Great West Corridor

Strategic Transport Study

Full Report

MAY 2019

London Borough of Hounslow

TRANSPORT FOR LONDON
EVERY JOURNEY MATTERS

Contents

1. Introduction

1.1. Context

The Great West Corridor (GWC) area is located in the eastern part of the London Borough of Hounslow and extends 2.5 miles along the Great West Road (A4), from Gillette Corner in the west to Chiswick Roundabout in the east. It is an important strategic corridor, connecting central London to Heathrow airport, via the M4 motorway.

Great West Corridor Opportunity Area

The Draft London Plan identifies the GWC as an Opportunity Area (OA) with the potential to deliver an additional 7,500 homes and 14,000 new jobs by 2041.

London Borough of Hounslow Local Plan

The development of the GWC is a key component of London Borough of Hounslow's (LBH) 2015 Local Plan. Following a commitment made in the Local Plan, LBH has been progressing a detailed review of the GWC ('The Local Plan Review'), which will set out a 15-year vision for how the area will grow and develop into a 21st century business hub supporting residential, retail and leisure uses.

As part of its scope, the Local Plan Review will detail the local transport improvements required to meet the housing and employment goals for the area and to enable growth to come forward in a sustainable way. Transport interventions will be fundamental to enabling 'Good Growth' in the area and encouraging more active, efficient and sustainable travel.

To ensure that the Local Plan Review and its policies are effective, it must be based on an extensive evidence base that reflects the current social, economic and environmental characteristics of the area, as well as likely scenarios for future growth. This Transport Study forms the transport evidence base for the Local Plan Review. It assessed the current situation, in terms of the challenges faced; analysed the impact of forecast growth on the transport network and assessed how growth can most effectively be accommodated on the transport network.

The Local Plan makes recommendations as to the transport infrastructure and other interventions that need to be delivered to enable the growth and support existing communities, whilst addressing current and future transport challenges and meeting the regional policy aspirations for the area.

Mayor's Transport Strategy

Many of the transport challenges associated with delivering the growth in the GWC are not unique to the area. As is typical for outer London, trips to and from the GWC tend to be longer and have start and end points spread over a wide range of geographical areas,

which make it harder to provide efficient public transport services. As a consequence, the car is used for a high proportion of trips in the area. Alongside these trips, strategic flows of through highway trips dominate the central corridor of the area.

The Mayor's Transport Strategy (MTS)[1] states that "the dominance of motorised transport [in Outer London] must be addressed. Improvements to walking and cycling environments will enable many of the trips currently made by car to be made on foot or by cycle. Measures that reduce car dependency will free up space for essential freight and business trips" (MTS 2018, p.33). The MTS sets ambitious targets for walking and cycling across London; improving the attractiveness of these modes of travel is important if these targets are to be met in the GWC.

The MTS highlights that the role transport plays in facilitating growth presents an opportunity to shape London into a city that works well for everyone. Using new public transport links and better walking and cycling environments to help areas to develop will create a future of reduced car dependency and increased active travel.

The MTS sets out a vision for 'Healthy Streets' and aims to reduce traffic, pollution and noise, create more attractive, accessible and people-friendly streets where everybody can enjoy spending time and being physically active. The Healthy Streets approach puts people and their health at the centre of decision making and aims to improve people's health.

These aspirations set out in the MTS set the context and the framework for this Transport Study and for the transport interventions needed to support Good Growth in the GWC. An integrated approach to land-use and transport planning needs to be taken, to ensure that active, efficient and sustainable travel patterns are supported and encouraged and so that fewer people will need to rely on cars.

Draft London Plan – Planning for Good Growth

This study is in line with the draft London Plan 2017[2], which takes a new approach to growth: "It plans for growth on the basis of its potential to improve the health and quality of life of all Londoners, to reduce inequalities and to make the city a better place to live, work and visit. It uses the opportunities of a rapidly-growing city to plan for a better future, using each planning decision to improve London, transforming the city over time. It plans not just for growth, but for 'Good Growth' – sustainable growth that works for everyone, using London's strengths to overcome its weaknesses." (draft London Plan 2018, p.11 para 1.0.7)

Good Growth principles will help ensure that the GWC performs to its full potential as a strategic employment area. By applying these principles its position as a business location

[1] https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf

[2] https://www.london.gov.uk/sites/default/files/new_london_plan_december_2017.pdf

can be maintained and strengthened in the future, whilst residential neighbourhoods will be better integrated and more synergies can be achieved from mixed-use urban developments, adding to the area's vibrancy and vitality. The Good Growth principles set out in the draft London Plan and MTS are:

- Good access to public transport
- High-density, mixed-use developments
- People chose to walk and cycle
- Car-free and car-lite places
- Inclusive, accessible design
- Carbon-free travel
- Efficient freight

Good Growth and integrated transport and land use planning are also considered essential in achieving the Council's ambitious vision to "transform the Great West Corridor into a state of the art 21st Century Employment Cluster of Digital, Media, Broadcasting and Creative Industries, supported by mixed use development, urban buzz, amenities, and with access to high quality open spaces and waterways." (Great West Corridor Local Plan Review, Preferred Options Consultation, October 2017[3]).

1.2. The Great West Corridor Opportunity Area

The Great West Road was built as a bypass around Brentford in 1925. Large multi-national companies were attracted to the area because of the strategic connections and the availability of large tracts of land alongside it. Companies such as Beechams, Gillette and Firestone located their headquarters along the road, heralding a new era of modern offices and factories, technology, research and development.

Today, the GWC is one of the largest and most diverse business hubs in London that, despite recent commercial developments, still retains a largely industrial character. Attracted by the connectivity of the A4/M4 corridor, connecting Heathrow and the west with central London, the area has become home to several multi-national organisations, such as BSkyB and GlaxoSmithKline (GSK), whilst also supporting a range of Small and Medium sized Enterprises (SME's) and light industrial uses. It is now one of the top locations in London for media and broadcasting jobs, whilst still supporting traditional industrial uses, such as the waste and aggregate management plants in the west of the corridor. Overall, the GWC contains around 450 businesses and 24,000 jobs, representing approximately 17% of all employment in the borough.

The variety of employment uses has resulted in an area made up of a series of smaller, inward-facing land-use zones that are fragmented and poorly connected. The trend towards

[3] http://www.hwa.uk.com/site/wp-content/uploads/2017/10/CDD.04_Great-West-Corridor-Local-Plan-Review-Preferred-Options-Consultation-October-2017.pdf

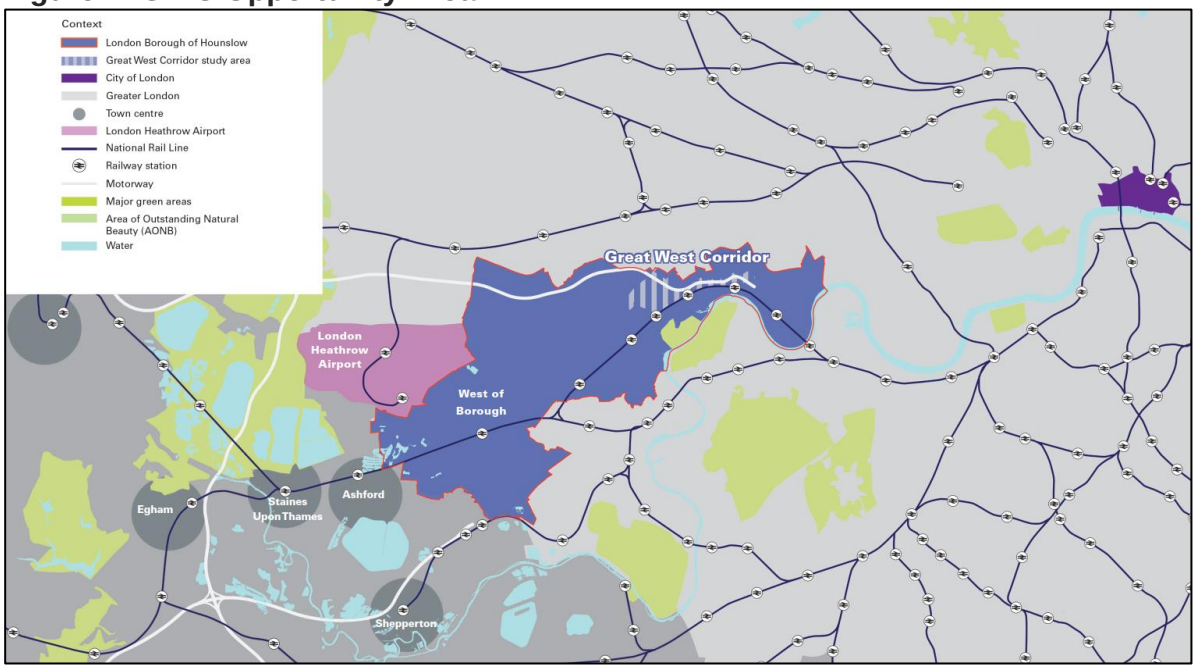
a service economy and the accompanying increase in commercial office space in recent years has exposed the lack of facilities for employees and affected the desirability of the area as a modern, vibrant business location. The domination of these areas by motorised modes of transport has meant that the streetscape and quality of the public realm have been noticeably eroded.

Although employment uses prevail, the area is surrounded by dense, suburban residential neighbourhoods and urban town centres such as Brentford and Chiswick. The recent construction of two large secondary schools on the edge of the corridor has further increased the pressure on the transport network and is contributing to a general change in the character of the area away from its industrial heritage. On the south-eastern edge of the corridor, the new 20,000 capacity Brentford Community stadium, due for completion in 2019, will bring almost 1,000 new homes and new facilities, including a hotel.

The GWC sits within a historically sensitive part of the borough and contains a relatively hidden network of green and blue infrastructure. The large parks and great estates at Gunnersbury and Boston Manor are both partially located within the corridor but are underused due to limited access points and a lack of visibility caused by the presence of the M4/A4. The River Thames is located to the south of the corridor within walking and cycling distance and the River Brent/Grand Union Canal passes through the GWC itself and provides a convenient active travel route, however, it is not well connected with existing walking and cycling infrastructure. The area is also surrounded by a number of listed buildings and conservation areas which contribute towards the area's distinctive character.

The extent of the GWC Opportunity Area is shown in **Figure 1**.

Figure 1: GWC Opportunity Area



Source: GWC Local Plan Review Draft for Consultation - October 2017

1.3. Scope and purpose of the study

The anticipated levels of growth in the Great West Corridor will put pressure on the strategic and local transport network. Although considerable work has been carried out by LBH to support the case for growth in the corridor, there has to date been no overarching strategic transport assessment for the area completed.

TfL and LBH have worked jointly on this Strategic Transport Study to identify the current and future challenges that the area faces, including as a result of the proposed housing and commercial growth. The study investigated the transport interventions that will help support these growth aspirations, providing an evidence base to support both the Local Plan and the development of any future transport projects.

Through this study, the potential role of several transport schemes that LBH has previously examined has been investigated. Other potential transport interventions have also been explored to investigate how the GWC can, in line with the aspirations set out in the MTS, become a place “where walking, cycling and green public transport become the most appealing and practical choices for many more journeys”.

Previous transport studies[4] undertaken on behalf of LBH indicated that major improvements to local and regional transport infrastructure are needed to support the anticipated levels of growth. The potential role of several transport schemes has been examined as part of those studies, most notably the impact of two new rail links, one connecting Southall to Brentford

[4] Golden Mile - Strategic Case for Transport Investment, Steer Davies Gleave, 2015; LB Hounslow Strategic Transport Study, WSP, 2012

and the other Hounslow to Hendon / Cricklewood via the Dudding Hill Line (now known as the West London Orbital Rail). This study has built on the work done to date and assessed the impacts of these and other interventions that help deliver the MTS aspirations.

1.4. Process of developing the transport study

The transport study was developed in discrete stages and supported by a strategic modelling exercise. This strategic modelling used TfL's suite of models including the LTS demand model, the SATURN-based Highway Assignment Model WELHAM and the Public Transport assignment model Railplan. The strategic modelling provided robust indicators for current and forecast transport demand and outputs which provide the empirical evidence base for the Transport Study and the Local Plan. Three technical study reports have been produced:

- *Great West Corridor Strategic Transport Study, LTS Demand Modelling, 2019*
- *Great West Corridor Strategic Transport Study, Rail Forecasting Report, 2019*
- *Great West Corridor Strategic Transport Study Highway Forecasting Report, 2019*

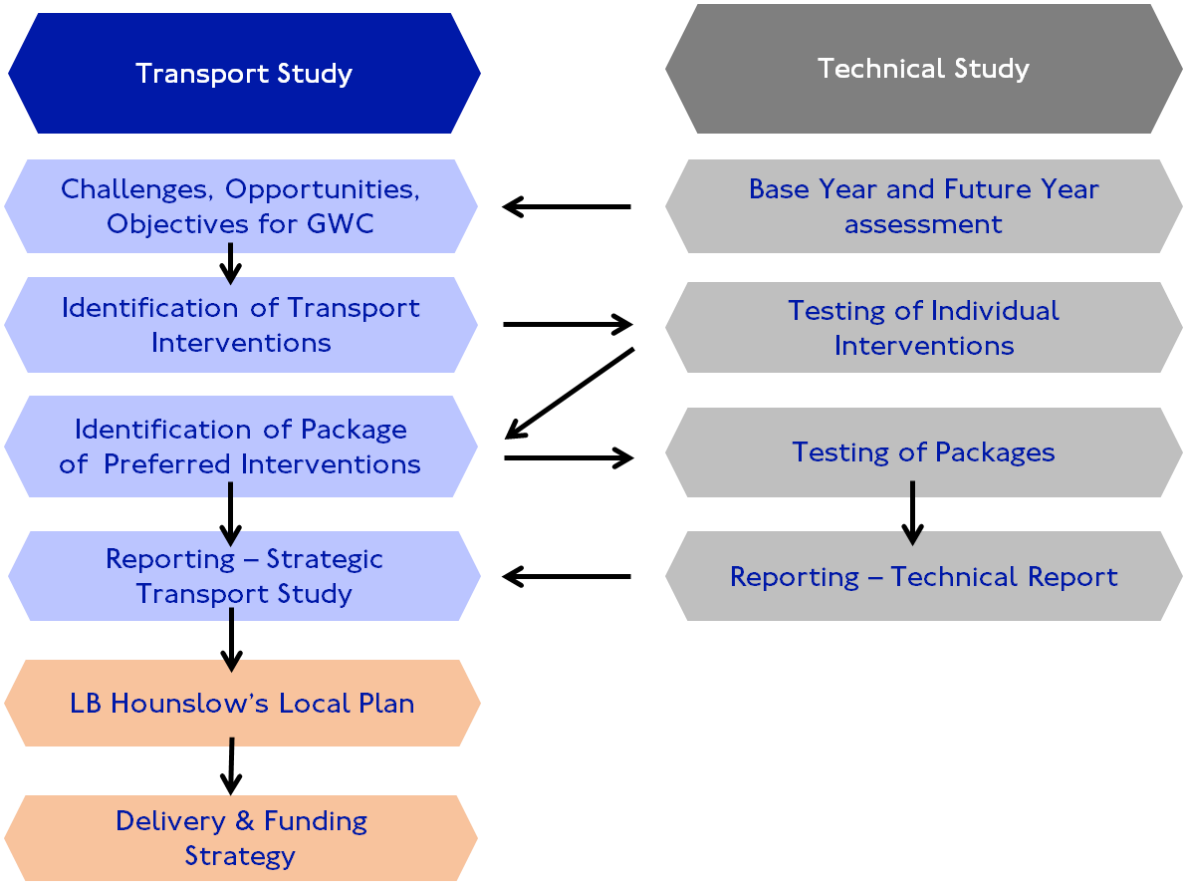
The use of these strategic models has enabled insight to be gained into the implications of London-wide growth until 2031 for the GWC area, as well as the implications of the local growth associated with the GWC area itself. Based on this analysis, a list of future year transport challenges has been developed.

Following this, a set of potential interventions was developed to help mitigate the identified future challenges. The list of interventions was derived from a review of previous studies, discussions and workshops with stakeholders and from TfL's and LBH's own assessments. These interventions were 'tested' using the strategic models to understand their effectiveness in mitigating the impacts of the GWC housing and employment growth. Whilst the technical study provides the numerical assessment of the interventions, it is one of the aims of this study to provide further context and assess the benefits of these interventions in relation to the wider objectives of the MTS and other regional policies.

Since multiple interventions would be needed to meet the objectives for the area, transport interventions selected from the initial assessment were formed into two packages of measures for testing in the suite of transport models. The packages included a range of interventions; one focused on bus-based measures and the other on rail-based measures. Both packages included assumed shift to active travel modes in line with the targets set in the MTS.

Figure 2 below provides an overview of the key stages of the transport study and the associated technical modelling study.

Figure 2 – Process of developing the strategic transport study

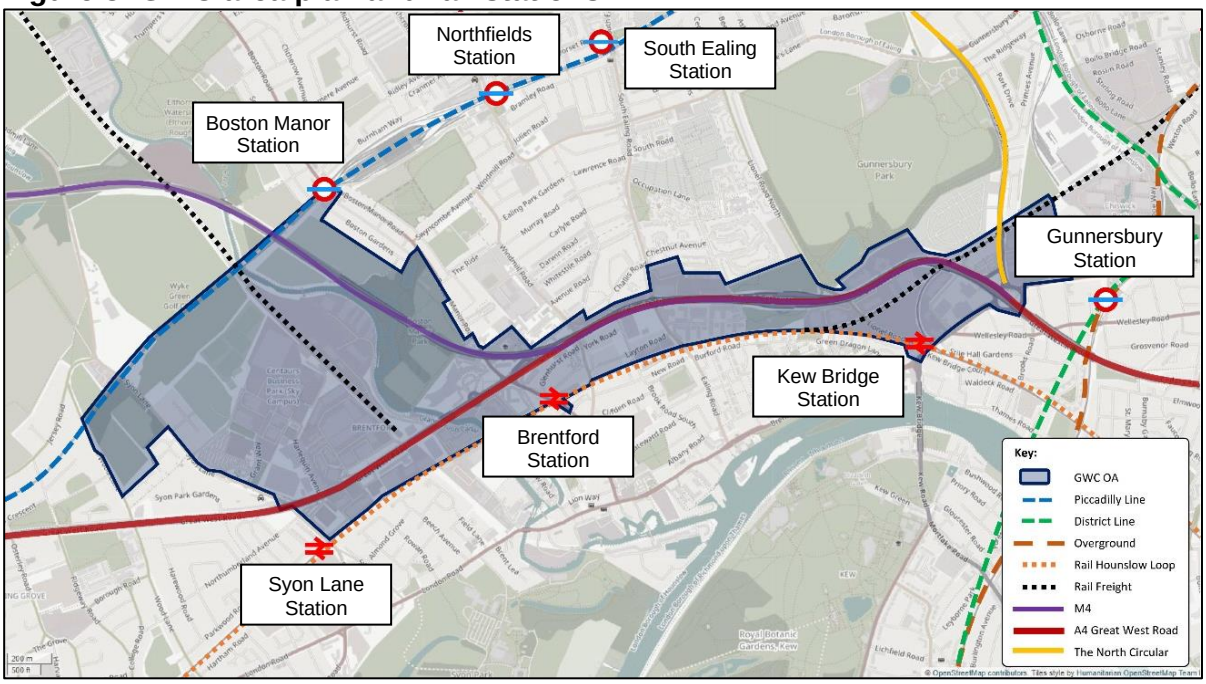


2. Current transport and travel in the GWC

2.1. The transport context

The Great West Corridor's transport character is defined largely by the dominance of east to west radial infrastructure on both the road and public transport networks (see **Figure 3**) which provide fast, convenient links to central London and Heathrow Airport (and beyond). These bisect the area and create physical barriers to local movements.

Figure 3: GWC area plan and rail stations



Source: ©OpenStreetMap

Severance

Both the road and rail infrastructure in the GWC form a barrier to local connectivity and result in severance for all modes. Vehicular movement across this infrastructure is restricted to four key north-south routes which suffer from congestion at peak times affecting all vehicular traffic and reducing the reliability of the buses that use these corridors. In addition, large footprint development further reduces permeability for those engaging in active travel.

At the periphery of the GWC, the River Thames to the south and the large expanse of Gunnersbury Park in the east also contribute to severance and the isolation of local communities.

Cycling and Walking

The quality and level of provision of cycle and pedestrian facilities throughout the GWC area is variable, with areas such as Brentford Town Centre and Brentford East having higher levels of active travel connectivity and accessibility.

By contrast, the A4 and its immediate environs do not meet MTS Healthy Streets aspirations. The area along the A4 is car dominated, suffers from poor air quality and is generally hostile towards both pedestrians and cyclists. Whilst the A4 has two-way segregated cycle tracks on both sides of the carriageway, these are intermittent, encounter barriers at major junctions and are often cut off by commercial development.

Other areas of the GWC have seen significant improvements in cycling infrastructure with connectivity between the GWC and Ealing improved recently by the installation of a kilometre of high-quality segregated cycle track connecting the Great West Road to Boston Manor along Boston Manor Road.

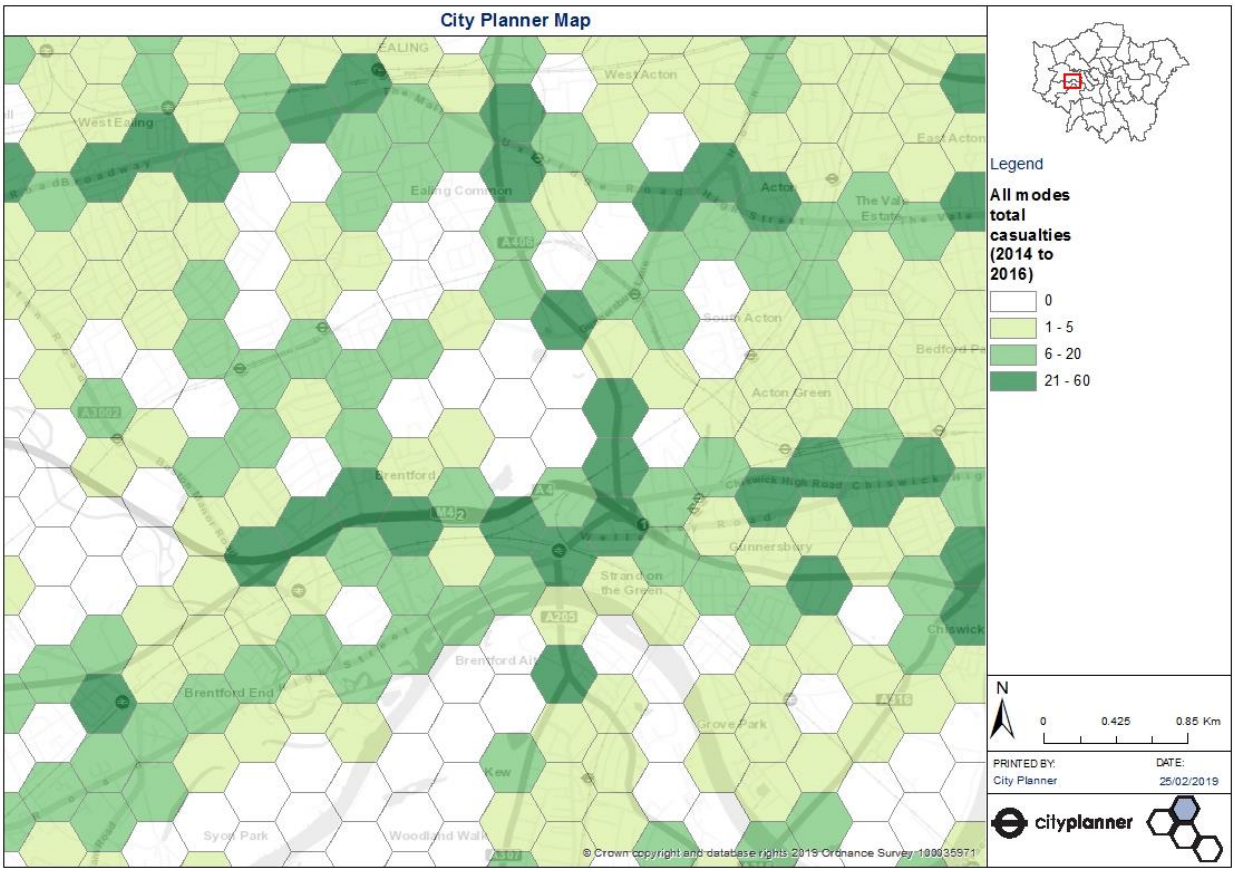
A new Cycle Superhighway 9 (CS9) is proposed to the south of the area, which would connect Hounslow to Kensington using the A315 and would significantly improve east to west journey times and safety for those travelling by bike.

Road Safety and Vision Zero

The MTS aims for a 'Vison Zero' approach to road danger in London. The Mayor's aim is for all road deaths and serious injuries from road collisions to be eliminated from London's streets by 2041. One of the ways to achieve this is to reduce the dominance of motor vehicles on the streets as well as introducing lower speeds, and promoting safe street design.

Figure 4 shows spatially where casualties have taken place in the GWC area in the wider area between 2014 and 2016. Darker green shaded areas indicate the areas with the most collisions. These are clustered along key road corridors. Within the GWC area most recorded collisions were at major road junctions such as Chiswick Flyover, Ealing Road, Windmill Road, Boston Manor Road and Gillette Corner. Between 2014 and 2016 there were a total of 394 casualties in the GWC area only, 1 of which was fatal and 28 of which were serious.

Figure 4: Total Casualties by all modes (2014 to 2016)



Source: TfL City Planner Tool

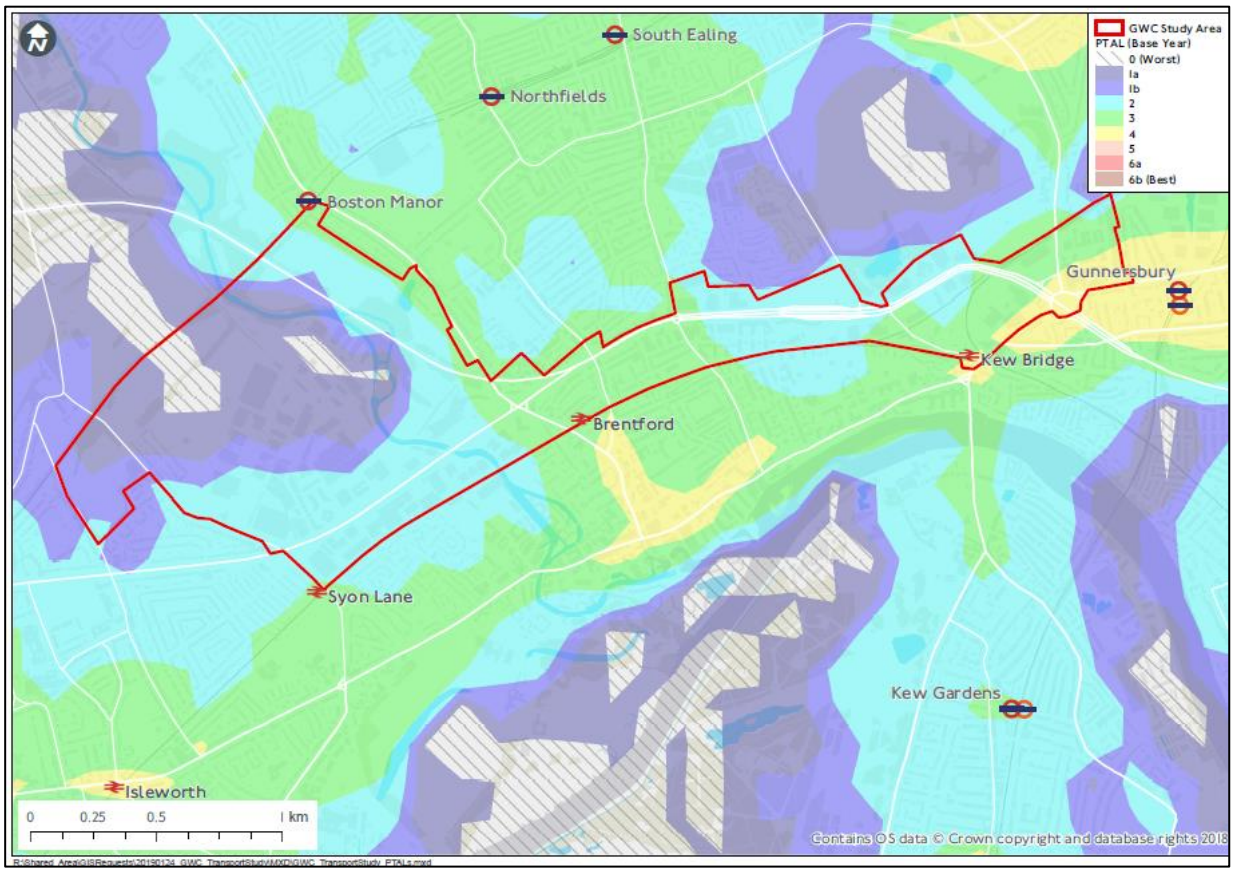
Public Transport Accessibility

Good public transport provision is conducive to achieving healthy and active neighbourhoods. More public transport stops and more frequent services within walking distance mean people are more likely to choose public transport instead of driving.

The Public Transport Access Levels (PTAL) measure gives an indication of the public transport density in a given area. Across the GWC area, PTALs vary significantly. The areas with the greatest access to public transport are around Kew Bridge and Brentford High Street, which have a PTAL of 4 (on a scale of 0-6b where 6b is the highest). The majority of the corridor area has a PTAL 3 or 2, however, there are also small pockets of PTAL 0 within parks and along the River Thames.

The full area PTAL ratings across the area are shown in **Figure 5**. Overall, the generally low PTALs in the GWC are a reflection of the small number of national rail or LU stations within the area with bus corridors providing access to them. Some parts of the corridor are left with long walk distances to rail or LU stations.

Figure 5: Public Transport Accessibility Levels (PTAL) in the GWC area



Source: TfL WebCAT tool 2019

Bus services and connectivity

The area has an extensive bus network with several bus routes running parallel to the Great West Corridor to the south, along Brentford High Street. Bus routes E8 and 235 travel into Hounslow from Brentford, the 237 runs between White City and Hounslow Heath, and the N9 provides a night service from Aldwych to Heathrow Terminal 1,2,3, & 5.

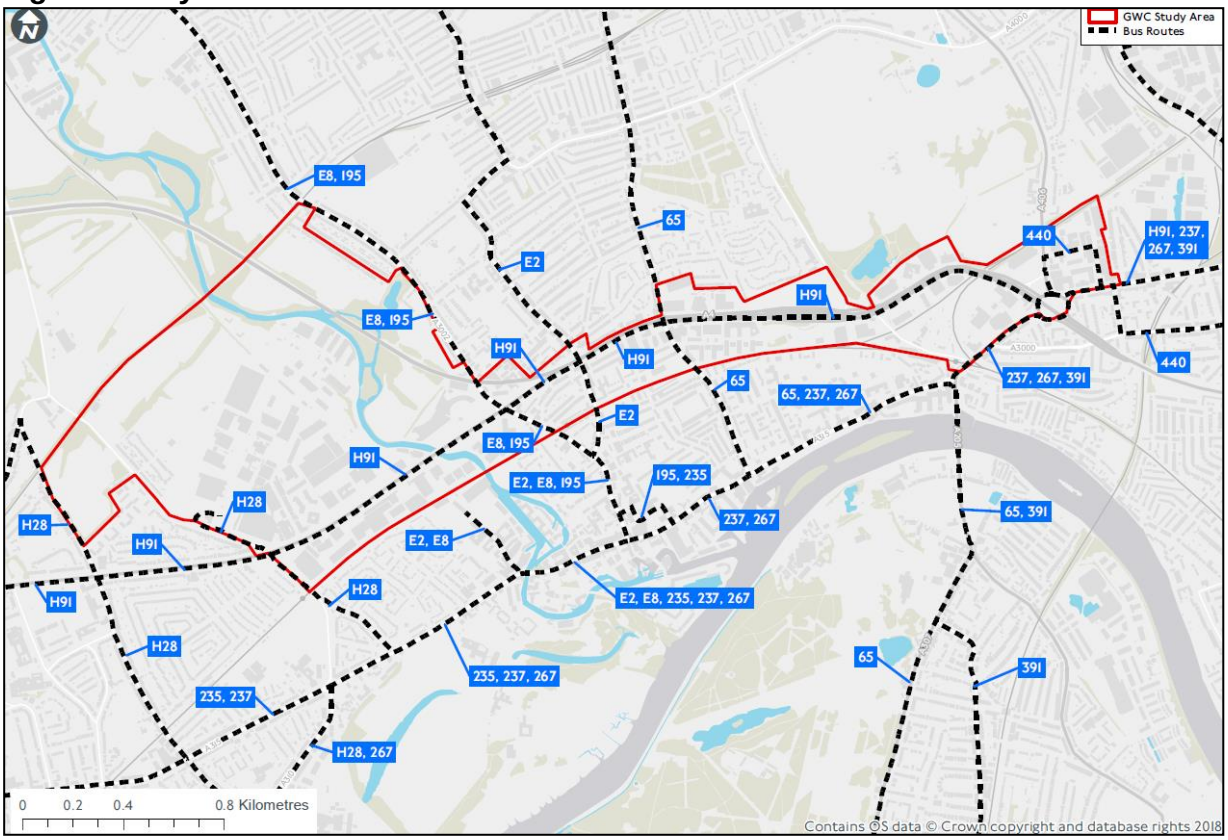
There are several orbital bus routes that cut north/south across the Great West Corridor, including the number 65 along Ealing Road and the E2 along Windmill Road. Boston Manor Road (A32002) is another important north-south route, which is served by two routes, the E8 and 195.

In total there are 11 bus routes serving the GWC area. The current bus provision and frequency is set out in **Table 1** and shown in **Figure 6**.

Table 1: Daytime bus routes in the GWC Area

Service	Route	Frequency (buses per hour)
H28	Bulls Bridge – Tesco Osterley	20
H91	Hammersmith – Hounslow West	7-11
E2	Brentford – Greenford Broadway	6-10
E8	Hounslow, Bell Corner – Ealing Broadway	6-10
65	Kingston – Ealing Broadway	4-8
195	Brentford – Charville lane Estate	10-13
235	Great West Quarter – Sunbury Village	6-10
237	White City – Hounslow Heath	6-10
267	Hammersmith – Fulham	11-14
391	Richmond – Fulham	11-14
440	Power Road – Stonebridge Park	12-14

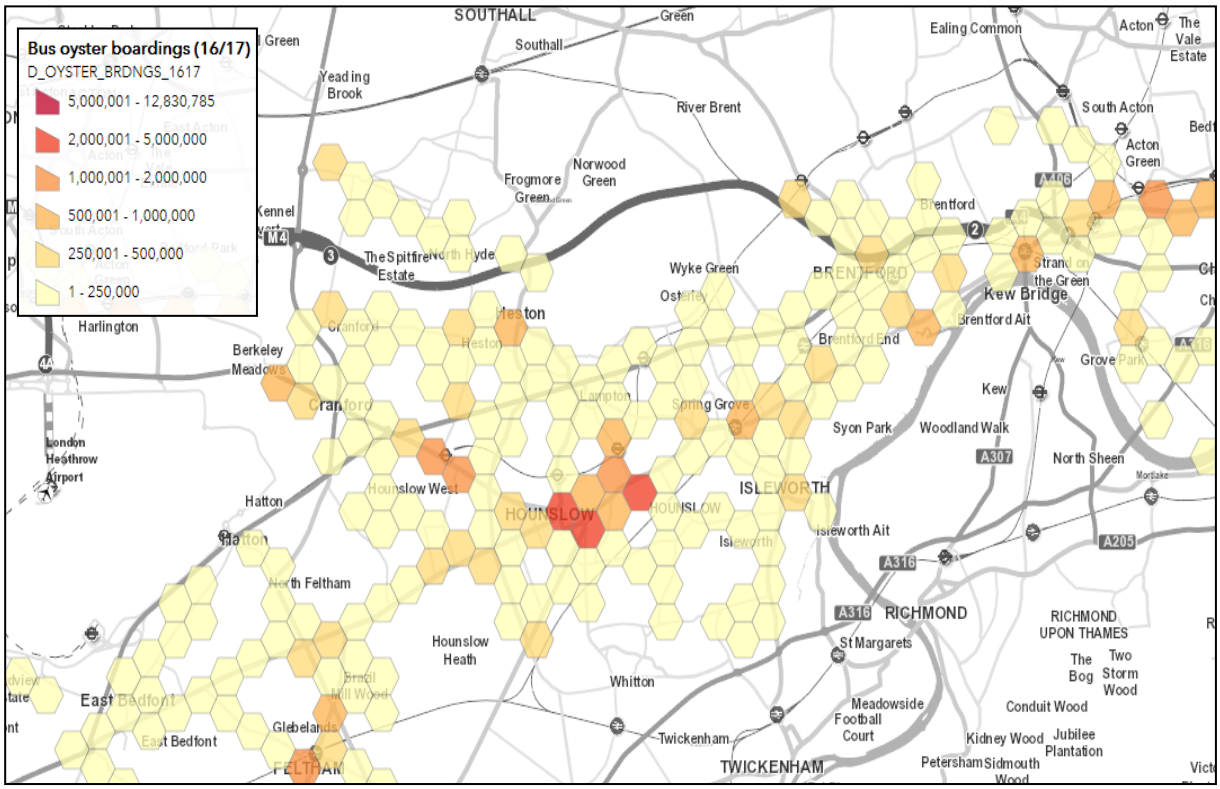
Figure 6: Daytime bus routes within the GWC



There is a relatively low bus service frequency along the A4 Great West Road itself with the H91 the only bus running along the length of Great West Road. Despite the limited service offered, buses along the A4 have high passenger loads. However, as shown in **Figure 7** bus passenger boarding and alighting numbers along the Great West Road are relatively low. Bus boardings on Boston Manor Road and along the A315 Brentford High Street are higher, reflecting the variety of facilities available in the area and greater service offer. Bus stops around underground and rail stations also display higher usage, indicating passenger

interchange. Given the distance of the majority of the GWC area from stations, buses are an important means of accessing the station.

Figure 7: Bus Boardings 2016/17



Source: TfL City Planner Tool

<u>Rail and underground access and connectivity</u>

The GWC area is served by South Western Railway services on the Hounslow Loop, which run south of the A4 connecting the GWC area to Richmond, Clapham Junction, Weybridge and central London. It is served by three stations: Kew Bridge and Brentford in the east and centre of the GWC respectively, and Syon Lane in the west of the GWC area.

London Overground services on the North London Line are available from Gunnersbury station situated to the east of the area providing connectivity to Richmond, Willesden Junction and Stratford. **Table 2** summarises the current rail provision and frequencies.

Whilst the rail-based public transport network provides convenient links to central London and Heathrow Airport, orbital journeys to the north and south are much less well served. The rail network therefore does not always provide a competitive alternative to the private car.

Table 2: GWC Rail Services

Rail Line	Service Route	Frequency (trains per hour)
Hounslow Loop Line	Waterloo – Clapham Junction - Barnes – Kew Bridge – Brentford - Syon Lane – Hounslow – Twickenham – Richmond – Putney – Clapham Junction – Vauxhall – Waterloo (also serves Reading, Windsor and Eton Riverside, Weybridge)	4tph per direction
Overground – North London Line	Richmond – Kew Gardens - Gunnersbury – Willesden Junction - Stratford	4tph per direction

Service improvements are planned for rail services within the Hounslow Loop in 2019, with Brentford station benefiting from a programmed 100% increase to 8 passenger trains per hour towards London Waterloo in the peak hour, 50% of these additional services will also call at Syon Lane station.

There are no London Underground (LU) stations within the GWC area itself. The closest stations are Boston Manor, Northfields and Osterley and South Ealing (served by the Piccadilly line) and Acton Town (served by the Piccadilly and District lines), which lie to the north, west and north-east of the GWC respectively. Gunnersbury station also lies just outside the boundary to the east of the GWC area (served by both the District line and London Overground). The Piccadilly line provides a daytime frequency of 12tph. The District line provides fewer services with 6tph in the daytime.

Whilst these stations serve the outer areas of the Great West Corridor, they are all situated at least 1.2 km (0.75 miles) from the A4/Great West Road within the study area, and beyond what is considered a reasonable walking distance of 960m.

In the future, Elizabeth line services will bring new options for residents and businesses close to the Ealing boundary of the borough. Although the route does not serve the GWC directly, there is a need to ensure that the area will benefit from this additional investment in public transport. Complementary bus network changes to support the introduction of the Elizabeth line have been planned across west London as a whole.

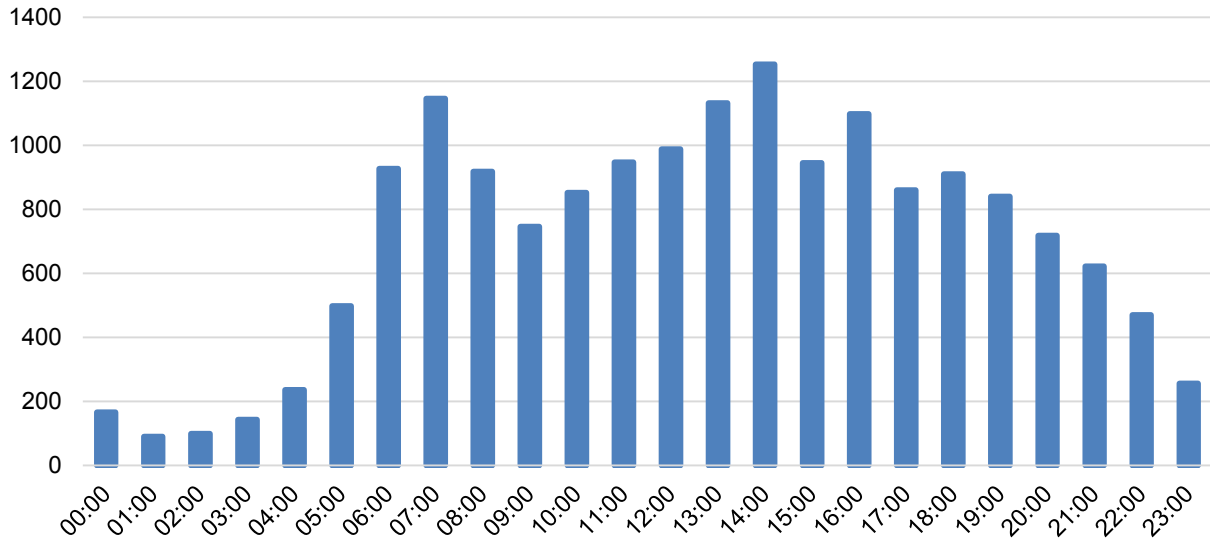
<u>Road Network</u>

Although it is just outside LB Hounslow, Heathrow's influence as a trip generator far outweighs any other single destination. Over time, the transport network has developed to accommodate connections between the airport and central London along the A4 which is a dual three lane carriageway and forms part of the Transport for London Road Network (TLRN). As a result, the A4 plays host to a very high proportion of through traffic. The A4 is not only a key component of the TLRN, but also carries several bus routes and a bi-directional segregated cycle way.

The study area also includes one motorway, the M4, which runs east-west through the GWC plan area and provides access primarily between the M25, Heathrow and inner/central London but also has exits to the A4 at Chiswick Roundabout. The elevated section of the M4, the 'Chiswick flyover', follows the route of the A4 until they part at Boston Manor Road, just north of Brentford train station.

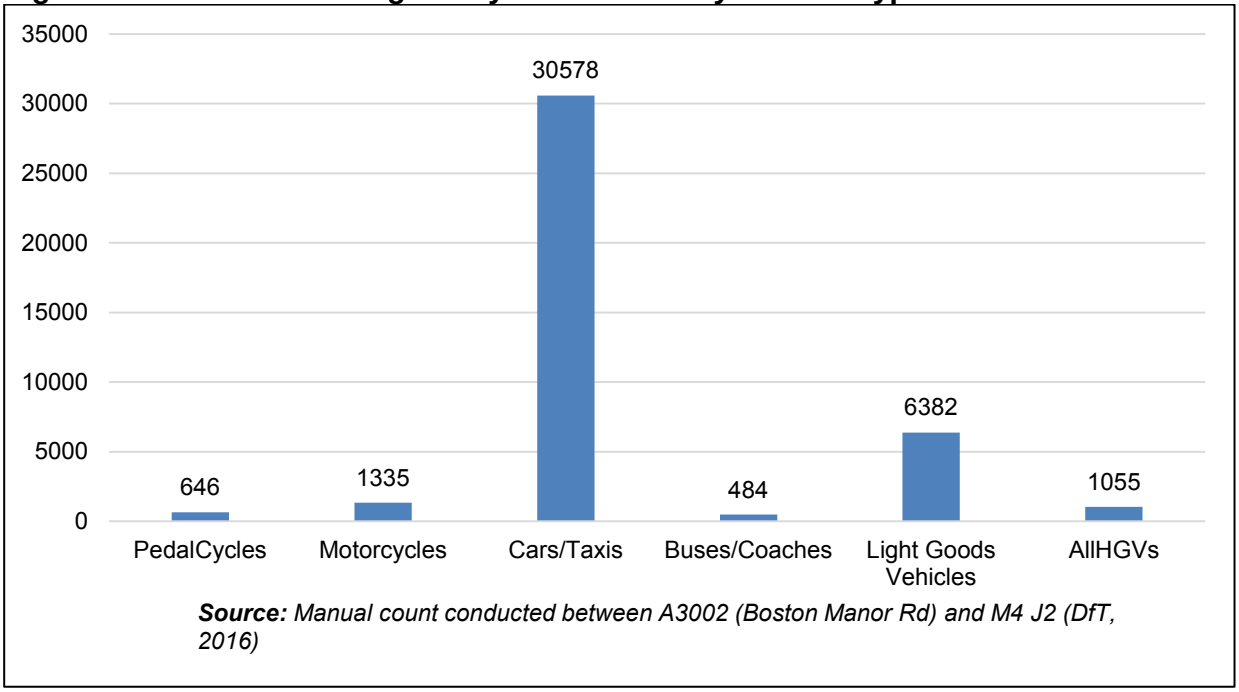
There is a high volume of vehicular movements along these corridors during the peak periods. Average annual traffic flow data for the A4 (**Figure 8**) suggests that there is a distinct morning peak on the A4 between 7.00am and 8.00am. A second peak flow occurs in the afternoon at 2pm, after which it gradually decreases. The vehicle type breakdown (**Figure 9**) further illustrates that around 18% of the vehicles using the A4 are light or heavy goods vehicles. These figures reflect the A4's role as a major strategic transport corridor.

Figure 8: A4 Hourly Traffic Flow



Source: *7-day average flow, count carried out between Osterley Station and Syon Lane in Sept 2017 for TfL*

Figure 9: A4 Annual Average Daily Traffic Flow by Vehicle Type



Source: *Manual count conducted between A3002 (Boston Manor Rd) and M4 J2 (DfT, 2016)*

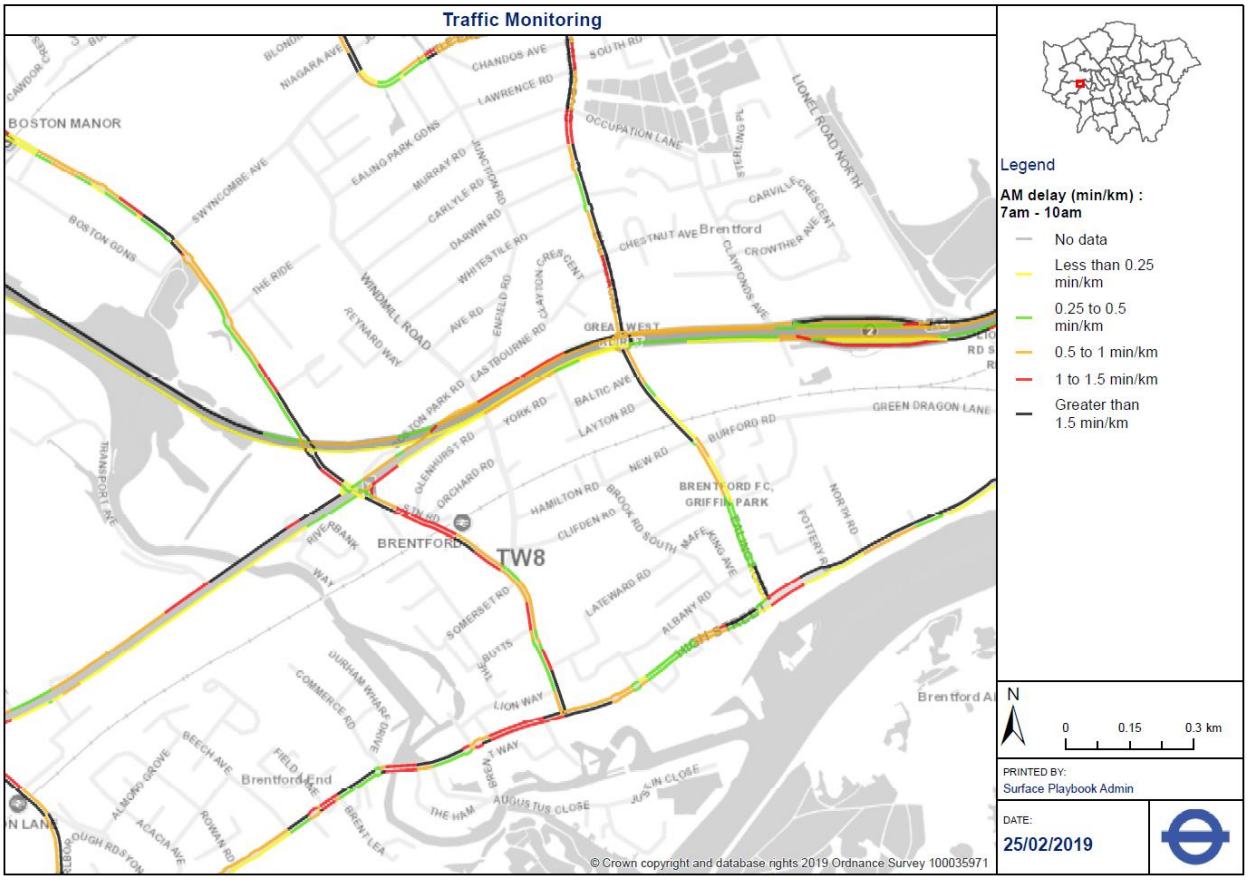
At the western end of the study area, the B454 Syon Lane crosses the A4 north-south and links the area to Isleworth in the south and Southall in the north. Further east, the A3002 Boston Manor Road also crosses the A4, and links Brentford town centre to Hanwell and the A4020 Uxbridge Road in the north.

At the eastern end of the study area, the A4 intersects with Chiswick High Road and Gunnersbury Avenue at the Chiswick Roundabout, one of the busiest junctions in London. Kew Road heads south from the area and provides access across the river to Kew and Richmond town centres.

Also intersecting at Chiswick Roundabout are the North and South Circular Roads, which together form a ring road around inner London. They converge with the M4 and the A4 at Chiswick Roundabout.

Figure 10 shows the delay experienced on the GWC road network in the AM peak period (7am-10am). Journey time delay on some sections is greater than 1.5m per km.

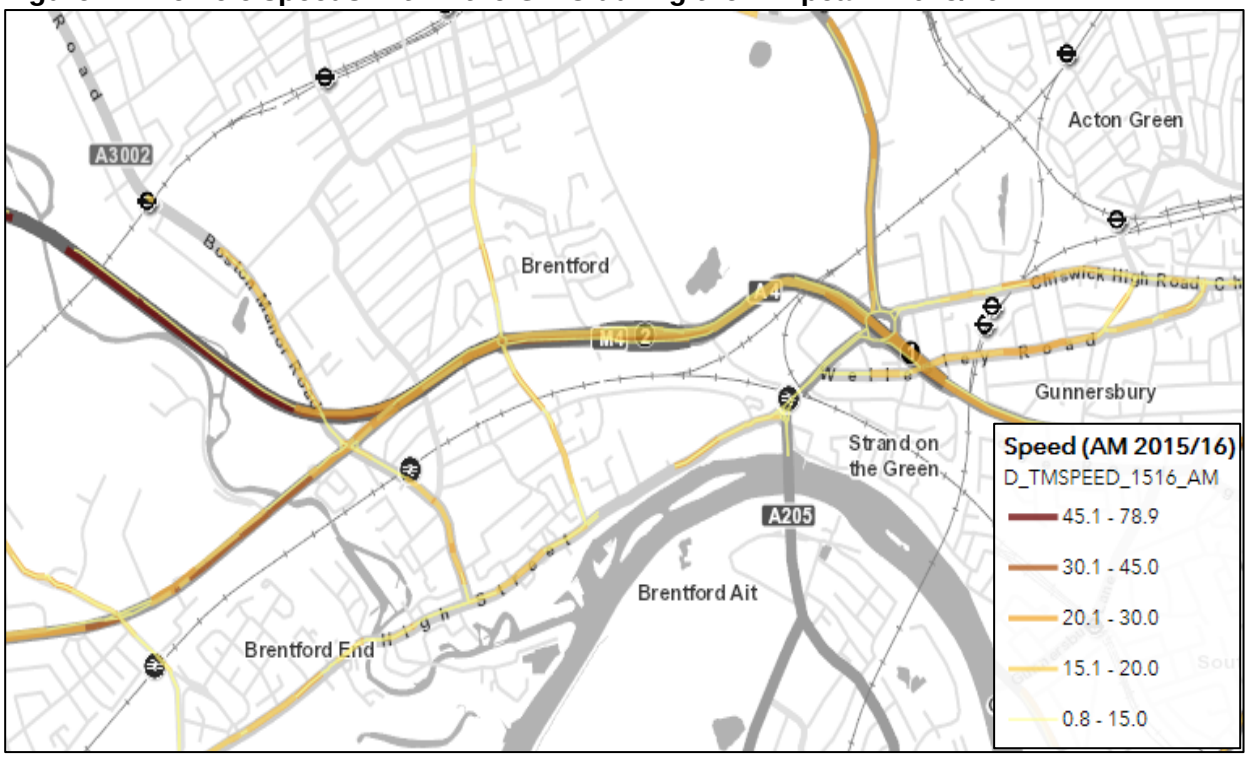
Figure 10: AM peak period (7am - 10am) delays on the road network



Source: TfL Playbook

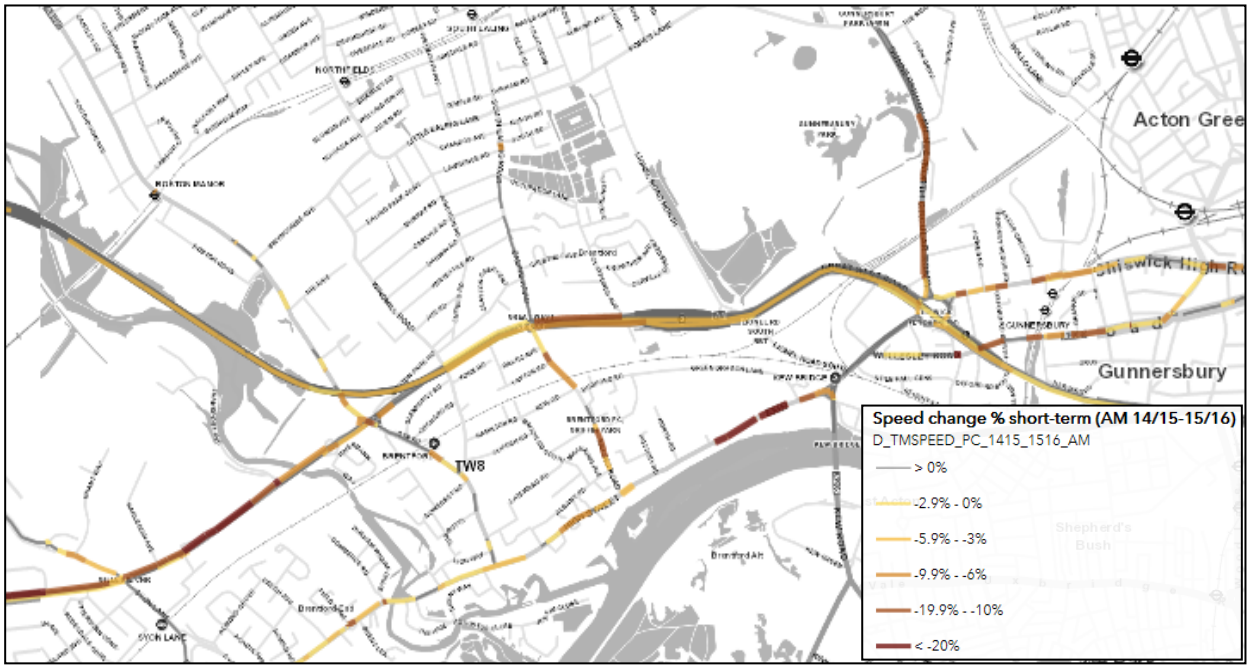
Corresponding to the high traffic volumes, **Figure 11** indicates that average speeds on the A4/ M4 during the AM peak are relatively low. This, and the level of delays shown above, highlight that the area suffers from congestion during peak periods. **Figure 12** indicates that speeds on the strategic road network within the GWC declined slightly between 2014/15 and 2015/16.

Figure 11: Vehicle speeds within the GWC during the AM peak - 2015/16



Source: TfL Playbook

Figure 12: Percentage change in speeds in the AM peak between 2014/15 and 2015-16



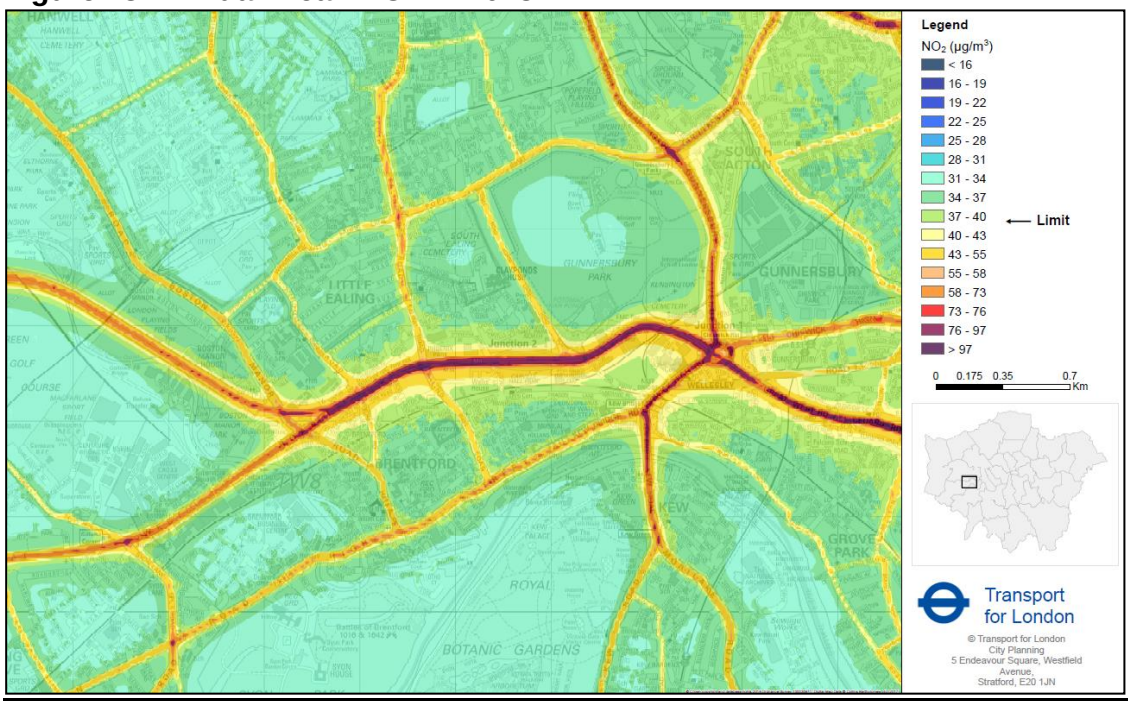
Source: TfL Playbook

Air quality

Air quality is a key consideration for the Healthy Streets approach. It is instrumental in achieving the aim to make of making the GWC greener, healthier and a more attractive place to live, work, play and do business. It is also intrinsically linked to the MTS mode share target of reducing car mode share to 20% by 2041. Poor air quality can result in negative health impacts, and analysis by the Institute of Occupational Medicine estimates that the total burden of fine particulate exposure to the Borough's population is equivalent to 116 deaths annually. Deaths linked to NO2 exposure is 79-174 deaths and 1,200-2,700 life years lost annually.[5]

Figure 13 shows that air quality along the main arterial routes within both the borough and the Great West Corridor is very poor. NO2 levels are in excess of EU limits along all of the main roads and are within the highest category identified along the A4-M4 corridor. Away from these roads NO2 levels within the borough are within acceptable levels. This demonstrates the negative impact vehicular traffic is having on air quality within the borough and within the GWC study area. Hounslow does not currently exceed EU PM (particulate matter) levels anywhere within the borough. Given the issues associated with poor air quality the whole of the borough has been designated as an Air Quality Management Area, with the A4 Great West Road A4 identified as a priority area for the Council.

Figure 13: Annual mean NO2 in 2013



Source: TfL

[5] GLA (2013) Air Quality in Hounslow: A Guide for Public Health Professionals. https://www.london.gov.uk/sites/default/files/air_quality_for_public_health_professionals_-_lb_hounslow.pdf

2.2. Current transport and travel in the GWC

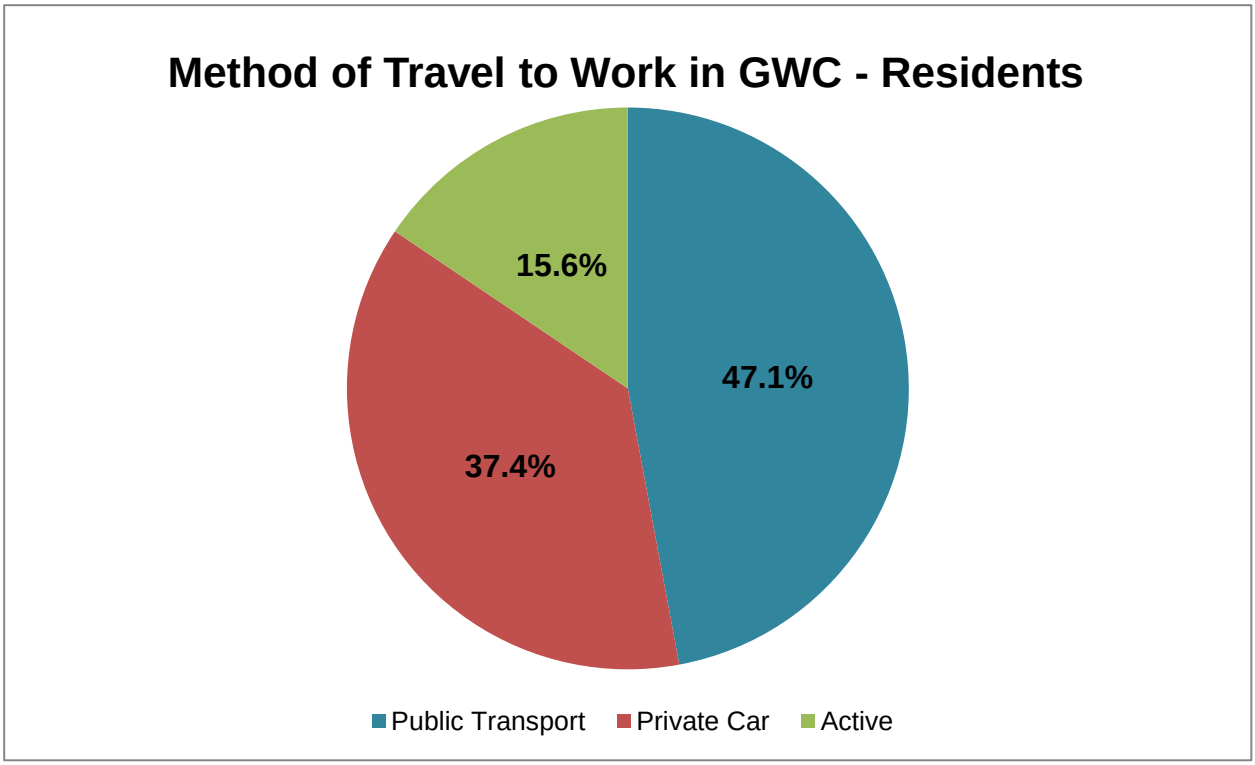
Mode Share

The Office for National Statistics 2011 census data has been examined to understand the travel to work mode choice for people living and working in the GWC. Travel to work data (for census output area QS701EW) has been analysed for the GWC, borough and London overall.

The mode share data for those living in the GWC is highlighted in **Figure 14**. It shows that the majority of existing residents in the GWC area (47%) travel to work by public transport, whereas a total of 37% travel by private car, either as the driver, passenger or by taxi. This leaves the remaining 16% who walk or cycle to work.

Comparing 2011 and 2001 census mode share data indicates that there has been a 10% change away from private car travel for travel to work in the GWC over that period. This corresponds with changes in the level of car ownership for those living in the area, which has also fallen from 0.9 to 0.8 per household.

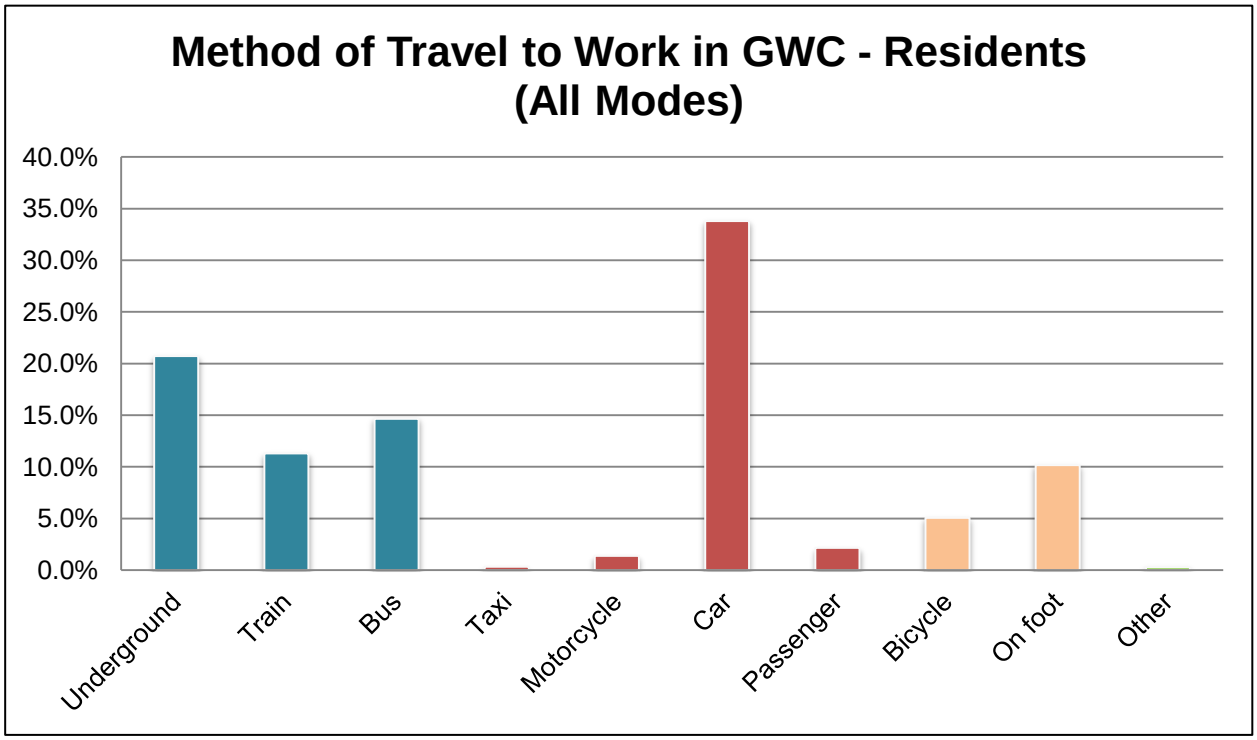
Figure 14: Method of Travel to Work - Residents



Source: Census 2011

The full breakdown of mode of travel to work by residents is shown in **Figure 15**. This provides greater detail, highlighting that whilst public transport accounts for the largest overall percentage of the mode share, the single highest mode of travel is by private car. This accounts for 34% of the disaggregate mode split. Of the public transport modes, underground is the highest with 21% of trips, compared to train and bus which account for 11% and 16% of trips, respectively.

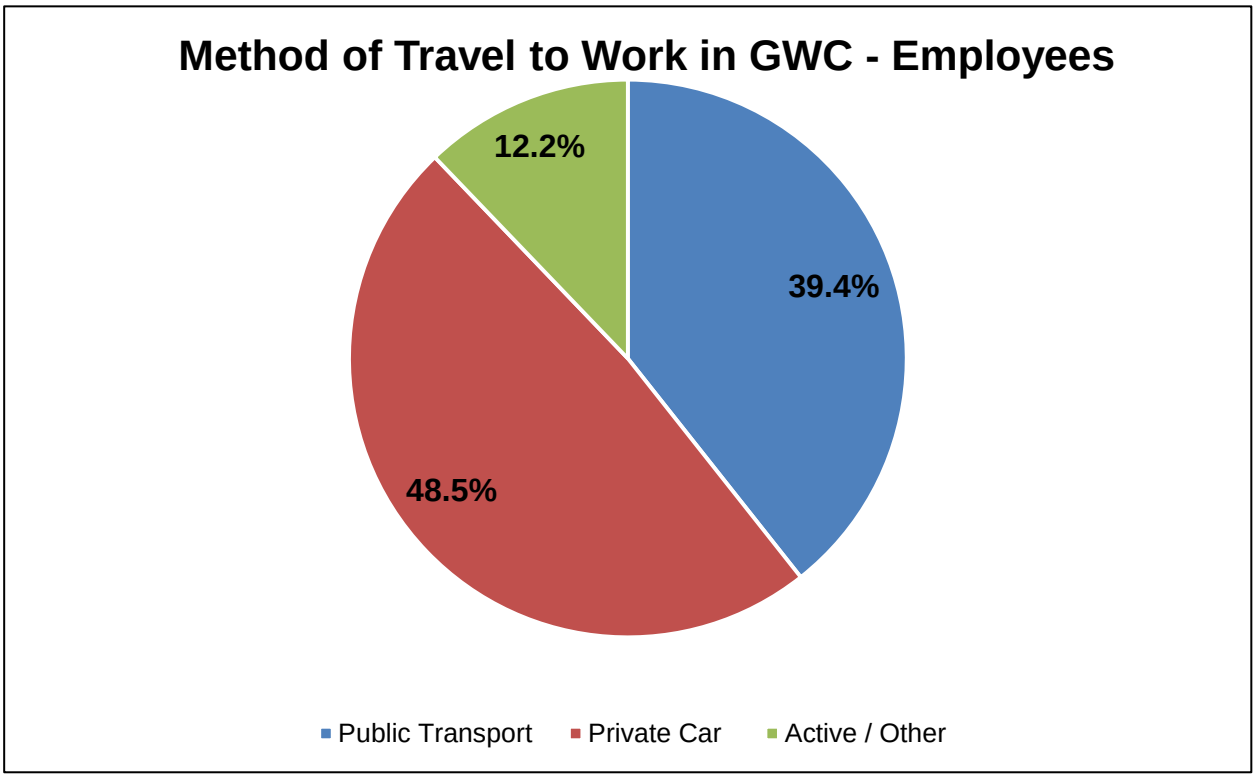
Figure 15: Method of Travel to Work - Residents All Modes



Source: Census 2011

The mode share data for employees travelling into the GWC area for work is detailed in **Figure 16**. The data shows that travel by private car attracts the highest mode share with 49%, whereas public transport provides for 39% and walking or cycling to work accounts for 12%. These mode shares are consistent with those quoted in the travel plans of large employers in the GWC (obtained via staff travel surveys).

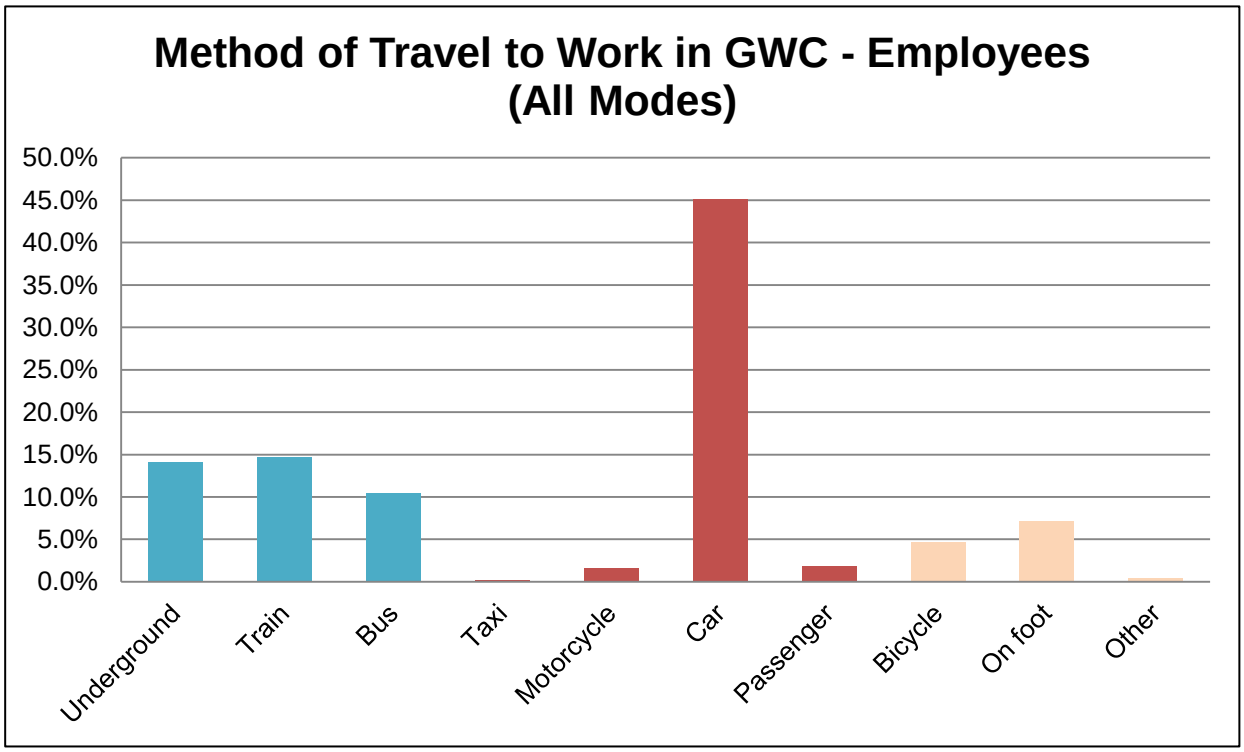
Figure 16: Method of Travel to Work - Employees



Source: Census 2011

Figure 17 breaks down the mode split for employee travel to work in more detail. As with the residential dataset travel by private car is the most popular method of travel, accounting for 45% of the overall mode split. The public transport mode share is more evenly split, with underground and train travel accounting for 14% and 15% of trips, respectively. The proportion of employees travelling into the area by bus is lower at 10%.

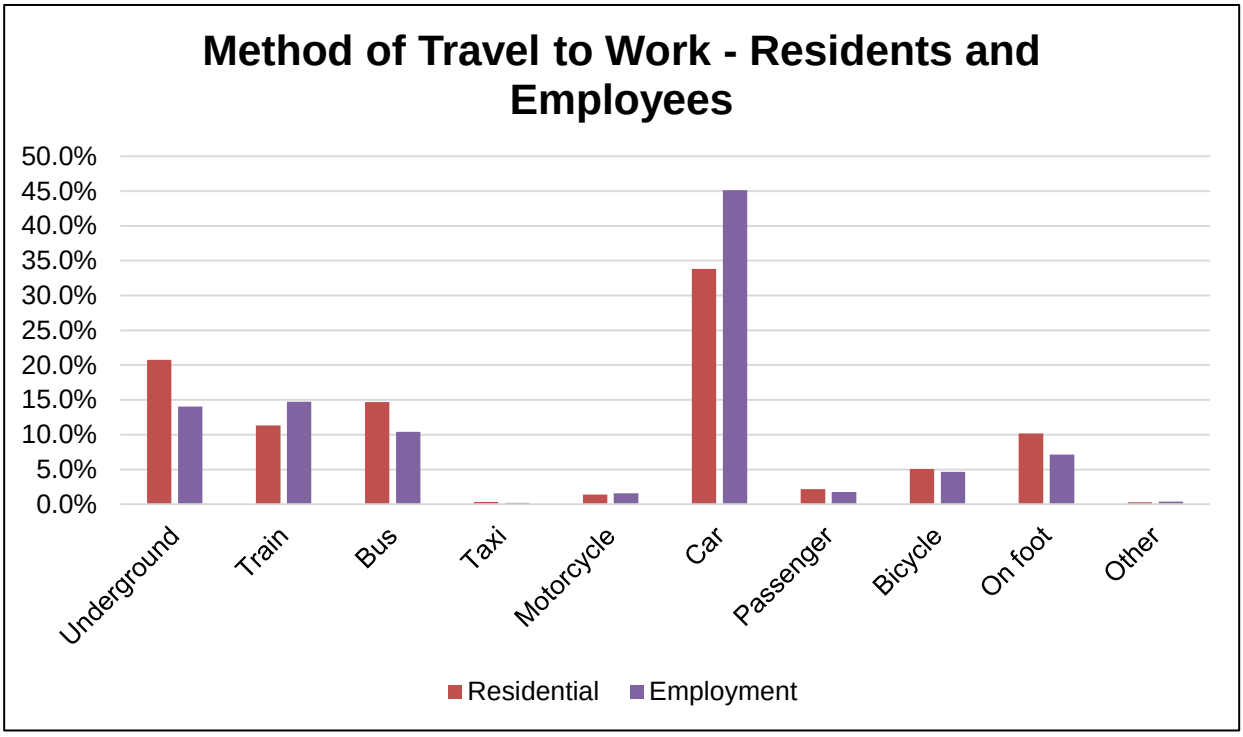
Figure 17: Method of Travel to Work Employment All Modes



Source: Census 2011

Figure 18 compares both the GWC area resident and GWC area employee travel to work data. This demonstrates that the majority of trips are made by private car for both individuals living in, and those working within the GWC area.

Figure 18: Residential – Employment Data Mode Comparison



Source: Census 2011

It can be noted that a higher proportion of residents living in the GWC travel to work by underground, 21%, compared to those travelling into the area for work, 14%. This is most likely to be due to the location of the LU stations which are more remote from the corridor's key employment sites, as well as the fact that employment trips originate from right across the Greater London area and beyond, where there may be other modes of transport more readily accessible than the LU network. By comparison, existing residential areas are closer to LU stations and residents of the GWC area benefit from good LU links into central London employment locations.

A higher percentage of employees travel to work by train into the area than those residing there, with 15% and 11%, respectively. This is likely to be due to the rail stations being located in close proximity to key employment sites, and the transport choices available to employees at the start of their trip.

The percentage of residents and employees in the GWC area who cycle is relatively low, at around 5% for each (although this is higher than the borough wide percentage of 3%). As would be expected, the percentage of individuals walking to work is higher for those living in the area than those travelling to the area for employment at 10% and 7%, respectively.

Borough Level and London Wide Travel to Work Data

The Travel to Work census data has also been extracted at the borough and London-wide level, as shown in **Table 3**. As expected, Greater London has a much higher proportion of residents travelling to work by public transport, with over half travelling by bus, train or underground. This is likely to be due to the wider range of public transport choices and the distribution of jobs at the city-wide level.

Table 3: Comparison of Residents Travel to Work Mode Share

	Public Transport	Active Travel	Private Car
Great West Corridor	47%	16%	37%
London Borough of Hounslow	42%	11%	46%
London-wide	53%	14%	33%

Source: Census 2011

London-wide, the private car continues to account for a significant proportion of travel to work with a 33% mode share and travelling actively by walking or cycle accounts for 14% of trips which is broadly similar to the GWC share of 16% (residential).

London Travel Demand Survey Data

Whilst Census data analysis is a useful tool to understand and compare travel characteristics of an area, it does have its limitations and the current dataset is now quite old. The London Travel Demand Survey (LTDS) is an annual dataset which provides a more up-to-date snapshot of travel by a sample of London residents for all purposes across the whole week. LTDS data for postcode areas TW7 and TW8, which cover the GWC area, have been considered between 2014 and 2017.

The LTDS data shows that whilst private car use in GWC held a similar percentage of the overall mode share (46%) to the census data, active travel accounted for 32% of the trips, approximately double the census data mode split for residents in the GWC.

2.3. The potential for mode shift

Some analysis has also been undertaken to understand for how many existing car driver trips made by residents of the GWC could realistically be made by public transport, walking or cycling. The analysis explores whether the known characteristics of the journey, trip-maker or alternatives are likely to prevent another choice being made. Where journeys are described as ‘feasible by another mode’, this means that another mode appears to be available: this alternative may not be appealing or suitable for the trip-maker and they may not be prepared to switch. The analysis essentially acts as a ‘maximum target market’ for mode shift from the car and can be used to guide more in-depth demand analyses in future.

The potential for mode shift analysis is derived from the London Travel Demand Survey (LTDS) 2014/15 to 2016/17 and is based on trips made by London residents which could reasonably be walked, cycled or done by public transport all the way but currently are not.

Approximately 37,000 trips are being made in the GWC area with 20,000 currently being made by car. Of these 37,000 trips, just under 20,000 could feasibly be made by an alternative mode, i.e. these are car trips that could be done by public transport or public transport trips that could be done by walking and/or cycling. Around 5,000 of these potential trips are currently by public transport, about 3,500 by bus, 1,200 by tube and a very small number by rail. The remainder of around 15,000 are trips that could potentially shift are currently made by car.

This highlights the high potential for mode shift within the GWC, indicating that around 75% of all car trips could potentially shift to more sustainable modes. **Table 4** highlights the cycling potential, showing that out of the total of almost 20,000 potentially switchable trips, almost 18,000 could be done by cycle. Furthermore, the potential to shift trips from public transport to active modes suggests that capacity on the public transport network could potentially be freed up in the future which would allow some of the GWC growth to be accommodate.

Table 4: Potential for residents' trips to switch mode in the GWC

Category	Number of trips on an average day
Walkable only	200
Cyclable only	12,800
PT only	1,600
Walkable and cyclable	1,200
PT and cyclable	1,900
PT, walkable and cyclable	1,900
Total trips that could shift	**19,700**

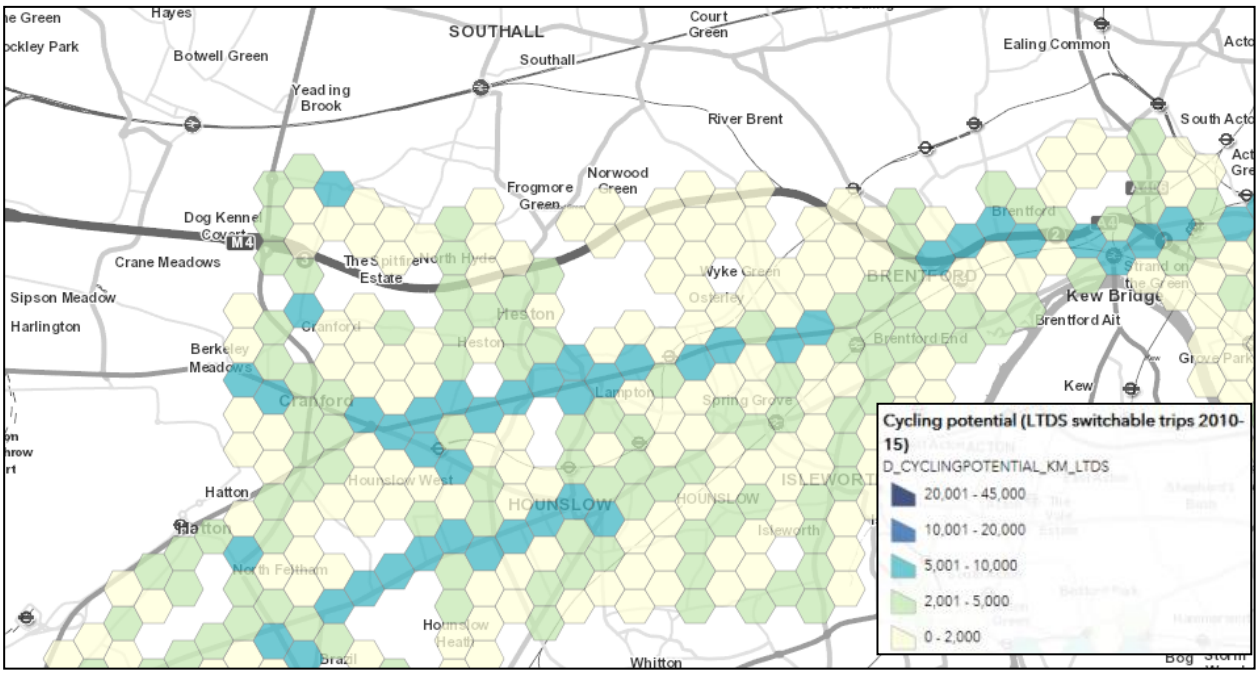
Source: LTDS 2014/15 to 2016/17

It is worth noting that these trips do not take into account future trips, which are particularly pertinent for growth areas like the GWC. In these areas, the potential for walk and cycle trips increases further as the urban form become more mixed use and denser, resulting in more services and facilities being located within walking and cycling distance.

Analysis presented above and evidence from elsewhere in London suggests that if targeted infrastructure improvements were made providing a safe, continuous and high quality cycle network in the GWC and Brentford area, it is likely that the number of people cycling part or all of their journeys could be significantly increased. **Figure 20** shows higher levels of

cycling potential in the darker area along both orbital and radial routes, particularly on Boston Manor Road and along the spinal routes of the A4 and A315.

Figure 20: Levels of cycling potential – LTDS Switchable Trips 2010 to 2015



Source: TfL City Planner Tool

The provision of attractive walking infrastructure is also important to encourage people to switch to sustainable modes. The majority of potential walking trips are not to the workplace but for leisure and to local facilities and services, however, there are potentially more stages as part of a daily commute involving other modes such as walking.

Given the majority of employment sites within the GWC lie 0.5km or more from a rail station or bus stop, it will be important to ensure that the ‘last-mile’ walking infrastructure is safe, well-lit, overlooked and of a high quality in order to encourage those who currently drive to work to use public transport .The focus of infrastructure improvements should therefore also be on routes between employment and residential sites and local transport hubs and bus stops.

3. Future growth and travel in the GWC

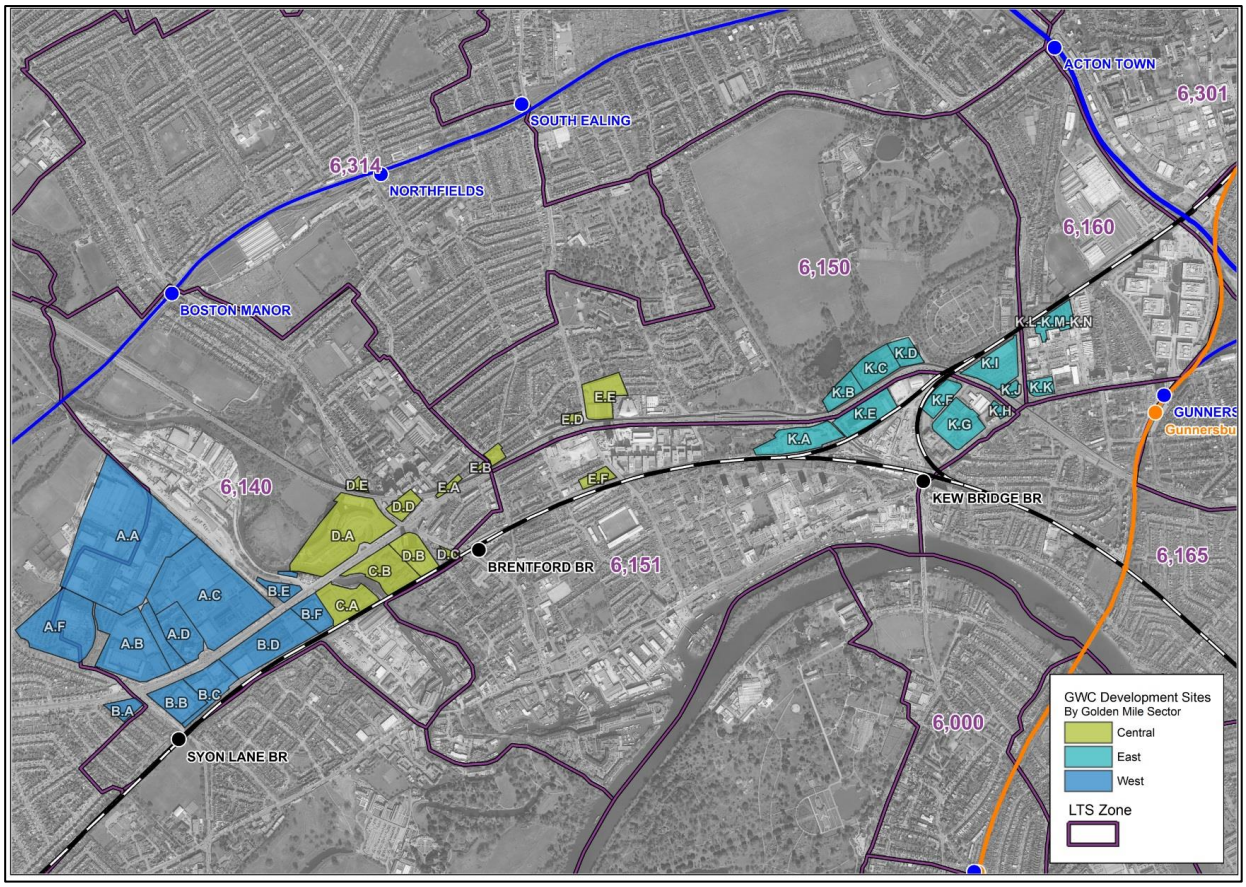
3.1. Forecasting future travel demand and patterns

TfL's Strategic Modelling Suite

TfL's suite of transport models including the LTS (London Transportation Studies) demand model, the SATURN-based Highway Assignment Model WELHAM (West London Highway Assignment Model) and the Public Transport assignment model Railplan have been used as part of this study to help understand potential future travel demand and its impact on the road and public transport networks.

The LTS model has been used to derive trip generation, distribution and mode choice at a strategic level (the GWC lies within four LTS zones as illustrated in **Figure 21**). This model was used to identify the mode share of trips made during the day.

Figure 21: LTS Report Zone Map



The Railplan public transport model and WELHAM highway model were then used to assign the LTS public transport and highway demand to their respective networks and to assess route choice using a more detailed representation of the transport networks and smaller model zones. That means forecasts of trips to, from, and within the area have been produced, for the three hour AM Peak (0700-1000) in the case of Railplan and the one hour AM (0800-0900) and PM (1700-1800) peaks for WELHAM.

Future Year Demand Scenarios

Two future year (2031) transport demand forecasts have been produced and assessed. These two scenarios are referred to as:

- the 2031 do minimum scenario (referred to as the 2031 reference case in the executive summary)
- the 2031 GWC development scenario

The **2031 do minimum scenario** assumed development growth across London as forecast in the draft London Plan, though only those developments in the GWC area that are already in the planning pipeline in early 2018, i.e. consented schemes. It excluded any unconsented developments which represent the growth aspirations for the GWC. In this scenario the area is expected to host around 14,000 homes and 48,000 jobs and includes significant development growth with more than 5,000 additional homes and 17,000 additional jobs in the GWC compared to 2011 (used in the model as a baseline year for comparison).

The **2031 GWC development scenario** assumed the GWC development growth comes forward at the scale set out for the OA in the draft London Plan. With this GWC development growth (i.e. 7,500 additional homes and 15,000 additional jobs), a total of around 21,500 homes and 63,000 jobs are expected in the GWC area, which represents a 52% increase in the number of homes and a 32% increase in jobs compared to the 2031 do minimum scenario.

Neither of these development scenarios assumed any transport interventions or schemes. The likely impacts of potential transport mitigation measures were assessed as part of the study using the 2031 GWC development scenario and are also reported on in Chapters 5 and 6 of this study report.

3.2. Scale of development growth in the GWC

As outlined above and shown in **Table 5**, the 2031 do minimum scenario already includes significant growth that is already committed in the GWC area. The growth in jobs relates mainly to committed proposals for the Sky campus, whilst growth in homes stems largely from development planned around Kew Bridge.

Table 5: Summary of total homes and jobs in 2011 baseline, 2031 do minimum and GWC development scenarios

	2011 Base		2031 Do Minimum		2031 Development		2031 Development Change over Do Minimum			
LTSZone	Homes	Jobs	Homes	Jobs	Homes	Jobs	Homes	Jobs	Homes %	Jobs %
6140	1,683	14,008	2,979	25,000	6,892	31,791	3,912	6,791	131%	27%
6150	1,634	2,359	1,755	2,896	3,005	6,996	1,250	4,099	71%	142%
6151	5,186	6,179	8,897	8,311	11,238	11,557	2,341	3,246	26%	39%
6160	698	8,021	728	11,592	728	12,658	0	1,067	0%	9%
Total	**9,201**	**30,567**	**14,359**	**47,799**	**21,863**	**63,002**	**7,503**	**15,203**	**52%**	**32%**

The GWC area can be divided into three geographical areas or 'sectors' as described below:

- The **western sector** is envisaged to attract more production, broadcasting, film and supporting businesses to cluster around the existing SKY campus, as well as offering workspace hubs and allowing an intensification of light industrial uses and distribution. Around 3,000 new jobs could be created in this zone as well as an additional 3,000 new homes.
- The **central sector** will see the least change. The area has the potential to accommodate just over 1,000 new homes and almost 4,000 new jobs. A new residential quarter with a mix of homes and an intensification of industrial / commercial uses along the A4 is envisaged.
- The majority of the growth is expected to come forward in the **eastern sector** of the GWC; this area has been identified as having the potential to accommodate almost half of the GWC growth with 3,300 homes and over 8,000 new jobs being predicted. The masterplan proposed high density living co-located with a mix of office, commercial and light industrial uses along the Great West Corridor and a new urban quarter clustered around Brentford Community Stadium

3.3. Forecast future travel demand and mode choice

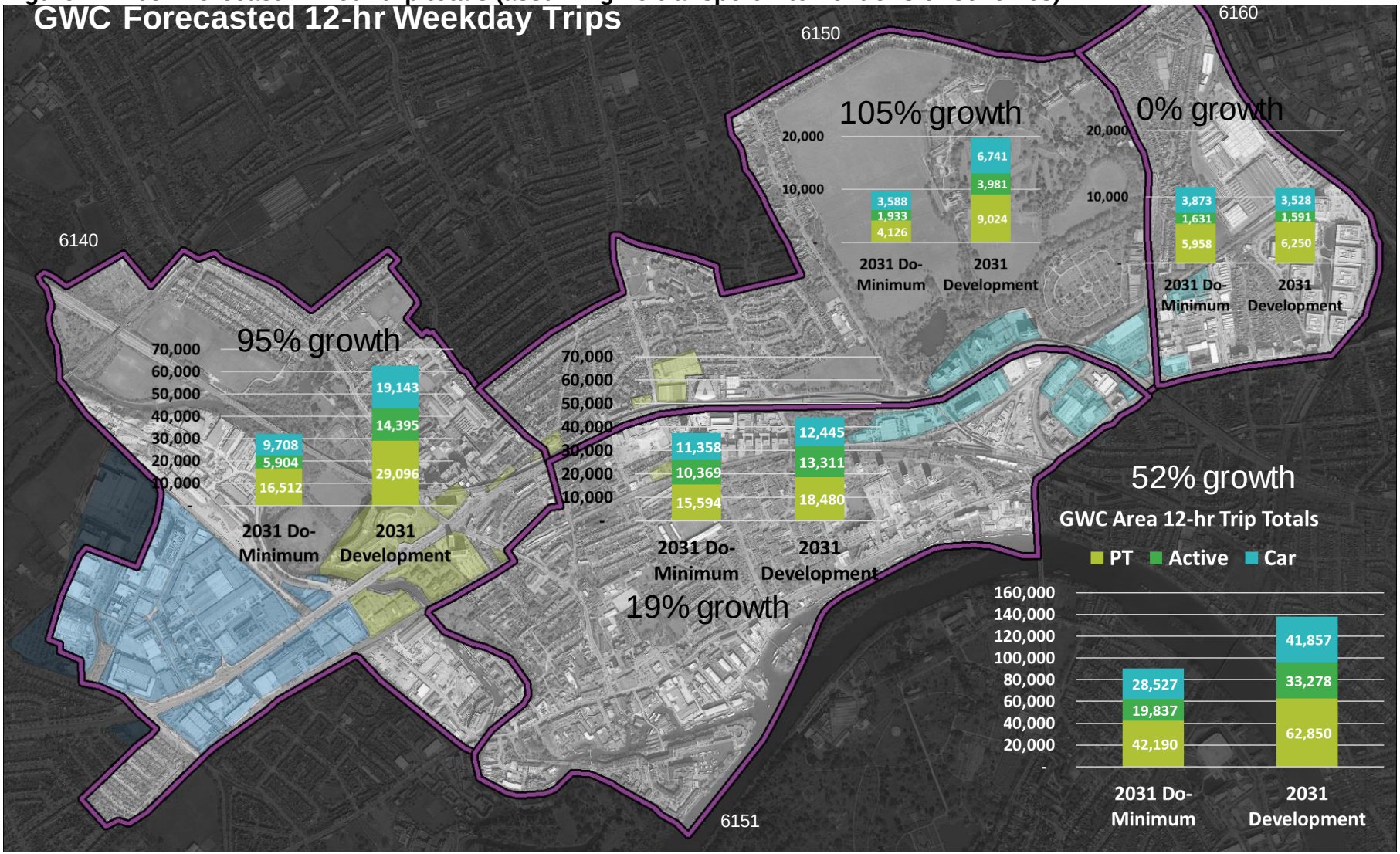
Demand Increases

Homes and jobs are the primary demand drivers for trip origins and destinations respectively. Therefore, the distribution of the additional homes and jobs in the GWC directly influences the impacts on the transport network. In general, in the AM peak, the number of trips originating from the area is linked to how many people are living there and the number of trips terminating in the area is linked to the level of employment there. In the PM the patterns generally reverse.

The forecast 2031 12 hour working day trip totals for all modes are shown in **Figure 22** below. An additional 47,600 trips per 12 hour working day are expected to be generated in 2031 by the proposed GWC development. Travel demand to and from the area is forecast to increase from around 90,500 trips in the 2031 do minimum to around 138,100 trips in the 2031 GWC development scenario. In total this represents around a 52% growth in trip demand.

The geographical distribution of trip increases to and from the area aligns with the distribution of additional homes and jobs in the GWC (the area was analysed in four zones due to model make-up as shown in **Figure 22**). The most significant growth in trips between the reference case and the GWC development scenarios takes place in zones 6150 and 6140. Zone 6160 shows 0% growth as all the new development in this zone is committed (already in the planning pipeline) and is therefore included in the 2031 do minimum scenario.

Figure 22: 2031 Forecast 12-hour trip totals (assuming no transport interventions or schemes)



Changes in Travel Mode Choice

The majority of the additional GWC development trips are forecast to be by active and public transport modes (even without any of the proposed transport interventions or schemes). As well as a general trend towards lower car ownership in new housing, a key reason for this is that as the GWC area densifies and land use becomes more mixed (with a more balanced distribution between homes and jobs) there is an increase in internal travel within the area. The LTS demand model assumes (based on underlying travel trends across London) that these shorter local trips are more likely to be undertaken by active modes.

Table 6 shows the change in modelled travel mode share from 7am to 7pm on an average weekday for the LTS zones containing the development.

Table 6: Change in modelled weekday trip mode share for GWC (12 hour)

	2016*	2031 Do Minimum	2031 Development Scenario
Car	35%	31%	30%
Active Modes	21%	22%	24%
Public Transport	44%	47%	46%

** 2016 mode shares are LTS model outputs scaled to 2016 LTDS borough mode shares*

It is worth noting that there are three primary reasons why the 2016 figures in Table 6 vary from those reported for LTDS in section 2 above.

- The comparison is between an average day and an average weekday. The nature of off peak and weekend travel creates a difference;
- The geographies of the comparison are different i.e. LTS zone vs post code areas
- Different years

There are significant spatial variations in forecast mode share as shown in **Figure 23**. Car mode shares vary from 28% in zone 6151 to 34% in zone 6150 with GWC development. Equally, public transport mode share varies from 42% in zone 6151 to 55% in zone 6160. This variation relates to the level of public transport provision, the type and mix of development and the distribution of origins and destinations for trips to and from the respective zone.

The changes in mode share also vary by zone, with zone 6140 forecast to see a large increase in active travel (by 5%). Whereas zones 6150 and 6160 both see a 3% increase in public transport mode share. As the main changes seen in the model zones are the addition of homes and jobs (and changes to the car ownership and parking models) it is the balance of this development and the distribution of travel to/from the zone that influence how mode share will change.

Figure 23: 2031 Forecast 12-hour weekday mode shares (assuming no transport interventions or schemes)

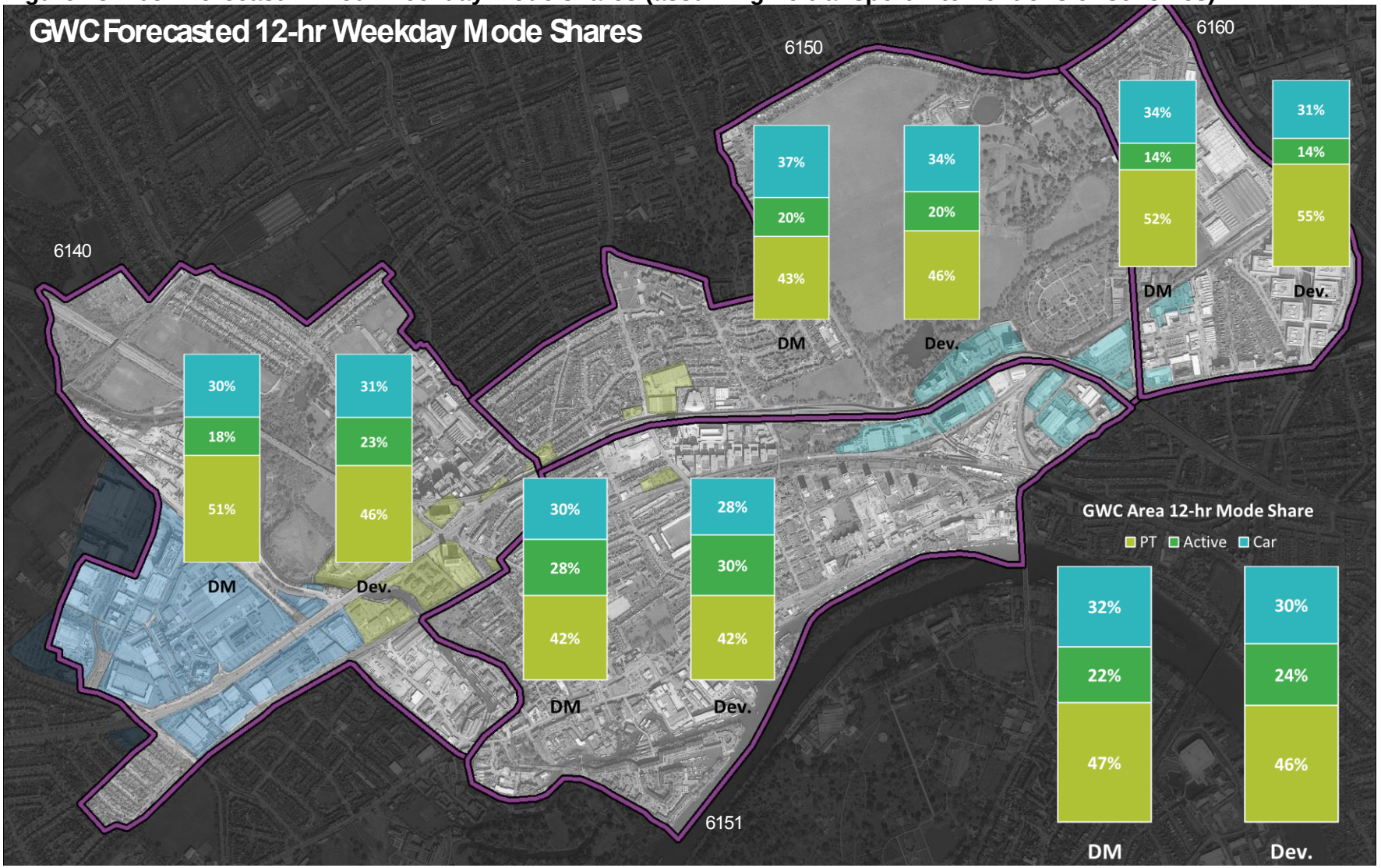


Table 7 below summarises the forecast public transport and highway trips demand in the GWC from the Railplan and WELHAM models respectively. It also shows their distribution by geographical sector (western, central and eastern) and mode shares.

Table 7: Forecast trip demand and mechanised mode share (AM peak 1 hour)

		Base				2031 Do Minimum				2031 Development			
		Trips		Mode Share		Trips		Mode Share		Trips		Mode Share	
		PT	HWY	PT	HWY	PT	HWY	PT	HWY	PT	HWY	PT	HWY
Origin Trip Ends	West	177	206	46%	54%	183	255	42%	58%	1,116	925	55%	45%
	Central	271	552	33%	67%	584	725	45%	55%	926	1,241	43%	57%
	East	368	514	43%	57%	1,151	638	64%	36%	2,138	1,271	63%	37%
	Total	836	1,272	40%	60%	1,918	1,618	54%	46%	4,180	3,437	55%	45%
Destination Trip Ends	West	285	2,642	10%	90%	3,540	3,112	53%	47%	4,052	3,563	53%	47%
	Central	712	961	43%	57%	814	1,139	42%	58%	1,542	1,869	45%	55%
	East	942	1,809	34%	66%	1,261	2,132	37%	63%	2,768	3,464	44%	56%
	Total	1,939	5,412	26%	74%	5,615	6,383	47%	53%	8,361	8,895	48%	52%

The 2031 forecast public transport mode share is highest for origin trips in the eastern sector of the GWC with 63% of mechanised trips undertaken by public transport in the AM peak hour. This is likely to be related to the better public transport provision in this area and in particular the rail and underground services providing direct radial links into Central London.

Looking at destinations, the eastern section of the GWC is predicted to have a 44% share for public transport; this lower public transport mode share is likely to be linked to the origin of these employment related trips (which are likely to be from a wide range of destinations inside and outside of London that would not always be served well by the radial public transport routes in the area).

The highest forecast public transport mode share of 53% for destination trips is seen in the western section of the GWC. A high proportion of growth from this section of the GWC relates to Sky development and employees are likely to travel to and from the area from Syon Lane, Brentford Station and Boston Manor stations.

From **Table 7** it can also be seen that generally trips are forecast to increase in all sectors, for both origins and destinations and for both modes. However, there are some sectors with significant differences in 'mechanised mode share' i.e. the mode share between highway and public transport. The largest percentage point changes in mode share between the two 2031 scenarios is for trips originating in the western sector of the GWC (PT mode share changes from 42% PT to 55%) and for trips destined for the eastern sector of the GWC (PT mode share changes from 37% to 44%).

The increase in PT mode share in the west will be influenced by changes in car ownership as new residential developments with lower parking standards are built. In the east where there is also a forecast increase in PT mode share for trips destined to this area this will be driven by the increase in both homes and jobs in the GWC, the lower car ownership of the

area overall, the reasonable public transport provision and the lack of available capacity on the highway network.

3.4. Future public transport demand and performance

Overall Demand

A significant increase in public transport trips is forecast by 2031 to and from the GWC development area. **Table 8** shows the forecast public transport trip demand to and from the GWC development area. This shows that in the 2031 do minimum scenario there is forecast to be an increase of around 8,700 additional public transport trips to and from the GWC development area during the 3 hour AM peak (a 278% increase in public transport demand) compared to the 2011 baseline comparison year. As a result of the additional GWC development growth, around 9,300 more public transport trips are expected to and from the area during the 3 hour AM peak (a 79% increase in public transport demand) compared to the 2031 do minimum scenario.

Table 8: GWC area forecast change in public transport trip demand (AM 3 hour peak period)

Movement	2011 AM Base Year	2031 AM Do Minimum	2031 AM GWC Development
From Development Area			
West	327	339	2,067
Central	502	1,082	1,714
East	3	1,465	3,294
Total	**832**	**2,886**	**7,074**
To Development Area			
West	527	6,556	7,503
Central	1,318	1,508	2,855
East	441	833	3,623
Total	**2,285**	**8,898**	**13,982**

Distribution of Trips

With the introduction of GWC growth, the highest relative future growth is in public transport trips originating from the GWC area, though destination trips related to employment trips are still dominant in absolute terms. Around one third of public transport trips originating in the GWC in the AM Peak period go to Central London; another third are within the immediate surrounding area in the London Boroughs of Hounslow and Ealing and the remaining third go to other destinations across London.

For trips ending in the GWC area in the AM Peak period a total of 40% originates from surrounding areas in LB Hounslow (21%), the GWC itself (5%), and LB Ealing (14%). Only

11% of trips originate in Central London and the majority of trips are spread from across London and the South East. These figures suggest that public transport demand to/from locations within the London Boroughs of Hounslow and Ealing in particular will increase; as outlined earlier in the document, those connections are not always well served by public transport.

The distribution of future trips to and from the area shows little difference between the do-minimum and GWC development scenarios.

Of those future public transport trips in the GWC development scenario, the rail mode share is highest in the eastern section of the GWC with around 50% using the wider range of services available from Gunnersbury (LUL District line and Overground), Acton Town (LUL Piccadilly line) and Kew Bridge (South Western Rail Hounslow Loop) stations.

By comparison the central section shows around 45% arriving/leaving by rail modes (with a similar split between South Western Rail Hounslow Loop at Brentford station and LUL Piccadilly line Heathrow branch at Boston Manor station predominantly, but also Northfields and South Ealing).

In the western section around 40% arrive and leave by South Western Rail via Syon Lane station, with under 5% using the Piccadilly line at Boston Manor station. In the west and central areas in particular, trips on the Piccadilly line additionally use a bus to get to or from the GWC. The bus corridors serving these LU stations carry GWC trips to/from further afield also, as does the A4 as it traverses the growth corridor itself.

Station Demand

There is forecast to be significant additional passenger numbers using rail stations in the area by 2031 (in both the future year growth scenarios). In particular Syon Lane, Kew Bridge, and Gunnersbury stations are expected to see an increase in passengers, which without mitigation would exacerbate existing capacity constraints and challenges at those stations. Gunnersbury station in particular already has to use gate-line passenger control measures on some days to avoid platform over-crowding during peak periods.

Rail Network Demand and Crowding

There is forecast to be some significant relative increases in rail network demand in the area in the do minimum scenario (relative to the base) notably westbound on the Piccadilly line, in both directions on South Western Rail and on the London Overground services. The GWC development scenario is forecast to have further impact on overall network demand levels, with impacts seen at a more local level.

Analysis of crowding impact for the Piccadilly line, London Overground and District line show that crowding is only an issue on the eastbound Piccadilly line from South Ealing to Acton Town in the Base Year and with a very slight worsening in conditions in the do-minimum and then the GWC development scenarios. In terms of rail crowding, relative to

the Base Year, the do minimum scenario forecasts show local rail services through the GWC generally experience a small increase in crowding. Relative to the do minimum, the GWC development scenario shows only a very small increase in crowding on eastbound South Western Rail services between Syon Lane and Barnes.

Bus Network Demand and Journey Times

An increase in the number of passengers using the majority of the local bus network is forecast in both the do minimum scenario (relative to the 2011 baseline comparison year) and in the GWC development scenario. This would be expected given forecast growth in background demand and the scale of new development proposed in the area. This growth exacerbates existing challenges on the bus network and brings new capacity challenges on the Ealing Road and Brentford High Street.

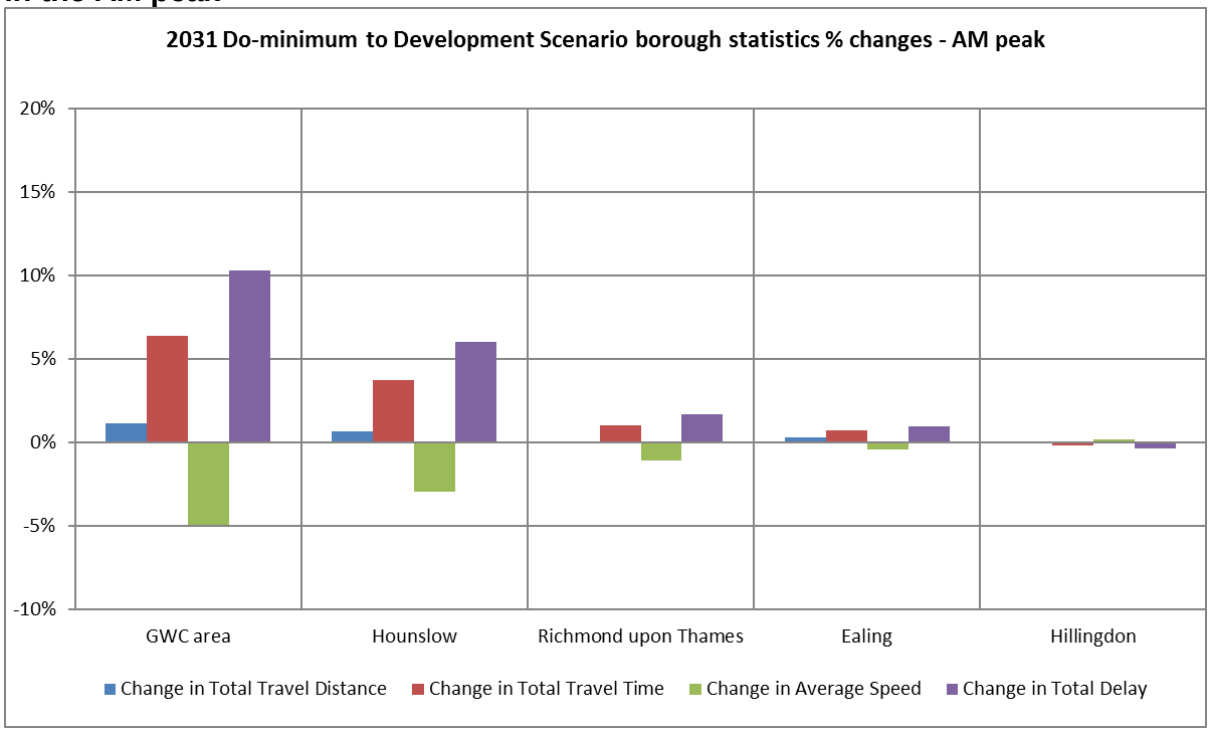
Analysis of bus journey times, however, indicates that without mitigation journey times along key bus routes is expected to increase by 2031 due to increasing highway demand and delay, which would make the buses less attractive to use by occupiers of new development without mitigation.

3.5. Future highway network demand and performance

As with public transport, overall traffic levels on the highway network by 2031 are forecast to increase in both the do minimum scenario and the GWC development scenario. Comparing the 2031 do minimum scenario with the 2011 baseline comparison year shows that background population growth in London and consented new development are forecast to have a significant impact on the performance of the highway network - average speed, total travel time, and total delay all increase significantly.

The forecast supplementary impact of the GWC development is smaller in comparison (as shown in **Figure 23**) but those impacts can be seen within the immediate GWC area, LB Hounslow and adjacent boroughs.

Figure 23: Changes in travel distance, travel time, average speed and average delay in the AM peak



Junction Delays

In the GWC area, the change in total travel time is greater than the change in average speed. This suggests that delay at junctions has the greatest impact on the overall delay rather than the volume of flows.

The high existing levels of congestion on the network, and the A4 in particular, mean the performance of the highway network is forecast to be worse in both the future development scenarios. Key highway junctions such as Syon Lane, Boston Manor Way, Windmill Road, Ealing Rd and Chiswick Roundabout are predicted to operate significantly over-capacity by 2031 in both the reference case and the GWC development scenarios.

Trip Purpose, Length and Distribution

Looking at trips with origins and destinations within the GWC only, the total number of highway trips across the entire GWC area is predicted to significantly increase when comparing the 2031 do minimum and the 2031 GWC development scenario. This increase is 55% for trip origins and 35% for trip destinations in the AM peak hour and 30% for trip origins and 50% for trip destinations in the PM peak hour. However, whilst there is a significant percentage increase in trip origins in the AM peak, the trip destination has larger absolute increases; and vice versa in the PM peak.

At over 60% for both origin and destination trips, the majority of these additional highway trips are made by car for commuting or personal trips (as opposed to work-related car trips) during the AM peak hour. LGV and HGV combined account for 30% of the additional

highway origin trips and 23% of the destination trips. In the PM peak, car use for non-work trip purposes caters for over 70% of the GWC highway trips, reflecting the comparatively lower freight activity.

In the 2031 do minimum there is a high concentration of short distance trips to and from the development area to areas in LB Hounslow (around 20% of trips during the AM peak) and LB Ealing (around 20% of trips), in addition to 7% of the origin and 3% of the destination trips being made entirely within the GWC area. Many car trips to and from the area are forecast to head north or south of the GWC area which is likely to be a result of limited public transport services that cater for this trip demand; trips heading west or east into London are better catered for by radial public transport connections.

With the development scenario introduced to the GWC area, the concentration of trips to and from the local areas in Hounslow and Ealing intensify and the amount of trips from the development across the west of the borough also increases. Highway trips made entirely within the GWC development area are predicted to triple, which suggest that there is potential for these trips to be made by other modes. This conclusion is further supported by a trip length analysis, which indicates 29% of highway development trips (with an origin and/or destination) in the GWC in the 2031 development scenario are less than 5km in length.

The growth in highway flows on the network is forecast to be high in a westbound direction in the AM peak period and high in an eastbound direction in the PM peak period. This is the reverse of the typical tidal flows into and out of London currently seen during the AM and PM peak periods respectively. This forecast growth is therefore reflecting the spare highway capacity that exists ‘filling up’ in these directions rather than indicating the distribution of demand.

4. Challenges and opportunities

Based on the review of existing and future transport network conditions it is clear that by 2031 mitigation measures will be needed to deal with the increase in trips forecast in both development scenarios. The following section sets out the key challenges and opportunities that have been identified associated with supporting the delivery of GWC growth whilst meeting MTS policy aspirations around Healthy Streets, Vision Zero (Road Safety), Good Public Transport and Good Growth. These are summarised below and then described in more detail.

A. Improving public transport connectivity, capacity and accessibility to maximise use
B. Managing station crowding and increasing capacity
C. Enabling more active travel and improving the health of residents
D. Reducing car dependency and managing the performance of the highway network
E. Balancing the strategic transport movement role of the A4 corridor with Healthy Streets aspirations

A. Improving public transport connectivity, capacity and accessibility to maximise its use

Key Challenges:

- Public Transport Access Levels (PTAL) levels vary across the corridor with some employment hubs served poorly by the public transport network.
- Rail services are focused on providing access to Central London; there is a lack of north-south connectivity with the exception of London Overground services at Gunnersbury Station in the east of the corridor.
- Orbital bus routes into key residential areas and transport hubs such as Ealing Broadway either don't exist or are affected by high levels of congestion and delays.
- General population growth and the planned development in the area will increase the pressure on public transport and could reduce its reliability and attractiveness.
- The western sector of the GWC has significantly smaller population and employment catchment areas via the public transport network than the central and eastern sectors as shown in **Figures 24 and 25** (for 2031 GWC development scenario).
- Planned levels of development and the council's ambitions for this to be a strategic employment area are likely to expand the catchment area of the GWC and mean that improved or additional strategic public transport connections will be needed.

Key Opportunities:

- Connectivity into central London is fast and efficient and further improvements are planned in the next 5 years. Better connecting services and infrastructure are needed to take advantage of service improvements already planned such as on the Piccadilly line.

- Improving walking and cycling connections to stations could deliver strategic connectivity improvements for residents and employees in the area
- Population and employment growth mean that bus demand will increase in the future, providing an opportunity to increase service frequency and capacity to meet the additional demand and improve public transport accessibility across the area.
- Targeted investment into the bus network could produce significant local connectivity improvements in a relatively short time period.
- Bus and active travel routes are particularly suited to shorter journeys such as last and first mile trips which are part of longer commutes.
- The future Elizabeth line will create new travel options and open up new catchment areas. A review of the bus routes in the area and interventions such as the Southall Rail Link will help to ensure better access to Elizabeth line stations from the GWC so that the benefits of the Elizabeth Line can be maximised.
- Providing an efficient bus network with good service frequency and improved journey time reliability will be essential to supplement rail based public transport services and ensure a good public transport experience. Improving bus services between local rail and underground stations and employment sites could increase the popularity of these modes further.
- New development will bring significant investment into the area and provide funding contributions to deliver strategic and local transport infrastructure improvements.

Figure 24: Jobs accessible within 45 minutes of GWC sectors

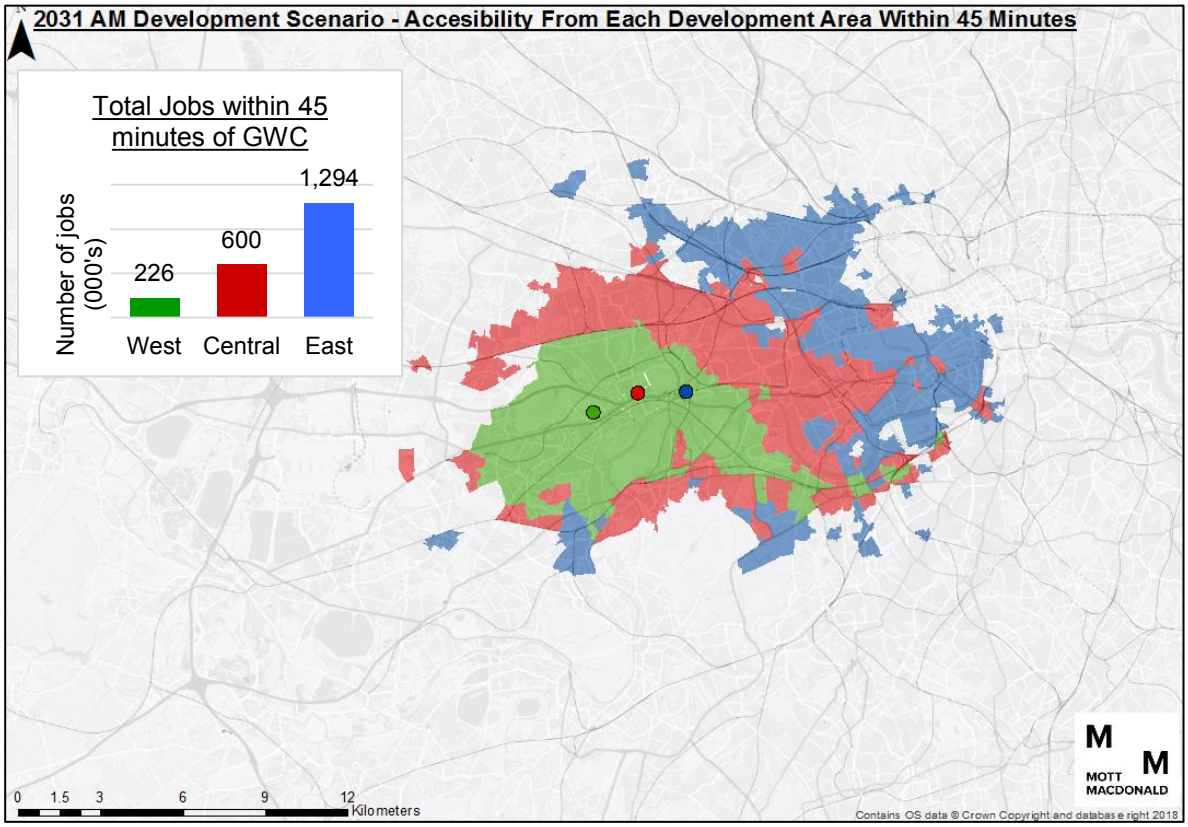
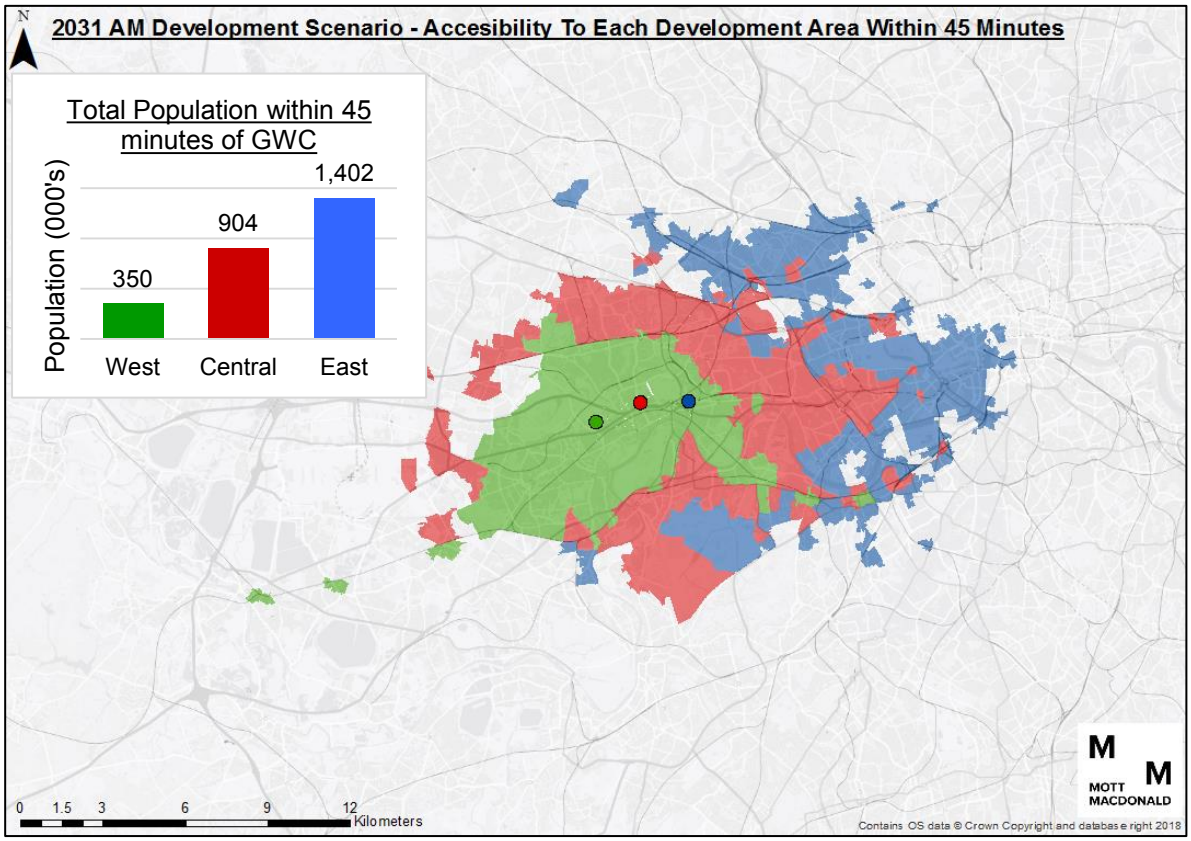


Figure 25: Total population able to access jobs in GWC sectors within 45 minutes



B. Managing station crowding and increasing capacity

Key Challenges:

- A number of stations in the area have capacity constraints during peak times, particularly at Gunnersbury, Kew Bridge and Syon Lane. These stations suffer from overcrowding on the platforms or on access routes into and out of the station. This increases passenger journey times and increases safety risks.
- Growth in the area will result in significant additional passenger demand at a number of rail stations in the area by 2031. In particular Gunnersbury, Kew Bridge and Syon Lane stations are expected to see increasing demand, which without mitigation will exacerbate existing capacity constraints at those stations.
- Accessibility for those with physical impairments requires improvement at these stations.

Key Opportunities:

- Improving station capacity and customer experiences at stations will help support a future growth in the use of rail services and reduce car use.
- New development will bring the opportunity to capture significant funding towards new transport infrastructure and services, including station enhancements.

C. Enabling more active travel and improving the health of residents

Key Challenges:

- The severance caused by the A4/M4, the dominance of car traffic, air pollution and noise all contribute to a hostile environment for walking and cycling and poor local north-south connectivity.
- Large footprint development could, if not planned with active travel in mind, result in a further lack of local permeability for local walking and cycling trips.
- Active travel infrastructure in the GWC is not always continuous and does not provide safe, convenient and pleasant routes to employment, transport hubs and services.
- Air pollution has a substantial impact on health, leading to a shortening of life expectancy for thousands of people across the UK every year. Without London-wide and local interventions, additional highway trips in the GWC area could exacerbate air quality problems in the future.

Key Opportunities:

- The Mayor's Healthy Streets approach seeks to encourage active travel and improve air quality, which are both key concerns for the GWC area and are intrinsically linked.
- The area will benefit from the introduction of the CS9 along Brentford High Street, which will deliver a step change in cycling provision in the area. Good local cycle links between residential areas and employment sites to the strategic cycle network will be important in maximising the benefits of this route.
- New development provides an opportunity to address some of these challenges and improve the walking and cycling environment.
- Creating new active frontages through development and design, densification and new mixed-use developments will help create local destinations within walking distance and help activate the area at different times of the day and at weekends.
- New development must be designed with Healthy Streets in mind and unlock new quieter parallel routes to the A4 that encourage more active travel.
- There is significant potential for trips to shift to cycling. Realising this potential through targeted interventions and improved cycling infrastructure will be a key opportunity to ensure that mode shift and cycling targets within the GWC are realised. Further evidence of this is provided by the results of staff travel surveys carried out by large companies in the borough which reveal that many people still drive short distances (<3miles) to work and that the perception of safety is still the most common barrier to cycling.

D. Reducing car dependency and managing the performance of the highway network

Key Challenges:

- Limited public transport connectivity could result in a higher dependency on the car in the Great West Corridor for some trips.
- The role of the A4 as a strategic corridor between Heathrow Airport and central London and the high volume of through trips.
- Reducing car dependency and trips is fundamental to achieving Healthy Streets, improving air quality and meeting Vision Zero aspirations.
- Analysis set out in Chapter 3 indicates that (without further intervention) some shift away from the car can be seen towards sustainable modes, as a result of more sustainable development and increased densities and demographic change for example; however with the overall growth projected, existing problems associated with car use will be exacerbated.
- Additional highway demand associated with the future growth, highlights that junction capacity, delay and queuing at key junctions along the A4 will worsen if unmitigated. These challenges are particularly pronounced at the junctions with Syon Lane, Windmill Road, Ealing Road, and the Chiswick Roundabout.
- Applying the Healthy Streets approach (and potentially removing road space for general traffic) to the A4 could exacerbate the existing highway capacity challenge further. This emphasises the need for a mode shift away from private car for local car trips to ensure that the A4 corridor can still fulfil its function as a strategic corridor.
- Shifting employee travel away from car towards sustainable modes is a key challenge for the GWC, as analysis indicates that those trips originate from a range of locations all over London and targeted interventions are therefore difficult.

Key Opportunities:

- There is a significant potential to shift current car trips undertaken by existing residents and employees of the GWC to active, efficient and sustainable modes
- Residential development proposed in the GWC area creates the potential for more people to live locally without relying on the car.
- The designation of the GWC as an Opportunity Area provides the opportunity to foster this mode shift through targeted interventions and improvements to transport infrastructure and service provision.
- Promotion of active and sustainable travel in all new development proposals, such as by reducing parking provision and other measures to discourage car travel, and making it easier to travel by other modes.

E. Balancing the strategic role of the A4 with Healthy Streets aspirations

Key Challenges:

- The role of the A4 and M4 as strategic transport corridors has led to significant severance for pedestrian and cycle movement.
- The dominance of motorised traffic along the A4 alongside the high levels of air and noise pollution create an unpleasant environment for pedestrians and cyclists.
- Strategic through-vehicle movements along the A4 can only be influenced to a certain extent through measures implemented in the GWC area.
- Catering for essential strategic journeys needs to remain a key function of the A4. Balancing this strategic role as a traffic corridor with place aspirations and the Healthy Streets approach is a key challenge.
- The introduction of transformative Healthy Streets measures such segregated cycle facilities, enhanced urban realm and bus priority measures on the A4 and other strategic roads will require a reduction in road space for general traffic. Without careful planning this could impact negatively on other parts of the road network and surrounding residential roads.

Key Opportunities:

- Transforming the A4 Great West Road into a Healthy Street that supports active travel and reliable high-quality bus services.
- New development area and plots can be designed with Healthy Streets in mind and unlock new quieter parallel routes to the A4 that encourage more active travel.
- New development will bring significant investment into the area and provide funding contributions to deliver improvements to the A4.

5. Transport interventions and schemes assessed

5.1. Interventions summary

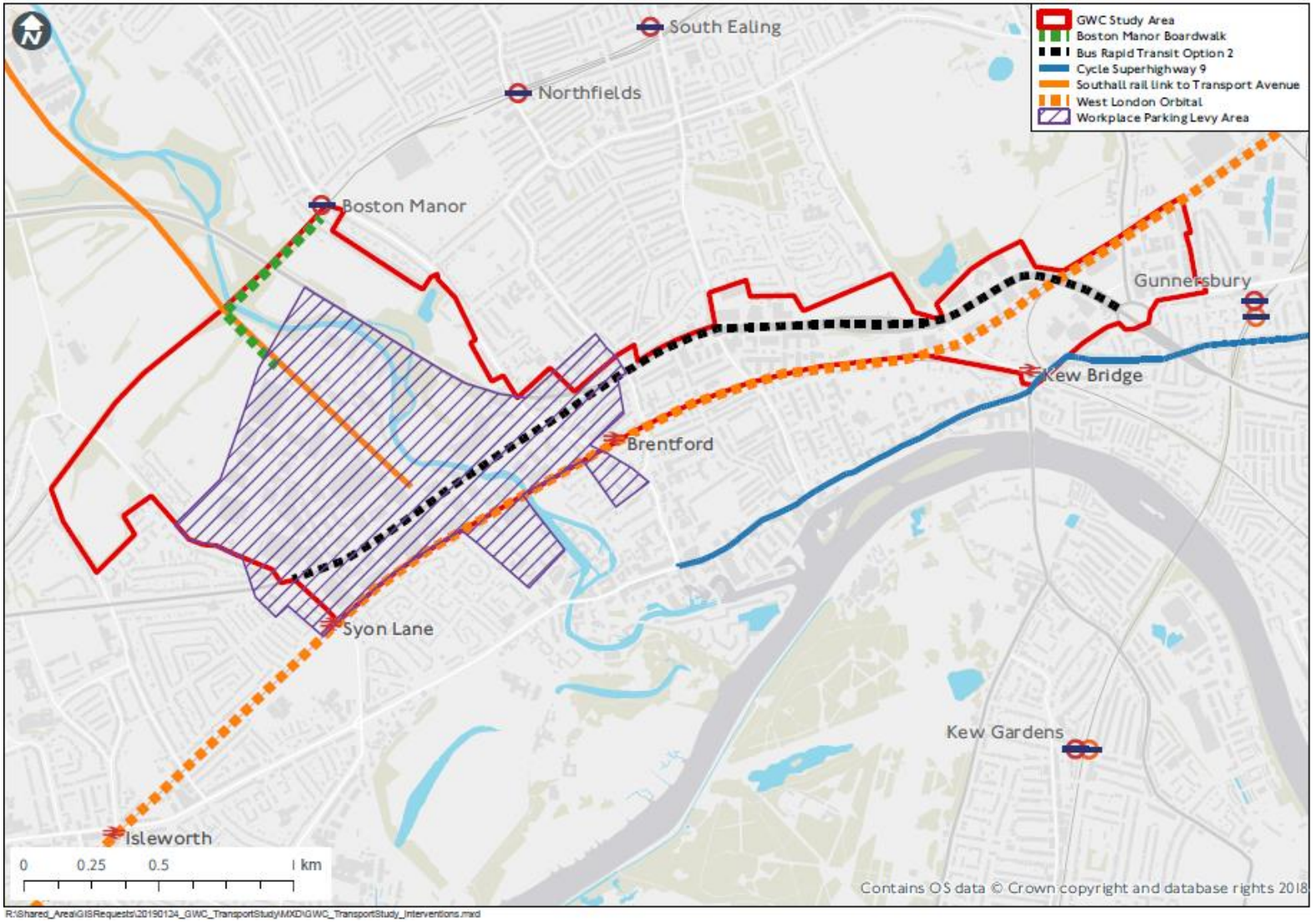
As part of this study a number of potential transport schemes were identified as a means of mitigating the effects of the forecast growth in transport demand in the GWC and addressing the transport challenges and opportunities described in chapter 4. These transport schemes are summarised in **Table 9** and **Figure 26** and are described in more detail in section 5.2 below.

Table 9: GWC transport interventions assessed

Intervention	Description	Challenges Addressed
Enhanced Bus Services	• This scheme entails re-routed and enhanced bus services in the GWC area with no new 'bus priority' infrastructure element	A, D
Bus Rapid Transit (BRT) Option 1	• Provision of a central two-way busway on A4 between Syon Lane and Gunnersbury Avenue • Re-routing / enhancement of existing bus routes to use the busway • Dedicated BRT-type service with high reliability, fast journey times and high-quality stops	A, D, E
Bus Rapid Transit (BRT) Option 2	• As above except this scheme entails the provision of 'continuous with-flow bus lanes' in each direction (instead of a central busway)	A, D, E
Rail and LU upgrade schemes	• Future potential capacity improvements to the Piccadilly line, District line and South West Rail (SWR) 'Hounslow Loop' (these schemes form part of the committed 2031 reference case) • All are currently unfunded • Provides an additional 33% network wide capacity (compared to TfL's standard 2031 AM Peak Period reference case)	A, D
New Southall Rail Link (SRL)	• New rail shuttle service (3tph each way in peak periods) • Operates from Southall station to a new Transport Avenue Station in GWC providing a direct connection from the GWC area to the Elizabeth Line • Utilises exiting GWR platforms at Southall station and existing freight only rail line with a 5-minute run time in each direction	A, D

Intervention	Description	Challenges Addressed
New SRL extended to Brentford	• As above with 3-minute additional run time to Brentford Station linking the Elizabeth Line directly to the Hounslow Loop	A, D
West London Orbital Rail Scheme (WLO)	• Proposed new rail service utilising existing rail lines: 4tph Kew Bridge – Hendon and 4tph Hounslow – West Hampstead service, providing an 8tph service through the central core • Serves the GWC providing enhanced frequency and capacity between Hounslow and new station at Lionel Road • Provides new direct service from Hounslow Loop Line to destinations on North London Line (South Acton, Acton Central, Old Oak Common) • Improves strategic connectivity with direct links to a new station at Old Oak Common (which would provide connections to Elizabeth line, HS2 and GWML services)	A, B, D
WLO (alternative 4tph service)	• As above except with alternative service pattern: 4tph Hounslow – Hendon only	A, D
Boston Manor Boardwalk	• A proposed new walk/cycle connection between the Sky Campus plot and Boston Manor LUL Station • 500m new link (6-minute walk time) • Provides users with a journey time saving of approximately 12-minutes compared to walk times via existing route (Boston Manor Road/A4).	A, C, D
Cycle Super-Highway 9 (CS9)	• A new strategic cycle route between Brentford High Street and Kensington Olympia • Junctions and carriageways have been re-designed to allow space for the cycle superhighway along the route • Segregated cycle lanes along this route are either one lane in each direction or a 2-way cycle-way.	A, C, D
Work Place Parking Levy (WPL)	• Introduction of a workplace parking levy (WPL) in the western and central sectors of the GWC. • The charge assumed in this proposal is £750 per employee per annum in 2018 prices.	D
Low Car Mode Share Measures	• A scenario where improved public transport and Healthy Streets measures are introduced across the area resulting in a mode shift to 80% using sustainable mode share in line with MTS targets.	C, D

Figure 26: GWC transport interventions assessed



5.2. Intervention descriptions and impacts

The impact of each potential scheme or intervention was assessed in either the Railplan public transport assignment model or the WeLHAM Highway Assignment Model. These intervention tests were based on fixed demand matrices and so indicate how attractive the mitigation is relative to the other interventions and therefore their potential to change.

Each of these schemes or interventions is described in further detail below along with a summary of their impacts and performance in addressing the transport challenges identified as part of this study.

Enhanced bus services

This scheme consists of the re-routed and enhanced bus services in the GWC area assumed for the two Bus Rapid Transit (BRT) options described below but without any bus priority infrastructure. **Table 10** outlines the enhanced bus service frequencies in the GWC. The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- Enhanced local bus connectivity to Ealing, Hounslow, Hammersmith and Brentford
- Increases public transport accessibility levels (PTAL)
- Provides additional bus passenger capacity and reduces bus passenger crowding
- Reduces station passenger demand at Syon Lane and Brentford stations
- Reduced passenger demand and crowding on SWR services
- Increased job and population public transport catchments to/from GWC

Table 10: Assumed bus frequency enhancements (AM peak period 7am to 10am) under enhanced bus services intervention

Bus Route	Frequency (bph) GWC Development Scenario	Frequency (bph) BRT1, BRT2 and Enhanced Bus service scenarios
E10	4.16	6.00
H91	6.24	10.00
440	4.16	4.00
H28	3.12	6.00
E8	7.80	10.00
235	5.72	10.00
195	5.20	10.00
27	8.32	N/A

Bus Rapid Transit (BRT) schemes (including enhanced bus services)

These schemes involve introducing a BRT priority system within the GWC and enhancing the existing services. BRT would use standard London buses but has the potential to provide a service with a high reliability, fast journey times, and high quality bus stops, operating within dedicated road space not shared with private vehicles. The dedicated nature of this intervention also allowed the extension of two existing bus routes, the 195 and 235, to better serve the GWC employers (by including a route-section along the A4 in the western sector).

BRT Option 1

BRT option 1 assumes the provision of a dedicated two-way bus lane in in the centre of the Great West Road between Syon Lane and Gunnersbury Avenue along with the re-routing and enhancement of a number of existing bus routes to use the busway as described above.

BRT Option 2

This scheme covers the same area of Great West Road between Syon Lane and Gunnersbury Avenue with 'continuous with-flow bus lanes' in in the outside lanes of the Great West Road, along with the re-routing and enhancement of a number of existing bus routes to use the busway.

The study transport modelling identified the following strategic benefits and impacts as a result of these scheme options:

- Similar overall strategic benefits as described for bus network enhancements but with faster connections to destinations such as Hounslow West and Gunnersbury stations
- Buses on the A4 corridor itself see significant improvements in journey times but there is little impact on orbital routes
- These options reduce highway capacity and result in re-routing of traffic from the A4 onto roads such as Brentford High Street
- The modelled highway capacity and delay impacts of BRT Option 2 are not as significant as BRT Option 1

Rail and London Underground upgrade schemes

This represents a package of potential future capacity improvements to the Piccadilly line, District line and South Western Rail 'Hounslow Loop' (forms part of TfL's Committed 2031 Reference Case). It provides an additional 33% network wide capacity in the AM peak period compared to TfL's Funded 2031 Reference Case. All these improvement schemes are currently unfunded. The study transport modelling identified the following strategic benefits and impacts as a result of these improvements:

- Increases rail and LU network capacity and connectivity
- Reductions in passenger crowding across London Rail network, SWR services and on the Piccadilly line
- Increased passenger demand at Gunnersbury Station exacerbating a station capacity challenge
- Significant increase in job and population public transport catchments to GWC central and eastern sectors

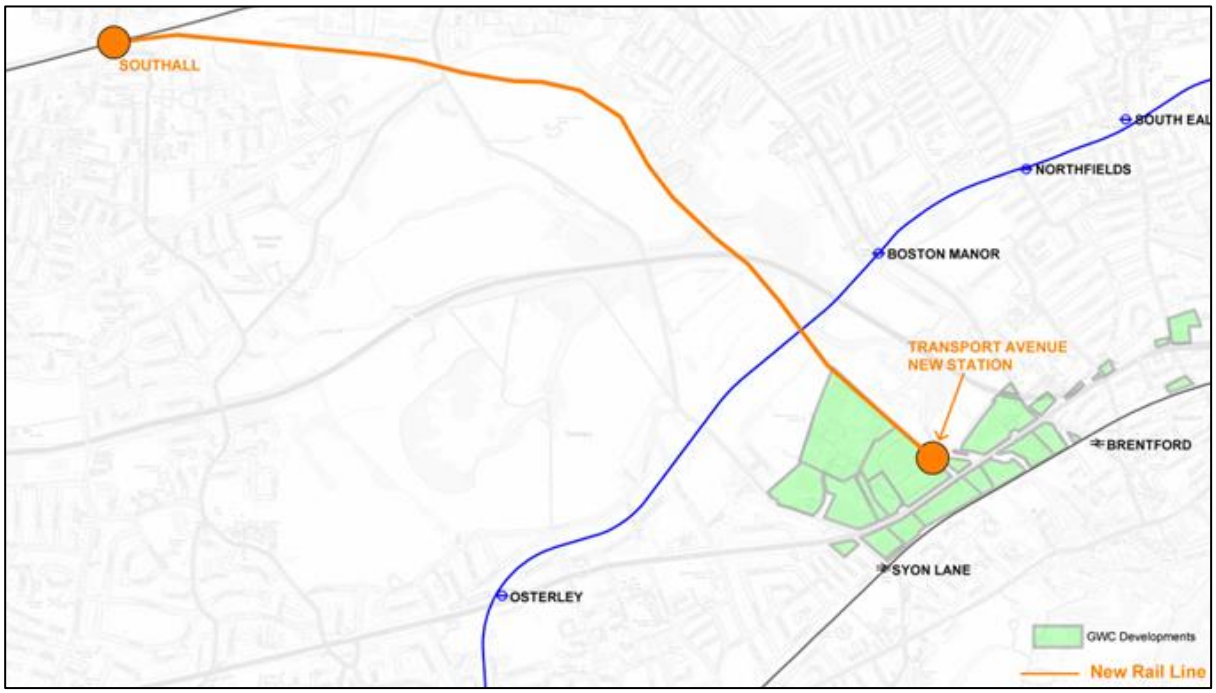
New Southall Rail shuttle

Two variations of a rail shuttle using an existing freight only link between the GWC area and Southall station were assessed.

New Southall Rail Link (SRL) to new Transport Avenue station

This is a potential new rail shuttle (3tph each way in peak periods) between the existing Southall station and a new station at Transport Avenue, located to the north of the A4. It would utilise existing GWR platforms at Southall station and an existing freight only rail line, with a 5-minute run time in each direction. A new Transport Avenue station would be located within the GWC area and serve the various new development sites within the western and central areas. The route of the proposed rail link is shown in **Figure 27**.

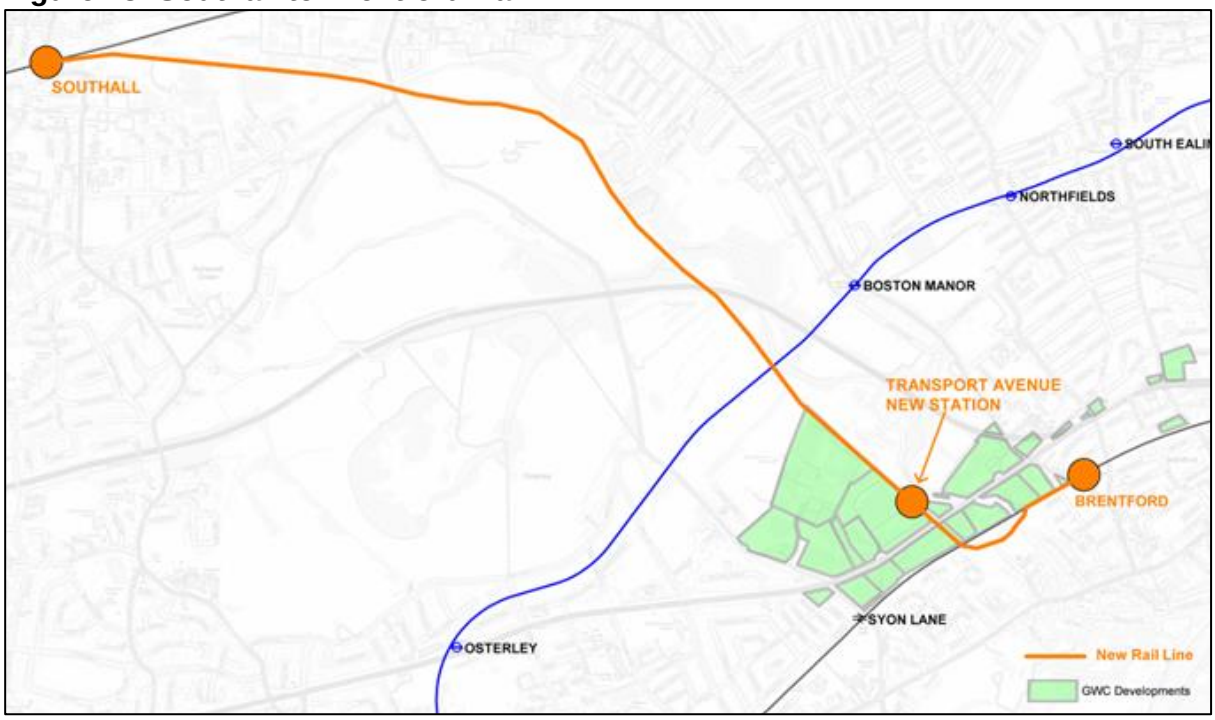
Figure 27: Southall to Transport Avenue Rail Link



New Southall Rail Link (SRL) including extension to Brentford Station

This scheme includes an extension of the Southall – Transport Avenue rail shuttle to Brentford station. It would utilise existing GWR platforms at Southall and existing SWR platforms at Brentford station and is shown in **Figure 28**.

Figure 28: Southall to Brentford Rail Link



The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- Increases strategic public transport connectivity and local public transport accessibility levels (PTAL)
- Increased job and population public transport catchments to/from GWC western sector (by 32,000 and 70,000 people respectively) (without the extension to Brentford) particularly linking with the Elizabeth Line corridor

West London Orbital (WLO) Rail schemes

This proposed new rail service between Hounslow in west London and Hendon/West Hampstead in north London would utilise existing rail lines including the South Western Rail Hounslow Loop, the North London Line section of the Overground and Thameslink.

The AM Peak (7am-10am) service tested would comprise a 4 train per hour service between Hounslow and West Hampstead and between Kew Bridge and Hendon. A variation with a 4tph service running between Hounslow and Hendon only was also assessed.

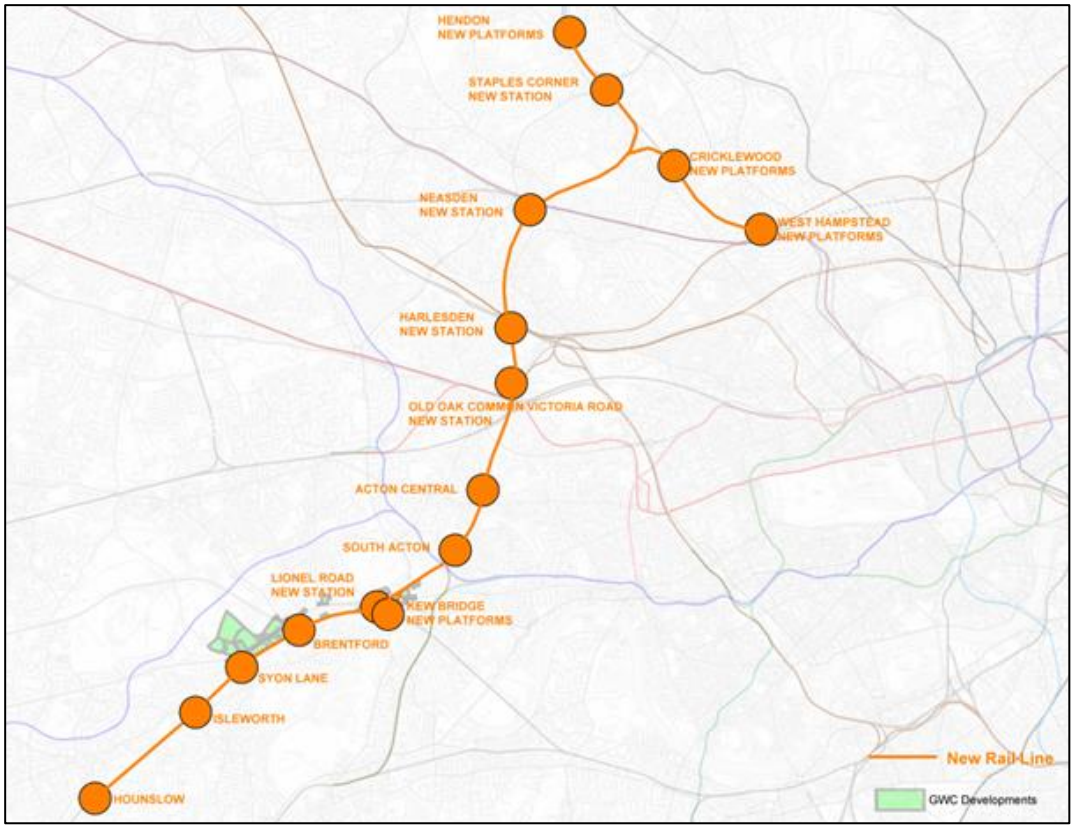
The scheme would serve the various sites along the GWC by providing enhanced rail service frequency and improved connectivity with direct links to Old Oak Common (which would provide connections to the Elizabeth line and HS2) and other key destinations/interchanges in Outer London.

Within the GWC area the WLO would serve Syon Lane, Brentford, Lionel Road (proposed new station) and Kew Bridge. An indicative route of the WLO corridor is shown in **Figure 29**.

The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- Increases strategic public transport connectivity with north London and beyond (via HS2, Great West Mainline) and local public transport accessibility levels (PTAL)
- Provides additional rail network passenger capacity and reduces crowding in GWC
- Reduces station passenger demand at Gunnersbury and Kew Bridge but increases passenger demand at Syon Lane and Brentford
- Reduces Piccadilly line and SWR passenger crowding
- Reduces local bus crowding levels
- Increased job and population public transport catchments to/from GWC

Figure 29: West London Orbital Potential Route Network



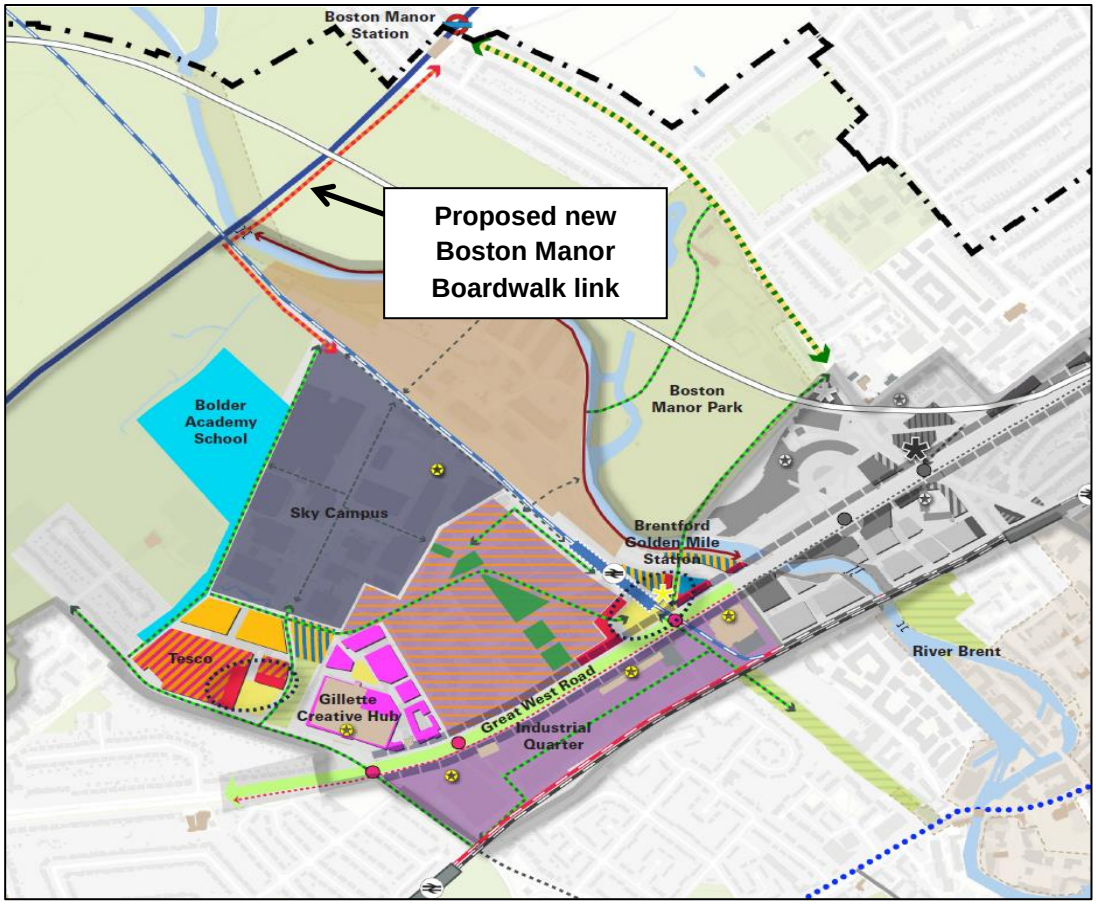
Boston Manor Boardwalk

This potential 500m walk/cycle connection would link employment sites in the western sector, including the Sky Campus plot and Boston Manor station on the Piccadilly line. The walk time along this link would be approximately 6 minutes, offering users with a journey time saving of approximately 12 minutes compared to walk times via the existing route (Boston Manor Road/A4). The potential route of the new link is shown in **Figure 30**.

The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- Improves connectivity from the GWC to Boston Manor station and the Piccadilly line
- Increases passenger demand at Boston Manor station and on the Piccadilly line
- Reduces station passenger demand at Syon Lane
- Reduces passenger demand on SWR services
- Passengers benefit from significant journey time savings
- Significantly increases the job and population public transport catchments for the GWC western sector (by 228,000 and 424,000 people respectively) through enhanced connectivity with areas around Heathrow, Hammersmith and Hanwell.

Figure 30: Boston Manor Boardwalk Scheme



Cycle Superhighway 9

Cycle Superhighway 9 is a proposed new strategic cycle route between Hounslow and Kensington Olympia. The scheme introduces significant junction and carriageway re-designs to provide space for the segregated cycle superhighway along the route. Segregated cycle lanes along this route are either one lane in each direction or a two-way cycle-way.

The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- Improves strategic cycle connectivity
- Road safety benefits
- Local urban realm benefits
- Reduces highway capacity for both general traffic and buses

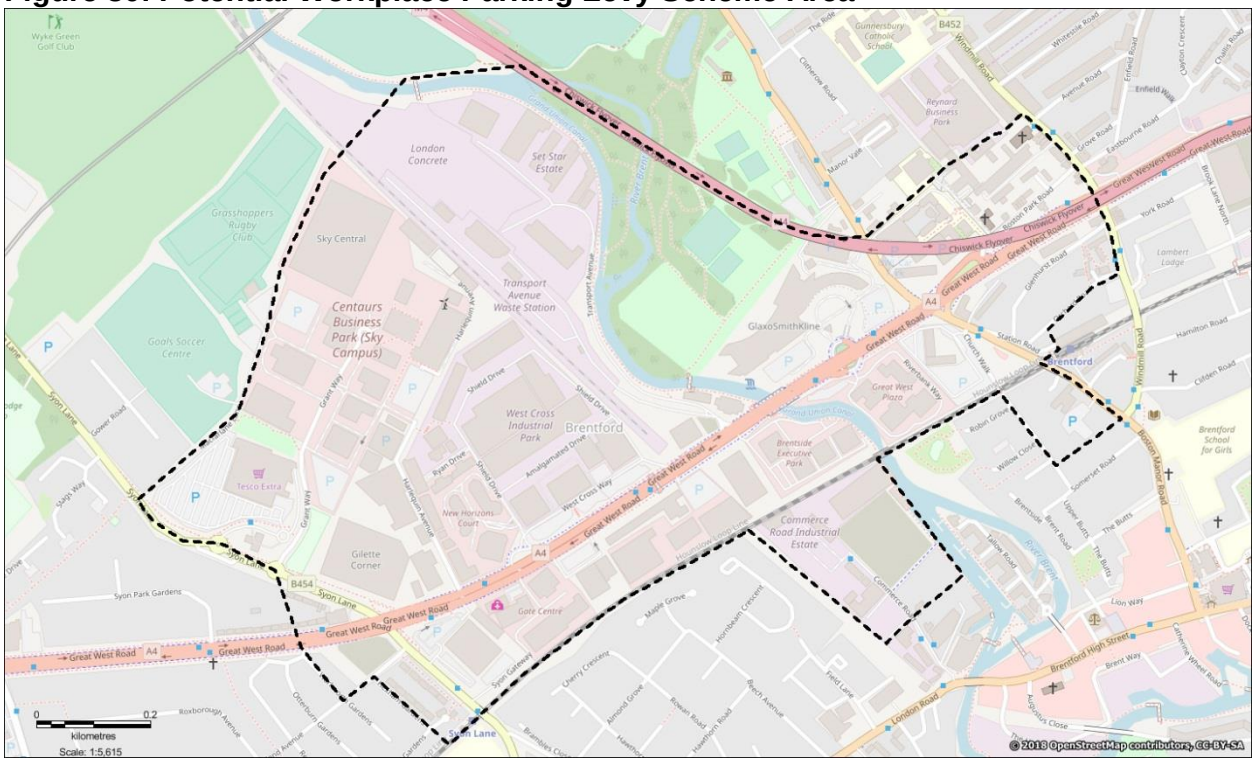
Workplace Parking Levy

A workplace parking levy (WPL) is a charge made by a local authority on employers who provide workplace parking for their employees. The revenue collected is used to fund transport improvements in the area. A WPL scheme is being investigated by the council. The charge assumed in the scheme tested is £750 per employee per annum in 2018 prices within the area shown in **Figure 31**. The impact on demand on the road network based on the daily cost of driving has been assessed as part of this study. It would make driving to work within the workplace parking area cost an additional £3.89 per day in 2031. Higher or lower charges would have a resultant impact on traffic forecasts.

The study transport modelling identified the following strategic benefits and impacts as a result of this scheme:

- 25% reduction in highway trips arriving in AM peak hour within the WPL boundary resulting in minor reductions in delays for vehicles
- Increases in station passenger demand at Syon Lane
- Increases passenger demand on SWR services

Figure 30: Potential Workplace Parking Levy Scheme Area



Low Car Mode Share Measures Scenario

The Mayor's Transport Strategy (MTS) has a target mode share of 80% of all trips to be made by sustainable modes i.e. public transport, walking and cycling by 2041. A scenario was assessed where improved public transport and Healthy Streets measures are introduced across the area resulting in a mode shift to 80% using sustainable mode share in line with MTS targets.

To model this, as well as a modelled reduction in capacity along the A4, a highway and public transport modelled demand adjustment was made to reflect the impact of a comprehensive set of infrastructure and behaviour change measures expected to be introduced both locally in the GWC and London-wide. These could include urban realm enhancements, new pedestrian and cycle routes, innovative public transport services, business travel planning and increases to the cost of driving (these are measures that cannot easily be represented in the LTS model). This was done to test the impact of the expected reduction in car trips and uptake in public transport, walking and cycling trips.

5.3. Interventions – summary of findings

Some of the main findings in relation to the individual interventions assessed are:

- The GWC **bus network enhancements** improve local connectivity throughout the GWC and to adjacent Rail/LU stations and provide additional capacity to support growth and reduce crowding levels on the bus network. It is also forecast that they would reduce passenger demand at Syon Lane and Kew Bridge Stations which would help address existing and forecast future capacity constraints.
- A **Bus Rapid Transit** schemes result in benefits for bus passengers on buses that use the A4 corridor. This route would see large improvements in bus passenger journey times but there is little impact on orbital routes. The introduction of a BRT scheme is forecast to reduce passenger demand at Syon Lane and Kew Bridge stations which would help address existing and forecast future capacity constraints. However, both BRT scheme options also reduce highway capacity and could result in re-routing of traffic from the A4 onto roads such as Brentford High Street. The impacts on the highway of BRT option 1 is more significant than option 2 and results in more delays.
- The **Boston Manor Boardwalk** could provide a new route to the Piccadilly line at Boston Manor Station and is forecast to attract a significant number (4,000) of trips to the western sector in the AM peak. It also significantly increases the jobs and population public transport catchment of the GWC western sector (by 228,000 and 424,000 respectively). The modelled link reduces walk time to the station by 12 minutes (in comparison to the existing route) which would provide significant passenger journey time benefits.

  Further work on this link is required to confirm its feasibility and to demonstrate how the design of a link could overcome personal security concerns and other challenges which are likely to mean it may not be as popular as forecast. It does clearly demonstrate the high latent demand for enhanced walking links to the Piccadilly line in this area which needs to be explored further.
- The package of potential future **Rail and LUL upgrade schemes** (improvements to the Piccadilly line, District line and South Western Rail 'Hounslow Loop') are forecast to deliver significant passenger benefits providing an increase in capacity on these modes and reducing crowding levels. They are however, forecast to increase future demand at Gunnersbury station which has existing capacity constraints.
- The new **Southall Rail Link** is forecast to attract around 1,200 passengers during the AM peak period. Extending the link to Brentford increases forecast passenger demand to around 1,600 passengers during the AM peak period. The Southall Rail link would open up faster public transport journeys to areas around new Elizabeth line stations and would increase the population catchment by public transport of the GWC western sector by 70,000. There is a much smaller impact on central and eastern zone public transport catchments.

Further feasibility and business case work around this scheme is needed to provide a better understanding of the benefits and impacts of the scheme (including its role in supporting growth in the GWC), and also its cost and value for money.

- The **West London Orbital Rail** scheme is forecast to attract a significant number of passengers - around 8,000 (in both directions) in the AM peak period. It reduces forecast station demand at Gunnersbury and Kew Bridge but increases demand at Syon Lane and Brentford. It provides wider public transport network benefits reducing Piccadilly line and SWR crowding levels and also reducing local bus crowding levels.

  TfL is currently undertaking further work considering the feasibility and business case for WLO options which will provide a better understanding of the benefits and impacts of the scheme, including its role in supporting growth in the GWC and elsewhere along the potential route(s), and also its cost and value for money. A funding strategy is also being developed.

- Introduction of the **Workplace Parking Levy** results in a significant 25% (around 550 trips) reduction in highway trips arriving in AM peak hour within the WPL boundary (which covers most of west and central sectors), resulting in minor reductions in delays for vehicles. Further work is required to develop the case for a scheme.

- The application of the **low car mode share scenario** equated to a 43% reduction in private car trips to and from the GWC and the removal of around 1,850 trips from the highway network in the AM peak. This represents around a 30% overall reduction in vehicle trips (cars, taxis, LGVs and HGVs) to and from the GWC.

6. Transport intervention packages assessed

The analysis carried out on individual mitigations indicates that, due to the scale of change planned in the GWC across a wide area, a package of complementary transport improvements will be required to help mitigate the impacts of housing and employment growth. Two packages of intervention measures were created and tested in the modelling suite to assess their effectiveness in mitigating the forecast impacts of growth in the area in 2031.

6.1. Package descriptions

Package 1 (Bus Package) focuses on maximising the impact of bus improvements and includes BRT option 2 which allows an express, high frequency service to operate along the A4 through the use of dedicated bus lanes. It also includes a comprehensive set of changes to existing bus routes which bring frequency increases to several routes already operating in the area, and route changes to enhance local connectivity to stations and local centres. **Table 11** provides a list of the schemes in package 1.

Package 2 (Rail Package) is of a much larger scale due to the inclusion of both potential rail schemes and their two associated new stations. A Workplace Parking Levy (WPL) (a charge on employers who provide workplace parking) in the western and central sectors of the GWC is also included in this package as it would be a critical funding mechanism for potential new rail schemes. A BRT scheme was not included although there are bus route enhancements. **Table 12** provides a list of the schemes in package 2.

There are three common elements to the packages which were chosen either because of their performance or importance with respect to policy objectives – the Rail and LUL Upgrade Schemes, CS9 and the low car mode share scenario.

A low car mode share scenario was included in both packages to reflect the goal of the latest Mayor's Transport Strategy that 80% of trips in London will be by public transport or active modes by 2041.

As well as a modelled reduction in capacity along the A4 in both packages, the low car mode share scenario adjustment is made to reflect the impact of a comprehensive set of infrastructure and behaviour change measures expected to be introduced both locally in the GWC and London-wide. These could include urban realm enhancements, new pedestrian and cycle routes, innovative public transport services, business travel planning and increases to the cost of driving. For the two 2031 packages tested for this study, a value of 75% was used in the Bus Package and 80% in the Rail Package, to reflect the application of two different levels of policies and initiatives in support of sustainable modes.

Table 11: Package 1 - Bus Focused

Mitigation Scheme	Description
Rail and LUL Upgrade Schemes	Improvements to Piccadilly line, District line and South Western Rail (TfL's Committed reference case)
Cycle Superhighway 9	Segregated cycle lane between Brentford and Kensington Olympia
Boston Manor Boardwalk	Improved pedestrian route between Boston Manor Station (Piccadilly line) and the Western OA sector
Bus Rapid Transit	A4 Option 2 – busway in two nearside lanes – reduced road capacity
Bus Improvements	Local bus enhancements – extensions/ rerouting/frequency increases to H91, E10, H28 and 440
Low Car Mode Share Measures	Improved public transport and Healthy Streets measures are introduced across the area resulting in a mode shift to 75% using active and sustainable modes

Table 12: Package 2 - Rail Focussed

Mitigation Scheme	Description
Rail and LUL Upgrade Schemes	Improvements to Piccadilly line, District line and South Western Rail (TfL's Committed reference case)
Cycle Superhighway 9	Segregated cycle lane between Brentford and Kensington Olympia
Boston Manor Boardwalk	Improved pedestrian route between Boston Manor Station (Piccadilly line) and the Western OA sector
Bus Improvements	Local bus enhancements – extensions/rerouting/frequency increases to H91, E10, H28 and 440
West London Orbital	New Overground Rail scheme between Hounslow and Brent Cross, including a new station at Lionel Road
Southall Rail Link	Rail shuttle service between Transport Avenue and Southall station on the Great West Mainline
Workplace Parking Levy	Fiscal scheme to charge employers for office parking spaces, with costs passed on to employees to discourage car use
Low Car Mode Share Measures	Improved public transport and Healthy Streets measures are introduced across the area resulting in a mode shift to 80% using active and sustainable mode (Lane removed from all traffic on A4 in each direction)

6.2. Package performance – findings

Overall trip demand

The study showed that the impact of the mitigation packages on overall trip demand in the GWC area as a whole is small – as shown in **Figure 32**. Total trip numbers from the LTS model increases slightly in the mitigation package tests compared to the GWC development scenario (2% increase in the Bus Package and a 1.4% increase in the Rail Package).

Note: The trip demand by mode shown in Figure 32 does not include the post LTS demand adjustment to represent the low car mode share scenario.

Mode Choice

Both packages result in higher public transport and active travel mode shares and a lower car mode share.

Figure 33 shows the mode shares (12 hour weekday) for each mitigation package by model zone (these do not include the post LTS demand adjustment to represent the low car mode share scenario). Overall the packages deliver a 2-3% increase in public transport mode share for the whole OA area. The difference in mode share changes between the two mitigation packages is small which is to be expected as both are targeted predominantly at public transport schemes. However, the Rail Package showed a higher mode share change.

Figure 34 shows the mode shares (average day) for all scenarios including the Bus and Rail packages (these do include the post LTS demand adjustment to represent low car mode share scenario) by model zone. The packages deliver a 9-12% increase in public transport mode share and a 10-15% reduction in car mode share for the whole OA area.

Note: the mode shares shown in Figure 34 also account for a conversion from average weekday to average day (i.e. including weekends).

Figure 32: GWC intervention packages - 12 hour weekday trip totals

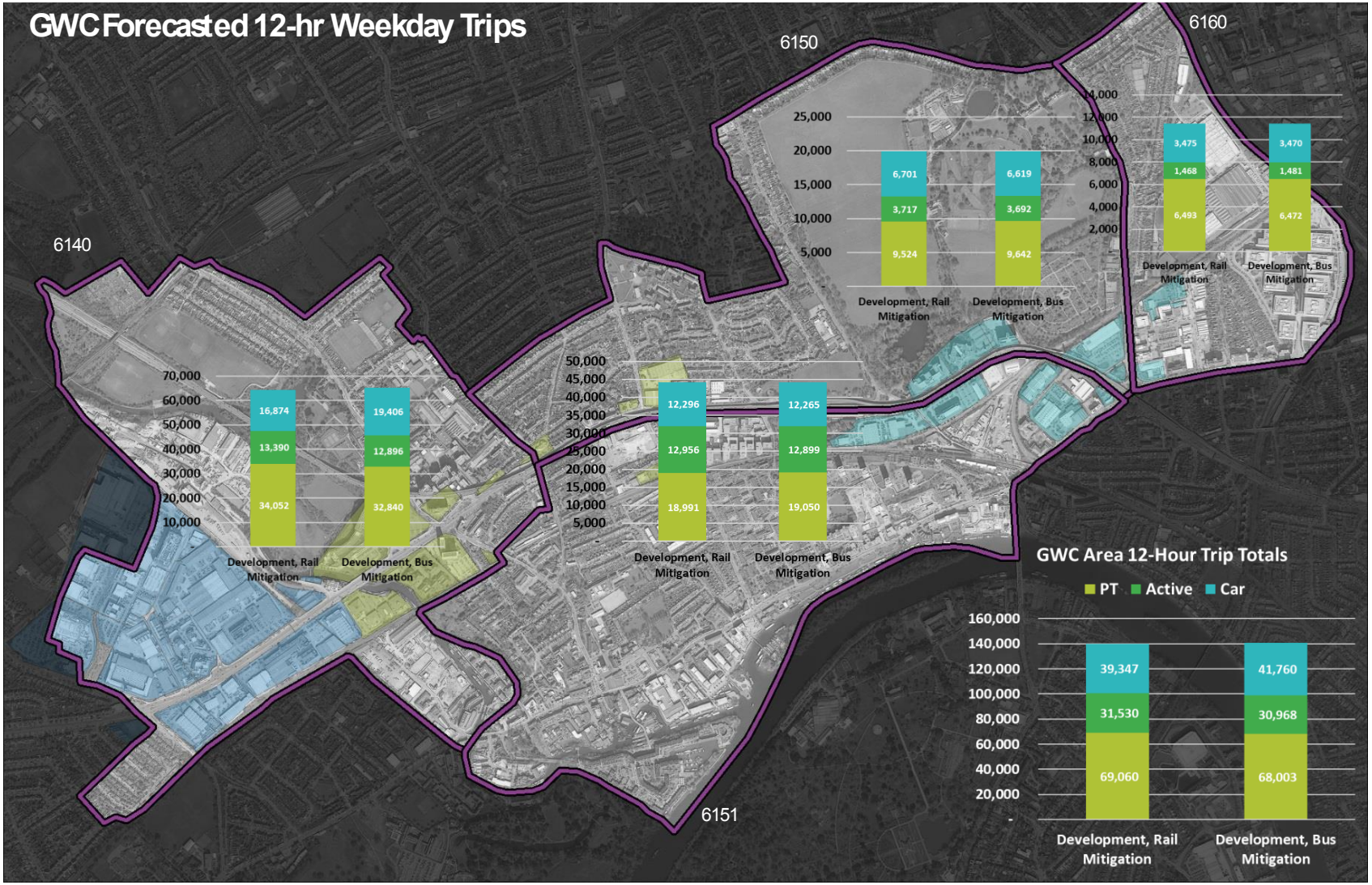


Figure 33: GWC intervention packages - 12 hour weekday mode shares

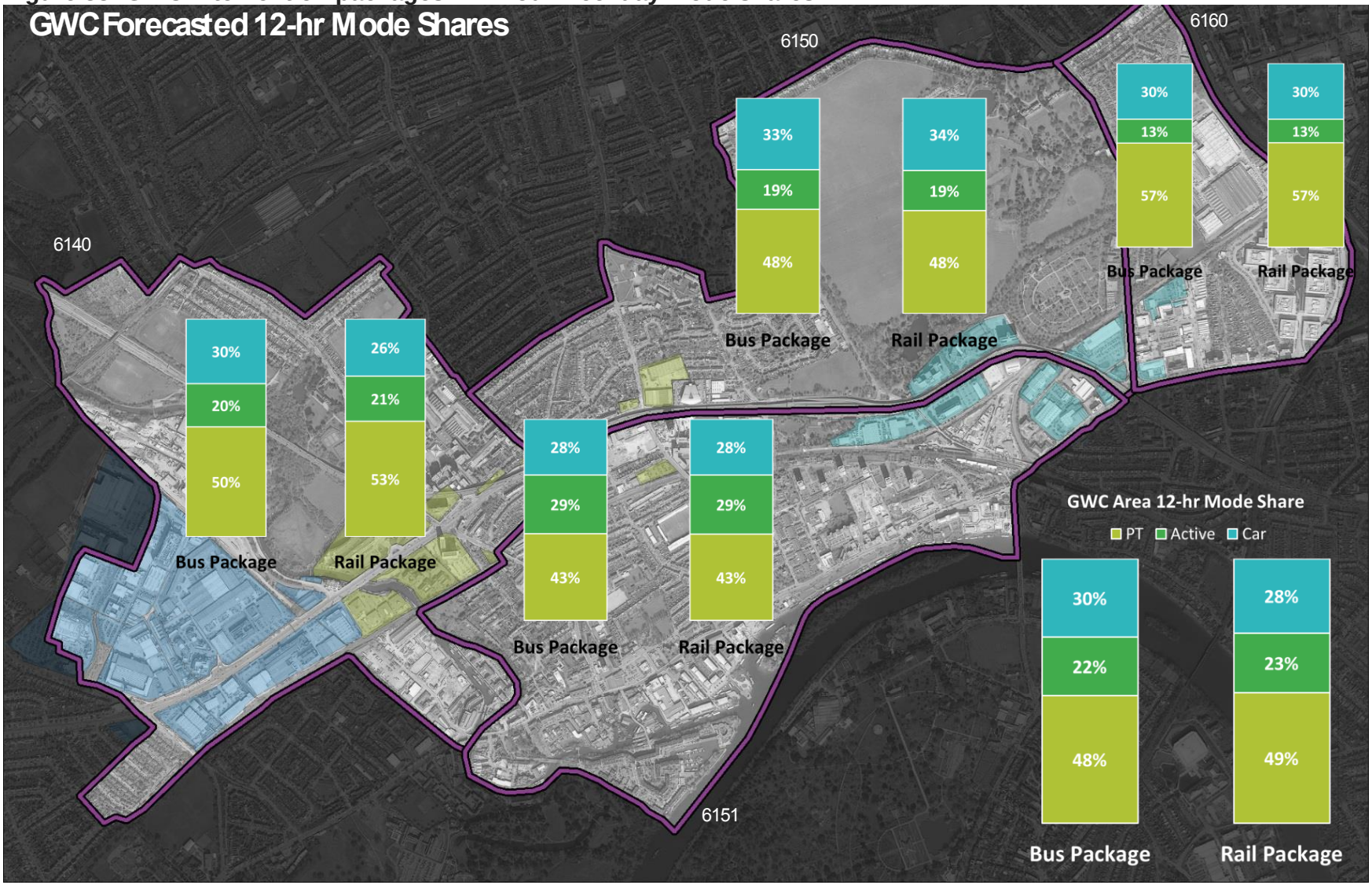
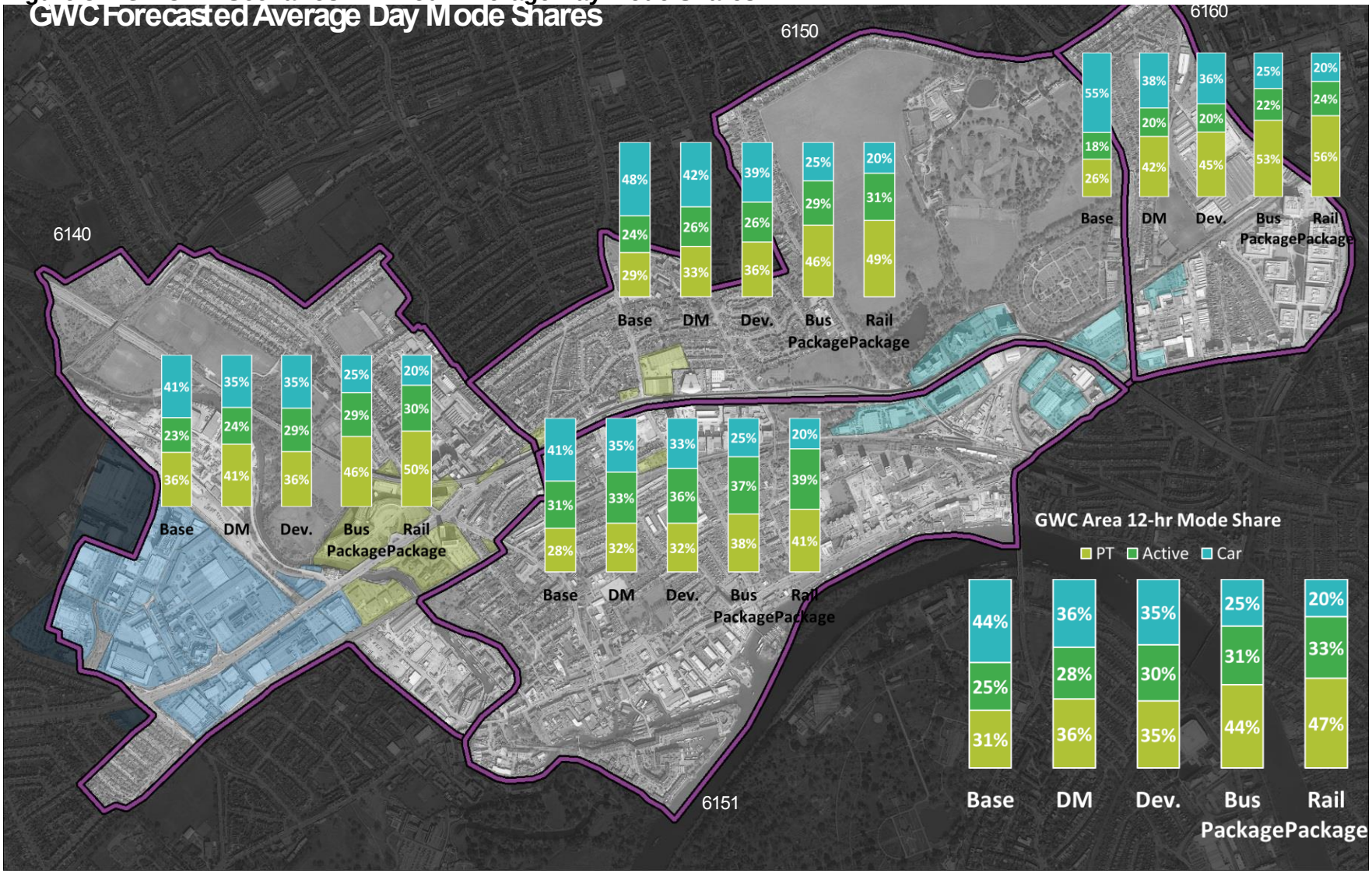


Figure 34: GWC All Scenarios - 12 Hour Average Day Mode Shares



Public transport network benefits

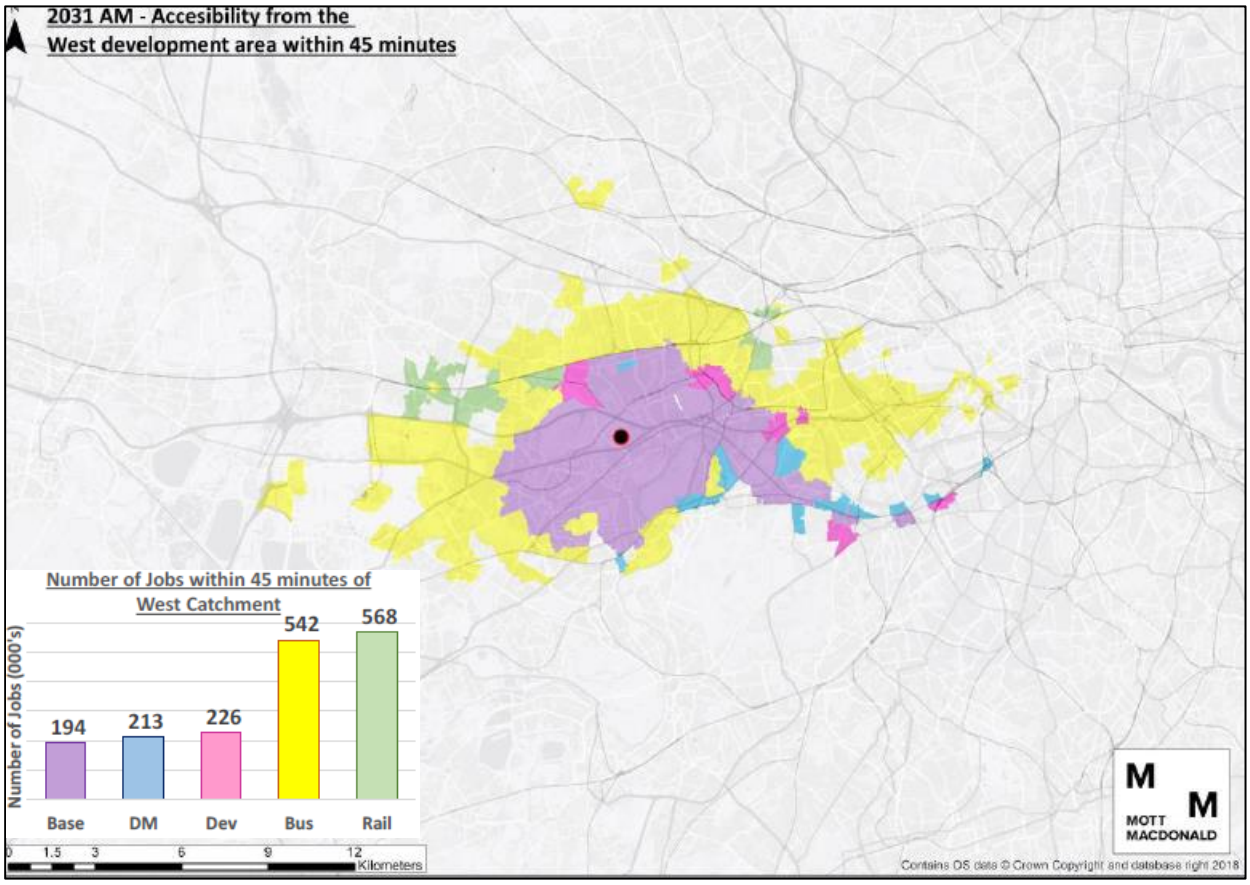
The key effects of the packages on the public transport network and in addressing some of the challenges identified as part of this study are summarised below:

Connectivity

Both packages provide significant improvements in both local and strategic public transport connectivity.

- **GWC western sector** – The western area in the GWC sees significant increases (around 250%) in both the employment and population public transport catchments in both packages. This is shown in **Figure 35**. This is mainly due to the Boston Manor Boardwalk, which provides a significant improvement in connectivity with the Piccadilly line. The enhanced bus services / BRT schemes and Southall Rail schemes also provide significant improvements in local connectivity. The Rail Package overall shows higher connectivity as it includes the Southall Rail Link scheme which provides improved access with Southall and areas to the west of Southall (along the new Elizabeth line).
- **GWC central sector** - there was approximately a 60% increase in employment and 30-40% increase in the population catchment in both packages. The enhanced bus service / BRT schemes provides significant improvements in local connectivity. The Rail Package overall shows higher connectivity as it includes the West London Orbital scheme and Southall Rail Link scheme which provides improved access to Hounslow, Acton, Old Oak Common, Hendon, West Hampstead and Southall respectively.
- **GWC eastern sector** - there is approximately a 30% increase in the employment and 20% increase in population catchments in both packages. The enhanced bus services / BRT scheme provide significant improvements in local connectivity. The Rail Package overall shows higher connectivity as it includes the West London Orbital Rail scheme which provides improved access to Acton, Old Oak Common, Hendon and West Hampstead.

Figure 35: Employment catchment by Public Transport (within 45 minutes) from GWC western sector



Public Transport Accessibility Levels (PTAL)

Figure 36 shows a number of site locations across the GWC area where the impact of the package of interventions on Public Transport Accessibility Levels (PTALs) has been assessed. The impact on PTALs at each of these sites is shown in **Table 13**.

Overall both packages of interventions increase PTALs at these sites within the GWC. The level of increase in PTAL achieved with each package is very similar in the central and western sectors - levels increase from 2 to 3 in the 2015 base year to 3 to 4 with both intervention packages. The Rail package has a more significant impact in increasing PTAL levels in the eastern sector due to the WLO scheme – levels increase from 2 to 4 in the 2015 base year to 3 to 4 with the Bus package and to 5 with the Rail package.

Figure 36: PTAL Site Locations

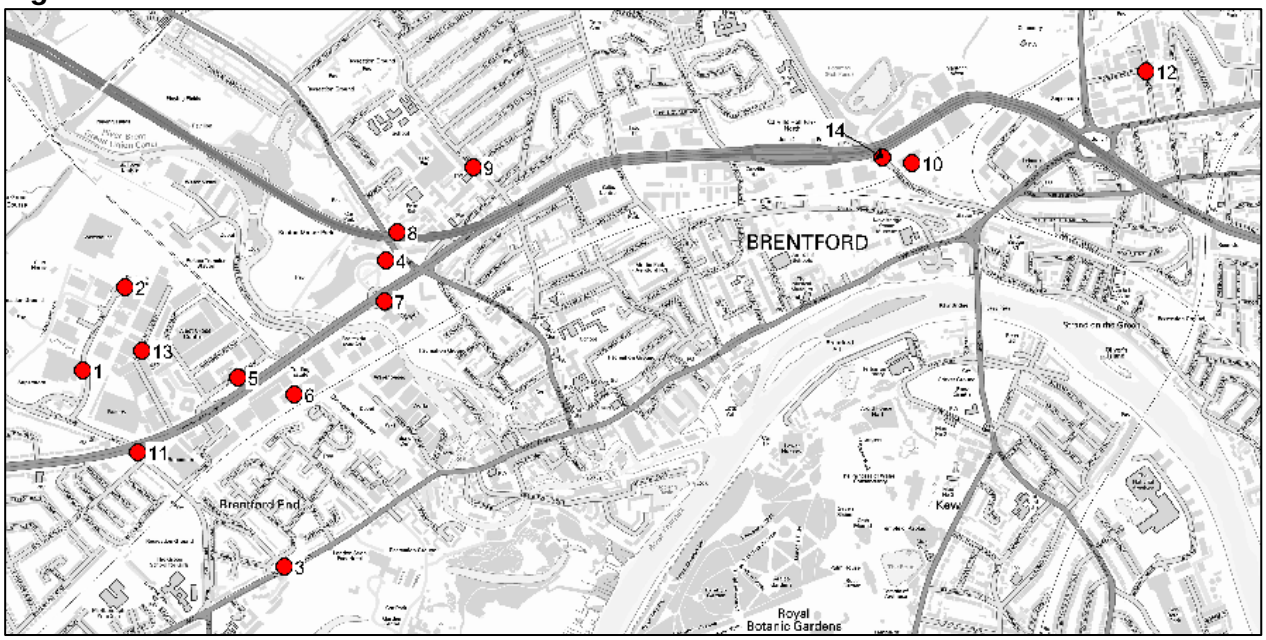


Table 13: Impact of intervention packages on PTAL at selected site locations

Site ID	Site Name	2015 Base	Package 1 (Bus)	Package 2 (Rail)
Eastern sector				
10	Lionel Road station	**3**	**3**	**5**
12	Power Road	**4**	**4**	**5**
14	GW Rd/Lionel Rd South	**2**	**3**	**5**
Central sector				
4	GSK	**2**	**4**	**4**
7	Riverbank Way	**3**	**4**	**4**
8	University of West London	**3**	**4**	**4**
9	Junction of Windmill Rd and Reynard Way	**3**	**4**	**4**
Western sector				
1	Tesco	**2**	**3**	**3**
2	Sky Campus	**1b**	**3**	**3**
3	Site 3 - Syon Lane	**3**	**4**	**4**
5	West Cross	**2**	**4**	**4**
6	Safestore site	**2**	**5**	**5**
11	Syon Lane/GWR	**2**	**4**	**4**
13	Harlequin Ave	**1b**	**3**	**3**

Rail Demand and Crowding

Both packages significantly increase demand on the District and Piccadilly lines. They also provide general demand and crowding relief across the rail network (as a result of a significant improvement in service capacity on both these lines arising from the Rail and LUL upgrade schemes).

Station Demand

- **Gunnersbury** - station demand at Gunnersbury significantly increases in both packages relative to the GWC development scenario (by 59% in the Bus package and 39% in the Rail package) – largely as a result of a significant improvement in service capacity on the District line as part of the LUL upgrade schemes) highlighting to importance of improving station capacity to address existing challenges and support future growth.
- **Kew Bridge** - both packages help to address the challenge of high forecast levels of future station demand at Kew Bridge reducing demand relative to the GWC development scenario (by 10% in the Bus package and 17% in the Rail package)
- **Syon Lane** - the Bus package reduces passenger demand at Syon Lane Station by 33% relative to the GWC development scenario. The Rail package increases demand very slightly (1%).

Bus Demand, Capacity and Travel Times

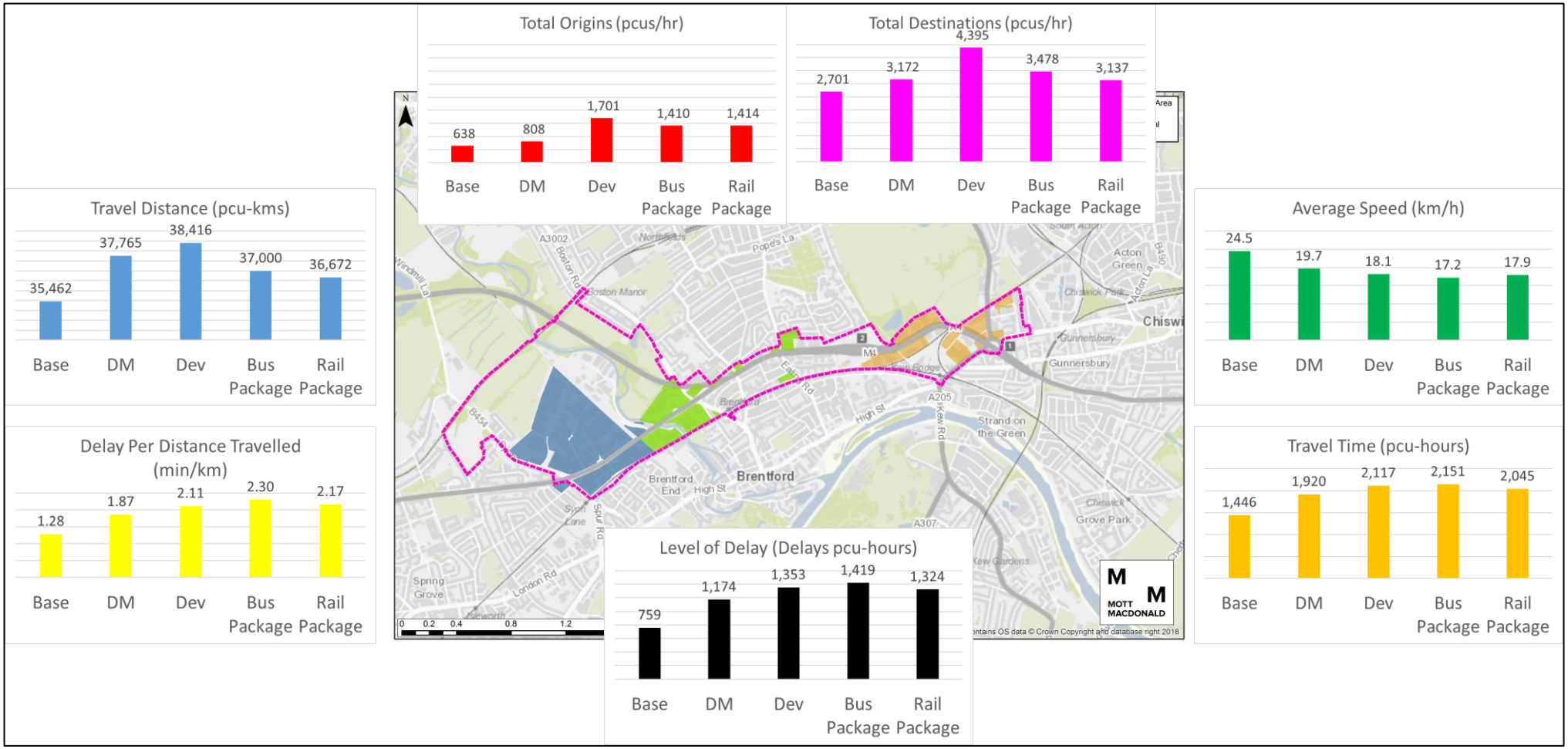
Overall, both packages are effective in relieving bus crowding. On the majority of routes crowding levels reduce relative to the do minimum Scenario. Bus journey times increase in both the packages as a result of the overall highway network capacity reduction associated with the introduction of segregated cycle and BRT infrastructure.

Highway network

The 'top line' statistics from the WELHAM modelling of the two packages (along with the base year, do minimum and GWC development scenarios) are shown in **Figure 37**. Statistics have been extracted for the GWC OA boundary and the following metrics for the AM peak hour are displayed:

- Trip totals (pcus/hr) – total origins and destinations
- Average speed (km/h) – congested average speed across the entire area
- Travel time (pcu-hrs) – total pcu-hours across the entire area
- Level of delay (pcu-hrs) – congested pcu-hours minus 'free flow' pcu-hours
- Travel distance (pcu-kms) – total pcu-kms across the entire area i.e. total traffic flow (pcus) multiplied by travel distance (kms)
- Delay per distance travelled (mins/km) – level of delay (converted to pcu-mins) divided by travel distance (pcu-kms)

Figure 37: GWC Area Highway Statistics



Overall Highway Network Demand

Both mitigation packages successfully reduce the total number of vehicle trips arriving in and leaving the OA to levels well below the GWC development scenario. The packages were therefore effective in mitigating the increase in demand on the highway network forecast as a result of the proposed GWC development scenario. However, it should be noted that even a return to trip levels seen in the do-minimum scenario does not remove the need for further mitigations since highway capacity challenges also exist at these levels.

The Rail Package performs better and reduces the destination trip demand to below the do minimum scenario level. This is due to the Workplace Parking Levy scheme being in place and the low car mode share target used (20%). There is an increase in trips leaving the OA (total origins) as there is a significant percentage increase in housing along the corridor.

As a direct result of fewer highway trips there is also an overall reduction in total pcu-kms, as a result of both packages – to below the do minimum scenario level.

Highway Network Performance

Neither package mitigates all the impacts of the GWC development scenario on the highway network. Despite the reduction in highway trips to and from the OA, the level of overall highway network delay in the area is forecast to increase by around 15% to 20% in both the rail and bus packages respectively, relative to the 2031 do minimum scenario. However, this is mainly due to the reduced highway capacity for general traffic arising from public transport and active travel schemes included in both packages such as BRT and Cycle Superhighway 9.

Junction Performance

A number of key junctions on the Great West Road such as Syon Lane, Boston Manor Road, Windmill Road, Ealing Rd and Chiswick Roundabout are forecast to be operating significantly over-capacity by 2031 (in both the do minimum and the GWC development scenarios). No significant improvement is seen in the performance of these key junctions with either package of measures. However, this is mainly due to the reduced highway capacity for general traffic arising from public transport and active travel schemes included in both packages that are designed to improve mode choice, connectivity and accessibility.

The sensitivity of these junctions to growth mean that more detailed individual Transport Assessments carried out as developments come on line will be critical in assessing the detailed impact of development and identifying and implementing appropriate mitigation measures.

Through traffic makes up a high proportion of trips in the GWC area now and in the future. There is a danger that any spare highway capacity released by mitigation measures and packages is used up by latent demand for through journeys. It is beyond the scope of this

study to consider the wider network outside of the study area; however, it is clear that the performance of the highway network in the GWC will also depend upon transport interventions at a regional and national level including those related to the potential Heathrow Airport expansion.

Work completed as part of the study reveals that the performance of junctions such as the South Ealing Rd/A4 and Chiswick Roundabout shows signs of improvement through junction optimisation (rebalancing of signals or new turn lanes). Transport Assessments should include local junction modelling to better understand the performance of these junctions, the impact of developments and if necessary contribute funding towards appropriate mitigations.

The work also highlights that it is the forecast redistribution or reductions in traffic demand on certain approaches that allows improved junction optimisation and performance. This highlights that demand management mitigations e.g. low car parking standards will also be important in managing impacts on the road network.

6.3. Packages – summary of findings

- Both packages result in higher public transport and active travel mode shares and a lower car mode share than seen in the GWC development scenario. The Rail Package shows a higher mode share change.

- Both packages are effective in reducing bus and rail crowding levels and in improving public transport connectivity and accessibility levels (PTAL) in the GWC area. The level of increase in PTAL achieved with each package is very similar in the central and western sectors - levels increase from 2 to 3 in the 2015 base year to 3 to 4 with both intervention packages. The Rail Package had a more significant impact in increasing PTAL levels in the eastern sector – levels increase from 2 to 4 in the 2015 base year to 3 to 4 with the Bus Package and to 5 with the Rail Package.

- Local issues are forecast to remain in both packages in terms of station demand and capacity and bus travel times (due to highway network conditions). Forecast Station demand issues are partially addressed by the Bus Package at Kew Bridge and Syon Lane stations in the future year growth scenarios but the demand at Gunnersbury station significantly increases. The Rail Package does not increase demand at Gunnersbury station as much as the Bus Package and also has a greater impact in reducing demand at Kew Bridge station.

- The Rail Package provides incremental improvements relative to the Bus Package in relation to the bus and rail crowding levels.

- The Rail Package provides significant strategic public transport connectivity benefits as it includes the West London Orbital scheme and Southall Rail Link schemes which provide improved access to Hounslow, Acton, Old Oak Common, Hendon, West

Hampstead and Southall (and areas to the west of Southall along the new Elizabeth line) respectively.

- The western area in the GWC sees significant increases (around 250%) in both employment and population catchments by public transport in both packages compared to the GWC development scenario. This is mainly due to the Boston Manor Boardwalk scheme (included in both packages), which provides a significant improvement in connectivity with the Piccadilly line. The BRT/enhanced bus service scheme and Southall Rail schemes also provide significant improvements in local connectivity.

- Both mitigation packages successfully reduce the total number of vehicle trips arriving in and leaving the OA to levels well below the GWC development scenario. The packages are therefore effective in mitigating the increase in demand in the highway network forecast as a result of the proposed GWC development scenario. The Rail Package performs better and reduces the destination trips to below the do-minimum scenario level.

- However, neither package mitigates all of the impacts of the GWC development scenario on the highway network. Despite the reduction in highway trips to and from the OA the level of overall highway network delay in the area is forecast to increase by around 15% to 20% in both the Rail and Bus Packages respectively, relative to the 2031 do minimum. This is mainly due to the reduced highway capacity for general traffic arising from public transport and active travel schemes included in both packages such as BRT and Cycle Superhighway 9 (CS9).

- A number of key junctions in the area such as Syon Lane, Boston Manor Road, Windmill Road, Ealing Rd and Chiswick Roundabout are also still forecast to be operating significantly over-capacity by 2031. Again, this is mainly due to the reduced highway capacity for general traffic arising from public transport and active travel schemes included in both packages such as BRT and Cycle Superhighway 9 (CS9). This highlights the challenge moving forward of maintaining acceptable levels of highway network performance whilst removing road capacity to facilitate the delivery of Healthy Streets schemes that would support the high quality public transport and active travel improvements that are required to improve connectivity and accessibility.

- Through traffic makes up a high proportion of trips in the GWC area now and in the future. There is a danger that any spare highway capacity released by mitigation measures and packages is used up by latent demand for through journeys. It is beyond the scope of this study to consider the wider network outside of the study area; however, it is clear that the performance of the highway network in the GWC will also depend transport interventions at a regional and national level including those related to the potential Heathrow Airport expansion.

7. GWC Transport study findings and conclusions

Based on the work completed and outputs outlined above the key findings and conclusions of this study are:

7.1 Impact of planned growth in the GWC

- The forecast growth in trips in the GWC area by 2031, in both the do minimum scenario and then the GWC development scenarios, is significant. Whilst the majority of the additional trips are forecast to be undertaken by active and public transport modes, the overall growth in trips in both scenarios will add significant pressure to the already busy local and wider transport public transport and highway networks without mitigation. In particular, unmitigated traffic growth on the highway network caused by poor public transport and active travel connectivity and accessibility would be unacceptable.
- In the context of the significant growth and transport network impacts already forecast to be seen in 2031 in the do minimum scenario, the additional impact of GWC development is smaller and it is considered that the overall proposed level of development can be accommodated with appropriate transport mitigations. The scale of new development proposed in both the reference case and GWC development scenario is considered to be manageable but needs to be supported and mitigated by an ambitious package of transport interventions in either case.

7.2 Supporting delivery of growth in the GWC

- A significant amount of new development is proposed for the GWC area as a result of its designation as an Opportunity Area. It is a key aspiration that new residents are provided with the best possible choice of employment and that the employment uses have as wide a catchment as possible in order to attract high quality businesses and employees. An essential element in achieving this, therefore, is by providing significant improvements to connectivity and accessibility from across the wider region as well as locally.
- To accommodate the scale of development growth proposed and to address existing and forecast challenges the study shows it is essential that new development across the area is brought forward in a carefully phased manner, in line with appropriate incremental improvements to the transport network, and in line with the Mayor's principles of Good Growth and MTS aspirations for mode share (80% active and sustainable modes).
- To meet the Good Growth principles and Healthy Streets aspirations all new developments should provide high levels of on-site permeability for pedestrians and cyclists, convenient and attractive walking and cycling connections to local stations and seek to meet the goal of car-free or car-lite development through very low levels of on-site car parking provision.

- The study shows that many of the individual measures assessed provide positive benefits and could play a role in the package of measures needed to support planned growth and addressing transport challenges across the whole GWC area. Some measures are forecast to have a more localised area of influence, with impacts particularly on one area in the GWC. For example, the WPL scheme is forecast to reduce highway trips in the western and central areas of the corridor but to have little impact in the east.
- The growth in future trips to and from the GWC is expected to be both orbital and radial in nature. It will therefore be necessary to consider both these types of trip demand when planning future transport improvements, particularly to ensure those living north and south of the GWC have realistic sustainable travel options.
- It is clear that neither of the two packages of measures tested fully mitigate the impact of development in the area. Therefore, it is essential that the package which provides the best opportunities for sustainable and active travel, as well as the best public transport benefits is delivered.
- It is therefore considered that the better results provided by the Rail Package are more likely to deliver the level and type of improvements necessary to support the proposed level of development. In particular this package of schemes will deliver the wider strategic public transport connectivity and accessibility that is necessary, as well as ensuring higher PTALs in the east of the area compared to the Bus Package. However, elements of the Bus Package are also desirable.
- **Table 14** outlines the package of potential transport intervention proposed in the GWC. The following measures will be needed throughout all phases of delivery of new development in the GWC, but will be particularly critical in the **short to medium term**:
    - improved walking and cycling connections to stations in the GWC e.g. Boston Manor Boardwalk scheme (subject to further feasibility work given concerns about deliverability and personal safety).
    - Healthy Streets improvements across the road network, including the A4, providing improved infrastructure for walking, cycling and buses.
    - Healthy Streets improvements within development areas in particular to unlock new quieter parallel routes to the A4, direct routes to stations and other new connections that encourage more active travel.
    - local bus network enhancements providing additional network capacity, better local public transport accessibility levels and improved connectivity to stations and local centres.
    - the delivery of future rail and LUL network enhancements planned for the Piccadilly line, District line and SW rail line.
    - station capacity, accessibility and other customer experience enhancements at Gunnersbury Station, Kew Bridge and Syon Lane.

- improvements to key junctions on the road network including at Syon Lane, Boston Manor Road, Windmill Road, Ealing Rd and Chiswick Roundabout.
- demand management measures including car-free and car-lite developments with low car parking standard, employee travel plans for existing and new businesses with ambitious mode share targets (targets set for staff mode share via the travel planning process are to be at a level to support the MTS goals and car-free / car-lite development aspirations for Opportunity Areas as set out in the draft London Plan).
- efficient freight management practices including delivery service plans.
- cycle parking on other on-site facilities at new development that encourage active travel.

- The study shows that the Southall Rail Link Scheme, West London Orbital Rail, Bus Rapid Transit and the Workplace Parking Levy schemes provide improvements in local and strategic public transport connectivity and accessibility levels, increase network capacity and also help to reduce highway demand. These are, however, larger scale and more complex schemes that are potentially more difficult to deliver and fund, albeit they are key elements of the transport package. They require further work to confirm their feasibility, develop scheme design proposals, test their public acceptability and prepare business cases.
- Southall Rail Link, West London Orbital Rail and BRT schemes are therefore considered important potential **medium to long term schemes**. They deliver essential public transport accessibility, connectivity and capacity benefits that would help support the later phases of GWC growth, particularly in the west and central areas of the GWC. They lso deliver significant benefits across the borough and a wider area. The WPL scheme represents a potential funding mechanism that help deliver these schemes. If feasibility shows these schemes to be undeliverable then contributions to other schemes that achieve the same benefits will still be required to mitigate the impacts of the expected levels of development.
- The study highlights the sensitivity of the performance of the highway network to future growth. This means that individual Transport Assessments (carried out as developments come on line) will be critical in assessing the impact of that development and identifying and implementing appropriate mitigations improvements if unacceptable levels of congestion and delay are to be avoided. Whilst, individual development transport assessments may not show a significant impact on a particular junction, the strategic implications of overall growth in the area illustrated by this study should be considered and mitigations put in place to avoid potential significant increases in delay and congestion due to the cumulative impact of developments.
- The work also shows that given the growth in development proposed in the GWC, and the scale of associated new trips, development will need to be carefully phased alongside the delivery of the transport interventions outlined above. Since increasing public transport accessibility levels (PTAL) and public transport connectivity is a key

priority for the whole of the GWC in order to deliver the proposed levels of development, all new development must be linked and contribute to both short, medium and long-term mitigations designed to improve these outcomes and to promoting use of active travel modes.

Table 14: GWC Potential transport interventions

Ref.	Intervention	Description	Challenges Addressed	Relative Scale of Cost	Deliver-ability	Funding Status	Phasing Period
A. Improving public transport connectivity, capacity and accessibility							
PT 1	**Bus Service Enhancements**	A package of bus enhancements designed to improve services between the GWC and stations / local centres	A, C, D	£	1	FFP	ST, MT, LT
PT 2	**Station walking and cycling connections**	Improved walking and cycling connections to stations in the GWC e.g. Boston Manor Boardwalk scheme	A, C, D	£ - ££	1 – 2	UF	ST, MT, LT
PT 3	**A4 Bus Rapid Transit**	Introduction of an express bus service with extensive bus priority measures along A4 corridor	A, D, E	£££+	2	UF	ST, MT
PT 4	**LUL and Rail Capacity Upgrades**	Piccadilly line, District line and SWR Hounslow Loop Upgrades	A, D	£££+	1	FFP	ST, MT, LT
PT 5	**Southall Rail Link**	Shuttle rail service running from a new station in the GWC to Southall	A, D	£££+	2	UF	MT
PT 6	**West London Orbital Rail**	A new service linking Hounslow to North West London and new station at Lionel Road	A, D	£££+	2 – 3	UF	LT
B. Managing station crowding and increasing capacity							
S1	**Station enhancements**	Station capacity and customer experience enhancements at Gunnersbury Station, Kew Bridge and Syon Lane	A, B	£ - £££+	1	UF	ST, MT, LT

Table 14: GWC Potential transport interventions

Ref.	Intervention	Description	Challenges Addressed	Relative Scale of Cost	Deliver-ability	Funding Status	Phasing Period
C. Encouraging more active travel and improving the health of residents							
HS1	**CS9**	Upgraded cycle facilities along Chiswick High Road and the A315	C, D	~~£~~£-£~~£~~	1	F	ST
HS2	**Healthy Streets – within Development Site Boundary**	A high standard of active travel permeability of new developments and attractive public realm	C, D,	£-~~£~~£	1	FFP	ST, MT, LT
HS3	**Healthy Streets - Local Connections Package**	A set of Healthy Streets enhancements designed to improve connectivity for pedestrians and cyclists from workplaces and residential areas to transport hubs, retail areas and leisure facilities including connections to CS9.	A, C, D, E	~~£~~£-£~~£~~	1	UF	ST, MT, LT
D. Reducing car dependency and managing the performance of the highway network							
M1	**Travel Demand Management Measures**	A package of soft measures and planning policies designed to complement new infrastructure and contribute to the Mayor's 80% sustainable mode target e.g. car parking standards and policies, employer Travel Plans, Delivery Service Plans, cycle parking, cycle Hire, improved walking and	C,	£	1	FFP	ST, MT, LT

Table 14: GWC Potential transport interventions

Ref.	Intervention	Description	Challenges Addressed	Relative Scale of Cost	Deliver-ability	Funding Status	Phasing Period
		cycling wayfinding					
M2	**Bus Priority Measures**	Bus priority measures on the road network and at key junctions to improve the reliability and performance of the bus network	A, C, D, E	£ - ££	1	UF	ST, MT
M3	**Workplace Parking Levy**	Fiscal disincentive to car use for commuting within 1km of new Golden Mile rail station	B, D	£	2 - 3	UF	ST, MT
E. Balancing the strategic role of the A4 with Healthy Streets aspirations							
B1.	**Healthy Streets – A4 corridor measures**	Measures for reducing severance and providing a more attractive environment for active travel, balance the needs of a strategic road corridor	C, D, E	£-£££+	1	UF	MT
B2.	**Junction Improvements/ Optimisation**	Improvements to key junctions on the road network including at Syon Lane, Boston Manor Road, Windmill Road, Ealing Rd and Chiswick Roundabout. As each development comes – look to apply optimisation or enhancements where delays are forecast to occur.	C, D, E	£ - £££+	1	UF	ST, MT, LT

TABLE KEY:

Outline cost	Deliverability	Funding Status	Delivery Phasing
£ - Up to 5M ££ - Up to 10M £££ - Up to 20M £££+ - Greater than 20M	1 – High / Common 2 – Medium / Challenging 3 – Low / Complex	F – Funded FFP –Good future funding potential & potential funding source identified PF – Partially funded UF - Unfunded	ST: Up to 2021 MT: Up to 2026 LT: 2026+

7.3 Area planning and phasing considerations

Considerations for new development in the eastern, central and western sectors of the GWC are set out below.

A. Eastern sector

- Overall, the eastern sector has the highest current level of public transport accessibility and early GWC development should be focussed here subject to improvements at Gunnersbury Station. Better active travel connections to existing transport hubs are required for development levels to be fully realised in line with the principles of Good Growth and Healthy Streets.
- Chiswick roundabout already operates at or above capacity and future development growth could significantly increase levels of delay. To minimise further pressure on this important junction, new development needs to be brought forward in a manner that promotes a shift away from use of the private car by employees and residents and supports the realisation of MTS sustainable mode share targets. One option to help control highway demand in this sector is to extend the potential WPL scheme already under consideration or similar parking controls in conjunction with travel plan targets for individual developments (that align with MTS mode share targets).
- Both Gunnersbury and Kew Bridge stations are forecast to see a significant increase in passengers as a result of future development growth in the area, which without mitigation would exacerbate existing capacity constraints and challenges. It is therefore essential that accessibility and capacity improvements at the station are implemented to support new development in the area and funded by new development (subject to a further more detailed station assessment and pedestrian modelling).
- The implementation of the WLO rail scheme with a new station at Lionel Road would improve public transport accessibility levels and connectivity in this area and help to relive congestion at Gunnersbury and Kew Bridge stations. If surface transport links to the new station are also improved this would also provide wider benefits across the GWC. Whilst this is a potential long-term project, its scale and cost means that a funding strategy needs to be identified and funding contributions secured from all developers in the area. Active travel links to the site of the station also need to be provided or, at the very least, safeguarded.
- The delivery of rail and LUL network enhancements proposed for the Piccadilly line, District line and SW rail line will help to enable the levels of planned new development in this area. New developments within reasonable walking distance of public transport hubs are to be prioritised.
- In advance of these large-scale mitigation measures, improvements to bus services will be essential in the shorter term with developers contributing towards these on an incremental basis to ensure adequate public transport capacity is maintained.

- CS9 will provide greater opportunity for cycling to and from this sector. New developments need to provide on-site permeability for active travel and also funding towards new and enhanced cycle links to and from CS9 and nearby transport hubs.
- Improvements to the active travel infrastructure will be essential to encourage more walking and cycling trips, including reducing or removing the severing effects of the major roads running through this sector.

B. Central sector

- The central sector has, on average, lower levels of PTAL than the eastern sector but compared to the western sector benefits from a greater number of orbital bus services which connect to local rail and underground stations. Congestion levels at junctions along the A4 are significant in peak periods.
- Brentford station lies at the heart of this sector and has already benefited from an increased frequency of service in 2019. New development should seek to improve active travel links to this station particularly from the northern side of the A4 since pedestrian movements across the A4 can be slow and indirect.
- The central sector is within walking distance of the proposed new Southall Rail Link station and Brentford station (which could host new services as part of the proposed West London Orbital rail scheme). The intervention packages assessed in this study have shown that these rail schemes represent potential medium to longer term options for improving public transport connectivity, accessibility levels (PTAL) and capacity and supporting the full levels of new development proposed in this sector. All developments will therefore be expected to contribute to the delivery of these schemes and participate in a WPL should it come forward.
- In the shorter term some early development could be brought forward if the required improvements in public transport connectivity, accessibility levels (PTAL) and capacity are delivered by new development through local bus network enhancements (such as those included in the mitigation packages assessed in this study). Active travel connectivity to existing stations will also need to be significantly improved.
- Such improvements could take the form of Bus Rapid Transit and / or bus service enhancements along the A4 which would also help improve public transport connectivity to and from this sector in the shorter term (particularly to stations such as Gunnersbury), improve public transport accessibility levels, reduce journey times and therefore make public transport a more attractive option for journeys in the area.
- The A4 junctions at Boston Manor Rd, Windmill Rd and Ealing Rd all showed high levels of congestion in the future year scenarios assessed, although both the Ealing Rd and Boston Manor Rd junctions responded positively to the potential mitigation packages assessed (including junction re-design / optimisation). However, there is a risk of re-routing of traffic onto residential streets and Brentford High St if the performance of these junctions is not improved as new development comes forward.

- Since junction performance is so critical in this area, all new developments should provide evidence of their expected impact on the highway network as part of the planning process and contribute towards mitigations as part of a strategic view of the area.
- The A4 presents a hostile environment for active travel modes. The application of a Healthy Streets approach to the A4 would help reduce severance and offer opportunities to make walking and cycling a more attractive option in the area and will therefore be a requirement in all development proposals. All developments will also be expected to contribute towards new active travel routes away from the A4.

C. Western sector

- The western sector has, on average, lower levels of PTAL than the eastern sector. Overall, an ambitious package of transport mitigations is therefore needed to increase the PTAL and significant improvements in public transport connectivity, accessibility and capacity are required to support the full levels of development proposed in this sector. These need to be delivered alongside Healthy Streets measures to promote use of active travel modes and reduce car dependency. All developments will be expected to contribute to this package of measures so that incremental change can be delivered.
- As in the central sector the Southall Rail Link, WLO and BRT schemes represent potential medium to longer term options for delivering these transport outcomes and supporting the full levels of new development proposed in this sector. A phased approach, with some new development coming forward in the shorter term, is possible if public transport connectivity and accessibility levels are improved through local bus network enhancements and active travel connectivity to existing stations is also significantly improved. All developments will need to contribute towards the medium to longer term delivery of the proposed rail projects. All development will, however, be expected to contribute towards these medium to long terms schemes.
- The catchment improvements brought about by new strategic transport infrastructure will have direct benefits for employers by increasing the pool of available staff and potentially improving staff retention by providing faster and less crowded journeys.
- Improved walking, cycling and bus connectivity to existing local rail (Syon Lane) and tube (Boston Manor and Osterley) stations will be essential to enabling development in this sector, including reducing the severing effect of the A4. To maximise the benefit of improved connectivity new or enhanced links will need to be delivered before or to coincide with the proposed rail and LU improvements.
- New, extended and enhanced bus routes (such as those included in the mitigation packages assessed in this study) would improve local public transport accessibility levels, provide increased capacity and improve connections to local stations and to transport hubs such as Ealing Broadway and Gunnersbury (which are further away but offer access to additional routes). These bus services would also offer improved connectivity to residential areas to the north and south of the GWC. Since bus

improvements can be delivered in the short term, development must be linked to potential new routes and/or frequency increases on routes such as the H91, E8 and H28.

- The Syon Lane/A4 junction is forecast to be overcapacity under all future year scenarios and currently operates close to capacity in the PM peak. New developments must minimise impact on this junction through a car-lite approach in line with Good Growth principles set out in the draft London Plan and MTS mode share targets. Junction optimisation or improvements will be required as new development comes forward.
- The study showed that the WPL scheme has the potential to deliver reductions in highway trips during peak times in the western sector. As part of a package of transport mitigations it could therefore be an important tool for managing highway demand. However its implementation is challenging and linked to funding the delivery of the Southall Rail Link. Should a WPL scheme not be taken forward, other demand management measures including ambitious mode share targets for employees will be needed.
- Planned accessibility improvements to Syon Lane Station will enable greater access for more people prior to any new development.

8. Next steps

The following next steps have been identified in the study:

(1) Complete further scheme definition and development work (feasibility, design development and business case development, etc.) on the following schemes:

- Southall Rail Link
- West London Orbital Rail
- Bus Rapid Transit on the A4
- Station enhancements including Gunnersbury, Kew Bridge and Syon Lane
- Station walking and cycling connections
- GWC area Healthy Streets package

(2) Prepare a funding and delivery strategy (drawing on a variety of funding mechanisms) to support delivery of transport infrastructure in GWC. This should include further work to develop and assess the case for a potential Workplace Parking Levy scheme in the GWC.