Accessing employment in Avonmouth

Avonmouth and Severnside Enterprise Area consists of 650 acres of brownfield development land and is currently home to large scale warehousing, storage and logistics use with an open planning consent in place over a large proportion of the area that encourages development to come forward quickly and easily. Recently a number of large scale distribution operations have come forward creating over 5 million sq ft of Regional Distribution Centre floorspace. There is another 2 million sq ft of logistics floorspace in the pipeline to come forward within the next few years, and space for another 5 million sq ft to follow on.

Commuting by workers to Avonmouth is predominantly by car for a number of reasons. The nature of large amounts of the business uses requires 24 hour work and therefore workers are on shift patterns that are often out of the usual business hours. As such, access by public transport services is often not realistic due to levels of services out of usual business hours. There are parts of the city with high levels of unemployment however transport links between existing and proposed jobs at Avonmouth are poor and unsafe. Currently the only realistic access is by car, ownership of which is less likely for those who are unemployed.

We need to investigate how we can improve links to Avonmouth from neighbouring Lawrence Weston and from areas in East and South Bristol to better connect people with jobs. The Servnet Flyer is a project has been running in the area and provides a demand responsive minibus service that fills in some of the public transport gaps, however more of this type of innovation is required to address the accessibility issues in Avonmouth. A transport plan for the Avonmouth and Severnside Enterprise Area is an aspiration for the near future, which will include a focus on improving public transport and mobility as a service connections.

Along with our West of England partners, Deliver & Enable **Enhanced metrobus routes**, including connecting the Portway Park & Ride site in to Severnside, new routes to Thornbury, Yate, and Clevedon, and an orbital route on the ring road connecting the East Fringe to key destinations on the route and other rapid transit routes to the city centre and beyond.

Along with our West of England partners, Deliver & Enable **improvements to local rail services** through the MetroWest project that seeks to reopen old and open new stations and increase the frequency of suburban rail services. This will include exploring new stations at Constable Road, Ashton Gate, St Annes, and the stations already planned as part of MetroWest which include Portway, Filton North, and Henbury. It will also include investigating Park and Rail options at new stations. We will work closely with Network Rail Great Western Railway, Severnside Community Rail Partnership and local groups to deliver these improvements. Improvements will also be considered to encourage better use of and access to existing local stations, connecting with wider transport network to ease passenger congestion at Bristol Temple Meads.

Along with our West of England partners, Deliver **strategic Park & Rides and multi-modal transport interchanges**, including new sites on the M32, A37 Whitchurch, and A38 South, expanded sites at Portway and Long Ashton, and relocation and expansion of the A4 Brislington site to the Hicks Gate roundabout to enable orbital Metrobus services. With changes to multi-modal hubs, we will consider changes in how users of the site are charged to use the hubs, as currently parking is free and passengers are charged on the bus.

Deliver, Enable & Explore **improved integration between transport modes** through interchange, ticketing, information, improving walking and cycling links, and explore bike hire opportunities. This includes

improving connections by sustainable modes to local rail stations to increase catchment areas of local stations.

Explore **the use of technology** to improve the seamless door-to-door journeys. Mobility as a service is an emerging transport sector that reduces the need for personally owned forms of transport by allowing citizens to plan order and pay transport services directly from smart phones through smart ticketing and apps. We will ensure that we allow our data to be open to enable the development of these emerging options.

**(map to show all public transport proposals in one, inc high frequency buses, rail, metrobus, P&R)**

Explore opportunities to work with bus service operators to introduce **low emission buses**.

Deliver & Enable **continuing improvements in the taxi service**, by working with the taxi trade to make journeys safer, introduce an annual taxi fare review, ensure the switch to low and zero emission vehicles and ensure taxi ranks and bays are appropriately located.

Along with our West of England partners, Explore working with the taxi trade across the West of England to **increase technological offering** of existing taxis, such as booking and paying by app and taxi sharing.

## **Make space and improve safety for movement by sustainable modes:**

**Outcome #5 | Walking to be safe, pleasant, accessible and the first choice for local journeys and combined with public transport for longer journeys.**



Deliver & Enable the **Bristol Walking Strategy** (to be completed in the near future and appended to this document), including undertaking the following actions:

1. **Deliver a strategic walking network**  
Identify and enhance the network of walking routes across the city.
2. **Adopt design standards for inclusive walking infrastructure**  
Ensure that these standards are inclusive, and integrate accessibility within them.
3. **Develop walkable communities through planning and development**  
Embed daily walking into new and existing communities to maximise health and socio-economic benefits.
4. **Connect walking to public transport**  
Improve walking links to rail stations and bus stops
5. **Count walking**  
Count, monitor, and share information about walking, exploring the use of new technologies
6. **Reduce obstructions to walking**  
Enhance enforcement measures for issues that make walking difficult or unpleasant. These include bins on footpaths, parking on footpaths and across access points, overhanging vegetation, street clutter, litter and dog fouling.
7. **Make walking safe**  
Implement measures to ensure pedestrians are safe and feel safe. Key issues include footpath design and repairs, lighting, safe crossings, reducing conflict with other road users, air and noise pollution.
8. **Make walking pleasant and comfortable**  
Consider the aspects that make environments attractive for walking. Enable access to toilets, changing facilities, drinking water and benches and include this information on online maps that can be easily updated.

9. **Provide walking information**  
Provide comprehensive walking information and resources including maps and Bristol Legible City wayfinding.
10. **Support walking through travel planning and enabling behaviour change**  
Encourage and help make walking the easy transport choice for businesses, schools, communities and local high streets.

### The Influence of Built Environment on Walking

A study was carried out by UWE in 2015 to compare how people felt when walking through 5 different central areas of Bristol. Participants reported higher levels of stress and fatigue when walking through retail areas with motor-traffic (The Horsefair) than pedestrianised areas and preferred to be in areas with green elements, such as Castle Park and College Green. Elements relating to stress and therefore a negative walking experience included motor traffic interrupting walking flow, noise and fumes, crowds of people and lack of aesthetics. Elements that contribute towards a positive walking experience included variety in building types, mixes of uses, historical elements, nature and social activity. As a result, the recommendations are to reduce physical barriers to walking, particularly to reduce traffic, enhance the connection with the place by enhancing the historical and community elements and incorporate nature in cities through parks, vegetation and water features.

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Deliver & Enable measures to **separate pedestrians and bikes** wherever possible and fix problem areas, as set out in our shared space policy ([link](#))

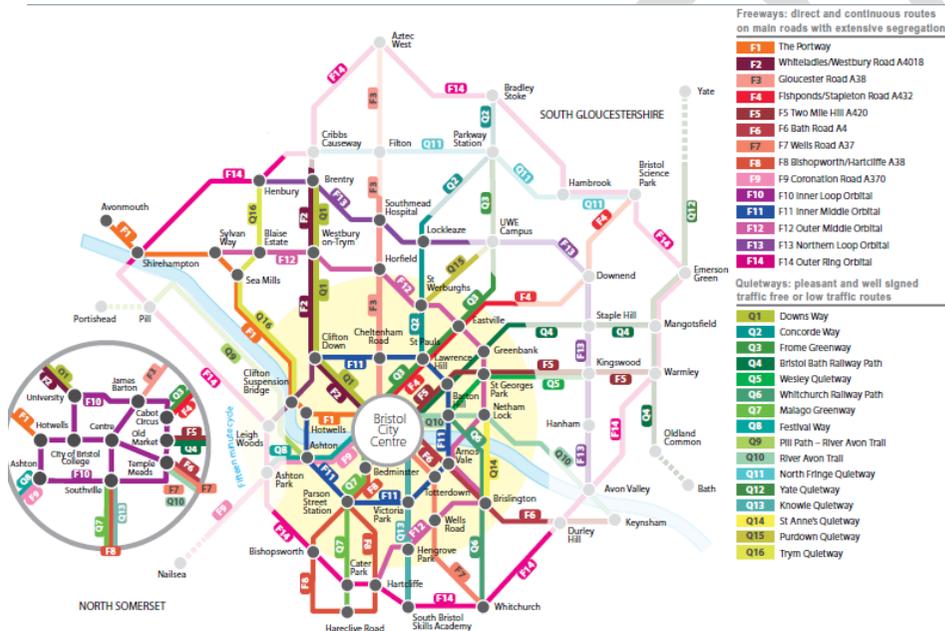
Deliver & Enable **new developments that are permeable and accessible** to all users and secure funding for off-site improvements through the development management process.

**Outcome #6 | Cycling to be safe, simple, accessible and convenient, either as an option for the whole journey or as part of a journey combined with public transport.**



Deliver & Enable the **Bristol Cycle Strategy** (to be completed in the near future and appended to this document), including:

- Connect the city for cycling  
Build a comprehensive cycle network accessible for all  
Adopt a simple and intuitive approach to cycle maps and signs and regularly audit  
Ensure quality facilities are in place at the beginning and end of journeys, including secure cycle parking to match the growth of cycling in the city  
Fully integrate cycling into the wider transport network



- Make cycling simpler and safer  
Adopt a simple and intuitive approach to cycle maps and signs and regularly audit  
Reduce and enforce motor traffic speeds to create a safer environment  
Regularly maintain the cycle network, especially in winter months, ensuring safe cycling surfaces and well lit corridors  
Make cycle training available to all citizens

*'I think if all drivers had to have a go at cycling then they would learn a whole lot about what goes on and why people do things the way they do and you know give people a wide berth.'* - Resident in Shirehampton

- Make cycling inclusive and accessible  
Enable and encourage a new wave of people to cycling through use of loan bikes including e-bikes  
Extensive promotion of cycling, including people at a point of transition e.g. new job, new school year, new university students  
Use innovative technology to help encourage new people to cycle and support those who cycle regularly  
Continue to research the different needs and motivations that may affect levels of cycling and seek ways to enable cycling for all  
Continue to work closely with organisations that encourage cycling  
Recognise and support leisure and recreational cycling as a way to inspire more people to cycle and promote Bristol as a lively and attractive city

Enable & Explore ways to enhance **cycle hire schemes**. Bristol has been approached by a number of companies offering dockless cycle hire schemes and we will work with them to provide services that benefit the city.

Deliver & Enable **new developments that are accessible by safe and attractive cycling infrastructure** and seek contributions towards off-site improvements to better connect the development as part of the development management process.



*'It is safe to cycle because I cycle on the track. I can take the track from here and go to Fishponds. I can take it from here and go to Bath. I can take the family to go anywhere I want to go and town. It keeps us safe on the track.'* - Gary Sangston- Barton Hill

## Case study- Family Cycling Centre

The Family Cycling Centre in Hengrove was set up using Central Government funding in 2016 and is run in partnership with British Cycling. The Centre is a traffic-free site that provides entry level cycling to a new generation of cyclists – starting with balance bikes of different sizes, through to 2, 3 and 4 wheelers, companion bikes, wheel chair bikes and hand-cycles, making cycling accessible to all.

The Centre is fully accessible in terms of the Equalities Act 2010 and has a Changing Places Toilet facility with Changing table and Hoist. Our Special needs schools come to ride at the Centre for their Bikeability training. Other disabled individuals come to experience the benefits of cycling.

The Centre also provides Bikeability training out of schools to allow all new cyclists to learn and develop confidence on bikes and there is also sports coaching for cycling.

The Centre's success continues to grow, with 12, 355 people attending sessions at the Centre in 2017-18.

Photo of Family Cycle Centre

**Outcome #7 | A resilient, safe and well-maintained network to enable continuous movement of people and goods, using smart technologies.**



Deliver & Enable a new **Transport Asset Plan** linked to a **Maintenance Manual**, setting out 2-3 year programme of maintenance and prioritising spending. Use maintenance works to implement change and also identify where transport projects can contribute to maintenance.

Explore opportunities to **use emerging technologies to monitor our transport assets** and to help prioritise and co-ordinate works on our network.

Explore opportunities for **mutually beneficial flood risk management, environmental and transport schemes**, including implementing flood schemes that improve the urban realm and deliver walking and cycling infrastructure.

Deliver key transport routes that are **sequentially located to avoid high flood risk areas** and ensure flood risk and subsequent diversionary routes are duly considered from the outset of a project.

Deliver & Enable others to build in **co-benefits to transport projects** such as Sustainable Drainage Systems by producing and promoting a design guide. In line with the existing West of England Sustainable Drainage Developers Guides.

Deliver & Enable reductions in road noise by **treating noise hotspots** on the road network.

Deliver & Enable a **Safe Systems Approach to Road Safety in Bristol**, (appended to this document) by reducing traffic volumes and speeds and making changes to the highway to reduce road danger.

A culture change is needed in order to achieve objectives of eradicating deaths and life changing injuries on the road. The term Safe System now represents the current consensus of what constitutes best practice strategic thinking in road safety and is recognised as such by international organisations including the World Health Organisation, the OECD, and World Bank. A Safe Systems approach to road safety is based on the principle that life and health should not be compromised to meet the demands of mobility. Safe Systems Road Safety requires a truly inter-disciplinary approach including that of public health<sup>50</sup>. Bristol should be a city where it is safe for a 10 year old child to walk independently to school. The aims of the Safe Systems Approach to Road Safety run throughout the Bristol Transport Strategy, and include:

- Safer Speeds – establishing and enforcing appropriate speed limits to create a road network that protects vulnerable road users and separates fast moving traffic where appropriate
- Safer Roads – improving road layouts to improve our network
- Safer vehicles – working with partners to improve the safety of the vehicle fleet
- Safer Road Use – education, training, and enforcement to influence road user behaviour

### Case study- Safe Systems Approach in Bristol

In 2015 the City Council published its Safe Systems Road Safety Plan. This demonstrated that poorer communities are at disproportionate risk of injury, most especially children, being up to six times more likely than children from the wealthiest communities. Efforts therefore need to be focused especially on reducing injuries within poorer communities. Lower traffic speeds are a key given the steep increase in risk of death as speed increases above 20mph. Targeted traffic-law enforcement effectively reduces the frequency of fatal motor-vehicle crashes and so working with the Police and other services, but also with communities, will be important in delivering multi-faceted interventions to reduce both the risk of road traffic injury and the fear which itself acts a deterrent to healthier and inherently safer modes of travel. A Safe Systems principle must be applied to all transport interventions; however we are carrying out specific road safety activities that include:

- Speed management (setting of speed limits, designing for those speed limits, enforcement and education) – particularly 20 mph
- Community speed watch
- Safety cameras – speed & red light
- Specific campaigns, behaviour change activity – e.g. mobile phone use, drink driving, drug driving etc
- Driver training / education (including fleet training for 20mph)
- Road safety training – e.g. pedestrian skills for schoolchildren, cycle training – adult & schools
- School Crossing Patrols
- Safer routes to School
- Specific engineering schemes – casualty reduction
- Improving quality of scheme design and fully embedding safety into all schemes,
- Segregated cycle ways at high conflict / busy locations
- Filtered permeability, where routes are made circuitous for motor traffic but direct for pedestrians and cyclists

## Encourage the use of sustainable modes and embed a sustainable transport ethos to help achieve our vision:

**Outcome #8 | More people making sustainable and healthy transport choices by improving engagement with communities, schools and businesses.**



Along with our West of England colleagues, Deliver **transport information** via TravelWest and other portals. Use social media platforms to improve the user experience and make it easier to access high quality transport information through the development of digital services and personalised information.

Deliver & Enable developers, schools and businesses to produce and implement **travel plans** to encourage the use of sustainable and healthy transport.

Explore working with businesses to **encourage flexible working patterns** that reduce the need for employees to travel to work, such as flexible hours and working from home.

Deliver & Enable information and engagement to **raise awareness of new infrastructure projects**. Engaging with communities from the start on transport projects and setting out how our projects fit in to the overall strategy for the city.

Along with West of England partners, Enable increased use of **car sharing and Mobility as a Service** options, including promoting car sharing and car clubs. Continue to deliver, enable and explore the use of

new technologies that promote home working and reduce the need to travel.

Enable **innovation and research**, improving the openness and quality of our transport data, and linking better with our local universities.

**Outcome #9 | New developments to be innovative in their approach to prioritise sustainable transport options and address the impact on the existing network.**



Deliver & Enable a new **Transport Development Management Guide** to assist developers through the process of delivering safe and accessible development in the interests of the future health of the new and existing population.

Deliver requirements for the submission of **robust assessments** to ensure we are correctly determining planning proposals in the interests of providing a credible evidence base upon which to input to the land use planning process

Deliver requirements for new development to **maximise the use of sustainable travel** by locating within convenient access to high quality public transport, walking and cycling opportunities in turn enabling optimum density development.

Deliver requirements to **integrate land use planning and transport through effective masterplanning** and uphold our obligation as Highway Authority to technically scrutinise and supervise the construction of new streets and improvements to existing streets undertaken as part of development proposals in the interests of permeability and delivering safe and direct routes and facilities for pedestrians, cyclists, and public transport users. This includes removing

physical barriers for cyclists and ensuring footways are wide enough for wheelchairs and buggies to pass each other.

Deliver requirements for **funding of new transportation infrastructure** to ensure that harmful impacts of development are minimised through the delivery of sustainable travel infrastructure and the effective incentivisation of active travel through the travel planning process. Secure investment from developers towards infrastructure either delivered by the council through S106 or by the developer through S278 agreements.

Deliver requirement for **oversight of the construction of new streets and transport improvements** by developers in the interests of avoiding safety risks and maintenance liabilities during and after construction.

Deliver requirements for **appropriate parking standards** by rationalising parking requirements for new development, with different levels depending on the accessibility of areas by alternative modes to

the car, as well as deliver appropriate levels of Electric Charge points and disabled parking.

Deliver requirement to **incorporate appropriate SuDS techniques** into new developments based on ground investigations.

**We will work with developers to ensure planning proposals meet the above criteria and actively encourage mode shift away from the private motor car.**

## City Centre

The How Bristol Works section highlighted that Bristol City Centre is a series of multiple centres, each with differing functions, which include the following areas:

- The enterprise area and transport hub at Temple Quarter;
- The shopping focus of Cabot Circus and Broadmead;
- The leisure and heritage focus of the Harbourside;
- The historical and cultural focus of the Old City

(map showing these areas with photos of each)

Bristol city centre is undergoing a transformation brought about by changes in how we shop and work and investment in public transport and public realm. There is growing demand for residential and student accommodation in the in the city centre that needs to be balanced alongside other uses. The development of Temple Quarter, with around 22,000 jobs is also shifting the centre of gravity of the city centre to the south-east. Although the city centre continues to be successful, there is a need to proactively plan for these changes and create places that can accommodate and provide for all the different needs of people living, working, and visiting the city. The city centre is a focus for economic regeneration, and as such changes faster than many other parts of Bristol.

Bristol is viewed as one of the UK's most liveable cities. People are attracted to live in the centre due to the excellent employment opportunities, education establishments, accessibility and the amenities on offer – shopping, parks and open spaces, culture and events. The population of the centre doubled to around 30,500 between 2001 and 2014, with the largest increase in the 18-24 age group. However, a lack of housing supply and affordability is becoming an ever increasing issue.

Although overall the centre is prosperous, there are large parts which suffer from high levels of deprivation, especially to the east.

The majority of people who live in the city centre do not travel to work by car, but congestion impacts everyone, causing delays and unreliable bus services, and worsening conditions for walking and cycling. Many bus routes across the city travel through the centre, with delays causing knock on effects across the city.

The success of the city centre is generating large volumes of travel demand, that are set to increase in future, causing congestion problems during the peak periods and increasingly throughout the day. The majority of congestion in the city centre in the morning peak is caused by commuting trips. The evening peak is caused by a mix of commuting and leisure trips.

Sustainable modes of transport such as walking, cycling, bus, and trains already play a vital role in the success of the city centre, and their role is set to increase in future with intensified urban living and improved public transport connections.

The city centre is also home to one of the region's major hospitals, the Bristol Royal Infirmary, as well as the Bristol Children's Hospital. Movement to and from the hospitals needs careful consideration, not only for emergency vehicles but also for patients for whom travel by walking or cycling may not be possible. The Joint Bus Strategy as referred to in the Citywide movement section will explore opportunities to improve the network to enable better access to hospitals by bus. We must keep the network flowing to enable access for emergency vehicles and for patients who have no realistic alternative to the car by encouraging the use of sustainable transport to those who can use it.

Transport needs to respond to these changes and the way we plan transport for the city centre must take into consideration the impact of transport and movement on place making. The draft City Centre Framework due to be published at the end of 2018 sets out the design and high level movement principles for the city centre to help shape future development. It is important that future area-specific plans such as the City Centre Framework covers multiple disciplines including transport, movement, urban design and planning to ensure there is a holistic approach to place making.

Making better places where people want to spend time means increasing access by sustainable transport modes and reducing the negative impact of motor traffic, such as noise and pollution, which costs and estimated £83m per year (2013 prices)<sup>51</sup>.

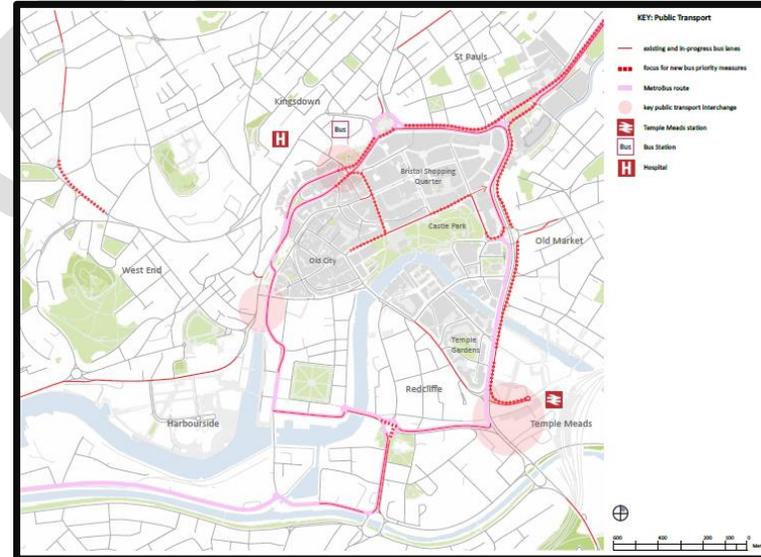
As mentioned in the City wide movement section, our approach to reducing unnecessary traffic travelling to the city centre to improve connections to the city by sustainable transport and to intercept traffic travelling from further afield on the edges of the city and then switching to an alternative mode of transport. This can enable spaces in the city centre to be re-purposed for people to spend time, which enhances the city's economy. This has previously been achieved in Queen Square and College Green.

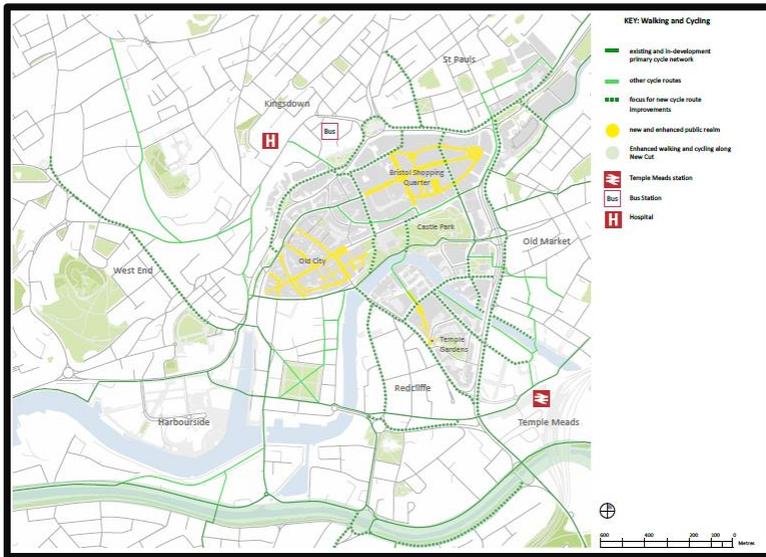
**Outcome #10 | A city centre that is accessible by active and sustainable transport and attractive to live, work and visit, enhancing its status as the foremost shopping and cultural centre in the South West.**



Deliver & Enable a **City Centre Transport Package**, as set out in the **City Centre Framework (2018)** that sets out the following aims for movement in the city centre:

1. New and expanded pedestrian priority areas
2. Complete a network of high quality public realm corridors
3. Complete the All Ages and Abilities (AAA) cycle network in the city centre
4. Complete the city centre bus lane network
5. Enable the transformation of Broadmead
6. New and expanded Park & Ride services
7. Improvements to interchange, coach parking, taxi ranks, and ferry services
8. Smarter motor traffic management
9. Parking strategy
10. Simplify the highway network





Enable the **regeneration of Temple Meads station** and additional **transport schemes linked to Temple Quarter**, improving connectivity to and through this expanding area.

**Photo of Temple Meads**

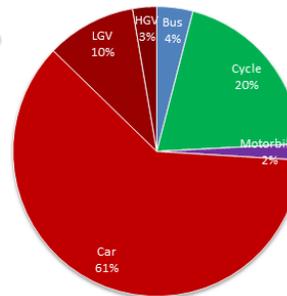
## Corridors

Bristol has many major transport corridors that stretch from beyond the city boundary to the city centre. There is very high demand on these corridors and they transport thousands of people travelling from with wider area daily. The A38 North, comprising Stokes Croft, Cheltenham Road, and Gloucester Road best highlights some of the key issues facing our transport corridors across the city.

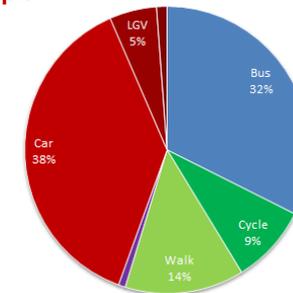
As many of our transport corridors are, the A38 North is a major attraction and destination in itself, with a large number of independent traders, cafes, bars and restaurants. However, it is also a key route into the city carrying at least 40,000 people per day between 7am and 7pm<sup>52</sup>. It is the most popular cycle route in the city, with 3,500 bikes a day on the busiest sections.

The graphs below show that although private cars account for the highest number of vehicles on the corridor, the majority of people travel by sustainable modes, which is similar on many of our corridors.

**Vehicles**



**People\***



\*figures calculated using actual bus occupancy data and Bristol average Car, LGV, and HGV figures

The main challenges for the A38 North, but are replicable in many transport corridors include:

- **Reliable transport:** average inbound speeds in the morning peak are 9 mph for motor traffic, and just 6 mph for buses<sup>53</sup> (although average cycling speed is 9mph). While there are some bus lanes on the route, these are not continuous and buses are still delayed in congestion. The large numbers of people boarding buses also contributes to these low bus speeds.
- **Improved safety, health, and security:** during the last three years there were approximately 135 reported road collisions, with 43% causing injury to cyclists and 27% injury to pedestrians. The majority of collisions involved vehicles turning to/from side roads<sup>54</sup>. The corridor also suffers from air pollution and is within the Bristol Air Quality Management Area.
- **Better places:** the corridor is dominated by motor traffic and there is a need to enhance the public realm and support local retailers.

Finding solutions to these issues is not easy, particularly given a lack of road-space which, on the A38 North narrows to just 13 metres between buildings at its narrowest. Bus priority has already been implemented where possible along most of the route and there is limited room for further public transport priority without extremely radical measures. Local rail infrastructure has limited coverage to serve as alternatives to the corridors.

The Joint Transport Study (link) explored potential options to enable movement along corridors more efficiently. These included gating corridors to general traffic to prioritise traffic for access to local areas only, with through traffic guided to use alternative routes, however this is likely to result in local and unsuitable streets being used as alternative routes. Other options explored included on-street trams, however, without a significant reduction in traffic, trams would likely be stuck in congestion. Construction of a tram would also mean several years of disruption and

road closures. As such, we have to look at more radical ways to use our corridors to move more people more efficiently.

The impacts of movements on our transport corridors are felt at a local level, however the strategic nature of these linking routes need a co-ordinated approach for improvements from our West of England colleagues and are therefore part of larger transport proposals in the emerging Joint Local Transport Plan.

**Outcome #11 | More efficient transport corridors to move the largest number of people in the space available.**



Along with our West of England partners, Deliver & Enable the **proposals outlined in the Joint Transport Study that benefit movement on Bristol's corridors**. The Joint Transport Study has informed the emerging Joint Local Transport Plan, which sets out the detail of how these schemes have been scored for prioritisation along with all other major transport schemes across the West of England. The following schemes all scored highly and are of high priority for delivery but given the scale of each project delivery will be in the medium to longer terms of this strategy. We will carry out feasibility studies where necessary to identify the most efficient option for each route. The routes identified in the Joint Transport Study and the proposals that we will investigate are:

- **City Centre to North Fringe:** Due to the lack of highway space and other constraints on much of this route, we will explore **underground options** for large sections of the route. The exact route alignment is to be decided, but could follow the A38 North

until departing to serve Southmead Hospital, Cribbs Causeway, Aztec West, and a new Park & Ride linking to M5 Junction 16.

- **City Centre to East Fringe: underground options** to be considered. The exact route alignment is to be decided, but could follow the A420 and A4174 ring road, serving destinations along the route including Emersons Green and new Park & Rides on the A420 and a new M4 Junction 18a.
- **City Centre to Keynsham/Bath:** The construction of the **Callington Road Link** will help to divert through traffic away from the city centre and unlock roadspace on the A4 Bath Road that can be re-allocated to create a rapid transit link. The intention is that this will initially be a **MetroBus** based service linking Bristol, Keynsham, Salford, and Bath.
- **City Centre to Airport:** There are various options available for this route, including **tram and underground options**. An underground option could divert to serve south Bristol, linking to a new Park & Ride on the A38, before emerging overground along the A38 to the Airport.

Besides the four corridors identified for improvements in mass transit, other options identified in the Joint Transport Study that have scored highly for prioritisation in the Joint Local Transport Plan for improving movement along corridors to be explored are:

- **Enhanced metrobus routes**, including connecting the Portway Park & Ride site in to Severnside, new routes to Thornbury, Yate, and Clevedon, and an orbital route on the ring road connecting the East Fringe to key destinations on the route and other rapid transit routes to the city centre and beyond.
- **Road improvements**, mentioned above which include the Callington Road Link and A4-A37 link, which will enable mass transit routes, and also improve the flow of traffic throughout

south-east Bristol and remove unsuitable through traffic from the city centre.

- **Cycle superhighways** to provide direct, continuous and safe cycle routes on key corridors, as part of wider ambitions to deliver 200 miles of all ages and abilities cycle network.
- **Local bus improvements** including increased bus priority and extended bus lanes as part of a Great Bristol Bus Network 2 project.

Enable **improvements in the bus service**, including reducing boarding times through integrated smart ticketing and prioritising movement of buses through use of the urban traffic control centre and traffic signal improvements. These measures will be covered by delivering a Joint Bus Strategy (see City wide movement section)

Deliver a **review of the road network** to ensure key routes are appropriately classified and have appropriate waiting and loading restrictions.

Explore, deliver, and enable **changes in parking provision**, including removal and/or relocation of on-street parking in the city centre and on key corridors to provide space for other uses and improve journey time reliability. Explore the potential for new off-street public car parks at local centres to replace lost spaces on corridors.

Explore, deliver, and enable **use of technology to improve corridor efficiency**, including improving links to corridors where bus services are frequent. This could be through Mobility as a Service options such as bike hire or shared taxi to connect the first or last mile from corridors with frequent services.

## Case Study: Exploring underground metro options

Given the restraints on many of our corridors, in many cases, the only deliverable alternative is to go underground. Along with our West of England colleagues, we are exploring lightweight underground systems, such as the Automatic Light Vehicle system in operation in Rennes, Turin, Toulouse, Lille, Taipei and other cities outside the UK. The system is the latest generation of Light Automatic Vehicle and is marketed as the backbone of the transport system in medium sized cities such as Bristol. The advantages of this system are:

- Automated operation with no drivers reduces costs and allows for more frequent trains with very short headways. Trains can be as often as every 60 seconds. This reduces crowding at stations.
- Short trains reduce costs as smaller tunnels and small stations can be used. This would allow the use of modern cheaper tunnelling techniques and prefabricated stations.
- The rubber wheels allow for tighter curves, and steeper gradients than conventional metro systems, which is well suited to Bristol's topography.
- Sections of track can be elevated or run at grade to reduce costs, although the system needs to be 100% segregated because there are no drivers.

A light automated metro could be transformational for the region, cutting peak journey times from Aztec West, Emerson's Green, and the Airport to the City Centre to under 25 minutes, with increased capacity and reliability with services every couple of minutes. An underground system would enable the removal of some above ground infrastructure, and streets could be redesigned to improve the public realm. While an underground system is technically deliverable, the costs are significant, at around £3-4bn needed for three lines.

The planning horizon for underground schemes is also long, with most schemes taking around 20 years to deliver. A key part of ongoing feasibility work will be exploring how future trends could impact on the feasibility of such a system. Initial feasibility work is currently underway to explore underground options in more detail, exploring construction and operation costs, ground conditions, patronage forecasts, future trends, and other considerations.

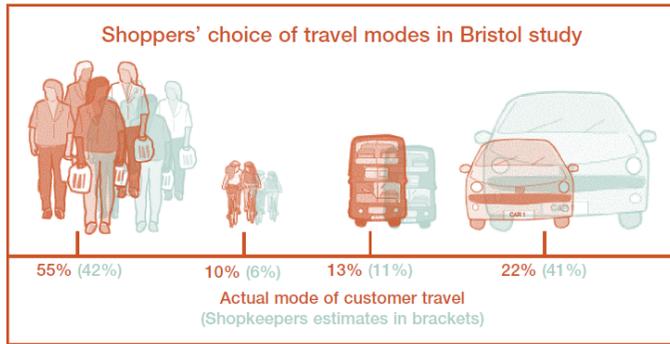
## Local Centres

Many of Bristol's local centres and high streets are located along key transport corridors into the city centre. The A420 Church Road is a local centre for residents living in Redfield, St George, Lawrence Hill, Barton Hill and Easton. The A432 Fishpond Road and Stapleton Road serves the neighbourhoods of Fishponds, Hillfields, Greenbank and Easton. Gloucester Road, Cheltenham Road and Stokes Croft together are located on the A38 one of the major transport corridors into the city. This stretch of road has the largest number of independent shops in the UK (Visit Bristol, 2018) and therefore provides a key local centre for residents living in Horfield, Bishopston, Redland, St Andrews, Montpelier, Cotham and St Pauls, but is also an attractive destination point for many travelling from across the city and wider region.

Given their positions on a main transport corridor into the city, many bus services travel through these local centres, with buses every couple of minutes. The Showcase Bus Route project improved access for buses by creating bus lanes that operate at peak times of the day. This meant that on street parking had to be limited to off peak hours only.

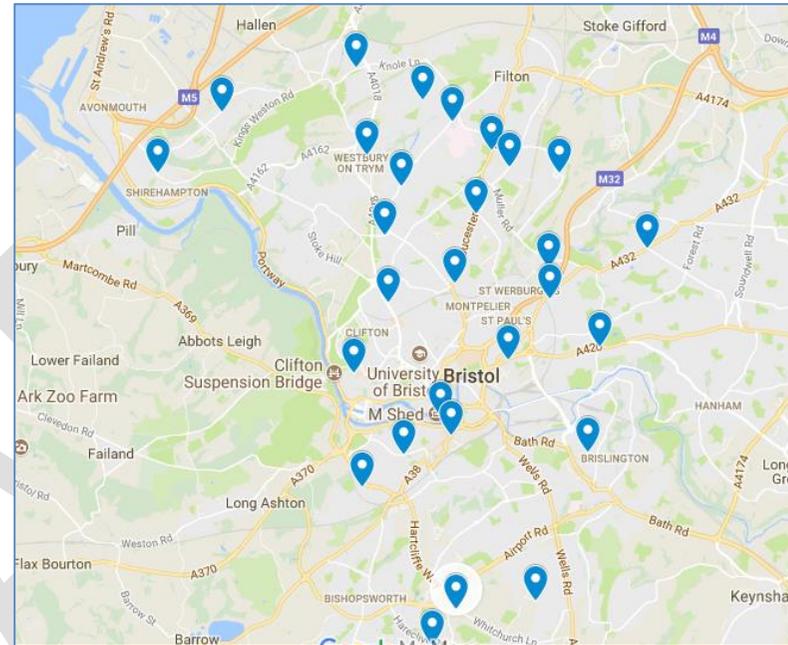
Sustrans carried out a study in 2006<sup>55</sup> in light of the Showcase Bus Route project to find out whether removing parking would affect the economy and viability of businesses along corridors in Bristol, as some business owners originally raised concerns about this. The study found that business owners overestimated the amount of trade they thought arrived by car and underestimated the number of people who arrived on foot, bike and bus.

Bus priority measures can facilitate better parking, delivery and drop off arrangements for local shops to enhance the local centre, while functioning as key transport corridors<sup>56</sup>.



Many other local centres are located across the city, although not all are on main transport corridors. Local centres in Shirehampton, Westbury on Trym, Southmead, Easton, Bedminster and Hartcliffe provide essential services and facilities for many residents who live nearby, which means residents do not have to rely on a car for many every day needs.

Local centres also provide places for people to meet and interact, and the influence of transport can have large impacts on creating a sense of place. As referred to in the City Centre section, it is important that we reduce the negative impacts of traffic in order to encourage more people to spend time in their local areas, not only as a functional space for shopping and services, but to increase social interaction, build communities and increase residents' wellbeing.



Better map required

By increasing options of access by sustainable modes of transport and reducing the amount traffic passing through local centres to reach other destinations, local centres can begin or continue to thrive as focal points of the community and provide a function to ensure all citizens have equal access to services and are not reliant on a car for every day needs.

**Outcome #12 | Supported and enhanced local centres and high streets, recognising that they provide key services and facilities, and can also be transport corridors and destination points for visitors.**



**Outcome #13 | Reduced impact of motorised traffic on local centres creating better public spaces that are more accessible by walking, cycling and reliable public transport.**



Deliver & Enable continuing improvements for pedestrians, to make walking the first choice for local journeys, as outlined in the **Bristol Walking Strategy** action plan (see City wide movement section)

Deliver & Enable continuing improvements to access local centres by bike, through the provision of safe routes and secure cycle storage, as outlined in the **Bristol Cycling Strategy** action plan (see City wide movement section)

Explore, deliver, and enable **changes in parking provision**, including removal and/or relocation of on-street parking on high streets that are congested transport corridors and explore the potential for new off-street public car parks at local centres to replace lost spaces.

Explore and enable better **connectivity and reliability around the city by bus and community transport**, working with bus operators to investigate new services, improve information and explore options for transport on demand and community transport services. This will be addressed in the Bus Strategy (see City wide movement section).

Deliver & Enable **improvements in road layouts** including reducing the width of junction mouths, enforcing appropriate speeds and improving access points to improve safety, create a more attractive walking and cycling environment.

Explore, Deliver & Enable **innovations in freight movements** to seek to reduce the impact of heavy freight vehicles and provide appropriate loading arrangements as outlined in the freight strategy (see City wide movement section).

## Neighbourhoods and residential streets

Bristol is made up of a number of neighbourhoods that each has its own identity. Besides the corridors and local centres, the neighbourhoods contain residential streets where our citizens live. The neighbourhoods and residential streets are designed differently as a result of the different eras in which housing has been developed. This ranges from narrow, Victorian streets where houses do not have off street parking to wide modern streets, shared spaces and home zones. It is important that citizens feel safe and confident to walk and cycle in their neighbourhoods to access local services and connect by public transport to other parts of the city to access jobs, education, leisure and health care without relying on a car.

**Outcome #14 | Key facilities and services increasingly accessible to all citizens without the need to rely on a car.**



**Outcome #15 | Safer places to live by working with citizens to design and deliver measures to improve movement and liveability in our neighbourhoods.**



Along with our West of England partners, Deliver & Enable the design and development of **communities that promote sustainable and healthy transport**, supported by high housing densities, with the highest densities around public transport facilities.

Along with our West of England partners, Explore **opportunities for releasing land currently used for transport infrastructure to support housing growth**, including exploring opportunities at Cumberland Basin and Lawrence Hill roundabout

Deliver & Enable **mixed use development** in co-operation with colleagues in housing and major projects to provide a range of amenities within a short distance of where people live and reduce the need to travel by car.

Deliver & Enable neighbourhoods to **reduce the negative impact of through traffic** and ensure through routes are appropriate to improve local air quality.

Deliver & Enable the development of the all ages and abilities **cycle network**, helping to develop a child friendly city cycle network. Develop cycling quietways through neighbourhoods, connecting to wider cycle network.

Deliver and Enable **improvements in bus services** to better serve neighbourhoods with poor public transport provision, working with bus operators to explore new service options and community transport.

Enable **community involvement in street design and use**. Community led transport projects need to be safe and adopted and maintained by the community in conjunction with the Council. The Council needs to be mindful of its legal responsibilities as the highways authority.

Deliver appropriate **SuDS schemes** to be incorporated into any local transport and public space improvements, based on ground investigations.

Enable communities to report transport issues, through promoting and improving the existing **Fix My Street website and open up data** to allow more efficient and demand responsive services.

Explore methods to **communicate and engage with communities** at a local level to encourage use of sustainable transport

Explore **refining existing Residents' Parking Schemes** and extend only where there is demand from residents, and investigate alternative approaches.

Deliver & Enable **improved compliance with 20mph limits** with more awareness raising and streets designed for appropriate speeds and investigate introducing new 20mph limits where there is local demand.

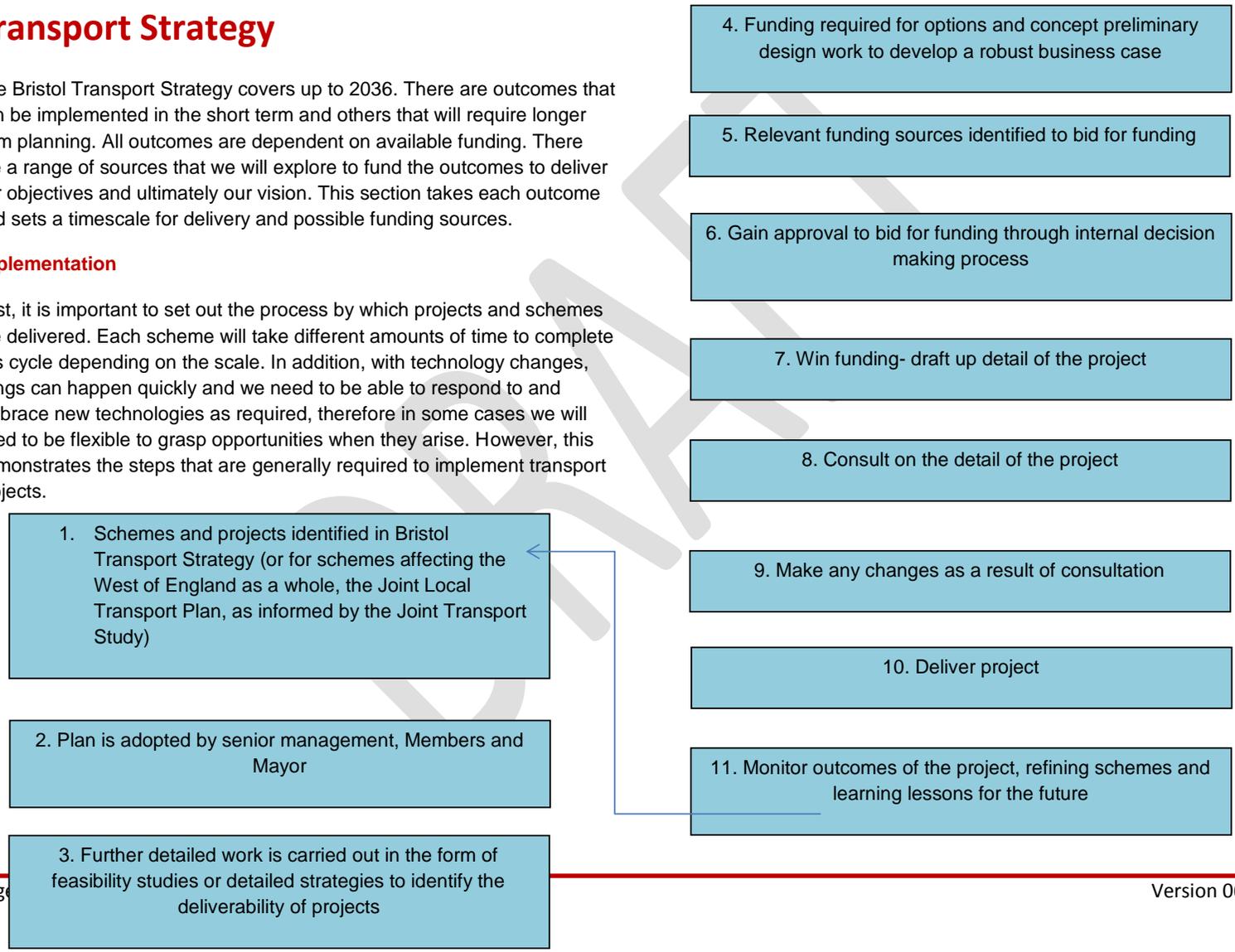
Deliver routine maintenance works and other projects to **improve the layout of residential areas** to create better places.

## Implementing and Funding the Bristol Transport Strategy

The Bristol Transport Strategy covers up to 2036. There are outcomes that can be implemented in the short term and others that will require longer term planning. All outcomes are dependent on available funding. There are a range of sources that we will explore to fund the outcomes to deliver our objectives and ultimately our vision. This section takes each outcome and sets a timescale for delivery and possible funding sources.

### Implementation

First, it is important to set out the process by which projects and schemes are delivered. Each scheme will take different amounts of time to complete this cycle depending on the scale. In addition, with technology changes, things can happen quickly and we need to be able to respond to and embrace new technologies as required, therefore in some cases we will need to be flexible to grasp opportunities when they arise. However, this demonstrates the steps that are generally required to implement transport projects.



## Funding

The projects and schemes identified in this plan can help to deliver a step change in how people move around the city. Along with our West of England partners, we are planning transformative changes that will benefit Bristol and the region. We have also set out projects and actions that we will take forward as a city to achieve our vision. All of which adds up to a large price tag, which is significantly more funding than has historically been available. As such, new sources of funding will be needed to deliver the objectives and vision of the Bristol Transport Strategy.

Potential funding sources are:

- Local Transport Planning maintenance and block grant from Central Government
- Major scheme bids to the Department for Transport (DfT) and other national bidding opportunities
- Council resources including parking income
- Bids for grants from Local Enterprise Partnership including Revolving Infrastructure Fund and Local Growth Fund
- Community Infrastructure Levy and s106 contributions
- Devolution gain share
- Private investment
- Workplace Parking Levies and/or Congestion Charging
- Other bids and funding sources such as Innovation Funding.

Much of the existing funding is already earmarked for schemes and essential operation of Council transport services, so additional funding sources are likely to be needed to deliver our vision.

All measures outlined in this strategy are high priority in order to achieve our vision, however we will seek to package schemes together to achieve

maximum impact from any bids we make. This could mean working in partnership with colleagues from housing, flood risk management, innovation or air quality to make bids that achieve our joint objectives.

As of March 2017 the West of England Combine Authority (WECA) was established as part of devolution deal from Central Government. This includes a devolved budget of £30m per year for the next 30 years to include funding towards transport. This funding will be focused on large strategic transport projects that contribute to our vision and connect housing with employment sites and services across the sub-region.

Smaller transport projects that contribute to achieving our vision will continue to be funded through Local Growth Deal allocations from the Local Enterprise Partnership and bids to Central Government, of which we have a very successful track record of winning and delivering.

However, even with these sources of funding there is likely to be a large funding gap and additional funding would be needed with potential sources including a Workplace Parking Levy and congestion charging.

### Workplace Parking Levy

A Workplace Parking Levy can be applied by a highway authority under the 2000 Transport Act, where employers are charged a fee per private parking space on their site. Employers may choose to pass this charge on to their staff, which can encourage staff to consider alternative ways of travelling to work if they have to pay to park. The employer may choose to pay the charge themselves, which could in turn encourage the employer to consider reducing the number of parking spaces they have on their site (and potentially expand their business premises without acquiring more land), which is therefore a measure of parking control to influence how staff choose to travel to work.

Previous assessments undertaken for the West of England show that there is a potential for a workplace parking levy to deliver an estimated 2% reduction in private car trips.

### Case Study: Nottingham workplace parking levy

Nottingham introduced a Workplace Parking Levy in 2011. It levies a charge to employers that have 11 or more private parking spaces on their site. The levy is charged at £379 per annum per space, which is around £1.50 per work day. Over £44m has been raised in revenue since charging began. The administrative costs of running the scheme take less than 5% of the revenue raised, meaning a large amount is reinvested in transport improvements in the city as identified in the Local Transport Plan. This has led to doubling the size of the tram network and redeveloping the city's rail station to support the electric bus network. The revenue raised has also been used as match funding to bid for external funding. Workplaces that are required to pay the charge are offered grants to enable staff to cycle to work. The levy scheme has resulted in a 4.5% increase in bus and tram patronage. Many employers in Nottingham were sceptical of the scheme before it was implemented, however, discussion with Nottingham Council suggests it is now accepted as a part of doing business in the city. No major employers left the city and inward investment has increased since the scheme was introduced, with businesses taking advantage of the improved transport infrastructure, creating 2,000 new jobs since 2012.

#### Photo of Nottingham tram

To fund transformational transport improvements such as an a light metro system, a Bristol scheme would need to cover the wider urban area and have a higher rate than the Nottingham scheme. This could potentially unlock up to £1.5bn of transport investment over 30 years.

### Road user charging

Road user charging has been implemented in various locations around the world; the most applicable location for comparison purposes is the congestion charge in London. The London scheme is an area based scheme operating for 12 hours per day on weekdays only and uses cameras to record number plates of vehicles entering and leaving the zone.

Road user charging in Bristol was first suggested in the 1975 Land Use Transportation Study and has appeared in several local transport plans since then. An assessment carried out in 2013<sup>58</sup> proposed a central area zone. A fee of £5 per day for all users was proposed, operational between 7am and 10am Monday to Friday. The expected annual income after operating costs were removed was between £5m and £20m per year dependent on the size of the zone and the number of people avoiding the zone. To fund transformational transport schemes such as a light metro system, a wider area scheme could be considered, and could potentially raise a similar amount to an area wide Workplace Parking Levy. Previous assessments undertaken by the West of England show that there is the potential to deliver a significant impact on demand for travel by car - an estimated 6-8% reduction of private car trips.

### Clean Air Zone

As mentioned in previous sections, a feasibility study is currently underway on implementing a Clean Air Zone in the city, which could include a charge for vehicles. Any potential charging scheme in future will have to assess the impact of multiple schemes in order to ensure objectives of this strategy are being met, including the impact on providing an accessible transport system for all.

**We understand these are controversial solutions, and as part of the consultation on this document we would like to seek views of the**

**public and stakeholders for transformational transport improvements such as a light metro system that could involve implementation of a workplace parking levy and/or road user charging charge.**

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### Funding and implementation plan

Include a timeline with short, medium, long term goals

Outcome	Partnerships for delivery	Implementation timescale	Potential funding sources
<b>Citywide: Outcome #1</b>   Efficient movement of traffic around the city, with increased resilience of the network and minimised impacts of congestion and air pollution.	WECA, air quality colleagues, Highways England	Medium	Devolution gain share, parking income, workplace parking levy, congestion charging
<b>Citywide: Outcome #2</b>   On and off street parking managed efficiently to encourage use of sustainable transport and tackle congestion, while providing options that support the city's 24 hour economy.	Destination Bristol, business improvement districts, car park operators	Medium	Parking income
<b>Citywide: Outcome #3</b>   Reduced excess lorry and van travel in the city (especially during peak hours), working with industry to find cleaner alternatives for the movement of goods.	Freight operators, WECA	Medium	Devolution gain share, workplace parking levy, congestion charging, private investment, S106 contributions
<b>Citywide: Outcome #4</b>   Public transport to be visibly integrated, convenient and reliable to enable people to move around the city in a more efficient way.	Bus operators, Transport Focus, WECA	Medium	Devolution gain share, workplace parking levy, congestion charging, private investment
<b>Citywide: Outcome #5</b>   Walking to be safe, pleasant, accessible and the first choice for local journeys and combined with public transport for longer journeys.	Walking Alliance, Living Streets	Short to Medium	Local Growth Fund, DfT funding, S106/278 agreements
<b>Citywide: Outcome #6</b>   Cycling to be safe, simple, accessible and convenient, either as an option for the whole journey or as part of a journey combined with public transport.	Sustrans, Bristol Cycling Campaign	Short to Medium	Local Growth Fund, DfT funding, S106/278 agreements
<b>Citywide: Outcome #7</b>   A resilient, safe and well-maintained network to enable continuous movement of people and goods, using smart technologies.	WECA, developers	On going	Local Transport Planning maintenance and block grant from Central Government, S106 contributions, community infrastructure levy
<b>Citywide: Outcome #8</b>   More people making sustainable and healthy transport choices by improving engagement with communities, schools and businesses.	Community groups, schools, businesses	Short to Medium	DfT funding, S106 contributions, workplace parking levy. Also, proportion of infrastructure funding to be allocated for promotion.
<b>Citywide: Outcome #9</b>   New developments to be innovative in their approach to prioritise sustainable transport options and address the impact on the	Developers, WECA	On going	S106 contributions, community infrastructure levy

<b>existing network.</b>			
<b>City Centre: Outcome #10   A city centre that is accessible by active and sustainable transport and attractive to live, work and visit, enhancing its status as the foremost shopping and cultural centre in the South West.</b>	WECA Network Rail Bus operators Retail and leisure operators	Medium to Long	Devolution gain share, parking income, workplace parking levy, congestion charging
<b>Corridors: Outcome #11   More efficient transport corridors to move the largest number of people in the space available.</b>	WECA, bus operators	Medium to Long	Devolution gain share, parking income, workplace parking levy, congestion charging
<b>Local Centres: Outcome #12   Supported and enhanced local centres and high streets, recognising that they provide key services and facilities, and can also be transport corridors and destination points for visitors.</b>	Business improvement districts Bus operators Neighbourhood groups Transport stakeholders	Medium	Bids for grants from Local Enterprise Partnership including Revolving Infrastructure Fund and Local Growth Fund, Community Infrastructure Levy and s106 contributions, private investment
<b>Local Centres: Outcome #13   Reduced impact of motorised traffic on local centres creating better public spaces that are more accessible by walking, cycling and reliable public transport.</b>	Bus operators Freight operators Transport stakeholders	Medium to Long	Workplace parking levy, congestion charging, Bids for grants from Local Enterprise Partnership including Revolving Infrastructure Fund and Local Growth Fund, Community Infrastructure Levy and S106/278 agreements, private investment
<b>Neighbourhoods: Outcome #14   Key facilities and services increasingly accessible to all citizens without the need to rely on a car.</b>	Neighbourhood groups, bus operators, transport stakeholders	Short to Medium	Local Growth Fund, DfT funding
<b>Neighbourhoods: Outcome #15   Safer places to live by working with citizens to design and deliver measures to improve movement and liveability in our neighbourhoods.</b>	Neighbourhood groups	Short to Medium	Local Growth Fund, DfT funding, S106/278 agreements

Timescales:

Short term: < 5 years

Medium term: 5-10 years

Long term: >10 years

Key:

WECA: West of England Combined Authority

DfT: Department for Transport

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## How will we measure success?

In order to know whether we are achieving success with our approaches as set out in this plan, it is important to understand whether we are meeting our objectives. As a reminder, the objectives of the Bristol Transport Strategy are:



Provide transport improvements to accommodate increased demand from growth in **housing, jobs & regeneration** on an already congested network with complex movements from within and outside the city boundary.



Promote **equality** with an inclusive transport system that provides realistic transport options for all



Create **healthy places**, promoting active transport, improving air quality, and implementing a safe systems approach to road safety



Create **better places** that make better use of our streets and enable point to point journeys to be made efficiently



Enable **reliable journeys** by minimising the negative impacts of congestion and increasing network efficiency and resilience



Support **sustainable growth** by enabling efficient movement of people and goods, reducing carbon emissions and embracing new technologies

The success against the objectives can be measured in a number of ways using known data sources, and we will work closely with colleagues in academic institutions to identify methods to measure success for those that do not have clear data sources. We will need to establish a baseline from which to begin measuring our success and this will be within the first year of adoption of the plan. From then on, monitoring of the Bristol Transport Strategy will be reported annually online on the Bristol City Council website.

Objective	What to measure	Data source
Provide transport improvements to accommodate increased demand from growth in <b>housing, jobs &amp; regeneration</b> on an already congested network with complex movements from within and outside the city boundary	Number of houses delivered	Planning applications
	Number of people who are homeless	Data from housing teams
	Number of jobs created	Economic development records and data from housing team
	Number of people who are unemployed	Data from employment and skills team
	Occupancy rates of buildings, both residential and commercial	Economic development records
	Percentage of people travelling to work by sustainable modes	Journey to work data
Promote <b>equality</b> with an inclusive transport system that provides realistic transport options for all	For each neighbourhood, provision of cycle routes connecting to employment areas	Data collected when cycle projects are delivered
	For each neighbourhood, proximity of a bus stop with high frequency services (10 minutes or less)	TravelWest journey planner
	Awareness of transport options	Qualitative data- will need input from academic colleagues
	Affordability of transport options	Bus fare data
	Satisfaction of transport options	Quality of Life survey. Transport Focus data
Create <b>healthy places</b> , promoting active transport, improving air quality, and implementing a safe systems approach to road safety	Percentage of people travelling to work by active modes	Journey to work data
	Percentage of people travelling on corridors by active modes	Modal split monitoring on key corridors
	Number of people killed or seriously injured on roads	KSI data
	Levels of air pollution, compliance with air quality standards	Air quality monitor data
	Levels of EV take up	DfT figures
	Perception of safety	Bike Life report
Create <b>better places</b> that make better use of our streets and enable point to point journeys to be made efficiently	Satisfaction of local area	Quality of Life survey
	Percentage of new schemes introducing SuDS	Flood risk management data
Enable <b>reliable journeys</b> by minimising the negative impacts of congestion and increasing network efficiency and resilience	Journey time reliability	National Bus / Rail satisfaction surveys
	Levels of bus and rail patronage	Bus/rail operator data
	Punctuality of services	Bus/rail operator data
Support <b>sustainable growth</b> by enabling efficient movement of people and goods, reducing carbon emissions and embracing new technologies	Journey time to measure congestion levels as development grows	ANPR data to time journey across city centre cordon
	Percentage of people travelling to work sustainably	Journey to work data

## List of contributors

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## References

- <sup>1</sup> Sunday Times (2017) Sunday Times Best Place to Live Guide
- <sup>2</sup> Ministry of Housing, Communities & Local Government (2015) English Indices of Deprivation 2015
- <sup>3</sup> West of England Councils (2017) West of England Joint Spatial Plan
- <sup>4</sup> Bristol City Council (2015) Joint Strategic Needs Assessment (JSNA) report 2015
- <sup>5</sup> Air Quality Consultants (2017) Health Impacts of Air Pollution in Bristol
- <sup>6</sup> Department for Transport (2010-18) Congestion Statistics
- <sup>7</sup> Goodwin, P., Hallett, S., Kenny, F., Stokes, G. 1991 Transport: The New Realism. Transport Studies Unit, University of Oxford.
- <sup>8</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>9</sup> Sunday Times (2017) Sunday Times Best Place to Live Guide
- <sup>10</sup> Office of National Statistics (2011) Method of Travel to Work by Local Authority 2011 Census
- <sup>11</sup> Ministry of Housing, Communities & Local Government (2015) English Indices of Deprivation 2015
- <sup>12</sup> Bristol City Council (2015) Joint Strategic Needs Assessment (JSNA) report 2015
- <sup>13</sup> Gössling, S. 2016 Urban transport justice, *Journal of Transport Geography*, 54: 1-9
- <sup>14</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>15</sup> Transport for London (2017) Healthy streets for London
- <sup>16</sup> <https://www.tfgm.com/oxford-road>
- <sup>17</sup> Nottingham City Council (2011) Nottingham Local Transport Plan
- <sup>18</sup> <http://www.eltis.org/>
- <sup>19</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>20</sup> Office of National Statistics (2011) Method of Travel to Work by Local Authority 2011 Census
- <sup>21</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>22</sup> Bristol City Council (2015) A Safe Systems Approach to Road Safety in Bristol
- <sup>23</sup> Bristol City Council (2015) Joint Strategic Needs Assessment (JSNA) report 2015
- <sup>24</sup> Pteg (2015) Ticket to Thrive. The role of urban public transport in tackling unemployment
- <sup>25</sup> Lee IM, et al. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *Lancet* 380: 219–29.
- <sup>26</sup> Scarborough P, Bhatnagar P, Wickramasinghe KK, Allender S, Foster C, Rayner M (2011) The economic burden of ill health due to diet, physical inactivity, smoking, alcohol and obesity in the UK: an update to 2006–07 NHS costs. *Journal of Public Health* 33 (4): 527-535
- <sup>27</sup> Ossa D and Hutton J (2002) The economic burden of physical inactivity in England. London: MEDTAP International
- <sup>28</sup> Air Quality Consultants Ltd. (2017). Health Impacts of Air Pollution in Bristol
- <sup>29</sup> Barratt, B et al (2013) London's Environment Research Group (ERG) and Guy's and St Thomas' Foundation Trust.
- <sup>30</sup> Office of National Statistics (2011) Method of Travel to Work by Local Authority 2011 Census
- <sup>31</sup> Bristol City Council (2018) Quality of Life Survey
- <sup>32</sup> Air Quality Consultants Ltd. (2017). Health Impacts of Air Pollution in Bristol

- 
- <sup>33</sup> Department for Transport (2017) Road Safety Data
- <sup>34</sup> Sustrans (2017) Bike Life Report
- <sup>35</sup> Bristol City Council (2018) Quality of Life Survey
- <sup>36</sup> SACTRA, 1994 Trunk roads and the generation of traffic. Standing Advisory Committee on Trunk Road Assessment. London: HMSO.
- <sup>37</sup> Department for Transport (2017) Annual Bus Statistics
- <sup>38</sup> Currie, G., Wallis, I. 2008 Effective ways to grow urban bus markets – a synthesis of evidence, *Journal of Transport Geography*, 6: 419-429.
- <sup>39</sup> West of England (2015) Bus Punctuality Data
- <sup>40</sup> Bristol City Council (2017) Bristol Transport Assets and Maintenance data
- <sup>41</sup> Department for Transport (2009) Impact Assessment of the Carbon Reduction Strategy for Transport.
- <sup>42</sup> Bristol City Council (2015) Our Resilient Future: A Framework for Climate and Energy Security
- <sup>43</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>44</sup> Centre for Connected and Autonomous Vehicles (2017) Market forecast for connected and autonomous vehicles
- <sup>45</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>46</sup> Urban Transport Group (2014) Bus Priority Works
- <sup>47</sup> West of England Councils (2017) West of England Joint Transport Study
- <sup>48</sup> Air Quality Consultants Ltd. (2017). Health Impacts of Air Pollution in Bristol
- <sup>49</sup> Bornioli, A (2015) The Influence of the Built Environment on Walking Experience- A Bristol Case Study. University of the West of England
- <sup>50</sup> Johnston, I. 2010 Beyond “best practice” road safety thinking and systems management – A case for culture change research, *Safety Science*, 1175-1181.
- <sup>51</sup> Bristol Health Technical Report (2013) J1899 F2.pdf AQC
- <sup>52</sup> Bristol City Council (2016) Traffic Counts
- <sup>53</sup> Department for Transport (2016) Traffic Master Data
- <sup>54</sup> Department for Transport (2017) Road Safety Data
- <sup>55</sup> Sustrans (2006) Retail vitality surveys
- <sup>56</sup> Urban Transport Group (2014) Bus Priority Works
- <sup>57</sup> Nottingham City Council (2011) Nottingham Local Transport Plan
- <sup>58</sup> Atkins (2013) Bristol Road Pricing Scoping Study