Sub-regional transport plan

West

MAYOR OF LONDON

Transport for London

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Mayoral foreword

Following my election in 2008, I set out my desire for TfL to "listen and learn from the boroughs....help them achieve their objectives and... negotiate solutions that will benefit the whole of London". I therefore asked TfL to embark on a new collaborative way of working with the boroughs, based on sub-regions.

As well as better collaboration, the sub-regional programme has led to an improved analytical capability, which has enabled travel patterns to be better understood and provided for. This collaboration and analysis helped inform my Transport Strategy (MTS), which set out my broad policies and proposals for London. The MTS also set out a commitment to develop the five sub-regional transport plans that would provide more detail about the priorities for each region, which in turn would help better inform the development of Local Implementation Plans.

I am pleased to see the fruition of that joint, collective work. And despite the fact that we are entering into a period of financial constraint, which will impact on our ability to do more in the short term, I am pleased that the sub-regional plans are forging ahead in making the case for more investment in London. The Capital is a vast and disparate city, and I recognise that one size does not fit all, and that there are different priorities that need to be addressed in each sub region. I also appreciate that these plans are 'live' and provide a working framework for TfL, the boroughs and other key stakeholders to amend and fine tune the proposals to ensure the transport system can support London to be the best big city on earth.

Boris Johnson, Mayor of London

London Councils' foreword

Boroughs play a key role in delivering the transport that London needs and deserves. However, there are many transport issues that cross borough boundaries and this is where the Sub-regional Transport Plans (SRTPs) are particularly important. The SRTPs fill the gap between the strategic policies and proposals in the Mayor's Transport Strategy (MTS) and the local initiatives in boroughs' Local Implementation Plans (LIPs).

We have very much welcomed the GLA and TfL's willingness to engage with London Councils and the boroughs on the development of the SRTPs over the last couple of years. The process has allowed boroughs and other stakeholders to agree on the key challenges for each sub-region and the most cost-effective potential solutions and policy options.

Whilst there are some common themes, the specific transport issues faced by each sub-region do vary just as factors such as the existing levels of transport provision and the anticipated growth in population and employment vary across London. Developing the SRTPs has allowed such variations to be taken into account and provided a range of analysis and information on potential solutions which will be useful for the future development of LIPs as well as TfL's own plans.

The current financial situation is incredibly challenging. Another important function of the SRTPs, particularly in the face of cuts to transport funding, is that we now have agreement on the types of initiatives that will need to be delivered in each sub-region if London's transport system is to meet the needs of all those who live, work and visit here. This means that we can adopt a co-ordinated approach to delivery and to securing funding for longer-term priorities.

London Councils and the boroughs will continue to work with TfL and the Mayor to develop the most effective package for each part of London and to deliver a more efficient, reliable and attractive transport experience for all Londoners.

Cllr Catherine West,
Chair, London Councils' Transport and Environment Committee

Executive summary

Introduction

Over the past two years TfL, the West London boroughs, West London Business, BAA and other stakeholders in the West London Alliance (in which Ealing borough is the accountable authority) have worked closely together in developing this sub-regional transport plan (SRTP). The purpose of the plans is to set out the transport strategy to address the particular challenges faced by each of the London sub-regions, of which there are five in all. The plans are informed by the Mayor's Transport Strategy (MTS) and by local authority transport priorities for improvement. The plans provide a sub-regional context for individual local authority LIPs. The SRTP sets out contributions to meeting the challenges - and hence the outcomes - of the MTS, and form a bridge between the MTS and individual local authority transport objectives.

In February 2010, an Interim Report on Challenges & Opportunities was published, providing initial analysis of the transport challenges facing the sub-region. The SRTP has been informed by this analysis and has been produced alongside the development of a multi-modal model for the sub-region. The plan is a live document and will need to be responsive to changing circumstances, including the impact of the Spending Review on the funds available for transport schemes and programmes. It is proposed that the implementation of the programme set out in this plan, and any changes to the plan, are the responsibility of a Sub-regional Panel, which will be formed from the participants in the west sub-regional programme to date, with representation from TfL, boroughs and sub-regional partners.

The west London sub-region comprises the following London boroughs: Brent, Ealing, Hammersmith & Fulham (which is the only inner London borough in the sub-region), Harrow, Hillingdon and Hounslow. The London boroughs of Barnet and Richmond-upon-Thames are not core boroughs in the sub-region but , in keeping with the 'fuzzy boundaries' approach, also need to be considered with regard to the west. In the same way, the plan will consider transport to and from the areas surrounding London, in particular Hertfordshire, Berkshire, Buckinghamshire and Surrey.

West sub-region and the SRTP

The MTS sets out six goals for transport in London, and these form the overarching structure of the SRTPs. The measures in each of these sections are also directly related to the challenges that have been identified for the sub-region. The following challenges have been identified for the west sub-region:

- Improve north-south connectivity
- Improve access to, from and within key locations
- Enhance east-west capacity and manage congestion
- Enhance the efficiency of freight movements in the sub-region
- Improve land-based air quality

Economic development and population growth
The SRTP's base is the committed investment in public transport capacity to support growth, including the London Underground upgrades, Crossrail, protection of the bus network and HLOS investment in national rail. This investment supports economic growth over the next decade, but further improvements to capacity are needed beyond that.

Crossrail will provide significant benefits to the sub-region in terms of east-west connectivity, providing a direct link to central and east London and into the west sub-region from the area west of London. Maximising the benefits of Crossrail by improving cycle access and considering the bus services serving the stations, as well as securing urban realm improvements from the development, will be important to the sub-region.

The Government has made a commitment to a High Speed 2 (HS2) rail link between London (with a direct link to Heathrow) and the north of England. An interchange at Old Oak Common in west London is proposed, with all Crossrail, Great Western and Heathrow Express Services calling at the station. TfL is investigating the potential for linking this station to Overground and Underground services, thus providing the area with a strategic interchange and better local connectivity in addition to the access it would provide to international destinations.

Heathrow Airport is of course highly significant for the sub-region both in terms of being a transport hub and as a major employer. Along with Park Royal, it is also a large generator of freight into and from the sub-region, and accounts for over half of all UK air freight, making it key to the UK's competitiveness.

Further connections to Heathrow, mainly via Crossrail and High Speed 2, will see this become a more important interchange for the region. If it is completed, Airtrack will provide an important link to the airport from the south west, and has potential to achieve a move away from car use to this destination.

Buses will continue to be important in the west and the plan highlights specific areas where demand is expected to grow, including metropolitan town centres, opportunity areas, interchanges, to Crossrail stations and to Heathrow.

Enhancing the quality of life for all Londoners
Journey quality will continue to be improved through reduced crowding, the refurbishment of stations, improved provision of information, more reliable bus services, and a better quality urban realm. The plan outlines improvements that can make town centres a more attractive place to visit, especially on foot.

West London contains some areas of poor air quality, and there is a need to balance air quality management with accommodating areas of growth. Londonwide measures such as the use of cleaner buses, developing walking and cycling and smoothing traffic flow, and potentially, targeted local measures will be used to improve air quality, as set out in the Mayor's Air Quality Strategy. Local measures might include reducing idling, use of shared spaces and restrictions on car parking. Particularly important on a Londonwide basis will be encouraging mode shift to sustainable modes.

Measures to encourage people to use active travel modes such as walking and cycling will bring benefits in terms of both individual wellbeing and in taking pressure off the road and public transport network and reducing emissions from transport.

Improving the safety and security of all Londoners
Public transport is already a relatively safe way to travel. Targeted activity to further improve safety includes continued investment in asset renewal, and management of the network, for example with regard to staffing at stations and improvements to urban realm. A strategy to improve transport safety and security in London will be published in early 2011.

Road safety has been improved significantly over the last decade, but there is more that can be achieved through targeted road safety campaigns and possibly lower speed limits on local roads: the plan identifies priority areas in the sub-region for increasing road safety.

Improving transport opportunities for all Londoners
In terms of physical accessibility, the achievement of an entirely low-floor bus fleet in London has brought significant benefit. Further improvements in west London need to be made by improving the design and layout of stations and streets. TfL continues to invest in step-free access to underground stations and this will improve in the west by 2018, although there will still be gaps. Access to transport is also a key factor in achieving regeneration and the Mayor and TfL will work with partners on transport priorities for those areas identified for growth or regeneration in the London Plan. While public transport accessibility levels are generally good, there are areas of lower access in the outer parts of the sub-region. Addressing this issue will need to be balanced with ensuring a good level of access to transport for deprived areas in the sub-region.

Reducing transport contribution to climate change and improving its resilience
West London has the highest emissions of CO_2 of all the sub-regions (2.69m tonnes/year in 2008). Although CO_2 emissions and climate change need to be tackled on a wider scale than an individual sub-region, it is still useful to consider local initiatives such as promoting cleaner vehicle technology for freight, and promoting the use of car clubs and electric vehicles in locations where these are most likely to be taken up.

Support delivery of the 2012 Olympic and Paralympic Games and its legacy
For the west sub-region, the main impacts will be visitors to the Games using Heathrow Airport to access London, and the events being held at Wembley Stadium and Wembley Arena. Managing onward dispersal from Wembley to other parts of the Olympic site will be a challenge for the sub-region.

Funding and Delivery
The plan includes both funded and unfunded proposals, but there is no new funding for the plan. The plan will be delivered over the next twenty years by TfL, the boroughs, the TOCs, National Rail and others.

The Plan will be monitored and reviewed jointly by TfL and the West Sub-regional Panel.

The plan is 'live' and will be updated at appropriate intervals.

CHAPTER 1: INTRODUCTION

1.1 CONTEXT

This west sub-regional transport plan (SRTP) addresses the goals and challenges set out in the Mayor's Transport Strategy (MTS) and how they will be met in the sub-region. It was developed through joint working between the boroughs, TfL, the West London Partnership and other stakeholders. It builds on the work undertaken for the West London 10-point Plan.

TfL proposes that existing sub-regional groupings are used to continue this work, with representation from boroughs, sub-regional partnerships and TfL as a sub-regional Panel. This will allow for the inclusion of additional boroughs, stakeholders and other parts of TfL to discuss the issues as considered appropriate. The Panel will effectively steer sub-regional engagement, articulate agreed priorities and input to the scoping of areas of work to be taken forward. Specific working groups could be tasked with more detailed work on particular projects or issues, however TfL, the Boroughs and other partners would retain their existing responsibilities. The panel could also be used as part of wider engagement on projects and service changes where a sub-regional discussion would have merit.

The MTS sets out six goals:

- Supporting economic development and population growth
- Enhancing the quality of life for all Londoners
- Improving the safety and security of all Londoners
- Improving the transport opportunities for all Londoners
- Reducing transport's contribution to climate change and improving its resilience
- Supporting delivery of the London 2012 Olympic and Paralympic Games and its legacy

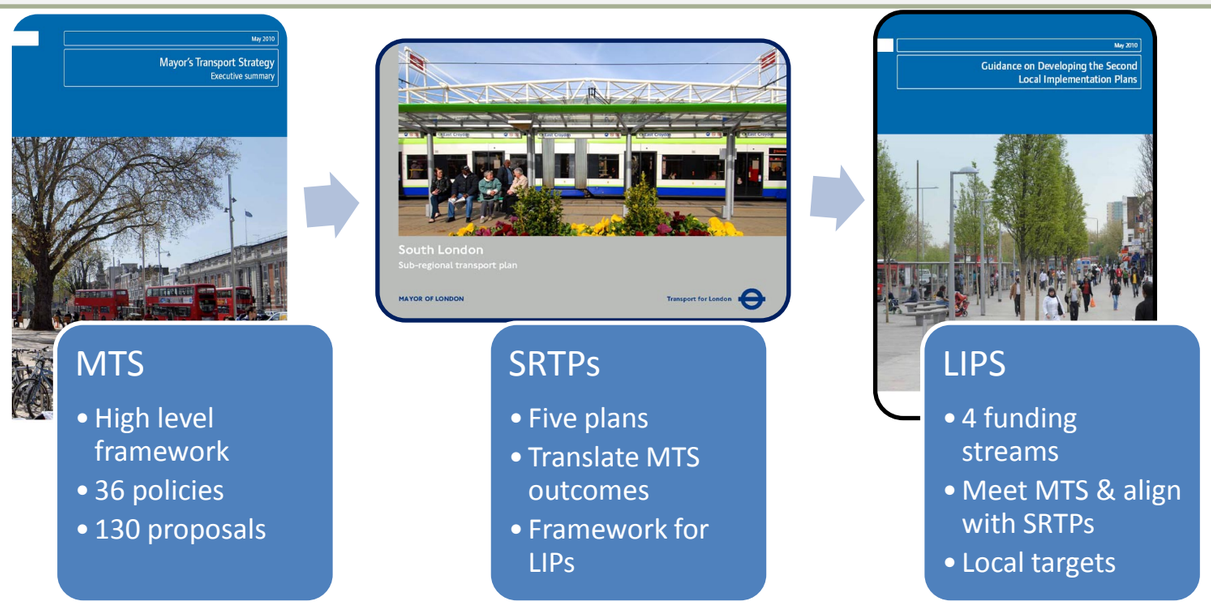


Figure 1.1 MTS, SRTPs and LIPs

The SRTP will show how the six goals will be met in the region.
Understanding the local priorities for west London has come through close working with borough members and officers, as well as through the analysis carried out for this Plan and in the Interim Report on Challenges & Opportunities for the west sub-region.

The SRTP will thus also seek to reflect a bottom up approach whereby the particular priorities and issues for the region and boroughs are reflected within this framework.
The MTS will only be delivered through close working with stakeholders, in particular the London boroughs, through the use of Local Implementation Plans (LIPs) which are an important mechanism for boroughs to plan and implement local improvements.

Local Implementation Plans (LIPs)
The LIPs process, as set out in the recently published LIPs guidance, has been simplified to provide boroughs with greater ownership of their own programmes and flexibility to reflect local circumstances. This new second round of LIPs becomes effective from April 2011.

LIP funding from TfL will be allocated to boroughs for Corridors, Neighbourhood and Supporting Measures; Maintenance Programmes; and Major Schemes. £146m will be allocated to support boroughs' investment for the year 2011-12, £142m for 2012-13 and £132m for 2013-14.

1.2 INTRODUCTION TO THE SUB-REGIONS

Figure 1.2 Map of sub-regions showing 'fuzzy' boundaries

Why sub-regions?

The Mayor's Transport Strategy showed how transport will help to deliver his vision of London as the best big city on earth. In order to achieve this, the Mayor proposed to coordinate efforts to address the specific challenges facing London's sub-regions through five sub-regional transport plans.

The plans span the gap between the Transport Strategy, with its London-wide scope, and the Local Implementation Plans with their necessarily local focus. They aim to provide a framework for delivery of the Transport Strategy at a sub-regional level, and also to identify and address common problems that might otherwise be missed.

The contents of the SRTPs

This SRTP identifies some specific priorities and projects for west London, such as a High Speed 2 station and sub regional interchange at Old Oak Common. In other cases, a broader framework or toolkit is presented which needs to be adapted for, and applied to, local circumstances – whether in relation to modal planning and implementation or local delivery.

The SRTP identifies planned investment in the shorter and medium term, although clearly the details of this will be subject to the outcomes of the Spending Review. It also identifies potential priorities for longer term investment required to deliver the growth in the future beyond the Business Plan. It will be important to identify potential alternative funding sources, such as Section 106 credits, the Transport Innovation Fund and the Community Infrastructure Levy .

Fuzzy boundaries and flexible thinking

The west London sub-region consists of the boroughs of Brent, Ealing, Hammersmith & Fulham, Harrow, Hillingdon and Hounslow. However, the boundary between the different sub-regions and the areas beyond London are envisaged as being flexible or "fuzzy" to reflect that the challenges being faced do not stop at administrative borders (see Figure 1.2).

Links beyond London are also important

London's economic engine depends on access to the wider south east labour market, while local retail centres and employment catchment areas frequently span the boundary between outer London and the home counties. The sub-regional programme seeks to achieve better coordination across the GLA boundary, and to strengthen links with London's neighbours.

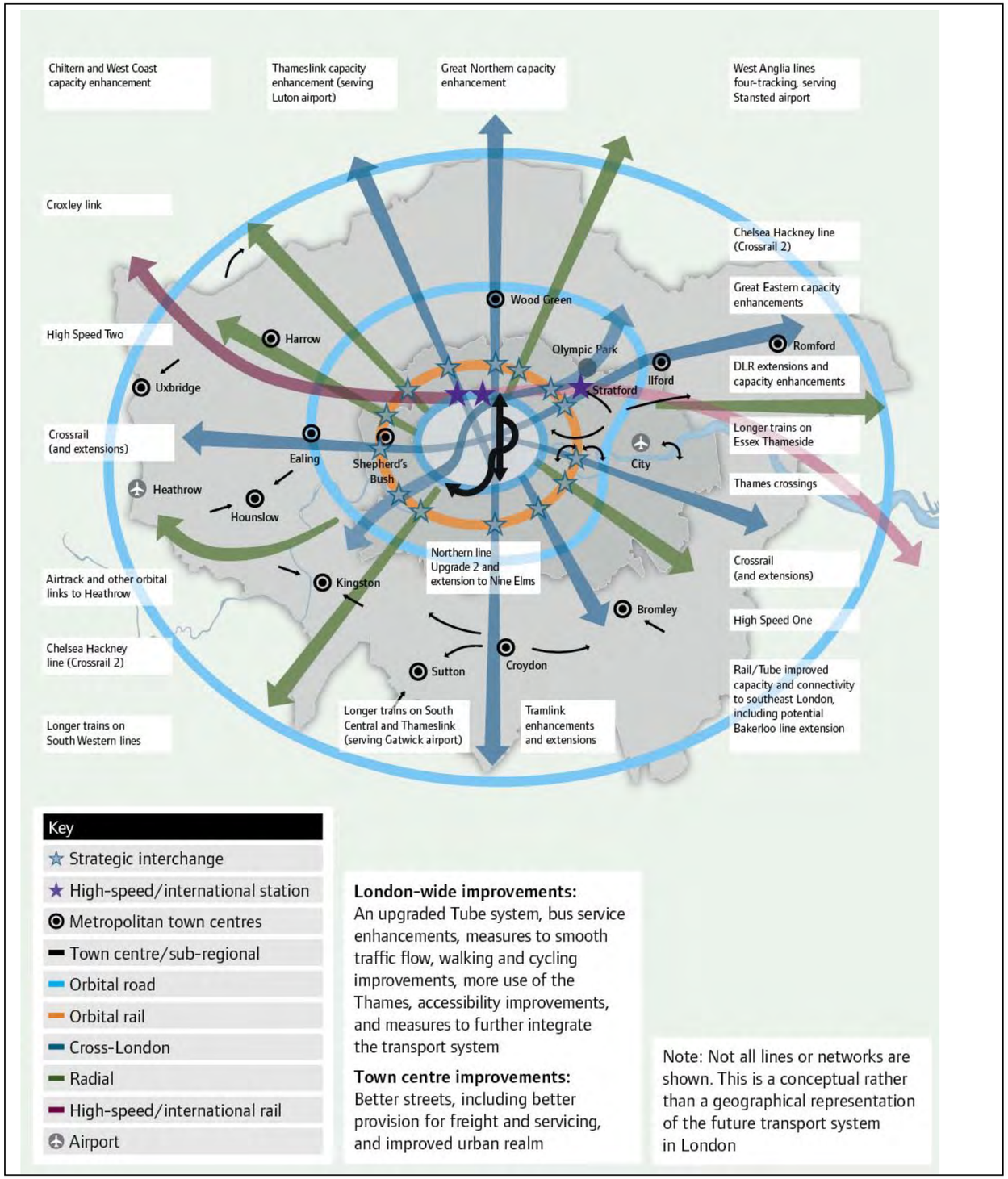
1.3 PLANNED INVESTMENT

Major investments are being delivered

TfL is spending £35bn on a comprehensive package of improvements across London. These include Crossrail, major upgrades to most parts of the Underground and Overground, initiatives to encourage cycling and walking and the provision of bus services. Major improvements are also being made to the national rail network serving London via the High Level Output Specification (HLOS). This sets out the outputs the Government would like to see delivered over a five-year rail industry control period, alongside an indication of the funding that will be available. HLOS1 covers 2009-14 and HLOS2 covers 2014-19. These improvements are essential, not just to ease the strain on the network now, but to cope with London's expected growth in the years ahead.

All regions are benefiting from this investment and the benefits to West sub region are summarised in the following pages. More detailed information on the transport measures for West London is given in Chapters 2 – 8. Appendix 1 is the Implementation Plan for funded and unfunded schemes in the sub-region.

Figure 1.3 Funded and unfunded schemes in London



Crossrail

Crossrail's phased opening from 2018 will bring significant benefits to west London. . Not only will it directly serve the Heathrow and Southall Opportunity Areas and Ealing metropolitan town centre, it will also support population and employment growth in other Opportunity Areas and town centres within the region. It will do this by providing a substantial capacity increase on public transport to central and east London, and by doing this will also deliver reduced congestion for passengers on busy existing lines particularly the Central, District and Piccadilly Underground lines. Crossrail will also stimulate regeneration within the locality of many stations and will see important urban realm improvements accompanying the station upgrades.

London Underground

Major upgrades are underway to the Metropolitan, District, Hammersmith & City and Jubilee lines which will in increase peak capacity into central London on these lines by 25-40%. The new rolling stock on the Metropolitan and District and Hammersmith & City lines will be air conditioned. In the future there will also be upgrades to the Piccadilly, Bakerloo and Central lines.

National Rail Enhancements

Enhancements to the National Rail network in the west sub-region include train lengthening on Chiltern Railways and South West Trains inner suburban services and on West Coast Mainline (London Midland) outer suburban services.

Network Rail is scheduled to publish its Route Utilisation Strategy (RUS) for London and the south east in December 2010. It will be important to consider this in relation to this SRTP.

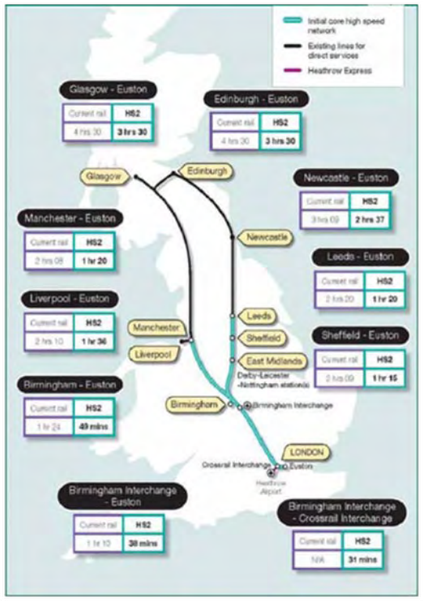
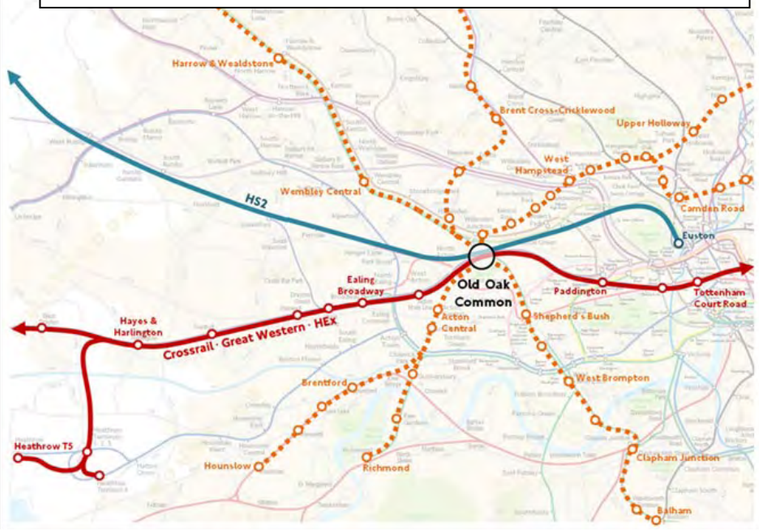


Figure 1.4 High Speed 2



High Speed 2 in west London

The previous Government announced plans for a high speed rail link between London and the West Midlands, and ultimately, on to Leeds and Manchester. The scheme has remained a priority for the new Government. The figure above indicates how journey times from outside London will reduce with the scheme in place: the Spotlight on HS2 later in this document sets out time savings from the west sub-region into central London.

High Speed 2 Station at Old Oak Common

London Euston has been chosen as the central London terminal location for High Speed 2. To help address onward dispersal problems at Euston, the DfT proposals recommend an interchange with Crossrail before reaching central London, at Old Oak Common. As part of the HS2 proposals at Old Oak Common, all of the 14 Crossrail trains currently planned to terminate at Paddington will be extended to Old Oak Common. As the London Overground North and West London Lines pass close to the site, there is a tremendous opportunity to better connect many parts of the west London region in to this new interchange, as indicated in the map above.

Major Section 106 Agreements
Southall Gas Works - South Road railway bridge widening, local highway improvements, changing bus services and infrastructure, 2 pedestrian/cycle bridges over the canal, car club, transport management fund, bicycle vouchers for new residents
Dickens Yard – contribution to bus interchange at Ealing Broadway, town centre public realm improvements, pedestrian and crossing facility improvements along Uxbridge roads, public parking messaging,
Chiswick Park – new bus interchange, New and extended bus routes, a new bridge over the railway line, Improvements to Gunnersbury station

Cycling
Two Barclays Cycle Superhighways (routes 9 & 10) are set to be installed in the region, with two others bordering (routes 11 and 8) bordering it to the north and south respectively. A number of west London boroughs are Biking Boroughs and are planning their investment in order to encourage more cycle trips. Ealing for example, are planning to develop a cycle 'hub' around Ealing Broadway. See the spotlight on cycling section for more details.
This investment will improve access to central London as well as to key places within the region. It will make orbital journeys easier and improve the urban realm for walking and cycling. There may also be potential to expand the Barclays Cycle Hire scheme or similar to areas outside central London, subject to funding and demand.

Buses
Buses play a key role in west London, with six out of every ten trips made by public transport in the sub-region made by bus. They play an important role in providing access to jobs and services; access to town centres; connections to the wider public transport network and as a 'feeder' service to Tube and rail interchanges. All TfL buses are low-floor and a strategy to improve the emissions performance of buses in place: all buses now meet a minimum Euro 4 standard for particulate matter for exhausts and TfL is rolling out further hybrid and low emission buses into the fleet.

1.4 WORKING SUB-REGIONALLY

Working Together

The west London Sub-regional Transport Plan (SRTP) has been developed in collaboration with boroughs and stakeholders from the west sub-region. In addition to meetings with individual boroughs, the key sub-regional dialogue has been via the West London Liaison Group and the West London Strategic Transport Group.

This initial version of the SRTP reflects this work with boroughs and other stakeholders and the analysis undertaken to date. In a number of areas, further work is planned to develop the options in greater detail, for example, complementary measures to Crossrail.

As outlined, these plans are intended to evolve and may be updated as and when required to reflect major developments or changes in the sub-region or more widely, for example, as the conditions in west London change, the funding available becomes clearer and as extra information relating to projects such as HS2 becomes available,

When will the Sub-regional Transport Plan be revised?

The plan is therefore a "live" document that will be updated in response to specific triggers. Possible revisions, in whole or in part, could be made following the approval of the LIPs, significant development changes or as options for particular schemes are further developed.

We will need to strike a balance between providing some certainty in relation to the priorities and revising the plans to ensure they reflect relevant developments.

The collaborative work between TfL, the boroughs and stakeholders will help to guide the ongoing development of the Plans and be able to advise on appropriate timescales for review and revision.

1.5 SUB-REGIONAL PANELS & CONTACTS

The west SRTP has been developed in collaboration with boroughs and stakeholders from the west sub-region. In addition to meetings with individual boroughs, the key sub-regional dialogue has been via the West London Liaison Group and the West London Strategic Transport Group

Following publication of the Plan, it will be important to continue this joint working.

TfL proposes that existing sub-regional groupings are used to continue this work, with representation from boroughs, sub-regional partnerships and TfL as a sub-regional Panel. This will allow for the inclusion of additional boroughs, stakeholders and other parts of TfL to discuss the issues as considered appropriate. The Panel will effectively steer sub-regional engagement, articulate agreed priorities and input to the scoping of areas of work to be taken forward. Specific working groups could be tasked with more detailed work on particular projects or issues; however TfL, the Boroughs and other partners would retain their existing responsibilities. The panel could also be used as part of wider engagement on projects and service changes where a sub-regional discussion would have merit.

The Plans will form the basis for this work. As live documents they will need to be responsive to changing circumstances and issues.

How the Panel would take this work forward

Using the sub-regional transport plan as the starting point for the work programme, the Panel could:

- facilitate continued discussion of the sub regional challenges identified in the SRTP and monitor progress on joint sub-regional priorities and projects. This could include consideration of the possible schemes for discussion with the sub-regional panels set out in Appendix 2
- ensure multi modal consideration of issues (with consideration of benefits and disbenefits across the different modes/ MTS indicators)
- consider how to deliver particular priorities set out in the MTS and SRTP in the sub-region (eg improving north-south connectivity, reducing emissions from transport) and the priorities related to particular contexts or schemes
- bring together different relevant interests early in the process to understand aims and implications of options
- help to integrate transport and land use planning at the strategic level and
- provide recommendations of further areas of work to support continued development of SRTPs, with terms of reference for each area of work agreed by the panel.

The Panel could also add value by considering the long-term operation and development of the sub-region's strategic road corridors, reviewing sub-regional corridor performance at a strategic level and sharing intelligence on the day to day operation along with opportunities to better manage traffic. They could also discuss matters relation to both the Transport for London Road Network and boroughs' road networks and their interactions.

The Panel could also play a place-shaping role.

Contacts

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If you have any comments on the West Sub-regional Transport Plan, please direct them in the first instance to Alex Williams.
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1.6 SUB-REGIONAL ANALYSIS AND MODELLING

Analysis
The SRTPs have been built on a considerable amount of underlying analysis and evidence. Much of the evidence base used in the production of this plan was made available to boroughs in TfL's Interim Report on Challenges and Opportunities published in February 2010. Further analysis has been undertaken since then including using both existing travel behaviour and network data, new work such as the central London rail termini study and town centre surveys, as well as incorporating data or findings of studies undertaken in collaboration with boroughs and other stakeholders. Where appropriate the SRTP analysis either has been or will be made available to boroughs. TfL will work with the boroughs and other stakeholders to discuss any further areas of work needed and priorities for ongoing work. The sub-regional panels will be an important mechanism for this.

Sub-regional models
An important aspect of the sub regional work has been the development of a multi-modal computerised transport model for each sub region which has been undertaken in parallel with the production of the plans. These sub regional models complement TfL's London-wide transport models and the more detailed operational models of smaller areas or junctions. The sub regional models represent flows and journey times on the highway and public transport networks as well as changes between modes (modal shift) that might result from, for example, a new transport scheme or significant development. The models can be used to examine the situation in the base year, currently taken as 2008, using data from the 'present day', as well as future years with a given set of assumptions about population and employment growth and planned transport improvements. The 'reference case' forecast is 2031 with the London Plan population and employment forecasts and transport interventions that are funded.

The models have been or are being thoroughly tested to ensure that they can replicate the impacts of major transport schemes that have actually happened on the network. They have also been used on a real study, demonstrating that, whilst the models have been designed to capture strategic transport movements, they can quickly and cheaply be adapted to model local effects as well, and provide the basis of local transport models. The west London Model has recently been completed.

The models represent a significant investment in transport planning in London and it is important that the models are used widely and subject only to the limitations of good practice. They are based on a vast amount of observed data ranging from counts to interviews. TfL is committed to maintaining the sub-regional models and would strongly prefer analysis to be carried out using them where possible, so that the lessons learnt can be captured and made available for later studies.

Therefore, where there are projects that the boroughs wish to pursue, where use of the models may be beneficial, TfL will cooperate in making the model available, subject to ensuring that lessons learnt and information gathered during studies are fed back into the model in a controlled way.

Boroughs who wish to use the models should ask the sub-regional team leader for access to the models and an approved list of suppliers who can develop and run the models. In addition, the models will be useful for developers, including those making significant planning applications, or other organisations who would pay a licence fee, which will enable TfL to maintain and update the models for future applications.

1.7 OVERVIEW OF THE WEST SUB-REGION

The Transport Network

West London is one of the best served sub-regions in terms of the Underground.

The public transport network in west London consists of a dense bus network, a well established Underground network, and a comprehensive National Rail network of services, supplemented by the Overground network in the inner part of the region. It also has a highway network that contains a significant number of strategic roads linking London to the rest of the UK (M4, A4, A40).

All of the region's metropolitan town centres are served by all modes with Ealing and Shepherd's Bush being particularly well connected to the Underground, Rail and Bus networks.

As is typical for the sub-regions, the density of the public transport network and the level of service provision, as well as the scale of the road network varies differs between inner-borough and outer-borough sections. Towards central London and the town centres, public transport provision and use are relatively high. In outer London however, the car plays, and is likely to continue to play, a significant role. These factors along with relatively high car ownership levels and long trip distances contribute to the key challenges facing west London, as set out in Section 1.8 below.

West London has relatively good connections with the adjacent regions outside London, both by road and rail.

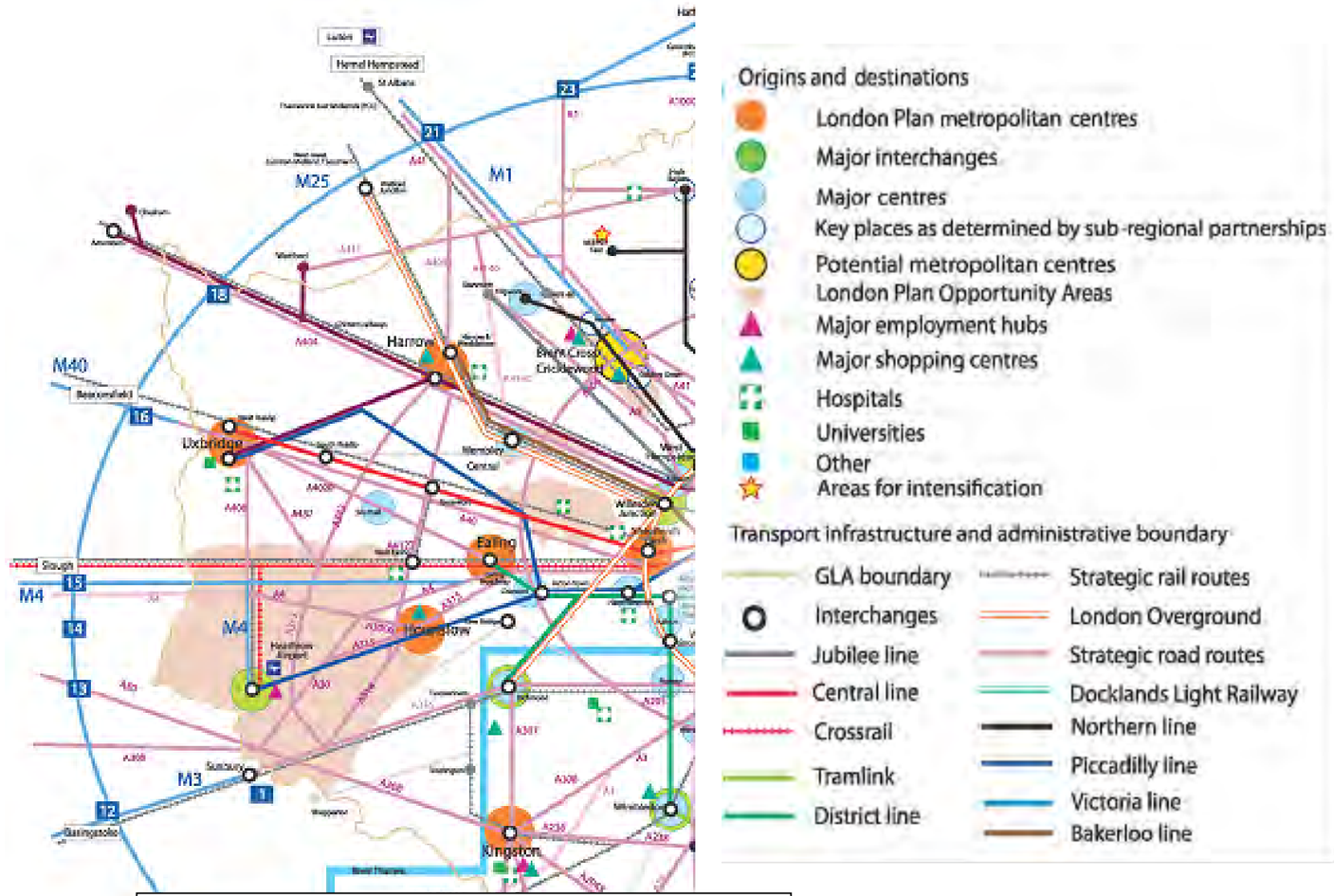
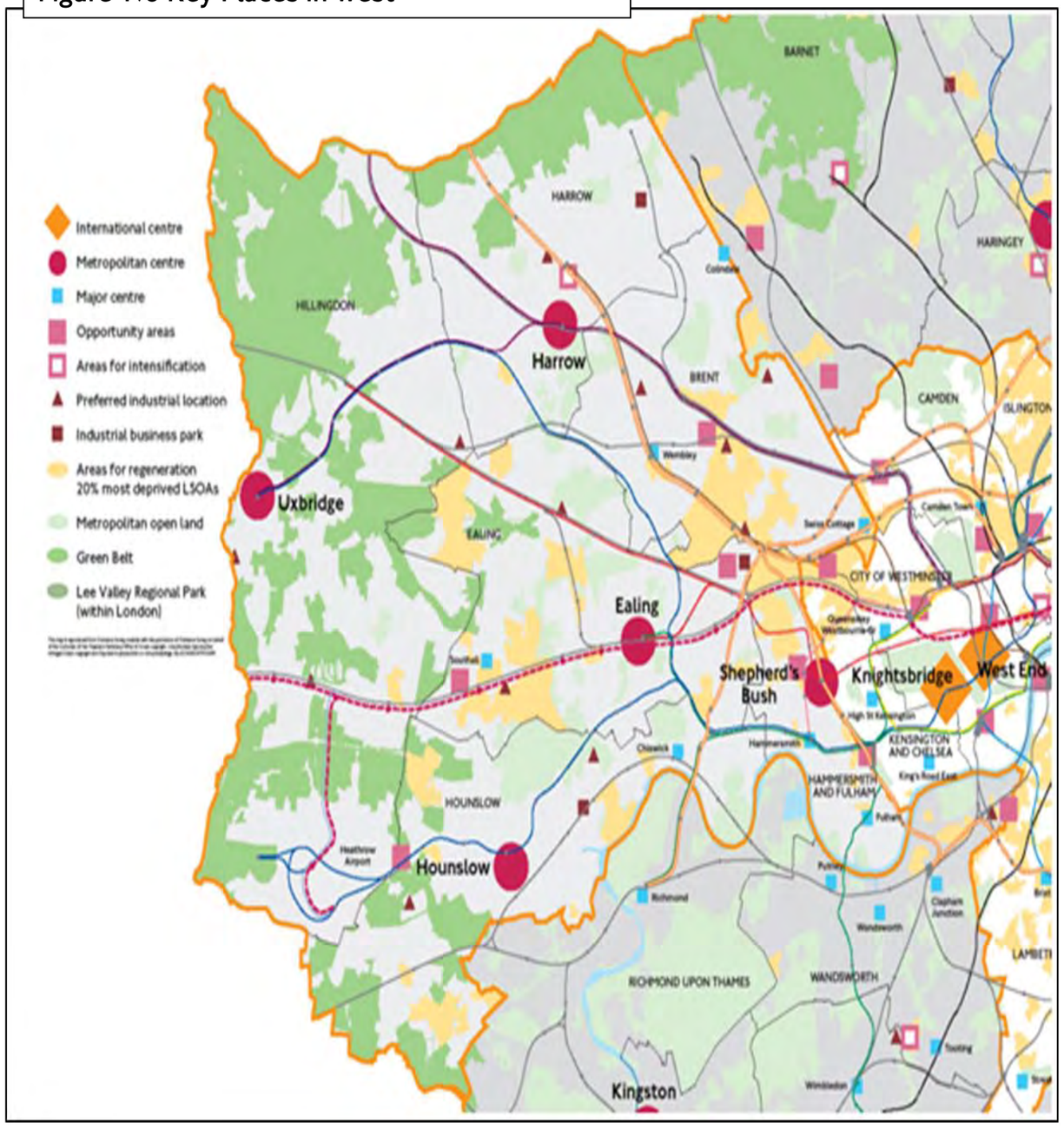


Figure 1.5 West London's transport network

1.8 KEY PLACES IN THE WEST SUB-REGION

Figure 1.6 Key Places in west



The London Plan is the spatial plan for London and provides a framework for the development and use of land in London, linking improvements to infrastructure and proposals for implementation.

West London is home to five Metropolitan Town Centres which provide a combination of a strong retail draw, offices, residential areas and open spaces: Hounslow, Harrow, Uxbridge, Ealing and Shepherd's Bush.

The sub-region is home to a number of Major Town Centres such as Southall, Wembley, and Chiswick. West London has a wide range of environments, such as parks and other green spaces, including Kew Gardens, Gunnersbury Park and Richmond Park.

The west sub-region also contains six Opportunity Areas where new population and employment growth is likely to be focused. These include: Heathrow, Southall, Park Royal/Willesden Junction, Wembley, White City and Earls Court. Harrow and Wealdstone is also designated as an Area for Intensification.

The west sub-region is home to Heathrow Airport, the busiest international airport in the world and the largest international gateway to London with 65.9 million annual passengers (BAA, 2009). It is also the region's largest employer providing over 70,000 jobs and generating thousands more through indirect employment in the region. Generating such large volumes of trips, means that surface access to and from Heathrow is of considerable importance to the sub-region. The extensive rail, Underground, bus, coach and highway connections allow travel demand to be spread across the network. Further connections to Crossrail (Terminal 4) and connecting to key interchanges at Ealing Broadway and Hayes and possibly High Speed 2 are likely to see Heathrow become even more important as an interchange between the networks of the west and south sub-regions as well as a destination for air passengers. Along with Park Royal, Heathrow is a very large generator of freight transport in and beyond the west sub-region.

1.9 WEST LONDON PAST, PRESENT AND FUTURE GROWTH

Past
Historically the trend in population change in west London has resembled those of north, south and east London, with growth in the inter-war years gradually peaking and giving way to decline from the 1950s to the early 1990s. Its population, however, has been consistently higher than the other regions.

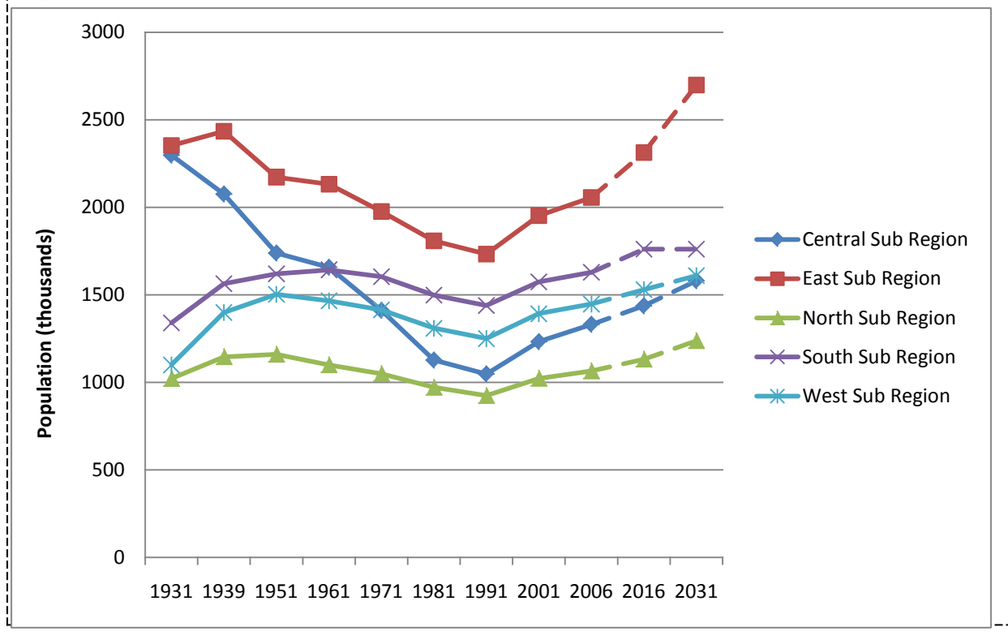
Present
West London has relatively well established towns and communities. It is home to 14% of London's population (1.4m people). It has dense development in the inner city areas of Ealing, Brent and Hammersmith and Fulham with lower densities in the outer parts of the sub region. Large employment areas exist at Park Royal, Shepherd's Bush and around Heathrow with the airport having a significant impact on the area's economic activity and communities.

Future
The population in west London is forecast to grow by around 6% by 2016/17 (from 1.4m in 2006), and then by another 5% to 2031 (to 1.6m). The focus of this growth is around the Opportunity Areas of Heathrow and Wembley. As can be seen in Figure 1.7, this level of growth is greater than that forecast for the north region and but lower than the other regions, particularly east.

Employment is forecast to increase by 13% between 2006 and 2031, (comparison). Employment growth will be concentrated around Metropolitan centres as well as Opportunity Areas, including Heathrow, Wembley, Park Royal, White City and Earl's Court. Employment growth will also take place in the Metropolitan town centres

The spatial pattern of growth is a driver of transport demand and therefore closely linked to the transport network.

Figure 1.7: Past and forecast population growth for each London sub-region



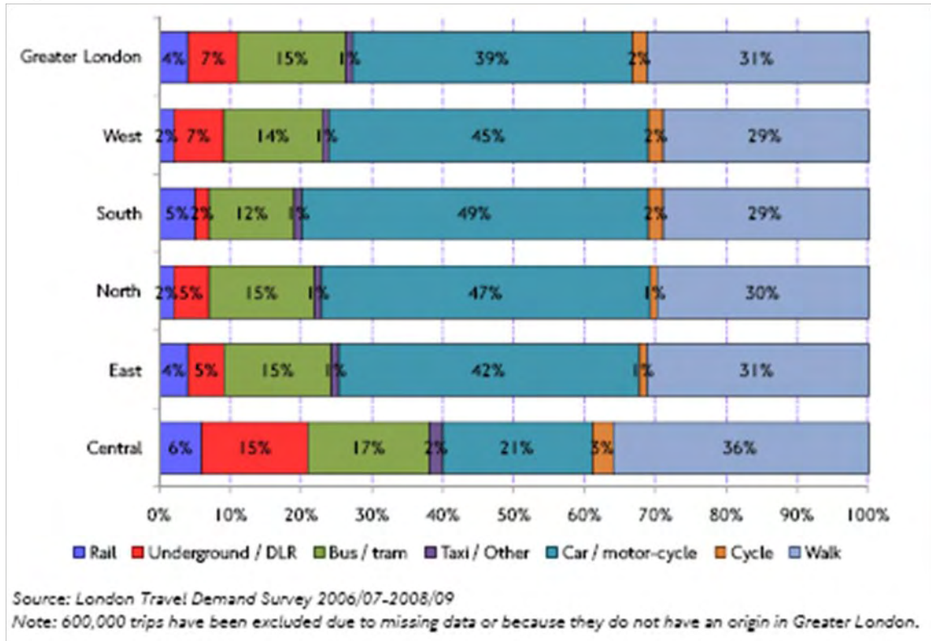
1.10 MODE SHARE CHALLENGE FOR WEST LONDON

West London context

West London's population of 1.4m is forecast to grow by some 11% to 2031 and jobs are forecast to grow by 13% between 2006 and 2031

In terms of mode share, the west sub-region is fairly typical of the sub-regions. Almost three-quarters (72%) of trips in west take place within the sub-region itself. It has relatively higher levels of car ownership, and relatively lower levels of public transport usage than other sub-regions (see Figure 1.8 below)

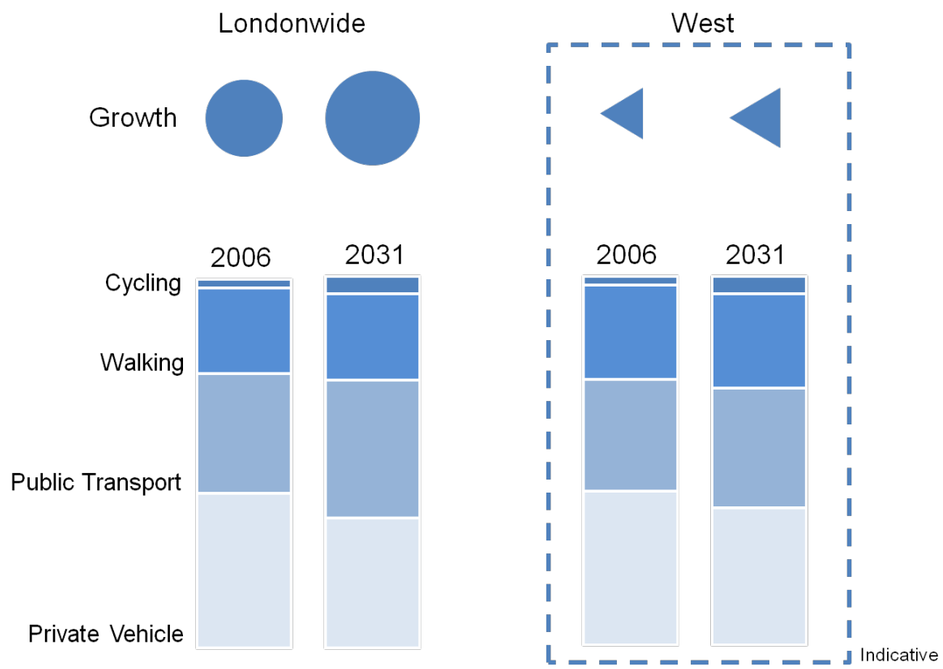
Figure 1.8 Current mode share in London



Source: London Travel Demand Survey 2006/07-2008/09
Note: 600,000 trips have been excluded due to missing data or because they do not have an origin in Greater London.

Looking forward, London will have more people and more jobs which will lead to an increase in trips, as shown in Figure 1.9. The Transport Strategy sets out the expectation that there will be substantial further mode shift to public transport, walking and cycling. The mode shift figures have been determined using a mix of prediction and targets. This need for mode shift represents a significant challenge which covers all the sub-regions and which the Transport Strategy, London Plan and Economic Development Strategy are aimed at delivering. Boroughs will need to reflect the need to meet this challenge in their local strategies.

Figure 1.9 Comparison of total trips and indicative mode share change from 2006 to 2031



Although growth and development in the west sub-region provide a significant opportunity to encourage mode shift of new journeys, boroughs will need to take action to encourage mode shift amongst *existing* travellers. In order to achieve this shift to more sustainable modes there will need to be considerable behavioural change in addition to investment in infrastructure. Measures to encourage a shift away from car could include smarter travel initiatives and measures to turn walking and cycling potential into reality. Other measures still allow access to services without having to travel as far, for example through better use of IT and freight consolidation.

1.11 POPULATION AND EMPLOYMENT GROWTH: OPPORTUNITY AREAS

Within the West sub-region there are 6 Opportunity Areas (OA) and 2 Areas for Intensification (AfI). Collectively the opportunity areas comprise around 19 square kilometres in the west sub region or 10% of the area designated as opportunity areas across London. If the opportunity areas were fully realised as set out in the London Plan with sufficient transport measures in place this would be the equivalent of 40% of the projected population growth and 60% of employment growth to 2031 in West London sub-region, which highlights the sub regional significance of the level of growth in these areas. The data is presented in the figure below; please see Chapter 8 for a map of the OAs and AfIs in the west sub-region.

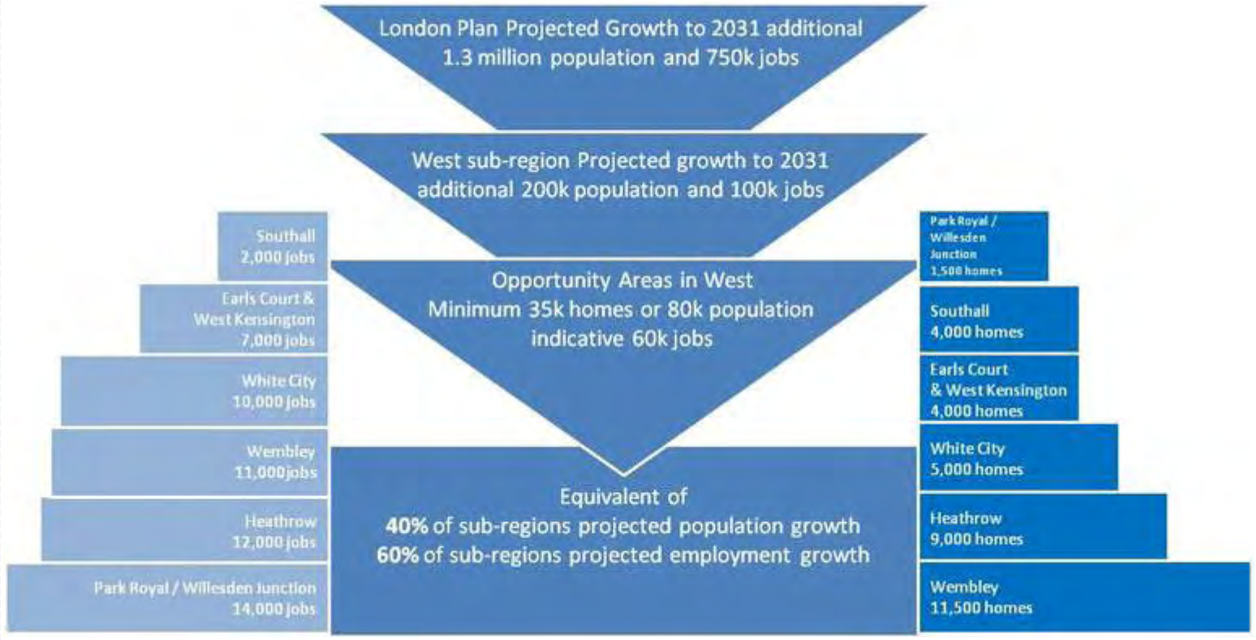


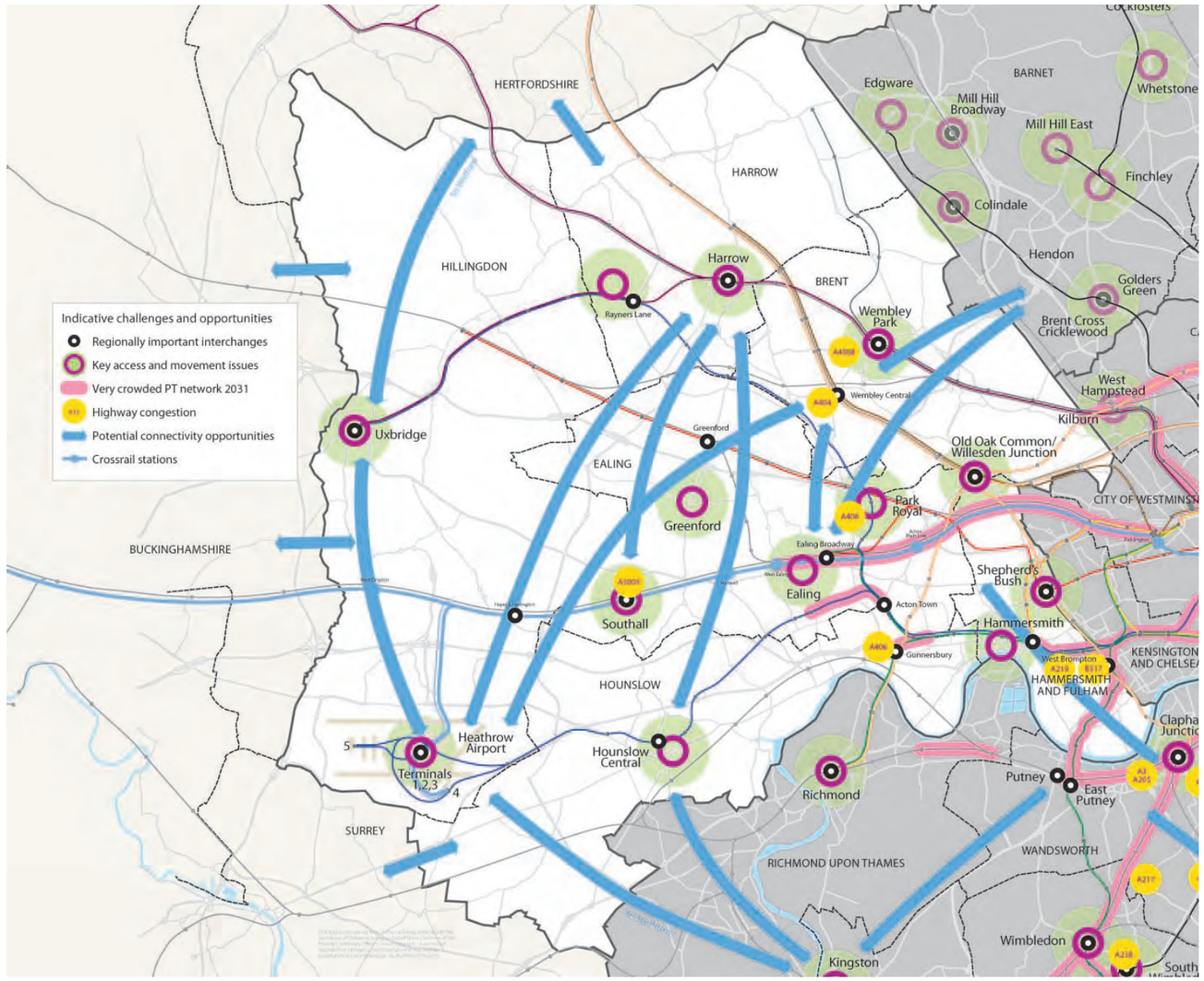
Figure 1.10 Opportunity Areas and growth in west sub- region

The nature of these areas will require significant transformation with changes to land-use mix and densities. Forecasts indicate that by 2031 based on current assumptions almost half of the additional trips in the west sub region originate from opportunity areas. Assessment of each opportunity area is required to identify capacity, access and connectivity measures, as well as urban realm improvements to ensure the areas are sufficiently connected to the transport network in an effective way that has minimum impact to the surrounding areas and where possible measures are designed into development. As far as possible the mode share of new trips should reflect high public transport, walking and cycling.

Working with the GLA, Boroughs and other stakeholders TfL has undertaken transport studies for some Opportunity Areas that influence proposed land use and identify a phased multi-modal transport strategy required to implement the planned development as part of the Opportunity Area Planning Frameworks. This provides a strategic assessment and a basis to assess transport requirements and for developer contributions to transport. Currently exercises are in progress for the White City and Earl's Court and West Kensington Opportunity Areas. It will also be important to consider the cumulative effects of these changes in terms of their interaction, synergies and the overall scale of change and its effect on transport. Some work looking at the cumulative effects of Opportunity Areas in inner west London (Western Arc) is currently being undertaken.

1.12 CHALLENGES FOR THE WEST SUB-REGION

Figure 1.11 – Challenges and Opportunities in West London



The Challenges and Opportunities document set out a number of transport challenges in west London, shown in Figure 1.11 and described over the next few pages. These were agreed through collaborative working between TfL, the west sub-region boroughs and key stakeholders.

Improve north-south public transport connectivity

Improve access to, from and within key locations

Enhance east-west capacity and manage congestion

Enhance the efficiency of freight movement

Improve land-based air quality

Challenge One – Improving north-south public transport connectivity

Orbital bus and rail services are already a feature of the area. In outer London, Heathrow is a major transport hub and a focal point for bus, rail & coach services including orbital links to Uxbridge, Harrow, Kingston and Southall as well as locations outside London. However there is a potential long term need for additional north-south services and building on the hub at Heathrow is an effective means of improving this connectivity.

The new Overground service provides orbital links around London with a number of stations in the west London sub-region, including Shepherd's Bush and Imperial Wharf. Longer term there is the case for improving connections and links with the Overground to facilitate easier access to radial routes including High Speed 2.

Challenge Two – Improve access to, from and within key locations

Locations in west London where improving access is important include those areas with large growth forecasts in employment and population, those which suffer from congestion and/or crowding on public transport, as well as those where severance is an issue. Effective links between areas of deprivation and areas of employment are also crucial to the success of those areas and will help maximise opportunities for all. Enhancing interchange between modes, particularly between radial 'hubs and spokes' in west London, would also help to address accessibility to all the metropolitan town centres and other key places. This includes linking stations that might be some distance from the town centre itself (for example, stations around Hounslow) and encouraging walking, cycling and parking, where appropriate, to help with the flow of pedestrians within centres.

Challenge Three – Enhance east-west capacity and manage congestion

Public transport crowding and road congestion will worsen significantly by 2031 as a result of population and employment growth, despite the implementation of Crossrail. Of particular importance are the 'hub and spoke' corridors serving the region's growth areas and key places, where high levels of demand are likely to be generated, eg for highway congestion the M4/A4 and Uxbridge Road corridors and for public transport crowding, the Hounslow – Waterloo and Ealing – Paddington corridors. Together, these serve the Heathrow, Southall, Wembley and White City Opportunity Areas. Public transport crowding is likely to affect the Hounslow-Waterloo and Ealing-Paddington National Rail corridors and the Piccadilly and Jubilee lines as they approach central London.

Challenge Four – Enhance the efficiency of freight movement in west

Freight transportation is an extremely important industry in west London that both contributes to and suffers from road congestion. Two key areas where freight access is considered fundamentally important to both businesses in the sub-region and London as a whole are Park Royal and the Heathrow area. These are located at a nexus of the national strategic road network, where the M25, M/A40, M/A4 and, to a lesser extent, the M1 all converge with the A406 North Circular linking these locations and corridors together as well as providing the outlay for freight transportation to the rest of London and beyond. There are also plans for an international freight exchange in Slough. A planning application for the Slough International Freight Exchange (SIFE) was submitted to the local authority in October 2010.

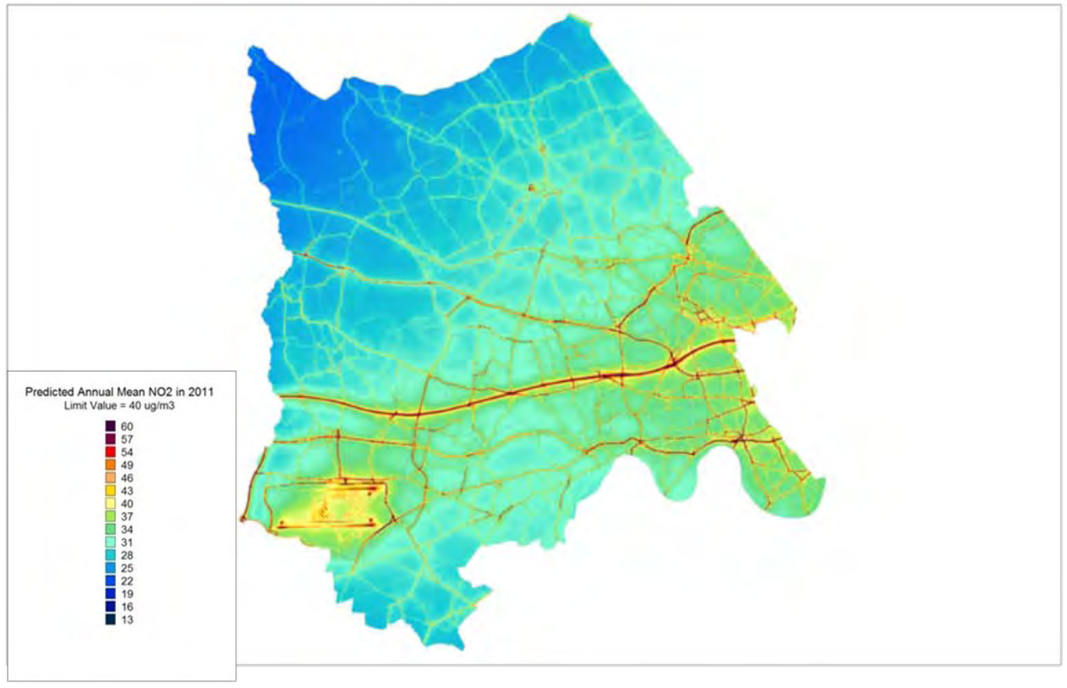
West London, therefore, acts as a key gateway for freight entering London. Improving sustainable freight transportation at these key locations and on the road and rail links within the region could have a significant impact on the congestion and emissions associated with freight in the west.

Challenge Five – Improve land-based air quality.

Key air quality pollutants arising from transport include fine particulate matter (PM_{10}) and oxides of nitrogen (NO_2). Heathrow is forecast to exceed NO_2 limit values set by the EU for 2015 to a degree matched only by central London. In addition, there are challenges along the A40 and Great Western Mainline, and around the A406 North Circular road

Action to tackle these is likely to involve both London-wide and local solutions. The electrification of the Great Western Mainline will reduce emissions from that source, but Heathrow and the major roads are likely to remain a problem.

Figure 1.12: Air Quality Pollutant levels



1.13 INTRODUCING THE SUB-REGIONAL TRANSPORT PLAN

The rest of this Plan is structured around the challenges set out in the Mayor's Transport Strategy (MTS).

Recent investment and additional planned investment over the next ten years delivers significant benefits for west London and contribute to improvements across the different MTS outcomes. But there is more to do to deliver the outcomes set out on the previous page and address the specific challenges identified by boroughs for the region.

The Plan therefore sets out a range of measures or potential options to help meet west London's ambitions as well as providing a framework for how the Mayor's vision will be implemented in the region.

MTS goals and challenges

- Supporting economic development and population growth (Chapter 2)
  - Supporting sustainable population and employment growth
  - Improving transport connectivity
  - Delivering an efficient and effective transport system for people and goods
- Enhancing the quality of life for all Londoners (Chapter 3)
  - Improving journey experience
  - Enhancing the built and natural environment
  - Improving air quality
  - Improving noise impacts
  - Improving health impacts
- Improving the safety and security of all Londoners (Chapter 4)
  - Reducing crime, fear of crime and antisocial behaviour
  - Improving road safety
  - Improving public transport safety
- Improving transport opportunities for all Londoners (Chapter 5)
  - Improving accessibility
  - Supporting regeneration and tackling deprivation
- Reducing transport's contribution to climate change and improving its resilience (Chapter 6)
  - Reducing CO_2 emissions
  - Adapting to climate change
- Supporting delivering of the London 2012 Olympics and Paralympic Games and its legacy (Chapter 7)

CHAPTER 2: SUPPORTING ECONOMIC DEVELOPMENT AND POPULATION GROWTH

The population and economy of London are growing rapidly, and are expected to continue to do so over the next two decades. Transport will play a key role in supporting this growth, ensuring that people and goods can move from place to place conveniently and efficiently and allowing communities and the economy to develop in a sustainable and stable manner.
It is vital that the transport network has sufficient capacity to accommodate growing numbers of trips, and TfL and boroughs should also take steps to encourage more sustainable travel wherever possible, for instance through providing better facilities for walking and cycling. Service patterns and public transport priority must be kept under review. New connections may be needed where there are gaps, or where existing connections are weak. TfL and other stakeholders will strive to ensure that travel by both public and private transport is as efficient as possible.

This goal comprises three challenges:

- Supporting sustainable population and employment growth
- Improving transport connectivity
- Delivering an efficient and effective transport system for people and goods

Supporting sustainable population and employment growth
Balancing capacity and demand for travel through increasing public transport capacity and/or reducing the need to travel.

Improving transport connectivity
Improving people's access to jobs and improving access to commercial markets for freight movements and business travel, supporting the needs of business to grow.

Delivering an efficient and effective transport system for people and goods
Making improvements on the road network, including managing delay, improving journey time reliability and resilience.

Improving public transport reliability and reducing operating costs.

Making the most of what already exists, by bringing and maintaining all assets to a state of good repair.
Enhancing use of the Thames for people and goods.

2.1 MAXIMISING THE BENEFITS OF PLANNED INVESTMENT IN THE WEST SUB-REGION

Introduction

The population and employment growth projected will further increase demand on the transport network. The result is likely to be a 40 per cent increase in demand across London for peak hour public transport by 2025, particularly on radial routes into central London.

Making the most of what's there

It is vital that the benefits of the existing transport network and current and future investment that are maximised. This means ensuring suitable development around stations and providing good, walking, cycling and public transport links to stations. It also includes providing **better information** explaining travel options and **improving interchanges** so that public transport continues to be a reliable and attractive choice for people.

Major capacity improvements in West London

There are number of major infrastructure schemes in West London that will add extra capacity to the transport network. The most important of these are Crossrail and the programme to upgrade the Tube.

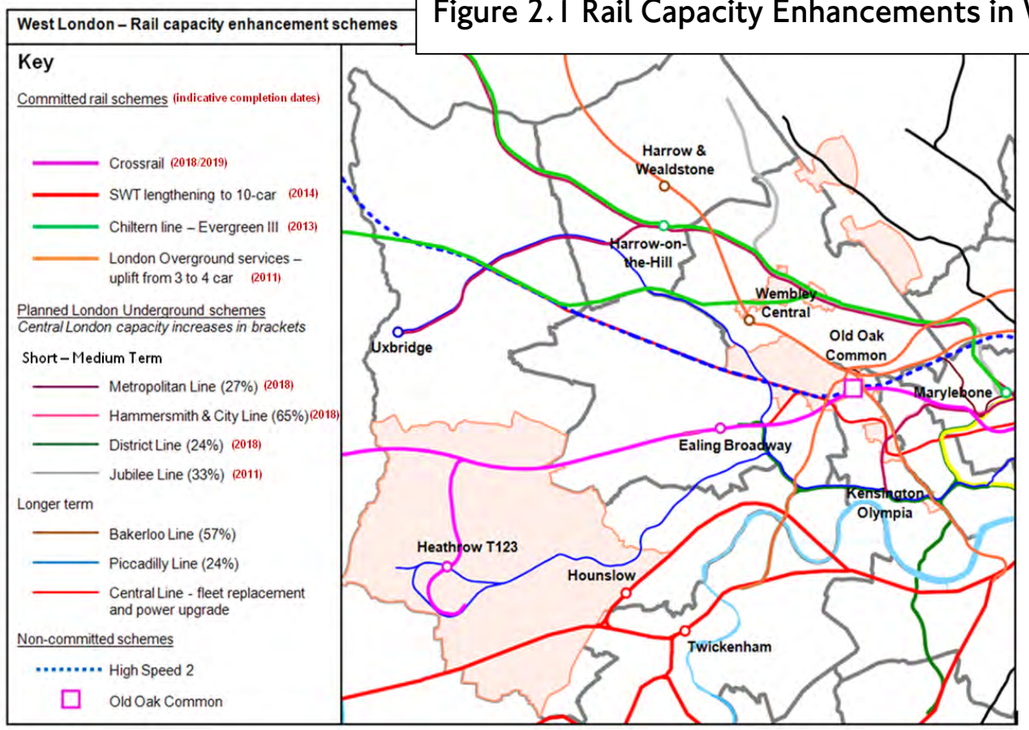
Other important capacity improvements relate to the National Rail network, where HLOS funding will see the following capacity improvements:

- More West Coast Main Line outer suburban services (London Midland) lengthened to 12 cars
- Additional half-hourly peak Watford Junction – Euston services
- New 4-car trains on London Overground services
- Platform and train lengthening to enable 10-car South West Trains suburban services

The Government's commitment to a High Speed 2 rail link from London to northern England goes through the west region and potentially has considerable capacity and connectivity benefits for West London.

Note that in Figure 2.1 below, Underground capacity increases are for Central London peak capacity.

Figure 2.1 Rail Capacity Enhancements in West



Buses

The bus network will continue to support the development of the west sub-region by linking key places and interchanges with their surrounding areas, and by providing sustainable transport options for new developments, such as the growth anticipated in Southall. Improving and changing bus services in response to changing demand will be made through the ongoing process of research and review.

Town centres in the region will continue to have a throughflow of buses and there will be a need to maintain and improve bus infrastructure, both in and around the town centres. Measures to improve reliability and journey times on radial routes into the town centres will be necessary, although in some cases different bus priority schemes may be needed.

Reducing the Need to Travel

Measures such as home-working and home deliveries are important tools to allowing growth to take place whilst limiting the impacts on the transport system. Re thinking travel to achieve modal shift will also help reduce impacts on the public transport and highway networks. This is set out in more detail in chapter 2.3

Unfunded improvements

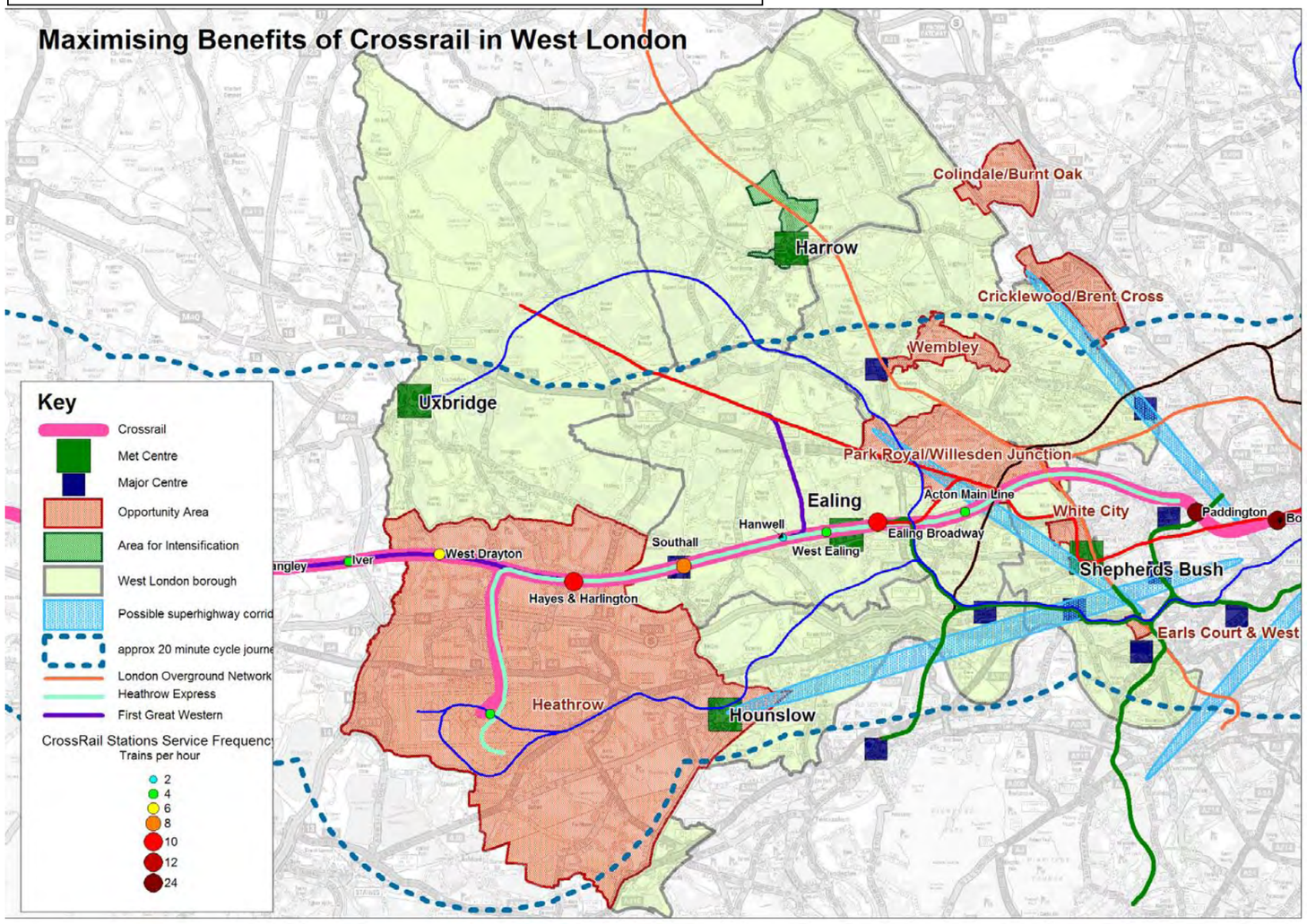
These include links to Heathrow, extensions to Crossrail and further capacity enhancements to South West Trains lines.

2.1.1 MAXIMISING BENEFITS OF CROSSRAIL

Maximising Benefits

Crossrail is due to be completed by 2018 and will change the demand for travel across the west London sub-region. To maximise its benefits it is essential that people can access Crossrail stations by bus, cycle and walk modes. This will require further consideration of how connecting links can be enhanced.

Figure 2.2 Crossrail in West London



Interchange with existing services

Enhanced station capacity and other station improvements (eg at Ealing Broadway) will make interchange with other services easier and quicker and it will be important to make West London residents aware of these opportunities. Signage and information provision is also key to ensure maximum integration and seamless interchange.

Ealing Broadway

Ealing Broadway is one of the key interchanges for the west region. Having ten Crossrail trains serving it per hour, located within the centre of the region on 2 select connectivity corridors, with key interchange options with the Central and District Underground Lines, Ealing Broadway has considerable potential to maximise the benefits of Crossrail. Ealing borough has plans to redevelop the station forecourt and to create a cycling hub in the area of the station.

Southall

Southall has been designated for considerable residential development on the former gas works site. Maximising sustainable access from this and other growth areas to Southall station, which will have relatively high service frequencies, is important for the west region. A cycling hub is also planned for the town centre.

2.1.1 MAXIMISING THE BENEFITS OF CROSSRAIL

Cycling provision

Figure 2.2 shows an approximate 20 minute cycle journey buffer from Crossrail stations and highlights the large portion of region that is within an easily cyclable distance. Four out of the five Metropolitan town centres are located within this strip and all of the region's Opportunity Areas lie within it. Building on schemes such as the Barclays Cycle Superhighways, there is a great opportunity for all stakeholders involved to put in place cycle measures that improve cycle access to all Crossrail stations. Whilst efforts should be made to improve access from all areas, particular focus should be centred on growth areas and areas with the highest concentrations of potentially cyclable trips It also makes sense to concentrate efforts on stations with the highest service levels such as Ealing Broadway, Hayes and Harlington and Southall.

Feeder Bus Services

The new Crossrail stations will need to be well served by bus services with good interchange opportunities. Prior to the opening of Crossrail, TfL will continue to review bus services and respond as required to changes in demand associated with Crossrail. Consideration should be given to the service levels at each station. Bus changes may include alterations to frequency, vehicle type and/or routing of buses. This may also reflect changes in demand on corridors parallel to Crossrail.

Urban Realm around stations

Crossrail will result in many stations being greatly improved and these improvements should be extended to the urban realm surrounding the stations, particularly where high levels of walking activity currently exist but also where there is high walking potential.

Two examples of potential for urban realm and interchange improvement exist around Ealing Broadway and Hayes & Harlington stations. At Ealing Broadway, Network Rail, working on behalf of Crossrail, will deliver an upgrade to the existing station that provides enhanced capacity to serve increased demand and gives access for passengers with restricted mobility. The opportunity is however wider than this. NR, Crossrail and TfL are working with the local councils (Ealing and Hillingdon) to investigate affordable and practical options to improve transport interchange; design public realm improvements beyond the Crossrail / NR station and seek to secure funding to implement them. This includes the possibility of better access to the already busy bus stops, taxi ranking and the large town centre retail, cultural and office destinations.

At Hayes & Harlington station, Crossrail offers the opportunity for significant town centre improvements which build upon the new interchange with the towpath along the Grand Union Canal and the station improvements that are currently in progress as part of the National Station Improvement Project. To maximise the benefits of Crossrail, Hillingdon Council are developing a major scheme funding bid for a comprehensive package of urban realm improvements that includes creating a town square north of the station and a conflict-free pedestrian route between the station and town centre.

Collaboration between different authorities is vital to ensure that a consensus is reached regarding the environs of Crossrail stations so that these can be realised as effectively as possible.

Promoting Sustainable Travel

Crossrail also provides a key opportunity to promote the most sustainable modes of travel as car parking provision at Crossrail stations will be limited and walking and cycling facilities will be improved. It is therefore important to ensure that new development being supported by Crossrail is designed to encourage sustainable transport use.

Additional Station at Old Oak Common

Currently there is not an interchange with Crossrail in west London, there may be opportunities for this in the future, as set out in the following section. While not required for the delivery of Crossrail, there are opportunities associated with High Speed 2 for an additional interchange at Old Oak Common. This is presented in more detail in the spotlight on the next page as well as within section 2.2 when looking at connectivity.

SPOTLIGHT ON HIGH SPEED 2 IN WEST LONDON

High Speed 2 Station at Old Oak Common
Key features are as follows:

- new hub for High Speed and Great West Mainline services
- new Crossrail station
- interchange with Overground and other national rail services
- direct link to Heathrow

Old Oak Common would, therefore, be a major new strategic interchange for the benefit of the West London sub-region as well as for the north and south sub regions.

Supporting Population and Employment Growth
Old Oak Common station would also support growth and regeneration around the Willesden Junction and Park Royal Opportunity Area. Further work needs to be undertaken to look at how High Speed 2 will change the pattern of population and employment growth, and how the benefits from this can be maximised.

Enhancing Connectivity
A station at Old Oak Common would provide the west region with greatly enhanced connectivity - providing possible connections between High Speed rail, Crossrail, Great Western, local rail, Overground and Underground services. This connectivity is set out in more detail in section 2.2.

Other benefits to west London

- could lead to a reduction in car trips with associated CO_2, Air Quality & reduced congestion benefits

Key issues

- ensure the design of Old Oak Common fully maximise these benefits
- ensure local connections to Old Oak Common from the immediate area are provided to make access available to local people and surrounding Opportunity Areas

Importance of HS2 to the Old Oak Common scheme
Whilst connecting the London Overground network to Crossrail at Old Oak Common would still be possible without High Speed 2 going ahead, High Speed 2 is extremely important for the Old Oak Common interchange scheme – both in terms of providing likely funding for the expensive interchange elements and also for providing the planning framework necessary to make such an interchange a reality.

Surface Access
Surface access to Old Oak Common is currently very poor. HS2 Ltd have currently proposed two mitigation measures to help improve surface access to the site:

- a new road link, linking the western edge of the site to the A40
- heightening of the low bridge under the GWML on Old Oak Common Lane to allow double-decker buses to access the site

There is a need to undertake analysis in collaboration with Hammersmith & Fulham and other neighbouring boroughs to determine what other surface access measures may be required. This analysis will be available in due course and will allow a detailed surface access strategy to be formed.

SPOTLIGHT ON HIGH SPEED 2 IN WEST LONDON

Links to Heathrow

In addition to Old Oak Common, the Government has identified the need for a full High Speed Network to have a direct link to Heathrow to achieve maximum potential for mode shift from air to rail. A number of options are being considered for this but a direct connection from High Speed 2 Heathrow in addition to Old Oak Common could have the following benefits:

- maximum potential for shift from air to rail for short haul flight
- access to High Speed 2 network from outer west London and areas west of London
- support for growth of Heathrow Opportunity Area.

In assessing options for a direct connection to Heathrow, it is important that the following issues are fully considered:

- potential to interchange with other rail services as part of a wider strategy for improving rail access to Heathrow and creation of a new transport hub
- local connections to Heathrow Opportunity Area
- proximity and ease of transfer to terminals to maximise mode shift

2.1.2 LONDON UNDERGROUND UPGRADES TO SUPPORT POPULATION AND EMPLOYMENT GROWTH

Introduction

The Tube has never been so important to west London's economic, social and cultural life. In the last year, the network carried more than a billion passengers for the fourth year in succession – almost as many passengers carried as the entire National Rail network. However, much of the infrastructure the railway relies on to meet the demand is very old, with some of it dating back to the 1860s. The Tube is the oldest Underground system in the world (in 2013 it will celebrate its 150th anniversary) and, with a legacy of underinvestment, it is vital that the network is rebuilt to ensure that it can deliver for the future.

By the end of the current programme of Underground upgrades, around 2020, there will be 30% more capacity on the network through the introduction of new trains, signalling and track. New assets will be capable of enabling the Tube to operate more trains during the peaks – many lines will introduce frequencies of over 30 trains per hour. The combined effect will be a reduction in levels of crowding on the network, and the ability to support the long term growth of London's business and resident population.

The following section sets out how the upgrade programme will benefit the west region.

Sub Surface Line Upgrades – Metropolitan, District, Circle and Hammersmith & City lines

The upgrade of the Sub-Surface lines will replace the whole fleet and signalling and control systems. The Sub-Surface Lines have some of the oldest assets on the network, including the Metropolitan line trains, which date from 1961, and some of the signalling, which dates from the 1940s.

The Sub-Surface Line upgrade will lead to a 27% increase in capacity on the Metropolitan line, a 65% increase on the Circle and Hammersmith & City lines and a 24% increase in capacity on the District line (figures are for peak capacity increases to central London). The capacity uplift will be delivered through the new signalling system, which will allow higher frequency services to operate on many of the lines. The new trains will also be larger with higher internal capacity.

The Edgware Road to Hammersmith branch of the Sub-Surface line has experienced a near doubling in capacity since the introduction of the Extended Circle timetable in December 2009 (with an increase from 7 to 12 trains per hour during the peak). There will be a further capacity increase on the Hammersmith & City line following the upgrade. This service improvement is of a huge benefit to locations along the line, and supports the planned development in the White City Opportunity area.

In addition to the capacity improvements the upgrade will also lead to shorter, more reliable journeys. The new rolling stock will have higher levels of comfort, with air conditioning, walk-through carriages, CCTV and improved customer information technology. The trains will also be more accessible, including four dedicated wheelchair areas per train and a smaller gap between the platform and the train.

This upgrade will have substantial benefits for the West Region, adding substantial capacity, which will facilitate growth. In particular, the upgrade will support growth in the Opportunity Areas of White City, Earl's Court and Wembley.

2.1.2 LONDON UNDERGROUND UPGRADES TO SUPPORT POPULATION AND EMPLOYMENT GROWTH

Jubilee Line Upgrade

The Jubilee line has seen dramatic demand growth linked to the developments at Canary Wharf. The upgrade involves the installation of a new signalling system, which will allow trains to be driven automatically – meaning faster, more frequent services for customers.

The Jubilee line upgrade will provide 33% more capacity (peak capacity on lines into central London), carrying around 5,000 additional passengers per hour. Journey times will be reduced by 22%.

The Jubilee Line upgrade will provide considerable support to the development planned at Wembley town centre and will improve the movement of people to and from events at Wembley Stadium. It will also help to relieve crowding on the Jubilee/Metropolitan line corridor southbound from Finchley Road.

Need for further upgrades

Piccadilly Line

The Piccadilly Line upgrade timetable is still to be confirmed. It is the most crowded line in the West region with severe crowding existing between South Ealing and Central London.

The upgrade will replace the rolling stock, signalling and control systems. It will increase the reliability of the assets and will allow the frequency of services to be increased. The new trains will also have a higher capacity and will be RVAR compliant, along with improved customer information and safety features. The upgrade of the Piccadilly line will increase capacity on the line by approximately 24% (peak capacity on lines into central London) and reduce journey times by around 19%.

The upgrade will be particularly important for Park Royal, Hounslow and the wider Heathrow Opportunity Area where considerable employment and population growth is expected. It will also accommodate the expected increase in Heathrow Airport's passenger numbers. The Piccadilly line upgrade will also help to relieve the crowding pressure through Earl's Court.

Bakerloo Line

The Bakerloo line trains date from 1972, and the signalling system from the 1980s. An upgrade of the Bakerloo line trains, signalling and control centre will allow ageing assets to be replaced, improving reliability and increasing capacity by making use of advances in technology. Once completed average journey times should improve by over two minutes and capacity will increase by almost 57% in the peak periods into Central London.

Whilst the Bakerloo line has relatively low levels of crowding in West London, growth at Harrow and Wealdstone and at Wembley will increase loadings on this line, so the upgrade will not only support this development but also relieve the crowding pressures in central London resulting from the growth.

Central Line Upgrade

The Central line was upgraded in the 1990s, with new rolling stock and an automatic train operations signalling system. Crossrail is forecast to relieve crowding pressure on the Central line as it runs in a similar, east-west alignment.

In the longer run, demand growth will lead to increased pressure on the Central line. This, coupled with the need to replace assets as they near the end of their reliable life, will be driving forces for the future upgrade of the Central line.

2.1.2 LONDON UNDERGROUND UPGRADES TO SUPPORT POPULATION AND EMPLOYMENT GROWTH

Other possible benefits of the upgrade programme for the sub-region

As well as the benefits to Tube services and users generally, the upgrades may also lead to the following benefits for the west sub-region:

- the Tube upgrades should encourage more people to transfer to public transport to make use of the additional available capacity. This should lead to congestion relief on key highway links, and should help to reduce emissions from private transport.
- crowding relief benefits on national rail lines could arise as the west sub-region makes use of the extra capacity available on the upgraded Tube lines.

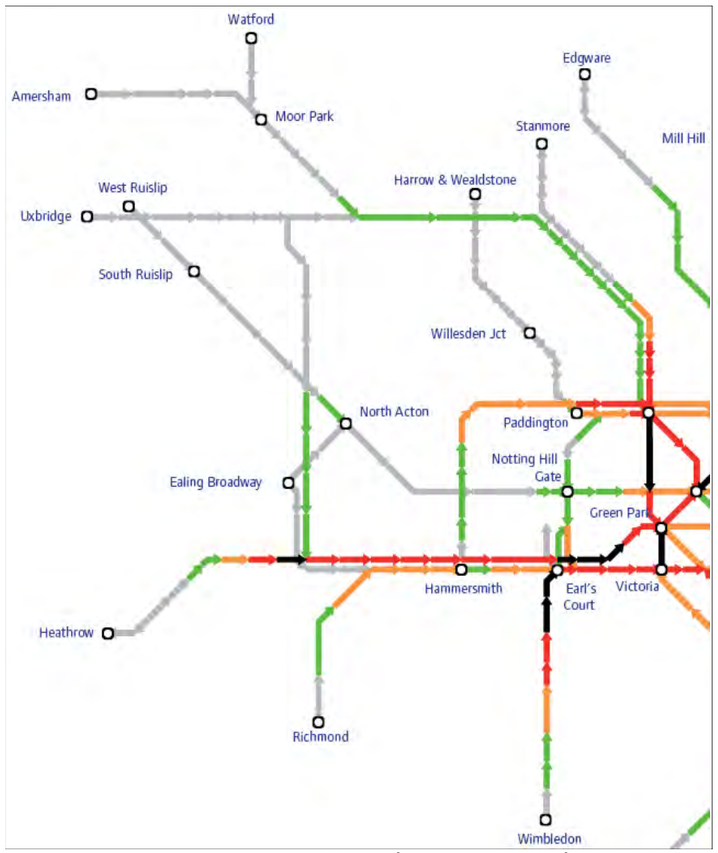
Maximising the benefits in West London

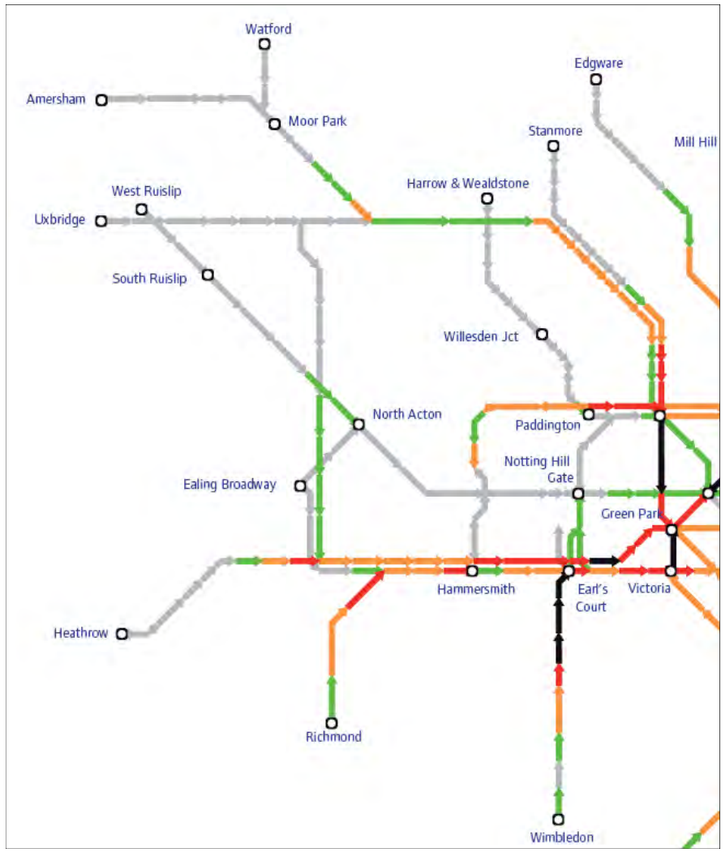
- information and marketing campaigns about the improved Underground services and what they mean for passengers will ensure that West London can make the most of the improved services on offer. Such campaigns will be particularly important for the Sub-Surface Lines, as the new air conditioned trains may encourage new users to take the Tube.

Tube Crowding in 2006 and 2031

The map below (left) shows the current level of crowding on Tube services in the West Region during the am peak. It shows severe crowding on most Tube lines from the West Region as they approach the centre of London. Crowding on the Piccadilly line eastbound from Northfields, on the Hammersmith & City line into Baker Street on the Jubilee and Metropolitan lines southbound from Finchley Road and on the District Line Wimbledon branch into Earl's Court is particularly severe.

Figure 2.3 Tube crowding in 2006 (left-hand side) and projected to 20331 (right hand side)



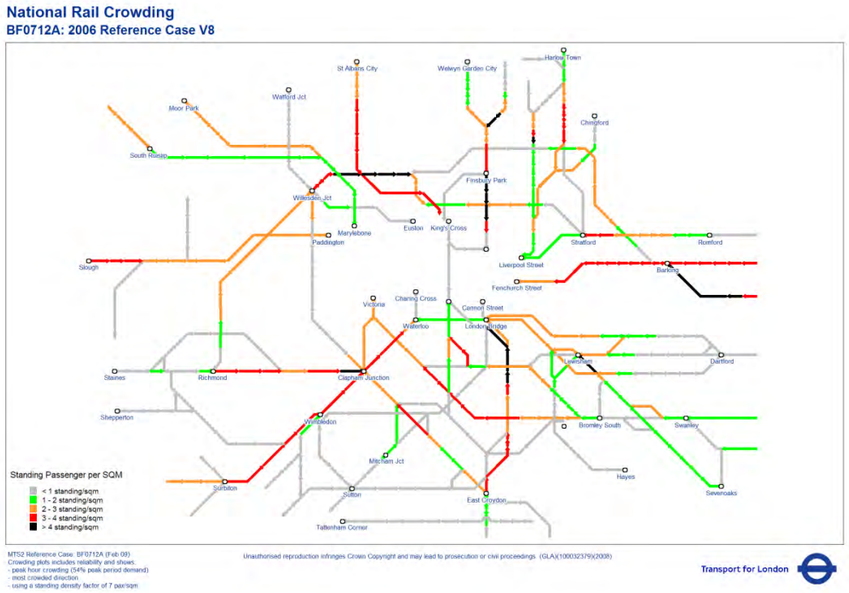


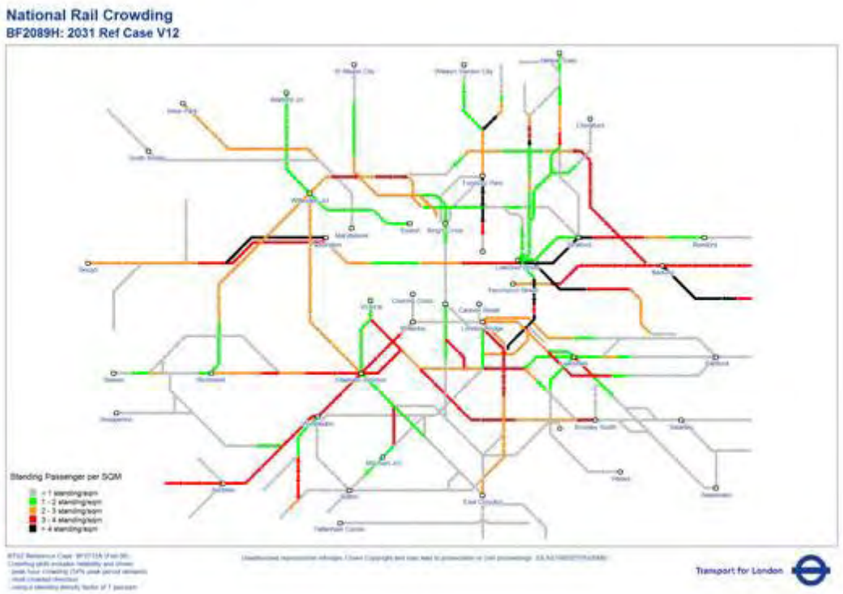
Modelling for the year 2031 (above, right), shows that the upgrade programme will relieve crowding on many parts of the network. Crowding will, however, continue to be a challenge along some parts of the network, particularly into Earl's Court on the Wimbledon branch of the District line. This is because, as the population of London grows, new demand will fill the extra capacity created by the line upgrades. The forecasts for crowding in the future point to the long term need for further upgrades and investment in the public transport network.

2.1.3 CAPACITY ENHANCEMENTS ON EXISTING RAIL LINES

Severe crowding and congestion exists on the radial corridors in west London. As shown in Figure 2.4 below, capacity enhancements on national rail lines will reduce rail crowding and help relieve highway congestion.

Figure 2.4 National Rail crowding





Committed Enhancements

The High Level Output Specification (HLOS) relates to the committed improvements to the National Rail Network, as outlined below. Without these schemes, severe levels of crowding remain across large parts of the National Rail network, and given the forecasts for future employment and population growth, these levels of crowding will worsen sooner than would otherwise have been envisaged. This will potentially affect London's ability to remain an attractive centre to do business. HLOS1 is vital to London's competitiveness, but more will be needed.

Windsor – Waterloo lines increased to 10 cars

This scheme will increase the length of trains and platforms on the Windsor SWT line from 8 to 10 cars. It should help reduce rail crowding into Clapham Junction and Waterloo, providing extra capacity and crowding relief benefits to passengers in centres such as Hounslow and Chiswick on the Hounslow Loop,

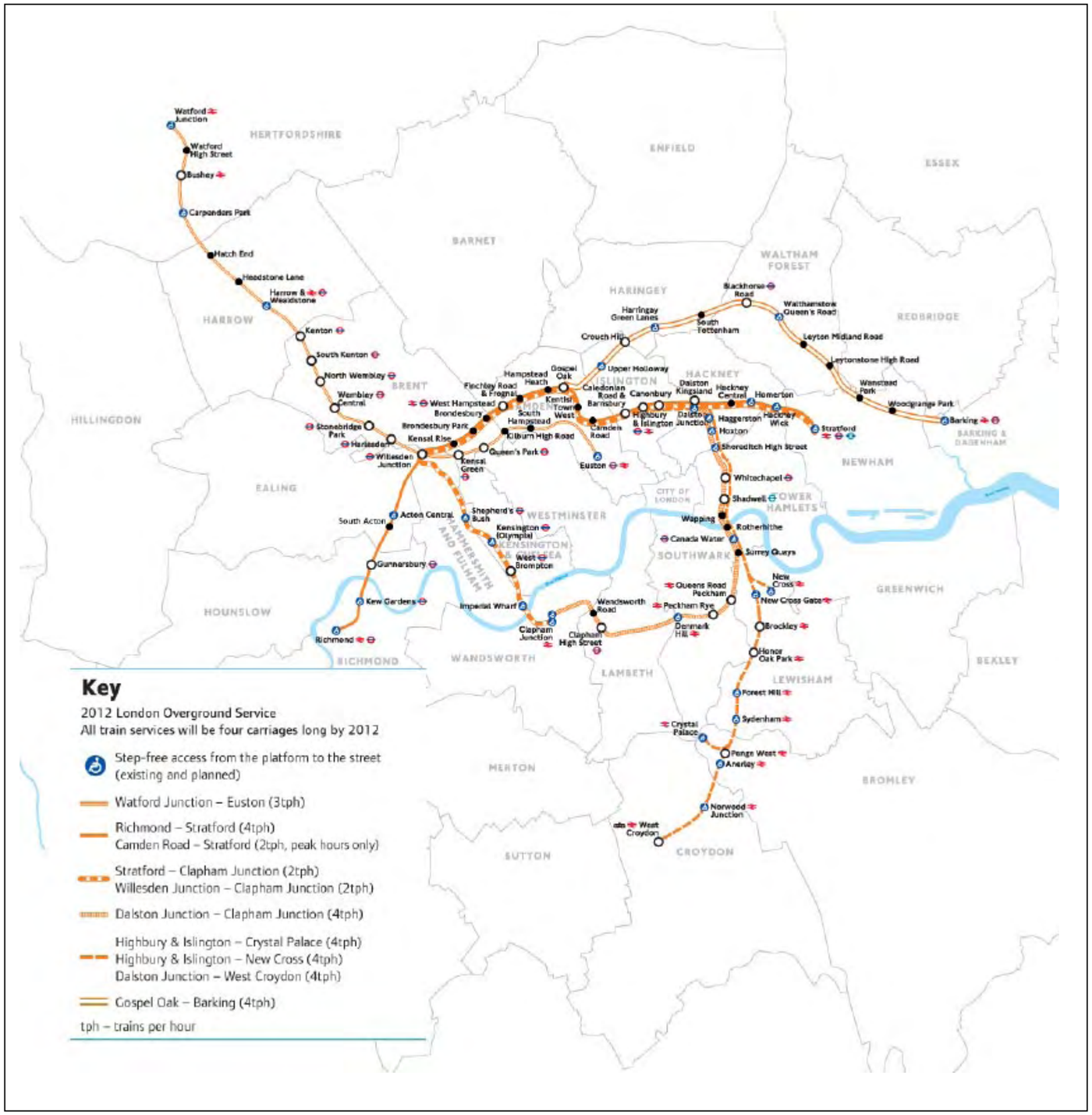
Chiltern Evergreen

Increase in frequency by an additional 2 trains per hour from the new route from Oxford to Marylebone Station which also give new journey opportunities. Line speed will also be increased to enable services to run between Marylebone and Birmingham in 100 minutes.

West Coast Mainline - Train lengthening and frequency improvements.

Outer Suburban services on London Midland will see trains lengthened to 12 cars and an additional two services will be provided between Watford Junction and Euston in the peak hour.

2.1.4 LONDON OVERGROUND UPGRADES TO SUPPORT POPULATION AND EMPLOYMENT GROWTH



London Overground

Substantial investment has been made in the London Overground network since TfL took over the running of it in November 2007.

There are two orbital routes that go through the west London sub region, the North and West London lines, providing connectivity to key interchange hubs such as Willesden Junction and Clapham Junction so that people in the region have good access to the north, south and east sub regions without the need to travel via central London.

By May 2011, the improvements will increase capacity and frequency of the service, provide refurbished stations and better customer information.

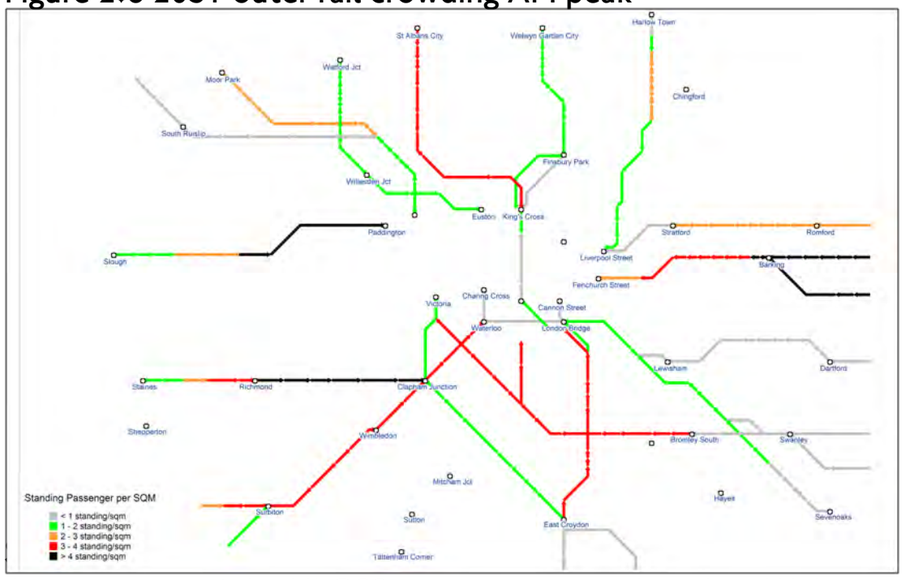
Figure 2.5 London Overground route map (2012)

2.1.5 ADDITIONAL PUBLIC TRANSPORT INVESTMENT TO SUPPORT GROWTH

Uncommitted Rail Schemes

Whilst HLOS1 will provide much needed capacity enhancements in the west London sub-region, much more investment is still needed to accommodate the growth that is forecast in London and to provide the quality of service that the city is working towards obtaining. As Figure 2.6 below shows, severe rail crowding into central London will still exist in 2031 despite the planned investment.

Figure 2.6 2031 outer rail crowding AM peak



An aspiration of the HLOS2 programme is to lengthen Woking to Waterloo inner suburban services to 12 car. This would involve longer trains and platforms. Crowding approaching Wimbledon and Clapham Junction should be reduced by this scheme.

Consideration of Western Crossrail extensions

Crossrail westerly extensions, coupled with careful planning of stopping patterns on the Great Western Mainline inner and outer services, may help reduce crowding west of Paddington and allow more Crossrail services to operate through the West sub region. The following Crossrail extensions have been considered:

- Reading – this would reduce crowding on outer rail services on Great Western lines into Paddington.
- Staines (through the Airtrack tunnel) – this would reduce crowding on South West Trains into Clapham Junction and Waterloo stations
- Milton Keynes (via Old Oak Common) - It may be possible to extend 8 of the 14 Crossrail trains currently planned to terminate at Paddington. This extension requires a short section of tunnel to connect the Great Western and West Coast lines in the Old Oak Common area. This would enable slow services on the WCML to terminate at Paddington, instead of Euston, thus reducing crowding on services into Euston.

Chelsea Hackney Line

- in 1989, the Central London Rail Study proposed a new line across London, taking a north-east to south westerly alignment. A route, connecting the Central line branch to Epping, with the District line branch to Wimbledon, via a new tunnel beneath Central London, was safeguarded in 1991 (refreshed in 2008) that is known as the Chelsea Hackney line. This safeguarded alignment passes through two potential stations in Hammersmith and Fulham: Parsons Green and Putney Bridge.
- the DfT has asked the Mayor of London to review the Chelsea Hackney Line (CHL) scheme, including considering if the safeguarded route is still the right alignment to be developed in more detail, or, if an alternative might better meet London's needs both now and in the future. Until a decision has been made on the best way forward for CHL, the safeguarded route will remain in place.

2.1.6 RESPONSE OF BUSES TO GROWTH IN THE WEST SUB-REGION

Bus Growth Areas

Bus services in the west sub region are expected to see most increases in demand in the areas highlighted in the diagrams opposite:

- metropolitan town centres such as Uxbridge
- Opportunity Areas such as White City
- routes serving key regional interchanges such as Willesden Junction
- routes serving Crossrail stations, particularly those that will have high service frequencies such as Ealing Broadway.
- routes serving Heathrow as part of plans for greater public transport mode share for employment

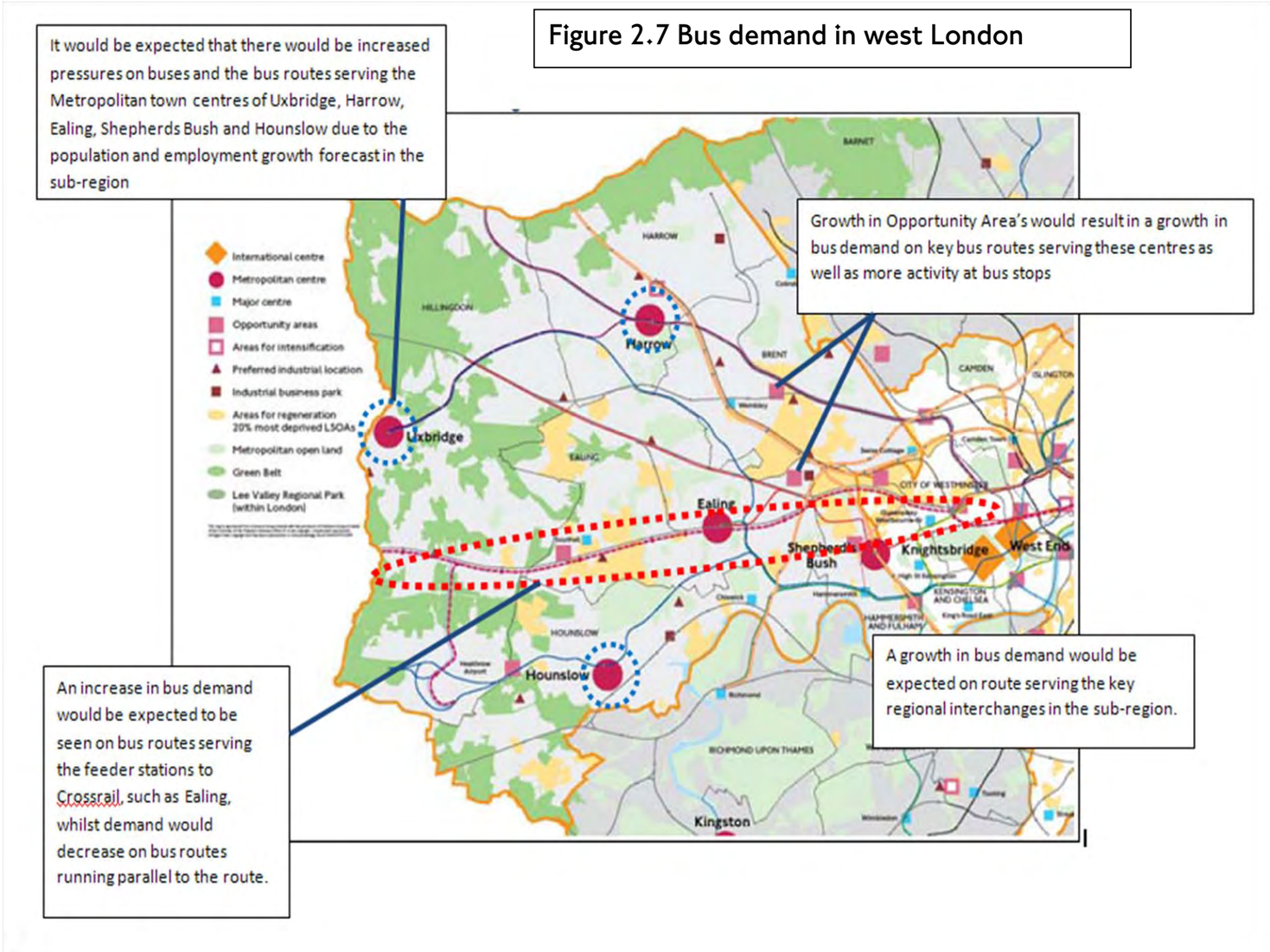
Changing Bus Services

Changing bus services in response to these pressures is made through an ongoing process of research and review. The Sub-Regional Panels have the potential role to feed into this process.

Enhancements to services feeding Crossrail stations are likely to be needed to cope with increased demand, whilst simultaneously there might be opportunities to respond to reduced demand on parallel routes.

Where there are new alignments or new development areas, the response may need to be more extensive.

Figure 2.7 Bus demand in west London



Supporting Infrastructure

A key challenge for the future is ensuring that there are adequate facilities in town centres and across the sub-region to accommodate buses including bus interchange facilities as well as standing space. The TfL bus network is subject to a continuous review process that examines groups of routes in an area. It also gives an opportunity to review the pattern of services and consider any need for bus priority measures or new infrastructure to support provision of services.

2.2 Improving transport connectivity

Background
Connectivity refers to improving access to people and commercial markets. In terms of transport this can be reflected by the time and convenience of a journey from one location to another. Connectivity can be enhanced through means ranging from improved interchange facilities, to increased service frequencies or entirely new infrastructure, such as Crossrail.

London's transport system has traditionally served its centre well. However, the city's emerging economic geography places new demands on the system. In particular, journeys within and between suburban areas are more often undertaken by car or bus, reflecting the more dispersed patterns of trip origins and destinations. Supporting the use of public transport for orbital movements requires a focus on those trips for which public transport is a realistic alternative. This can be assisted by coordinating improvements to radial and orbital links, often through good interchange.

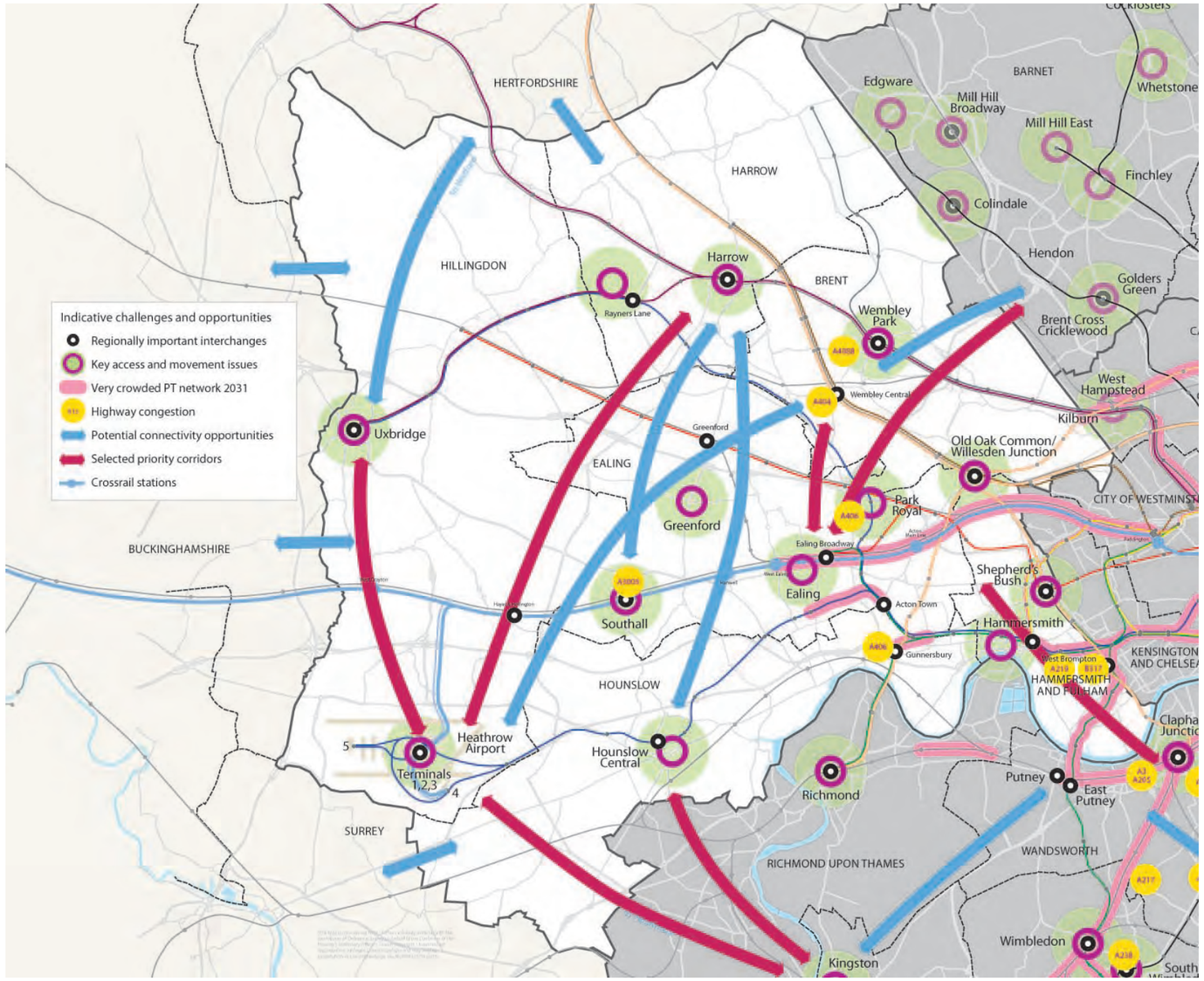
Radial links
Radial links within the sub-region are generally strong, because they connect it to central London. However, for the same reason, they are often crowded and congested – and a legacy of underinvestment now manifests itself in capacity shortages and unreliability. While the transport system has traditionally been oriented towards central London, trips to areas further west are not as well served.

Orbital links
A key element of Improving connectivity in the west sub region is enhancing the region's existing north-south rail and bus connections. Figure 2.8 below shows the corridors with connectivity challenges within the west sub-region. In the longer term it might mean extending or installing new links where there is identified need and benefits.

Interchanges
Interchanges are needed to unlock the full range of network benefits which are available. In particular good interchange between orbital and radial services allows good access to a much wider range of locations across a network without the need for travel via the centre.

2.2.1 Selecting priority corridors

Figure 2.8 Corridors in west London with connectivity challenges



North-south connectivity in west

One of the key challenges in the west sub-region is enhancing north-south public transport connectivity. Public transport journey times between certain metropolitan centres are well in excess of one hour and are not competitive with private car journey times. Highway congestion also has a direct adverse effect on public transport (bus) journey times.

West London has a comprehensive, well-established transport network yet there remain connectivity challenges within and to/from the region as a result of poor links, congestion or overcrowding. Figure 2.8 shows corridors identified as having connectivity challenges. These were derived from the Challenges & Opportunities document.

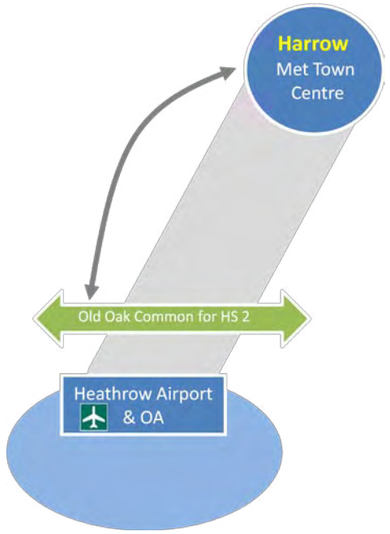
TfL's analysis has been used to take forward seven 'select' corridors (highlighted in red). The factors considered in this analysis include:

- demand (both existing and forecast)
- public transport vs highway journey time
- population / employment growth
- rail crowding
- highway congestion

The seven 'select' corridors are listed below (in no particular order), together with the rationale for choosing them and specific issues relating to each corridor.

2.2.2 Improving transport connectivity on selected corridors

Selected sub-regionally important corridors – key issues and short, medium and long term priorities



1. Heathrow - Harrow

This corridor covers an end-to-end distance of about 17km. At one end Heathrow Airport attracts employees from a wide area. Six per cent of airport employees live in the Harrow area, of which, according to the Heathrow Travel Survey, around 20 per cent travel to work by public transport. There is a direct high-frequency 24-hour bus service along the whole length of the corridor serving Northolt, Yeading and Hayes, with an end-to-end journey time of around 70 minutes, with significant bus priority in place. A journey via the Piccaddilly Line changing at Acton Town may also be an option for some.

<u>Potential solutions</u>

Short term

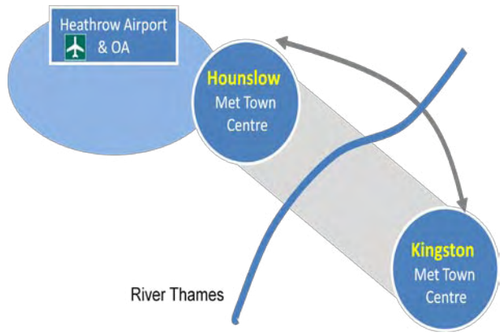
- Improved journey planning information
- Smoother traffic flow including through the signal timing review programme
- Car-sharing schemes where potential demand exists

Medium term

- Measures to speed up bus journeys

Long term

- High Speed 2 interchange at Old Oak Common, allowing interchange between WCML and GWML, Crossrail, West London Line and North London Line.



2.Hounslow - Kingston

These two Metropolitan Centres are only 8km apart, but because they are separated by the Thames, rail journeys require an interchange and bus services take approximately twice as long as private vehicles.

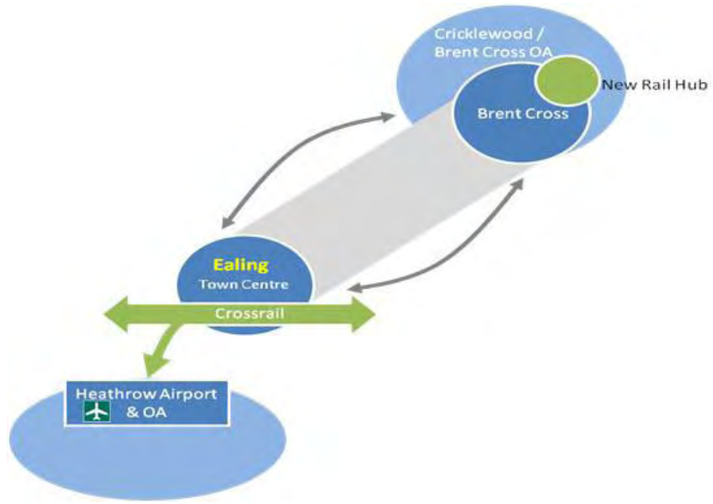
<u>Potential solutions</u>

Short term

- Improved journey planning information targeted at Hounslow and Kingston residents
- Improvements to Cycling infrastructure and legibility of routes.

Medium term

- Measures to speed up bus journeys
- Bus infrastructure improvements around A316 at Twickenham
- Improve interchange at Twickenham rail station



3. Ealing – Brent Cross

Brent Cross/Cricklewood is forecast to see high population growth. The Great Western Mainline is important and Crossrail will serve Ealing Broadway. The North Circular runs along the corridor and a bus route runs between the two centres via Hanger Lane, Stonebridge Park and Neasden: currently the journey takes approximately one hour by public transport and is not competitive with private transport. Brent Cross offers abundant free parking which will tend to influence mode choice towards the car.

<u>Potential solutions</u>

Short term

- Encourage more journeys by cycling through smarter travel measures

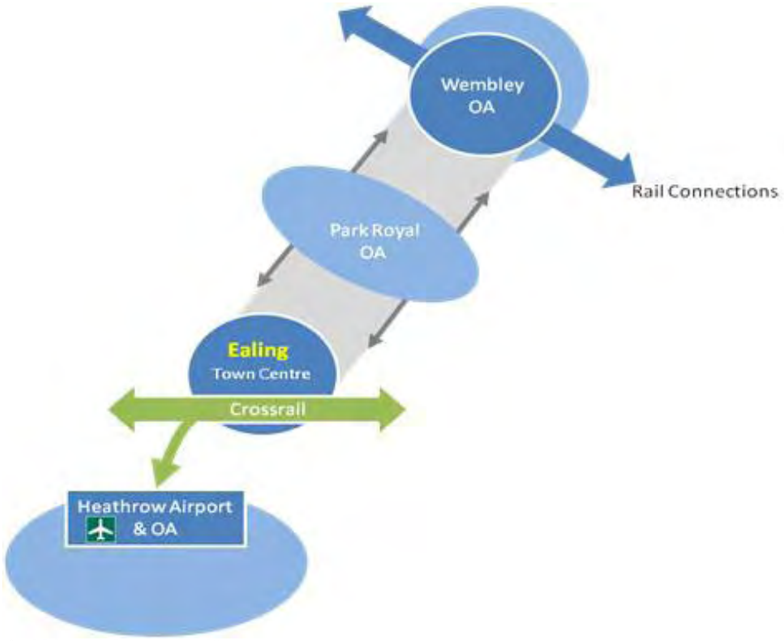
Medium term

- Measures to speed up bus journeys
- Cycle infrastructure enhancements
- Review feeder bus services to Crossrail at Ealing Broadway

Long term

- New orbital rail link
- High Speed 2 Interchange at Old Oak Common allowing services from GWML to Cricklewood

Selected sub-regionally important corridors – key issues and short, medium and long term priorities



4. Wembley - Ealing

There is a high-frequency 24-hour bus route between these centres also serving Alperton and Hanger Lane. Demand is expected to grow due to, for example, development in the Wembley OA and Crossrail Services at Ealing Broadway. The Park Royal OA is near the Wembley-Ealing corridor. It draws employees from the surrounding areas. Over time, there may be a need to strengthen and enhance these bus services. In the longer term, the rail hub at OOC could have the potential to serve this area. Freight movements along this corridor are also important.

<u>Potential solutions</u>

Short term

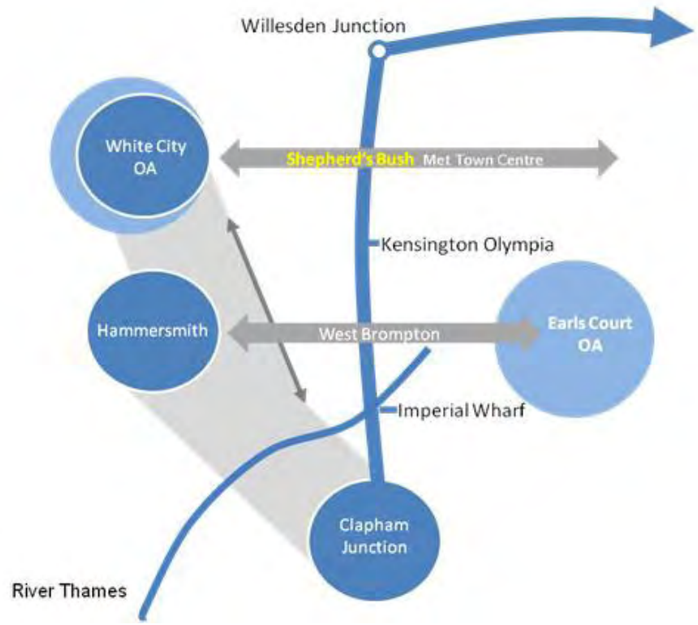
- Develop workplace travel plans to encourage more car sharing / cycling,
- Investigate whether signalised junctions on the A406 can be optimised / linked

Medium term

- Cycle infrastructure enhancements
- Measures to speed up bus journeys between the two town centres, via Park Royal

Long term

- High Speed 2 interchange at Old Oak Common, allowing interchange between WCML and GWML



5. White City -Hammersmith – Clapham Junction

This corridor is subject to significant growth all along it, particularly in the Opportunity Areas of White City and Earls Court. The London Overground provides a key orbital link that connects the strategic transport hubs of Clapham Junction and Willesden Junction. However, as a result of current high demand and future growth, more capacity on this line will be needed. There is also the need for improved local links for pedestrians and cyclists to help facilitate access to/from the rail nodes.

<u>Potential solutions</u>

Short term

- Improve cycling infrastructure and wayfinding

Medium term

- Improved interchange at Kensington Olympia and at Clapham Junction
- Enhancements to junction of Lillie Road / Fulham Palace Road
- Potential expansion of cycle hire to the west of the central zone
- Measures to speed up bus journeys

Long term

- New pedestrian / cycling bridge across River Thames at Chelsea Wharf

Selected sub-regionally important corridors – key issues and short, medium and long term priorities

6. Heathrow – Kingston

Bus services linking Heathrow and Kingston include express route X26, with two buses per hour, and route 285 – a high frequency, 24-hour stopping service on broadly the same alignment. Route 111 also runs between the two centres, but on an indirect alignment in order to connect Hampton, Hounslow and Heston to both ends. Growth around the Heathrow area may exacerbate the existing problems of congested highway links (A308), low public transport use by airport staff living in Kingston and longer public transport times compared to the private car.

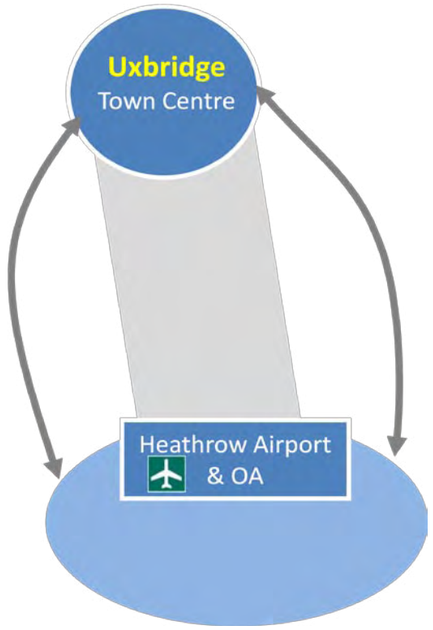
<u>Potential solutions</u>

Short term

- Improved travel planning information
- Extend cycling network north of Kingston and Hampton area

Medium term

- Measures to speed up bus journeys
- Airtrack provides rail connection via Twickenham



7. Heathrow – Uxbridge

As a metropolitan town centre, Uxbridge is a key location for Heathrow employment. The Heathrow Opportunity Area will increase demand for travel along this corridor, as too will the forecast rise in airport passenger numbers. A range of existing bus services operate on different routes along this corridor but improvements are needed to accommodate growth, increase the attractiveness of public transport and to meet the airport's mode share targets. The key focus for improvement includes improving the hub at Heathrow and enhancing bus services, including measures to improve bus reliability.

<u>Potential solutions</u>

Short term

- Improved travel planning information and service information in the area
- Cycle infrastructure enhancements

Medium term

- Measures to speed up bus journeys

Spotlight: HS2 Station and Interchange at Old Oak Common

The Government has proposed the creation of a new high speed railway – High Speed 2 (HS2) – from London to Birmingham, Leeds and Manchester, starting in central London at Euston and calling at a new interchange at Old Oak Common in west London. The basic HS2 proposal would see all Crossrail, Great Western and Heathrow Express services call at this new interchange, providing additional journey opportunities for HS2 passengers to access Heathrow, the Thames Valley, parts of central London and Canary Wharf. A small bus interchange would also be provided, and local bus access provided via Old Oak Common Lane. Analysis has shown that this initial plan removes around a third of HS2 demand from Euston, by providing an excellent Crossrail interchange. This however still presents onward dispersal problems at Euston.

The existing interchange proposal provides poor connectivity for areas to the north and south – i.e. those not on the Crossrail corridor. Those areas would either 1. have to access Euston for HS2 services; 2. take lengthy routes to travel to Old Oak on Crossrail via Paddington or Ealing; or 3. take long bus journeys to Old Oak Common. Indeed, were the new interchange to be better connected to parts of West London off the Crossrail corridor, this could also promote new journey opportunities independently of HS2. The following lists some characteristics of the Old Oak Common site:

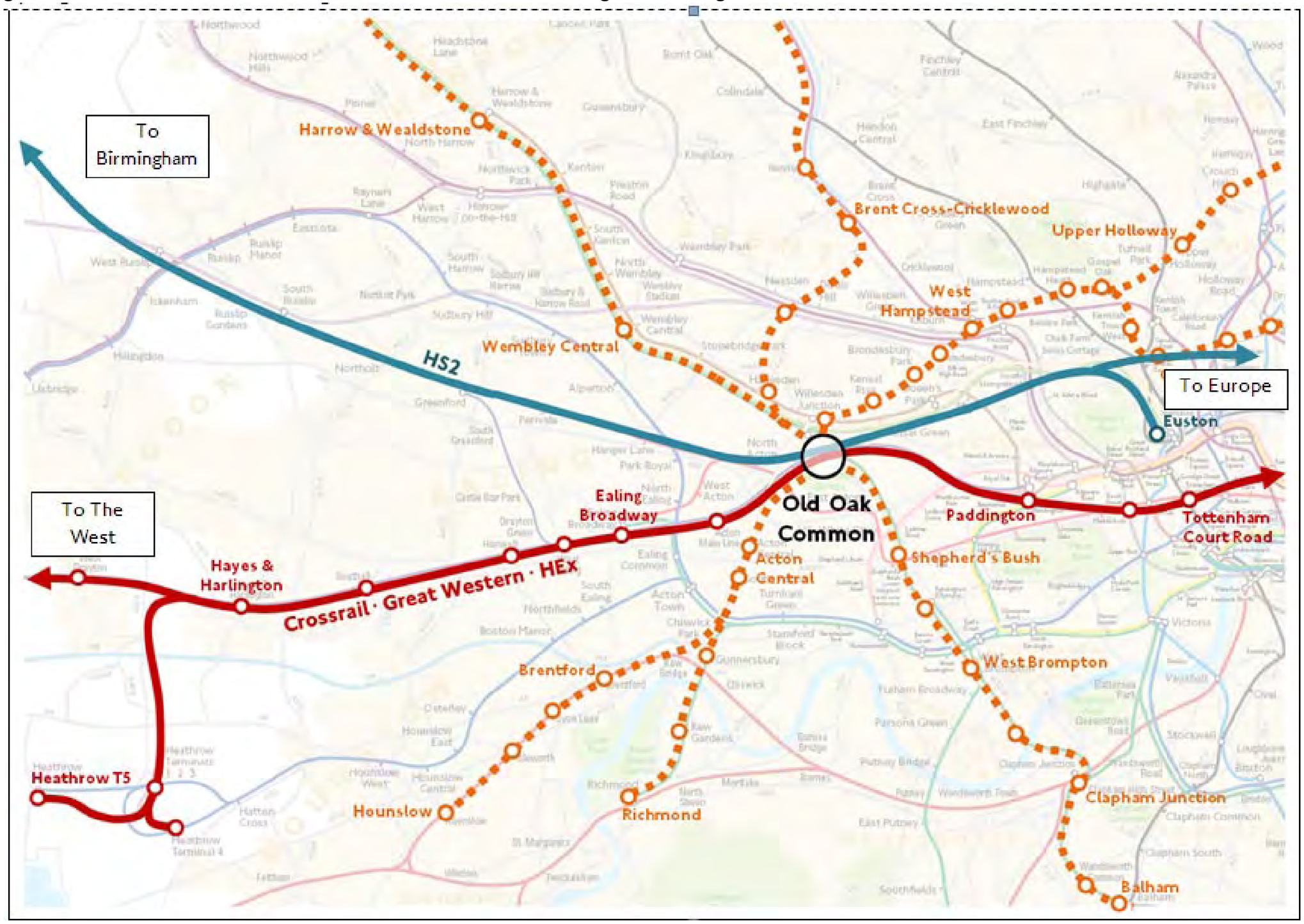
- Large site close to central London, currently used for railway operations
- Currently, 10 Crossrail trains per hour are scheduled to pass through the sidings at Old Oak Common – a new station would be required (estimated cost £750m)
- Provides HS2 interchange for Heathrow via Crossrail, 11 minutes away by Heathrow Express
- Could also act as an interchange onto the West London Line to Clapham Junction, and the North London Line to Richmond. Further links to Cricklewood & Hounslow could be possible
- Potentially, up to 14 empty Crossrail trains could start at Old Oak Common, allowing excellent access to the West End, City and Isle of Dogs
- Risk of contributing to the already-heavy congestion on the local road network
- Surface usage at the site is currently planned to be a Crossrail depot (although HS2 Ltd have found a solution that fits an Old Oak Common station in with these plans)

TfL is investigating (jointly with HS2 Ltd) the potential for connecting Old Oak Common into the local rail network to ensure access to the high speed network is improved for residents and businesses of south-west, north-west and south London. This includes the potential for connecting the station to the London Overground and London Underground networks. Looking at the 12 corridors outlined in the Challenges & Opportunities document, Old Oak Common could help address the following west London sub-regional corridors:

- Brent Cross – Ealing
- Heathrow – Harrow
- Heathrow – Wembley
- Wembley – Ealing
- Hounslow – Brent Cross

Spotlight: HS2 Station and Interchange at Old Oak Common

Figure 2.9: Potential for Old Oak Common station to act as a strategic interchange

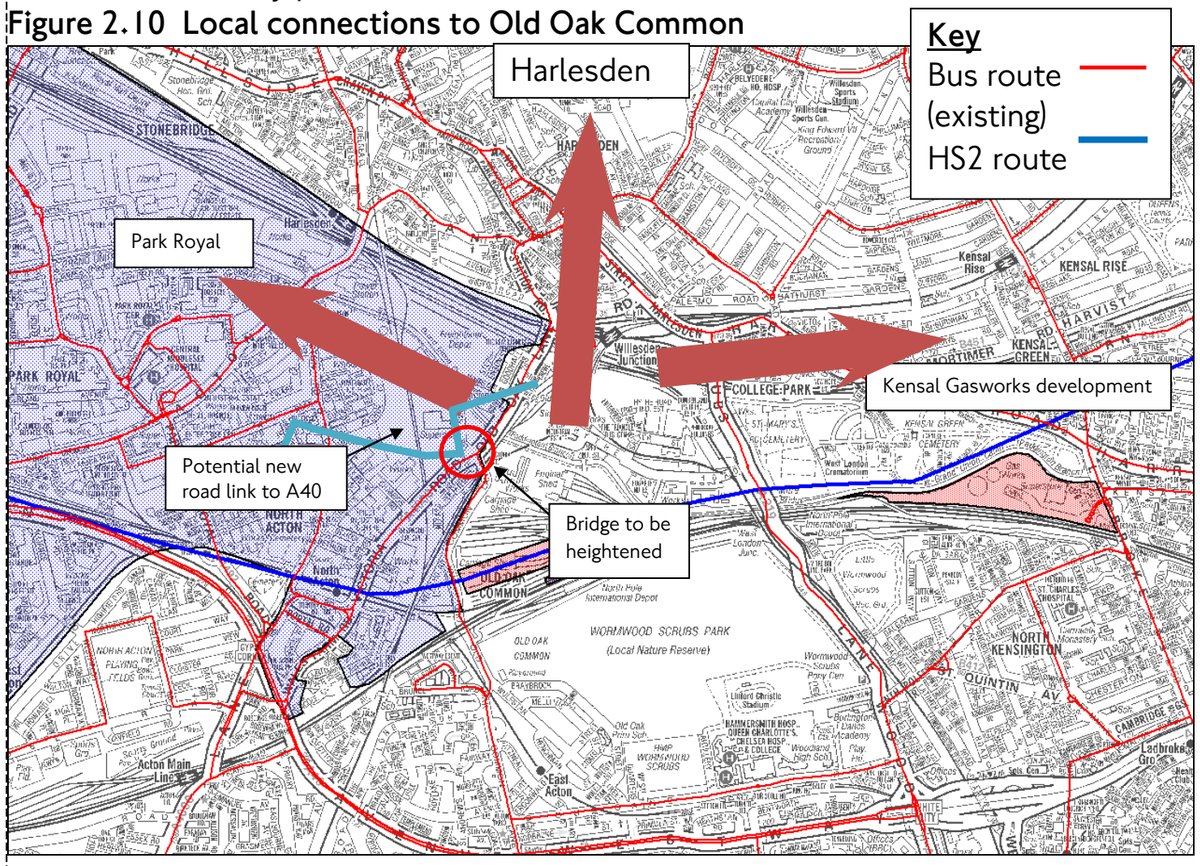


Spotlight: HS2 Station and Interchange at Old Oak Common

Local connectivity

Connecting the new interchange to the local transport network is just as important as providing strategic rail links. There is a danger of contributing to the already-heavy congestion on the local road network, if a high proportion of passengers accessing the station do so by private car.

Figure 2.10 Local connections to Old Oak Common



Surface access to Old Oak Common is currently poor. The bridge on Old Oak Common lane is currently only accessible to single decker buses. HS2 Ltd has proposed two mitigation measures to help improve surface access to the site:

- A new road link, linking the western edge of the site to the A40 along the Central Line corridor
- Heightening of the low bridge under the GWML on Old Oak Common Lane to allow double-decker buses to access the site

TfL's preferred connectivity option would see Willesden Junction only one stop from the high speed station at Old Oak Common on the London Overground, meaning that large parts of Brent and Harrow would be within easy reach of the high speed interchange with Crossrail.

There is a need to use the West London Model to determine what other surface access measures are required. There is also a need to collaborate with LB Hammersmith & Fulham to understand what development aspirations are being investigated for the site.

This analysis will be available in due course and will allow a detailed surface access strategy to be formed.

Figure 2.11 below indicates journey times on Crossrail from Old Oak Common into central and east London.

Figure 2.11 Crossrail journey times from west into central and east London

2.2.3 OTHER CONNECTIVITY OPPORTUNITIES

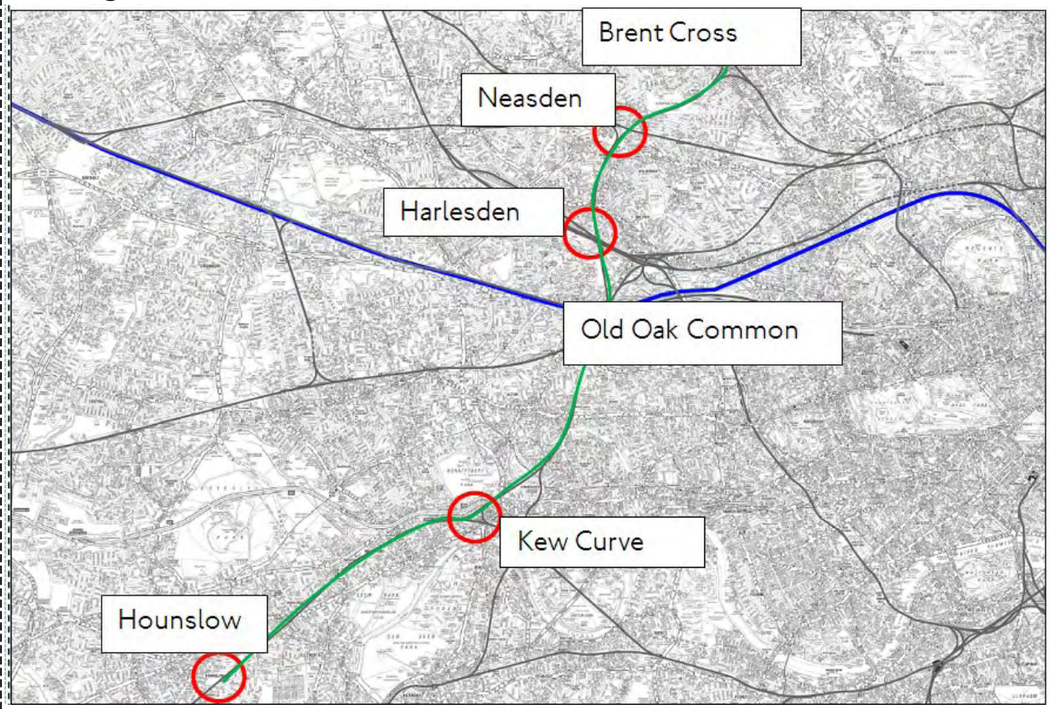
Dudding Hill Line

There is potential to electrify and open up this currently freight-only line to passenger services.

Subject to operational analysis and value for money assessment, there is potential to operate a new London Overground service between Hounslow and the proposed new station at Brent Cross via Old Oak Common. The option would require further electrification of the Kew Curve in order to allow access to Hounslow. The Dudding Hill route could include new stations on the Dudding Hill Line at Neasden and Harlesden, to improve accessibility. This scheme has the potential to improve orbital connections in west London and provide better access to HS2, Heathrow Airport and other key locations via Old Oak Common station. Other potential connectivity improvements that could benefit from the Dudding Hill line include Brent Cross – Ealing, with a change at Old Oak Common.

Both the Dudding Hill line and Kew Curve would need to be electrified and freight may need to be re-routed. An assessment of this and the potential impacts on the road network is yet to be undertaken.

Figure2.12 Potential route from Hounslow to Brent Cross via Kew Curve and Dudding Hill line



The case

The case for Old Oak Common in providing interchange with Crossrail and dispersal of HS2 passengers is accepted by all stakeholders. TfL have raised the issue of Old Oak Common local connectivity with HS2 Ltd and they accept there is a need to improve access to the station from the surrounding area. TfL have identified an option for doing this by creating a new strategic interchange (see Figure 2.12), bringing the North and West London Lines and potentially the Dudding Hill Line into a new station connected to Crossrail, Heathrow Express, Great Western and HS2. This reduces journey times to HS2 (and Crossrail) from large parts of west, south west and north west London and facilitates transfer between orbital and radial services, reducing the need to travel through Central London. TfL are making the case to HS2 Ltd that this extra connectivity should be incorporated as part of Phase 1 of HS2.

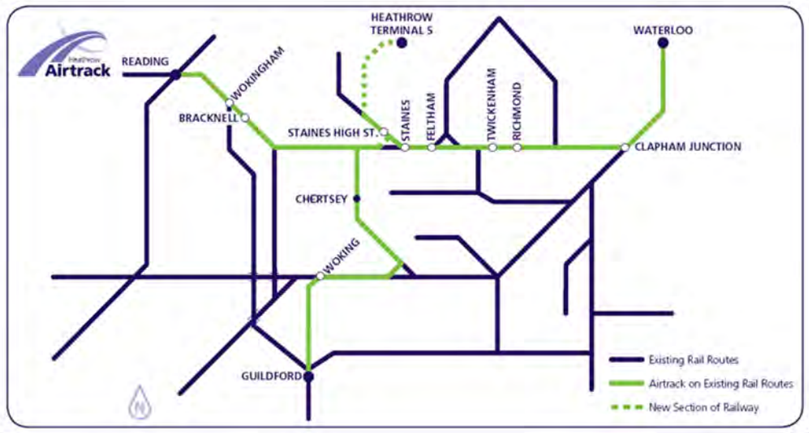
Airtrack to Heathrow from South West Train lines

This £700m scheme will provide a new rail link to Heathrow from the South West Trains lines, establishing significant journey time savings to the airport from key centres such as Twickenham and Richmond.

In terms of improving connectivity for the west-region, Airtrack will improve connectivity along the Heathrow-Kingston Corridor. The scheme will also improve access from centres outside London such as Guildford and Woking.

Airtrack's business case indicates that 50% of Airtrack demand is extracted from road. 10% of the journey time benefits associated with the scheme are highway-based benefits. Road congestion should reduce around Heathrow, particularly along the M4, Bath Road and Western / Southern Perimeter Roads. The additional Airtrack services mean that level crossings will be closed for longer, potentially causing problems on the borough road network.
This scheme is currently going through a Transport and Works Act Order (TWAO) and a decision is expected in 2011.

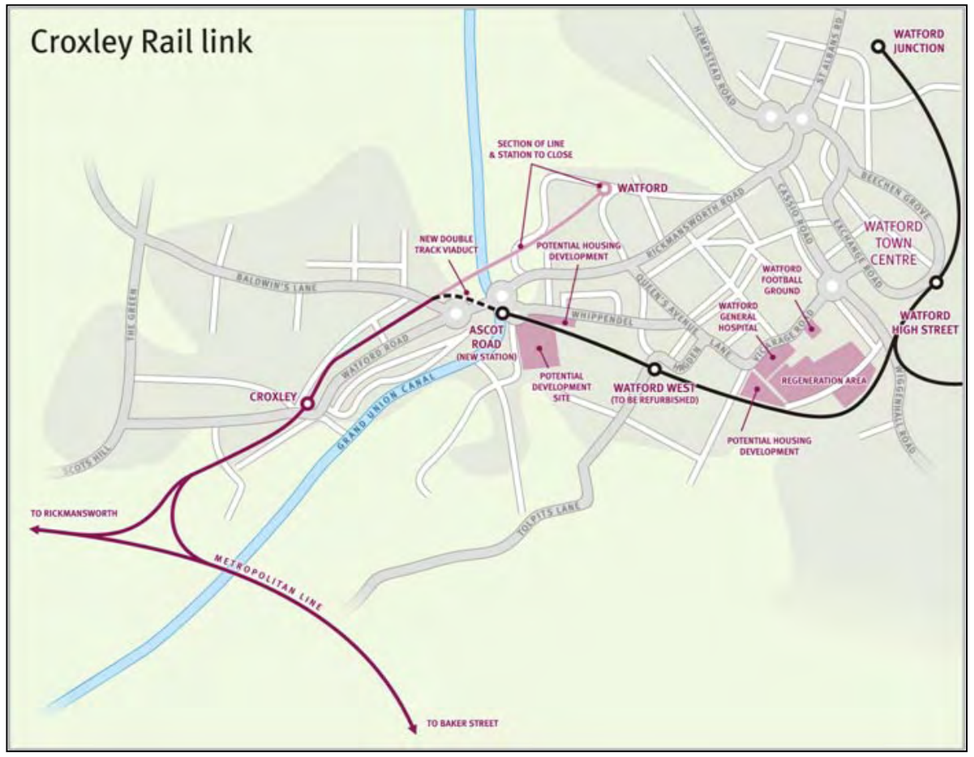
Figure 2.13 Planned Airtrack route map



Croxley Rail Link

The Mayor is supportive of a link to connect Watford Junction into the Metropolitan Line via a new rail link. This would significantly improve access from northwest London to the retail, employment, health and leisure opportunities of west and central Watford. The scheme is being promoted by Hertfordshire CC, which is responsible for securing funding.

Figure 2.14 Croxley Rail link



2.2.4 LINKS TO PLACES OUTSIDE THE GLA BOUNDARY

Cross-boundary links are provided by a number of existing bus and rail services. New infrastructure schemes such as Crossrail, the Croxley Rail Link and Airtrack will all improve connectivity between West London and its neighbouring centres outside the Capital. However, further improvements to cross-boundary links, particularly with centres such as Uxbridge on the western side of the region, may be appropriate.

Links to Heathrow Airport from outside London are also extremely important (see Spotlight below). Close cooperation between TfL, the London boroughs and neighbouring authorities is crucial to running existing arrangements and realising further improvements. TfL funds many cross-boundary bus links. Others are provided partly as commercial services or, increasingly, paid for by local authorities outside London.

Cooperation between authorities is needed to reduce the impact that administrative boundaries have on preventing people from making local, sub-regional and inter-regional journeys. Key priorities identified in the two recent DfT DaSTS (Delivering a Sustainable Transport System) studies to the west of London (Thames Valley; and South West Quadrant [M25]) are broadly consistent with this Plan, but further work is needed to maximise the strategic benefits across the key western border of London.

2.2.6 IMPROVING CONNECTIVITY – OTHER MEASURES

Cycling Improvements

Cycle Infrastructure Enhancements

The table below shows comparative journey times along a series of corridors in west London. It shows that journey time by cycle is very often competitive with public transport. The relevant west London boroughs could look at enhancing cycling conditions along these corridors and in other areas in line with the relevant available evidence about potential cyclable trips (please see also Section 3.5.6 on cycling). This could help to improve connectivity to the town centres as well as increasing cycle usage to contribute towards meeting the Mayor's target of achieving a 400% growth in cycling. Four out of the five corridors, highlighted in red, are the selected priority corridors for the sub-region. Two of the five corridors feature Ealing – an area identified as having one of the highest densities of potentially cyclable trips outside of central London.

Table 2.1 Cycle journey times

Corridor	Distance (crow fly) km	Time taken to cycle (mins)	Peak PT Journey Time (mins)
Wembley – Ealing	5.7	c. 25	c. 60
Brent Cross – Ealing	8.9	c. 35	c. 60
Hammersmith – Clapham Junction	5.1	c. 25	c. 60
Southall – Harrow	8.5	c. 35	c. 60
Heathrow - Uxbridge	8.6	c. 35	c. 40

New pedestrian / cycling bridge across River Thames at Chelsea Wharf

There is a long term aspiration to improve pedestrian and cycle links between the new Imperial Wharf development (north side) and Clapham Junction (south side). This scheme, if funded, would provide excellent links to Imperial Wharf station from the south.

Bus

Feeder Bus Services to Crossrail

As discussed on page 29, enhancing bus links to Crossrail is vital to ensure sustainable access is provided to the key west London scheme. This involves improving connectivity along corridors serving the eight Crossrail stations in west London.

Bus Infrastructure Improvements

Enhanced bus priority in appropriate corridors would be beneficial to journey time reliability. Several routes in west London currently suffer from running in mixed traffic during peak times, when congestion significantly effects journey times. This section gives a number of examples of where efforts could be concentrated to help improve this.

Short-term measures

As well as hard infrastructure solutions, there are also a series of short-term, softer solutions that should be pursued through the LIPs framework. These short term solutions are corridor specific where possible, but can be categorised into the following groups:

1. Improved journey planning information
2. Explore the potential for work place travel plans to create a mode shift to public transport
3. Investigate potential to link signalised junctions in close proximity (to aid bus routes suffering from congestion)
4. Improve walking routes and wayfinding

2.2.7 IMPROVING CONNECTIVITY: BETTER INTERCHANGE

Improving the interchange between lines and different modes is a key element in improving connectivity in the west sub region. Providing interchanges may make journeys, hitherto, difficult or impractical by public transport, now a real travel option. Whilst improving existing interchange through operational or physical measures will reduce the so called 'interchange penalty' for passengers and make the public transport journey more attractive. Improvements may range from updating signage within a station to redesigning the entire station layout.

As well as improving sub-regional connectivity, better interchange will and expand the level of access to opportunities and services as well as supporting population and employment growth by increasing capacity at the interchange points.

The toolkit for improving interchange focuses on three key areas:

- Quality (shorter term)
- Connectivity (medium term)
- Capacity (longer term)

This might include enhancing the built environment around a station, strengthening bus services to town centres, wayfinding, encouraging walking, cycling and parking (where appropriate), or increasing the physical capacity of an interchange.

TfL's Interchange Best Practice Guidelines 2009 is a useful reference point.

In the West London Sub Region, three examples of where better interchange would bring important connectivity benefits are: Ealing Broadway, Willesden Junction and Southall. Potential short, medium and long term priorities for each are set out below. Heathrow, as an international interchange is set out in the spotlight on the following page.

It is important to point out that Ealing Broadway and Willesden Junction are also **Strategic Interchanges**, which are discussed in their own section on page 65 below. Strategic Interchange is about moving people onto alternative routes and services so to avoid central London and busy, crowded areas within the sub-region.

Willesden Junction

Major interchange for London Overground, and possible location for new HS2 interchange on adjacent site at Old Oak Common.

Short term
Quality improvements to urban realm and access to town centre
Medium term
Capacity improvements to accommodate town centre growth
Long term
HS2 interchange at Old Oak Common (see Spotlight above)

Ealing Broadway

Major transport hub for west London with 15 bus routes serving the station in this Metropolitan centre
Short term
Support for LB Ealing to improve interchanges

Medium term
Complementary measures to Crossrail. Improved links to town centre and regeneration areas

Southall

Busy suburban station situated on heavily-congested South Road. Major development at Southall Gas Works is likely to add significantly to demand over next 20 years
Short term
Support work to ensure mitigation of impacts of Gas Works development.
Medium term
Complementary interchange measures to Crossrail. Improved links to town centre and regeneration areas
Long term
Potential capacity enhancement to support town centre growth and OAPF regeneration

SPOTLIGHT: INTERNATIONAL INTERCHANGE AT HEATHROW

Heathrow is the UK's busiest airport and the world's busiest airport for international passengers. Last year, 66 million passengers used Heathrow airport and 1.3 million tonnes of cargo passed through. The Opportunity Area is well connected to Central London by public transport via the Piccadilly line and the extension serving Terminal 5, Heathrow Express and the Heathrow Connect services; there are local links to the Metropolitan Town Centres through a network of buses and coaches. Bus links from Heathrow Terminals provides local access to Kingston, Croydon, Hayes, Hounslow, Richmond, Southall, Stockley Park, and Uxbridge. Heathrow is both a key employment hub for west London and a key public transport node.

Air traffic is forecast to continue to increase and this will further exacerbate issues surrounding pollution and congestion in the area. BAA has proposed the introduction of Airtrack to improve links to the south of Heathrow. There has been some consideration of the possibility of a road user charging system at Heathrow in an attempt to limit the number of people driving to the airport. BAA has a target for 40% of passengers to access the airport by public transport by the end of 2012, and there are also staff travel targets. Various other schemes are planned or under consideration that might encourage mode shift to public transport. Crossrail is due to serve Heathrow (Terminals 1,2,3 and 4) by 2018, and there is the possibility that High Speed 2 trains may also stop at the airport. The bar chart shows where passenger demand for Heathrow originates, and the proportion of these which currently travel by car.

Figure 2.15 Potential rail connections to Heathrow

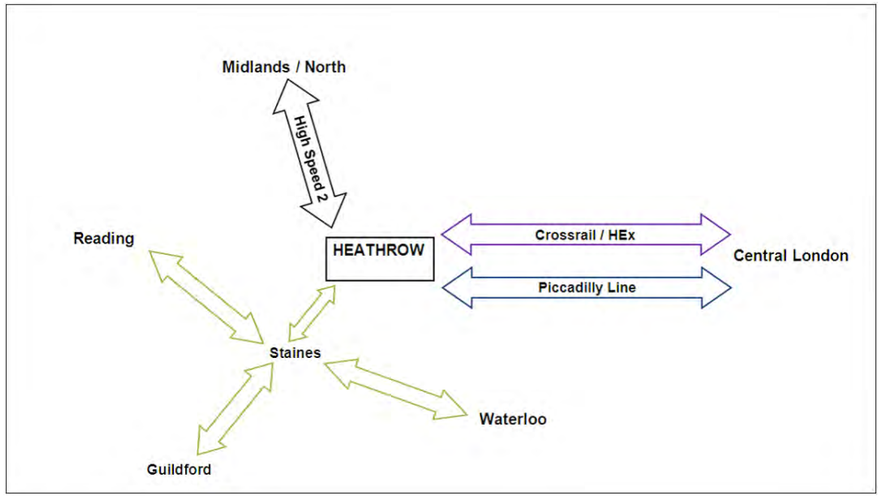
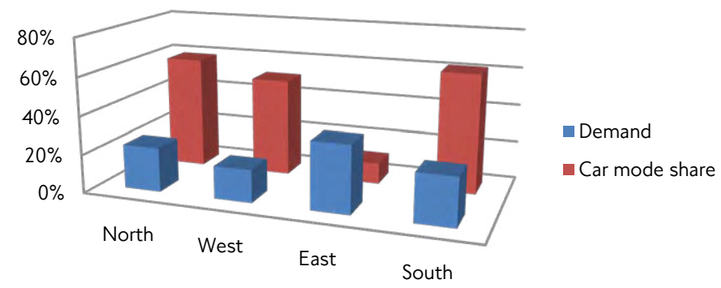


Figure 2.16 Heathrow: pasenger demand by origin of journey in UK* and car mode share



2.3.1 DELIVERING AN EFFICIENT & EFFECTIVE TRANSPORT SYSTEM – SUMMARY OF MEASURES

Introduction
As well as providing more capacity and better connectivity to support population and employment growth in west London, it is equally important to manage the transport system so that people and goods are transported as efficiently and effectively as possible. Not only will fast and reliable journey times make London an attractive place to do business in but it will make living in the Capital more attractive too. This page set out the main measures that will help address this challenge in west London.

Managing the road network better:
Managing the road network is crucial to the efficient operation of walking, cycling, buses, cars and freight. The key measures for this involved in the road network management include:

- minimising the impact of planned interventions
- minimising disruptions from unplanned events
- maintaining road network assets for safety and efficiency
- developing the road network where appropriate
- achieving targeted modal shift from car journeys to more sustainable modes
- working with utility companies to reduce delay

Freight

- considering use of diversionary routes where freight has no origin or destination in London
- increasing the rail freight mode share
- supporting the existing freight sites in west London
- addressing the emissions impacts of freight

Improving public transport crowding and reliability

LU Upgrades
A programme of asset renewal on all London Underground lines will ensure that the system continues to offer the reliability and efficiency that is required to keep London moving.

Bus

- measures to improve the reliability of bus journey time
- journey planning information and real-time updates

Rail

- asset renewal
- 7 day railway

Land Use Planning and Rethinking Transport

- concentrating high-density and high trip-generating development where there is transport capacity, connectivity and accessibility
- enhancing public realm and place shaping

Strategic Interchange

- maximising the benefits of improvements to Willesden Junction and Ealing Broadway

2.3.2 MANAGING THE ROAD NETWORK

Introduction

The way the road network is managed underpins much of the transport strategy. It directly affects walking, cycling, buses, cars, freight and contributes to economic development, improving the urban realm, improving air quality and reducing CO_2 emissions and other broader outcomes.

There is scope for further targeted demand management measures to encourage mode shift in particular areas or corridors, particularly those where public transport enhancements are being made.

For the remaining traffic, including freight, the majority of the benefits to be derived will be from better *management* of the road network. Despite recent improvements, there is still scope to manage the road network in London better, including better co-ordinated and active traffic control to keep traffic flowing as smoothly as possible, better management of planned works such as road works to reduce the disruption they can cause, better contingency planning for incidents, collisions etc so that they can be dealt with promptly and their impact minimised.

There are also opportunities for improvements in specific locations to improve conditions for all road users, including pedestrians and cyclists, which are proposed in this sub-regional plan.

However, the way in which the road network is planned and managed in London is extremely complex, with many highway and traffic authorities with separate, overlapping or joint areas of responsibility for different aspects of the road system. A coordinated approach is therefore essential.

The Mayor's Transport Strategy, and this sub-regional plan, therefore set out clearly the roles and responsibilities for managing the road network, together with a proposed set of strategic corridors. It is suggested that the planning, management and performance of these corridors is monitored by each of the relevant sub-regional panels.

Managing the road network in west London

The Mayor's Transport Strategy sets out a corridor approach to managing the road network. Using a corridor approach better enables the strategic function - for example in providing London-wide or sub-regional connectivity - to be understood and considered alongside local functions in both planning and managing the road network. Corridors are defined by their strategic significance, primarily on the connectivity they provide. It is suggested that the management and planning of these corridors should consider their strategic significance. Both TfL and the boroughs have roles and responsibilities in managing these corridors. The next steps for these activities will be taken forward by the sub-regional panels (described elsewhere in this plan).

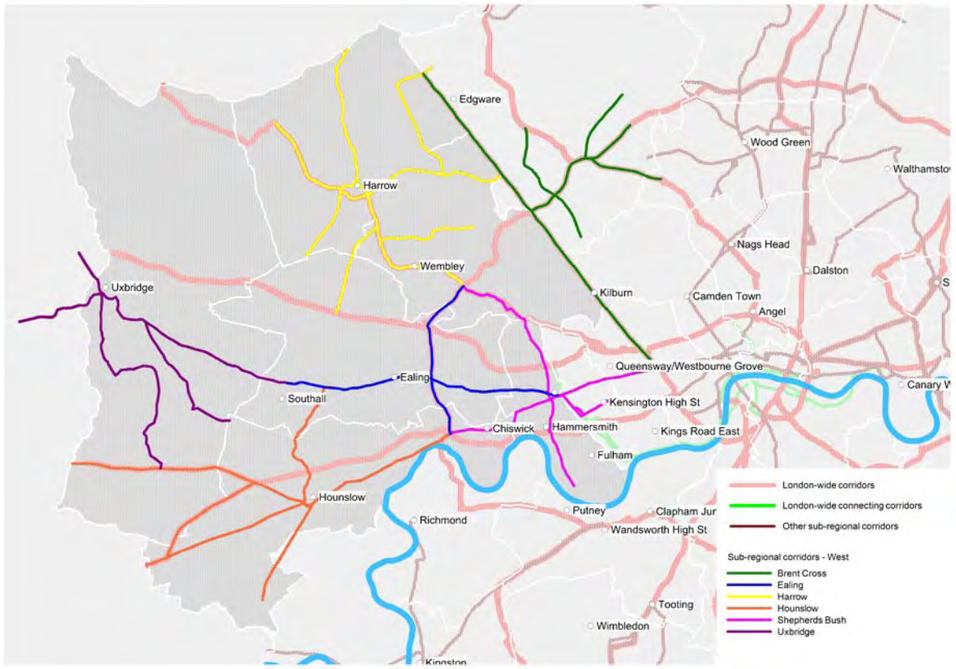


Figure 2.17 London-wide and sub-regional corridors in west London

Congestion

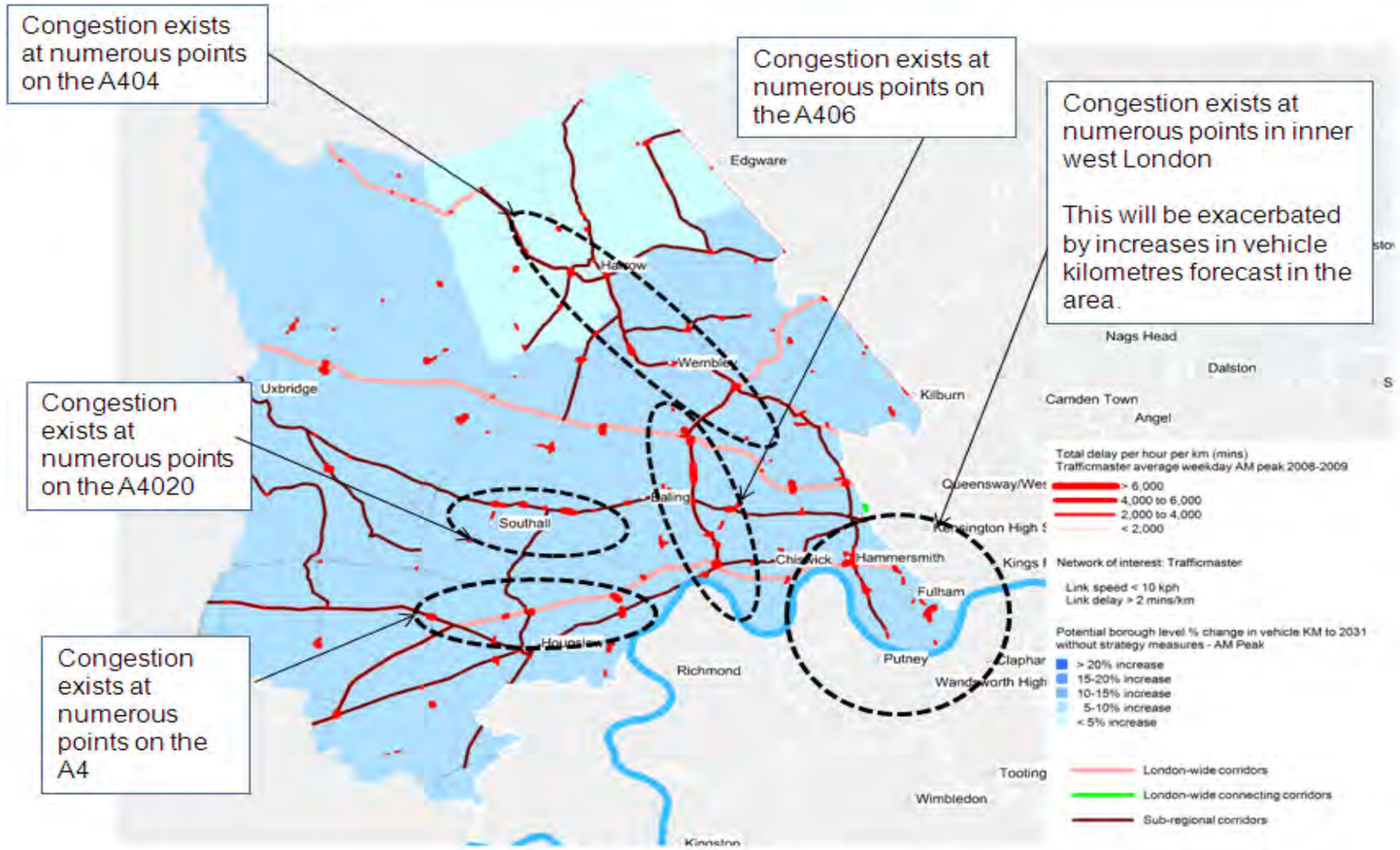
Currently, existing parts of road network across the west sub region operate at capacity, with the inner areas being particularly affected. The population and employment growth planned for this area will lead to increase in economic activity. Even with currently funded public transport improvements (Tube, HLOS, Crossrail) it is likely that vehicle kilometres, particularly lorries and vans, will increase.

Without the right measures in place this will affect the resilience of the network which will translate into poor journey time reliability and increase overall journey times.

Average speed across the West sub-region in the morning peak period is 32 kph while during the interpeak it is 35 kph. The evening peak period is slower with average speed at 29 kph. These speeds are comparable with the average speed in outer London in general.

The following map identifies congestion hotspots at locations where weekday morning peak speeds are below 10kph and delay exceeds 2 minutes/km. There are clusters of congestion hotspots in inner west London and at numerous locations on the A404, A406, the A4020 (Uxbridge Road), A4 (Great West Road), and at numerous points in inner west London. Further analysis suggests that congestion is more widespread during the evening peak period on both weekdays and weekends with the locations mentioned above experiencing severe congestion across all days and time periods.

Figure 2. 18: Congestion hotspots



The hotspot mapping allows us to identify areas for targeted solutions that may include safeguarding of capacity, forward planning of road and utilities works, better management of incidents and optimisation of the network.

Understanding the nature of the trips in the most congested areas will help us to encourage mode shift to sustainable modes and release pressure on the network by managing demand. For strategic routes long term demand management measure and land use planning along the corridors can be identified in advance.

Indicative results of this analysis are presented for example locations below, and this process could be applied to priority sites to reach tailored solutions.

2.3.3 EXAMPLE MANAGING THE ROAD NETWORK LOCATIONS

Argyle Road (B452), South Greenford

The majority of traffic on Argyle Road is characterised by low car occupancy and primarily work-based trips during the peak periods. Trips tend to be shorter in comparison to some of the other hotspots in the west sub-region and the average distance travelled is 18km. Origins of most vehicles using this link are clustered closely together within the west sub-region, indicating that traffic using Argyle Road is relatively local to it. While most destinations are also located within the west sub-region, they are more dispersed than the origins and a number are located outside the GLA. Encouraging mode shift away from the car to cycling could be a viable option to reduce congestion on the link, particularly during the inter peak where over 50% of trips are within the 2-8km travel distance band. Workplace travel planning could play a role in reducing congestion at this location particularly given the number of work related trips in the AM and PM peak periods.

Hanger Lane

The majority of vehicles at the Hanger Lane congestion hotspot are single occupancy cars. The average distance travelled depends on the particular road (distances on the A406 are approximately 10km longer than those on the A4055). Analysis of count data revealed traffic to be above road capacity guidelines on the A406 and on Western Avenue.

Shifting some car trips to walking may be a viable option to ease congestion on the A4055 due to the higher share of short trips (less than 2km) recorded on this road. Given the high proportion of work related trips across the day there is the potential for workplace travel plans to help alleviate congestion in the area.

Hammersmith

Traffic flows at the Hammersmith congestion hotspot are highest during the PM peak and spread across a variety of trip purposes. Origins of traffic using the A219 Shepherd's Bush Road are spread across a large share of London (with the exception of the south sub-region). Most traffic using the A315 Hammersmith Road originates in the central sub-region. Average distances travelled are relatively long and destinations of traffic at the hotspot are dispersed across the west and south sub-regions. Despite trips over 20km being the most frequent at the hotspot, there is some limited potential to ease congestion by:

- shifting car trips to cycling on the A219, where over 10% of trips are between 2km and 8km and;
- shifting car trips to cycling and walking on the A315, where over 25% of trips are between 2km and 8km in length and over 5% are less than 2km in length.

The number of work related trips indicates that workplace travel plans could play a role at reducing congestion. Congestion seems to occur on links which are between SCOOT regions. Considering where trips can be moved to cycling may be particularly useful here.

Potential targeted interventions on the west London road network

Across the sub-region (and London as a whole), congestion will be managed and reliability and resilience will be improved through better traffic control systems, better management of planned events, and better management of unplanned incidents. In addition, there are more specific opportunities for targeted interventions such as to encourage mode shift to public transport, walking and cycling, or to improve the road network's contribution to other Mayoral goals such as improving air quality and reducing CO_2 emissions.

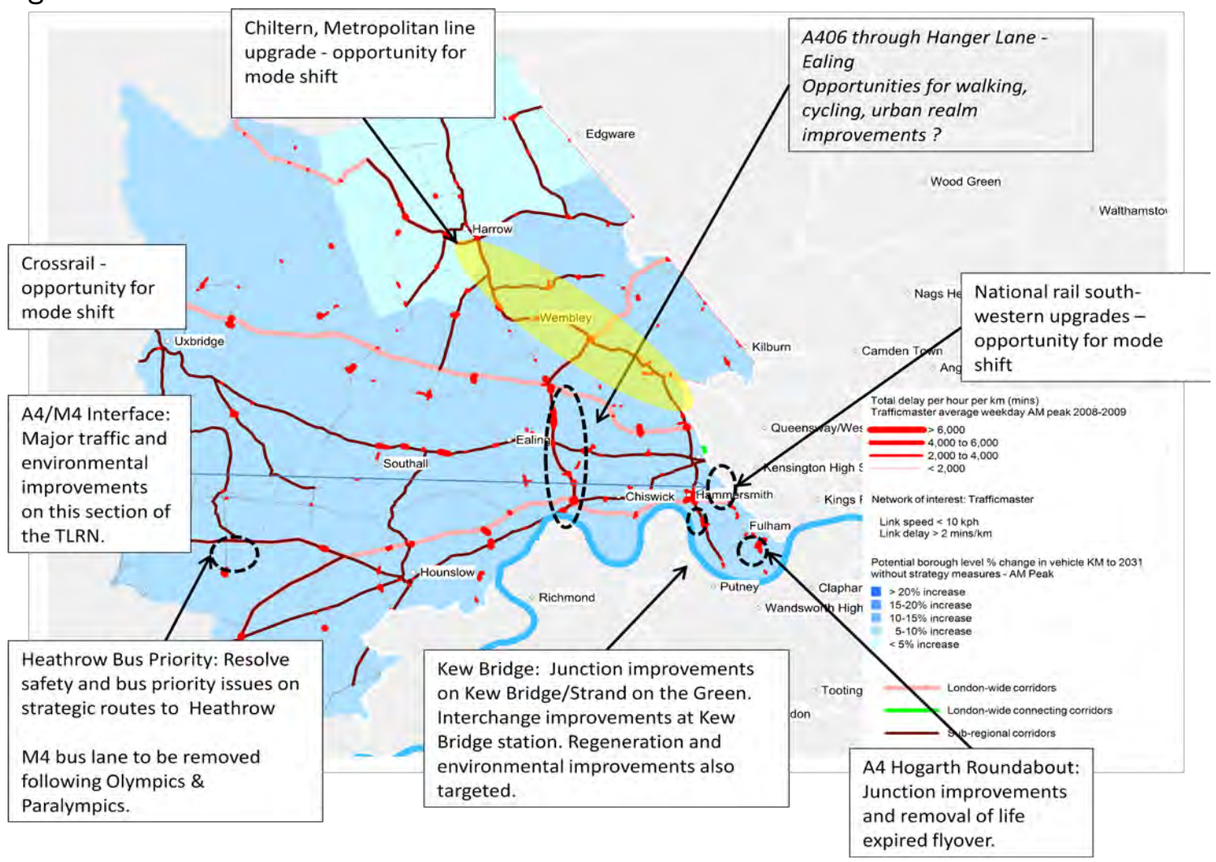
In terms of tackling congestion, the priorities for further targeted mode shift are:

- inner west London
- the western end of the A406
- A404, A4020, A4
- metropolitan town centres

Effective initiatives in the short term include:

- signal timing reviews including the potential removal of traffic lights
- managing disruption
- school and workplace travel planning
- review of parking provision and charges
- freight delivery and servicing plans for town centres

Figure 2.19 Potential interventions on the road network



These initiatives will be more effective if accompanied by improvements to walking and cycling facilities, the urban realm, and road safety. These can be delivered as part of town centre redevelopment and regeneration initiatives.

In the longer term there are further opportunities for mode shift through:

- land use development with an location, density and mix of uses that encourages access by public transport walking and cycling
- provision of enhanced public transport, including new and extended rail services

2.3.4 FREIGHT IN THE WEST SUB-REGION

Roads

There are a number of key routes that pass through the West sub-region including the M/A4 and A40, M25 and North Circular. Key freight routes in the area include the A40 which serves Park Royal and the M4 and A4 both of which feed traffic through to Heathrow. The A4 is a particularly key route into central London from the West (see image below). There are issues with congestion in the Heathrow and Park Royal areas in part caused by freight movements, but also by heavy general traffic. There are also issues in Shepherd's Bush, which is a key retail centre and in Southall, due to its proximity to both the M4 and Heathrow. Other major key freight arteries are the M25 and the North Circular.

Key Locations

Park Royal and Wembley

West London has two major Strategic Industrial Locations (SILs) at Wembley and Park Royal. Both are also Preferred Industrial Locations, which highlights the fact that they both have extra capacity for further development. As SILs both these areas are likely to produce a significant amount of freight traffic to particular zones across London.

Heathrow Airport

Heathrow is designated as an Opportunity Area in the London Plan. Heathrow is a key freight destination for London and the UK. 1.3 million tonnes of cargo pass through it each year. This includes 83,300 tonnes of Post Office goods. 94% of all cargo arrives in the hold of scheduled passenger services. There are around 100 industrial estates located within a 5 mile radius of the airport, of which 40% are directly related to the airport.

Rail freight

A significant issue surrounding rail freight is the conflict that exists between rail freight movements and passenger services. One approach is to divert all freight traffic with no origin or destination in London so that it does not need to pass through the city. An example of this is the proposed diversionary route from Felixstowe to the West Coast Mainline at Nuneaton.

West London is a key location for a potential Strategic Rail Freight Interchange (SRFI), although this might be sited close to rather than within the sub-region. These interchanges increase rail's freight mode share by enabling goods to be carried by rail nearer to the end markets in the capital. A possible location has been identified adjacent to the Colnbrook line, just outside the M25 near Heathrow.

There are also a significant number of key local freight sites located in the West sub-region, identified by the TfL Rail Freight Strategy (August 2007) as having existing or potential rail freight usage. These are:

- Brent: Neasden Stone Terminal and Willesden F Sidings
- Ealing: Acton Yard and Stone Terminal, Park Royal Stone Terminal and Willesden Euro Terminal
- Hammersmith and Fulham: Old Oak Sidings
- Hillingdon: Northolt Park Waste Transfer Facility
- Hounslow: Brentford/ West London Waste Terminal

Making more use of the waterways for freight transport

In west London, there is potential to increase water-based freight transportation activity using the London Blue Ribbon Network. In particular, Grand Union Canal, provides a significant opportunity for a shift to water-based transport, including the transportation of waste. There are a number of wharves already in service: Old Oak Wharf at Willesden Junction, Powerdays tri-modal wharf at Willesden, the Hanson Wharf at West Drayton and the National Grid Wharf at Southall. Expansion of these existing facilities as well as the development of new wharves will help shift freight away from the road.

Freight Priorities for the west sub-region

There are a number of freight priorities for the west sub-region

- planning and providing for freight and servicing as part of the redevelopment plans for Opportunity Areas and town centres.
- opportunities for better use of the Grand Union Canal (Main Line and Paddington branches) for freight movement
- strategic Rail Freight Interchange(s) – eg Colnbrook
- seeking opportunities for small scale rail freight facilities
- smoothing traffic flows to provide better journey time reliability which will benefit freight and servicing traffic
- extending the application of Freight Quality Partnerships building on the existing west London FQP
- consideration of consolidation and break-bulk centres at strategic points on the road network in west London.

2.3.5 PUBLIC TRANSPORT RELIABILITY

Rail reliability

The reliability of National Rail services has been rising steadily for the last eight years (following the disruption caused by the accident at Hatfield). The PPM (Public Performance Measure) for all train operating companies was 91.5% to October 2010 (moving annual average). For operators in London and the south east the PPM captures the proportion of trains arriving at their final destination within five minutes of their scheduled time.

For operators serving west London, the PPM is 91.6% for First Great Western; 93.2% for South West Trains; and 95.1% for Chiltern.

Toolkit/ generic measures

- increased capacity (through train lengthening) and frequency on key lines, including Overground
- asset renewal

Underground reliability

The Jubilee, Piccadilly, Bakerloo, Central lines and Sub-Surface Rail (District, Circle, Hammersmith & City and Central lines) are of most importance to the West sub-region.

London Underground reliability has been improving in recent years following investment in infrastructure renewal. The 'excess wait time' reliability measure has improved year on year from 2002/03. Many of the assets continue to suffer from age-related reliability issues, which will be addressed as more London Underground lines are upgraded, and assets are replaced or renewed.

This will mean that there should be fewer delays resulting from failed assets, such as trains and signalling. The 'excess wait time' should continue to improve. Furthermore, extra capacity will also help relieve crowding in the short run which can lead to fewer passenger incidents, and therefore greater reliability.

Toolkit/ generic measures

- asset replacement and renewal
- extra capacity

Bus reliability

The bus network relies on the infrastructure provided with TfL's partners to deliver reliable and fast passenger journeys, in a pleasant and safe environment, while keeping operational costs as low as possible. As London continues to grow there is a need to ensure that appropriate measures are taken to maintain attractive and reliable bus services. Measures to improve journey time reliability and reduce journey times can also help to improve the efficiency of the network. Over the past ten years excess wait time for high-frequency buses has continued to fall (and is now just over a minute on average); over 80 per cent of low-frequency services run on time.

Across the west sub-region there will be opportunities for measures that improve service reliability and these should be pursued particularly where bus passengers represent a significant proportion of all road users. This includes the major town centres but also the growth areas.

Toolkit/ generic measures

- route planning and measures to improve journey time reliability
- asset renewal

2.3.6 LAND USE AND PLANNING AND TRANSPORT PLANNING

Role of land use planning in improving efficiency
Integrating land use and transport infrastructure is an essential part of planning efficient and successful development. It is vital to ensure that necessary transport capacity and connectivity is provided in advance of or concurrently with new development in order to allow development to proceed. The location, scale, mix, phasing and design will impact on the relationship between demand and capacity and in doing so will influence the mode share and mode shift, trip generation and distribution, patterns of movement and accessibility by different modes. Investment in transport infrastructure increases the value and marketability of development while encouraging sustainability and successful place shaping.

Assessing the impact of new development on the transport network is an essential part of the planning process. Developers are required to prepare a robust up to date transport assessment and travel plan as part of their planning application submission. To assist in this process TfL has produced *Transport assessment best practice guidance (April 2010)* which is available on the TfL website. TfL has also prepared guidance on travel planning, freight, delivery and servicing and cycle parking to supplement advice to developers. It is important to engage in pre application discussions with local planning authorities and TfL on strategic developments to scope out the effects of development.

Planning permission will only be granted where the impacts of the development are adequately mitigated in transport terms. Once a development has been robustly assessed it may be necessary or appropriate to include planning conditions and section 106 obligations including financial contributions by developers. TfL has an ongoing role with the local planning authority in managing the effects of development and this should be reflected in these control mechanisms. An example of a recent large section 106 agreement in the west sub-region is the funding obtained for the Southall Gas Works development, where the South Road Railway Bridge will be widened and local highway improvements, bus enhancements, and two pedestrian/cycle bridges over the canal will be delivered (details of enhancements subject to confirmation).

The phasing of development and transport infrastructure is an important consideration in planning successful development. The effects of individual phases of development should be considered as this will assist in the effective management of demand and capacity of transport.

Promoting mixed use development that reduces the need to travel and encourages walking and cycling as well as public transport must be central to preparation of transport policies for new development. The following objectives should be applied:

- concentrating high density and high trip generating development where there is transport capacity, connectivity and accessibility
- phasing development with transport infrastructure
- Working with service providers to plan new services to support users
- enhancing public realm and place shaping.
- having regard to all forms of public transport and interchange and seeking to design out crime
- encouraging walking and cycling by, for example, designing permeable routes through development and integrating these with existing walking and cycling networks
- improving information for transport services and information within development sites eg Countdown
- promoting green travel planning measures including car clubs or car sharing
- preparing delivery and servicing plans and construction management plans and maximising opportunities for sustainable freight distribution
- ensuring land for transport is safeguarded
- applying maximum car parking standards and meeting cycle parking standards and provide infrastructure for electric vehicles, disabled parking and where appropriate support car-free development

Examples of new development in West London which showcase these requirements include RAF Uxbridge,

2.3.7 RETHINKING TRAVEL TO IMPROVE THE EFFICIENCY OF THE TRANSPORT SYSTEM

Smarter Travel

Smarter Travel initiatives bring behaviour change techniques together with the transport planning of small-scale infrastructure schemes, designed to reduce the pressure on transport networks by influencing how, where and when people travel.

Principal amongst those techniques, available to authorities, are workplace and residential travel plans which should be secured through the planning process (as required by the replacement London Plan). These provide the basis from which developers and occupiers can deliver behaviour change amongst residents, employees and visitors to new communities and workplaces.

The targets and measures of these plans can be designed to reflect the opportunities and challenges presented by the specific location and the wider sub-region. Opportunity Areas such as Southall and Heathrow provide ideal opportunities for such activity.

Car use and the School Travel Programme

Car ownership in the west sub-region is relatively high.

In locations with high public transport accessibility and good connections to walking and cycling routes car-free and low-car housing developments can provide a feasible option. These are supported by on-street parking controls and restricting residents from on-street parking permits.

Encouraging the use of car clubs can help to reduce the need for car ownership. TfL will be working with local authorities to support the further development of car clubs, including in the piloting of car clubs in non established locations and the promotion of low emission vehicles. To this end, has worked with London Boroughs to finance the development of car club bays in across London and to disseminate best practice.

The 'school run' is a major contributor to congestion, particularly in the morning peak period. TfL's school travel programme has achieved significant mode shift amongst pupils (average 6.5% reduction in proportion of car journeys to school and with those in TfL's Accreditation scheme achieving up to 12.4% reduction in the proportion of car journeys).

Continued engagement with school children can additionally contribute to improvements in road safety and health, complementing road safety education and training and promoting active travel.

Tailoring the interventions

Other established smarter travel initiatives such as promoting sustainable travel within businesses or providing scheme-specific travel information can be tailored and geographically targeted in order to:

- add value to specific small-scale improvements to infrastructure, such as road safety engineering schemes;
- help make best use of London's limited road space, helping authorities meet their Network Management Duties; or
- reduce the scale, delay the timing, or remove the requirement for major transport infrastructure investment.

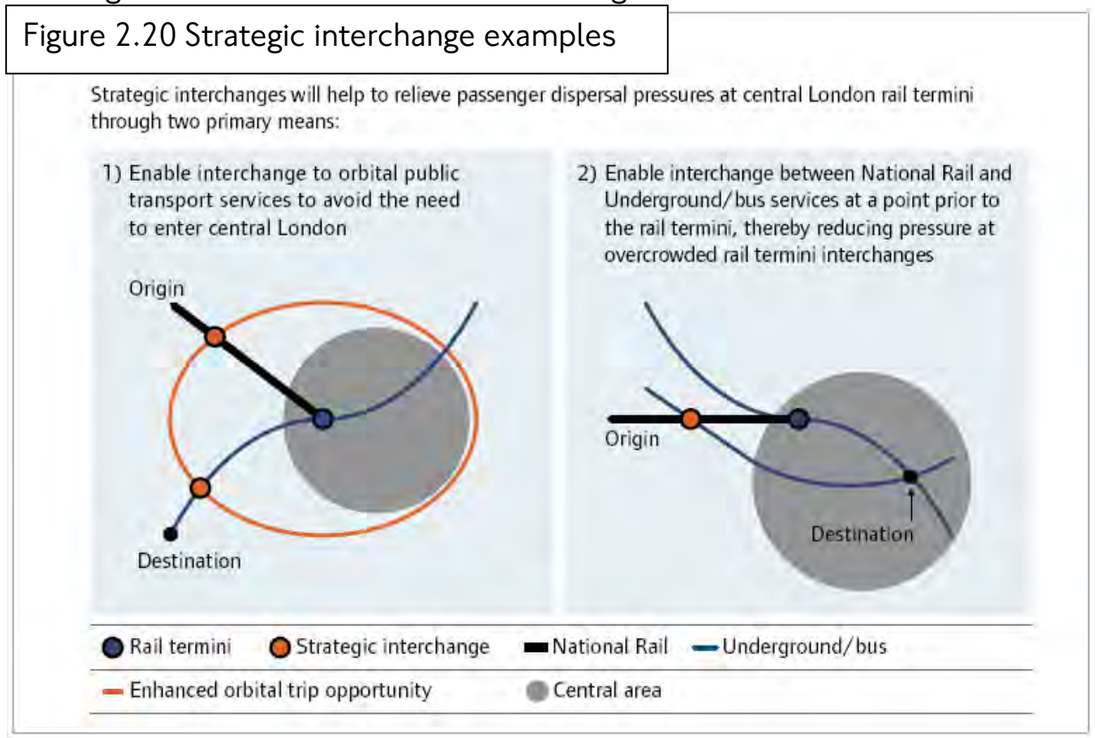
The targeted provision of smarter travel initiatives as supporting measures to the Barclay's Cycle Superhighways provides an example of smarter travel adding value to small scale infrastructure projects. These initiatives were specifically designed to break down the barriers to cycling among the Superhighways' potential users and included free bike servicing, cycle training and cycle storage at commuters' places of work and homes in proximity to the routes.

Rethinking travel includes rethinking why we travel, and whether we need to make some trips at all. Encouraging people to switch to more active modes, for example to walk to the supermarket, could relieve pressure on busy public transport and road routes. However, this is not always feasible, and in these cases increasing use of online work and shopping opportunities could help relieve pressure on central London's busy transport network.

2.3.8 STRATEGIC INTERCHANGE IN THE WEST SUB-REGION

The concept of strategic interchanges is defined in the MTS as follows:
Strategic interchange aims to improve orbital public transport travel opportunities, in particular links between outer London town centres, and to ease pressure on the central London transport system, in particular passenger dispersal pressures at London's rail termini.
The diagram below illustrates how these might work.

Figure 2.20 Strategic interchange examples



There are two main strategic interchanges in west London which have the potential to improve the efficiency of the transport system for both West London and Central London:

- Willesden Junction
- Ealing Broadway

Each of these interchanges has potential to improve access across west London and the interventions needed to unlock the benefits will vary by location. This could include physical improvements to the stations as well as changes to service patterns. Network Rail, the DfT and train operating companies would be key to delivering these benefits.

Willesden Junction allows cross-London journeys to be made via the orbital links of the Overground network, avoiding the need to interchange at in central London. Benefits of the forthcoming capacity enhancements to the Overground network should be maximised to achieve further shift to this network.

Ealing Broadway station provides interchange between the Central and District lines, GWML and Heathrow Connect rail services. In 2018 it will be one of the region's most important Crossrail stations and therefore has the potential to become a Gateway to Heathrow Airport, central London and East London. Strategic use of all the lines going through Ealing Broadway will be important in maximising the efficiency of the rail network.

Potential Future Strategic Interchange at Old Oak Common
As set out in section 2.2, a High Speed 2 station at Old Oak Common has the potential to provide the west sub-region with an interchange of significant strategic importance.

In addition, Heathrow is an important interchange for people accessing the airport (see Spotlight on Heathrow in Connectivity section).

CHAPTER 3: ENHANCE THE QUALITY OF LIFE FOR ALL LONDONERS

Transport can have a powerful direct and indirect effect on people's quality of life. Travelling can range from an enjoyable experience of speed and comfort to a frustrating one of crowding and delays. Since so much of the urban landscape is designed around the need to travel, including walking and cycling, thinking carefully about the design and architecture of transport interventions can improve the experience of travelling in the city.

Our travel can also have an impact on other people's quality of life: noisy or polluting vehicles can degrade the environment, while on the other hand by choosing sustainable modes or low emission vehicles we benefit the wellbeing of ourselves and others. The interactions between these issues are complex, but in many case solutions for one problem will benefit another.

This goal comprises five challenges:

- Improving journey experience
- Enhancing the built and natural environment
- Improving air quality
- Improving noise impacts
- Improving health impacts

Improving journey experience
Improving public transport customer satisfaction, reducing public transport crowding and improving road user satisfaction for all road users, including drivers, pedestrians and cyclists.

Enhancing the built and natural environment
Enhancing streetscapes, improving the perception of the urban realm and developing 'better streets' initiatives as well as protecting and enhancing the natural environment.

Improving air quality
This challenge seeks to reduce air pollutant emissions from transport and contribute to meeting EU air quality targets.

Improving noise impacts
Improving perceptions and reducing the impacts of noise.

Improving health impacts
Improving the health impacts of transport and facilitating an increase in walking and cycling.

3.1.1 IMPROVING JOURNEY EXPERIENCE FOR PUBLIC TRANSPORT USERS

Forecast population and employment growth will put greater pressure on a public transport network that is already under strain. Overcrowding and delays can result in London becoming a less attractive prospect to employers, employees, visitors and potential customers. In addition, crowding affects journey experience and hence people's quality of life. Despite the investment to increase public transport capacity, renew assets and improve reliability, problems will remain on the network, particularly on National Rail services with crowding Acton Mainline and Paddington.

On the Underground network, crowding will remain on many lines including the Piccadilly line towards Earl's Court and the Wimbledon branch of the District line. Bus passengers are considered in the next section under road users.

TfL will seek to incorporate improvements to the journey experience and customer facing environment in stations when future works are undertaken to the underlying asset base at stations and as part of large station projects, subject to funding.

Potential measures to improve public transport journey experience

There are a range of measures in the MTS that seek to make the experience of travelling on public transport more pleasant, including better information provision, measures to make the journey more comfortable such as cooling the Tube, and measures to reduce crowding. Other measures that are relevant in west London include:

- additional capacity and infrastructure improvements on rail services –improvements and public transport reliability
- Tube upgrade – reducing crowding, new trains, air conditioning on sub-surface lines,
- asset renewal to improve reliability –
- improved interchange and improvements to reduce station crowding
- higher frequency services, 7 days a week
- minimising weekend and evening disruption from engineering works – 7 day railway
- link to the role of information in improving journey experience (as part of the short term commitments through iBus, real time information, third party technology apps)
- improved customer service
- measures to protect and enhance bus reliability

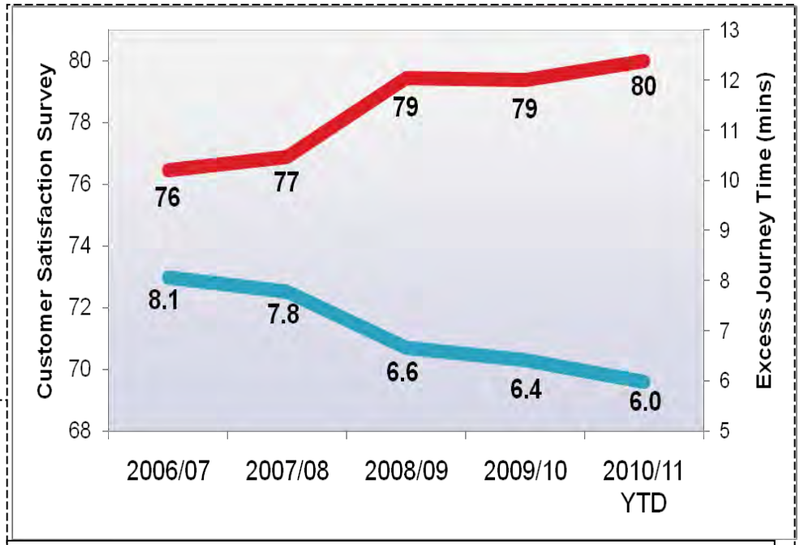


Figure 3.1: Tube customer satisfaction

National rail service standards

The MTS sets out higher service standards for national rail services in London. these standards directly benefit customer experience and support mode shift to rail. Standards include:

- station facilities
- first and last trains
- off-peak service frequencies

In addition, further acceptance of Oyster over a larger network (for example, in stations beyond London such as Slough) is encouraged.

3.1.2 IMPROVING JOURNEY EXPERIENCE FOR ROAD USERS

Every day in London the roads are used to make 10.1 million car trips, 6 million walking and cycling trips and thousands of bus and freight trips. Congestion and poorly maintained roads are uncomfortable and hazardous for pedestrians, cyclists and motor-vehicle occupants. In addition, unreliability and delays waste time and cause frustration for car, freight and bus users. Measures to manage the road network, improve the urban realm and air quality will help make using west London's roads a more pleasant experience for all users.

Measures to improve road user journey experience

- encouraging people to use public transport, walking and cycling for short trips currently made by car to help alleviate congestion – smarter travel planning initiatives and supporting borough initiatives,
- other measures to smooth traffic (LINK to population and employment section) including more SCOOT technology, minimising the impact of planned works and unplanned events and developing the road network where appropriate to contribute to more effective management of the road network. Also supporting boroughs with aspirations for traffic calming measures.
- measures to improve reliability and the provision of live information to help improve road user satisfaction
- smoother traffic as a result of road and junction improvements at Hanger Lane
- measures to improve bus journey times and increase bus user journey experience, including information provision
- measures to improve interchange between services and modes

3.2.1 ENHANCING THE BUILT AND NATURAL ENVIRONMENT

The role of the built and natural environment in transport

Improvements to the spaces through which people move and spend time can make a journey more pleasant and places more vibrant. For instance, there are strong links between the quality of the built environment and levels of walking, cycling and public transport use. The Mayor's Approach to Better Streets seeks to find a new working balance between the different users of London's streets and spaces, distinguishing them with good quality sustainable materials and with high levels of craftsmanship, and reflecting local character.

In addition to improving the quality of spaces and increasing the economic vitality of places, improvements to the local environment can also increase levels of road safety and improve perceptions of personal safety in an area.

The scale of improvement can range from the general tidy up and de-cluttering of streets across west London to rethinking the traffic management in an area and recreating the street.

Improving the west sub-region's town centres

Working with the boroughs, MTS aims to develop locally agreed improvements that:

- Enhance the vitality of outer London, including improved accessibility to, and between, metropolitan town centres and a greatly improved urban environment within town centres
- Better integrate transport in town centres with local conditions

As with the rest of London, the places in the west sub-region are diverse and each will have differing needs for improvement and change. The typology of places in west is shown on the next page.

Whilst many of the measures will be determined locally by boroughs, there are some areas where numerous factors will need to be taken into account in determining how the "place" should operate, e.g. impacts on traffic, buses, taxis, retail etc. The use of the existing working arrangement for west London will enable consideration of the strategic issues through Panel discussions and recommendations.

Natural environment

The natural environment in west London ranges from residential gardens through to parks and wild spaces. West London benefits from extensive green space, such as Kew Gardens and Gunnersbury Park. Open spaces provide opportunities for exercise and relaxation and therefore contribute to health and wellbeing.

Access to open spaces is vital to enhance quality of life. This is considered in more detail in the section on accessibility.

The natural environment in west London also provides opportunities for cycling for pleasure, including a number of Greenways (eg Osterley Lane). Additionally, canal towpaths (along the Grand Union canal) and waterway paths (such as the River Crane around Whitton and the Thames Path) are suitable for cycling.

3.2.2 URBAN REALM 'KEY PLACES' – TYPOLOGIES

A simple way of looking at the potential for improving the urban realm of town centres is to relate them to a set of typologies. These typologies, developed by TfL, classify town centres into a few types, determined by characteristics such as the main types of transport access, the shape of the town centre and its main uses. Case studies have been developed for different types of town centres and the treatment applied to these can be used as a guide for improving other town centres of the same type. Examples from other sub-regions, then, will be of use for the west sub-region, and these can be found in the other SRTPs and supporting information.

One of the aspects classified is the physical form/shape of the centre: linear (type A); confluence (type B); and constrained (type C).

Within the west, the following are type A centres: Ealing, Hounslow, Southall, Chiswick, Wembley and White City. The following are type B: Hammersmith, Park Royal/Willesden Junction and Shepherd's Bush/Westfield. Uxbridge and Harrow are type C centres.

Better Streets

Better Streets is a Mayoral document which outlines a generic approach applicable within all key places, delivering urban realm improvements in a phased viable way - 'The Golden Thread'. This long term vision approach utilises both maintenance and other public/private funding as and when it becomes available.

The key principles of Better Streets are:

1. Understand the current and future function of the place.
2. Imagine the place as a blank canvas to remove perceived barriers to the vision.
3. Reflect the character of the place
4. Go for quality of materials and workmanship. Do smaller parts of the project better by delivering gradually.
5. Define the degree of separation realistic for a safe future function.
6. Avoid over elaboration: the majority of solutions are simple.

The montage in Figure 3.2 below demonstrates a *Better Streets* approach. Given budget constraints, stage 1 to 3 projects are likely to be more common than those requiring stages 4 to 5.

Figure 3.2 An approach to *Better Streets*

Stage 0 Street today | *Stage 1 Tidy-up* | *Stage 2 De-clutter* | *Stage 3 Re-locate/ merge* | *Stage 4 Rethink* | *Stage 5 Re-create*

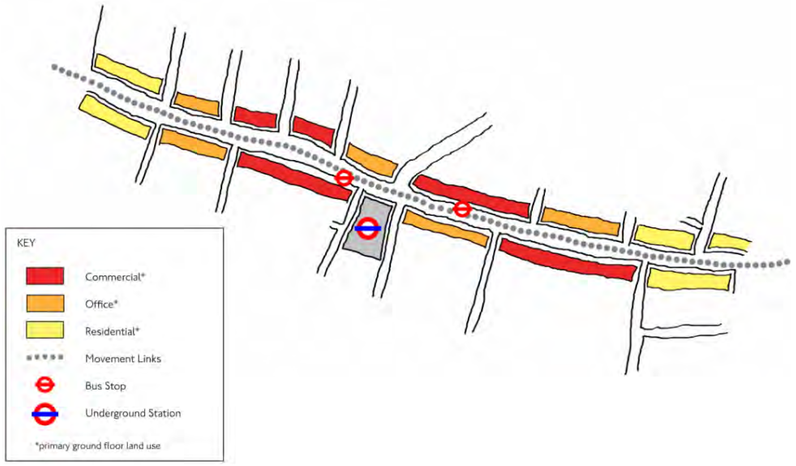
3.2.3 EXAMPLE ENHANCEMENTS FOR KEY PLACES

The shape of key places (linear, confluence or constrained) influences the pattern of movement in the area, and hence the transport interventions which will be most effective at improving the urban realm.

Specific interventions for a particular location will depend on the precise local characteristics and what improvements have already been completed. However, to some extent, it is possible to set out a general approach which could be taken. Examples for the three forms are shown here, based on case studies of various locations across London undertaken by TfL's Urban Design team.

Figure 3.3 Examples of linear, confluence and constrained form places

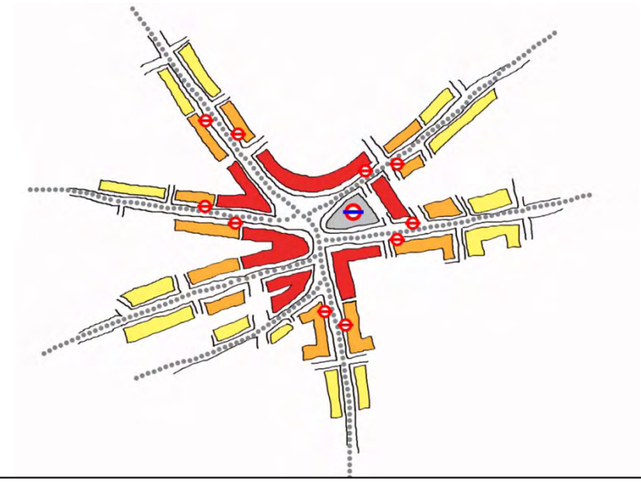
1. Linear form – movement along and across the corridor



Typical enhancements for this form might include:

- Widen pavements following a tidy-up, de-clutter and merging of street functions and introduce shared car parking with additional cycle parking
- Reduce vehicle speeds by reducing corner radii and tabling the whole junction utilising a change in carriageway material/ colour to emphasise a change in priority and place but respect traffic loads.
- Investigate innovative ways to blend required furniture

2. Confluence form – complex movement, with many conflicting flows



Typical enhancements for this form might include:

- De-clutter, merge street functions and widen pavements where possible
- Improve sightlines for pedestrians, cyclists and vehicles (which also improves road safety)
- Area-wide traffic calming to slow vehicle speeds
- Investigate diagonal and other direct pedestrian crossings, to enable pedestrians to follow desire lines

3. Constrained form – barriers to movement, segregation and constraining of pedestrians.

Typical enhancements for this form might include:

- Look at relocating bus standing and routing to avoid conflicts with pedestrian movements.
- Ensure consistency in public realm and way finding for legibility of town centre.
- Merge street functions at pinch points to increase pavement space.
- Open up linkages within town centre, improve connections across main barriers.

3.3.1 AIR QUALITY IN THE WEST SUB-REGION

Why is air quality important?

Air pollution refers to substances in the air which directly affect human health, welfare, plant or animal life. Transport is the major cause of exposure to harmful air pollutants. Poor air quality can cause serious health problems and reduces quality of life. Its impacts are most severely felt by vulnerable people including children, older people and those with existing heart and lung conditions. Deprived communities are more likely to be affected by poor air quality as they are more likely to live in areas with higher air pollution concentrations, including next to major roads.

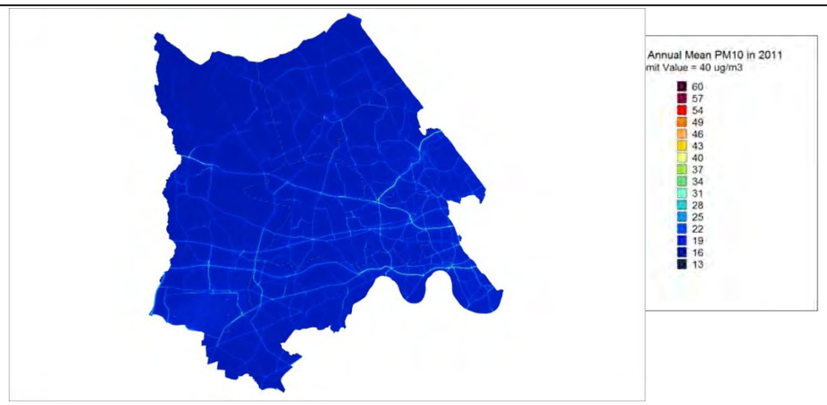
Two pollutants cause most concern within London: particulate matter (PM_{10}) and nitrogen dioxide (NO_2). PM_{10} aggravates respiratory and cardio-vascular conditions such as asthma. At high levels, NO_2 causes inflammation of the airways and long-term exposure can affect lung function and respiratory symptoms. It can also increase asthma symptoms. The health impacts of NO_2 are however less well understood than those of PM_{10}.

Whilst road transport contributes a large proportion of emissions in London (around 40% of NO_x emissions, and 60% of PM_{10}), there are many different sources within London, in addition to pollution from outside the region, which contribute to the overall air quality hence many air quality policies are designed to reduce Londonwide emissions. However, local conditions, such as traffic mix and congestion, road layout, buildings, and meteorology are all important factors which contribute to air quality. Whilst the transport contribution to poor air quality in general is a sub-regional and Londonwide issue, additional action at the local level may also reduce emissions and/or air quality concentrations. In many cases, particularly along major roads or corridors similar air quality problems exist across the boroughs and sub-regions.

Air quality in west London

West London has relatively poor air quality compared to other parts of the UK. It also has areas with the worst levels of air quality in London. Air quality is poorest around major roads and rail lines and some urban centres. Reflecting the London norm, air quality is poorer in inner west London than outer west London (with the exception of Heathrow), and alongside main roads and motorways, but also with many of the main centres where a mix of traffic, industrial and commercial, and residential emissions, contribute to the elevated air quality levels.

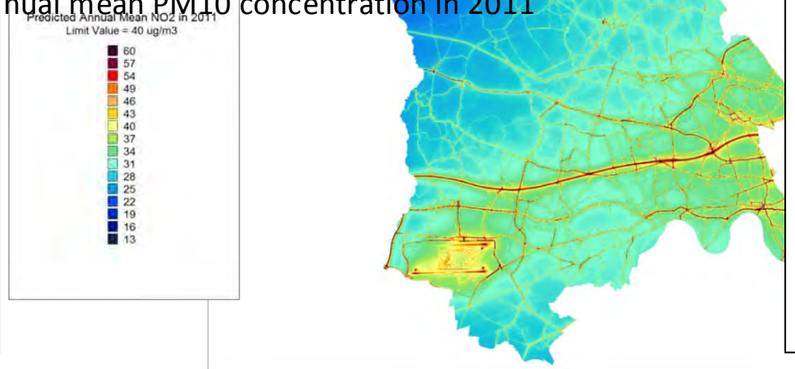
Figure 3.4 Predicted annual PM_{10} concentrations in 2011



PM_{10} annual and daily mean limit values expected to be met by 2011. Highest concentrations predicted to be closest to roads, although locally some sources (such as

Figure 3.5 Predicted annual mean NO_2 concentrations in 2011

Predicted annual mean PM10 concentration in 2011



Meeting the NO_2 limit value is recognised as challenging. Many roadside locations currently exceed, and are likely to do so in future years based on current trends.

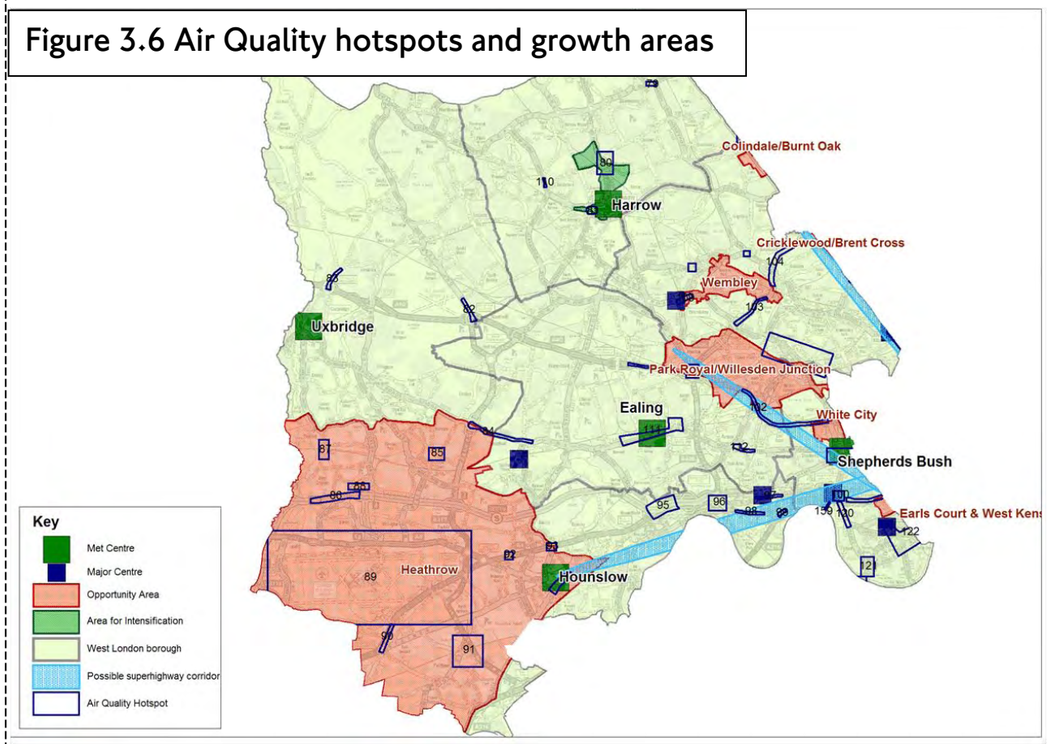
Based on predicted annual concentrations for 2011, the highest air quality concentrations are generally predicted to occur close to major roads in the region which include: A406, A40, A4020, A4, A315

3.3.2 SUB-REGIONAL FOCUS AREAS: AIR QUALITY

Sub-regional focus areas
Opportunity Areas such as Heathrow, Hounslow and White City present challenges in terms of balancing air quality management with population and employment growth. In addition, intensification areas and strategic/preferred industrial areas in the sub-region including Park Royal and Heathrow North may result in higher movements of HGVs and LGVs, or increased industrial emissions, as well as increased car traffic (where related to retail and housing). Growth in major centres such as Southall, could also have air quality impacts, as well as those in the metropolitan town centres of Ealing, Hounslow, Harrow and Shepherd's Bush.

Figure3.6 below shows west London's air quality hotspots in relation to the key growth areas in the region. Whilst it is important to address all the hotspots identified, the hotspots located within or near to the growth areas have particularly importance as planned development will only worsen the air quality at these locations

Figure 3.6 Air Quality hotspots and growth areas



The nature of air quality focus areas varies are heavily affected by the contribution of emissions from cars, taxis, buses, LGVs and HGV which are in turn influenced by factors that include:

- whether it (or part) is on the TLRN
- whether it (or part) is on the London Freight Network
- whether it (or part) is on a sub-regional corridor
- how many bus routes intersect (these do not necessarily travel throughout the area)
- any bus station or depot within 500m
- the type of area it is within (or partly within) eg town centre or Strategic Industrial Area
- whether it is identified as a Congestion Hotspot

Potential solutions must be tailored to the needs of the area.

In the west sub-region, all road transport modes are important contributors to emissions of PM_{10} in the focus areas, but cars tend to dominate due to the much larger number of vehicles involved. Taxi NO_x emissions tend to be lower than other modes, but can be seen to increase closer to Central London.

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Buses/coaches tend to contribute much lower proportions of PM_{10} exhaust emissions and this is in part a reflection of LEZ policies and TfL ongoing strategy to reduce emissions from buses. However, buses contribution increases in locations with high bus provision, for example in some town centres. Cars contribute about half of PM_{10} exhaust emissions in all focus areas and HGVs and LGVs a combined 30 per cent approximately.	It can be seen that all road transport modes are important contributors to emissions of NO_x in the focus areas but in many case buses contribute the highest proportion of emissions reflecting the level of bus provision in some areas. In some cases, especially related to focus areas on the London Freight Network, HGVs contribute significantly to NO_x emissions for example on parts of the A4, A4020 and A40. Cars contribute around 25% of NO_x emissions in all focus areas. Over half the hotspots in west are located within/adjacent to a growth area, with the Heathrow Opportunity Area containing the most number of instances. They are located on both TfL-managed and borough-managed roads and around half are located on the London Freight Network. Identifying these areas and their characteristics is important for the delivery of measures to improve air quality in west London.	A combination of measures is needed to tackle emissions from transport and the toolkit below sets out the types of interventions that TfL and the boroughs should consider in their approach. Where freight transport is a large contributor to air pollution in the region specific freight measures, in collaboration with the freight industry, will be required in order to improve conditions. These include moving to cleaner vehicles, and better logistics management through new/improved consolidation centres and freight quality partnerships.

3.3.3 THE MAYOR'S AIR QUALITY STRATEGY

The Mayor's draft air quality strategy (MAQS) proposes a wide range of policies to reduce the emissions from various sectors, including road transport, in terms of both PM_{10} and NO_2 in both 2011 and 2015. Examples of the larger policy initiatives include the introduction of LEZ phase 3 for LGV operators, and a taxi age policy is proposed in order to reduce emissions in future years from this source.

In addition, the strategy recognises that it is essential to capture the benefits of other long term proposals as outlined in the 20 year transport strategy. For example mode shift to 'active modes' will be encouraged through:

- further promotion of work and school travel plans
- better information for walking
- improved and more inviting public spaces
- Barclays Cycle Superhighways
- event days to encourage cycling

Other transport measures outlined within the strategy that have wider air quality benefits include:

- smoothing traffic through better traffic management and street works coordination through measures including the London Permit Scheme
- focusing on incentivising the adoption of the cleanest vehicles and new technologies including electric and electric-hybrid cars
- Freight Delivery and Service Plans to reduce unnecessary freight mileage and increase freight efficiency

In addition to the overall strategy to improve air quality, additional measures may need to be considered to help reduce emissions locally and tackle poor air quality in focus areas. These may assist in reducing pollution levels further as they may reduce emissions, improve design and urban realm through planning, and help to reduce exposure to poor air quality. A toolkit has been developed to help identify these potential measures. A summary of the key measures is set out to the right, whilst the complete toolkit can be found in the strategy itself.

The toolkit provides a list of the potential options available to TfL and boroughs that may be suitable to help improve air quality at priority areas. The toolkit includes specific local measures and wider demand management solutions to reduce traffic flows, and smooth traffic and reduce congestion. However, the management of all different road transport modes in order to reduce contributions to emissions is important including increasing cycling and walking options, managing freight, and providing alternative forms of transport. The many options will vary within each site, depending on other local constraints, and may also be linked to planning and development related options, and potential options may not be suitable in all locations.

Air Quality Toolkit

Local measures

- adjustment or removal of traffic lights
- shared spaces
- access restrictions
- effective policing of red routes
- reducing idling
- toll roads
- restrictions on car parking
- vegetation
- access control/ clear zones
- local LEZs
- re-routing and road hierarchy
- roadside emissions testing
- urban Traffic Management and Control

Indirect traffic related measures could include:

- anti-idling
- awareness raising
- cleaner fuelled vehicles
- development of walking and cycling
- fleet management and cleaner fuels
- land-use planning
- parking management and charging

Modal measures

- deployment of cleaner buses
- adjustment or removal of traffic lights
- effective policing of red routes
- extension of FORS

Longer term options

- modification of London-wide LEZ or local LEZs
- road user charging

3.4 Noise impacts of transport

Noise mapping shows noise levels from road transport are relatively low in the west sub-region except in close proximity to main roads. When surveyed as with the other sub-regions, the greatest cause of disturbance from transport related noise is traffic on the roads, followed by roadworks, although air transport also causes a high level of disturbance, similar to roadworks. The proportion of people disturbed by traffic on the roads, road works and air transport is significantly higher in west London than the London average. Furthermore, disturbance from other sources is also higher than the London average. Therefore, residents of west London experience a significantly higher level of disturbance from transport noise than those in the other sub-regions.

Noise toolkit

There are a number of ways for TfL, the London boroughs and other stakeholders to improve or mitigate the noise impact of transport, including:

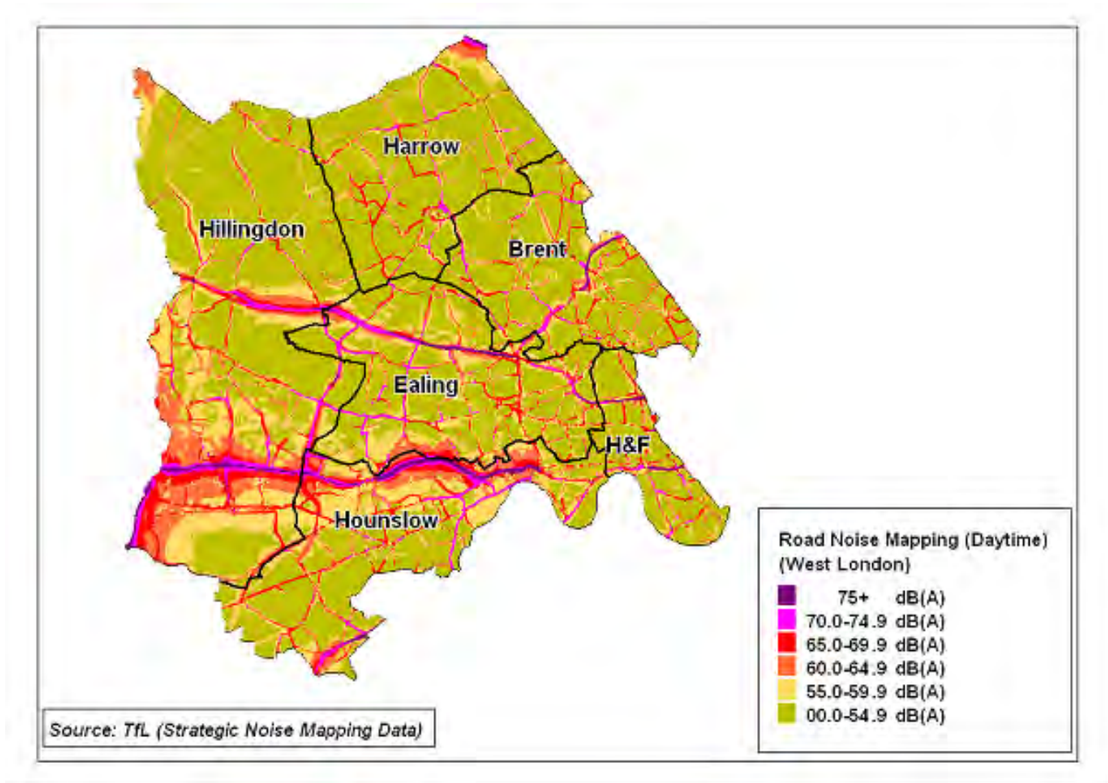
- Timely and effective rail maintenance and replacement works
- Ensuring new transport projects consider noise mitigation
- Introduce road maintenance programmes to replace road surfaces with low noise surfacing
- Improve traffic management and signal control techniques, and discourage noisy, rapid acceleration and deceleration
- Introduce quieter buses and public sector service vehicles
- Encourage quieter driving through publicity campaigns
- Seek to coordinate flight paths to minimise impact on London

Road traffic noise

Noise levels are high along the M4 corridor into London, particularly near the M25 and Heathrow junctions. Noise levels decrease with distance from the road. Noise levels are also high along the A40, and in parts of the sub region where the M25 passes in close proximity such as north Harrow, and south west Hillingdon.

In order to address noise disturbance from the rail network, further work should be undertaken to identify locations where noise from National Rail and Tube services and station announcements are most problematic.

Figure 3.7 Daytime road noise map



3.5.1 IMPROVING HEALTH IMPACTS

Transport and health

Transport affects our physical and mental wellbeing in a number of ways, and plays a part in determining our overall quality of life. It can bring enormous benefits by providing access to education, services, jobs and social activities. When we choose physically active forms of travel, such as walking and cycling, we can reap personal health benefits as well as having a positive impact on the general environment around us.

Conversely, it can have an adverse affect; air pollution from road transport is harmful; the fear of traffic can be off-putting to potential cyclists; and transport noise can cause sleep disturbance, for example. Road and public transport safety are also of relevance here and are considered in Chapter 4 of this plan. This section considers how the noise impacts of transport can be addressed, and how walking and cycling can be encouraged.

Walking and cycling can provide a clear health benefit, by reducing the risks of developing heart disease and diabetes. Nearly one in 10 early deaths in the UK is due to excess weight and obese people die nine years earlier on average. Government guidelines are that adults take 30 minutes moderate exercise five times per week, which can include brisk walking and cycling.

Shifting journeys from car to walking and cycling would also bring about an improvement in air quality and urban realm, with consequent health benefits for everyone.

The sections on walking and cycling below give further detail on how such a shift might be achieved and what benefits it might bring to the sub-region.

Perceptions of health and life expectency

Transport can affect a person's perception of their own health either positively by contributing to improved fitness through walking and cycling, or through access to health care, and negatively, for example where air pollution exacerbates existing health conditions. These perceptions might differ considerably from measured incidence of disease and life expectancy, for example, but are still important.

In west London generally, Brent has the highest proportion of Londoner's rating their health as 'not good', followed by Ealing, Hounslow and Hammersmith & Fulham. However, when looking at life expectancy, Hounslow and Hillingdon have the lowest life expectancy ages for both men and women in west London, whilst Harrrow has the highest.

Obesity

Transport can play a key role in combating obesity by encouraging active travel through walking and cycling and improving access to sports and leisure facilities.

In 2007, around 22% of men and 27% of women in London were obese. The pattern of obesity in west London differs from that found elsewhere in London, where obesity is higher in inner boroughs. In west London, the highest levels of obesity in children aged 10-11 years are found in Hounslow (23-27%).

Toolkit to improve health impacts of transport

- address air pollution
- address road traffic noise
- improve access to health services, including working with the NHS to site health facilities in areas of good public transport access and where gaps in provision exist
- raise levels of active travel by encouraging walking and cycling
- reduce levels of illness and mortality through transport improvements to assist in regeneration of deprived areas and work with boroughs to address income and other inequalities

Figure 3.8 Self-reporting of health

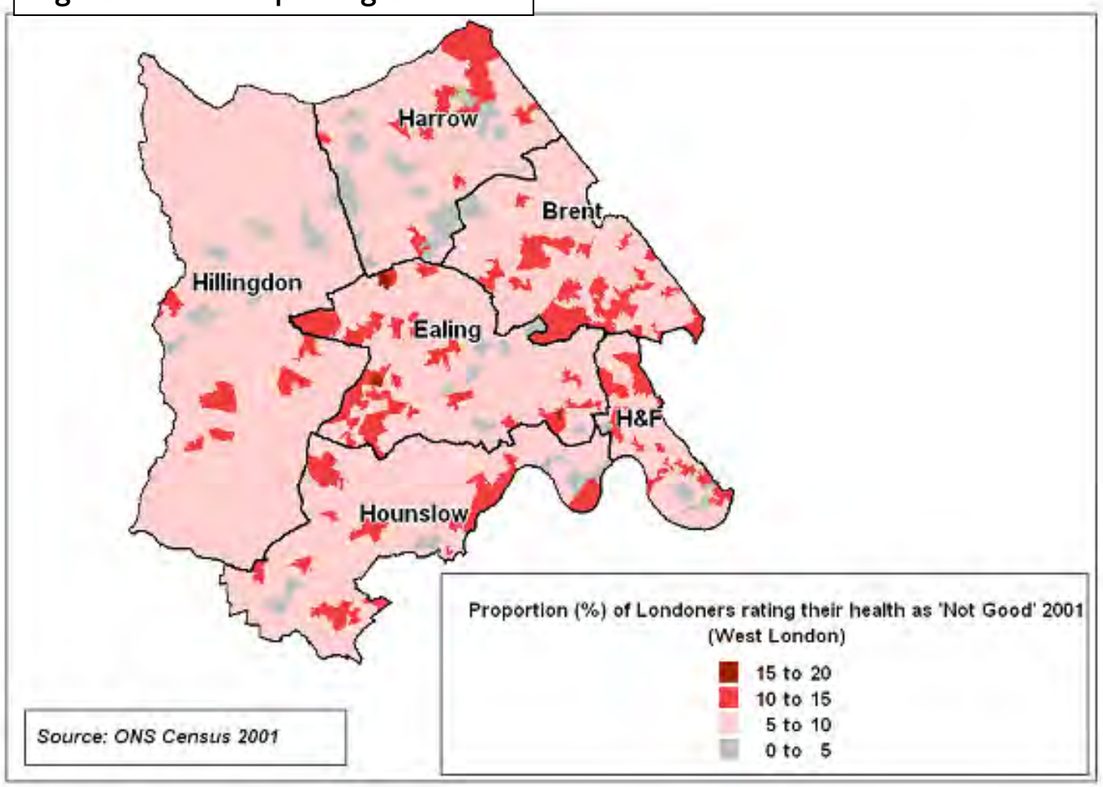
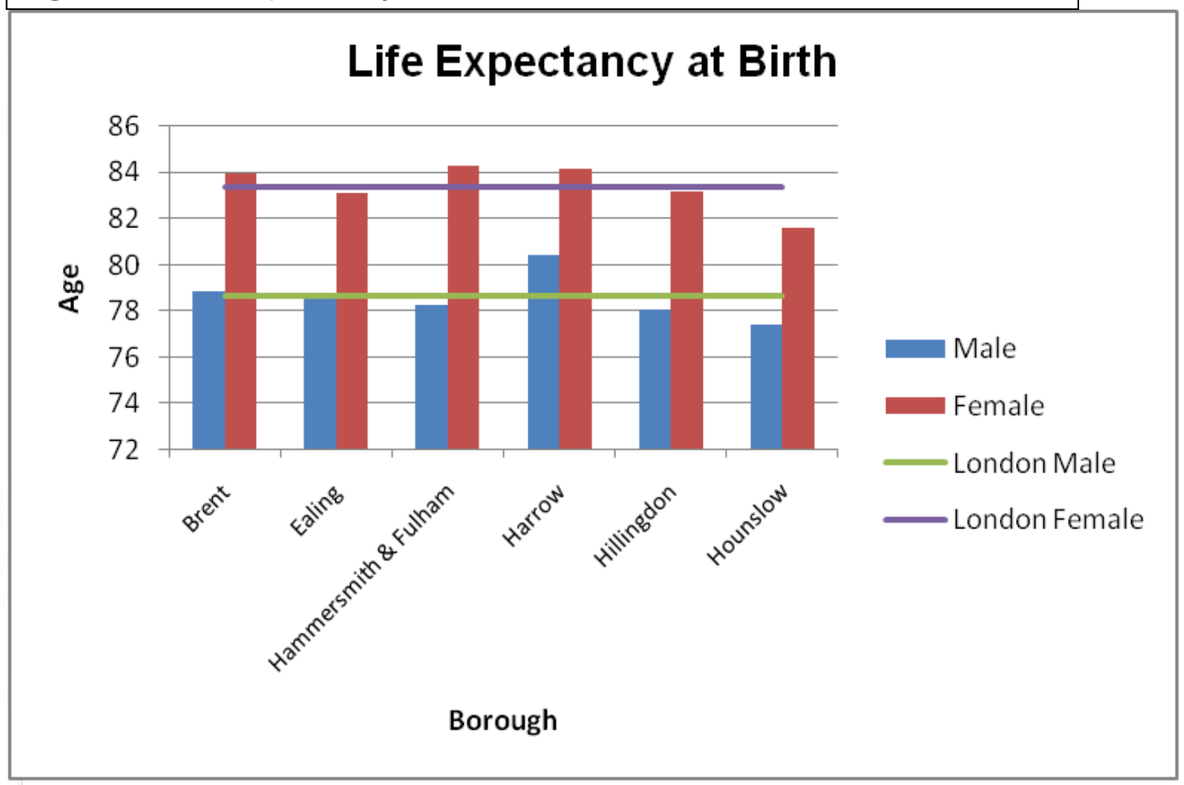


Figure 3.9 Life Expectency at Birth



3.5.2 FACILITATING AN INCREASE IN WALKING IN THE WEST SUB-REGION

Context

In west London the walking mode share for west London residents is around 27% (trips with an origin or destination in the sub-region). Other analysis shows that 71% of all potential walk trips are already being walked, giving West London plenty of opportunity to increase its walk mode share. Analysis shows that 15% of all mechanised trips in the region could potentially be walked (11% of all west trips). There is considerable support from partners in the region to improving the walking environment which the boroughs can build on.

Key barriers to overcome

Looking at the *Attitudes to Walking* survey in 2009, more than half of Londoners said they would walk more if there were new or improved routes and if they had information about them. They also say that they dislike fumes, dirty streets, and some feel unsafe walking in their local area. Other reasons for not walking include: lack of knowledge, safety, habit, convenience and simply 'not considering walking'.

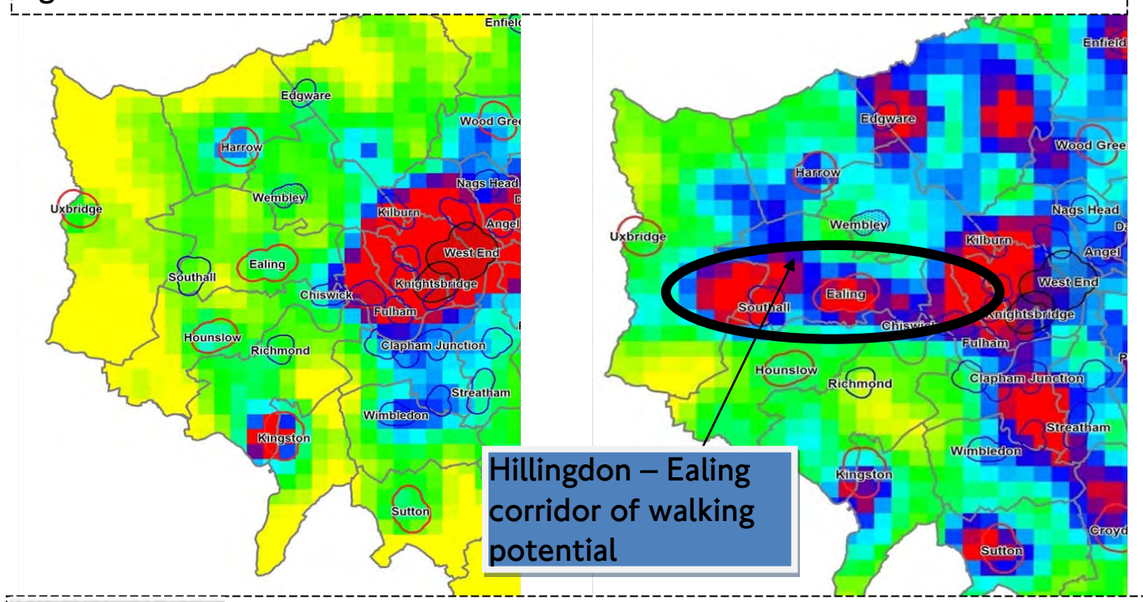
General Aims

Increasing the number of trips made by walking in West London is directly relevant to most of the Quality of Life MTS challenges, particularly: improving journey experience, improving the built environment, improving health and improving air quality. In fact the relationship between walking and these challenges is two way: increasing walking will improve these challenges and vice versa. Shifting people to walking can also have benefits in terms of reducing congestion and crowding on the road and public transport network.

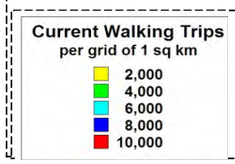
Walking Potential in west London

TfL analysis shows that, at present, walking activity is concentrated is the central/inner part of the region. The analysis also shows areas where there is potential for significant increases in walking activity: Ealing, Hillingdon, Southall and White City and the areas in between these centres. Indeed Ealing and Hillingdon account for half of all the region's potentially walkable trips. Additionally, there is potential radiating out from Harrow, particularly to the west and southwest. Whilst many of the measures outlined in this spotlight should be implemented across the region, the case for investment should be considered in these centres in particular.

Figure 3.10 Current walking by destination (left) and potentially walkable trips (right)



Note that the scale is different for current and potential trips

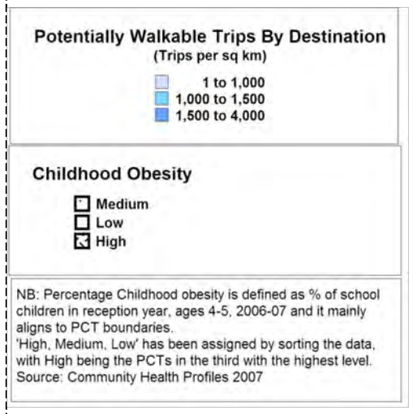


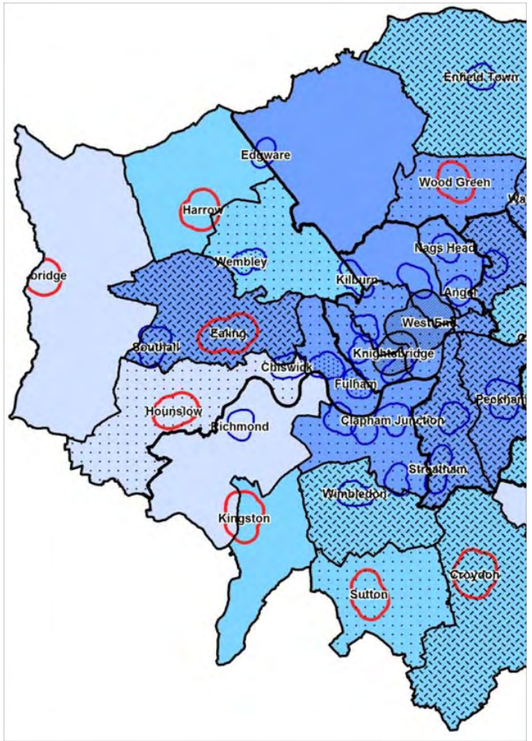
3.5.3 THE CONTRIBUTION OF WALKING TO HEALTH

Walking and Health

Walking has significant health benefits. Additionally, improving the health of the west London population is itself likely to lead to more walking activity. The map shows boroughs levels of childhood obesity alongside borough levels of walking potential.

Figure 3.11 Child obesity and walking potential





Walking and Journey Experience

Walking is involved in over half of all trips* in West London and, consequently, improvements in the walking environment will provide direct benefits to a significantly large number of people. There are likely to be safety benefits to all road users, as well as pedestrians, from less congested footpaths.

Measures to improve the built environment and streetscape as well as **air quality** are amongst the most important interventions to improve the walking environment. Possible interventions for improving the built environment are set out opposite along with key areas where they should be focused.

*This is based on the assumption that most public transport trips have a walk stage in them

Walking and the Built Environment

Measures to improve the built and walking environment include:

- removing street clutter and unnecessary railings/barriers
- enforcement of A-Boards and other commercial
- widen footpaths
- raise carriageways on crossings to footway level
- tree planting
- bench installation
- crossings moved to fit pedestrian desire lines
- shared spaces
- improving natural surveillance

Such interventions should be focused on Key Walking Routes which TfL will work with the boroughs to identify. These interventions should also be prioritised in places which have high walking potential as well as poor urban realm environments. Southall, Ealing and Hillingdon are three town centres that have both attributes.

Urban Realm in Southall

3.5.4 SUMMARY OF WALKING MEASURES

Legible London
Boroughs should consider implementing Legible London to improve local pedestrian wayfinding and encourage walking.
An improved wayfinding system can be a valuable tool as part of wider projects and corridor activities (e.g. a Key Walking Route).

Information
Linked to Legible London is the need to ensure information is sufficient. Making people aware of the journeys that are quicker by foot and ensuring clear and prominent information about these journeys is available at termini and stations, as well as through online journey planning tools are important.

Crossing streets
Opportunities to introduce new crossings and amendments to existing facilities should ideally be considered in all Corridor and Neighbourhood interventions and as part of Key Walking Routes. However, particular accident problems or public demand will always ensure the need to consider new crossings on an ad-hoc basis as well. Opportunities to introduce 20mph zones should also be considered

Urban realm
High quality urban realm and public space is a great generator of walking trips. Well-designed public space can provide benefits to London's overall vitality and economy in addition to promoting walking. Street environments are not just transport corridors but are places to live, work and play.

Key Walking Routes
These should be focussed in areas that are currently used by large volumes of people or those routes with a known suppressed / potential demand.
The main features of a key walking route can include:

- widened and repaved footways
- new and improved pedestrian crossings on pedestrian desire lines
- improved accessibility including raised tables and dropped kerbs
- de-cluttering of street furniture
- environmental enhancements including hard and soft landscaping
- seating
- measures to improve pedestrian safety
- pedestrian wayfinding
- street lighting that benefits pedestrians
- shared space where appropriate

Guidance and auditing
TfL has developed a new Level of Service (LoS) tool for use across London to measure pedestrian comfort. The coinciding research report provides policy, context, technical information/rationale, case studies and examples for pedestrian comfort in London. This new tool will be used to inform clients, stakeholders, designers, consultants, developers and maintenance workers of pedestrian requirements and considerations for pedestrian comfort in London.

One of the most effective ways to understand the issues pedestrians face and identify deficiencies in pedestrian environments is to undertake walking audits and develop the results into a works programme.

3.5.5 WALKING – NEXT STEPS

Further work	Funding avenues
• developing a greater understanding of walk potential (TfL), for example market segmentation • understanding locally where walking interventions can have most benefit – in west this might be around Crossrail stations for example • looking at how walking can be used to relieve pressure on crowded parts of the tube network • also potential future work on 'proximity interchanges' to encourage people to walk between interchanges on tube, bus and rail– offers time savings as well as crowding relief • work with the boroughs to implement joined-up measures that compliment each other across borough boundaries.	• walking interventions are relatively inexpensive • when their knock-on effects – improved air quality, supporting local economies– are considered, they provide additional value for money • promoting walking also provides Londoners with a fare-free form of transport, which is important in a time of personal economic constraint • promoting walking also contributes to improving the health of Londoners • considering the role of walking in land use planning – it is effective, and inexpensive, to consider walking opportunities when locating services etc, which could also present new sources of funding
Potential issues/trade-offs	**Links with LIPs**
• walking may compete with cycling for short trips. When modelling walking and cycling potential, with walk trips assumed at being less than 2km and cycling less than 8km, some trips will show potential to be converted to both modes • leisure vs utility trips. A greater reduction in crowding & congestion might be obtained from focussing on converting *utility* trips to walking. However it may be easier to create or convert leisure trips • monitoring. - we need to find more ways of monitoring the level of walking, Counting trips (end-to-end journeys) will tend to underestimate the amount of walking that occurs within the trip as journey stages. We also need to better understand how various interventions work	• LIPs 2 guidance published alongside MTS in May 2010 • within the new, cross-modal approach to LIPs, walking is considered under the funding stream of 'Corridors and Neighbourhoods'. Along with the other four streams, indicative 3-year funding has been agreed • mode share is a mandatory indicator for LIPs Data is reported each year as supplied by TfL and is a static 3-year average of trips by London residents with an origin in the borough (see Table B1 in TiL2) • walking target: boroughs are required to set targets on walking and cycling mode share/levels • LIPs must contain borough transport objectives, a 3-year Delivery Plan programme and a performance monitoring plan

3.5.6 FACILITATING AN INCREASE IN CYCLING IN THE WEST SUB-REGION

Why cycling is important

Building on the significant growth already achieved the MTS sets out the ambitious target of bringing about a 400% increase in cycling by 2026 (based on a 2000 baseline). There are a number of reasons why it makes sense for TfL, boroughs and other stakeholders to continue to invest in cycling:

- ✓ it is the most energy-efficient and least polluting mode of transport
- ✓ for many trips (especially those under 2 miles) cycling is the fastest and most reliable transport option
- ✓ very low cost to users compared to other modes
- ✓ cyclists and pedestrians spend more money in town centres than users of other modes (average monthly spend - walk £136, cycle £114, bus £105 and car £95)[1]
- ✓ rhe benefits in terms of health promotion and longevity far outweigh the loss of life years in injury on the roads[2]
- ✓ new evidence about cycling potential will allow boroughs and TfL to target their investment
- ✓ cycling can be promoted through non cycling specific schemes, e.g. integrating cycle parking into urban realm improvements
- ✓ predicted growth in numbers of trips means that it is essential to accommodate the needs of the most efficient users of road space (cycling, walk, buses)

1. *Understanding the economic contribution made by bus users to London's town centres (TfL)*
2. *British Medical Association (1992). Cycling: Towards health and safety, London: BMA*

Current cycling context in west

On average, around 66,000 pedal cycle trips are made each day by London residents which either have an origin or destination in the West sub-region (1.6% of all trips) and 31,500 people cycle in the region every day. This is quite similar to London overall where 1.7% of trips are made by bike and 1.9% of the population cycle each day.

38% of current cycle trips in the west are made for work and 46% for shopping and leisure. 6% of residents of the sub-region are frequent cyclists (cycle 3 or more days a week); another 6% cycle at least 1-2 days a week and 59% never cycle for any trips.

3.5.7 CYCLING - MAINTAIN

Barriers and opportunities to promote cycling in west

'Potentially cyclable trips' are defined as trips currently made by other modes which *could reasonably be cycled all the way* (based on LTDS data). The analysis of potentially cyclable trips seeks to quantify the nature and extent of the potential for cycling in London, by identifying trips made at present by other modes from the LTDS three year dataset 2005/8, and assessing whether they could potentially be cycled. Trips which fell into the following categories were excluded: trips made by young children, elderly and disabled people; trips longer than 8km or which would take at least 20% more time if cycled; trips made at night; and trips made with heavy or bulky goods. The filters are intended to act as a 'rule of thumb' to identify those trips most likely to be cyclable and, as a result, some trips are excluded which could, in fact be cycled and vice versa. This data was presented in the Challenges & Opportunities Document.

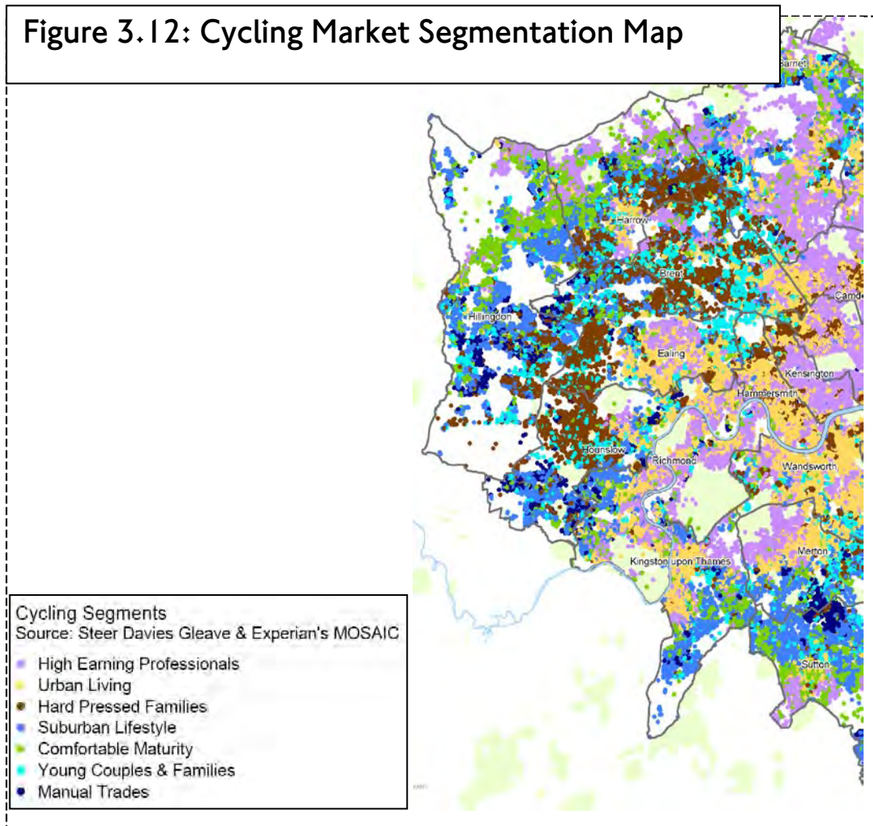
In west, the main barrier to improved cycle permeability is the high severance caused by major roads (e.g. A406, M4), railways and waterways. Furthermore, west has a high dependency on the car and in some places traffic speeds and behaviour do not encourage on-road cycling. A large proportion of residents in the sub-region can be found in the older age brackets, which influences the approaches taken by boroughs to encourage cycling.

Cycle Market Segmentation data on the propensity to cycle

The MOSAIC cycling profile map is one of the outputs of the segmentation. It shows every postcode in London colour-coded to reflect the segment the Postcode belongs to. It provides an instant overview of the nature of an area in terms of the type of people who live there, and whether they are the type of people most likely to cycle.

Combined potential cycle trips and market segmentation analysis
A map showing potentially cyclable trips made by people in the categories with the highest propensity to cycle, namely the 'Urban living', 'High earning professionals', 'Young families and couples', and 'Suburban lifestyle' segments by trip origin is also available.

Figure 3.12: Cycling Market Segmentation Map



3.5.8 CYCLING - FOCUS

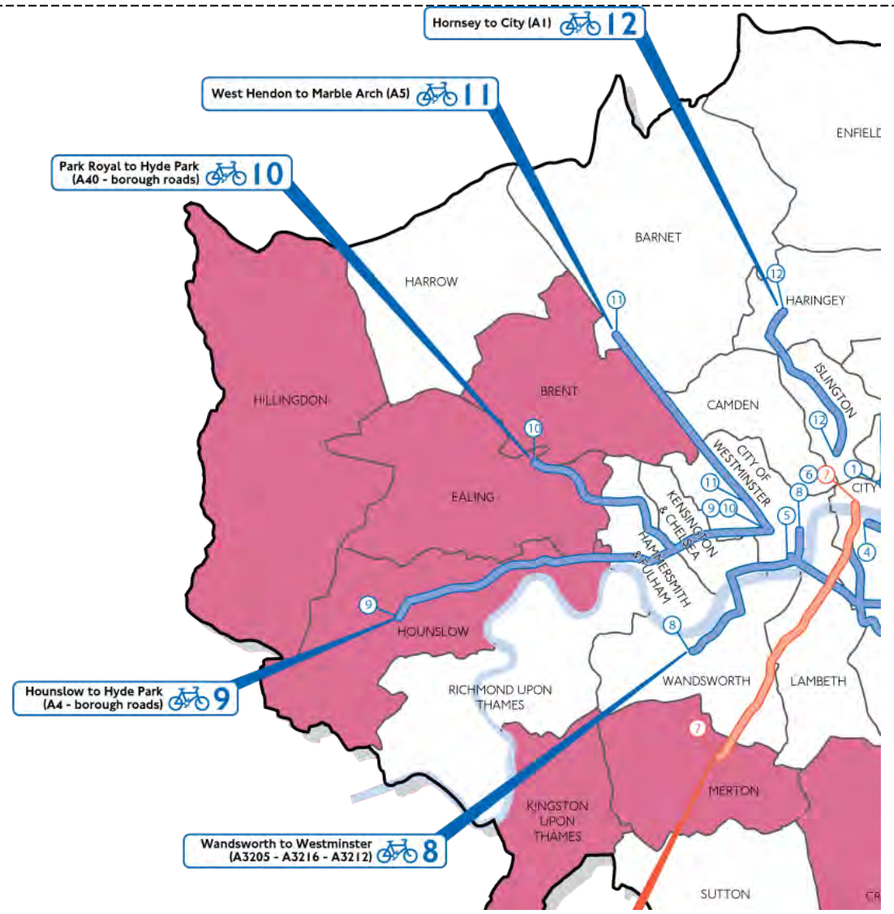


Figure 3.13: Biking Boroughs (in pink) and Barclays Cycle Superhighways (planned)

Several boroughs in the west sub-region are Biking Boroughs (see Figure 3.13). Biking Boroughs will be making a step change in their local transport delivery to improve their cycling environment and to raise the profile of cycling through local events and community initiatives. Biking Boroughs will be underpinned by strong local partnerships with the public sector and local community organisations.

A new approach to cycling investment

The new evidence relating to cycling potential allows decision makers to target resources in the most cost effective way (see Figure 3.14).
It can be developed collaboratively between TfL, boroughs, lobby groups, user groups and local delivery agents.
It relies on getting the balance right between the following three categories of intervention:

Promote: 'Promote' interventions are not focused on a particular area and are able to reach large numbers of people at relatively low cost. e.g. marketing and training.
Focus: More intensive infrastructure based solutions focused on areas which have been identified as having the highest concentrations of potentially cyclable trips. e.g. cycle lanes and cycle parking.
Intensify: Undertaking evidence based trials and monitoring results of new and innovative measures and sharing results in order to promote best practice. e.g. legislative change.

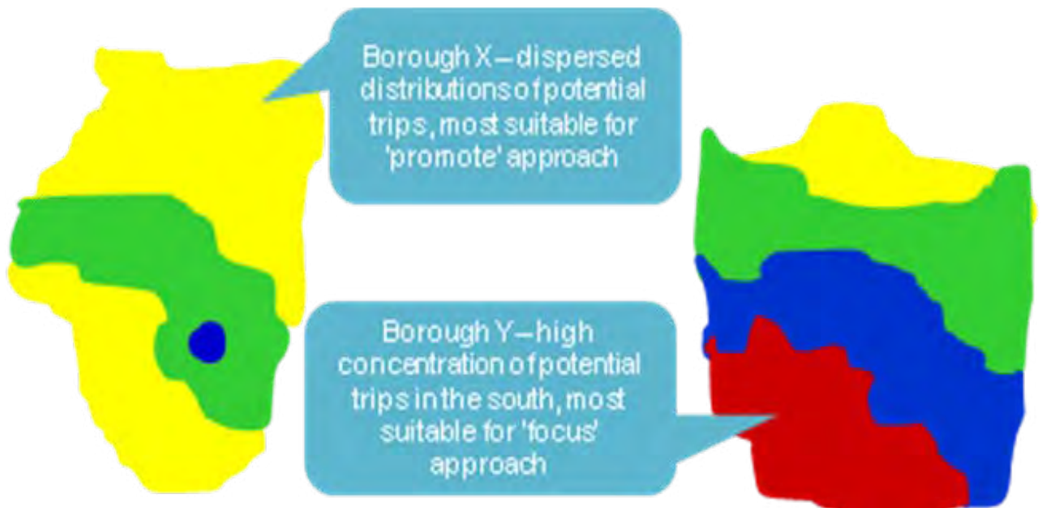


Figure 3.14 Examples of combining propensity to cycle with cycling potential to identify areas for investment

Promote: measures to increase the baseline of cycling provision in west

Cycling remains a minority activity in London. This means that there is significant potential amongst those groups of the population already more likely to cycle – there are many people who are 'just like' cyclists, but don't cycle.

''Promote' measures are not focused on a particular area but are instead intended to reach a large number of people at a relatively low cost (through promotion, training and safety awareness campaigns etc).

TfL and the boroughs also have an opportunity to ensure cycling benefits are levered from elsewhere, for example by:

- using planning powers and expertise to better integrate cycling into planned urban realm schemes and new development.
- ensuring that cycle-friendly activity is integrated across all programmes, e.g. road maintenance, signage or bus priority schemes.
- Introducing 20 mph zones to make local roads safer for cycling

Some barriers are specific to individual user groups, others apply to many - boroughs and TfL should continue to address these barriers in order to widen the appeal of cycling. TfL has conducted a great deal of attitudinal and behavioural research into the potential to encourage cycling and the barriers which apply to new cycle trips. For more info about the results of behavioural change please see TfL's 2009 Attitudes to cycling report and the 2008 Cycling in London report.

Focus: working with west boroughs to develop the full potential for cycling

Focus measures make use of the evidence about people's propensity to cycle which enables investment to be focused in the areas with the greatest potential.

A number of sources of evidence (e.g. potential cycle trips, topography, severance, existing cycle facilities, customer and behavioural research) are available which allow boroughs and TfL to identify potential interventions with which to approach their target market, interventions might include:

- improving routes to and permeability through town centres
- installing cycle parking
- working with employers

TfL can support the boroughs in developing an action plan for investment in cycling. This could take place through workshops with TfL and local stakeholders who understand the barriers which exist (e.g. campaign groups, NHS trusts, charities etc).

Intensify: Evidence based trials of new or innovative measures

Cycling interventions for 'intensification' are based on key elements provided by all of the best performing cities around Europe[1]:

- an extensive network of dedicated cycle facilities (paths and lanes etc),
- junction modifications and priority traffic signals,
- traffic calming,
- bike parking (abundant and high quality),
- coordination with public transport, e.g. good links to stations with cycle parking
- traffic education and training ,e.g. HGV driver and cyclists safety awareness campaigns
- traffic laws (protecting vulnerable cyclists but also promoting good behaviour).

Each requires financial commitment from the borough and political leadership. Furthermore, changes should be monitored and results shared (as success may prompt others to follow). TfL can provide strategic support for scoping of monitoring and should also act as a depository for information.

The approach to develop an intensify plan is the same as that for 'focus'.

Potential intensification measures:

- utilising 'Superhighway' principles; providing wide continuous cycle lanes and rationalise parking and loading on key routes to reduce need to merge in and out of main traffic stream and implementing cycle lane markings through junctions.
- improving permeability by enabling two-way cycling down one way streets using markings and other innovative methods such as mode filters.
- creating areas of shared space between pedestrians and cyclists.
- changes to the road traffic regulations (working with TfL and the DfT to pilot legislative change).
- using volunteer rangers to investigate maintenance issues.

[1] *World Transport, Policy and Practice (2007)*

3.5.9 CYCLING – INTENSIFY

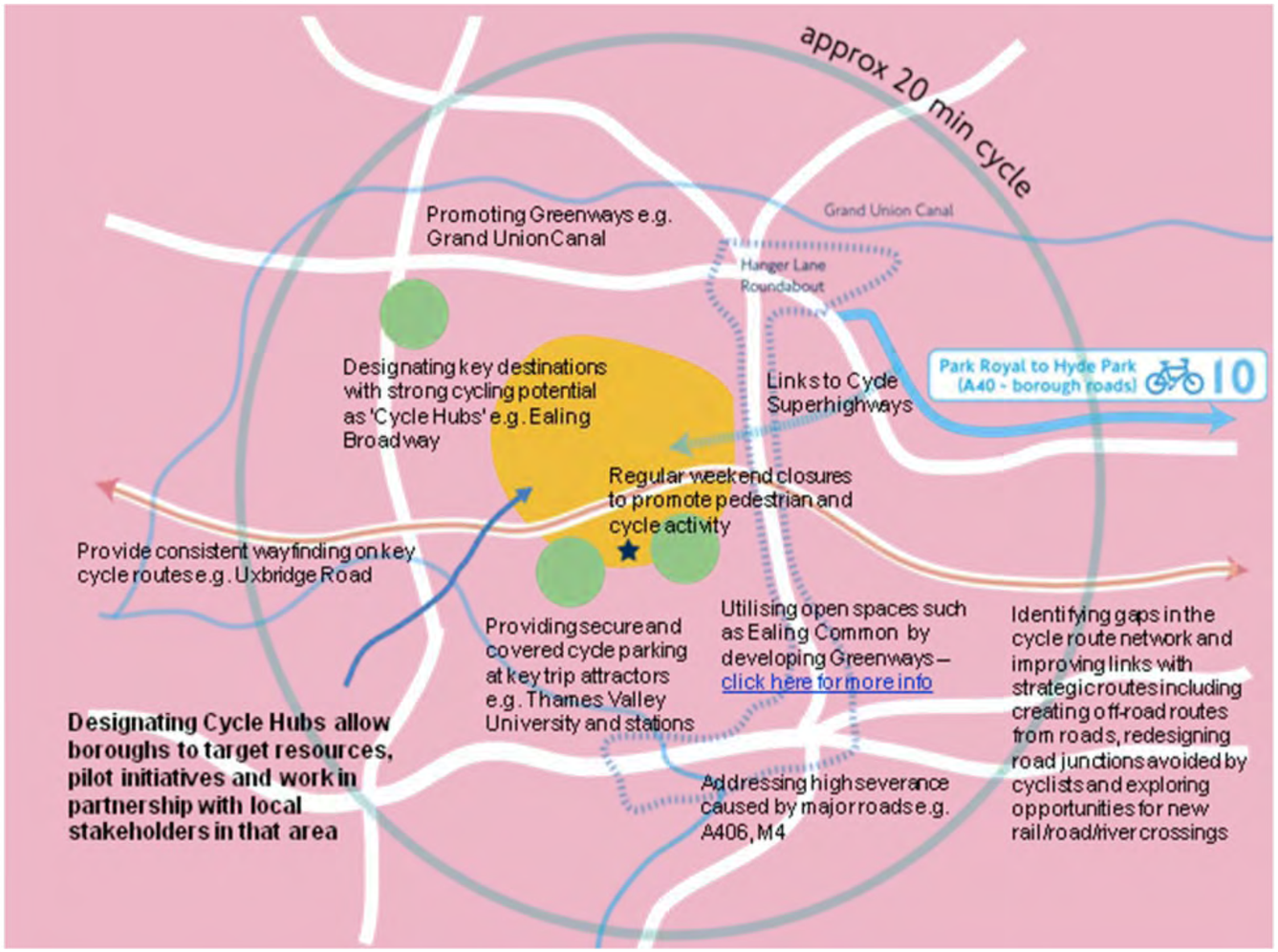
Intensify: More intensive infrastructure based solutions focused on areas with the highest potential

Example approach: Ealing town centre

Key Characteristics:

- rail, waterways and key arterial roads are physical barriers to permeability
- Ealing has 70 parks and open spaces, several of which are close to the town centre
- the town centre has projected high growth in population and employment
- Greenford Road and Uxbridge Road are already popular cycle routes at peak times
- Ealing Broadway postcode has the highest level of cycle thefts in the borough (2009)

Figure 3.15: Ealing town centre



Monitoring

TfL can provide strategic support for scoping of monitoring and should also act as a depository for information when it is published. This allows best practice to be freely shared between boroughs and others.

Next steps

Sub-regional planning presents an opportunity to encourage and promote greater collaboration between TfL, the Boroughs and other stakeholders. This collaborative approach is essential if London is to become a truly 'cyclised' city.

CHAPTER 4: IMPROVE THE SAFETY AND SECURITY OF ALL LONDONERS

London is a very safe place in which to travel. Traffic collision rates have been falling over a number of years, and public transport services continue to demonstrate very high standards of safety. Likewise, those travelling in London can be confident that their security is being maintained by the police and other stakeholders. Nevertheless, TfL, the British Transport Police, the Metropolitan Police and others concerned will continue to work together to ensure that all opportunities are taken to improve safety and security through new technology or emerging best practice.

This Goal is comprised of three challenges:

- Reducing crime, fear of crime and anti-social behaviour
- Improving road safety
- Improving public transport safety

Reducing crime, fear of crime and anti-social behaviour
Reducing crime rates and improving perceptions of personal safety and security

Improving road safety
Reducing the numbers of road traffic casualties

Improving public transport safety
Aiming to reduce casualties on the public transport network

4.1 REDUCING CRIME, FEAR OF CRIME AND ANTI-SOCIAL BEHAVIOUR

London's transport network is experiencing historically low levels of crime. All modes of transport in London have experienced reductions in crime including bus, Tube, and National Rail.

The low levels of crime on the transport system have been achieved through a combination of:

- visible and accessible policing
- targeted and intelligence led enforcement
- staffing of stations
- improvements in design (incorporating new evidence on crime prevention)
- introducing new technologies (such as CCTV), environmental improvements and listening to, and informing, staff and the travelling public

As indicated in the Challenges & Opportunities document, levels of crime on the network in west London are generally low, with local hotspots.

Figure 4.1 Map of bus crime in west London

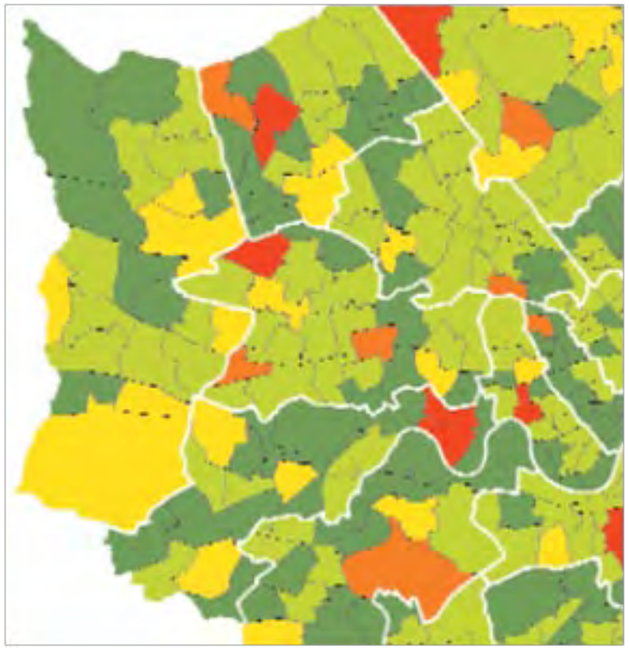
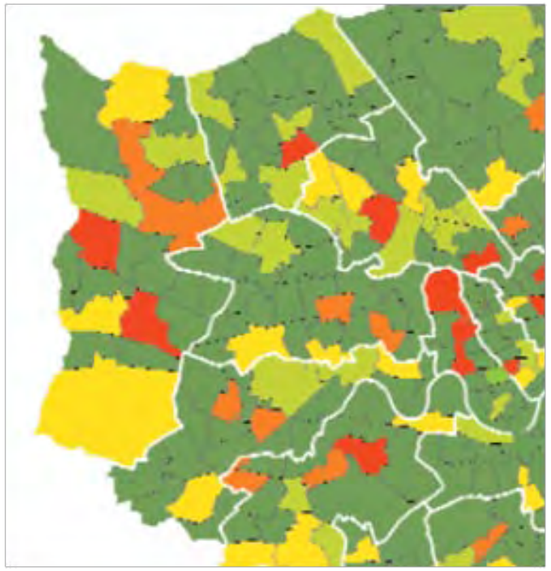


Figure 4. 2 Map of rail crime in west London



The Right Direction

Later this year TfL and its policing partners will publish '*The Right Direction: The Mayor's Strategy to improve transport safety and security in London 2010-2013*' (
The strategy encompasses all transport modes and should be read in conjunction with this sub-regional plan.

The objectives of the document are to:

- reduce crime and antisocial behaviour on the public transport network
- increase confidence in the safety and security of travelling in London
- reduce the volume of Londoners injured on London's roads as a result of criminal or antisocial behaviour
- improve cyclists' safety and security by tackling crime and antisocial behaviour
- contribute to the step change in the walking experience through removing crime and the fear of crime as barriers to walking

The Right Direction provides more detailed commentary and analysis against each of these areas and identifies a number of actions to deliver on the objectives and achieve the targets within the document.

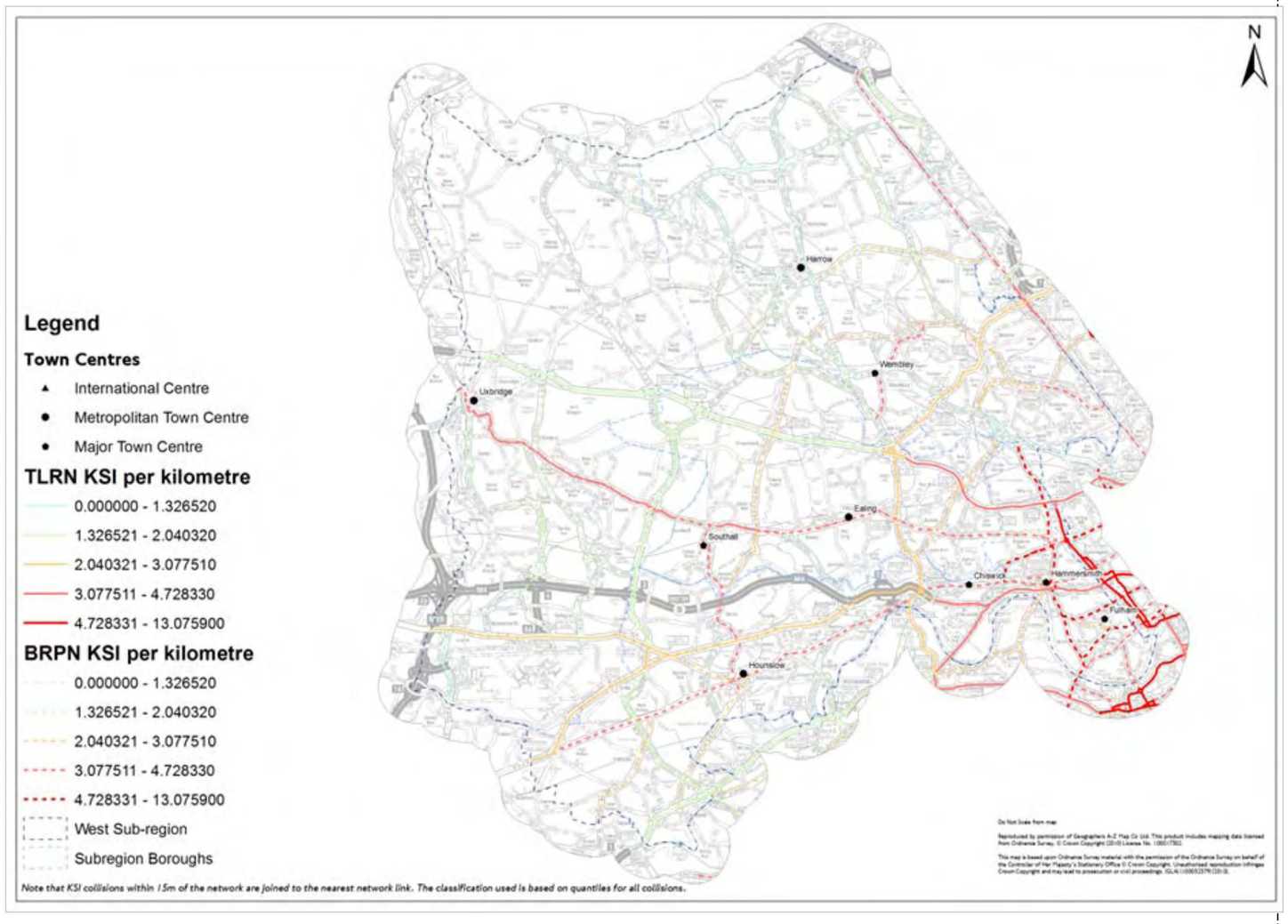
4.2 IMPROVING ROAD SAFETY

Introduction

Significant improvements in road safety have been achieved in London over the last decade. By the end of 2009 Killed and Seriously Injured casualties (KSIs) in London had reduced by 52% compared to the mid 1990's. Potential activities for achieving further reductions in KSIs, notably in the context of increasing levels of cycling, are outlined by the Mayor's Transport Strategy. These include public engagement to improve road user behaviours, specific measures to improve cyclist/ HGV safety (as set out in the recent Cycle Safety Action Plan), work related safety initiatives, road safety engineering, and road safety enforcement.

The MTS also describes the potential benefits of lower speed limits on residential roads and better speed limit enforcement including through equipping vehicles 'intelligent speed adaptation' technology.

Figure 4.3: Priority areas for improving road safety in the west sub-region



Safety improvements for A and B roads

Over 40% of KSIs occur on 30 or 40 mph A roads in this sub-region. While reductions in speed limits are generally not appropriate for these roads, there is scope for targeted enforcement and public information campaigns to improve road user behaviour. The map above shows potential priority areas where these activities could be targeted.

The potential for 20mph zones on local roads to reduce KSIs

Research has suggested that, London-wide, there are significant potential safety benefits of extending 20mph speed limits (with traffic calming features or enforcement) to further residential roads.

The rate for KSIs on 20mph local roads is 0.03 per km. The equivalent rate for 30mph local roads is 0.14, 4.6 times higher. These rates are lower than the London average for 20 and 30 mph local roads which are 0.07 and 0.20 KSI/Km respectively.

If all local 30mph roads were converted to 20mph with appropriate enforcement, and assuming a 28% reduction on these roads were achieved, KSIs would reduce by 34 per annum, or 8% of the overall total for all roads in the sub-region.

The map on the right shows the KSI rate per kilometre of 30mph local road. It provides an indicative guide to broad areas of each of the sub-regions where further conversion of 30 to 20 mph roads might potentially be most effectively targeted. Note that the map shows a total of three years' data (2007-2009).

With regard to other targeted measures, motorcyclists account for over 20% of the number of road users killed each year, yet the number of journeys made by motorcyclists account for less than 1%. Motorcycling can therefore be considered the most dangerous mode of transport. Consideration should be given to motorcycle issues during the safety audit process of new schemes.

Figure 4.4

4.3 IMPROVING PUBLIC TRANSPORT SAFETY

The injury risk posed to passengers and staff on London's public transport network is already very low and there are no specific sub-regional issues. The MTS seeks to ensure that high health and safety standards are maintained as public transport provision expands and to reduce the risk of disruption from unpredicted events.

CHAPTER 5: IMPROVE TRANSPORT OPPORTUNITIES FOR ALL LONDONERS

A key objective of the Mayor's Transport Strategy is to ensure that all Londoners have access to the wealth of opportunities the city offers, bringing benefits both to individuals and entire communities. To achieve this, TfL, along with boroughs and other stakeholders will need to consider the location and accessibility of services, jobs and amenities, identifying gaps and possible improvements. Places which are yet to be built present a particular opportunity for joined-up planning. There will also be particular focus on the specific needs of those less able to access travel opportunities than others, and all stakeholders will need to work together to ensure that access to transport is not in itself a barrier to opportunities.

Improving accessibility
Improving the physical accessibility of the transport system, and improving access to services

Supporting regeneration and tackling deprivation
Aiming to support wider regeneration

5.1 IMPROVING ACCESSIBILITY IN THE WEST SUB-REGION

Improving accessibility
Improving accessibility consists of two main areas – improving the physical accessibility to the transport system and improving access to opportunities and services. The former is set out in this section and is further sub-divided into improving the design and layout of vehicles, streets and stations, and improving door to door transport services. Improving access to opportunities and services is set out in Section 5.3

Improving Physical Accessibility
Improving the design and layout of the transport system
A crucial element of improving physical accessibility is improving the design and layout of all parts of the transport system – stations, vehicles and streets. All three realms need to have good physical accessibility standards to allow people with mobility impairments to travel with confidence and security from the start of the journey to the end.

Vehicles
The London bus fleet has made great strides in accessibility with all buses in London now having low floor doors and wheelchair and pushchair areas.

Accessibility improvements are also being made to Underground trains, with new sub-surface trains having four dedicated wheelchair spaces as well as shorter gaps between train and platform.

The new Overground rolling stock has much more standing space and has walkthrough carriages.

Priorities in the west region are on bus and rail services where:

- crowding prevents people with mobility impairment on boarding services
- where a different vehicle type would be more suitable to serve the population being served

Measures include:

- use rail franchise renewals to improve the suitability of vehicle design for passengers with mobility impairments
- awareness campaigns to improve passenger behaviour towards people with mobility impairments

Streets
Priorities in west London are the streets around existing step-free stations with poor levels of accessible urban realm as well as around planned step-free stations.

Other priorities areas are the places identified in Key Places (Chapter 8), where trip levels are high.

Measures to include:

- de-cluttering – removing unnecessary street furniture and guard railing
- enforcing regulations regarding a-boards and commercial operations that extend out onto the public footpath
- widening and smoothing footpaths
- reducing speed limits
- ensuring pedestrian desire lines are properly catered for
- considering the position of bus-stops directly outside station entrances
- removing/relocating on-street parking
- improving the integration of footpath and road
- provision of accessible bus stops

5. 2 IMPROVING THE DESIGN AND LAYOUT OF THE TRANSPORT SYSTEM

Stations

Transport for London is continuing to invest in the installation of step-free facilities to underground stations across the Tube network. Network Rail also has its own programmes of station upgrades. Current and future (2018 Business Plan reference case) step-free station provision in London is set out in Figure 5.1 below. It shows that there are currently no step-free stations in the inner section of the Hounslow corridor but that this, along with the Ealing corridor, will improve by 2018. The whole Uxbridge corridor however, still remains poor with the Central Line continuing to have no step-free access in the west (see Figure 5.1).

Figure 5. 1 Step-Free stations

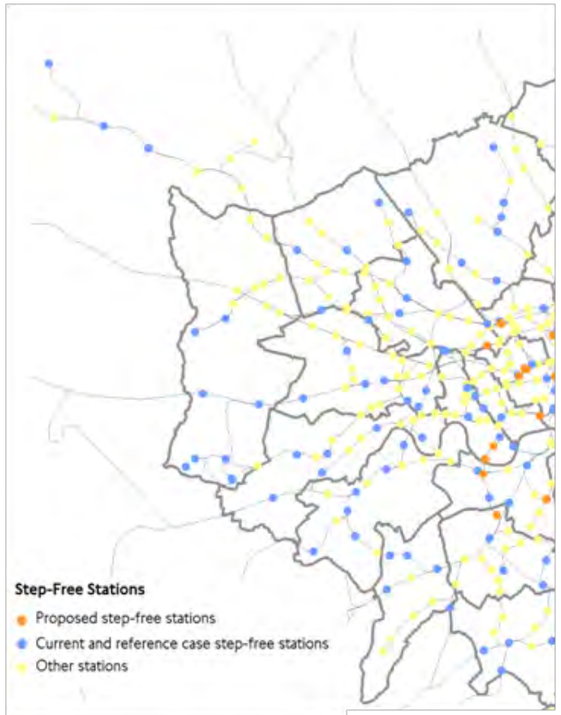


Figure 5.2 Current step-free access levels

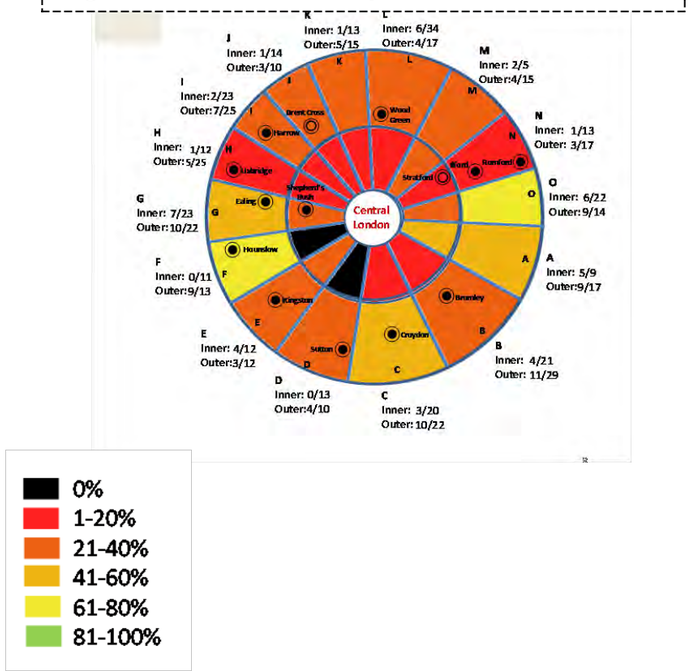
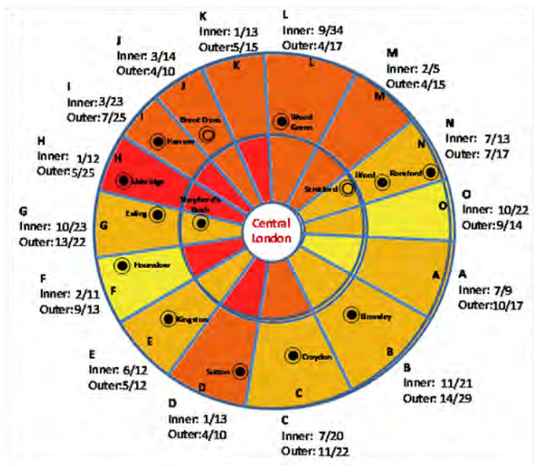


Figure 5.3 MTS Reference Case in 2018



Measures to improve stations include:

- including plans for physical accessibility in plans for station development/refurbishment
- integrating step free plans with car parking facilities – perhaps targeting improvements at stations with significant parking facilities, or introducing more parking at step free stations
- standardising information and wayfinding in National Rail stations in the region with TfL way-finding (Legible London format)

Door-to-Door Transport

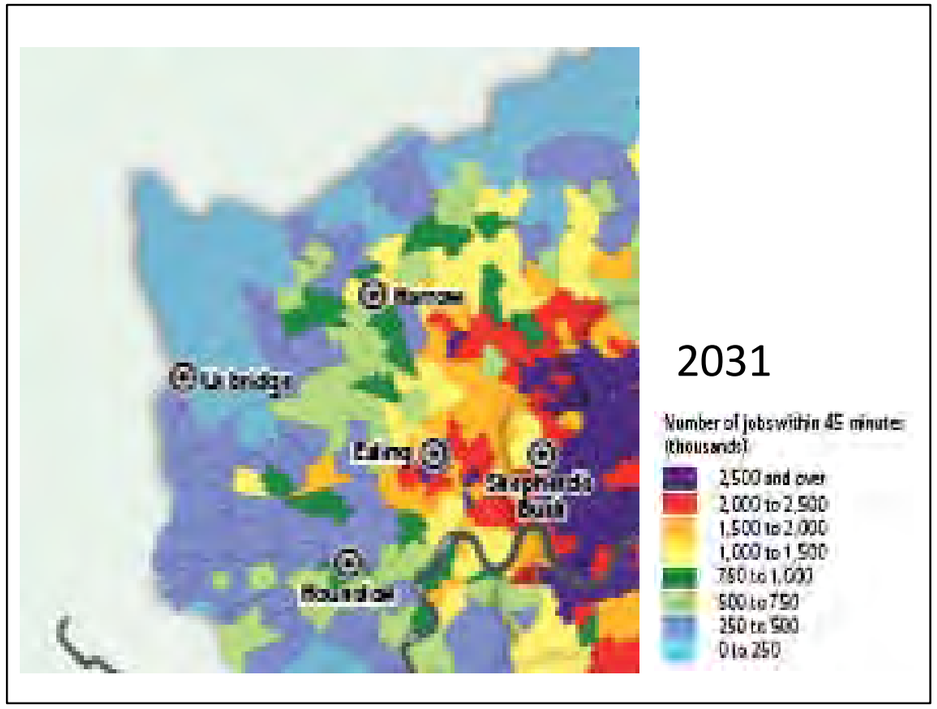
Door-to-door transport services are a crucial element in providing access to opportunities and services for all by providing transport for people who find it difficult or impossible to use mainstream public transport. Door-to-door services are provided by a number of public sector bodies across the capital (NHS London, London Boroughs and TfL) and through a variety of providers (Dial-a-Ride, Taxicard, Borough Community Transport fleets etc). One of the key measures to improve door to door transport is the rationalisation of the service to provide a simpler and more efficient service for passengers. London Councils is investigating a number of options to integrate the numerous forms of door-to-door transport in London and TfL will work with them on this initiative.

5. 3 ACCESS TO OPPORTUNITIES AND SERVICES

Access to opportunities and services in the west sub-region
While improving accessibility to the public transport system is principally the responsibility of transport operators and local authorities, improving the access to opportunities and services needs to be facilitated by a wider group, including service providers and developers.

As would be expected, the overall level of access to opportunities and services across London is high, particularly when compared to other parts of the UK. This is in part due to the extensive public transport system in London, but also due to the high density of people and the services they need. However, when looking at west London there are some pockets of poorer relative access, particularly away from inner areas. Access to employment is and will continue to be poor (relative to other parts of London) in most parts of Hillingdon.

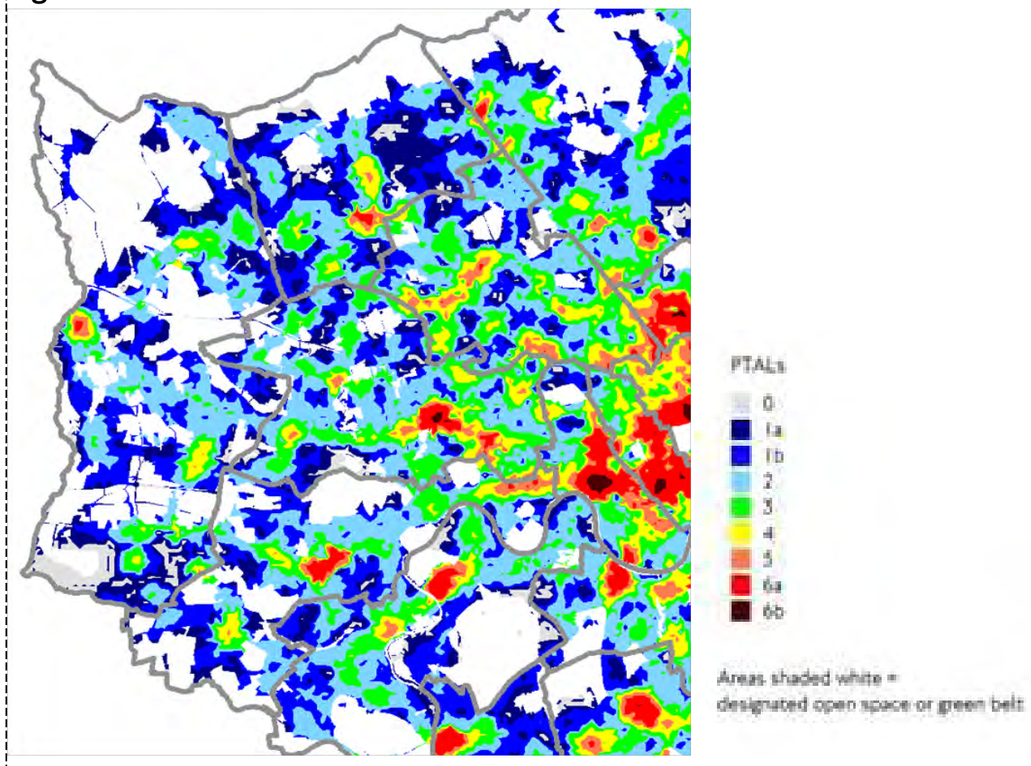
Figure 5.4 Access to employment in west London



Whilst this pattern of access will in most cases reflect population levels and land use, poor access to opportunities and services does exist in the region's residential/urban areas. Again, improving access should be focused on areas with high levels of deprivation - where access to opportunities and services is both needed and wanted. The solutions are varied and complex and do not just involve transport improvements but also regeneration and inward investment, and improvements in safety and personal security. Access to public transport and services may be high but use of the public transport system and/or local services might be low due to barriers of access such as lack of knowledge, fear of crime or affordability. Similarly, jobs might exist locally but employment opportunities might be low due to a mismatch between job requirements and the skill sets of the local population.

Figure 5.5 below show the Public Transport Accessibility Level (PTAL) within west London. PTALs are based on the combination of the walk distance to the nearest public transport service and wait times and it can be seen that the best levels are located in the metropolitan centres, along the radial PT corridors and within the inner part of the region. Poor accessibility levels are located throughout the region but are particularly prominent in the outer areas of region in Hillingdon and northern Harrow.

Figure5.5 PTAL levels in west London



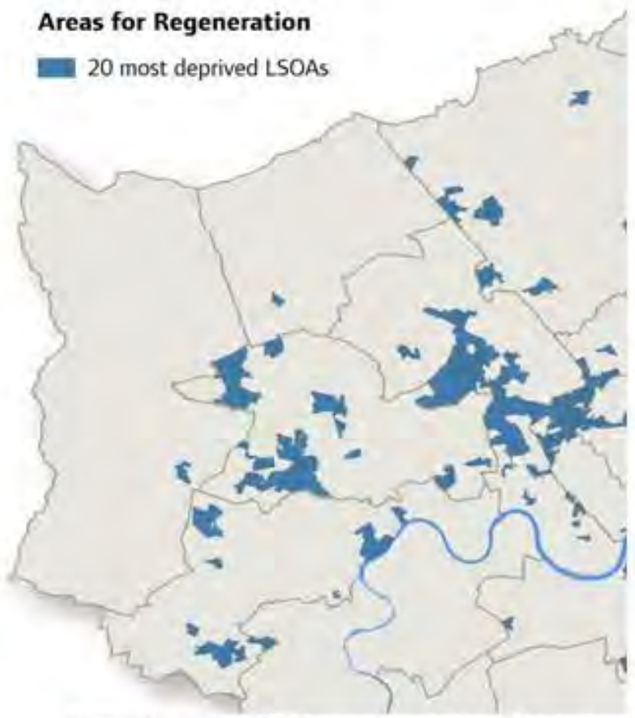
When prioritising the improvement of poor public transport accessibility, TfL and local authorities may choose to focus on areas that also have high levels of deprivation. Figure 5.6 below shows that in West London, Yeading, Southall, Kensal Green, Willesden have poor levels of public transport accessibility as well as high levels of deprivation. Crossrail will greatly improve PT accessibility in Southall and Yeading and the HS2 station proposal at Old Oak Common would greatly improve accessibility at Kensal Green and Willesden.

Figure 5.6 PTALs and deprivation levels

5.4 SUPPORTING REGENERATION AND TACKLING DEPRIVATION

The London Plan identifies key areas of change – Opportunity Areas, Areas for Intensification, and Areas for Regeneration. Areas of regeneration reflect the 20% most deprived areas. These are areas where the Mayor will work with strategic and local partners to coordinate their sustained renewal by prioritising them for neighbourhood based action. Figure 5.7 shows these areas in west London.

Access to transport is one factor among many in achieving regeneration: transport allows people to access employment opportunities, education and health services (for example), thereby increasing quality of life. Many of the Areas for Regeneration identified in the London Plan currently enjoy relatively high public transport accessibility levels, and in this case improving awareness and information about existing transport services will contribute to regeneration. In deprived areas with low public transport accessibility, regeneration could be facilitated through additional provision of public transport, giving a wider range of opportunities to travel to and from these areas.



Source: Department for Communities and Local Government
ONS Super Output Area Boundaries.

The London Plan Review Draft Consultation Plan (2009)

Figure 5. 7 Areas for Regeneration

CHAPTER 6: REDUCING TRANSPORT'S CONTRIBUTION TO CLIMATE CHANGE AND IMPROVING ITS RESILIENCE

In response to the issue of climate change, the Mayor has set an ambitious target of a 60% reduction in London's CO_2 emissions.

Because of its high population density and other characteristics of its transport geography, London is well-placed to take on this challenge – but facing it will require concerted action across the coming years and decades to improve conditions and change travel in the capital.

London will need to find ways to reduce its contribution to climate change even further, whilst leading the world in the face of a potentially fast-changing climate. Dealing with these challenges should generate wider economic and social benefits, while avoiding the potentially serious consequences of inaction.

This goal comprises two challenges:

- Reducing CO_2 emissions
- Adapting to climate change

Reducing CO_2 Emissions

Adapting to Climate Change

6.1 REDUCING CO_2 EMISSIONS IN WEST SUB-REGION

Key issues for sub-region / priorities

Increasing CO_2 emissions are a global problem and whilst it can be helpful to identify CO_2 hotspots, this can lead to a focus on reducing CO_2 emissions at these specific locations, or shifting the problem. Although a regional and borough breakdown of emissions is presented, it is important to note that population size and the attraction of areas within each sub-region influence the road emissions. It is therefore not appropriate to tackle a single region, borough or mode but the focus should be on helping boroughs reduce carbon emissions across the board, for instance by looking at placing electric vehicle charging points nearest those most likely to be early adopters, implementing policies to reduce mileage from delivery and servicing vehicles. In addition, local measures applied to reduce emissions of air pollutants can reduce CO_2 emissions too, in particular those that reduce congestion at junctions or urban centres.

As part of the process of monitoring LIPs, progress is tracked against five strategic performance indicators on which boroughs are required to set locally specific targets. Annual tonnes of CO_2 from ground-based transport is one of these indicators.

West Sub-region

As shown in Figure 6.1 below, aviation emissions (from on site activity and emissions up to 1km in the air) are 39 per cent of transport emissions in London. 37 per cent of all ground based transport emissions (or 67 per cent of road transport emissions) in the west sub-region are from cars and motorcycles. Taxis contribute around 1per cent more to road transport CO_2 emissions than the other outer London sub-regions probably because of business being conducted around the Heathrow area

Figure 6.1

Ground-based transport emissions from West London (excluding electricity generation) = 2.69 million tonnes CO_2

Freight

In west London, freight vehicles contribute around a quarter of the region's road transport CO_2 emissions. Local measures can be added to London-wide and national initiatives to reduce the freight industry's contribution to CO_2 emissions. These include many of the measures set out in the air quality section, particularly those that focus on reducing freight vehicle km and adopting cleaner vehicle technology.

Mode Shift to Sustainable Modes

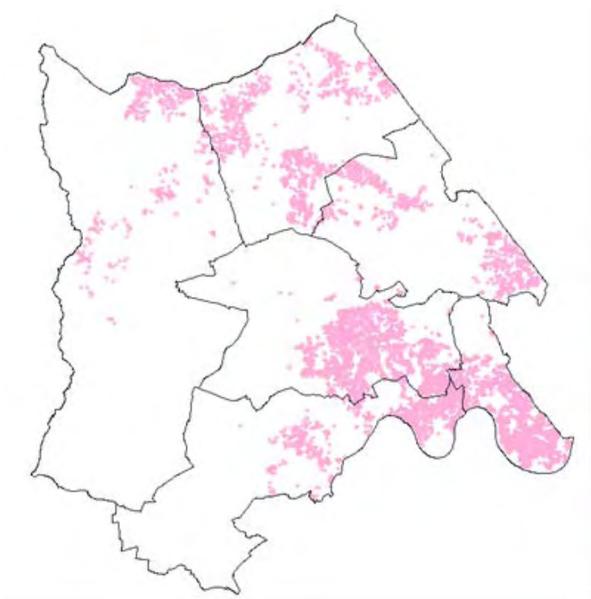
As outlined in the section on Rethinking Travel above, there are a number of measures that can be used to encourage people to change their travel behaviour to modes of transport that produce less $C0_2$ per passenger km travelled. These included smarter travel programmes, better information provision, pricing initiatives and car-free development. They also include land use policies and information technology that reduce the need to travel by car, improvements to public transport services, measures to encourage cycling and walking and also advice on how to drive to minimse carbon emissions.

6. 2 REDUCING EMISSIONS: ELECTRIC VEHICLES & CAR CLUBS

Electric Vehicles

The map below highlights those areas that, given the current socio-demographic make-up of the sub-regions, are likely to purchase an electric vehicle in the short to medium term. As would be expected the more central areas of the sub-region stand out with less potential for purchase in outer London. Those areas currently not highlighted are still considered to be suitable locations for EV uptake but in the medium to longer term as costs and battery range become more in line with conventional vehicles.

Figure 6.2 Potential purchasers of EVs



Beyond these areas of potential early uptake, new residential and commercial developments should provide facilities for EV charging, even if not highlighted on the maps, in order to respond to the changes in regional make up over time.

Alongside provision for EVs, sub-regions should also take into consideration alternative fuels and technologies that are being developed. This could be through working in collaboration with other boroughs when trialling new a technology for fleet vehicles and introducing technology - neutral incentives for the uptake of low emission vehicles.

Car Clubs

Car clubs enable those who require occasional access to a car to have this on a pay-as-you-go basis without the need to own a vehicle. Thus members have an incentive to avoid non-essential car journeys. Since May 2008, the Mayor and TfL have invested more than £1million in the development and expansion of car clubs in London, with 127,000 car club members, accounting for 87 per cent of the UK's car clubs.

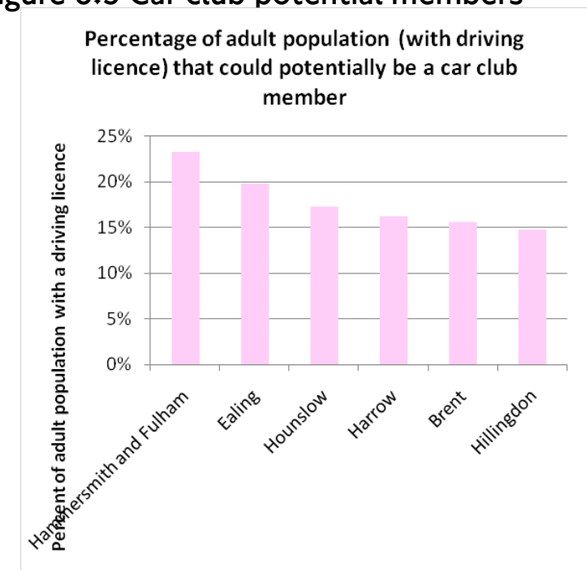
The continued expansion of car clubs in west London will make an important contribution to the reduction of transport CO_2 emissions as users reduce their mileage and use vehicles that are more efficient than the average private vehicle in London.

According to the Carplus annual survey of car clubs 2009/10, recent data indicates that on average car club members report making 4 - 5 car driver trips of less than 25 miles per month compared to 33 for the average London licence holder. On average the car club fleet is 10-33 per cent more efficient than the average UK fleet and each car club car is estimated to result in an average of eleven private vehicles being sold and a further nine not being purchased.

Areas of greatest potential

In west London, TfL analysis, based on the socio-demographic make-up of the areas, indicates that Hammersmith & Fulham has the greatest potential for the uptake of car club membership (Figure 6.3). As with electric vehicle uptake, new residential and commercial developments will create greater potential for membership and so provision of car club bays in these areas is encouraged. In existing areas of residential concentrations on street car club bays can alleviate parking pressures and expand the number of members.

Figure 6.3 Car club potential members



6.3 ADAPTING TO CLIMATE CHANGE

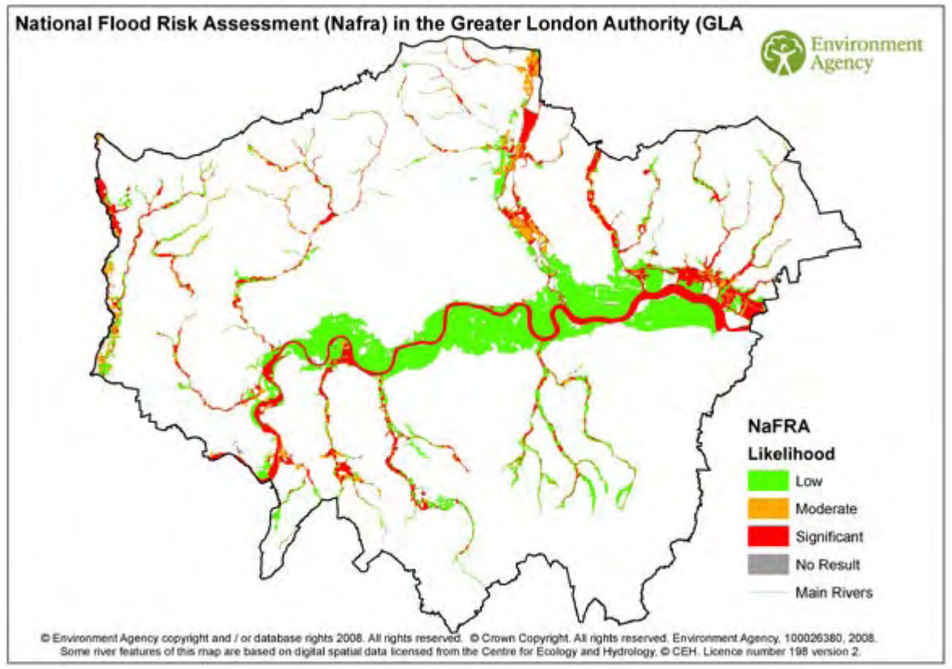
The Mayor's draft Climate Change Adaptation Strategy outlines potential climate impacts and opportunities for London's transport networks, as summarised below.

Flooding has the potential to cause delays and closures to rail and road based transport, particularly affecting underpasses, subways and tunnels. Waterborne freight and other river based transport such as the Woolwich Ferry could be affected by more frequent closures of the Thames Roding Barriers due to flooding.

Hotter summers will affect the health and comfort of passengers on public transport and those walking, cycling and in private vehicles. For rail transport, overheating would lead to increased risk of speed restrictions, rail buckling and trackside fires, while more extreme weather could lead to increased delays due to flooding and damage from frost, snow and ice.

As set out in the MTS, London's transport network will need to adapt to more frequent and intense extreme weather. Proposals in the MTS include measures to improve the resilience of the network and ensuring that new infrastructure and assets are designed with climate change impacts in mind.

Figure 6.4 Flood risk assessment in GLA area



CHAPTER 7: SUPPORTING DELIVERY OF THE LONDON 2012 OLYMPIC AND PARALYMPIC GAMES AND ITS LEGACY

The 2012 Games will place new pressures on London's transport system. Much has been and continues to be done to upgrade and enhance the network to respond to these pressures, including new infrastructure and careful planning. During the Games themselves, TfL, Boroughs and other stakeholders are committed to keeping London moving.

The Games also present an opportunity for London to capture lasting legacy and regeneration benefits and embed sustainable travel habits in its growing population. This goal comprises two challenges:

- Supporting the delivery of the London 2012 Olympic and Paralympic Games
- Supporting the legacy of the Games

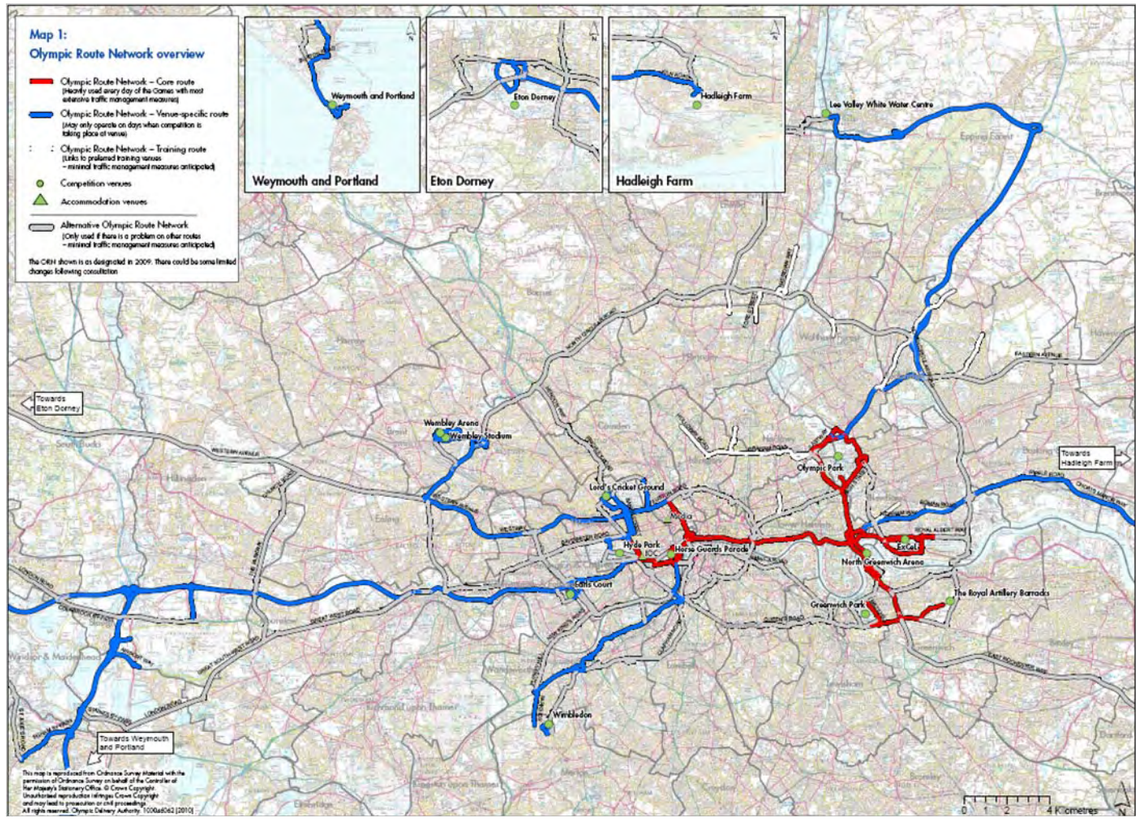
Supporting the delivery of the London 2012 Olympic and Paralympic Games

Supporting the legacy of the Games

During the 2012 Olympic Games, badminton, rhythmic gymnastics and the football finals will be hosted at Wembley stadium and Wembley Arena. As a world class venue, Wembley is already well connected by Underground, national rail and bus. As with all events, spectators will be encouraged to travel to the venue by public transport, walking and cycling, and following the Games a sustained increase in active travel would contribute to the legacy.

As one of the main gateways to the Olympic Games, Heathrow Airport will see a large number of spectators arriving in West London. Managing this onward dispersal through the west region to the Olympic Site at Stratford and other Olympic venues across the city, particularly Wembley, is a key challenge for the west London sub-region. Ensuring sufficient capacity and network reliability along the Olympic Route Network is essential to a successful Games and to keeping day-to-day activities in the region going as well.

Figure 7.1 The Olympic Route Network



CHAPTER 8: KEY PLACES

8.1 OVERVIEW

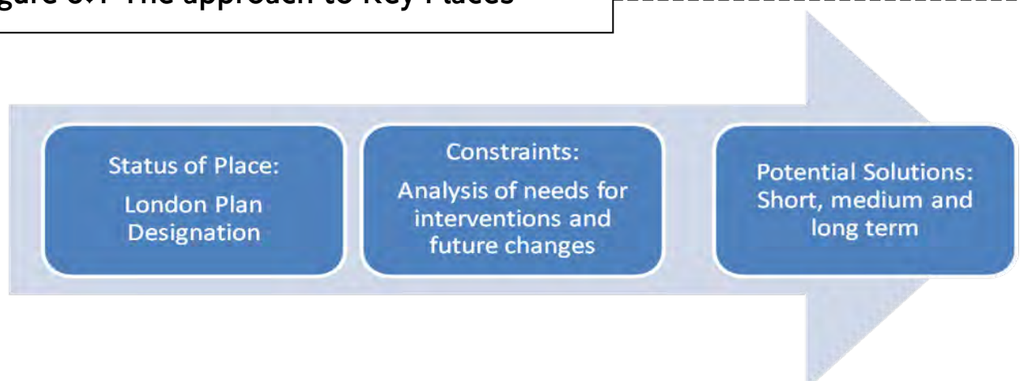
Key places for each sub-region were identified in the Challenges and Opportunities documents published in February 2010. These were based on London Plan designations, local policy documents (SPD, LDFs, etc) and engagement with the sub-regional boroughs.

The west London Challenges and Opportunities document identified key places in the sub-region including opportunity areas, areas for intensification, metropolitan town centres and other important centres

Some initial analysis and assessment of these areas has been carried out, in line with the process shown below. The challenges and opportunities set out in the preceding sections of this plan must be integrated to ensure good access to, from and within town centres and other key places. The quality of the urban realm is also vital to ensure their attractiveness as places to live, work, shop and visit.

In the context of constrained funding, ensuring complementary investment and focusing resources where there are other opportunities will be particularly important. TfL and the boroughs will need to work closely with organisations including Network Rail and developers to maximise the value of investment.

Figure 8.1 The approach to Key Places



Key considerations

Good access to/ from key places is vital. In some cases, enhanced capacity will be needed to support growth and reduce crowding while in some areas, new links may be needed to improve connectivity. Bus services play a key role in supporting access to town centres and provision will need to be reviewed on an ongoing basis. Interchanges are important, not just in terms of their capacity, quality and accessibility but also their integration to the surrounding area.

There is significant congestion in many of the town centres in west London, parking is an issue for many and highway journey time reliability needs to be maintained where traffic levels grow. However, these areas also have potential to increase walking and cycling and to encourage mode shift, with appropriate support measures, such as cycle parking and wayfinding information. Freight access to key places and provision for deliveries and servicing is integral for their commercial vitality – finding better ways to manage this and reduce the traffic and environmental impacts will be increasingly important.

Access and the quality of movement within these locations must also be prioritised, including encouraging walking and improvements to the urban realm. The value for money of measures is likely to be increased when it is combined with other initiatives and investment being made, such as in interchanges.

In some cases, the tension between providing access to and access within places may be a pressing issue. Addressing these competing demands will need a consideration of the different traffic impacts (including buses) and the priorities for the place.

Next steps

As highlighted, some more detailed work has already been undertaken in a few locations to enhance TfL's understanding of current and potential future travel patterns and some of the opportunities for change. Further more detailed work to try and establish the key transport and urban realm issues in each place will be discussed with the Sub-regional Panels to agree the priorities and approach. In addition, specific studies may be undertaken with particular schemes or growth areas, such as Opportunity Area Planning Frameworks, which will consider

8. 2 EXAMPLES OF KEY PLACES IN WEST: METROPOLITAN CENTRES

Harrow

Harrow is the second largest Metropolitan Town Centre in London after Croydon. The town centre serves as a hub for shopping and leisure activities in the local area and is also home to a number of major institutions including Northwick Park Hospital, University of Westminster Harrow Campus and Harrow Boys School.

Harrow is well served by public transport with the Metropolitan line serving Northwick Park and Harrow-on-the-Hill stations and the Bakerloo line and London Overground serving Kenton to the east of the area. National Rail services from London Marylebone also serve Harrow-on-the Hill station. Currently, the networks serving Harrow town centre have spare capacity at the points that serve the area. Despite being a significant retail centre, Harrow lacks good quality office facilities and is often seen as a traditional suburb and has therefore struggled to attract investment from larger businesses. A significant number of the area's highly skilled workers commute to jobs outside of the town centre, and the town centre area itself suffers from deprivation and some dated public realm. The existing extra capacity on the transport network at Harrow could be used as a way to attract new business and investment to the area.

Key potential and issues

- Perception that it is a suburban/residential rather than business location
- Suffers from competition from nearby town centres such as Uxbridge, Brent Cross, Watford and more recently Westfield
- Connectivity issue to Heathrow
- Surplus transport capacity means that the area has the potential to support more business/activities utilizing its current infrastructure
- Potential to improve transport links further by offering better connection between Bakerloo line at Kenton and Metropolitan line at Northwick Park

Ealing

Ealing is a key Metropolitan Town Centre for West London. It serves as a significant centre of employment and retail for the local area, with a significant focus on The Broadway which includes a shopping centre and access to major transport links. Ealing is served by two tube lines at Ealing Broadway station, the Central and District lines, and also by the Piccadilly line at Ealing Common and South Ealing stations. National Rail services to and from London Paddington station also serve the station, including Heathrow Connect services, providing a direct rail link to the airport. There is an identified need to improve the town centre, which has suffered recently through competition from Westfield shopping centre. The opportunity for this may arise through Crossrail redevelopments of Ealing Broadway station. There are some indentified connectivity issues between Ealing and neighbouring areas such as Brent Cross and Wembley.

The A4020 runs east-west through Ealing, and the North Circular (A406) also goes through the far east of the area providing a key north-south link. Parts of the North Circular in this area suffer from heavy congestion, especially during peak times. The Ealing Common junction can experience queuing northbound during the AM peak and traffic can become congested on the approach to the bridge the crosses the Great Western Mainline where the road narrows considerably.

A key bus route that provides a link between Ealing and Brent Cross/Golders Green can often become delayed in congestion on the North Circular. Car mode share is relatively high in Ealing at around 30%.

Key potential and issues

- Need to improve quality of town centre
- Opportunity to improve town centre area through major redevelopment of Ealing Broadway station and the adjacent Arcadia site
- Congestion in and around the town centre – high car mode share
- Potential to improve cycling and walking – encourage mode shift
- Connectivity issues between neighbouring areas/other regional centres (Wembley and Brent Cross)

Uxbridge

Uxbridge is projected to see residential and housing growth in the coming years in line with its status as a Metropolitan Centre. The town centre is home to two large shopping centres, and several major offices and Brunel University. In the London Plan, Uxbridge Industrial Estate is designated as a Preferred Industrial Location and North Uxbridge Industrial Estate is included as one of the 14 strategically important Industrial Business Parks.

Uxbridge is well served by public transport. Both the Metropolitan and Piccadilly lines terminate at Uxbridge station in the town centre, providing direct links into central London. There is, however, no National Rail station in the town, the nearest being in Ruislip. The town is a key terminus for west London's bus network, and buses to the west outside the GLA boundary. A high proportion of the town's residents are employed in Heathrow Airport and there are a number of buses that provide direct links. Uxbridge has easy access to the M25 and A40/M40.

Key potential and issues

- Improve bus journey times between Uxbridge and Heathrow , eg by reducing highway congestion
- Reduce highway congestion on key arteries
- Encourage walking and cycling through infrastructural improvements and initiatives such as Smarter Travel.

Hounslow

Hounslow is a major retail and leisure activity centre which is projected to see housing and employment growth in line with its status as a Metropolitan centre. The Great West Road, to the north of the town centre, is designated by the London Plan as strategically important Industrial Business Park.

The town centre is well served by public transport; it has three stations on the Piccadilly line (Hounslow East, Central and West) which provide direct, regular links to Heathrow Airport and central London. Hounslow is also served by a station on the National Rail network. There is an extensive bus network but no direct route into central London. The M25, M4 and A4 are within easy access of the town centre.

Key potential and issues

- Improving the appeal of the town centre for shopping: improvements to public realm. LB Hounslow commissioned a visioning strategy for the town centre which included a re-design of the High St and other improvements. Along with this comes the promotion of better walking routes though the town centre from Underground and rail stations

Shepherd's Bush

Shepherd's Bush recently gained its status as a Metropolitan Town Centre in LB Hammersmith & Fulham. With its close proximity to White City, Shepherds Bush is earmarked for strategically significant levels of growth with strong demand in retailing, leisure and office development.

Shepherd's Bush is well served by major radial routes into the CAZ and Central London via the A40 (Westway), as well as Uxbridge Road and Goldhawk Road. The north-south routes through West Cross Route, Holland Road and the Shepherds Bush Road provide the connection from Kensal Canalside to Earl's Court/Kensington Olympia. Shepherd's Bush Town Centre has benefited from the two new stations – Shepherd's Bush station and Wood Lane station

Shepherd's Bush Underground provides access to the Central Line and Hammersmith & City (H&C) Line, and access to Heathrow via the Piccadilly Line from nearby Hammersmith. The West London Line (Willesden Junction – Clapham Junction) also serves the new Shepherd's Bush station, as do Southern services. Bus services can be accessed at the 'southern Interchange' as well as the new bus station closer to Westfield shopping centre.

Key potential and issues

- Good highway connections but the network is operating at capacity while demand continues to rise. Currently, Holland Park Roundabout is heavily used throughout the day and the road system around Shepherd's Bush Green can become congested at peak times, as it serves a number of routes for buses and private vehicles
- Currently there is also a lack of east-west connectivity due to the strategic road network and railway line acting as severance. Cycling and walking schemes will need to be considered and implemented jointly with the borough and developers to encourage the mode shift from cars
- Committed TfL Investments will deliver an improved service for the WLL at 4tph from Willesden Junction – Clapham Junction.
- TfL's analysis suggests potential to increase cycling and walking in this area. Two cycle superhighway routes running north-south will be implemented in the area.

8.3 EXAMPLES OF KEY PLACES IN WEST: OPPORTUNITY AREAS

Park Royal

Park Royal Opportunity Area is mainly concerned with employment growth in one of London's key industrial locations. 1,400 houses are earmarked for the area. With regard to transport, the key issues are around high car mode share, on-street parking, and congestion on the surrounding highway network experienced by both freight and private drivers. There may be potential to encourage more use of public transport by improving the walking environment into the Park Royal estate.

Heathrow

The London Plan sets out a minimum of 9,000 new homes and 12,000 new jobs for the Heathrow OA. The area includes the town centres of Hounslow, Feltham, Hayes and West Drayton, as well as employment areas such as Stockley Park, Heathrow North and the Hayes-West Drayton corridor. In terms of transport, please see the Spotlight on Heathrow in Chapter 2 on ways of supporting the growth in this area.

White City

It is proposed that the White City OA is extended to include Shepherd's Bush and the area has significant potential for a mix of different types of development: residential, commercial, leisure, retail, education and open space development, building on the existing history of creative industry. 5,000 homes and 10,000 jobs are planned. White City is well served by public transport but the road network is currently at capacity at the key junctions of the Holland Park roundabout and the A40 Westway/A3220 West Cross Route. As part of the development of the area, it will be important to embed facilities for walking and cycling.

Wembley

The growth envisaged for the Wembley Opportunity Area is significant: 11,500 new homes and 11,000 new jobs (largely in leisure development integrated with the stadium). The area has high public transport accessibility but the high volumes of traffic accessing the area during events cause severe delays on the network, especially at weekends. In developing plans for improvements to transport and public realm, both Wembley Stadium and the town centre need to be considered.

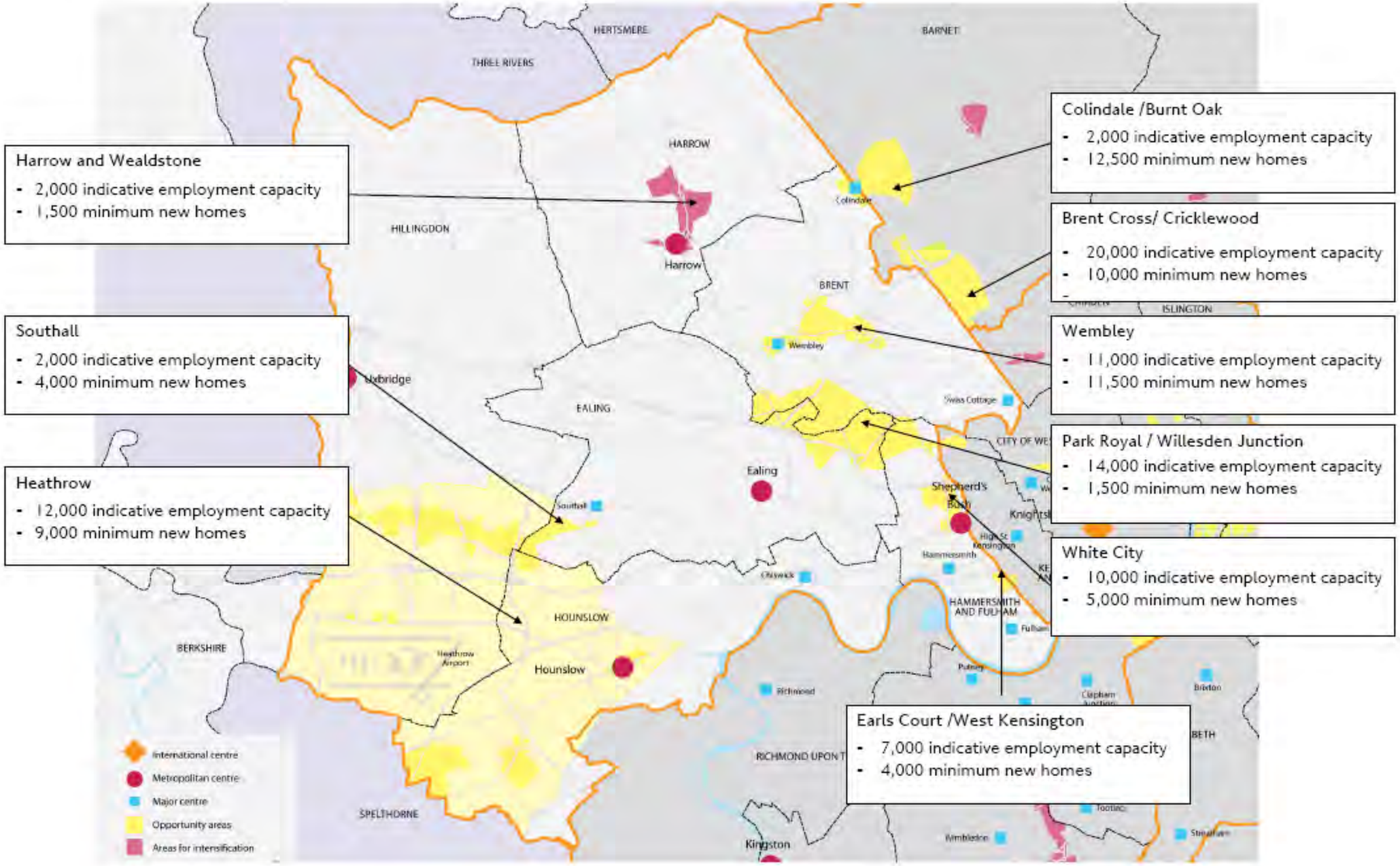
Southall

With planning consent for at least 4,000 new homes and 2,000 new jobs, there is a great opportunity to enhance the area, including links between the town centre and the Southall Gas works and integrating it into the wider area. The road network experiences severe delay throughout the day and managing this demand and encouraging the use of public transport will be a challenge.

Earl's Court & West Kensington

The London Plan sets out 4,000 new homes alongside estate renewal and 7,000 new jobs in strategically significant office, retail and hotel businesses. The area has excellent public transport connections, but the very centre of the OA has a much lower level of access, which it is anticipated will be resolved as part of future development.

Figure 8.2: West London Opportunity Areas and Areas for Intensification



CHAPTER 9: DELIVERY OF THE PLAN AND SUSTAINABILITY ASSESSMENT

9.1 DELIVERY PROCESS

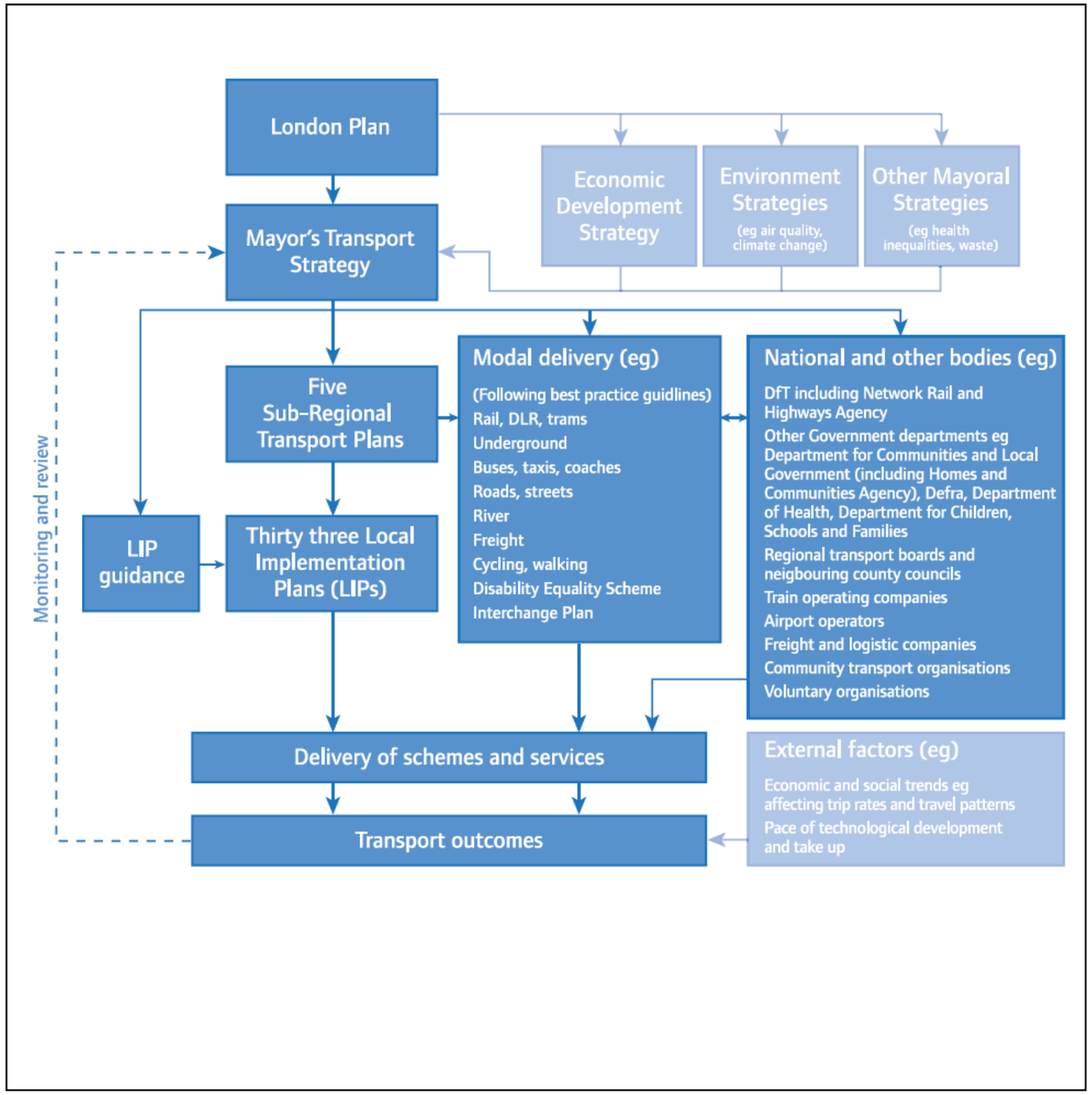
The challenges set out in Chapter 1 of this plan were agreed by TfL and west sub-region boroughs and partners as the major transport issues for the sub-region over the next 20 years. The plan has set out various schemes, measures and initiatives that contribute to meeting the sub-regional challenges.

This sub-regional plan will be delivered over twenty years and that details of this, including phasing and funding are shown in the Implementation Plan at Appendix 1.

The delivery process is set out in the MTS and in the LIPs guidance. These set out the organisations involved and shows how the SRTP (in full) relates to London boroughs' LIPs. Figure 8.3 summarises the process.

An overview of how the sub-regional challenges will be met by the implementation plan is provided below. This is followed by information about the Assessment of Sustainability carried out on the plan.

Figure 8.3 Delivery Process



9.2 SUMMARY OF MEASURES TO MEET THE SUB-REGIONAL CHALLENGES

Improve north-south public transport connectivity

As part of the development of this plan, seven corridors in the region have been identified as facing connectivity challenges. Measures for each are set out in Section 2.2. These include:

- improved capacity and frequency of Overground
- LU Upgrade
- ongoing review of the bus network in the sub-region
- promoting smarter travel measures such as workplace travel plans
- smoothing traffic flow and encouraging cycling
- Old Oak Common interchange
- Heathrow Airtrack

Improve access to, from and within key locations

- improved capacity and frequency of Overground
- maximising interchange between radial and orbital services eg the strategic interchanges at Ealing Broadway and Willesden Junction.
- access to Heathrow Airport will be improved by Crossrail and Airtrack rail services
- links to places outside London are also important and will benefit from these schemes
- walking, cycling and urban realm improvements
- highway network management and bus service provision to maintain journey time reliability an d service frequency standards on spokes providing access to key places

Enhance east-west capacity and manage congestion

- implementation of Crossrail providing fast journey times into the sub-region and on into central and east London (and also relieve pressure on Central line)
- Old Oak Common providing interchange with HS2 and potentially other rail connections
- Underground upgrade and asset renewal which will increase capacity and provide a more reliable service
- targeted interventions on congestion hotspots (eg A4, A404, A406, A4020)
- encourage use of public transport, walking and cycling

Enhance the efficiency of freight movements

- transferring freight to rail where this is appropriate
- making more use of the Grand Union Canal
- planning and providing for freight movements as part of the development of areas such as Park Royal, Wembley and Heathrow
- build on West London Freight Quality Partnership
- freight delivery and servicing plans

Improve land-based air quality

- further roll-out of low-emission and hybrid buses
- encourage use of car clubs and electric vehicles
- use of local measures from Air Quality Toolkit at specific hotspots, particularly where growth is expected.

9.3 ASSESSING THE SRTPs

The nature of the SRTPs is such that they are not legally subject to a formal Strategic Environmental Assessment, otherwise known as an SEA. Nonetheless, to deliver best practice, TfL decided to undertake an Assessment of Sustainability, which includes a non-statutory SEA for each SRTP. The objective of carrying out the AoS was to maximise the contribution that the SRTPs can make to progressing sustainability across London in line with the vision set out in the MTS.

The AoS incorporates non-statutory consultation with those organisations who would otherwise have represented the 'statutory consultees' for an SEA, namely: The Environment Agency, Natural England and English Heritage. Comments from these consultees have been considered and used to inform the development of the SRTPs.

The Scoping Report and the subsequent Assessment of Sustainability for the West sub-region will be made available as separate documents in due course.

CHAPTER 10: NEXT STEPS

10.1 ONGOING WORK

Using the sub-regional panels
The west Sub-regional Transport Plan (SRTP) has now been produced, but this does not mean that the work is finished. The SRTP process has led to an improved analytical capability as well as more collaboration between TfL, boroughs and other stakeholders. It has built upon the broad policies and proposals set out in the MTS and provided more detail about the challenges, opportunities and priorities for the West sub-region.

The Plan is a 'live' document which means that, although London and the UK are facing a period of financial uncertainty, the importance of planning beyond the short term is even greater. The sub-regional transport plans will continue to make the case for more investment in London, helping to prioritise the limited resources available and improving the evidence base upon which decisions are made. Whilst no additional funding has been identified to deliver the specific elements of the plan, the scene has been set for what will be required to meet the needs of all those who live, work and visit London.

The next phase of the work will use the sub-regional panels to help steer sub-regional engagement, articulate the agreed priorities and scope further work to be taken forward within the sub-region. The programme of work will include additional analysis, assessment of options and, where appropriate, the sub-regional models may be used to test future scenarios.

Future work areas
This SRTP makes reference to some areas and issues where further study is required to develop the Plan further. These need to be agreed via the sub-regional panels but could include:

- Old Oak Common connection to local rail network particularly associated with improved access to HS2
- Managing the road network, initially with agreement on which sub-regional corridors to focus on next
- Walking and cycling priorities in west London
- Freight movement, especially around Park Royal and Heathrow

In addition, further understanding of the implications of the Spending Review, especially in relation to HLOS1 and the OAPFs will influence the development of the Plan.

Further Development and Assessment of Options

Initial investigation has been undertaken into the range of schemes and proposals developed and supported in this Plan. This has involved an assessment of options against the Goals and Objectives outlined in the Mayor's Transport Strategy. Both qualitative and quantitative data (where available) has been used in this assessment, including use of TfL's Strategic Assessment Framework.

In some cases, to determine demand and secondary impacts, individual mode and route options have been modelled using TfL's Railplan model. At this stage no traffic modelling has been undertaken to determine the highway impacts. In some cases high level engineering feasibility has been undertaken but if priorities identified by the sub-regional panel are to be progressed, further analysis is needed.

A list of possible schemes for discussion with the sub-regional panels relating to the west sub-region, as put forward from the boroughs and other key stakeholders, is provided in Appendix 2. The inclusion of this list does not imply endorsement of the schemes by TfL.

10.2 MONITORING AND ONGOING WORK

Monitoring MTS outcomes

The top-level monitoring of the outcomes in the MTS will be via TfL's annual *Travel in London* report. The MTS identifies 24 indicators to monitor the strategy's outcomes, the key Strategic Outcome Indicators (SOIs). In addition, the Travel in London report contains data, analysis and interpretation relating to other Transport Strategy policies that are not directly covered by the 24 SOIs.

The majority of MTS SOIs can be disaggregated to the more local level, be it network, sub-region or borough without additional work. However, for several, it is not readily possible to obtain robust statistics that directly reflect sub-regional geography (for example, some of the survey/perception-based indicators).

In other cases, such as operating costs, a sub-regional disaggregation is not appropriate (for example, they relate to transport network geography). Some indicators are more appropriately monitored on a case-by-case basis (for example, supporting regeneration, Olympics and Paralympic Legacy), and these will be covered by appropriate, specific content (for example, case studies) in future *Travel in London* reports.

The first two *Travel in London* reports are available from TfL's website.

Link with LIPs

Local Implementation Plan Guidance mandates five LIPs performance indicators. These cover:

- transport mode share
- bus service reliability
- road traffic casualties
- CO_2 emissions from ground-based transport, and
- highway asset condition.

These are in alignment with the 24 MTS SOIs, and can be readily aggregated to the sub-regional level.

TfL's *Travel in London* report will continue to include data, at a borough level, on each of these LIPs performance indicators.

Potential development of particular sub-regional monitoring

The principal area where additional work may be required is to monitor, perhaps on an 'exemplar' or 'case study' basis, the contribution to local and strategic transport goals of specific transport infrastructure development or policies. The Olympics and Paralympics, opportunity areas and major projects such as Crossrail are examples where this additional work may be required.

APPENDIX 1: IMPLEMENTATION PLAN

The table below sets out the schemes planned for implementation in the west sub-region, their phasing and whether funding has already been or is yet to be secured. Funded schemes are shown in yellow, unfunded in red. Some schemes are labelled as unfunded as they require further funding to be made available before they could be taken forward, or because they fall outside the timeframe of TfL's current Business Plan.

The schemes identified in this plan are shown in three time periods for delivery:

- Short term: The period up to and including 2012
- Medium term: From 2013 up to and including 2020
- Long term: From 2021 up to and including 2031

The implementation plan reflects the current delivery priorities. The plan will be regularly reviewed through the TfL Business Plan, the GLA Corporate Plan and the DfT's Network Rail and Highways Agency investment programmes to ensure ongoing alignment with priorities. Longer-term unfunded schemes are at varying stages of development. Scheme development will be regularly reviewed to ensure alignment with policy priorities, value for money, deliverability and to take account of opportunities for funding that may become available.

This implementation plan is consistent with the MTS and London Plan implementation plans published earlier in the year, while providing more detail, where appropriate, of schemes particularly relevant to each of the sub-regions[1].

The reference numbers used in this table are common to all five sub-regional plans – this is to aid cross referencing between plans, hence the numbering is not sequential as some measures are not relevant for this sub-region.

Key to Implementation Plan	
	Funded schemes
	Unfunded schemes
*	2012 for TfL schemes and 2014 for Network Rail schemes (as per HLOS CP4)
†	2013 for TfL schemes and 2015 for Network Rail schemes (post HLOS CP4)

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
	Rail (DfT/Network Rail/TOC led schemes)				
3	High Speed 2 - new line from London northwards	London to the West Midlands and beyond with Strategic interchange at Old Oak Common and terminus at Euston. Opportunities to link into West London line, North London line, Crossrail and Heathrow Express as well as High Speed 1			
13	Chiltern enhancements	Enhanced inner suburban service			
25	Great Western enhancements	Train lengthening on long distance services			
26	Great Western electrification	Electrification - initially Paddington to Oxford and Newbury via Reading, followed by further potential enhancements			
33	Airtrack service to Heathrow	Link Southwest London railway network to Heathrow (partly BAA funded)			
34	Rail service standards	Improved first and last train time consistency, and off-peak service frequencies to be at least four trains per hour including weekends			

[1] This implementation plan table does not list improvements to national and international services that will predominantly benefit all of London, such as improvements to national rail long distance services, or international rail services. (Where relevant to London, these are included in the MTS and London Plan implementation plans).

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
35	Improved rail freight terminals to serve London	New and/or expanded rail freight terminals to serve London			
36	Improved rail freight routes	Conceptual freight link from Barking to Gospel Oak line to West Coast Main Line			
	Rail (TfL led schemes)				
37	Crossrail 1 core scheme	Core scheme: Maidenhead and Heathrow in the west to Shenfield and Abbey Wood in the east			
38	Crossrail 1 westerly extensions	Westerly extensions and/or increased frequency west of Paddington - potentially to Reading and/or to connect with West Cost Main Line, possibly with an interchange with HS2 at Old Oak Common			
42	London Overground enhancements	Further train lengthening and improved service frequency			
43	London Overground enhancements	Diversion of Watford Junction services to Stratford (instead of Euston) to release capacity for High Speed 2 at Euston			
46	Chelsea Hackney line	Enhanced southwest – northeast London capacity and connectivity. All new infrastructure will be fully accessible.			
	Stations and interchanges				
48	Further Tube station congestion relief schemes	Targeted station capacity expansion programme			
49	Tube station refurbishment/ modernisation programme	Continuing programme of refurbishment/ modernisation of stations			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
51	Develop strategic interchanges	Programme of schemes under development including increasing frequency on orbital London Overground routes, stopping more trains at strategic interchanges, and improving pedestrian routes			
52	Rail station refurbishment/ modernisation programme	Delivery of National Station Improvement Programme (NSIP) in London, and other service standards as agreed in rail franchises (Station facilities, notably availability and quality of CCTV, help points, shelter, lighting, passenger information, cleanliness, cycling facilities such as parking, and availability and quality of ticket retailing)			
59	Improved surface-rail interchange	Improvements including enhanced bus services, interchange and urban realm at selected Crossrail and/or Thameslink stations			
	Tube				
63	Jubilee line upgrade	Jubilee line - upgrade involves installation of new signalling to provide faster more frequent services and provide 33% more peak capacity and 22% reduction in journey time			
68	Piccadilly line upgrade	Piccadilly line upgrade to provide additional capacity and improve journey times			
69	Sub-Surface Line Upgrade	Circle, District, Hammersmith & City and Metropolitan line upgrade (including new air-conditioned rolling stock and new signalling) to provide additional capacity and improve journey times			
70	Croxley Rail Link	Metropolitan line extension from Croxley to Watford Junction, led by Hertfordshire County Council			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
71	Bakerloo line upgrade	Bakerloo line upgrade: Including new energy efficient and high capacity rolling stock and signalling			
73	Cooling the Tube programme	Enabling operation of services post line upgrades and improved passenger comfort			
74	Tube network core asset renewal	Programme of core asset renewal to lock-in benefits from the upgrades and maintain assets in a state of good repair			
75	Energy-saving initiatives	Initially, a programme of trials to include low energy lighting, smart electricity metering at stations and low loss conductor rails			
76	Regenerative braking and automatic train control	To be implemented as an integral part of the Tube upgrade programme			
	Bus				
90	Bus network development	Regular review of bus network, including reviews of the strategic priorities underlying the process approximately every five years, to cater for population and employment growth, maintain ease of use, attractive frequencies and adequate capacity, reliable services, good coverage and good interchange with other modes			
91	Bus network development	Re-patterning of bus services to take in to account new infrastructure and the related changes in demand			
92	Development of a New Bus for London	Pilot to create new iconic bus for London (which will include enhanced accessibility design features)			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
93	Phasing out of 'bendy' buses	Anticipated by the end of 2011			
94	Low emission buses	Intention that all new buses entering London's fleet post 2012 be low emission (initially diesel hybrid)			
95	Enhanced real time service information	Delivery of Countdown 2; enhanced real time information at stops, on internet and mobiles			
96	Bus priority	On a case by case basis, implement bus priority measures to maintain service reliability			
97	Provision of suitable bus infrastructure to support Opportunity Areas/new developments	Review individual developments on a case by case basis and provide as necessary bus priority measures, accessible bus stops, additional bus stands, upgraded or new bus stations. To be delivered in phases to support development in area			
98	Provision of suitable bus infrastructure to respond to new rail infrastructure such as Crossrail, Tube Upgrades, HLOS upgrades	Review individual sites on a case by case basis and provide as necessary bus priority measures, accessible bus stops, additional bus stands, upgraded or new bus stations. To be delivered in phases to support development in area.			
99	Additional bus stands and upgraded or new bus stations	On a case by case basis, provide additional bus stands and/or upgraded or new bus stations to support demand in specific locations in order to increase capacity and improve service reliability			
	Cycling				
101	Barclays Cycle Hire scheme enhancement	Possible expansion of area covered and/or additional bikes in London Cycle Hire scheme where demand justifies			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
102	Additional cycle parking	Around 66,000 additional cycle parking spaces in London			
103	Barclays Cycle Super Highways	Two initial trial radial routes to central London, followed by further routes			
104	Borough cycling initiatives - infrastructure based	Infrastructure based solutions such as cycle parking, cycle routes and improved signage, on areas with highest potential including Biking Borough initiatives			
105	Borough cycling initiatives - non-infrastructure based	Non-infrastructure solutions to help promote cycling across London including identifying the markets and planning interventions based on evidence and other Biking Borough initiatives			
	Walking and the urban realm				
106	London-wide 'better streets' initiatives to improve pedestrian connectivity and urban realm	Improvements to urban realm and pedestrian environment			
107	Access to stations and surroundings	Targeted programme of works to improve accessibility and personal security on walk and cycle routes to stations and bus stops, prioritising activity based on current demand and future growth			
109	Walking information and campaign	Walking campaigns, including the '2011 year of walking', that will focus on walking routes, wayfinding , events and activities			
110	Improved wayfinding	Targeted introduction of on-street wayfinding specifically designed for pedestrians, for example, using 'Legible London' principles			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
111	Urban realm improvements as part of the Mayor's Great Spaces initiative	Urban realm improvements to revitalise some of London's recognised and lesser known streets, squares, parks and riverside walks			
112	Urban realm improvements in town centres	Urban realm improvements			
113	Improving urban realm and walking conditions on key routes which have high demand, for example between stations and town centres	Urban realm improvements			
118	Increased tree and vegetation coverage	Additional 10,000 street trees by 2012 (funded), with a target of an additional two million trees in London's parks, gardens and green spaces by 2025			
	Roads				
119	Improved traffic control on London-wide and sub-regional corridors	Improved traffic control systems, for example further roll out of SCOOT			
120	Improved management of planned interventions on London-wide and sub-regional corridors	Minimising the impact of planned interventions on the road network with the potential to disruption traffic flows through the use of the permit scheme for road works for example			
121	Improved management unplanned events on London-wide and sub-regional corridors	Minimising disruption from unplanned events (accidents, emergencies etc) in 'real time' as they occur and returning the network quickly and efficiently to its planned steady state operation as soon as possible			
122	Review of loading and waiting restrictions in central London and elsewhere	Review and report on potential improvements - using a targeted demand led approach			
129	Potential gyratory and one-way system improvements	Improvements to make greater contribution to urban realm, environmental, safety and quality of life goals, for example, as well as enabling			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
		appropriate vehicular movement and smooth traffic flow			
136	Further highway enhancements and/ or changes to the local road network	Consideration of further highway enhancements that will smooth traffic flow and/ or changes to the local road network related to major developments in response to increased local demand			
137	Achievement of state of good repair of road infrastructure	Ongoing programme of maintenance			
138	Continue trials of intelligent speed adaptation technologies	Continue trials and technology development			
139	Encourage further implementation of average speed camera technology	Continue trials and technology development			
140	Investigation of merits of 20 mph zone or zones	Assess contribution of 20 mph zone or zones in central London or elsewhere to MTS goals including safety, air quality, CO2 and congestion benefits			
141	Car club support	Support expansion of car clubs			
142	Low Emission Zone enhancements	Further LEZ enhancements and vehicle coverage			
143	Provision of infrastructure to support low emission road vehicles	Introduction of electric vehicle recharging points by 2015 - and support distribution networks for other alternative fuels such as hydrogen and biofuels (unfunded)			
144	Continue to work with DfT on road pricing feasibility programme	Review the option of road user charging and/ or regulatory demand management measures to influence a shift to more			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
		CO2-efficient road vehicles and lower carbon travel options, such as walking, cycling and public transport			
145	Promote emission-based parking charges	Boroughs and car park operators to be encouraged to expand coverage of parking charges to vary by duration of stay and vehicle emissions			
146	Congestion Charge Western Extension	Remove the Western Extension of the central London Congestion Charge and mitigate where possible			
	London river services and river crossings				
150	Walk/cycle river crossings in east London	Including schemes in central London and walk/cycle links to access Isle of Dogs from east and west, including cable car crossing			
152	Improvements to Thames passenger services	Consistent service standards, examine opportunities for enhanced pier facilities (including at North Greenwich and Isle of Dogs) and development of the River Concordat			
154	Promote the use of Thames and other waterways for freight movement	Enable freight access to waterways			
	Other measures				
155	Integrated fares and ticketing	Integrated fares collection system and ticketing across all London public transport services, including Oyster zonal fares on all suburban rail services and Oyster on river services			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
156	Enhanced travel planning tools	Ongoing programme of enhancements to information availability, including TfL Journey Planner			
157	Richmond 2009 to 2012 Smarter Travel Programme	Complete the three-year programme of smarter travel initiatives in Richmond			
158	Targeted smarter travel initiatives	Smarter travel initiatives to reduce the environmental impact of travel, make more efficient use of limited transport capacity and/or encourage active travel such as walking and cycling			
159	Increased use of travel plans	Increased use and power of travel plans for workplaces, schools and individuals			
160	Continued development and roll-out of freight initiatives	Town centre and area-based DSPs, CLPs and promotion of collaborative approaches such as consolidation centres and/or break-bulk			
161	Promotion of freight best practice	Development and incentivisation of membership of the FORS and develop functionality of the freight information portal			
162	Integrated transport policing	Establish joint transport policing intelligence unit and reporting systems to enable integrated working between the agencies policing London's transport system			
163	Tackling antisocial behaviour	Programme of initiatives to tackle antisocial behaviour, including preventative and enforcement measures			
164	Enhanced CCTV capability and Help points	Including introduction of two-way audio-visual communication at Help points and further expansion of CCTV coverage and enhanced 'smart' monitoring capability			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
165	Transport system climate change adaptation	Develop a strategy to improve transport system resilience and safety to the impacts of climate change			
166	Olympic & Paralympic Transport Legacy Action Plan	A range of interventions to secure the maximum benefit of the physical infrastructure provided for 2012; staging of the event and longer term opportunities this presents; behavioural change as a result of the event; and supporting convergence.			
	Accessibility				
167	Crossrail 1 accessibility	All stations through central London and the majority of stations in Outer London to offer step-free access			
169	Chelsea Hackney line	All new infrastructure will be fully accessible			
170	New accessible tube and rail rolling stock	New rolling stock will be Rail Vehicle Accessibility Requirements compliant			
171	National Rail step-free access station programme	DfT's Access for All to increase number of step - free rail stations in London to 160 (47 per cent) by 2015, from around 100 today			
172	Continuing roll out of step-free access schemes on the Underground	Continuing programme of station step-free access schemes			
173	Tube platform to train level-access	Platform humps rolled out across the Tube system as new rolling stock is introduced to provide level access from platform to train			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
174	Tube station upgrade programme	To include some of the following features at upgraded stations:- Audible and visual information at all platforms and ticket hall- Improved handrail colour contrast and design- Improved visual contrast at leading edge of each riser and tread on steps- Removing, modifying or highlighting obstructions- Induction loops at Help and Information points- Listening points at some stations- Improved lighting and public address systems- Improved signs and wayfinding- Tactile walking surfaces on every platform and staircase- Increased amounts of seating - Accessible unisex toilets at all step-free stations where toilets already exist			
175	Tube wide-aisle ticket gates	Explore opportunities for further implementation of wide-aisle ticket gates			
176	Tube travel information	Accessible Tube map showing step-free and mostly step-free routes			
177	Bus network development	Regular review of bus network, including reviews of the strategic priorities underlying the process approximately every five years, to cater for population and employment growth, maintain ease of use, attractive frequencies and adequate capacity, reliable services, good coverage and good interchange with other modes			
178	Bus stop accessibility	Improved accessibility of bus stops, for example, through removal of street clutter			

Reference Number	Scheme	Description	Completion 2010– 2012*	Completion 2013– 2020†	Completion Post 2020
179	Development of a New Bus for London	New bus will include enhanced accessibility design features			
180	Accessible crossings programme and urban realm improvements	Improve the physical accessibility of the streetscape, particularly in town centres and on routes to stations and bus stops, taking accounts of the whole journey approach			
181	Travel information	Improve the availability, quality, quantity and timeliness of accessibility-related travel information			
182	Staff availability	To ensure staff are available to provide assistance, information and reassurance throughout services hours			
183	Staff training	To ensure the needs of the disabled passengers are understood by all frontline staff			
184	Initiatives to improve attitudes of staff and travellers	Stakeholder, staff and public initiatives to improve staff and public attitudes and raise awareness of people's accessibility needs			
185	Enhanced Dial-a-Ride service	New Dial-a-Ride fleet and review of operations			
186	Further Extensions to the public transport system	All extensions to the public transport system will meet the requirements of the Disability Discrimination Act			
187	Blue Badge discounts	Discounts on Congestion Charging schemes			
188	TfL's Disability Equality Scheme (DES)	A statutory document, updated every three years, which sets out in further detail what TfL is going to do to ensure that the services it offers are accessible to disabled people			

APPENDIX 2: POSSIBLE SCHEMES FOR DISCUSSION WITH THE SUB-REGIONAL PANEL

Please note: Schemes listed below include some which have been proposed by the west London boroughs and key stakeholders during the SRTP development process[2]. Many have not been included in the plan as it has not yet been possible to consider their merits in addressing the west sub regional challenges. They will be further discussed and, if considered appropriate at the sub-regional panel meetings and subject to available funding from interested parties, initial analysis may be undertaken.

No.	Title	Description of possible scheme
1	Hubs and Spokes – Improved Bus Frequencies	Improve frequencies to a minimum standard of at least as good as 1 per 10 minutes during weekday peak periods and in daytime hours between these periods (7am to 7pm), where demand justifies this level of service
2	Hubs and Spokes – Improved Interchanges	Improved interchanges between public transport services (bus, LUL, rail, taxi) at priority locations.
3	Hubs and Spokes – Highway Journey Time Reliability	Journey time reliability maintained into the future with no worsening for all highway travel modes on all highways forming Spokes
4	Interchange between Central and Piccadilly lines at Park Royal	A new Central Line station with a link to the Piccadilly Line as part of the Park Royal Western Gateway development proposals, with improved pedestrian access and bus interchange facilities
5	Wembley/ Park Royal/ Acton Bus	Limited stop bus service between Wembley Park & Acton Main Line, linking Park Royal
6A	West London Orbital Metro	Rail link from Surbiton to Brent Cross.
6B	West London Orbital Express Bus Equivalent Route	Limited stop bus service from Surbiton to Brent Cross
7	Heathrow to Uxbridge Express Bus	Limited-stop bus service between Heathrow and Uxbridge via Yiewsley, West Drayton and Stockley Park.
8	Harrow to Edgware Express Bus	The proposal is to provide a new limited-stop bus service between Harrow and Edgware along the route of the existing 186 service
9	Airtrack proposals	New rail routes connecting Heathrow with Staines, Feltham, Richmond and London Waterloo and with Reading, Woking and Guildford
10	Overground West Link rail service to Hounslow	New 15-minute frequency service between Hounslow and Willesden Junction stations. This route would utilise existing lines including electrification of the rail freight line between Brentford and South Acton and provide a direct connection between Hounslow/Brentford and the North London Overground at Willesden (identified in LB Hounslow LIP)

[2] The numbers refer to those presented in the MVA note (11 version 6) *List of Transport Schemes for West London*. Schemes which are not listed have been removed either following initial analysis of viability or if they have been superseded by other schemes.

No.	Title	Description of possible scheme
11	West Ruislip – Greenford- Ealing Broadway – Clapham Junction Rail Service	Extend existing Ealing to Greenford rail link to West Ruislip to the west to provide connection with Chiltern line (LB Ealing LIP) Potentially also to West Brompton and Clapham Junction to the east and south.
12	HS2 rail connections to Heathrow with interchange at Old Oak Common between Crossrail, HS2, Great Western, central Line and North London Line/ West London Line	Potential connections to Crossrail, Great Western, Central and North London Line/ West London Line.
13	New stations at Du Cane Road on Central Line	New station at Du Cane Road identified in LB Hammersmith and Fulham's LIP.
14	New road schemes	New bridge over Central line in North Greenford to take HGVs from areas of major employment north of the central line to/from A40 avoiding them passing through residential areas on Greenford Road (LB Ealing LIP) Link Road through Southall Gas Works development area to A312 (LB Ealing)
15	Feeder service public transport connections to Crossrail	Improve frequencies to a minimum standard of at least as good as 1 per 10 minutes during weekday peak periods and in daytime hours between these periods, that is between 7am and 7pm. To be determined as demand forecasts justify.
16	Stop at Turnham Green on Piccadilly Line	Allow all Piccadilly Line trains to stop at Turnham Green to improve accessibility from the station.
17	Express bus services	Limited stop services between Eastcote and Stockley Park and Heathrow and between Northwood Hills and Heathrow
18	Orbital buses running along North Circular	Limited stop bus service running all along the North Circular Road. Would benefit area between Chiswick and Brent Cross
19	Crossrail extension to Uxbridge	Possible future branch of Crossrail from Hayes & Harlington to Uxbridge
20	182 bus corridor	Measures to improve bus speeds
21	Apex Corner improvements, A316 / A312	Junction & Environmental improvements at over capacity junction. Could be added to scheme 17
22	Bakerloo Line extension to Watford Junction	Direct link from Watford Junction to West End and reduce operating costs by removing the Euston – Watford Junction Overground branch.
23	Crossrail extension to Milton Keynes via link to West Coast Main Line	New branch of Crossrail 1 via Willesden Junction to Milton Keynes Central, to release slow line tracks for potential HS2, improving accessibility to central London & facilitating London Underground congestion relief
24	Extension of Metropolitan Line to Watford Junction via Croxley Link	New link from Metropolitan line to Watford Junction at 6 trains per hour.
25	Hogarth roundabout improvements – junction	Junction improvements and removal of life-expired flyover. Could be added to scheme 17

No.	Title	Description of possible scheme
	improvements and removal of life-expired flyover	
26	New PT link from Uxbridge to a hub on GWML at surface	Allows direct link from Uxbridge to GWML
27	Piccadilly Line – future line upgrades	Future line upgrades beyond the existing plans (which will increase capacity on the Piccadilly line to 30tph in the central section)
28	Extension of Piccadilly line to GWML hub	Extend Piccadilly Line services to GWML hub, allowing users from the west to access Heathrow easily
29	Providing 12 car services on South West trains inner suburban services	Providing 12 car services on SW trains inner suburban services.
30	Pedestrian and cycle bridge over River Thames between Wandsworth and Imperial Wharf	A new pedestrian / cycle facility to cross the Thames, linking Imperial Wharf with Wandsworth. Could either be added to the side of the railway bridge or a standalone structure
31	Demand management scheme at Heathrow working with BAA	Potential congestion charge zone associated with access to Heathrow.