Connecting Oxfordshire: Local Transport Plan 2015-2031

Bus & Rapid Transit Strategy

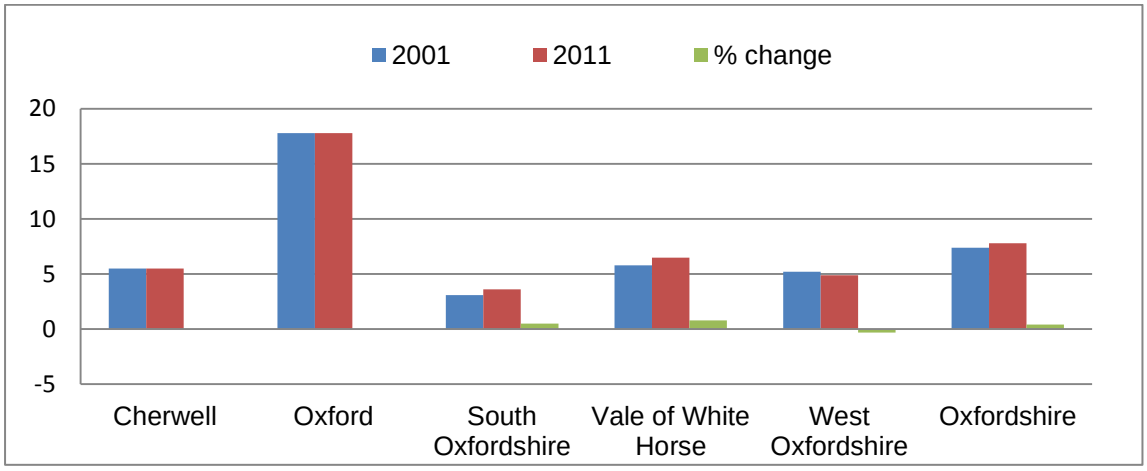
Oxfordshire Bus and Rapid Transit Strategy

Introduction

1. Oxfordshire County Council has a long and consistent track record of promoting bus travel, working in close partnership with the bus industry. Our forward-looking pro-bus policies over the last four decades have been a key factor in the continued growth of bus patronage and the development of a bus user culture, especially in and around Oxford, which now has one of the most highly-developed and successful commercial bus networks in the country.

2. As a result, Oxfordshire has managed to avoid the widespread decline in bus passenger numbers elsewhere in the country, with one of the highest rates of growth in England and the South-East region. During this time major improvements have taken place on the inter-urban bus network and with the introduction of a Quality Partnership, including an integrated ticketing scheme in Oxford.

3. In the past four years alone total bus passenger journeys in Oxfordshire rose by almost 21% and the number of journeys per head of population by almost 17%. In 2013/14, there were over 43 million bus journeys in Oxfordshire, an increase of seven and a half million trips in just five years. In the more rural districts the bus network is much less developed, with bus patronage substantially lower as figure 1 shows. In 2011 over 70% of all bus commuting trips in the County originated and/or ended in Oxford.



Bus Strategy Figure 1: Commuting to work by bus & coach in Oxfordshire - 2001 and 2011 - mode share by district [Source: Census]

4. Despite this sustained growth, Oxfordshire continues to have very high levels of car congestion, especially at peak hours. This makes journeys unreliable, limits capacity for growth and damages health. Transforming the bus network is a key contributor to limiting congestion, encouraging sustainable transport and addressing the Plan's high-level goals. The table below identifies the main LTP outcomes from this bus strategy:

Connecting Oxfordshire high-level goals	To support jobs and housing growth and economic vitality	To support the transition to a low-carbon future	To support social inclusion and equality of opportunity	To protect, and where possible enhance, Oxfordshire's environment and improve quality of life	To improve public health, safety and individual wellbeing
Bus strategy key outcomes	More people will be able to travel to more destinations by bus, improving access to work, shops and local centres	Sustainable, energy-efficient bus transport will reduce sole-occupancy car usage and help manage car emission levels	Accessible bus connections will enable disabled people, elderly people and those unable to drive will travel more	More public transport journeys mean fewer car journeys: fewer roads need to be built and harmful vehicle air pollution is lower	Regular walking and cycling to and from bus stops and interchanges can be an important contributor to keeping fit

Bus Strategy Table 1: Key Outcomes

Challenges

6. Over the next few years the Council and its partners face a number of unprecedented challenges in meeting this aim of transforming the bus network. These are:

(i) Major reductions in revenue funding, coupled with increasing demand for essential non-transport services such as social care. This has led the Council to take the unwanted step of having to withdraw funding from the supported bus network across Oxfordshire. Instead there will be an increased reliance on developing and enhancing the Commercial Bus Network, and access to it, coupled with funding from development to extend it. . We already have a good track record of working in partnership with the commercial bus operators who provide the majority of bus services in the county, but in future will have fewer resources for partnership working, with less ability to fund infrastructure such as stops, shelters and real time information displays and more emphasis on traffic management and working with developers and other partners to provide facilities.

(ii) The huge increase in population forecast for Oxfordshire. There is already a housing shortage and parts of the county, particularly Oxford, are among the least affordable places to live in the UK. The scale of housing and other development required to address this problem and cater for population growth is significant and a major part of Oxfordshire's plans. Although growth has the potential to increase congestion it can also create opportunities through additional demand for public transport and the potential to ease recruitment problems e.g. for bus drivers.

(iii) The limited capacity of the road network, which already suffers from severe congestion. Making better use of the network and reducing the share of car travel in favour of bus will be essential. This requires measures to reduce congestion and/or enable buses to avoid it. Many of the opportunities to reallocate road space to buses through measures such as bus lanes have already been taken in Oxford, where tough choices and radical options, such as a workplace parking levy may be needed, as outlined in the Oxford Transport Strategy.

(iv) Changes in our lifestyles and work patterns and how they impact on commercial bus services. Successful commercial bus services need high passenger numbers and affordable fares. The ideal pattern of demand is a good load of passengers in both directions throughout the day, as this makes best use of the key resources of drivers and vehicles. A service mainly used by commuters in peak periods will be less viable, with the risk of buses running nearly empty during the day. Balanced demand can benefit from a variety of journey purposes e.g. shopping, leisure, healthcare, working and education; flexible working patterns can also help, particularly if commuters can avoid the peaks.

(v) Changes in land use - This includes the trend towards more complex and dispersed patterns of movement, with (for example) important employment sites scattered through the Science Vale area and in Oxford's Eastern Arc. Although these are not currently well served by bus other than mainly radial routes to and from central Oxford, there is scope to run direct services and develop interchanges between services at locations like Park & Ride sites.

The Bus Strategy

5. The main elements of our strategy are:

- **Integrated transport planning** building on Oxford's successful policy of land use planning, traffic management, parking management and restraint, and bus promotion, and adaptation of this approach to the rest of the County.

- **A cohesive and integrated bus network and provision of accessible, high quality infrastructure** with clear policies and design standards to guide the development and improvement of route infrastructure.

- **Tackling congestion and delays** by implementing bus priority or other traffic management measures at specific points along the major bus routes to ensure that buses can operate reliably and at commercially attractive speeds.

- **Adapting the bus network** to cater for more complex and dispersed journey patterns and new major development. We will encourage and support the development of more cross-town and cross-area bus routes where these are practically feasible and there is sufficient potential demand.

- The development of **mass rapid transit systems and routes** between Oxford and a proposed **new outer ring of Park & ride sites**.

- The **development or upgrading of new high quality Premium urban and inter-urban services** where new development makes it feasible including bus priority measures and enhanced passenger and interchange facilities in:
  - Oxford, especially within and linking to the growing Eastern Arc
  - The Science Vale area,
  - larger towns outside Oxford,
  - locations along some strategically important inter-urban routes.

- **Enabling good onwards access on foot to major destinations** facilitating the penetration of bus services as close as possible to the heart of destinations such as town centres, employment areas and hospitals, with conveniently located bus stops.

- The further development and extension of **integrated and flexible ticketing** which will offer a greater range of journey choices than at present, e.g. for part time workers.

- **The further development of the Quality Bus Partnership approach** to focus on improving service punctuality/reliability, information and integration in line with the Government's emerging proposals to strengthen partnerships

- **Improvements to the securing and use of developer contributions for bus development,** by revising our approach to securing and utilising Section 106 developer contributions, and making preparations to achieve optimal use of the Community Infrastructure Levy.

- **Enhanced partnership working with local planning authorities** and use of the planning system to achieve better coordination between land use planning and future bus service provision.

- **Integration with Science Transit** to develop new technology and research in bus operation and network development, including autonomous vehicles and integrating the commercial bus network with any future personal rapid transit (PRT) in a complementary way.

Oxfordshire's Bus Network

6. Oxford and its immediate surrounding area have a highly developed and generally high quality bus network, including a well-established Park & Ride system. Within Oxford there are already extensive bus priority measures (although gaps or 'pinch points' remain). Outside Oxford bus priority is almost non-existent on inter-urban routes and is generally under-developed in most of the larger towns. We need to identify the most important routes or corridors outside Oxfordshire where bus priority (or new services) may be needed to improve journey time reliability and reduce traffic congestion.

7. The Premium route bus network in Oxfordshire tends to follow a strongly radial, 'hub and spoke' pattern centred on Oxford, particularly the city centre. Outside these radial corridors – both within Oxford and Oxfordshire as a whole – there is currently more limited public transport connectivity.

8. The existing strategic inter-urban bus network is well connected to some major towns outside Oxfordshire, but there are other strategically important links where services are less developed. Passenger demand may grow substantially as a result of major planned development in and outside Oxfordshire and the strategic co-ordination through links to Northamptonshire, Milton Keynes and Cambridge through the proposed 'Economic Heartland of England' strategy area.

9. Bus networks in and around Oxfordshire's larger towns have become increasingly limited and bus patronage has not grown significantly. Our strategy is to use developer funding where available to 'pump prime' increased service frequency on routes serving the new developments if the new service is considered likely to become commercially viable by the end of the funding period.

10. The Council can no longer afford to support socially necessary but non-commercial bus services, other than those which we have a statutory responsibility to provide, e.g. for those entitled to free home to school transport.

11. There may be opportunities to develop a new approach to rural public transport, including a role for community-based transport services, given that the County Council can no longer afford to support these financially. However, finding volunteers can be a challenge so, while potentially valuable, community transport will not be able to fill all of the gaps left by previously subsidised rural bus services.

12. Travel demand within Oxfordshire is becoming highly dispersed and complex and it is difficult to serve with single-stage bus services. With substantial employment and urban growth planned over the next 20 years, much of which will be concentrated within the 'Knowledge Spine' area, travel demand patterns will become increasingly decentralised. The public transport network needs to evolve in order to cater for this more complex pattern of internal journeys. Supporting this with more efficient and attractive payment and ticketing systems helps create an easier to use, integrated public transport system.

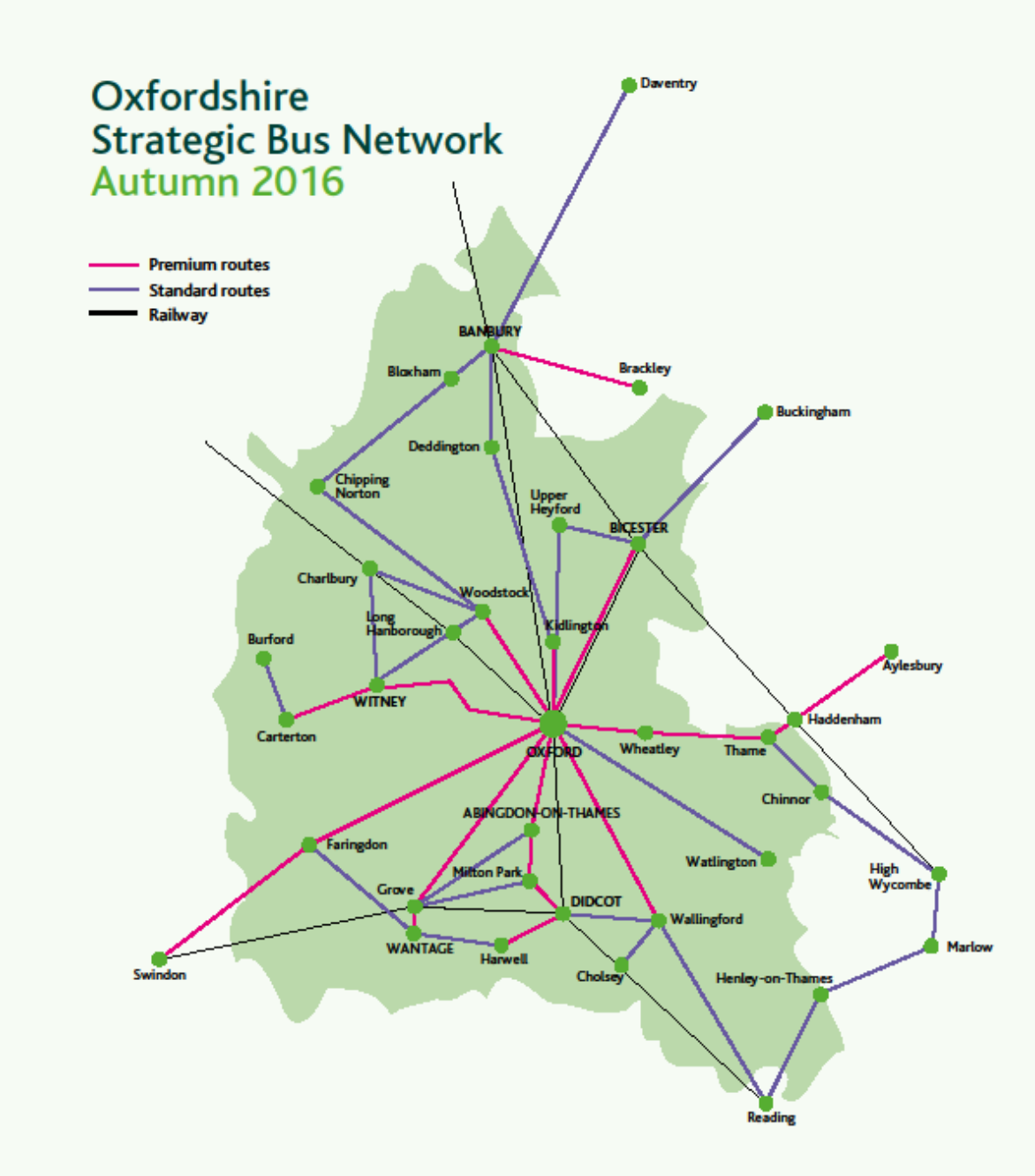
13. Developing the bus network will remain the primary responsibility of the commercial bus operators, and new services (even with some initial pump-priming funding from development) will need to have the potential to be commercially viable. The location and layout of new development can help to make or break a new bus service in terms of its long term financial and economic sustainability.

Bus Network Hierarchy

14. Three levels of service are set out below, all of which will need to be fully commercial in the longer term although short term pump priming may be available in some cases. Each of these service levels would cater for all journey purposes, with those more dependent on commuter flows subject to marketing to promote other journey purposes such as leisure and tourism in order to enhance their commercial viability.

SERVICE	DESCRIPTION	PRIMARY FUNCTION
RAPID TRANSIT	• Very high passenger volumes • Very high frequency (ideally a minimum of 6-8 buses per hour) • Extensive hours of operation • High level of bus priority/segregation • High quality vehicles and passenger and interchange facilities	• Connect places of strategic importance and busiest demand on main transport corridors in and approaching the largest settlements e.g. A40 corridor,
PREMIUM TRANSIT	• High frequency (ideally a minimum of 4 buses per hour) • Early and late evening services • Direct, with some express services esp. at peak-time • High level of bus priority/segregation Moderate level of bus priority on inter-urban corridors but may utilise high level BRT infrastructure to Oxford) • High quality vehicles and passenger and interchange facilities • Different standards for urban/extra-urban and inter-urban routes	• Connect places on main inter-urban corridors between Oxford, market towns and major urban centres in region • Links to main line railway stations at Oxford, Oxford Parkway, Didcot, Bicester (Village & North) and Banbury
CONNECTOR TRANSIT	• Moderate frequency (ideally a minimum of two buses per hour) • Less extensive hours of operation and Saturday/Sunday services • Fixed route • High quality vehicles and passenger and interchange facilities • Fully commercial services or services with strong prospects to become so • May have a moderate level of bus priority /segregation on main urban and inter-urban roads (but may use high level BRT infrastructure into Oxford)	• Local town services • Utility journeys to key trip generators (including railway stations) • Main corridors between market towns and larger villages • Secondary corridors into Oxford

Bus Strategy Table 2: Oxfordshire's strategic bus network hierarchy



Bus Strategy Figure 3: Oxfordshire's strategic inter-urban bus network

The Strategic Bus Network

Introduction

15. Figure 3 shows the strategic inter-urban bus network identifying Premium and other routes. The aim of the strategic bus network is to optimise the use of existing strategic transport infrastructure and minimise the growth in vehicle traffic. In some cases the premium routes shown may not yet have a frequency of four per hour but will have seen increases towards this level as well as investment in high quality vehicles and infrastructure. The Oxford Transport Strategy includes an Infrastructure Plan which provides details of proposals for rapid transit in and around Oxford.

16. Our policy is for the bus network as a whole to become entirely commercial, especially services on the strategic network. This will require the right combination of:
    - **Potential demand -** matching desired travel patterns between residential origins and a range of potential destinations, across the day and not just in peak hours.
    - **Critical mass** – ensuring that services provide the optimum level of capacity for the size of development.
    - **Frequency and reliability –** providing a service that is attractive in terms of frequency and journey time reliability for work trips and other types of journey.
    - **Fares –** affordable fares optimising potential revenue which will sustain further growth and improvement.
    - **Seat capacity** – bus sizes matched to the level of demand, to maximise vehicle efficiency and keep bus movements in urban centres to an acceptable level.

17. Where developer or other external funding allows, our policy on the strategic network is to make services as attractive as possible for current and potential users through:
    - **'Pump priming'** increased service frequency or operating hours, where there is a prospect of the higher level of service being commercial once funding is removed.
    - **Improving on-road conditions** for strategic bus services to achieve better journey time reliability and faster journey times.
    - **Improving passenger facilities and access** to bus stops and other interchange points particularly on foot and by bicycle. This element is covered in detail in the 'Door to Door' section of the Active & Healthy Travel Strategy
    - Supporting commercial bus operators through the **Bus Quality Partnership** framework in delivering well-targeted and designed marketing and promotion.

- In addition, where service improvements are associated with new residential or business developments there is a significant role for travel planning and other smarter choice initiatives to help achieve the development's bus mode split targets.

Rapid Transit Routes/Services

18. We aim to develop three Rapid Transit routes centred on Oxford that will achieve an exceptionally high level and quality of service. These routes will require substantial investment in bus priority measures, or possibly purpose-built infrastructure, as well as on-board passenger facilities and high quality pedestrian and cycling links to stops. The Active Travel Steering Group will review priorities and funding options for creating better cycling and walking links to access popular bus (and rail) hubs. We expect higher density developments around the hubs/routes to take maximum advantage of the investment and the potential for encouraging sustainable travel behaviour. Our strategy for developing these routes is set out in the section on the Oxford area bus strategy in Annex 1 and in the Oxford Transport Strategy.

Premium Transit Routes/Services

19. Premium Routes generally serve the most heavily trafficked road corridors and larger settlements and employment areas in the County. Improving bus journey times and service punctuality is therefore a high priority for all Premium Routes.

20. A major challenge is to provide protection against worsening traffic congestion in order to ensure that buses remain attractive alternatives to the private car for work, education and shopping. Premium bus routes will therefore require investment in bus priority and/or other measures to address congestion where circumstances permit, in order to improve journey time reliability and speed.

21. We wish to see future development proposals located on or near Premium Route corridors, where appropriate sites can be identified. This would be more financially sustainable than designation of entirely new routes and is also likely to reduce levels of traffic generated by new developments.

22. Premium Routes have traditionally focused on service frequency; but operators have demonstrated already that there are many other aspects of the service that help to deliver a quality product. For example, operators have introduced high quality and low environmental impact vehicles on services in and around Oxford.

RAPID TRANSIT

Why do we need rapid transit solutions in Oxford and the surrounding area?

Huge population growth is proposed in and around Oxford over the next 20 years. There are acute and increasing levels of traffic congestion and we are faced with virtually insurmountable physical constraints on further improvements and expansion of conventional bus service solutions. Together these create the need for new rapid transport solutions.

Bus rapid transit (BRT) represents an innovative, relatively low cost public transport solution to many of Oxford's mobility and accessibility problems. BRT is a way to improve mobility in Oxford and the sub-region at relatively low cost through incremental investment in a combination of bus infrastructure, new vehicles, operational improvements, and technology.

An example of bus rapid transit and its infrastructure.

Another option for rapid transit is the introduction of a tram system. Trams share many of the same benefits as BRT, but also differ in a number of ways. At this point in time it is difficult to be sure what type of system will be most suited to Oxford.

What is Bus Rapid Transit?

BRT systems are found in cities throughout the world. Although they vary in form, their key characteristic is that, compared to conventional bus services – even good ones – they are faster and higher quality, operating on routes ranging from an above average level of on-road bus priority up to complete segregation e.g. a separate, possibly elevated track.

They are more than this however. BRT is an integrated system of facilities and services that collectively improves the speed, reliability, and identity of bus transport. Other typical features include: use of 'rubber-tyred' vehicles and roads (rather than rail track), faster methods of passenger boarding, faster fare collection, and a unique identity and recognisable public image. The best systems include a combination of Intelligent Transportation System (ITS) elements in a fully integrated system.

BRT's flexibility and ability to be built quickly, incrementally, and economically accounts for their growing popularity in these times. In many respects BRT is similar to a light-rail rapid transit system, but with greater operating flexibility and lower capital and operating costs. As with new tram systems, the implementation of a BRT system can be accompanied by improvements to the public realm, improving the feel and function of city streets.

Some buses on BRT systems will be able to run entirely on electricity without any aids such as diesel hybrid engines and overhead wires for power supply.

An example of a BRT system in the UK: Cambridgeshire

The Cambridgeshire Guided Busway connects Cambridge, Huntingdon and St Ives and the route consists of two long sections of guided operation (together covering 16 miles), a bus-only road, and other places with on-street operation using conventional bus lanes. New park and ride sites have been built at Longstanton and at St Ives, with a cycle track/bridleway alongside some sections of the route. The scheme includes bus priority and real-time passenger information system displays at special busway bus stops, and better links are being created to bus stops for pedestrians and cyclists.

The busway between Oakington and Longstanton. The cycle path runs alongside on the left.

Two bus operators have been given exclusive use of the route for five years in exchange for providing a minimum service frequency. Specially adapted buses are used on the guided sections.

A total of 2,500,000 trips were made in the first year of operation - 40% higher than predicted. Bus ridership along the corridor was estimated to have increased by 33% over the same period.

The benefits of trams and light rail

Trams have the potential to be more efficient at carrying large numbers of people, require less road space because they follow a fixed railway, and where travel demand is high, can have lower operating costs. Trams are often seen as superior to and faster than buses although BRT is increasingly able to offer a high quality passenger experience.

Trams and their appropriateness to Oxford

However, there are some reasons to suggest that trams are less suited to Oxford. According to the 2011 census, the population density of Oxford is 3,331 persons per km2. This is somewhat lower than other (much larger) English cities with tram systems, such as Sheffield (4,092/km2); Nottingham (4,073/km2); Manchester (4,051/km2); and the London Borough of Croydon (4,200/km2). Research in the USA suggests that for trams to be in the top quarter of cost-effective rail investments, densities closer to 7,000/km2 are required.

Consequently, even allowing for the potential future growth needed in the City of Oxford, it would be likely that densities would have to increase significantly in order to make a tram system viable. Given the constraints due to Oxford's unique heritage and the Green Belt, achieving such densities may be unlikely.

Costs and funding

Construction costs for the physical infrastructure for trams tends to be much higher than those for BRT. Early indications from feasibility studies into light rail versus BRT between Oxford and Witney suggest that infrastructure for BRT may be as much as 30% cheaper than light rail.

The Nottingham Express Transit tram system.

Due to funding constraints from central government and the dependence on seeking funding via developer contributions, the ability to construct infrastructure for BRT routes incrementally allows for greater flexibility relative to the comparative difficulty in extending tram systems.

Connector Transit Routes/Services

23. Connector bus services often play an important role in providing "feeder" links to the Premium Route bus services and rail services, as well as origin to destination journeys. Services will need to be commercially provided and except where new development requires (and funds) a higher frequency (to be attractive to new users) than early numbers of residents or employees would justify until the development is completed.

24. Our main is to assist with protecting and improving commercial viability through infrastructure and service enhancements such as:
    - Targeted measures to address problems such as on-street parking
    - improving traffic signal operation;
    - Improved bus stops and hubs;
    - Integration with more frequent bus and rail services

25. In return, bus operators will provide high quality, low emission vehicles and well trained drivers with good and consistently available information.

Developing and upgrading bus services and routes

26. We need to take advantage of travel demand from proposed future development – in particular housing, employment and urban retail - to increase the frequency of existing bus routes where these exist, to Premium or higher standard if potential demand exists, and introduce new routes where different travel patterns are created. "Pump priming" funding from section 106 developer contributions can provide enhancements to higher standards, particularly in terms of service frequency, for an initial period of time. After the end of the pump priming, services need to be provided on a commercial basis with additional demand primarily coming from new development. The priority for service enhancements will therefore be on work and other utility journeys (education, shopping and access to essential services) which can be financially sustainable.

27. Bus routes that run within new developments must be planned and designed in a way which minimises vehicle journey time, whilst aiming for a maximum walking distance from a bus stop of around 400 metres. Longer maximum walking distances are tolerable if this results in a better, faster and/or more frequent bus service although this

can have an adverse impact on older and disabled people). Time consuming and circuitous bus routes must be avoided, as they will not be attractive to most people. The road layout of new developments should therefore enable buses to be routed efficiently and to provide easy access for people transferring from other modes of transport.

28. Bus priority measures help attract more passengers by providing faster and more reliable services. Until now there has been little investment in bus priority measures in the larger urban areas other than Oxford, or on the main inter-urban routes. However, with growth and increasing congestion on many of these routes, we need to increase the amount of bus priority infrastructure and co-ordinate it with introducing new services – which tend to come from different funding streams - to maximise the potential for use. Where we have a reasonable expectation of sufficient demand we will encourage bus operators to develop new routes, to avoid unnecessary interchange.

Other types of bus service

29. There are a number of specialised services designed to meet the needs of specific groups. The most numerous of these are school bus services, which we provide for those living over three miles from their nearest state-maintained secondary school (two miles for primary schools). These are run largely as an independent network not available to the general public. Some independent schools also provide services. Higher and further education establishments provide a range of services; some of these – notably the *Brookes Bus* network provided by Oxford Brookes University – also run as scheduled local bus services which contribute to the local network.

30. Some major employment sites fund bus services to serve their sites, notably Oxford Science Park. These are generally combined with local bus services. Some retail sites also fund shoppers' services to their sites; these generally run free to users, are not registered as local bus services and completely separate from the local bus network. We expect the operators of such sites to ensure that they are accessible by public transport without funding from the council but, where they might be conveniently combined with a local bus service, we will help facilitate discussions with the operator.

Public transport interchange strategy

31. Reliable and attractive public transport services require high-quality, easily accessible stops where users can wait in safety and comfort. High quality interchanges make transfers between bus and other public transport services easier and quicker, resulting in more frequent and wider ranging travel opportunities.

32. The main challenges we face in improving interchange in Oxfordshire include:
    - Overcrowded and inadequate stops and interchange facilities and limited available space in Oxford city centre
    - Extended dwell times and layovers occupying stops for longer than necessary and delaying other buses
    - Some Park & Ride sites close to capacity at certain times
    - Inadequate interchange facilities in many of Oxfordshire's other main urban centres and along main inter-urban bus routes.
    - A need to protect and enhance the built environment and ambience in all town or city centres, with Oxford presenting a particular challenge.
    - An increasing demand for travel
    - Increasing passenger expectations of safety, security and comfort
    - Differing needs of passengers and pedestrians
    - Working with many partners who often have differing objectives and priorities.
    - Limited financial resources

    We will increase connectivity and access and improve the passenger experience by

    - working with operators and other partners to develop and improve the public transport hubs and other interchanges facilities so that they are appropriate to the size of urban area and demand along the corridor;
    - improving access to these facilities by feeder modes (both access routes and co-ordination of services); and
    - making payment and ticketing systems easier and speedier to use.

33. Criteria which will be considered in planning and designing appropriate interchange facilities include facilities for disabled passengers, opportunities to connect by walking and cycling, improving personal safety and security, and enhancing the public realm..

34. There are a number of major hub locations where the potential for new or improved interchange will be developed in coming years :

    - **Oxford** – station re-development as part of wider master plan with enhanced bus / rail interchange; a revised Park & Ride system involving the creation of a ring of new sites further out of Oxford on key radial corridors.
    - **Banbury** – reviewing bus interchange facilities in and near the town centre and making improvements accordingly.
    - **Didcot** – further development of the multi-modal interchange at the station creating a high quality gateway leading to the town centre.

35. With the recent development of high frequency inter-urban bus routes in the County there is a growing demand for better access to these services by residents in towns and villages along the routes and surrounding villages so better interchange facilities at other urban centres on the Premium inter-urban bus network will need to be considered.

36. Increased access by car to the inter-urban bus network suggests there could be benefit in developing small local parking facilities close to stops at some locations and we recognise there may be situations where small formal car parking may be desirable in order to facilitate access, encourage patronage growth, and avoid undermining access by car to local centres. Where development funding permits, we will consider parking provision and management at locations along strategic inter-urban bus routes.

37. We will work with the new Active Travel Steering Group to encourage and facilitate access to main bus routes by walking and cycling, with improved foot and cycle access to bus routes given a high priority when new routes are developed or existing routes upgraded or altered, or when investigating the siting of new bus stops. Where funding can be secured, cycle parking facilities will also be provided where appropriate. If funding allows, opportunities will be taken to introduce low-cost improvements to waiting facilities, if possible on a whole-route basis.

38. Co-ordinating bus and rail services to reduce waiting times and facilitate easy connection is a particular challenge given the large number of private operators and sometimes conflicting priorities. Operators however recognise the importance of making services more attractive, particularly to those that have the option of car use. We will

continue to work with bus and rail operators to improve service co-ordination and integration, although we can no longer afford to subsidise railbus services.

39. Developing more efficient and attractive payment and ticketing systems is a particularly important. This is a highly complex and challenging issue but substantial progress has already been made in Oxfordshire with the introduction in 2011 of the *Smartzone* integrated, multi-operator ticketing system centred on Oxford, which has enabled bus passengers to make trips on any operators' service within the zone and was the main reason for the large growth in passenger numbers following its introduction.

40. Outside Oxford, the ability to use smartcard payments systems - particularly when these are associated with more economical regular user tickets for certain periods – can benefit both passengers and operators. For the former they can make payment easier (and cheaper) and for the latter they help speed up boarding and journey times.

41. However, with increased bus network development and greater bus and rail network connectivity, demand for an extension of the *Smartzone* integrated ticketing system to other parts of the County is likely to grow. We will look for opportunities to extend the integrated ticketing system as well as support the further development of smartcard and other off-board payment and ticketing systems.

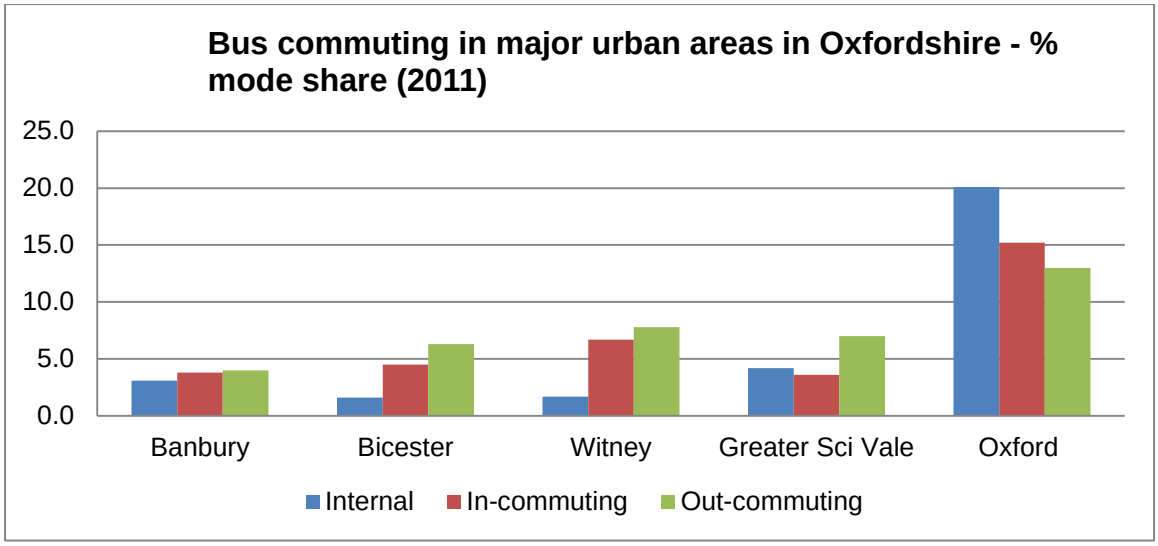
42. However for passengers it is the cost and range of fares available that usually matter most, not the technology and means of payment. In particular, we need to cater for the growing number of people who travel regularly but not every day as flexible working patterns become more common.

43. Outside Oxfordshire some neighbouring authorities plan to develop public transport hubs that will have an impact on the Oxfordshire bus network and travel opportunities for Oxfordshire residents. The most significant of these is a proposed major park & ride site on the A420 on the approach to Swindon. It is important to ensure that this complements rather than undermines the growing Oxford-Swindon through bus service.

Developing and enhancing bus networks in the main urban areas

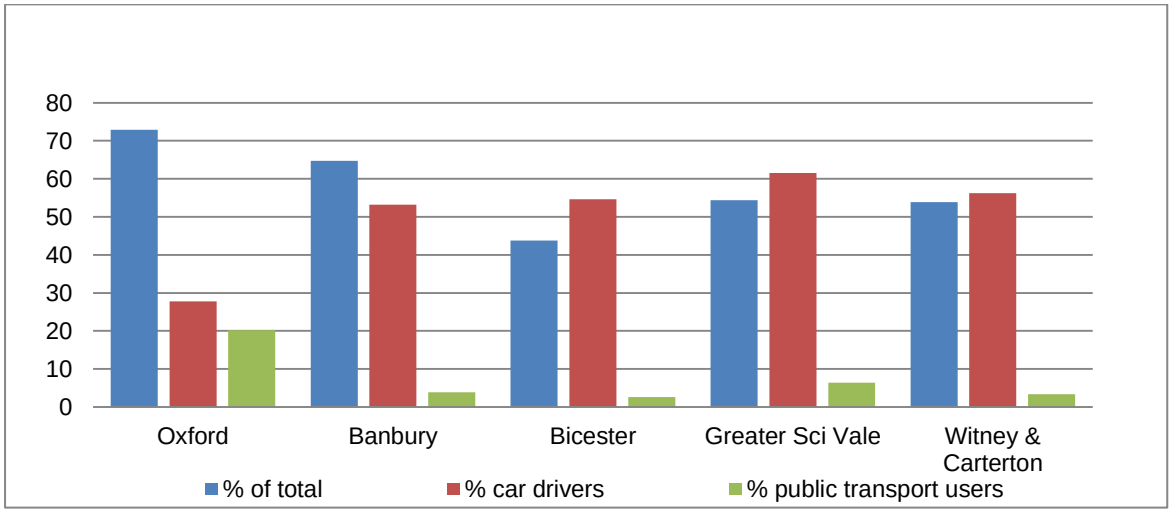
44. For this strategy the main urban areas have been defined as Oxford, Banbury, Bicester, Witney and Carterton, and the Greater Science Vale area which includes Abingdon and Wallingford. Figure 6 shows the proportion of people that were commuting to work by

bus in 2011 within, to and from these settlements or areas (i.e. for the longest part of their journeys) and shows the very low levels of bus commuting in outside Oxford.

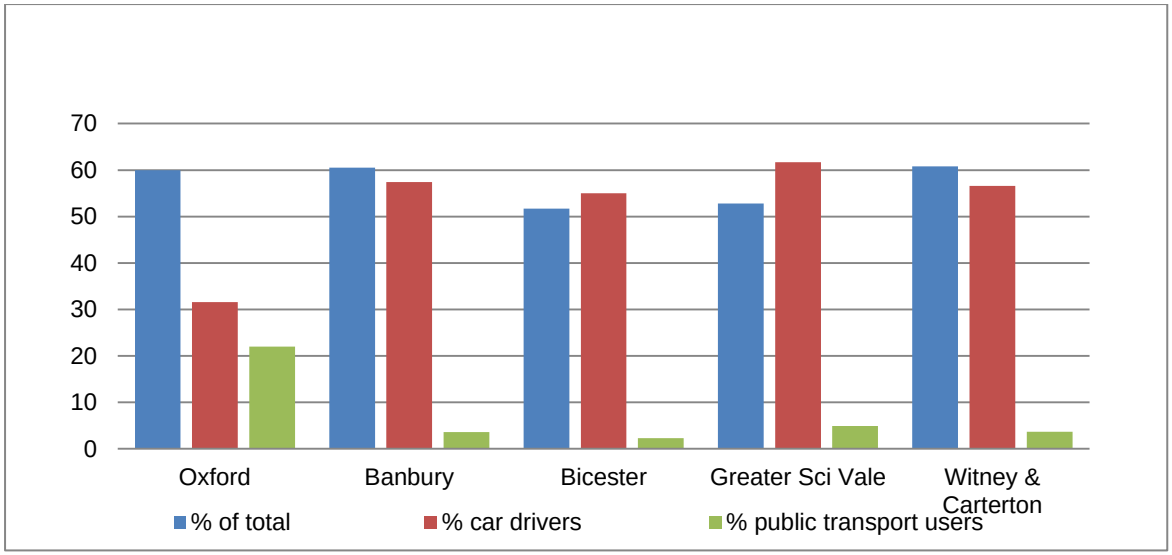


Bus Strategy Figure 3: Bus commuting in major urban areas in Oxfordshire

45. These settlements display a very wide variation in the proportion of local employees who live within the surrounding area (defined here as being up to 10km of their workplace) and the proportion of residents whose workplace is within this range. This, alongside the comparative level of access by bus and other modes of transport, has a profound influence on mode choice and mode split within these settlements and surrounding catchment areas (see figures 3, 4 and 5). We have developed plans for bus network improvements to 2031 for each of these areas.



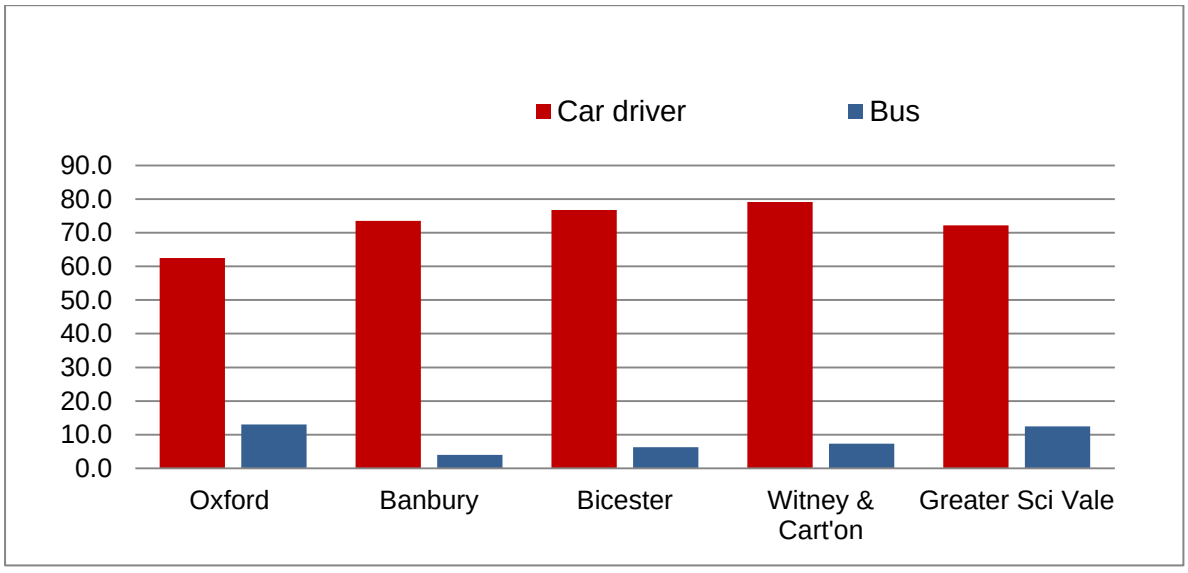
Bus Strategy Figure 6: Main urban areas: Means of transport and percentage of residents working within 10km of home (source: 2011 Census)



Bus Strategy Figure 7: Means of transport and percentage of employees residing within 10km of workplace (source: 2011 Census)

Developing and enhancing the inter-urban bus network

46. A large proportion of journeys in Oxfordshire, particularly commuting to work, involves travel outside residents' home settlements and the vast majority of these journeys are made by car and very few by bus (see figure 8 below). These produce the majority of road based carbon emissions, vehicle miles, and traffic congestion on busy inter-urban routes and within urban areas.



Bus Strategy Figure 8: Out-commuting by bus and car, main Oxfordshire urban areas, 2011 (Source: Census data)

47. For many journeys, bus is the main alternative to car travel. A relatively frequent inter-urban bus (and coach) network has developed in Oxfordshire in recent years linking some of the larger towns in the County, and also Oxfordshire to the wider region and beyond. In partnership with the main bus operators the Council has supported the development of this network which has helped facilitate a significant and rapid growth in passenger numbers on several routes.

48. The network has a strongly radial pattern centred on Oxford and the inter-urban routes with the highest proportion of bus/coach commuters generally start or finish in Oxford. To some extent this reflects the centralisation of employment and services in Oxford and subsequent weaker patterns of demand between other urban centres. . As travel patterns become even more complex (and decentralised) in the future, the strategic inter-urban bus network will need to adapt to cater much better for complex, non-radial patterns of travel demand.

49. Given that bus patronage growth in Oxford has levelled off in terms of market share, the majority of passenger growth in the County is now occurring on these routes and for operators it seems likely that this where many of the best commercial opportunities lie.

50. Our approach to increasing growth on the strategic inter-urban routes is divided into three main elements:
    - a revised Oxford Park & Ride strategy
    - increasing inter-urban bus connectivity within, to and from the Knowledge Spine
    - improving inter-urban bus connectivity within Oxfordshire and for connecting Oxfordshire to the wider region

Park & Ride and the Bus Strategy

Introduction

51. The Oxford Park & Ride strategy has evolved, in conjunction with parking management, bus priority and service improvements. It is one of the main means of tackling traffic congestion on the main radial routes within the City and on the Oxford ring road. It facilitates access to Oxford city centre and other destinations such as the hospital sites. Its main purpose is to enable transfer to bus for the last leg of the journey into Oxford.

52. Park & Ride has become a hugely successful, commercial operation. Many of the existing sites are now often close to capacity, however, and especially for those sites within the ring road, the congestion has spread to the approaches to the sites. This not only increases car journey times to reach the sites but suggests the current strategy has limited potential in dealing with further expansion in travel demand along these routes.

53. Oxford's Park & Ride system is one of the key elements affecting the City and County's bus system and has a wide geographical influence on travel behaviour. Changes to the County's Park & Ride strategy and system will therefore have a considerable impact on the planning, operation, and attractiveness of the Oxfordshire public transport network.

Strategy

54. A new approach to Oxford's Park & Ride system has been proposed as part of our updated Oxford Transport Strategy. The following section outlines these proposals, which will require further development before a final approach is agreed.

(a) Short/medium term Park & Ride strategy

55. The main element of the new approach to Park & Ride is the development of a network of larger sites located further out of Oxford adjacent to the main inter-urban radial routes. This 'outer ring' of sites has been developed to meet the following objectives:
    - maximising the potential for intercepting trips closer to their point of origin and before they cross the ring road
    - reducing congestion on the inter-urban network,
    - increasing bus modal share to Oxford (and onward connections), and
    - site availability and financial feasibility.

56. The first of these new sites, opened in 2015, adjoins the new residential development at south-west Bicester (A41). Five other locations, plus expansion of the existing Oxford Parkway and Thornhill sites, are proposed as part of Oxford's longer term Park & Ride strategy - all aimed at intercepting car trips before they reach the ring road. These are at: A40 East & West Corridors, A420 Corridor, A4074 Corridor, A34 North & South Corridors, and the A44 Corridor. The Oxford Transport Strategy document contains further details.

57. The development of this 'outer ring' of sites may mean that some of the existing sites within the Ring Road could be redeveloped or used for parking in a different way, for example to cater for shorter stay shopper or visitor parking rather than all-day commuting. This is being considered as part of our further Park & Ride strategy work.

58. Opportunities will also be created from new Park & Ride developments planned outside Oxfordshire. In particular, we recognise that the proposed P&R site on the A420 approaching Swindon will potentially have an impact on traffic along the A420 corridor in both directions, and on inter-urban and local bus services in the area. In partnership with Swindon Borough Council and bus operators we will seek to maximise the public transport benefits for Oxfordshire.

(b) Impacts on the County's inter-urban and local bus networks

59. It is too soon to predict the impacts of proposed changes to the Park & Ride system on the network and travel patterns, but the following changes are planned or expected:
    - The proposed outer Park & Ride sites described earlier, along with the existing site at Thornhill, would become the termini of three Rapid Transit routes centred on Oxford.
    - Outer Park & Ride sites are expected to develop into significant bus hubs connect Rapid Transit or Premium Transit services into/from Oxford with services to/from neighbouring urban and rural areas and longer-distance bus and coach services, greatly enhancing public transport connectivity and access across Oxfordshire.
    - Bus journey times and reliability for all services using the Rapid Transit routes will be greatly enhanced. In combination with other measures, this should help facilitate substantial growth in bus use on inter-urban routes in and out of Oxford.
    - Providing feeder bus services to sites may boost local bus services and networks, and help facilitate a reduction in car dependency outside Oxford.
    - The interchanges planned on the RT routes within Oxford and the Park & Ride sites close to built-up areas, would not only greatly enhance public transport connectivity within and out of the City, but also give increased pedestrian and cycling access to the strategic public transport network and final destinations.
    - There will therefore be a strong emphasis on providing good links to/from interchange facilities and neighbouring employment sites, residential areas, and other trip attractors and cycle parking at interchanges and destinations. We will ensure that active travel facilities are considered as a priority.

c) Longer term Park & Ride strategy

60. Longer term, there may be the need and opportunity to develop additional Park & Ride sites to serve Oxford and other towns in Oxfordshire. In developing this, consideration will be given to meeting the following objectives:
    - reducing the total amount of car travel (and therefore carbon emissions),
    - promoting and enabling Door to Door travel involving cycling or walking
    - maximising other non-car access options to/from the site including integration with connecting local and inter-urban bus services,
    - encouraging outward- as well as inward-bound commuting,
    - potential for supporting local economies and town centres,
    - minimising damage to the environment and landscape including flood risk

Connecting the Oxfordshire Knowledge Spine

Introduction

61. The majority of employment and housing growth in Oxfordshire up to 2031 is likely to take place along the 'Knowledge Spine', which lies along the north-south strategic transport corridor consisting of the A34 road and the Didcot-Oxford-Bicester rail line. The A34 is already severely congested in many places and prone to severe unplanned disruptions, particularly at peak times. There are very few suitable alternative north-south roads capable of providing adequate connectivity within the Knowledge Spine.

62. Table 4 shows the level of commuting flows between the major urban centres and some of the major employment areas within the Knowledge Spine in 2011. It shows Oxford City and the employment clusters at Milton Park and Harwell Campus as the two largest inter-urban commuting destinations and also the significant scale of out-commuting from Abingdon. With large amounts of growth planned initial modelling suggests that this pattern will continue, although Bicester and Didcot in particular are likely to grow in importance both as the destination and origin of inter-urban commuting trips.

63. The difficulty of accommodating more movements on the existing north-south road network, particularly the A34, highlights the need to significantly enhance the strategic public transport network between growth areas along the Knowledge Spine (and beyond), and also strengthen east-west public transport connections.

		DESTINATION						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	640	2,530	130	50	80	3,430
	Kidlington	280	-	3,575	130	30	50	4,065
	Oxford	400	980	-	960	250	900	3,490
	Abingdon	70	240	3,700	-	370	1,100	5,480
	Didcot	<50	140	1,430	780	-	1,560	3,960
	TOTAL	800	2,000	11,235	2,000	700	3,690	20,425

Table 4: Commuter flows between key towns and selected employment areas within the Knowledge Spine, 2011 (Source: Census data) 1. Kidlington including Oxford airport 2. Milton Park and Harwell Campus

64. The main rail line linking Didcot, Oxford, and Bicester is an extremely important part of the public transport strategy for the Knowledge Spine and Oxfordshire. Rail can move very high volumes of people quickly and efficiently, especially for medium and longer-distance journeys. With new infrastructure and services being developed and planned, for example East West Rail, the new Oxford Parkway station and proposed development of the Cowley branch line, rail is likely to provide a much greater proportion of journeys within and to the area in the future, especially for commuter trips.

65. The majority of travel demands within the Knowledge Spine - including to main business / employment clusters – tend to be dispersed and complex and this is likely to continue. For many of these journeys, bus services will be more flexible and accessible than rail. Services can potentially operate at very high frequencies and move high volumes of passengers on main strategic corridors, with certain services deviating from the main route to serve more dispersed demand in residential or employment areas nearby. Multi-stage bus journeys can be made easier by providing more and better bus integration and service co-ordination. Investment in bus priority measures on specific routes can also demonstrate very good value for money, especially when coupled with investment by operators in new vehicles and additional services.

66. The importance of the bus for commuting to work is identified in table 5, which shows the shares for bus and rail commuting for the trips mentioned in the previous table. The data also shows the much lower levels of bus commuting to the locations mentioned

outside Oxford. Notable are the very high level of bus use between Kidlington and Oxford and that bus commuting between places on the opposite side of Oxford is currently very limited given the lack of direct services or easy ability to interchange.

67. More detailed analysis shows that the majority of inter-urban bus commuters along the Spine tend to work - or live - in the central part of Oxford City, given the relatively poor access by bus to the eastern side of Oxford.

Rail commuters		**DESTINATION**						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	0.3	3.3	0.0	4.0	1.3	2.6
	Kidlington	0.0	-	0.0	0.0	0.0	0.0	0.1
	Oxford	3.2	0.0	-	0.4	6.7	6.8	2.7
	Abingdon	0.0	0.0	0.7	-	0.3	0.0	0.5
	Didcot	8.9	3.0	19.9	0.6	-	0.0	7.6
	TOTAL	2.1	0.3	3.5	0.5	2.9	1.7	2.5
Bus commuters		**DESTINATION**						
		Bicester	Kidlington[1]	Oxford	Abingdon	Didcot	Business Parks[2]	**TOTAL**
ORIGIN	Bicester	-	2.8	17.3	2.3	0.0	0.0	13.4
	Kidlington	12.5	-	36.6	5.3	3.3	2.0	33.3
	Oxford	18.8	20.7	-	14.5	5.9	7.6	14.4
	Abingdon	10.4	4.1	25.4	-	7.0	8.5	19.7
	Didcot	0.0	3.0	2.5	6.2	-	13.9	7.7
	TOTAL	14.8	11.8	24.2	9.9	6.0	10.4	18.1

Table 5: Commuting between main towns and employment areas within the Knowledge Spine in 2011, % comparison between rail and bus based on the mode used for the longest stage of the journey (Source: Census data)

Strategy

68. Given the pattern of transport demand in the area, the flexibility of bus transport and its much lower infrastructural costs, the bus and Rapid Transit (RT) in places with high demand will continue to provide the main public transport alternative to the car for most inter-urban journeys within the Knowledge Spine.

69. Buses will also play a vital role as feeder services between railway stations and main business sites, town centres and residential areas.

70. Our strategy for improving bus connectivity within the Knowledge Spine comprises:

New Park & Ride strategy:

- The proposed new 'outer' Park & Ride sites adjacent to the strategic highway network linked to the development of three Rapid Transit Routes centred on Oxford, will improve bus connectivity between Oxford and other parts of the Knowledge Spine.

Increased and improved public transport interchange capacity:

- The improvement in interchange and greater connectivity within Oxford, with the planned interchanges between RT and other bus and rail services, is likely to significantly improve access by bus to/from the Eastern Arc in Oxford, and increase bus connectivity through the City for people travelling to destinations on the opposite side of Oxford.

- We expect the Park & Ride sites to develop as significant bus and coach hubs facilitating the growth in local bus services improving access and connectivity.

A major new north-south highway corridor linking Didcot and the eastern side of Science Vale with east Oxford:

- A potential new road link and Thames River crossing with bus priority where required connecting north Didcot, Culham Science Centre and the east side of Oxford.

Innovative strategic bus routes:

- Where possible, we will encourage and support bus operators' proposals to develop innovative bus services and routes, especially more direct and express services, for example a strategic bus link from south-east of Bicester to the Oxford Eastern Arc.

- We will explore the feasibility of a busway 'spine' running north-south through central Science Vale – possibly terminating at the proposed A34 South Corridor Park & Ride site in the north and Harwell Business Park in the south. This would be a high frequency RT route with services branching off to strategic employment and residential developments.

- With Highways England we will continue to explore the possibility of bus priority measures at junctions and on specific links on the A34.

Connecting Oxfordshire and the wider region

Introduction

71. While most of Oxfordshire's housing and employment growth up to 2031 is likely to be within the Knowledge Spine it will be important to strengthen the bus network in the rest of Oxfordshire and increasing bus connectivity to the wider region where we can, to:

    - reduce traffic growth and congestion;
    - reduce transport emissions,
    - support local economies in Oxfordshire, including the rural economy
    - provide opportunities for people without cars to access employment and services.
    - Provide opportunities for active & healthy travel, e.g. by combining bus with cycling

72. The focus of this section is on the inter-urban bus and coach network outside the Knowledge Spine, and the following section addresses the rural bus network.

Strategy

73. Following analysis of current and predicted peak hour and commuting, general and bus passenger flows and patterns of major growth in Oxfordshire and adjoining areas, the strategic inter-urban bus network has been updated as shown in table 6 below.

74. Where inter-urban bus routes are designated as Premium standard we will, where applicable, review the conditions for bus operations and passenger access, as part of developing route strategies. Route strategies for the A420, A34, and the A40 will give a high level of consideration to facilitating quicker bus journeys, and better access and bus interchange facilities along the routes. Review of bus conditions and facilities on other strategic inter-urban routes will take place according to need and opportunity, especially where related to major development on or near the route.

ROUTE/LINK	CHANGE	RATIONALE
Didcot - Harwell Campus link	Upgraded to Premium	Strategic importance, housing & economic growth, high volume of demand
Witney – A40 West Corridor P&R – Northern Gateway – Headington – Cowley – A34 South Corridor P&R / A4074 Corridor P&R	New RT route	Strategic importance, high volume of demand. Intercept trips on A40, A4074, and A34 corridors at P&R sites and provide high speed, high frequency service to/from Oxford
A44 Corridor P&R (Begbroke) – City Centre - Blackbird Leys	New RT route	Intercept trips on A44/A4260 corridors at P&R and provide high speed, high frequency service to/from Oxford
A420 Corridor P&R – City Centre – Thornhill P&R	New RT route	Intercept trips on A420 and A40 corridor east of Oxford at P&R sites and provide high speed, high frequency service to/from Oxford
A44 – A4260	Designated a potential strategic link	Potential connection for Banbury – Oxford and/or Witney – Woodstock – Kidlington airport bus routes
Kidlington – Upper Heyford	New strategic route – connector level	New development at Upper Heyford
Banbury - Upper Heyford - Bicester	New route – connector level	Major growth at Banbury, Upper Heyford and Bicester
Bicester - Milton Keynes	Designated a strategic route – connector level	Major growth at Bicester and along Cambridge Arc
Bicester & Banbury - Brackley– Northampton (A43 corridor)	Designated a strategic route – connector level	Major growth at Bicester, Banbury and Northants
Grove – Faringdon	Designated a strategic route – connector level	Strategic importance of access to employment in Science Vale from west part of Vale of White Horse and Swindon; moderate volume of demand
Harwell - Newbury	Designated a strategic route – connector level	Strategic importance of access to employment in Science Vale from Newbury area
Thame - Aylesbury	Upgraded to Premium route	Strategic importance, mod/high level of demand
Oxford – Swindon	Upgraded to Premium route	Strategic importance, mod/high level of demand

Bus Strategy Table 6: Proposed changes in the strategic bus and coach network

75. Bus services also provide important links across our county boundary, with a growing market on several routes serving destinations in neighbouring areas, such as Reading, Newbury, and Swindon. We will work to grow bus services on these routes, with are a number of services to that will benefit from the improvements proposed in our route corridor strategies, such as the A420 route strategy. Where strategic bus routes extend into neighbouring areas we will work with the relevant authorities to ensure that our respective plans for bus infrastructure and service development are co-ordinated.

76. Partnership with rail operators will need to be strengthened, by bringing bus and rail operators together. Given the lack of county council funding for railbus services, we will consider lobbying for these to be provided as part of future rail franchise commitments. This would have the further advantage of better integration of timetables and ticketing.

77. Partnership with the Active Travel Steering Group will be established to improve facilities for active travel such as cycling or walking in combination with bus (and rail).

Public transport for rural areas

Introduction

78. Oxfordshire is one of the most rural counties in the South East. Most rural settlements in Oxfordshire do not lie on main inter-urban bus routes and the dispersed and low level of transport demand in many rural areas makes the provision of commercial public transport services unfeasible and publicly supported or subsidised services are no longer affordable. To meet it statutory responsibilities, the Council continues to fund a range of 'supported transport' services including: Home to school transport (SEN and Mainstream); Adult social care transport (older people, learning disabled, mental health); Children's social care transport and Concessionary fares.

Integrated Transport Hub

79. We have introduced a new Transport Hub; a 'single front door' for all supported transport services in Oxfordshire. The Hub is a single team which deals with all requests for supported transport services in a coordinated and fair way, ensuring that people are

allocated transport according to their needs; supporting those who are judged as capable to use existing public transport or a suitable voluntary sector provider, while protecting the most vulnerable with specialist, bespoke services. This improves how we allocate our available resources and also ensures that the whole process for accessing supported transport is now more simple and straightforward.

80. There is a wide range of bus service information available, but funding pressures mean that our whole approach to information provision needs to change, with emphasis on commercial partners funding and providing what is needed. This will be done in partnership with operators and representatives of bus users and other target groups, ensuring a greater focus on the “end customer”.

81. Oxfordshire’s Real Time Information service is amongst the best-performing systems in the UK primarily because the partners have focused on achieving quality in terms of the proportion of buses accurately predicted at stops and bus operators have invested in the on-board technology so have a vested interest in the performance of the system. The issues faced by the system include whether the geographic coverage should be extended and whether the functionality of the system should be further developed.

Integrated Ticketing and Payment

82. We support the development of off-bus and integrated ‘smart’ payment, as a means of facilitating multi-stage and multi-operator public transport journeys, and reducing bus journey times by speeding up boarding. The integrated smart ticketing system introduced in Oxford has significantly increased bus patronage on urban and some inter-urban services by making multi-operator journeys easier and more affordable.

83. We will continue to work in partnership with operators to develop payment and ticketing schemes, potentially to include other services like parking at Park & Ride sites.

Partnership working

Quality Bus Partnership

84. The County Council and bus operators have worked in partnership since the 1970s, with successful outcomes including a network of co-ordinated timetables and smarter ticketing on Oxford's main bus routes. The challenge is now to expand the scope of the Partnership across Oxfordshire and work with bus operators and other partners to develop strategies for serving new development and making existing markets and routes function more effectively.

85. This approach will be based on the Department for Transport's "Enhanced Partnership" model, which will see a broader range of Stakeholders, including District Councils and the Local Enterprise Partnership, to further develop quality partnership working covering the commercial network across the whole county.

86. The primary focus will be on the major urban areas and inter-urban corridors (especially where development is planned) with objectives including:
    - Greater time-based and geographic coverage of bus services based on evidence of when and where people want to travel.
    - Reduction in service cancellations and delays as a result of traffic congestion.
    - Increases in passenger satisfaction with the "end to end" journey experience.
    - Increase in numbers of bus passengers.

87. Future Oxfordshire QBPs will concentrate on the following major strands of activity:

    - Strategic oversight of the Oxfordshire Bus Market, including integration with other transport services, scheme prioritization and funding bids, third party and other supported services.

    - Development of the Oxfordshire Bus Network and services as a central component of supporting Oxfordshire's growth, spatial planning and infrastructure investment proposals and outcomes.

    - Influence and take into account changes to national bus policy and other central government led proposals.

    - Consider / review strategic bus planning and related work, e.g. Oxford and other Locality Transport Strategy workstreams and the Oxfordshire Park & Ride network.

- Decision making on shared priorities for network/service development and investment proposals, including commissioning / review of business case(s) for bus priority and other infrastructure investment.

- Ownership of the Oxfordshire Bus Strategy, and associated Network and Punctuality Improvement Plans, including delivery of agreed priorities and actions, and monitoring progress of Network Management and Punctuality Improvement workstreams on an 'exception' basis.

- Senior Manager / Director liaison on all aspects of partnering, including identification of issues and proposals for political consideration.

- Oversee formal Oxford Bus Qualifying Agreement, including signing off any proposed changes to Coordinated Services

Equality-related partnership working

88. The Council will follow two important principles on all schemes. The first of these is that consultation with disabled people and their representatives should take place from the earliest stage in the development of schemes and initiatives before any details have been determined. The second principle is that the Council should secure high level disability awareness training for all appropriate staff in order that scheme designers can have greater awareness of the needs of disabled people.

89. In planning new schemes and improvements to existing facilities, we will consult local access groups, OXTRAG (the independent body representing disabled and mobility-impaired people throughout Oxfordshire in relation to transport issues) and with the Oxfordshire disability organisation Unlimited. We will also, when necessary, seek expert advice to ensure the final outcome is a satisfactory and useable facility for everyone.

Promoting bus use through the planning process

Strategy

90. Our strategy to enhance the bus network and achieve a substantial increase in bus patronage through the planning process consists of the following main elements:

Integrated land use planning, transport development control and travel planning

91. To support bus development and maximise use of strategic transport investment we will:
    - Encourage appropriate types of new development to be located, planned and designed with good access to the strategic bus network, especially alongside designated Rapid Transit and Premium bus routes.
    - Encourage growth to be concentrated in existing larger urban areas or, with the development, to reach a threshold of greater potential self-containment and transport sustainability
    - Support increased urban densification, especially near major strategic public transport infrastructure
    - Encourage master planning to give bus a central place in the transport hierarchy
    - Seek developer funding to support the development of existing or new bus services to achieve a higher and more attractive standard of service as required where there is a reasonable expectation of longer-term commercial sustainability.
    - Where significant new developments are planned, seek developer funding to pay for necessary bus stop infrastructure to upgrade it to the desired standard and aim to ensure that secure cycle parking is be provided close to busy bus stops.
    - Ensure that new developments are planned to ensure optimal movement of buses, with commercial services that operate frequently, reliably and efficiently. Bus routes must provide very high levels of penetration through and within sites, complementing the pedestrian and cycle networks.
    - With the relevant district council partners, explore the possibility of introducing tighter parking standards at new major employment sites and residential developments, and restraint measures at existing major employment sites.
    - Explore opportunities with the relevant District and Town Councils and local businesses to gradually introduce parking controls/regimes in town centres that could encourage the greater use of buses and other non-car modes of transport while taking account of town centre vitality.
    - Support residential and workplace sustainable travel planning, including ambitious sustainable travel plans and targets which are monitored, managed and enforced
    - Secure planning agreements that support bus development in terms of both hard infrastructure and ‘soft’ travel planning measures.

92. Increased consideration will be given to the most appropriate developer funding source for infrastructure schemes and bus service development and the most appropriate and best use of developer funds in particular cases. The options include Section 106 contributions, Community Infrastructure Levy (CIL) and devolved major scheme funding.

Section 106 agreements

93. The identification, negotiation and securing of section 106 developer contributions to bus services and infrastructure is currently undertaken on a site by site basis. OCC (and partners such as bus operators and District Councils) consider a number of factors when proposing bus service and infrastructure improvements – shown in Table 7 below.

94. There is no strict formulaic approach which calculates a financial contribution to transport measures. The size and phasing of any specific developer contribution is a matter of negotiation and agreement between the local authorities and the developers. The current approach allows flexibility based on the specific circumstances of development(s) based on experience elsewhere. Service and infrastructure measures can be tailored to circumstances, based on available local evidence and knowledge of bus operating conditions and potential passenger demand and professional judgement

Improvement	Key Factors
New bus service or improvement in existing frequency / daily coverage	• Size of development (e.g. number of houses, number of new jobs, floor area of retail development etc.)
	• Time taken to construct and occupy development (phasing)
	• Location of development (i.e. distance from existing frequent public transport corridor)
	• Frequency / commercial viability of existing bus services
	• Proximity to existing urban centres and travel generating destinations
	• Potential links to other proposed developments
Bus priority measures	• Evidence of current problems and / or future congestion resulting from development-related travel demand
	• Requirement to minimise journey times to adjacent settlements / developments
Bus stops and support accessibility improvements (walking routes and road crossings)	• Size and geographic extent of development
	• Minimising the required walking time from the development
	• Proximity of existing or proposed bus routes
Travel Plans	• Size of development and travel demand generation potential
	• Projected travel patterns (origins and destinations)
	• Socio demographic profile of development

Bus Strategy Table 7: Factors in identification of service and infrastructure improvements

95. Our policy has been to concentrate on promoting the development of local bus services by using developer contributions to increase service frequencies, particularly for employment and utility trips, attract more passengers and therefore improve commercial viability. The developer funding to support these services is time-limited therefore it is critical that improved services become commercially sustainable in the longer term. There is also a role for travel planning and other initiatives to support these services.

96. A drawback of the current approach is the potential for a lack of transparency and consistency in the way developer contributions are secured and apportioned, especially where more than one development is required to make a contribution to bus service and infrastructure improvements in an area or corridor. Individual developers may challenge the financial contribution expected if they believe that they are paying more than their "fair share". This all makes for a time-consuming and inefficient system. There is also a need to plan a future integrated network that links different developments rather than simply introducing a series of isolated routes.

97. There is a case for defining a more consistent and transparent policy and process for developer contributions towards transport improvements, including bus services and infrastructure. With the much higher future level of population and employment growth anticipated outside Oxford and our ambition to achieve a major step change in the bus system and patronage it has become a priority to review our strategy and policy in this area. This will imply adopting a formulaic approach for calculating contributions from developments to public transport, based on the anticipated transport impact (including the key factors outlined above). The key principles of this approach could include:

    - Provision of a multi-modal trip rate for the different classifications of development (e.g. residential, B1 office, retail etc.).
    - Calculation of a financial value per trip based on the estimated cost of transport services (including buses) and infrastructure that would be necessary to make the development work in transport terms.
    - Provision of local weighting factors to reflect specific circumstances (potentially including local economic conditions, sustainability of the development site, proximity of existing Premium Routes etc.)
    - Agreement of binding targets for bus use from specific developments – with additional investment being triggered if targets are not met.

98. For this to work, there will need to be a clear local vision for a future bus network which would link each development to an appropriate range of trip attractors and generators. Individual s.106 agreements will need to build up the wider public transport network rather than simply providing isolated routes that would disappear once funding ended. We would also need to ensure that operators who provide services as part of s.106 contributions subscribe to the principles set out in the Quality Bus Partnership.

Community Infrastructure Levy (CIL)

99. We need to improve conditions for buses and facilities for passengers outside Oxford and on inter-urban routes, where bus priority is currently under-developed. In some areas bus operators have indicated that they would find investment in infrastructure, particularly bus priority and other traffic management measures that would improve bus reliability more beneficial and attractive for them in the longer run than subsidising higher service frequencies. It is suggested that this might make them more willing to take the commercial risk of introducing new or additional services. As CIL is only applicable to capital infrastructure schemes, enhancements to bus services would still need to be secured through section 106 contributions.

100. The basis of CIL is a charging rate per residential dwelling or square metre of development, which generates an overall sum for funding strategic infrastructure required to facilitate both individual and multiple developments. There is no size limit to CIL and the money can be pooled to address transport problems that are wider than any specific development. The potential advantages of CIL include:

- Improving predictability and certainty for developers as to what they will be asked to contribute;
- Increasing fairness by broadening the range of developments asked to contribute;
- Allowing the cumulative impact of small developments to be better addressed; and
- Enabling important sub-regional infrastructure to be funded.

101. Bus services and infrastructure are a vital part of the solution for additional travel demand and congestion that could be generated by planned development in the county. Therefore CIL policies and schedules being developed by the District Councils should include provision for bus priority and transport hub strategic priorities.

Annex: Bus strategies for selected urban areas

Oxford and surrounding area

Introduction

102. In functional and transport terms Oxford exerts a strong centralising influence over a large part of central Oxfordshire. In 2011 it had a resident population of almost 152,000 and had approximately 96,000 jobs and about 32,000 full-time students. It is also a major regional centre for retail activity and other services - particularly health care.

103. Oxford enjoys a very high level of employment self-containment which is conducive to sustainable travel behaviour. Currently only a very small proportion of employed Oxford residents work outside the City - 13% - and 52% of jobs based in Oxford were filled by local residents in 2011. In addition, there are a very large number of student commuting movements, which are predominantly internal, relatively short-distance, and mostly performed using sustainable modes of transport.

104. The bus has become a key part of the Oxford local transport system as part of a long established integrated transport strategy approach. In 2011, over 10,500 residents of Oxford (about 18% of the total) regularly commuted to work by bus or coach, and of these 8,500 travelled to workplaces inside Oxford (over 20% of internal commuters).

105. Levels of bus commuting from outside Oxford are also relatively high: in 2011 almost 7,000 commuters (over 15% of *in-commuters*) travelled to work by bus/coach. However levels of *out-commuting* by bus/coach (with the exception of journeys to London) are significantly lower than levels of internal and in-commuting: slightly over 2,000 residents commuted out of Oxford by bus in 2011 of which almost 600 travelled to London.

106. The following factors present challenges to the further growth of bus use in/to Oxford:

Traffic congestion: There is acute congestion on several of the main radial roads in and approaching Oxford City, the A34 and A40, the Oxford Ring Road, and at a number of locations in the 'Eastern Arc' during the morning and afternoon/ evening peaks. Despite extensive on-road bus priority measures conditions for buses have tended to become worse in many places leading to deterioration in bus journey time reliability. A few major 'pinch points' still exist on some of the main radial and the few orbital routes.

Constraints on the continued effectiveness of the current Park & Ride system: Most of the existing P&R sites on or near the edge of the City are now often operating close to capacity and congestion now affects the approaches to most sites at peak times.

Restricted bus movement around/through the city centre: The constrained central area road network creates difficulty in traversing or going around the city centre impeding the development of cross-town services.

Limited capacity for further bus growth in the city centre: 'Transform Oxford' improved the city centre and conditions for pedestrians and cyclists partly by restricting the number of buses entering the area while slightly increasing capacity by moving to double-decker buses. With the road space available there is limited scope for further increasing bus capacity without once again worsening the ambience and conditions for pedestrians and cyclists.

Limited public transport interchange and inadequate passenger facilities: There is generally a poor level of interchange between different bus routes and between bus and rail in the city centre and very little outside the centre. This makes passenger interchange costly in terms of the time and distance penalty involved and discourages bus use for some journeys within Oxford and also some outbound journeys. In addition, there are insufficient conveniently located, high quality facilities for bus passengers and space for buses and coaches to wait and offload and a need to improve connections between interchanges.

Limited bus connectivity to and within the 'Eastern Arc': The main commuting flows to Oxford are from north, west and south-west directions but a large proportion of employment is located in the east and south-east parts of the city (the so-called 'Eastern Arc'), accessible by only a few river crossings. Consequently within the city, and Eastern Arc in particular, there is currently insufficient orbital connectivity, leading to poor access by all transport modes and worsening congestion on the Ring Road and within the built up area. At the moment, most travel to the Eastern Arc from West Oxfordshire and Cherwell necessitates a difficult interchange in the city centre, although there are a few direct services which lack good bus priority. Bus travel to/from these areas is therefore relatively unattractive.

Acute sensitivity of bus services to disruptions on the road network: Unplanned and planned events both inside and on the edge of the City often lead to virtual gridlock for extended periods affecting bus services as well as general traffic.

107. With the scale of housing and employment growth expected in the City and surrounding area the City's existing public transport system faces major challenges in the future. Without decisive action to further transform public transport infrastructure and improve sustainable travel options, traffic conditions, particularly at peak hour, would be likely to deteriorate significantly. The bus strategy which follows is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

108. The Council's vision of the strategic bus network in Oxford and the surrounding area in is shown below. The strategic network and the categorisation of routes and services will be kept under constant review as circumstances change and new opportunities arise. Proposals are likely to evolve over time in response to changing circumstances and opportunities, however by 2031 they are likely to include the following elements (described in greater detail in the Oxford Transport Strategy):

Enhanced bus network connectivity, integration, and access:

- New outer-ring of Park & Ride sites further away from Oxford on main radial routes to intercept trips closer to their point of origin, prior to reaching the Ring Road
- Redevelopment of existing Park & Ride sites inside the ring road / A34
- Development of bus hubs/interchanges within the City linking services and providing for healthy and active journeys (walking and cycling), using best practice models
- Better transport interchanges at railway stations including Oxford, Oxford Parkway and proposed new stations on the Cowley Branch line.
- New city centre bus terminals.
- Expanded and improved integrated smart payment systems.

Development of Rapid Transit routes and services:

- Three routes have been designated as future 'Rapid Transit' (RT) routes traversing the City and terminating at the new 'outer' Park & Ride sites.
- RT services in Oxford are likely to have the following general features: higher levels of frequency; enhanced on-route bus priority or (where circumstances require) grade segregation; off-board ticketing; separate passenger entrance and exit doors for speeded up loading/off-loading; overall faster journey times; higher capacity and high

quality vehicles; zero emission technology (i.e. at point of use); comprehensive use of intelligent transport systems; good cycling and walking links (including secure cycle parking) to interchange points, high quality passenger facilities at stops, termini and other interchanges, and a strong, unique public image.

Traffic management:

- Various priority measures e.g. reallocating road space, improving junction, and access restrictions to improve flow conditions and access for conventional buses, especially on designated Premium bus routes.
- Enhanced contingency planning to deal with traffic disruptions, in time utilising the potential of intelligent transport systems.

Other measures to enhance and promote bus travel:

- Extension of the smart payment system
- Enhanced real-time bus information, including innovative advanced journey planning systems.
- Work with local bus operators through a Quality Bus Partnership
- Strong marketing/branding campaigns carried out with local bus operators.
- Improved passenger facilities in accordance with standards set out in the bus network hierarchy.
- Further Improvements in the quality and comfort of bus vehicles and vehicle emission standards.

Banbury

Introduction

109. Banbury is the second largest town in Oxfordshire, with a population of nearly 47,000 and over 28,700 jobs, accounting for 42% of the total jobs in Cherwell District.[1] In addition to Oxford, Banbury is currently the only settlement in Oxfordshire to have more jobs than employed residents. Located in north Oxfordshire, close to the M40 motorway and several 'A' roads and with good long-distance rail connections, Banbury acts as a Primary Regional Centre in its own right with an extensive catchment area.

[1] Source: *Cherwell Economic Analysis Study*, 2014 (presented as evidence at the Cherwell Local Plan hearing)

110. The *Cherwell Local Plan* anticipates that Banbury will continue to grow significantly, with an additional 7,000 houses and 3,500 jobs in the town by 2031. Key residential sites are proposed in the south, west and north-west of Banbury. Proposed employment sites are located on the east side of Banbury, close to M40 Junction 11.

111. Given its prime location in relation to the wider region, excellent strategic transport links, and the size and diversity of its economy, Banbury employment sites attract commuters from a wide area. In 2011 its employees had the longest average commuting trip of all the main Oxfordshire settlements (see Table 11 below).

Banbury	Bicester	Witney	Abingdon	Didcot	Oxford
16.1	**14.9**	**11.5**	**14.6**	**10.6**	**14.9**

Bus Strategy Table 11: Employees' average travel to work distances (straight-line distance between postcodes) in major Oxfordshire settlements, 2011 (km) (Source: Census)

112. Banbury has a high level of employment self-containment, with associated shorter commuting distances: 60% of journey-to-work trips are currently undertaken within the town, with a home origin and work destination in Banbury. However, whilst 32% of these trips are undertaken on foot and 57% of by car only 3% are by bus. The levels of in-commuting and out-commuting by bus are only slightly better than this at about 4%.

113. Collectively these statistics suggest that there is considerable potential for encouraging sustainable travel both within the town and the immediately surrounding area. Creating a bus network that better serves journeys to work forms a key strand of the town's Sustainable Transport Strategy (see LPT4 Volume 2 Section ii).

Strategy

114. The Banbury Bus Strategy objectives aim to address the following issues:

Objective One: Commuting by Bus

Issue: The current network of town bus services does not provide direct or frequent services for trips to work within Banbury, as bus services do not run directly from residential areas to employment sites.

Objective: To provide direct and frequent commercial cross town services between residential and employment sites to ensure that the bus is a genuinely viable alternative to the car for trips to work within Banbury.

Objective Two: Reliable Journey Times

Issue: Unreliable bus journey times, caused by buses getting stuck in congestion, has led to bus operators implementing irregular bus timetables which are not intuitive or helpful for bus users. Unreliable bus journey times also dissuade people from taking the bus as they cannot be certain of arriving at their destination on time.

Objective: Improve bus journey time reliability though measures, such as, routing buses away from key congested junctions; routing buses through bus only roads; provide bus priority measures on congested corridors and junctions to ensure operators run frequent and reliable commercial services which are attractive for users, particularly commuters.

Objective Three: Buses serving Banbury Rail Station

Issue: Poor access by bus to Banbury Rail Station.

Objective: Serve Banbury Rail station with an increased variety of bus services by firstly routing buses from the town centre to the Thorpe Way employment area via Higham Way, thus serving the new station entrance in the multi-storey car park; and secondly exploring with landowners opening Station Approach and Tramway Road to through bus services, most likely north-south bus services in the first instance.

Objective Four: Banbury Bus Station

Issue: Banbury bus station does not provide easy interchange between bus/coach and other modes of transport. The bus station is difficult to walk or cycle to, and has no designated car/taxi drop off facility. The bus station is underused by operators, many of which prefer to use on street bus stops.

Objective: In line with the Banbury Masterplan explore options for the current bus station layout and access arrangements, as well as whether a bus station at a different location or as a series of on street bus stops can provide an improved offer.

Objective Five: Serving new developments

Issue: Serving new residential and employment developments with high quality commercial bus routes.

Objective: Ensure the location and layout of new developments enable high quality commercial public transport services to serve the development.

Bicester and surrounding area

Introduction

115. Bicester has a population of almost 33,000 people and over 13,000 jobs in 2011 and is the fastest growing town in Oxfordshire. It has an increasingly diverse and strong economy that includes Bicester Village shopping outlet which has become a major UK tourist attraction, drawing in nearly six million visitors a year.

116. The town possesses excellent road links via the A34 and the M40, and rail links to Oxford, London Marylebone, High Wycombe and Birmingham (and in the near future, also Milton Keynes), and has a highly advantageous location in relation to major areas of economic growth in Oxford and Science Vale, the Oxford-Cambridge Arc, and the Northamptonshire Arc.

117. Bicester has major ambitions for growth. The Cherwell Local Plan seeks to exploit Bicester's potential to deliver jobs-led growth, supported by housing, with approximately 10,000 new homes and up to 9,000 additional jobs planned up to 2031. The Plan also seeks to strengthen the town centre economy. The town is also to become a new 'Garden City' with up to 13,000 new homes.

118. Given the compactness and current size of the town a relatively high proportion of residents that work in the town currently walk and cycle to work. However the level of bus commuting is extremely low – less than 2% in 2011. Residents that work locally however represent only a minority of the town's commuters: because of a shortfall in the number of local jobs and the town's location, the level of out-commuting is relatively high, and of these 77% were car drivers. Similarly 80% of in-commuters were car drivers. The levels of in- and out-commuting by bus were 4.5% and 6.3% respectively.

119. The challenges to the further growth of bus use in the Bicester area are:

An inadequate existing local bus network: There is currently a low level of bus frequency and poor coverage of many residential and employment areas in the town and to settlements in its immediately surrounding travel to work and shopping/service catchment area.

Traffic congestion: There is acute traffic congestion on key main routes through and in the town, and at specific locations at certain times e.g. the junctions in the vicinity of Bicester Village. There are currently virtually no significant bus priority measures within the town.

Car dependent local attitudes: According to the *Bicester Movement Study* there is currently a lack of popular support for demand management measures e.g. road space reallocation and parking restraint that would constrain car use and support increased bus use.

120. With the scale of planned growth in jobs and housing in the town, it is clear that decisive action to further transform public transport infrastructure and travel options, as well as increase existing overall transport capacity, will be necessary to avoid a further deterioration in traffic and environmental conditions in Banbury. The bus strategy which follows is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

121. Oxfordshire County Council's vision of the strategic bus network in Bicester and the surrounding area in the short to medium term is shown in figure 13. The strategic network and the categorisation of routes/services will be kept under constant review as circumstances change and new opportunities arise.

The Bicester Transport Strategy will support the development of local and inter-urban bus services through a combination of integrated transport strategies and policies. Proposals are likely to evolve over time in response to changing circumstances and opportunities however they are likely to consist of the following elements: **Enhancement of the town's bus network:**

- Improving bus services along key routes to connect residential areas with existing and future employment centres, as well as the railway stations, town centre, Bicester Village and the Park & Ride site. This will be achieved by using funding from development to enhance the quality and frequency of existing services, with the aim of services reaching full commercial viability.

- Growth at Upper Heyford will need to be considered in terms of improved public transport frequency and connectivity with Bicester.

- Prioritise highway improvements and bus priority measures at key congestion pinch points on designated Premium bus routes and other places where there are identified needs arising from strategic development sites. For example, a bus priority scheme on Bucknell Road-St Johns Street-Manorsfield Road is vital to deliver an improved bus service to service the major North West Bicester development.

- A comprehensive review of town bus operations will identify other short, medium and long term infrastructure and service improvements required.

Enhancement of bus interchange facilities:

- use the opportunities offered by the redevelopment of Bicester Village Railway Station to create a 'state-of-the-art' multi-modal interchange offering high quality facilities for pedestrians, bus users and cyclists.

- Fully utilise the potential of the new Park & Ride site at South West Bicester to promote bus use to as wide a possible range of destinations inside and outside the town, especially to promote both in and out-commuting by bus. Within Bicester the P&R should be directly linked to Bicester town centre, key employment centres, and Bicester Village.

Other measures to enhance and promote bus travel:

- Extension of integrated multi-modal, multi-operator smart payment to the area
- Enhance real-time bus information

- Work with local bus operators through a Quality Bus Partnership (see section 2.7). In particular co-operate with local bus operators and key local stakeholders to carry out a strong marketing/branding campaign promoting the Bicester P&R and bus connections to EW Rail and the Garden Town vision

- Improved passenger facilities in accordance with standards set out in the bus network hierarchy.

- Improvements in the quality and comfort of buses and vehicle emission standards.

Other changes that would benefit bus travel:

- Expand capacity on new and existing peripheral routes to encourage their greater use for employment purposes and longer distance traffic. This would help reduce congestion

in the town centre and central corridor, and thus help facilitate improved conditions for bus movement on these routes and in these areas.

- New link roads to enable new routes/services (e.g. through the SE Bicester development area). Peripheral developments should enable attractive inter-urban bus travel along new links.
- Review of parking provision, management and information
- Better connections to bus stops, e.g. walking/cycle links to improve Door to Door multi modal travel for longer trips, as outlined in the Active & Healthy Travel Strategy.

Science Vale and surrounding area

Introduction

122. This Plan contains an area transport strategy for Science Vale; however for the purposes of strategic bus planning we have defined a slightly larger area south of Oxford consisting of not only the Science Vale area (including Grove, Wantage, Didcot and the high-tech business parks at Harwell Campus, Milton Park and Culham Science Centre) but also Abingdon and Wallingford.

123. In 2011 this area had a population of approximately 117,000 and over 54,000 jobs. The Oxfordshire Strategic Economic Plan has also recommended that approximately 20,000 new homes and 20,000 additional jobs be concentrated in the Science Vale area by 2031 – the majority likely to be located around Didcot and Grove/ Wantage. This would mean an increase of approximately 55,000 residents, almost a 50% growth in population.

124. The major business parks in Science Vale possess a very high concentration of employment in high-tech industries and therefore attract employees from a very wide catchment area as well as generating a large number of national and international business trips. In 2011 the jobs located in the area generated about 47,000 commuter journeys of which 57% were internal, and about 52% of employed residents of the area worked locally.

125. Although a relatively high proportion of residents work in the area, the level of bus commuting to workplaces within the area is currently extremely low: only about 4% of employees in the area commuted to work by bus in 2011, whereas over 62% of internal commuters and 82% of commuters from outside the area were car drivers. The level of bus commuting to workplaces outside the area was slightly better: about 7% travelled by work by bus (and 73% were car drivers).

126. The following factors present challenges to the further growth of bus use in - and to – Science Vale and the surrounding area:

Limited bus connectivity between major settlements in the area and employment areas: many services between important destinations are currently relatively infrequent and slow, and in some cases do not exist at all. Connections to the centre of Oxford are more frequent; however those to other areas, especially major employment areas in the Oxford Eastern Arc are relatively poor.

Traffic congestion and lack of bus priority measures on busy, main connecting routes

Weak car demand management policies and measures: little or no strategic use of parking policies to manage demand and encourage sustainable modes of transport, despite the number of users already cycling in the area,

Limited public transport interchange and inadequate passenger facilities: With the exception of Didcot railway station there are currently few high quality interchange facilities enabling transfer between different bus services, between bus and rail, and park & ride.

Lack of integrated ticketing: There is currently no system of multi-operator and multi-modal ticketing for public transport services within the area.

127. With the scale of housing and employment growth planned in the area it is clear that without decisive action to further transform public transport infrastructure and improve sustainable travel options, traffic conditions, particularly at peak times, would be likely to deteriorate significantly. The bus strategy is an important component of our overall, integrated approach to develop a sustainable transport system and travel choices.

Strategy

128. The Council's vision of the strategic bus network in Science Vale and the surrounding area in the short to medium term is shown in figure 14. The strategic network and the categorisation of routes/services will be kept under constant review as circumstances change and new opportunities arise.

129. To support planned growth and cope with the predicted growth in travel demand it is vital to develop a much improved bus network within the area and, together with the railway network, connect it (through the 'Science Transit network') to other parts of Oxfordshire, especially the 'Knowledge Spine' and wider region. Other complementary measures to encourage and facilitate sustainable travel will also be important.

130. The Science Vale Transport Strategy will support the development of local and longer-distance bus services through a combination of *integrated transport strategies and policies*. Proposals are likely to evolve over time in response to changing circumstances and opportunities however by 2031 may consist of the following key elements:

A major new north-south transport corridor linking Didcot and the eastern side of Science Vale with east Oxford:

- A potential new road link and Thames River crossing with bus priority where required running between north Didcot, Culham Science Centre and the east side of Oxford).

Traffic management:

- Various measures to improve traffic flow and give greater priority to buses on strategically important local routes and at junctions (esp. on Premium bus routes – see map and above)
- Bus priority measures where required on the Harwell Campus - Didcot - Milton Park - Abingdon – A34 South Corridor P&R – Oxford route, which is seen as the 'spine' of the bus network in the area linking the two main towns and most major employment sites

Development of new and enhanced commercial bus services, focusing on high quality, high frequency Premium services on the following core north-south routes:

- Harwell Campus- Didcot - Milton Park - Abingdon – A34 South Corridor P&R - Oxford
- Harwell Campus- A34 South Corridor P&R - Oxford
- Wantage - Grove - Oxford

Development of high quality commercial services on the following 'Connector' Bus Routes (with the following routes our initial priority):

- Wantage - Grove - Abingdon
- Wantage - Grove - Milton Park
- Grove - Wantage – Harwell Campus
- Wallingford – Didcot

New and better quality bus interchange facilities:

- Improved and expanded bus-rail interchange as part of a redeveloped Culham railway station.
- Proposed Park & Ride site and bus 'hub' on the A34 South corridor.
- Provision of a bus-rail interchange at the potential new railway station in the Grove area.
- Enhancement of bus and passenger waiting facilities in Didcot, Abingdon, Wantage, and Wallingford town centres to meet projected demand by 2031
- Better facilities for integration between bus and cycling and walking including safe, accessible routes, street lighting, and cycle parking at key bus stops.

Other measures to enhance and promote bus travel:

- Extension of integrated multi-modal, multi-operator smart payment to area
- Enhanced real-time bus information, including innovative high-tech journey planning systems.
- Work with local bus operators through a Quality Bus Partnership
- Strong marketing/branding campaigns carried with our partners at major employment sites and local bus operators.
- Improvements in quality and comfort of buses and vehicle emission standards.

Integrated land use-transport planning measures

131. The strategy gives priority to north-south Premium routes and services, as this is where the greatest demand and growth potential currently lies. While we would also like to see Premium level bus services on key east-west routes within the area there is currently insufficient actual and potential demand for these. Realistically given present circumstances our goal is to develop and maintain services at a 'Connector' standard (i.e. at least 2 buses per hour) on the priority routes mentioned. The key factor in achieving Premium standard on east-west bus routes would be additional residential and/or employment development on a sufficiently large scale in the Grove/Wantage area (perhaps linked with the development of a new railway station at Grove).

Witney and Carterton

Introduction

132. This Plan contains separate area transport strategies for Witney and Carterton. In terms of strategic bus planning however it makes sense to look at the two towns together given their close proximity and the strong travel and bus connections between them.

133. Witney is the largest town in West Oxfordshire with a population in 2011 of about 27,500. It is the main commercial and service centre for the predominantly rural district of West Oxfordshire and possesses a relatively strong and diverse economy. In 2011 Witney was home to about 12,300 jobs. Carterton, the second largest settlement with a population of just under 15,800 is a relatively modern town which has grown, in the main, to serve RAF Brize Norton. It has a small but varied economy, largely focused around the provision of local services.

134. Both Witney and Carterton are identified as a growth areas by West Oxfordshire District Council with opportunities for both residential and employment growth. The two towns enjoy a frequent, high quality Premium bus service to Oxford, however the range of other destinations in West Oxfordshire and in adjacent local authority areas that are served by bus is very limited and the services generally infrequent.

135. Both towns currently experience fairly high levels of out-commuting: in 2011 some 58% of Witney's and 62% of Carterton's employed residents worked outside their respective home towns. In- and out-commuting in Witney is strongly car based: about 81% of in-commuters and 78% of out-commuters travelled to work by car; the proportions commuting by bus were respectively 6.7% and 7.8%. Internally though, given the compactness and size of Witney, a relatively high proportion of residents that work in the town currently walk and cycle to work. The level of bus commuting is however extremely low – less than 2% in 2011. Commuting in Carterton is very similar to Witney.

136. Despite the high rate of out-commuting, of all the main Oxfordshire settlements Witney has the greatest proportion of employees (72%) living within 10km of their workplace. Many of these employees live in Carterton and a smaller proportion in surrounding villages. This suggests that there is strong potential for increased bus commuting between the two towns and to Witney in general, which is likely to increase significantly with the housing and employment growth planned.

Strategy

137. The Council's vision of the strategic bus network in Witney and Carterton will support the development of local and inter-urban bus services in these towns through a combination of integrated transport strategies and policies. Proposals are likely to evolve over time in response to changing circumstances and opportunities. They are likely to consist of the following elements:

Objective One: Commuting by Bus

Issue: The current bus network serving Witney and Carterton does not link residential areas to employment sites. This is particularly the case in Witney, where the large employment areas at Range Road and Station Lane are not directly served by buses.

Objective: To provide direct commercial services between residential and employment sites to ensure that the bus is a genuinely viable alternative to the car for trips to work.

Objective Two: Reliable Journey Times

Issue: Unreliable bus journey times, caused by buses getting stuck in congestion, dissuade people from taking the bus as they cannot be certain of arriving at their destination on time. This particularly affects buses running between Witney and Oxford on all routes. Bus operators have tried to remedy the variability in bus journey times by building more time into each timetable to make it more resilient, however this in turn makes their operations inefficient.

Objective: Improve bus journey time reliability though implementing measures specific to the section of routes that are inter-urban from those within towns/villages to ensure operators run frequent and reliable commercial services which are attractive for users, particularly commuters. Measures proposed for the A40 corridor include:

- An eastbound bus lane between Eynsham Roundabout and the Duke's Cut, Wolvercote;
- Westbound bus priority on the approaches to Cassington traffic signals and Eynsham Roundabout;
- A Park & Ride on the A40 West Corridor;
- Junction improvements along the A40 between Witney Bypass and Eynsham Roundabout,
- Bus priority on the approach to Swinford Tollbridge;

In towns and villages measures such as routing buses away from key congested junctions; routing buses through bus only roads; provide bus priority measures on congested corridors and junctions may be explored. Including:

- through Witney particularly along Corn Street, Market Place, Bridge Street and Newland;
- joining the A40 eastbound at B4044 Shores Green.

Objective Three: Improve the frequency of bus services

Issue: Bus services that run infrequent timetables can be unattractive to users.

Objective: We will seek developer funding to improve the frequency of bus services to produce commercially viable bus services on the following routes:

- Between Carterton, Witney and Oxford; including City Centre, hospitals and Oxford Brookes University;
- Between Carterton, Witney and rail stations, in particular main stations on the Cotswold Line such as Hanborough, but also Oxford, and Oxford Parkway rail stations.

Objective Four: Serving new developments

Issue: Serving new residential and employment developments with high quality commercial bus routes.

Objective: Ensure the location and layout of new developments enable high quality commercial public transport services to serve the development.

Objective Five: Measures to enhance and promote bus travel

Issue: Ensuring bus travel is accessible

Objective: To take opportunities to seek measures to enhance and promote bus travel to make it accessible including:

- Enhance town centre bus interchange facilities
- Provide new bus stops to better serve employment sites such as RAF Brize Norton.
- Extension of integrated multi-modal, multi-operator smart payment ticketing to the area
- Enhance real-time bus information, including innovative advanced journey planning systems.
- Improved passenger facilities at bus stops, and access to these on foot and by bicycle.
- Improvements in the quality and comfort of buses and vehicle emission standards.