West of England Joint Transport Study

Issues and options for consultation Key Principles Report

November 2015
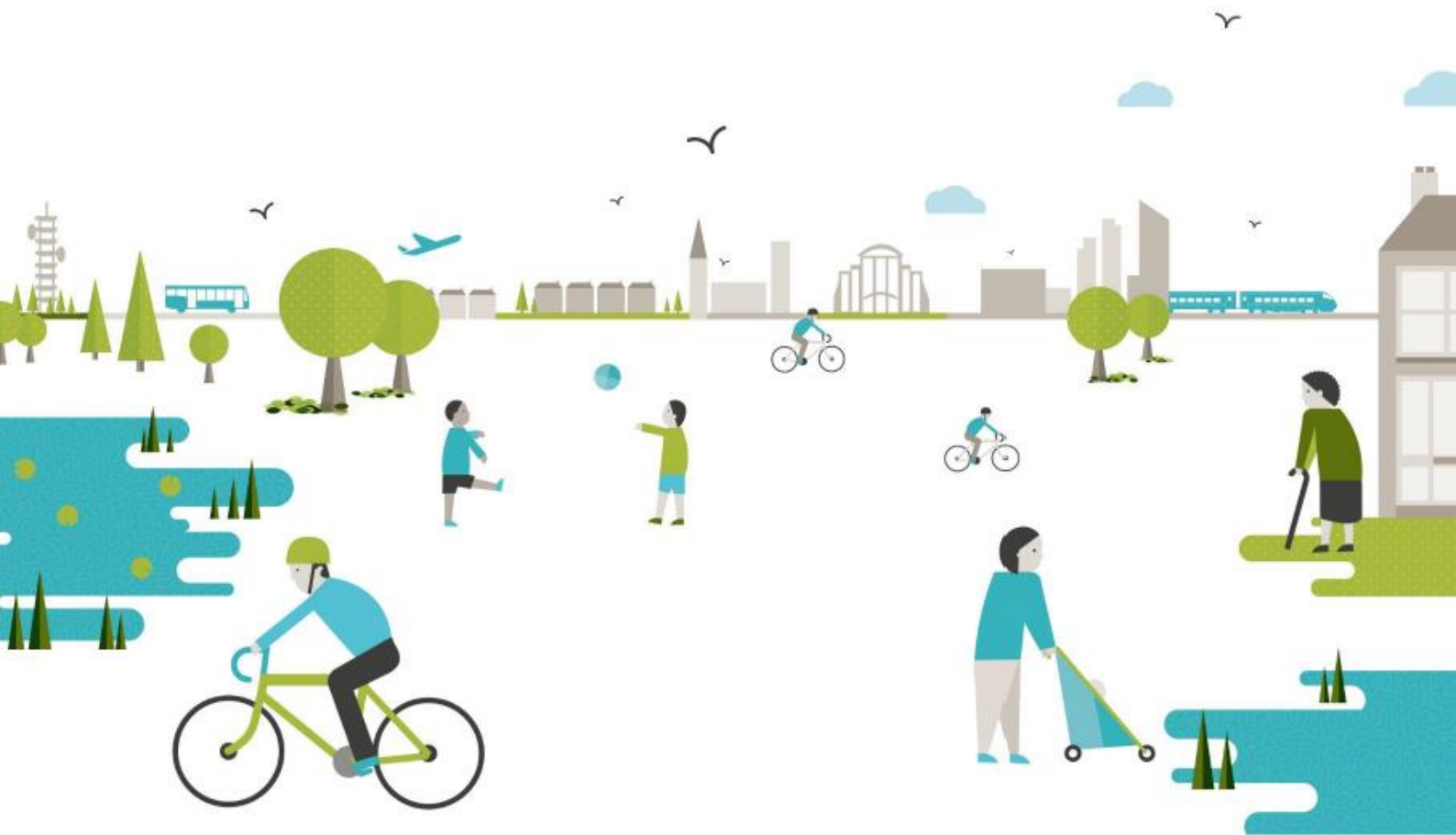
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1. Introduction

1.1. Joint Spatial Plan and Joint Transport Study

The West of England Authorities (Bath & North East Somerset Council, Bristol City Council, North Somerset Council and South Gloucestershire Council), supported by the West of England office, are in the process of preparing a Joint Spatial Plan (JSP) and Joint Transport Study (JTS). The Plan area covers the whole of the West of England, including Bath & North East Somerset, Bristol, North Somerset and South Gloucestershire.

The purpose of the Joint Spatial Plan is to consider the long-term development needs in the West of England to 2036 and identify strategic locations for growth. This includes identifying overall requirements for housing and employment land, the most appropriate locations for the housing and employment growth, and transport and other infrastructure requirements in the Plan area.

The purpose of the Joint Transport Study is to provide a clear direction for the long-term development of the transport system in the West of England to 2036 and beyond. This will follow on from the current Joint Local Transport Plan (JLTP) which sets investment priorities to 2026. The Joint Transport Study will also inform, and be informed by, the Joint Spatial Plan, and will therefore consider alternative spatial scenarios and facilitate work to identify a preferred spatial strategy.

1.2. Purpose of this Report

This Key Principles Report is the first output from the Joint Transport Study. The purpose of this technical report is to review the current policy context, identify key challenges, set clear objectives, and develop the guiding principles for the development of a wide range of strategic options for consideration through the Joint Transport Study. This report will ensure that the subsequent steps of the Joint Transport Study are guided by clear objectives and principles, and that potential options clearly correspond to actual needs.

The overall approach to compiling this report is summarised in Figure 1-1. This illustrates the linkages between the development of strategic options (or Future Transport Concepts) and the existing policy context and evidence base.

Figure 1-1   Approach to defining key principles
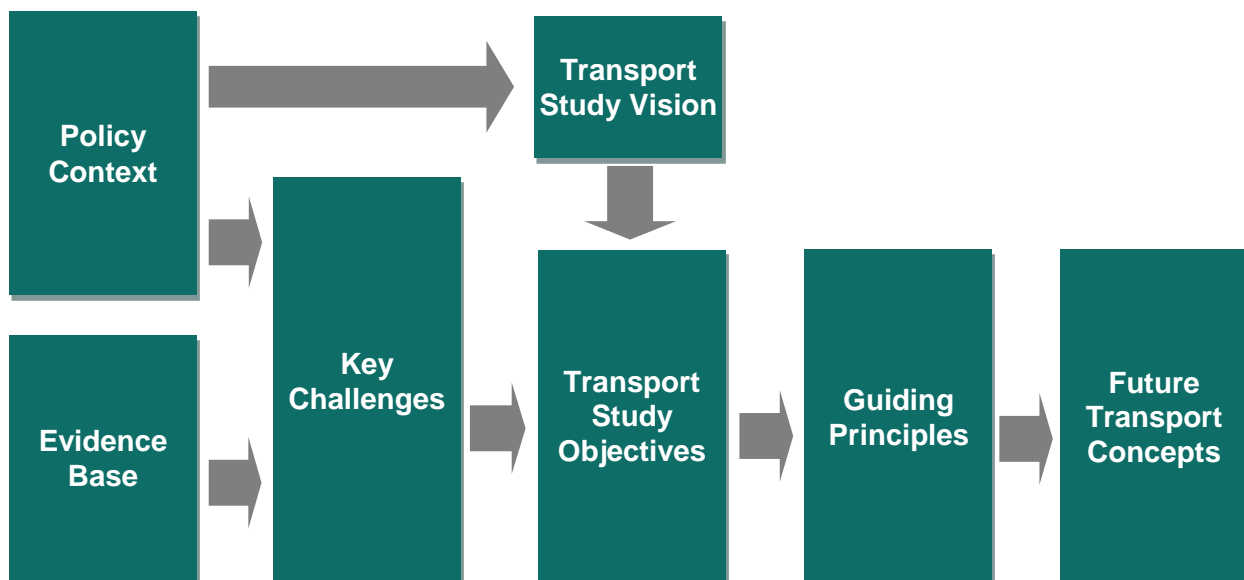
1.3. Structure of this Report

In accordance with the approach presented within Figure 1-1, this report is structured as follows:

- Chapter 2 provides an overview of key policy documents for the West of England and the implications for the strategic direction of the study;

- Chapter 3 presents the transport challenges for the area, both now and in the future, by building on and updating the evidence base in the current Joint Local Transport Plan, together with estimates of future housing needs and employment growth;

- Chapter 4 sets out an initial vision and accompanying set of objectives for the Joint Transport Study, drawing on the policy direction discussed in Chapter 2 and the challenges identified in Chapter 3;

- Chapter 5 presents a set of guiding principles which build from the study objectives and set out the approach to identifying strategic options;

- Chapter 6 provides an initial set of Future Transport Concepts, which have been identified through targeted stakeholder discussions; and

- Appendix A sets out potential component schemes within the Future Transport Concepts.

2. Policy Context

2.1. Introduction

The West of England has a well-developed transport policy framework and it is essential that this is reflected in the approach used to identify and refine the options to be considered through the Joint Transport Study. This chapter provides a brief synopsis of the key messages from the main policy documents and the implications for setting the objectives and guiding principles of the Joint Transport Study.

2.2. West of England Local Transport Plan 2011-2026

The current JLTP (to be referred to as JLTP3) was published in 2011 and sets out the priorities for transport to 2026. In particular, the JLTP3 seeks to achieve a better connected, more balanced and more customer-focused transport network. The vision of the JLTP3 is for:

"an affordable, low carbon, accessible, integrated, efficient and reliable transport network to achieve a more competitive economy and better connected, more active and healthy communities."

In order to achieve this vision, the JLTP3 sets out five transport goals:

- Reduce carbon emissions;

- Support economic growth;

- Promote accessibility;

- Contribute to better safety, security and health; and

- Improve quality of life and a healthy natural environment.

Related challenges are grouped under each of these goals to reflect the key issues to be addressed. These have been derived through the analysis of a comprehensive evidence base. These challenges in turn have been used to develop strategies for each of the goals to 2026, including the identification of the current major scheme programme.

The JLTP3 therefore provides a strong platform for the Joint Transport Study and provides the basis of the vision, goals and objectives for the study (see Chapter 4), which reflect the vision and goals presented above. More recent data enables an update on the challenges presented within the JLTP3, as discussed within Chapter 3, but the key principles remain valid.

2.3. West of England Strategic Economic Plan 2015-2030

The Strategic Economic Plan (SEP) was submitted to Government in March 2014 and sets out how the region aims to develop its economy, with particular emphasis on investment needs up to 2021. The SEP sets a vision for economic growth which is managed sustainably to ensure all those within the area benefit and that the environment is protected and enhanced.

The importance of delivering travel improvements, and in particular improved transport infrastructure to support this growth, are key themes within the SEP. A number of policy drivers emerge, which should be captured within the Joint Transport Study, including:

- *"Easier local, national and international travel" (SEP Vision)* – with particular emphasis on the need to link communities to employment opportunities and local services, to control and reduce congestion and to improve strategic connections;

- *"A low carbon and resource efficient economy" (Objective 2)* – ensuring that growth is achieved within environmental limits and also that the economy is resilient to any future environmental shocks;

- *"Ensure all our communities share in the prosperity" (Objective 5)* – especially in terms of reducing inequalities in employment opportunities, overall quality of life and health outcomes; and

- *"Create places where people want to live and work" (Objective 3)* – particularly in terms of building on the strengths of cultural attractions and the benefits of the distinctive mix of urban and rural areas and in ensuring essential infrastructure is provided to enable sustainable growth.

Whilst the SEP does not fundamentally shift the policy direction from that presented within the JLTP3, it will be important to ensure that this increased emphasis on sustainable economic growth, in particular, is reflected within the Joint Transport Study objectives.

2.4. Spatial Strategies in the West of England

The spatial strategy for the West of England is currently described in the Core Strategies for the four authorities (Bath & North East Somerset, Bristol, North Somerset and South Gloucestershire). These set out spatial visions and plans for the allocation of housing and employment land to the late 2020s, and they also identify transport policies and infrastructure requirements to help manage and accommodate this growth.

2.4.1. Bath & North East Somerset

Bath & North East Somerset includes the historic city of Bath (which has World Heritage Site status), the Cotswolds and Mendips Areas of Outstanding Natural Beauty, former industrial areas in the Somer Valley (including Radstock and Midsomer Norton) and the urban fringes of the Greater Bristol conurbation (including Keynsham and Whitchurch). Much of the authority area is covered by Green Belt, which is intended to prevent the coalescence of Bristol and Bath and to protect the unique historic and environmental setting of Bath.

The area around the city of Bath is characterised by significant environmental constraints – both in terms of the historic quality of the built form of the city, and the high quality of the surrounding landscape. The south of the authority area, including the Somer Valley, and the authority's rural locations faces challenges of service provision and high levels of out-commuting and car use. The area around Keynsham and Whitchurch, in particular, is currently characterised by significant infrastructure constraints, especially with congested road networks.

These challenges are reflected in the spatial strategy, which focuses growth in strategic locations in Bath (within the Enterprise Area, including the regeneration of Bath Riverside), Keynsham, Midsomer Norton and Radstock. In addition, strategic green belt releases have been identified for Whitchurch, Keynsham and to the south of Bath. The main focus for transport investment is the Bath transport package and the development of showcase bus corridors connecting the towns.

Bath & North East Somerset Council is developing a series of local transport strategies, designed to complement emerging spatial strategy. The Bath Transport Strategy was adopted as Council policy in November 2014, while the Keynsham Transport Strategy was adopted in Summer 2015. Further transport strategies are under development for the Somer Valley (including Radstock and Midsomer Norton), and for the Chew Valley & Rural Areas. The planned MetroWest project will also increase local train frequencies between Bath and Bristol.

2.4.2. Bristol

Bristol is one of the UK's strongest performing cities, but is also a place with areas of acute deprivation. The city centre has a strong concentration of higher-value business and professional services, and the Temple Quarter Enterprise Zone is intended to attract innovative businesses and creative industries. The city centre has important historic interest, reflecting the long maritime heritage of the city. North of the city centre, Clifton, Redland and Westbury-on-Trym offer a high quality environment that has attracted higher-skilled workers. There are significant social challenges in the post-war estates on the edge of the city, including Lawrence Weston, Southmead and Lockleaze, together with the eastern side of the inner city, including Easton and Lawrence Hill. South Bristol remains a major challenge, where skills, health and income are all lower than in most other parts of the city, and the area is a regeneration priority.

The spatial strategy identifies a number of areas for growth and regeneration. In the city centre, the focus is on commercial floorspace, regeneration of old office stock and provision of new homes. Regeneration will

take place in the Northern Arc and Inner East areas of the city, while Avonmouth and the Port of Bristol will be the focus for warehousing and heavy industry. The south of the city is the focus for comprehensive social, economic and physical regeneration, with new homes and a range of employment floorspace. The current transport major scheme programme includes the MetroBus project (comprising routes from Ashton Vale to Temple Meads and North Fringe to Hengrove, together with the South Bristol Link) and MetroWest, a comprehensive upgrade to the rail system serving the wider area. In addition, the spatial strategy identifies additional road links and rapid transport corridors that are not currently part of the major scheme programme.

2.4.3. North Somerset

North Somerset is characterised by a mix of urban and rural areas, extending from the edge of Bristol to the Severn Estuary and Mendips Area of Outstanding Natural Beauty (AONB). Weston-super-Mare is the most important town in the authority: whilst it has seen large-scale growth in recent years, with new housing on its eastern edge, there remain significant social challenges in much of the inner urban area, reflecting its changing economic role. Clevedon, Nailsea and Portishead are other important towns, with significant commuting to the Bristol urban area. A significant proportion of the authority area is covered by the Bristol Green Belt, and the south of the authority forms part of the Mendips AONB. North Somerset is also home to Bristol Airport, with a catchment area covering the whole of the South West peninsula, and Royal Portbury Dock is an important location for imports and exports, including cars.

The spatial strategy sets a vision for Weston-super-Mare as a major economic centre catering for the employment, retail and social needs of its residents, with new development areas creating mixed-use communities. Clevedon, Nailsea and Portishead will increasingly meet the needs of their populations and will play less of a dormitory role, whilst villages will cater for rural needs and open countryside will be protected. Major transport improvements are to be delivered in support of the strategy, including the MetroBus project (Ashton Vale to Temple Meads and South Bristol Link) and MetroWest Phase 1 from Portishead. Packages are also under development to support access to key development locations, principally the Weston Villages.

2.4.4. South Gloucestershire

South Gloucestershire is a diverse area, extending from the northern and eastern fringes of the Bristol conurbation to the Cotswolds Area of Outstanding Beauty in the east of the authority. South Gloucestershire has close functional links with Bristol, with significant commuting into and from the city. The area has distinct communities, each with its own opportunities and challenges. The largest areas of population are in the northern and eastern fringes of the Bristol conurbation. The North Fringe, which includes the communities of Filton, Patchway and Bradley Stoke, is also the largest area of employment and is home to major manufacturing and services companies, drawing in employees from a wide catchment area. The East Fringe is a major residential area and is characterised by high levels of out-commuting. Yate and Chipping Sodbury, although distinct towns, collectively form an important community, and Thornbury is an historic market town. Severnside is an important industrial area that has attracted heavy industries and warehousing, and benefits from close proximity to the Port of Bristol.

The spatial strategy identifies the priorities for these distinct communities and plans for significant levels of growth in the North Fringe, East Fringe and Yate and Chipping Sodbury, with smaller-scale growth in Thornbury, commensurate with its role as a local market town. Development in Severnside will continue to focus on industrial and logistics uses. Major transport improvements are identified, including rapid transit to connect the North and East Fringes and the MetroWest programme (included in the current major scheme programme for the West of England) and packages to support the development of new neighbourhoods.

2.5. Implications

This chapter has considered a range of drivers of transport policy in the West of England. The JLTP3 has five goals addressing diverse challenges that must be addressed by the transport system. Although the SEP focuses on economic growth, it makes clear that all must benefit from growth, and the environment must be protected and enhanced. The Core Strategies recognise the diversity of the West of England and the distinct challenges that must be addressed in each area.

From this review, it is clear that the Joint Transport Study must seek to:

• Enable the West of England to meet its full potential as one of the most successful city regions in Europe, with highly productive businesses and the creation of new businesses and new jobs;

- Deliver new housing, in the right places, to support the growth ambitions of the city region, to create high quality communities and to create a better balance of jobs and houses in different areas;

- Help tackle deep-rooted challenges of deprivation, inequality and poor health in many parts, but in particular in South Bristol, other parts of Bristol and Weston-super-Mare;

- Protect areas of high quality natural environment, including the Areas of Outstanding Natural Beauty and protect high quality historic built environments and regenerate targeted areas in towns and cities; and

- Continue the drive towards more sustainable lifestyles, with an imperative to tackle carbon emissions, particularly from the use of cars, which will require action to provide more effective travel choices and reduce congestion.

The next chapter explores the evidence relating to these challenges.

3. Challenges

3.1. Introduction

The review of the policy documents in the previous chapter has shown that the West of England faces a number of opportunities and challenges relating to transport and travel. These can be considered as follows:

- *Direct transport challenges* – a lack of attractive travel choices, high levels of congestion and a lack of resilience within the transport network to incidents or wider disruption; and

- *Wider challenges which impact / are impacted upon by transport* – including the quality of the environment, people's health and quality of life, delivery of new housing to accommodate a growing population and capacity to unlock the economic potential of the area.

These challenges are considered in this chapter under the following themes:

- *Limited travel options* – high levels of car dependence in most areas;

- *Congestion* – high levels of car use causing overloaded networks, delays, unreliable journeys and wider impacts;

- *Environmental challenges* – carbon emissions, high levels of noise and impacts on communities;

- *Social challenges* – high levels of inequality, poor skills, poor health and limited life chances;

- *Housing demand* – potential scale of new housing needed in the West of England; and

- *Economic growth* – ambitions for the creation of new jobs and developing the West of England as an economic powerhouse.

These are relevant to the West of England both now and in the future and can be considered in the context of three time horizons:

- *Current challenges* – certain challenges are being addressed in part by the current transport infrastructure investment programme (both the major schemes and smaller schemes) but a number of challenges will remain; these can be viewed as 'legacy' problems of connectivity, capacity, congestion and impacts of transport on quality of life and environment;

- *Impacts of growth associated with development defined in the Core Strategies to 2026 and beyond* – the Core Strategies have identified transport measures to mitigate the impacts of new development, but not all of these schemes are funded. Challenges may continue to emerge as the transport system fails to keep pace with growth in travel driven by economic growth and increased levels of activity; and

- *Longer term growth to 2036 and beyond* – consideration of the implications of alternative options for growth, potential requirements to mitigate this scale of growth, but also opportunities to shape growth through potentially transformational new transport infrastructure.

3.2. Limited transport options

The West of England has an area of influence that extends beyond its boundary into South Wales, west Wiltshire, southern parts of Gloucestershire and northern parts of Somerset. This has implications for travel choices in the area, including movements across the Severn Estuary from South Wales and movements from nearby towns and rural areas in Gloucestershire, Wiltshire and Somerset.

The international gateways – Bristol Airport and Bristol Port – also create wider travel demands. Bristol Airport has a catchment that extends across the South West and into South Wales, whilst Bristol Port generates freight traffic to/from other parts of the UK.

In terms of transport accessibility and choices, the West of England area has historically experienced:

- Very high levels of car use in rural areas and urban fringes (with slightly lower levels in urban areas);

- Low levels of public transport use across the whole area, including the urban areas, although there is evidence that this is growing; and

- A relatively high and growing level of cycle use in the urban areas, when compared to equivalent UK cities.

Figures 3-1 to 3-3 illustrate these issues:

Figure 3-1   Proportion of residents using private transport to get to work
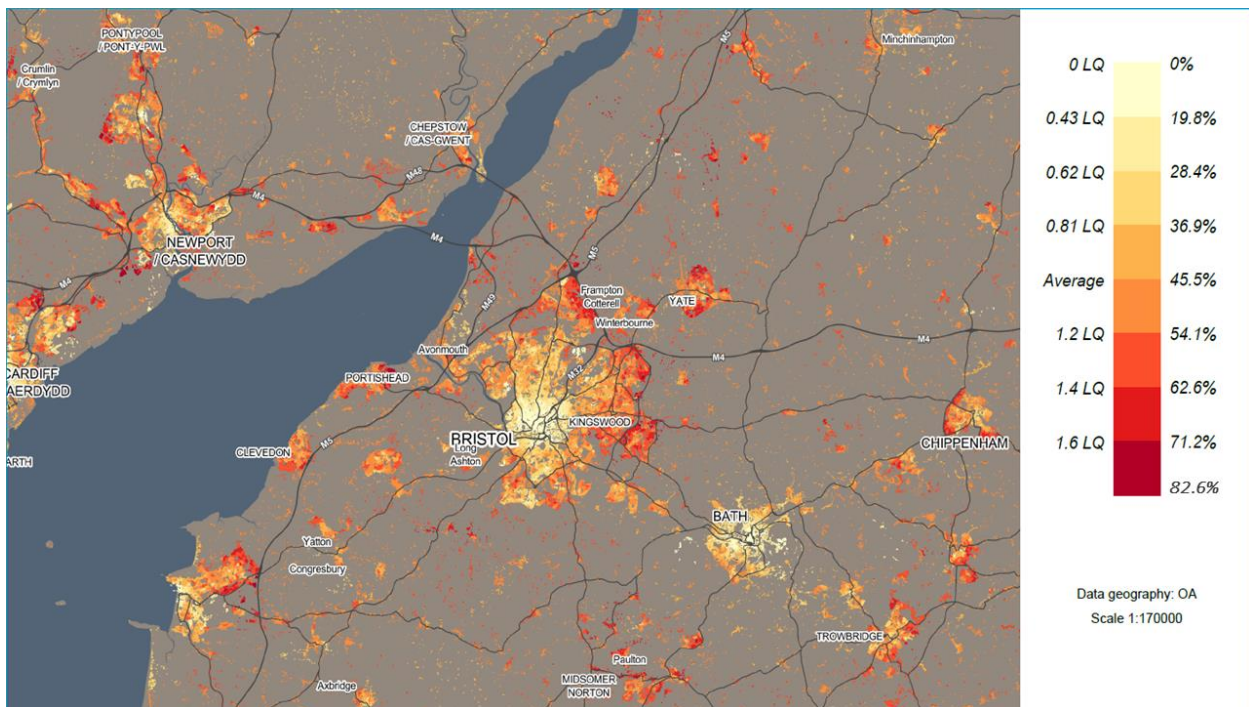
Source: 2011 Census (as visualised at www.datashine.org.uk). LQ = Location Quotient, which is the ratio of private transport use in each location compared to the national average (national average = 45.5%). Areas with a higher LQ have higher use of private transport and areas with a lower LQ have lower use of private transport.

Figure 3-2   Proportion of residents using public transport to get to work
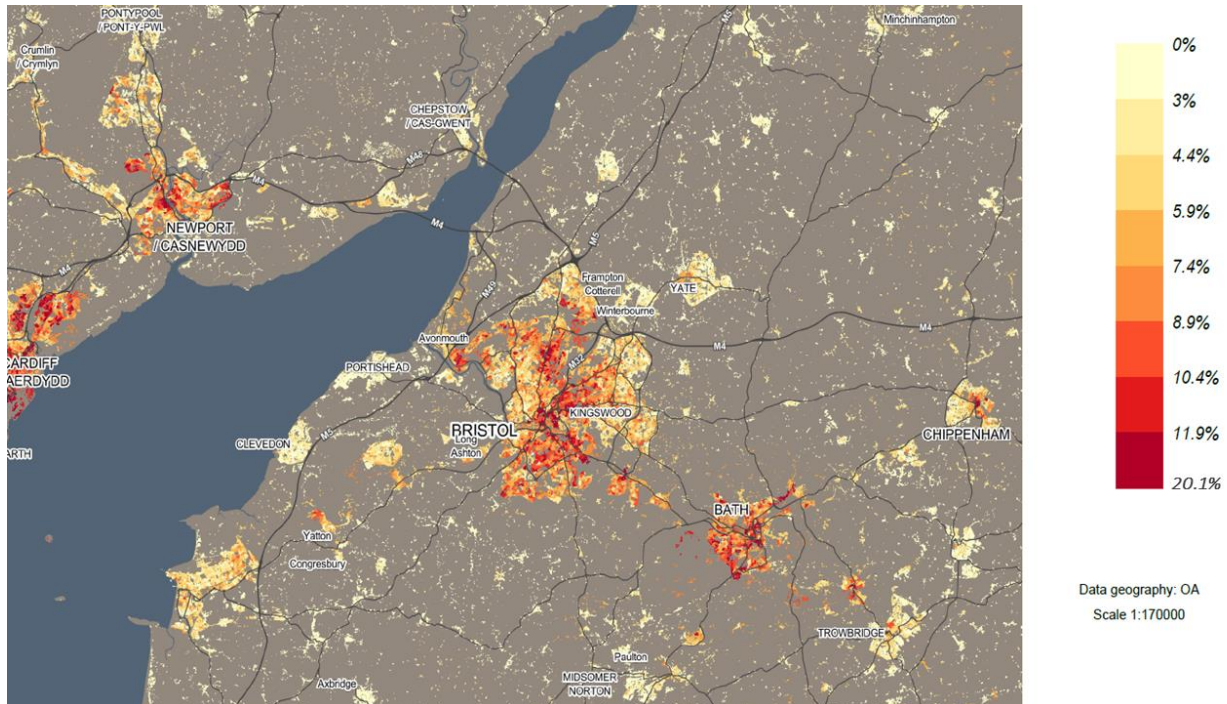
Source: 2011 Census (as visualised at www.datashine.org.uk). National average = 11.5%.

Figure 3-3   Proportion of residents who walk, cycle or use a mode other than car or public transport to get to work
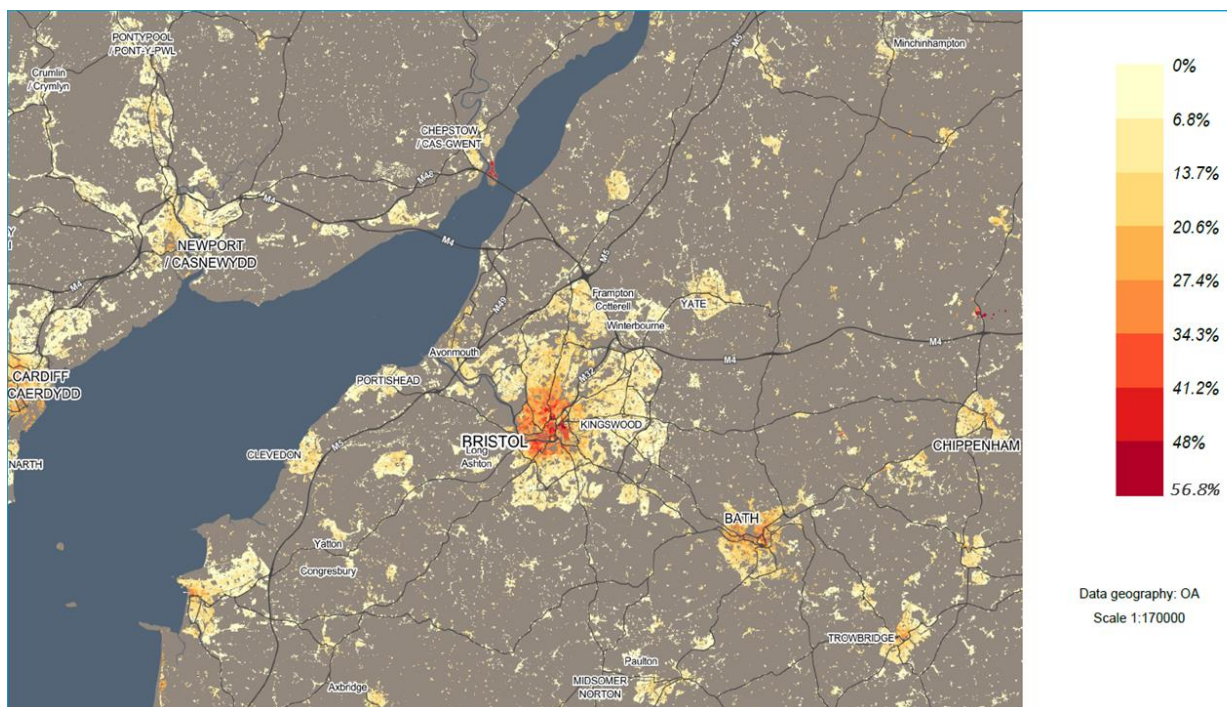
Source: 2011 Census (as visualised at www.datashine.org.uk). National average = 9.9%.

These maps demonstrate high levels of car use, not just in the rural areas, but also in many of the towns and in the northern and eastern fringes of Bristol. The areas on the eastern fringe of Weston-super-Mare, eastern side of Portishead and eastern and northern fringes of Bristol have all been developed during the last three decades. In the case of Weston-super-Mare and Portishead, there are high levels of out-commuting to the Bristol area, and access from Portishead is via a single road, with no rail access. The North and East Fringes

have high levels of commuting to Bristol city centre (radial movements) and to the North Fringe (orbital movements), with long public transport journey times and high car use.

Public transport use is generally low across the area. Slightly higher levels are seen along key bus corridors and in inner urban areas, and patronage has recently grown significantly in the Bristol urban area. It is particularly low in many of the towns, including Yate, Thornbury, Midsomer Norton, Clevedon and Portishead, although recent investment has been made in some areas to attempt to improve the attractiveness of services. There are high levels of walking and cycling in much of Bath and the inner part of Bristol, together with parts of the North Fringe, inner Weston-super-Mare and in the centres of towns including Clevedon, Nailsea, Portishead, Yate and Thornbury. Recent monitoring data has shown significant increases in cycling, some growth in bus use and a very large increase in rail use since 2008.

The current programme of investment in the West of England will contribute to improving the attractiveness of walking, cycling and public transport. Investment in improvements to the cycling network are forecast to increase the numbers of people cycling. The MetroBus system, which is now under construction, is forecast to attract new users to the public transport network, and the planned MetroWest project will attract new users to the rail system. Together these will help to reduce reliance on cars, contributing to a shift from cars to more sustainable modes. However, the growing numbers of people living and working in the West of England will mean that there will be continued growth in the numbers of cars and vehicle traffic.

3.3.   Congestion is impacting on many areas

The West of England is a prosperous area that has experienced significant traffic congestion over a number of years on the motorway network, core radial routes and around main employment centres. Traffic congestion causes a number of problems including:

- Longer and more unreliable journey times – for business, commuting and leisure journeys;

- Reduced resilience in the event of incidents;

- Reduced economic competitiveness;

- Reduced accessibility to jobs and services;

- Worsened reliability of bus services;

- Dominance of road traffic on the urban environment; and

- Idling traffic causing air quality and health problems.

Figure 3-4 shows the problems of road congestion across the West of England. This is sourced from transport model data and observed conditions on the road network. It also shows key locations where the resilience of the network is a problem. These locations tend to be particularly vulnerable when traffic accidents or other incidents occur, causing widespread disruption across the wider network.

Figure 3-4   Road congestion and resilience challenges in the West of England
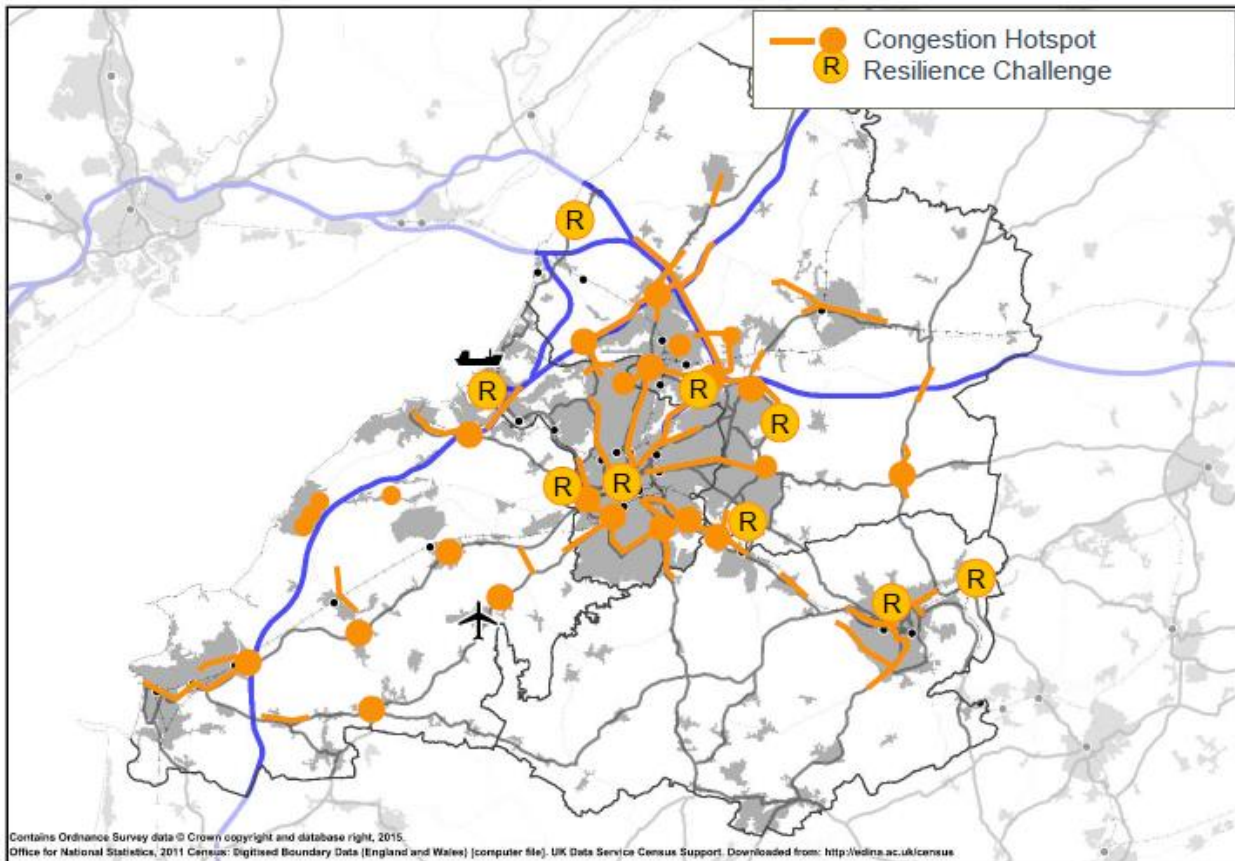
The map shows the current scale of the challenge, with congestion problems in Central Bristol and on radial routes in East Bristol and North Bristol. There are also significant problems on the A4174 Ring Road in South Bristol and in the North and East Fringes. The M32 into Central Bristol experiences queueing at present: these are forecast to extend in the future, although the North Fringe to Hengrove MetroBus scheme will improve travel choices and mitigate delays for buses.

The North Fringe already experiences significant problems, with a complex mix of radial, orbital and more local movements. These are forecast to worsen in future, although the North Fringe to Hengrove Package will help mitigate these issues by providing new infrastructure and improving travel choices. Yate also has problems on the A432 approach to the town centre from the west. The Cribbs Causeway area is forecast to experience growing levels of congestion in future, including the M5 motorway junctions. Significant issues are also faced on the A369 from Portishead to M5 Junction 19, M5 Avonmouth Bridge and the A38 from Thornbury to the North Fringe (particularly approaching M5 Junction 16) and onwards to Bristol.

Existing congestion problems have been identified on the network within Weston-super-Mare. Many of these challenges have been mitigated with the recent completion of the Weston Package, but future challenges are likely to emerge as the town continues to grow. The operation of the M5 between Junctions 20 and 21 will become an increasing challenge, due to increasing numbers of trips between Weston and the Bristol urban area. There are also high traffic flows on the A370 through villages in North Somerset, creating both congestion and environmental problems in these communities, and the village of Barrow Gurney also suffers high traffic flows. The completion of the South Bristol Link (SBL) will provide an alternative route across the south-west quadrant of Bristol which will help to relieve Barrow Gurney. The additional capacity provided by the SBL will help to accommodate traffic growth on the A38 associated with the expanding Bristol Airport.

The A420 corridor east of Bristol is likely to become an increasing challenge, as is Keynsham on the A4 corridor. The A4 through Saltford and routes to the south of Bath (avoiding the city centre) are already a significant problem and most of Bath experiences high levels of traffic and congestion. The road network to the east of Bath is a worsening problem, with high levels of through traffic (including goods vehicles)

between the A36 and A46 passing through the middle of the city. The A46 corridor between Bath and M4 Junction 18 also carries high volumes of traffic.

This demonstrates that the congestion challenges are complex, and reflect the complex patterns of movement within both urban and rural areas, with a transport network that has failed to adapt to provide adequate travel choices.

3.4.   Environmental challenges

There are a series of environmental challenges resulting from the impacts of limited travel choices and congestion experienced across the West of England area. These include:

- **Carbon emissions:** directly related to the high levels of car use, as discussed above – a global environmental challenge;

- **Impacts on urban areas:** including the effects of high traffic flows and dominance of traffic on streetscene; and

- **Impacts on rural areas:** including the effects of traffic flows on routes through the Cotswolds and Mendips Areas of Outstanding Natural Beauty;

Road traffic contributed 32% of total **carbon emissions** in the West of England in 2008[1], but good progress is being made in reducing emissions from traffic. In 2006, road transport generated 1.43 tonnes CO_2 per capita and a target was set for a 16% reduction by 2020 (or 1.20 tonnes per capita). Monitoring data shows that this target was on track to be met by 2013[2], so very good progress has been made. This reflects mode shift to cycling and public transport and also increased fuel efficiency. However, it is notable that this metric is per capita. With future growth, increases in the numbers of people living and working in the West of England will offset the per capita reductions, and it will therefore be more challenging to reduce total carbon emissions. There remains, therefore, a significant challenge for the West of England in reducing total carbon emissions and the overall carbon footprint.

Poor air quality, noise and the severance effects of traffic have a negative effect on the quality and experience of the **urban environment** across the study area. These effects are particularly acute in Bath, Bristol urban neighbourhoods and parts of Weston-super-Mare. Many residential streets are characterised by high levels of on-street parking, particularly in areas close to major areas of employment, with resultant safety concerns and impacts on the quality of life in the area. There is an ambition to improve the quality of public realm in many areas, as part of regeneration or place-making activities, and the dominance of traffic is a potential challenge in reallocating roadspace for other place-based activity.

Figure 3-5 shows Air Quality Management Areas (AQMAs) designated by the local authorities, due to the levels of emissions and their impacts on people in the area. In Bristol, the AQMA covers the central area and most of the radial routes, including the M32, A38 Gloucester Road, A420 through Lawrence Hill, A4 Bath Road, A37 Wells Road, A38 Parson Street area and the Cumberland Basin. Within the Greater Bristol area, AQMAs are otherwise located at discrete and localised air quality hotspots, including Keynsham town centre and the centres of Kingswood and Staple Hill. The AQMA in Bath covers the central area, A4 London Road and A36 Warminster Road, reflecting longer-distance traffic passing through the city. Poor air quality is a major health issue.

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[1] Source: JLTP3, Page 43
[2] Source: JLTP3 Progress Report 2013/14, Figure 4.2
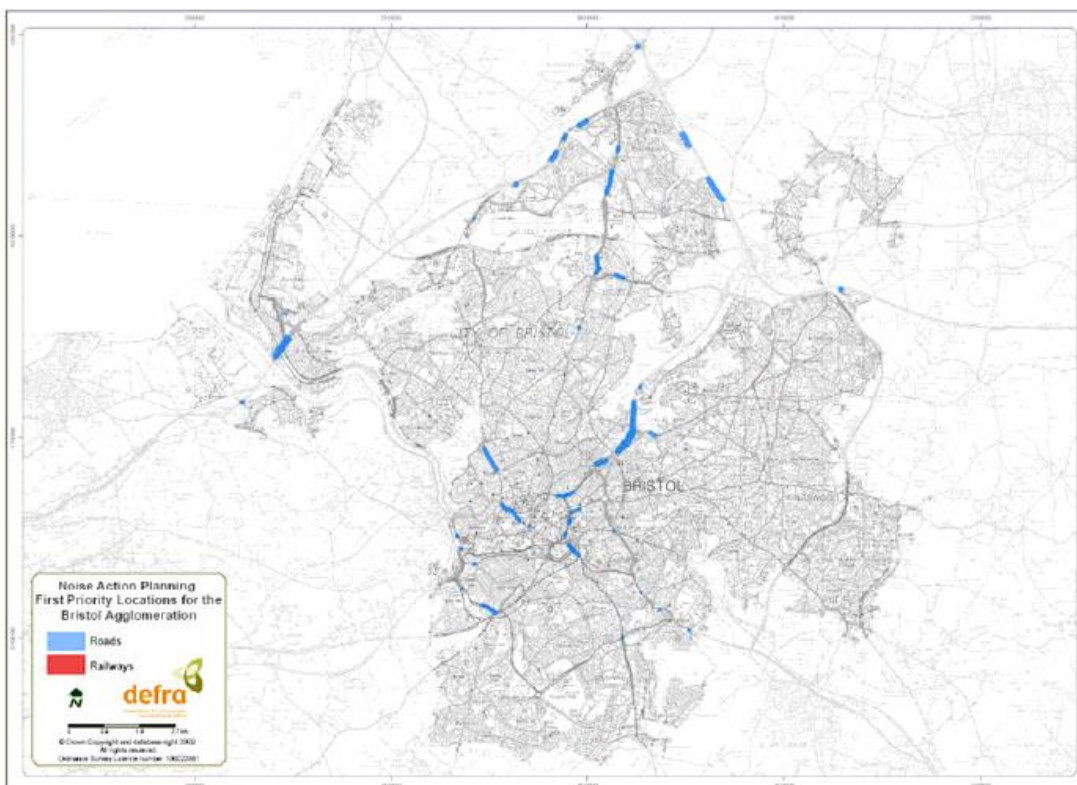
Figure 3-5   Air Quality Management Areas - wider Bristol and Bath area
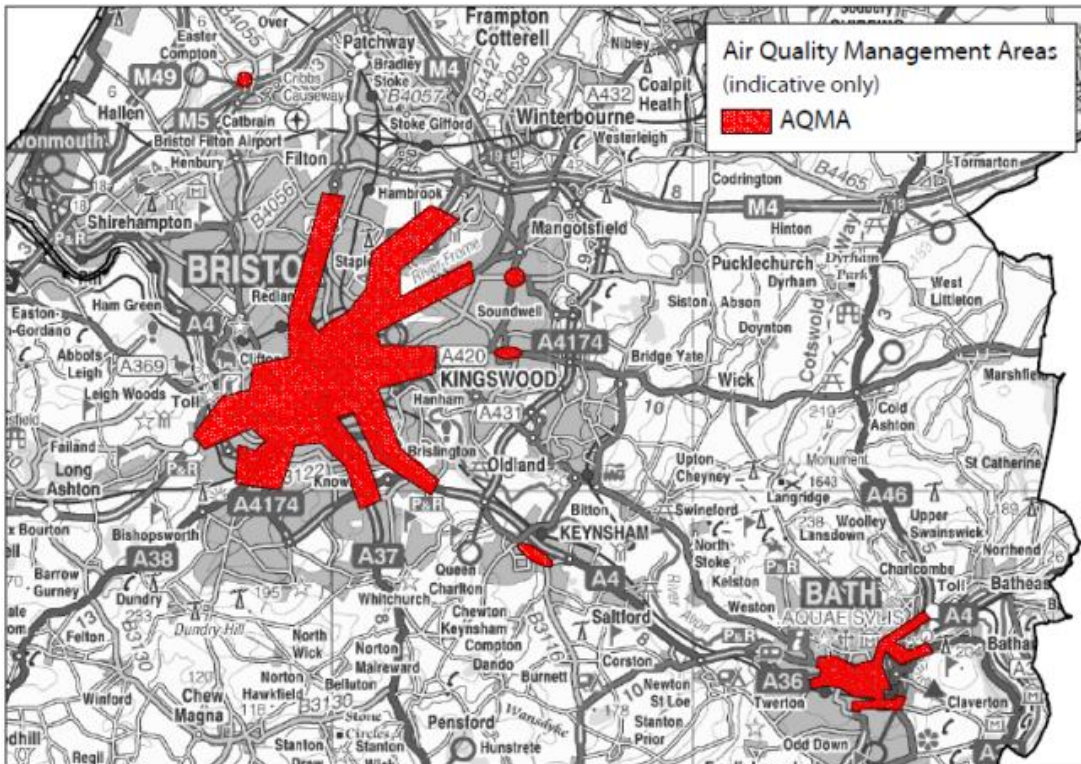
Source: JLTP3

Figure 3-6 shows communities impacted by noise in the Greater Bristol area.

Figure 3-6   Noise on key routes in Greater Bristol


Source: JLTP3

These are typically areas next to major roads with heavy traffic flows, particularly areas adjacent to the M4, M5 and M32, sections of major radial routes and key routes around the central area. It is recognised that noise is a characteristic of urban living, but in many cases, these communities are impacted by traffic passing through the area. There are therefore important questions about the impacts of through traffic on communities, and balancing the needs of movement against the needs of local communities.

There are also adverse environmental impacts of traffic in **rural areas**, where the tranquillity of areas such as the Cotswolds and Mendip AONBs are affected by traffic in some places. For example, Figure 3-4 indicates the impacts of high traffic flows on the A46, the area to the east of Bath and in parts of North Somerset. However, there are also important opportunities to proactively encourage access to the countryside, by sustainable modes of travel, to support the rural economy and as part of the unique quality of life on offer in the West of England.

3.5. Social challenges

Despite the overall prosperity of the West of England, a number of communities and groups of people face significant challenges. These include problems of poor skills levels, poor health, low incomes and high levels of deprivation in general. Figures 3-7 to 3-9 illustrate these challenges.

Figure 3-7   Proportion of households deprived in two dimensions
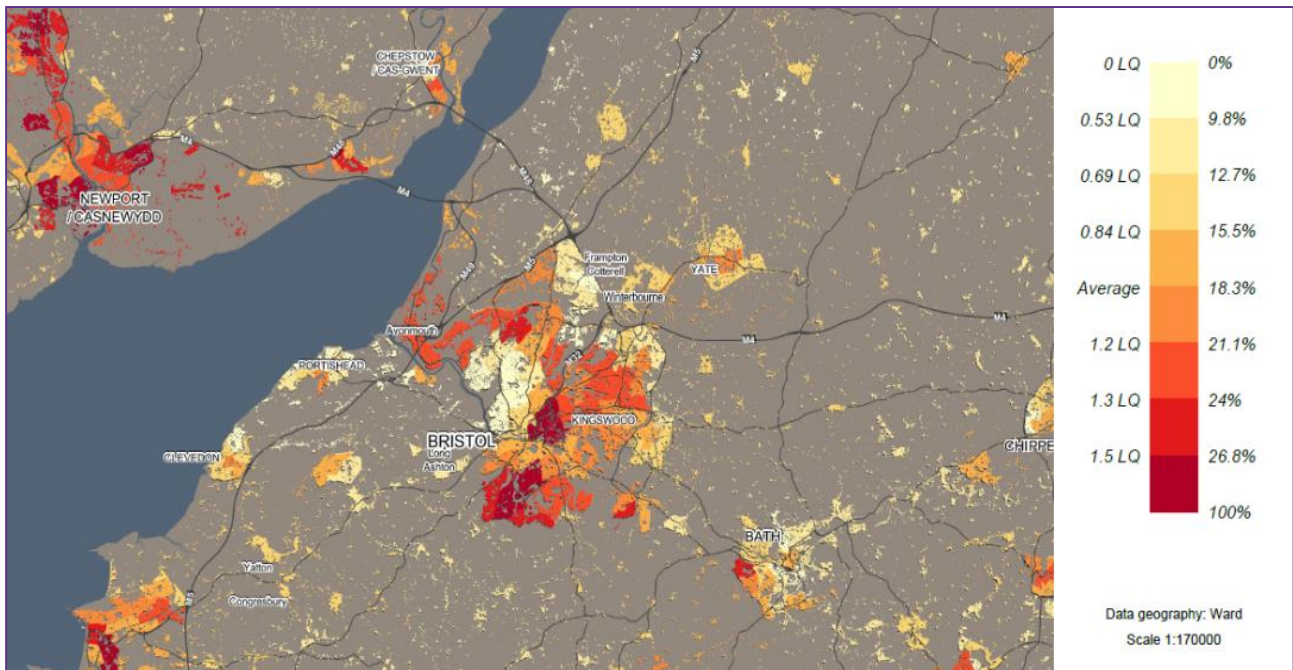
Note: this shows the proportions of households facing deprivation in two or more dimensions, for example, income deprivation, worklessness, poor health or no qualifications. Source: 2011 Census (as visualised at www.datashine.org.uk). LQ = Location Quotient, which is the ratio of households deprived in each location compared to the national average. Areas with a higher LQ have higher proportions of households deprived and areas with a lower LQ have lower proportions of households deprived.

Figure 3-8 **Proportion of residents whose day-to-day activities are limited a lot through poor health or disability**
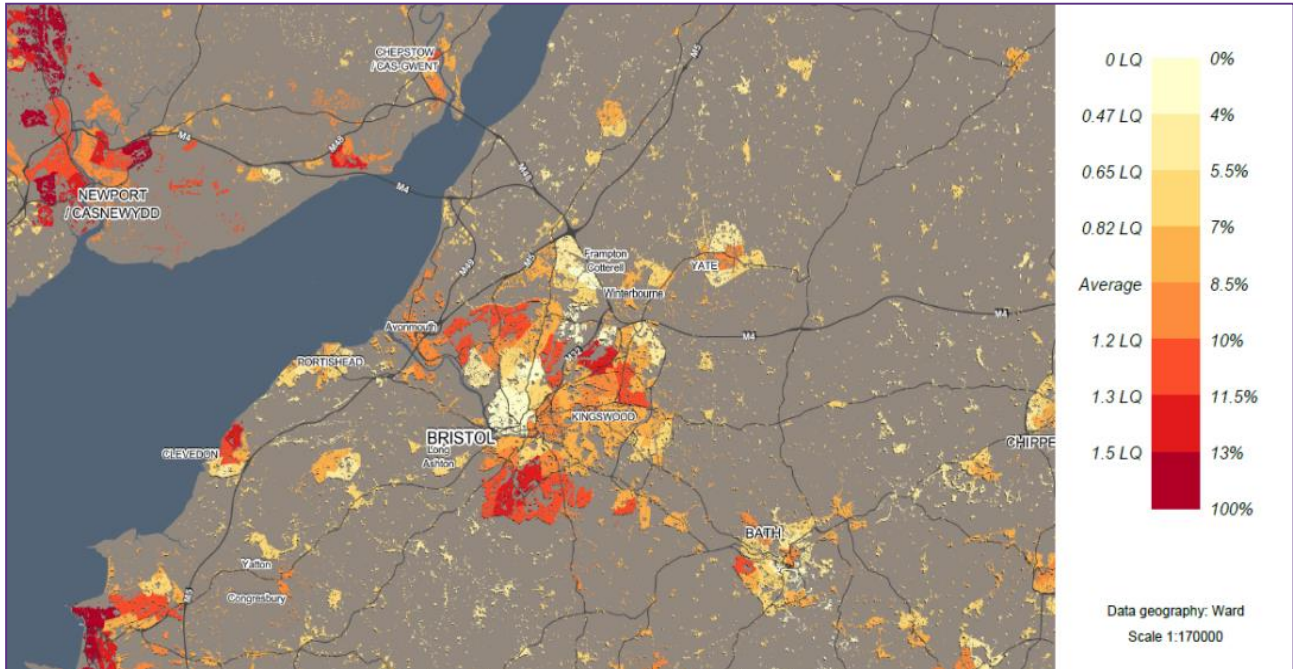
Source: 2011 Census (as visualised at www.datashine.org.uk). LQ = Location Quotient, which is the ratio of residents whose day-to-day activities are limited compared to the national average. Areas with a higher LQ have higher proportions of residents whose day-to-day activities are limited and areas with a lower LQ have lower proportions of residents whose day-to-day activities are limited.

Figure 3-9 **Proportion of residents with no qualifications**
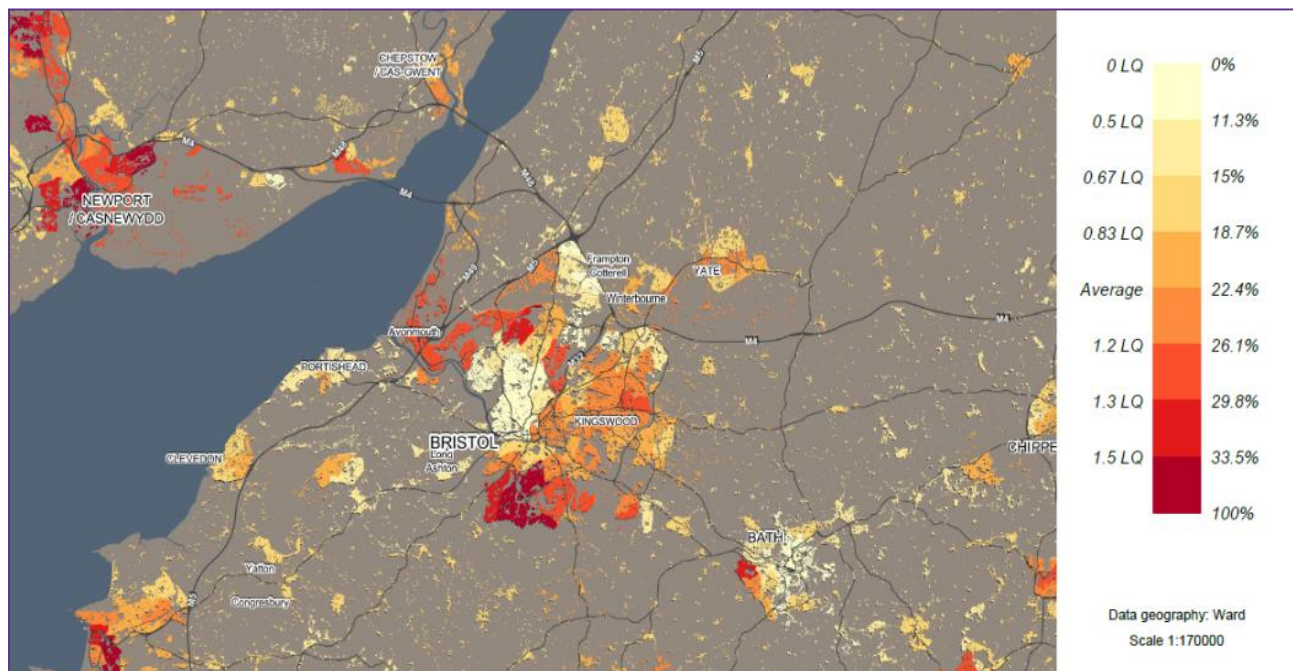
Source: 2011 Census (as visualised at www.datashine.org.uk). LQ = Location Quotient, which is the ratio of the proportion of residents with no qualifications in each location compared to the national average. Areas with a higher LQ have higher proportions of residents with no qualifications and areas with a lower LQ have lower proportions of residents with no qualifications.

These figures demonstrate strong geographic correlations, with some areas showing multiple challenges of deprivation, health problems and poor basic skills. These areas include South Bristol, eastern inner Bristol, the Northern Arc of Bristol and parts of inner Weston-super-Mare. Parts of Bath also face challenges, including Twerton, together with parts of Keynsham.

There are important questions about the role of transport in contributing to these challenges, for example whether poor accessibility prevents people reaching jobs. The evidence indicates that accessibility is not the only issue preventing people entering the labour market: there are many complex issues. For example, the Southmead area of Bristol is in close proximity to job opportunities in nearby Filton. However, these are typically high-paid jobs requiring advanced technical skills. Skills levels in the Southmead area are relatively low, with high numbers of people with no qualifications. Many people living in this area would tend typically to need to access different types of jobs, within the local area, in nearby Cribbs Causeway or in the city centre.

South Bristol faces particular challenges. There are relatively few jobs in the area, and most people commute to the city centre. The economic restructuring following the closure of older industries has not been followed by new job creation, and the lack of local jobs in the area is a challenge. However, the area is also characterised by poor skills levels and widespread relative ill health, which means that many local people are ill-equipped for work. Weston-super-Mare is also a particular challenge, with a relative lack of jobs in the town, and high levels of out-commuting by residents, particularly those people living on the eastern fringe near M5 Junction 21. Many people in the inner area of the town have poor basic skills and are relatively ill-equipped for work – with significant distances to jobs in the Bristol area adding to this challenge.

The health challenges in many of the urban areas are notable. It is recognised that poor air quality has a significant impact on those with health conditions. Figure 3-5 showed the distribution of AQMAs in the Greater Bristol and Bath urban areas. However, there is limited apparent correlation between the areas shown with poor air quality in Figure 3-5 and the areas with high numbers of people for whom day-to-day activities are limited. The relationships are therefore complex – there are a number of major social challenges impacting on people's life chances in the most deprived communities in the West of England.

Road safety is also an important consideration. The West of England has made good progress in reducing casualties on the road network. The average number of people killed or seriously injured was 472 per year averaged over the 1994-98 period. The target was to reduce this by 40% to 2010 (to below 300), and by 2009 this had reduced to 253[3]. A new target has been subsequently set for 250 by 2020. Despite increases in accidents from 2009 to 2010 and from 2011 to 2012, the evidence indicates that this target should be met.

3.6. Demand for housing

There are significant challenges relating to housing delivery across the West of England area. Housing delivery over recent years has slowed due to the recession and the four councils each have early Core Strategy review mechanisms scheduled in 2016 to address the pace of housing delivery. A Strategic Housing Market Assessment (SHMA) has forecast future housing requirements across the West of England as part of the evidence base to inform the Joint Spatial Plan and Joint Transport Strategy.

The Joint Spatial Plan Issues and Options document[4] sets out these challenges. It highlights that the SHMA has identified an Objectively Assessed Need for housing in the Wider Bristol Housing Market Area of 85,000 homes from 2016 to 2036. The current Local Plans and small local windfall developments are estimated to deliver around 56,000 new homes in the Wider Bristol Housing Market Area from 2016 to 2036. It is therefore estimated that the JSP will need to plan for a further 29,000 dwellings to be delivered.

Overall, the requirement for 85,000 dwellings will be equivalent to an increase of around 18% on current housing provision in the sub-region, and represents major growth in the sub-region. This will pose significant challenges in terms of ensuring that the new homes are located in the most efficient locations, to maximise use of existing facilities and in maximising opportunities for walking, cycling and public transport. There will also be significant challenges in ensuring the deliverability of new infrastructure (including transport infrastructure) to support the requirements of this new housing.

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[3] Source: JLTP3, Page 89
[4] West of England Joint Spatial Plan: Issues and options for consultation, November 2015, located at https://www.jointplanningwofe.org.uk

3.7.   Employment growth

The Strategic Economic Plan (SEP) sets out the ambition for sustainable economic growth across the West of England area, which includes planning for 95,000 new jobs by 2030[5]. This is equivalent to approximately 18% growth in the total number of jobs in the West of England between 2013 and 2030.

Central to the strategy will be the delivery of the Enterprise Zone, five Enterprise Areas and priority regeneration area in South Bristol. These strategic development locations together have the potential to deliver around 70,000 new jobs by 2030. However, previous research for the West of England Authorities by Atkins [6] has estimated that only around 14,000 of the 70,000 target jobs would be likely to be created without improved transport connectivity and capacity. The study estimated that the additional connectivity and capacity delivered by the current major scheme programme would support creating a further 20,000 jobs. However, the ability to deliver the conditions for the remaining 36,000 jobs would be constrained unless additional infrastructure was provided to further improve transport connectivity and capacity. It is also important that regeneration in South Bristol and Weston-super-Mare, and economic restructuring in the Somer Valley, is supported by growth and investment in order to re-balance the economy across the area.

3.8.   Implications

This chapter has demonstrated the challenges that need to be addressed through the Joint Transport Study. As highlighted in the introduction, these can be categorised as current challenges, challenges associated with growth in the Core Strategies to the late 2020s, and challenges associated with the growth to the late 2030s.

The evidence indicates that failure to act will have serious consequences for the West of England. At present, the shortcomings in the transport network are mainly seen as 'direct' impacts, in terms of limited travel options and high levels of congestion, which reduce connectivity across the city region. The current major scheme programme will make some progress in addressing these challenges. However, these schemes are due to be completed by 2021 and there is no investment programmed beyond these schemes.

Planned housing and employment growth to 2026 will place additional pressure on the network. Infrastructure packages will at least partially mitigate planned development, but will not fully address the impacts of background growth in travel demand. Challenges will remain in 2026 and traffic conditions are likely to deteriorate. Air quality is likely to remain a challenge without a significant mode shift: improvements in emissions technology could help to mitigate some of the problems, but traffic growth will further exacerbate the challenges. A mix of vehicle technology, engineering, education and enforcement will help to reduce road casualties, although patterns could change with increasing numbers of people walking and cycling. The deterioration in connectivity and network capability could, however, have a significant effect on the competitiveness of parts of the West of England, which will impact on future job creation.

Planning for growth to 2036 will pose further challenges. Fundamental challenges are likely to remain, even if new technologies transform society through new forms of mobility. Without investment in new infrastructure there will be issues associated with lack of network capacity. If new capacity is not provided, together with policies to encourage sustainable travel choices, the transport network is unlikely to be able to cope with a significant increase in demand. This would cause major problems with congestion, reliability, resilience and connectivity in many areas, which will damage the competitiveness of the West of England, and act as a major barrier to delivering new growth.

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[5] West of England Strategic Economic Plan 2015-2030, located at http://www.westofenglandlep.co.uk/about-us/strategicplan
[6] GVA impacts of major transport schemes, Atkins for West of England Authorities, December 2012

4. Vision and Objectives

4.1. Introduction

This chapter first describes the vision and objectives for the Joint Transport Study, which respond to the current policy framework and the challenges described in the preceding chapter. It then sets out how the vision and objectives will be used in the identification of potential options and in the design of the assessment framework to inform understanding of the potential impacts of the Joint Transport Study.

4.2. Vision and Objectives

The proposed vision, goals and objectives for the Joint Transport Study are presented in Figure 4-1 overleaf. As previously discussed within Chapter 2, the vision and goals are those that are currently contained within the JLTP3. Similarly, the objectives presented here have been drafted to align with the challenges of the JLTP3 and the policy direction presented with the SEP.

It is acknowledged that changes in the policy context may alter the scope and wording of the current JLTP vision and goals. The objectives presented overleaf may need therefore to be revisited to ensure that these changes are reflected within the assessment framework.

4.3. Application of Vision and Objectives

The Joint Transport Study intends to adopt a structured, objective-led approach to strategy development to identify potential solutions that best deliver the intended outcomes. Objectives therefore need to help **identify potential options** for solutions and should **inform the assessment framework** to enable an understanding of the likely impacts of the future transport components.

4.3.1. Identification of options

The objectives guide thinking on the types of option that could be considered for the Joint Transport Study, and in particular the areas that the options will need to address. The objectives have therefore been used to help define the Guiding Principles within Chapter 5 of this report. These in turn inform the Strategic Transport Concepts within Chapter 6.

In particular, the objectives provide the link back to the evidence of need, identifying the changes that are required to overcome the challenges and achieve the goals of the Joint Transport Study.

4.3.2. Development of the assessment framework

The objectives form a key component of the assessment framework for the Option Formulation stage of the Joint Transport Study, by providing the basis against which assessment criteria will be determined. Objectives have been identified that are measurable and enable appropriate indicators to be defined that provide a sound basis for decisions.

The assessment of the performance of each option against the objectives will enable a broader understanding of their overall benefits or disbenefits and the appreciation of trade-offs involved. It is important to ensure that the objectives are sufficiently broad in scope, but without duplication. In particular, this will help to better assemble options so that all outcomes are supported and that any undesired impacts can be better managed.

Figure 4-1   Vision, Goals, Challenges and Objectives

Vision	*An affordable, low carbon, accessible, integrated, efficient and reliable transport network to achieve a more competitive economy and better connected, more active and healthy communities*				

Goals	Support economic growth	Reduce carbon emissions	Promote accessibility	Contribute to better safety, health & security	Improve quality of life and a healthy natural environment
Challenges	Congestion impacts Demand for housing Employment growth	Limited transport options		Social challenges	Environmental challenges
Objectives	EC1: Tackle congestion and improve journey times and journey time reliability EC2: Improve the resilience of road and rail networks to incidents and the impacts of climate change EC3: Deliver the transport infrastructure capacity needed to enable job creation and business growth EC4: Deliver the transport infrastructure needed to unlock sustainable growth in housing EC5: Improve connections with strategic road and rail links, Bristol Port, Bristol Airport and other Gateways	CA1: Provide a transport network which is low carbon and resource efficient in operation CA2: Encourage low carbon travel choices	AC1: Improve access for all to employment, education and training AC2: Improve access to local services	SH1: Encourage healthy travel choices and behaviours SH2: Address issues of poor air quality generated by transport SH3: Improve the safety of all users of the transport network, particularly the most vulnerable	EV1: Reduce the impacts of travel on the quality of places and enhance the built environment EV2: Minimise the impacts of transport and travel on the rural environment

5. Guiding Principles

5.1. Introduction

This chapter sets out a series of guiding principles for the development of options to be considered through the Joint Transport Study, which draw on the policy context, evidence and vision and objectives developed in the previous chapters.

5.2. Guiding Principles for Strategy

The analyses of the challenges in Chapter 3 have demonstrated that doing nothing is not an option. The current major scheme programme will contribute to addressing some of the existing challenges, but the underlying growth will soon mean that familiar challenges are again faced. The lack of planned investment beyond 2021 will mean that problems of lack of effective travel choices and increasing network strain become significantly more marked. This will become progressively worse during over the next 20 years if no action is taken to improve travel choices and improve network capacity.

On the basis of the evidence in Chapter 3 and the policy framework developed in Chapter 4, the following Guiding Principles help to define the development of options for the Joint Transport Study:

1. Options should, as far as possible, address positively the challenges and objectives described in this report – options should aim to address several objectives, rather than having a narrow bias;

2. Options should be consistent with the development of an integrated transport network that maximises sustainable travel choices and provides improved resilience and connectivity;

3. Options should complement and maximise the value of the current major scheme programme (i.e. avoid creating competing routes or abortive works);

4. Options should support the development of an inclusive transport system that is accessible and affordable for its users, to enable them to easily access jobs and other opportunities;

5. Options must not result in significant increases in traffic flows on busy urban roads (i.e. careful consideration must be given to traffic routings and impacts);

6. Options must not result in unmitigated damage to the quality of the natural and built environments – in the case of impacts being identified, high quality mitigation solutions will be required; and

7. Options should not be dismissed on the grounds of current technical feasibility or cost before being given initial consideration (provided that they align with the other principles) – their benefits could be sufficiently transformational to justify further consideration.

These principles have been used to help inform the development of an initial series of 'Future Transport Concepts', which are described in Chapter 6, which are designed to capture the full range of options that should be considered in the following stages of the Joint Transport Study.

5.3. Guiding Principles for Spatial Options

In the light of the discussion above, it is possible to identify Guiding Principles for the development of spatial options in the Joint Spatial Plan workstream, and for consideration and testing through the Joint Transport Study. Spatial options should be developed in the light of the following transport principles:

1. Spatial options should help to address existing challenges on the transport network, by complementing and supporting measures to improve sustainable travel choices, journey reliability, resilience and connectivity;

2. Spatial options should positively support the shaping of an integrated transport system to improve sustainable travel choices, journey reliability, resilience and connectivity;

3. Spatial options should support the development of an inclusive, accessible and affordable transport system, that enables people to easily access jobs, education and training and services;

4. Spatial options should not result in significant increases in traffic flows on sensitive urban and rural roads that cannot be mitigated through alternatives to the car and/or demand management; and

5. Spatial options should be considered which fully integrate new transport infrastructure, with high quality design for new transport infrastructure as an integral part of new development.

6. Future Transport Concepts

6.1. Introduction

This chapter presents a series of Future Transport Concepts that have been developed as an initial response to the vision, objectives and guiding principles described in previous chapters.

6.2. Rationale for Future Transport Concepts

The Future Transport Concepts represent alternative ways of addressing the transport challenges described in Chapter 3. At this stage they are purely illustrative and form inputs to the next stage of more detailed transport strategy development. However, they present the likely envelope of potential solutions that could be delivered to tackle transport challenges and support growth up to 2036. These concepts are expected to be tested via ongoing stakeholder consultation as part of the study process. In addition, certain strategy concepts could be delivered as part of complementary packages and should not be seen as mutually exclusive.

The proposed Future Transport Concepts are presented in **Table 6-1.** These include consideration of practical as well as innovative transport solutions.

Table 6-1: Future Transport Concepts

Ref.	Future Transport Concepts
1	Strengthen and enhance public transport corridors
2	Extended MetroBus network
3	Extend MetroWest
4	MetroWest ++ (including new rail based transit options)
5	Walking and cycling superhighways
6	Better connectivity
7	Pinch points and bottlenecks
8	Strategic corridor packages
9	Working better together
10	Local Sustainable Transport Fund
11	Regional connectivity
12	Freight
13	Travel demand management

Note: this list has been amended in November 2015 to ensure consistency with the list of concepts in the Transport Study Summary Document produced for the Issues and Options consultation.

The details of the potential schemes and measures within each of these concepts can be found within Appendix A. The contents and detail of the Future Transport Concepts will be developed in the next phase of work for the Joint Transport Study.

Appendix A

Appendix A. Future Transport Concepts

A.1.   Transport concepts and associated schemes and measures

The following table sets out potential schemes and measures which could be considered within the Future Transport Concepts outlined in Chapter 6. This list of potential schemes and measures within each concept is not intended to be exhaustive (and is strictly illustrative at this stage), but is to inform the formulation and assessment of transport options.

Note: this list has been amended in November 2015 to ensure consistency with the list of concepts in the Transport Study Summary Document produced for the Issues and Options consultation.

Table A-1   Future Transport Concepts and illustrative schemes and measures

Future Transport Concepts	Illustrative schemes by mode			
	Rail	**Bus**	**Highways**	**Other**
1. Strengthen and enhance public transport corridors	New stations Increased frequency and capacity Station parking / Rail and Ride Public transport interchange Integrated ticketing Information provision Electrification Station upgrades (including Bristol Parkway and Temple Meads)	MetroBus increased frequencies Improved stops Quality Price Integrated ticketing Public transport information Ticketing information Park and Ride (expansion and new) BRT corridors Low emission vehicles Service frequencies	Bus priority expansion	Local station packages (to include station access)
2. Extended MetroBus network		Emersons Green and East Fringe A4 corridor Orbital connections Yate and Thornbury Severnside to North Fringe Portishead, Clevedon and Nailsea Weston-super-Mare		
3. Extend MetroWest	Henbury Loop Thornbury Bristol – Bath Bristol – Birmingham Bristol – Cardiff			
4. MetroWest ++	Airport connection City Centre Bristol / North Fringe Tram Train Yate to Bath	Enhanced MetroWest and MetroBus interchange		
5. Walking and cycling superhighways				Cycle superhighways (including cycle trunk routes) Improved walking routes
6. Better connectivity		Strengthen orbital bus connections	Severnside / North Fringe Link Smart Routes M5 Smart Motorway M4 – Ring Road Link Hicks Gate Junction Improved connections around South Bristol 2nd Avon Crossing Improved connections around North Bristol	

Future Transport Concepts	Illustrative schemes by mode			
	Rail	Bus	Highways	Other
7. Pinch points and bottlenecks	Weston rail capacity Bristol – Birmingham / Cardiff pinchpoints	Windsor Bridge Road improvements	A36 - A46 Link A4 Saltford Bypass A370 A4174 Ring Road junctions Callington Rd Link A37 (Whitchurch bypass, Clutton bypass) A4 – B3316 junction	
8. Strategic corridor packages	A4 (bus, highway, active travel) A370 (bus, highway, active travel) A38 (bus, highway, active travel) A37 (bus, highway, active travel) A432 (bus, highway) A4018, A420, A367, A39 improvements M32 Callington Link			
9. Working better together	Franchising powers Financing powers	Franchising powers	De-trunking of key routes WoE/Highways England network management	
10. Local Sustainable Transport Fund	Smart and multi-modal ticketing	Local bus improvements	Local walking / cycling package	Wider use of broadband and home-working, shared mobility (including bike hire, car sharing and car clubs)
11. Regional Connectivity	*Influence national stakeholders (government, rail industry, Highways England) to improve links to London, South Wales and the Midlands*			
12. Freight	Freight consolidation service Low emissions zones HGV restrictions and routing changes			
13. Travel demand management	Parking management (e.g. residents parking) Parking standards Work place parking levy Congestion charging			

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