West Midlands' Key Route Network

Evidence Report 2018

Transport for
West Midlands

MAYOR'S MESSAGE

The Key Route Network is an important part of my vision for a safer, more efficient and well managed and maintained road network across the West Midlands. This network of roads defined in collaboration with our local authority partners provides the opportunity for greater flexibility and improved coordination, not just to support our economic growth ambition, but also to contribute to the overall resilience of the West Midlands transport network as we enter a period of unprecedented investment across the region.

The primary role of the Key Route Network is to enable the growth ambition of our region as we seek to build more houses, create jobs, improve the health of our people and help our population to make sustainable choices in order to improve the environment in which we live. As Mayor, I am excited to present the first major milestone in our development of the Key Route Network. These baseline reports prepared by Transport for West Midlands, are the first documents detailing the issues, challenges and opportunities on each of our 23 routes from the Black Country to Coventry.

This work will form the basis for developing our Highways Investment Plan for the Key Route Network and help us to better understand the immediate priorities and further help us develop our future investment programme, which will complement our 10 Year Delivery Plan. The work presented in these reports sets out performance in terms of congestion, delay, and reliability. It also considers safety, interaction with public transport, cycling, network resilience, public health and the environment and the state of assets including carriageway, footway and structure condition.

This evidence-led approach is the first step towards delivering the improvements required across the transport system, which ultimately aims to improve the lives of each resident of the West Midlands.

Andy Street,
Mayor of the West Midlands

KEY FACTS

Customer Satisfaction

81%
Provision of Lighting

79%
Quality of Signage

76%
Visibility of Road Marking

48%
Congestion

45%
Information on Delays

43%
Maintenance

605km
23 Routes

17.7mph
Average Weekday Peak Speed

OVER 800k
Daily Bus Trips

3.05bn
Vehicle Miles Travelled In 2016

2,664
Collisions In 2016

508
Killed or Seriously Injured (14% of all casualties)

41%
of journeys under 2 miles by car

OVER 200k
Birmingham and Black Country residents exposed to average road traffic noise above >55dB

6
Air Quality Management Areas with between 2,000 & 2,400 attributable deaths

Defining The Key Route Network

The West Midlands sits at the heart of the national transport network and the roads through the region are managed by three separate bodies. The motorways and important trunk roads commonly referred to as the strategic road network are operated, managed and maintained by Highways England. The M6 Toll road which bypasses the M6 in Birmingham is privately operated by Midland Expressway Limited. Additionally, the roads within the local authority boundaries are individually maintained by each of the seven local highway authorities amounting to over 9,000km of roads.

In November 2015 the West Midlands local Highways Authorities commenced a period of consultation on defining a Key Route Network (KRN). An initial draft Metropolitan Main Road Network was included in the West Midlands Strategic Transport Plan: Movement for Growth, which was published in 2016.

The network was developed with the aim to serve the main strategic demand flows for general traffic, bus and freight operations across the conurbation. The defined main road network needed to support robust accessibility for businesses and logistics, and accommodate movement of rapid transport vehicles and core bus services to ensure journey time reliability and an enhanced role for Urban Traffic Control (UTC). This draft presented in 2016, was comprised of mainly A-roads (98%).

Additional analysis showed that road classification does not necessarily reflect the hierarchy of use by traffic, freight and bus.

It was observed that while the A-road network represents a reasonable proxy for the definition of a draft Main Road Network, the definition should be more focussed on routes which add the greatest economic value and which underpin connectivity across the region.

It was therefore concluded that some B-roads also carry a relevant and important proportion of traffic and could potentially form part of the final version of the KRN.

In January 2016, the roads comprising the KRN was agreed by the local highway authorities and Transport for West Midlands (TfWM).

The KRN comprises 605km (7%) of all the roads within the local authority road network. The network is essential for the following main purposes:

- Serving the main strategic demand flows of people, goods and services;
- Serving large traffic volumes; and
- Providing connections to the national strategic road network.

The KRN is mainly made up of A-roads and some B-roads with the remainder consisting of a small section of the A38 (M) Aston Expressway motorway.

The network has subsequently been adopted in legislation as part of the creation of the West Midlands Combined Authority (WMCA).

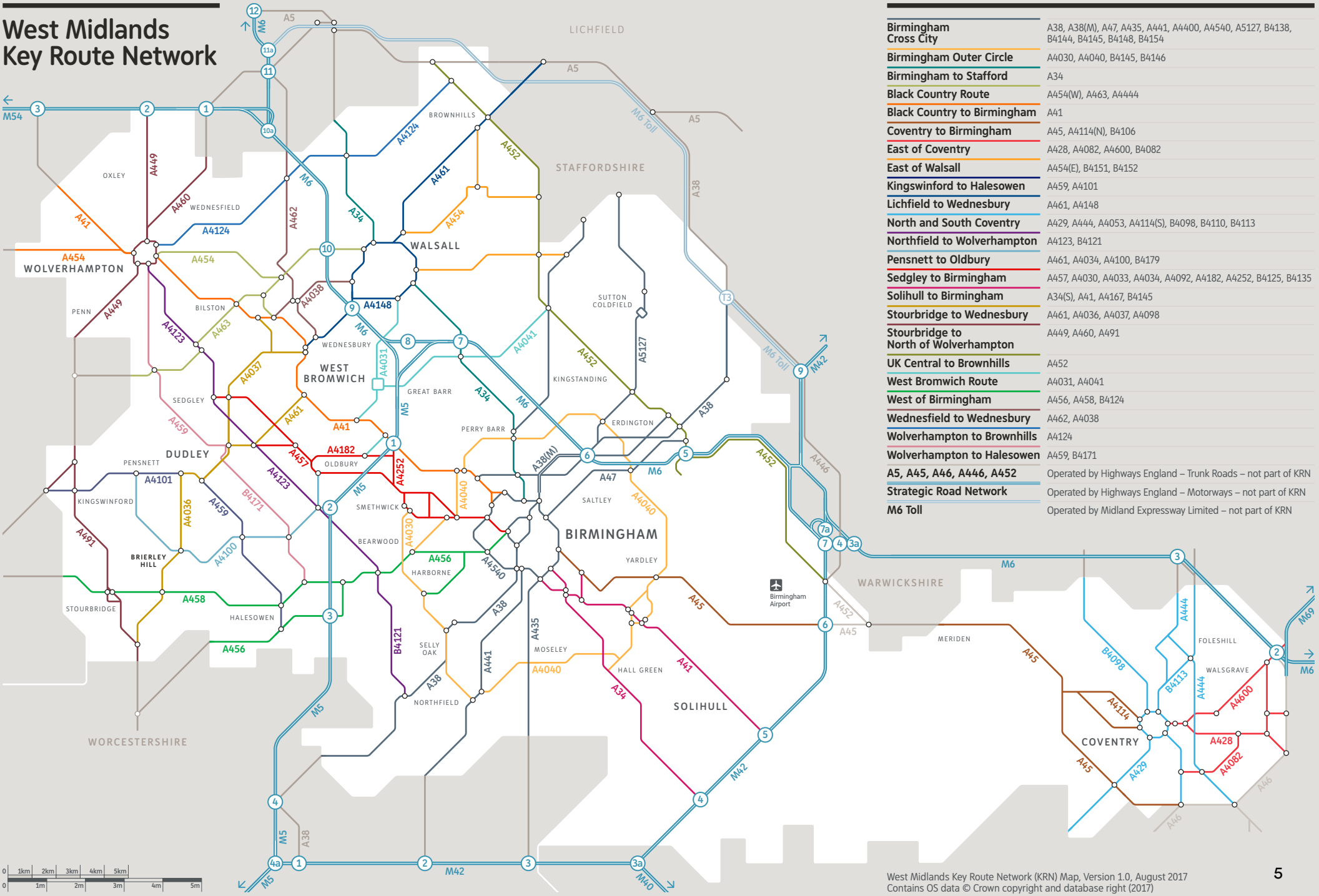
The WMCA is led by the region's first elected Mayor who has specific concurrent powers on the KRN in the following areas:

- Road Safety
- Bus Lane Contravention
- Permit Schemes
- Air Quality

The day to day operations and maintenance of the KRN remains with the seven local highway authorities, whilst strategic oversight, coordination and management of the KRN is undertaken regionally by the WMCA on behalf of the seven constituent authorities. The WMCA maintains close working relationships with non-constituent authorities who in some cases manage sections of the KRN that falls outside of the WMCA area. Following on from the work to define the KRN, and its adoption in legislation, additional development work has taken place during 2017 including separating the network into 23 discreet routes and these are shown on **Figure 1**.

Figure 1

West Midlands Key Route Network



Birmingham Cross City	A38, A38(M), A47, A435, A441, A4400, A4540, A5127, B4138, B4144, B4145, B4148, B4154
Birmingham Outer Circle	A4030, A4040, B4145, B4146
Birmingham to Stafford	A34
Black Country Route	A454(W), A463, A4444
Black Country to Birmingham	A41
Coventry to Birmingham	A45, A4114(N), B4106
East of Coventry	A428, A4082, A4600, B4082
East of Walsall	A454(E), B4151, B4152
Kingswinford to Halesowen	A459, A4101
Lichfield to Wednesbury	A461, A4148
North and South Coventry	A429, A444, A4053, A4114(S), B4098, B4110, B4113
Northfield to Wolverhampton	A4123, B4121
Pensnett to Oldbury	A461, A4034, A4100, B4179
Sedgley to Birmingham	A457, A4030, A4033, A4034, A4092, A4182, A4252, B4125, B4135
Solihull to Birmingham	A34(S), A41, A4167, B4145
Stourbridge to Wednesbury	A461, A4036, A4037, A4098
Stourbridge to North of Wolverhampton	A449, A460, A491
UK Central to Brownhills	A452
West Bromwich Route	A4031, A4041
West of Birmingham	A456, A458, B4124
Wednesfield to Wednesbury	A462, A4038
Wolverhampton to Brownhills	A4124
Wolverhampton to Halesowen	A459, B4171
A5, A45, A46, A446, A452	Operated by Highways England – Trunk Roads – not part of KRN
Strategic Road Network	Operated by Highways England – Motorways – not part of KRN
M6 Toll	Operated by Midland Expressway Limited – not part of KRN

SCOPE OF THIS EVIDENCE REPORT

This evidence report sets out the baseline describing our understanding of the condition and performance of the KRN, the issues and challenges affecting the routes particularly congestion, road safety, junction capacity problems, impacts on public health and the environment and the state of our assets.

Gathering the evidence in this way across the region represents a major step forward in providing a complete assessment of our KRN for the first time. This evidence will support ongoing development work across our local constituent authorities as collectively we aim to shape the ongoing investment across the local highway network.

The evidence report is presented in three parts:

The West Midlands View

This is the main body of the report which looks at the issues and challenges from a West Midlands wide perspective and considers the evidence relating to network performance and operation, road safety, cycling, public health and the environment, asset condition and key regional considerations.

The Individual Route Reports

There are 23 routes on the KRN and the individual route reports describes the route characteristics, performance, sets out the key challenges and opportunities facing each route; provides commentary on route capability, condition and constraints and identifies future growth aspirations.

Technical Annex

The Technical Annex contains all the details that were gathered from local highway authorities particularly relating to the condition of highways focusing mainly on carriageways, footways and structures.

This evidence report makes no attempt to suggest or promote solutions.

WHAT OUR CUSTOMERS TOLD US

Overview

The West Midlands Strategic Transport plan - 'Movement for Growth' sets our vision, priorities, approach and commitment to building a world class, sustainable, infrastructure system.

A monitoring and evaluation framework has been developed to help us measure progress against this vision. In January 2017 we conducted a survey to measure specific key performance indicators relating to walking, cycling and car driving along with general public perception and behaviour.

The results of the survey showed a mixed view regarding the customer's experience using local roads in the West Midlands; these are roads operated and maintained by local highway authorities.

Car drivers in particular had fairly mixed customer satisfaction ratings, with only 65% satisfied with the overall driving journey experience. It was also shown that the provision of lighting (81%), amount/quality of signage (79%) and visibility of road markings were more highly rated by car drivers (76%)[i].

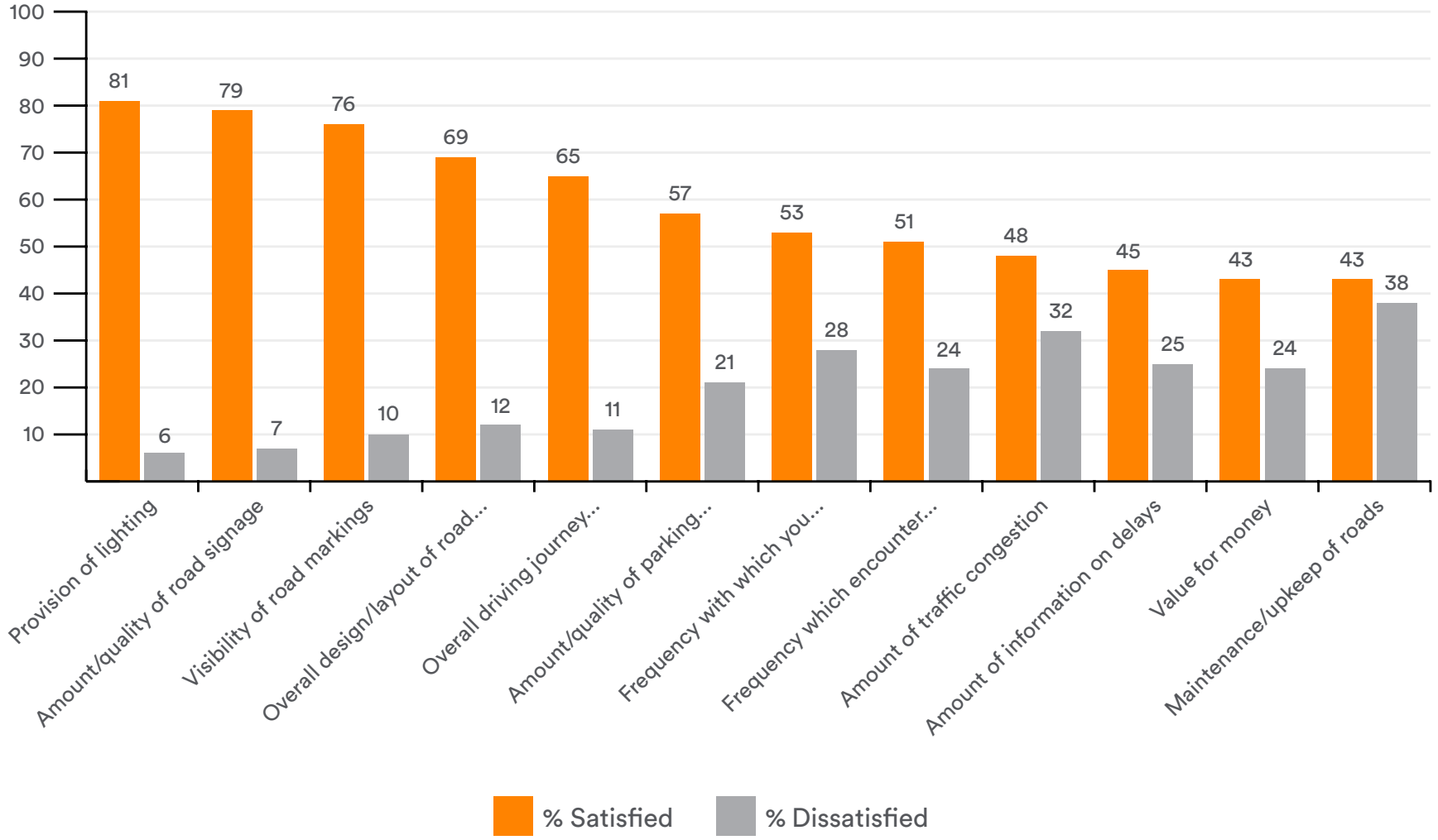
The amount of traffic congestion (48%), information on delays (45%), value for money (43%) and maintenance/upkeep of roads (43%) were rated significantly low by car drivers.

In addition, those drivers who travelled in the rush hour had the lowest levels of satisfaction, particularly with regards to traffic congestion (33%) and amount of information available on delays (36%). Moreover, one in four (25%) drivers said they built extra time into their journeys to allow for delays/congestion – rising to 44% amongst weekday peak time users.

Concerning improvements, the top priorities to local highways were for the removal of pot holes (49%), followed by more/better road surfacing/ filling in of potholes (22%), along with calls for more car parking (6%).

The study also revealed a significant minority (42%) of drivers who in the past six months, had concerns over their personal safety due to another driver's behaviour. The type of behaviour most commonly mentioned being aggressive behaviour/road rage, drivers cutting them up and/or drivers jumping traffic lights.

Figure 2 - Findings from Movement for Growth Survey January 2017



Network Context

The KRN makes up only (7%) of roads across the West Midlands' road network by length, but carries half (50%) of its traffic. Across the 605km of network, 3.05 billion miles were travelled in 2016. Traffic flows on the KRN have increased steadily since 2013 despite some years of marginal decline. Based on the latest Department for Transport (DfT) statistics, traffic flows are returning to the level seen prior to the 2008 recession[ii].

A consequence of increased traffic levels across the KRN is the impact this has on the travelling public, particularly bus passengers. Across the West Midlands the bus remains the most important mode for moving people and growing our economy. Increased traffic congestion has seen the average speed of many bus services reduced to a single digit in the AM peak period (07:00 – 10:00).

The ability of the region's businesses to make and receive deliveries of goods and raw materials efficiently is crucial to the growth of all sectors of the West Midlands' economy. The predictability of delivery times is critical to the productivity of manufacturing and retail businesses that rely on being able to deliver and receive the right goods at the right time.

Close examination of the routes on the KRN shows that the worst performing sections are frequently those where junctions provide access into our largest strategic centres. There are widespread link and junction capacity issues across the whole of the KRN, particularly in Birmingham, the Black Country and some sections in Coventry. This is due mainly to the large volumes of traffic accessing urban centres in the AM peak where many junctions are over capacity and network performance has been significantly reduced.

As a consequence there is break down of flow leading to congestion.

Peak Hour Speeds

The West Midlands KRN has an average weekday AM peak period speed of 17.7mph (Sep – Nov, 2016 figure). The AM peak period (07:00- 10:00) is generally the busiest period on the network and helps us to understand the impact of the worst congestion on journey-times. The sections of the KRN with the lowest peak hour speeds are concentrated around the largest strategic centres – Birmingham, Wolverhampton, Coventry, Walsall, West Bromwich and Brierley Hill.

Congestion

Congestion in this report refers to the state of a link (section of road) or junction on the road network which is carrying so much traffic that it deteriorates in the quality of expected performance, causing queuing and increased journey times.

Congestion data for A-roads has been gathered using DfT automatic traffic counters (ATCs) and manual traffic count data. National trends show that vehicle traffic increased between 2008 and 2015 with traffic flows on urban roads decreasing and flows on motorways increasing. The West Midlands traffic trends follow national trends and have seen a decrease in average vehicle speed across the region with particular congestion locations along routes and junctions serving commuter centres.

The Top 20 congestion locations in the AM and PM peak are shown below in **Tables 1 and 2** and **Figures 3 and 4.**

Increased Journey Times

The sections of the KRN with the weakest performance under this measure are concentrated along those roads providing link access to the largest strategic centres including Birmingham, Wolverhampton, Coventry, Walsall, West Bromwich and Brierley Hill. The main causes for increases in journey times include volume of traffic and high demand for road travel, particularly in the AM peak.

Public Transport (Bus)

The impact of congestion and increased journey times on the KRN is felt by all users but there is an important adverse impact for bus passengers. The bus in the West Midlands remains the single-most important mode for achieving the ambition for reducing congestion and improving air quality whilst moving the largest volume of people in a sustainable way.

Across the 23 routes, there are over 500,000 daily traffic movements, but also in excess of 800,000 bus trips. The importance of these routes for moving people particularly by bus should be noted and the important contribution of bus trips in reducing single occupancy private vehicle congestion remains vital across the KRN. A key part of pulling together this evidence report has been to gather the intelligence relating to the existing performance of key bus routes using
the KRN.

Information relating to main bus routes, frequency, number of daily trips and average bus speeds has been provided within each of the 23 route reports.

Table 1 - Top 20 Congestion locations on the KRN – AM Peak

No.	Location	KRN Route
1	A5127 Lichfield Road / A453 Tamworth Road Junction	Birmingham Cross City
2	A5127 Gravelly Hill at Salford Circus Roundabout	Birmingham Cross City
3	A461 Burnt Tree / A4123 Birmingham New Road Junction	Stourbridge to Wednesbury
4	A4114 Holyhead Road / B4107 Four Pounds Avenue Junction	Coventry to Birmingham
5	A4041 Newton Road / A34 Birmingham Road Junction	West Bromwich Route
6	A491 Hagley Road / A4036 Ham Lane Roundabout	Stourbridge to North of Wolverhampton
7	A461 Lichfield Road / A454 Mellish Road Roundabout	Lichfield to Wednesbury
8	A4100 High Street / A4036 Merry Hill Junction	Pensnett to Oldbury
9	A41 Wergs Road / Upper Green Junction	Black Country to Birmingham
10	B4124 High Street Harborne	West of Birmingham
11	Grove Lane / A41 Soho Road Junction	Black Country to Birmingham
12	A5127 Sutton New Road / Summer Road Roundabout	Birmingham Cross City
13	A4123 Wolverhampton Road at Birchley Island Roundabout	Northfield to Wolverhampton
14	A4040 Brookvale Road North-East of Witton Train Station	Birmingham Outer Circle
15	B4138 Kingstanding Road / A453 College Road Junction	Birmingham Cross City
16	A4123 Birmingham New Road / A4037 Tipton Road	Northfield to Birmingham
17	A456 Hagley Road at Five Ways Roundabout	West of Birmingham
18	A435 Alcester Road along Balsall Heath	Birmingham Cross City
19	A4540 Icknield Street / A457 Spring Hill Roundabout	Birmingham Cross City
20	B4098 Radford Road between junctions with Lydgate Road and Beake Avenue	North and South Coventry

Table 2 - Top 20 Congestions locations on the KRN – PM Peak

No.	Location	KRN Route
1	A4252 Kenrick Way / M5 J1 / A41 Birmingham Road Roundabout	Sedgley to Birmingham
2	A461 Horseley Heath / B4517 New Road Roundabout	Stourbridge to Wednesbury
3	B4148 Tyburn Road / A452 Chester Road Roundabout	Birmingham Cross City
4	A4041 Newton Road / A34 Birmingham Road Junction	West Bromwich Route
5	A461 Burnt Tree / A4123 Birmingham New Road Junction	Stourbridge to Wednesbury
6	Cinder Bank Island Roundabout	Stourbridge to Wednesbury
7	A47 Fort Parkway at Spitfire Island Roundabout	Birmingham Cross City
8	A38 Chapel Lane / A4040 Harborne Lane Junction and Harborne Island Roundabout	Birmingham Cross City
9	A4100 High Street / A4036 Merry Hill Junction	Pensnett to Oldbury
10	A456 Manor Way	West of Birmingham
11	A5127 Lichfield Road at Salford Circus Roundabout	Birmingham Cross City
12	A4123 Wolverhampton Road at Birchley Island Roundabout	Northfield to Wolverhampton
13	A4040 Watford Road / A441 Pershore Road Roundabout	Birmingham Outer Circle
14	A429 Kenilworth Road / A45 Kenpass Highway	Coventry to Birmingham
15	A4540 Highgate Middleway at Haden Circus	Birmingham Cross City
16	A45 Coventry Road / A452 Kenilworth Road Roundabout	Coventry to Birmingham
17	B4124 High Street Harborne	West of Birmingham
18	A45 Small Heath Highway at Heybarnes Circus Roundabout	Coventry to Birmingham
19	A4040 Bromford Lane / A38 Tyburn Road Junction	Birmingham Cross City
20	A452 Chester Road at Tyburn House Island Roundabout	UK Central to Brownhills

Figure 3 - KRN AM Top 20 Hotspots

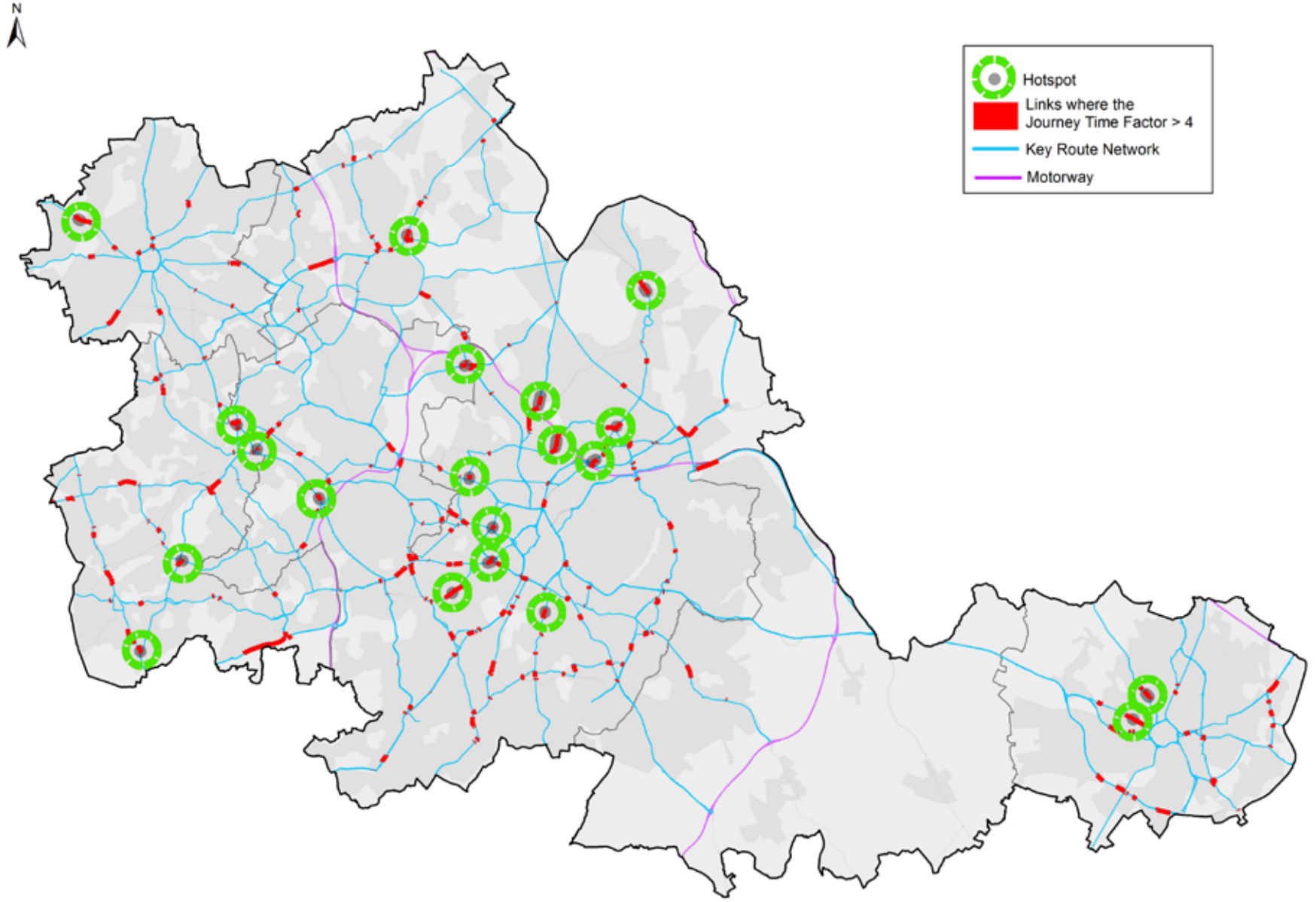
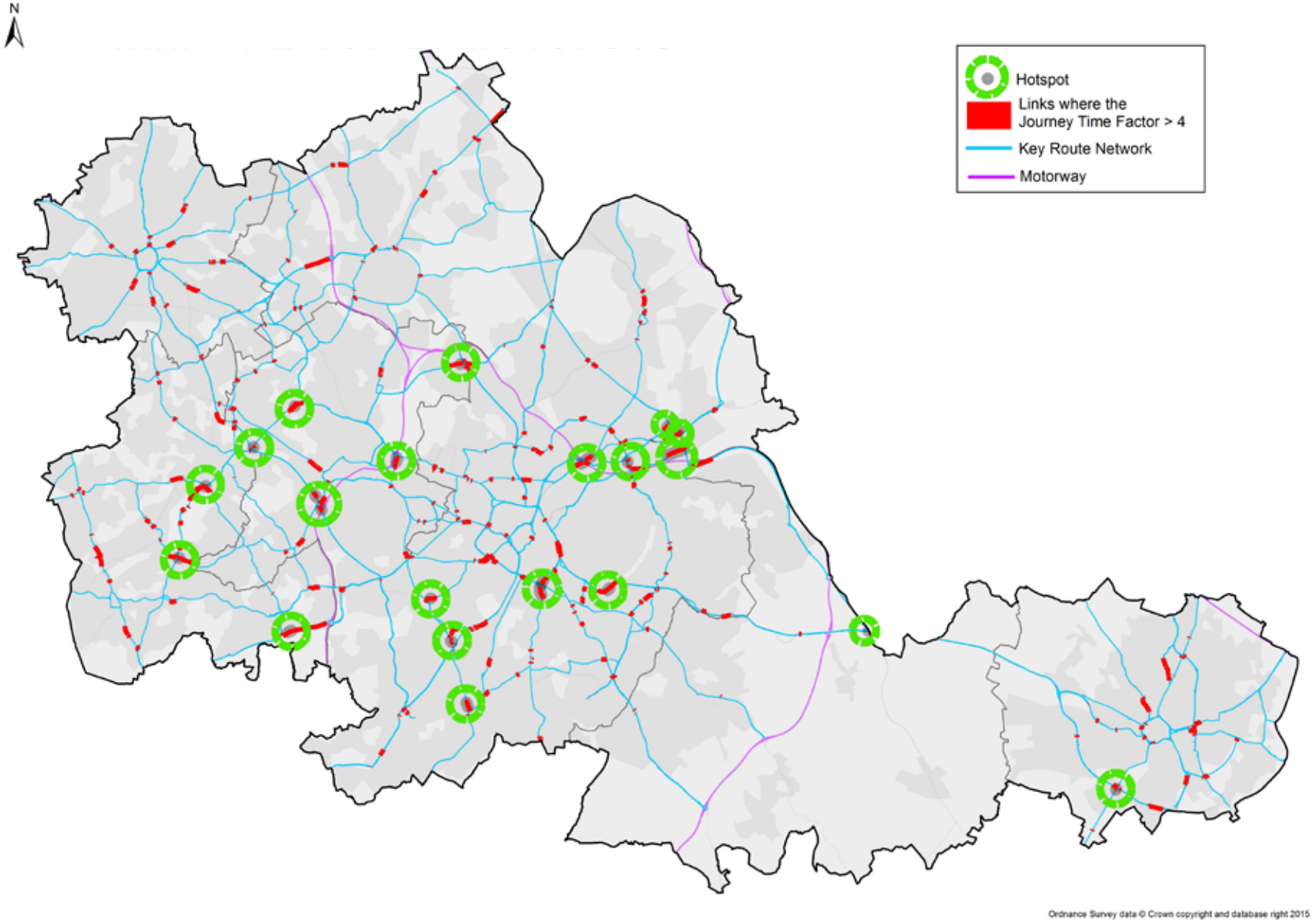


Figure 4 - KRN PM Top 20 Hotspots



In the West Midlands the M6, M5 and M42 link to form the Birmingham Motorway Box (as shown in **Figure 5**) joining strategic routes of national economic importance and providing vital connection routes across the region. Traffic data taken from one hour during inter-peak time in 2011 shows a large proportion of motorists joining the network in the West Midlands use the strategic road network to make shorter journeys of 1 or 2 junctions as shown in **Table 3** and wider movements as shown in **Table 4**.

Other trunk roads (important A Roads) in the region are operated by Highways England but this data concerns the primary motorway movements connecting the region.

Table 3 - Regional Movements

Joining At Junction	Total Cars Joining At Junction	Travelling For One Junction		Travelling For One To Two Junctions		Accessing A38(M)	
		No.	%	No.	%	No.	%
A38(M)	2993	1396	47%	1472	49%	N/A	N/A
M5-4	871	112	13%	245	28%	0	0%
M5-3	999	167	17%	306	31%	5	1%
M5-2	1551	245	16%	308	20%	13	1%
M5-1	1138	77	7%	326	29%	4	0%
M6-10	1421	29	2%	36	3%	262	18%
M6-9	1039	0	0%	139	13%	110	11%
M6-7	1127	130	12%	355	31%	225	20%
M6-6	2465	1456	59%	1491	60%	1273	52%
M6-5	580	107	18%	183	32%	0	0%
M6-4	621	82	13%	127	20%	110	18%
M42-1	331	21	6%	79	24%	0	0%
M42-2	555	55	10%	86	15%	0	0%
M42-3	957	39	4%	106	11%	0	0%
M42-4	893	53	6%	166	19%	1	0%
M42-5	713	118	17%	130	18%	27	4%
M42-6	1123	11	1%	106	9%	68	6%

Table 4 - Wider Movements

Joining At Junction	Travelling North West	Travelling South West	Travelling South East	Travelling East	Travelling North East
	% of vehicles				
A38(M)	8%	0%	1%	10%	13%
M5-4	11%	42%	0%	0%	0%
M5-3	12%	31%	0%	3%	5%
M5-2	10%	9%	13%	6%	6%
M5-1	23%	11%	10%	2%	2%
M6-10	33%	2%	3%	7%	0%
M6-9	42%	1%	3%	4%	2%
M6-7	2%	5%	9%	7%	1%
M6-6	9%	1%	2%	2%	2%
M6-5	0%	1%	16%	18%	15%
M6-4	3%	0%	0%	35%	0%
M42-1	0%	0%	26%	7%	8%
M42-2	7%	15%	10%	11%	17%
M42-3	0%	27%	23%	10%	16%
M42-4	0%	4%	29%	13%	20%
M42-5	2%	12%	19%	4%	23%
M42-6	4%	10%	7%	6%	24%

Figure 5 - Birmingham Motorway Box

Overview

Improving road safety is critical to the overall vision of the West Midlands Strategic Transport Plan – Movement for Growth. The development of a new Regional Road Safety Strategy in early 2019 and Action Plan will have regard to the current West Midlands forecasts to achieve a 40% reduction in fatalities and serious injury casualties by 2020, from a 2015 average[iii].

Road Safety Data

The primary data source informing personal injury collisions across the West Midlands is taken from the STATS19 database. The information contained in this data is recorded by police officers who attend the scene of personal injury collision across the region. The DfT makes this data available annually. It should be kept in mind that a considerable proportion of non-fatal casualties are not known to the police. The DfT acknowledge this, stating in their quarterly Reported Road Casualties in Great Britain that hospital and compensation claims data all indicate a higher number of casualties than suggested by police accident data. Therefore, the data used as the basis for these statistics are not a complete record of all personal injury road accidents.

During November 2015 the West Midlands Police Force, along with some other police forces, changed the reporting system used for recording reported road traffic collisions[iv]. This has led to more accurate recording of injury severity but as a result comparisons of serious injury figures from 2016 are not comparable.

Using the data from the STATS19 database, each route on the West Midlands' Key Route Network has been ranked based on the number of casualties and collisions on that route over the last three calendar years (2014 to 2016)[v]. It is recognised that in the data used, there are discrepancies in the recording and figures relating to casualty totals and casualty types.

Across the West Midlands' KRN during the calendar years 2014-2016, a total of 8,125 collisions were recorded and these resulted in **1,398** people being killed or seriously injured (KSIs).

Collisions

During the calendar year 2016, we noted the following key statistics across the KRN:

- 2,664 collisions – a decrease of 5% on the 2015 figure of 2,814
- Main contributory factor – Failed to look properly (pedestrian) represented 21% of all collisions
- Other contributory factors
  - Poor turn or manoeuvre (7% of all collisions)
  - Failed to look properly (5% of all collisions)

Contributory factors to collisions are recorded by the emergency services when collisions are reported. Collisions that were not reported are not included in these statistics.

Casualties

During the calendar year 2016, we noted the following key statistics across the KRN:

- Total casualties – 3,587
- Killed or Seriously Injured – 508 (14% of all casualties, up 3% when compared to 2015 figure of 442.
  - Killed – 35 (1% of all casualties, same as 2015)
  - Seriously injured – 473 (13% of all casualties, up by 3%)
- Slights – 3,079 (86% of all casualties)

CYCLING

Approximately 41% of journeys under 2 miles in the West Midlands are made by car. Therefore, there is great scope for a substantially increased role for sustainable travel including cycling, which can be a viable choice for many people. Smarter choice initiatives have an important role to play in the approach, as do improvements to cycle-public transport integration to support longer journeys. The West Midlands Cycling Charter aims to influence higher standards of cycling infrastructure provision, including segregated cycle routes and improved canal towpath provision.

The Strategic Cycle Network in the West Midlands (as shown in **Figure 6**) identifies the major corridors of the movement of cyclists through the metropolitan area. These corridors were identified using Propensity to Cycle data (Census 2011), and movement patterns generated through key destinations (including residential, employment and other sites).

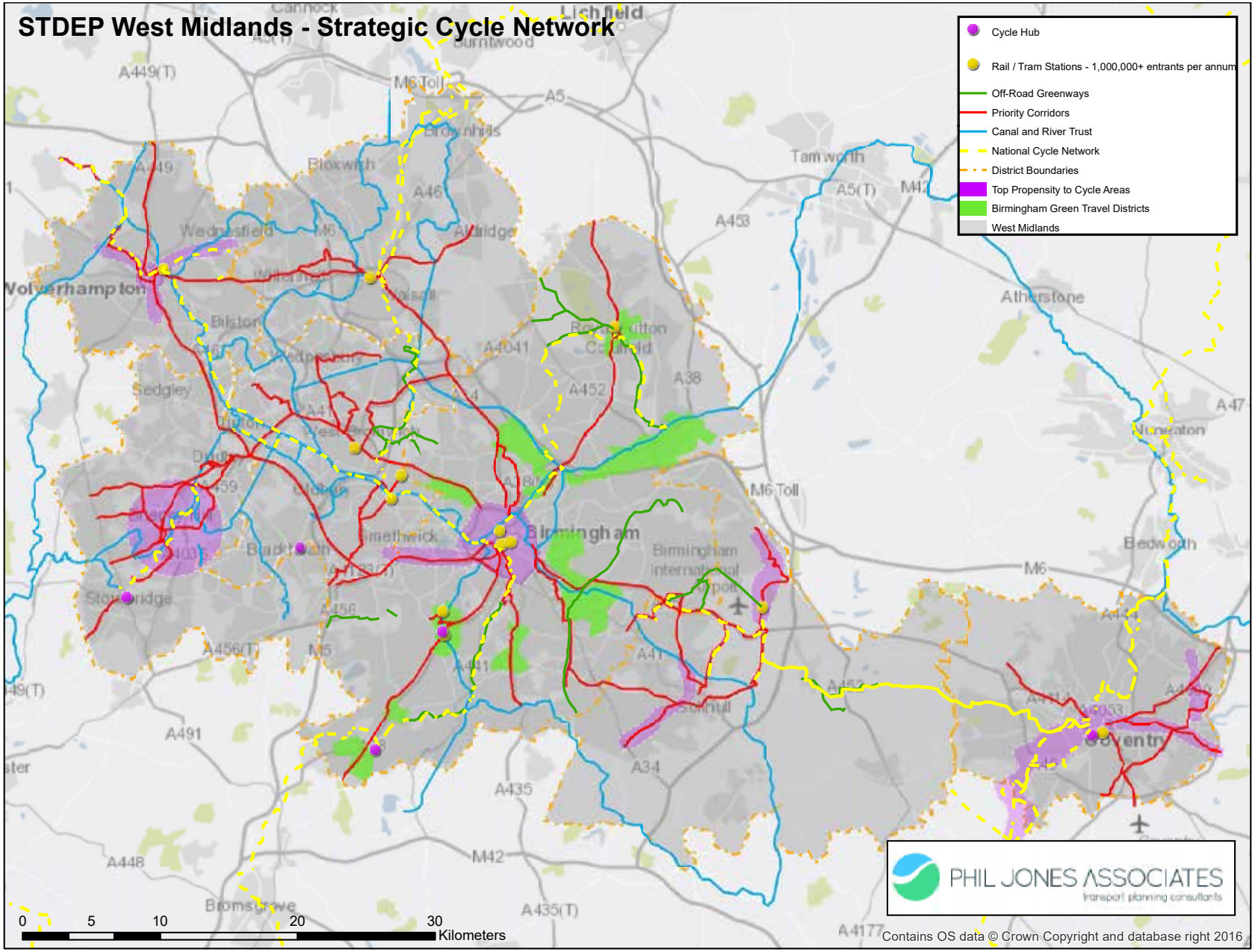
The Metropolitan Cycle Network includes the strategic cycle network as well as the canal towpaths, greenways, National Cycle Network and other local routes through the region.

These cycling corridors play a vital role in facilitating safe movement across the West Midlands away from the busy and congested KRN. However as the corridors are developed, there are important interactions with the KRN that may take place along the 23 routes, these include:

- Stourbridge to North of Wolverhampton – along the A449 Stafford Road
- Black Country Route – along the A454 Willenhall Road
- Birmingham to Stafford – A34
- Black Country to Birmingham – along the A41
- West of Birmingham – A456 Hagley Road
- Birmingham Cross City – along the A38, A435 and A5127
- Coventry to Birmingham – along the A45 Coventry Road
- East of Coventry Route
- North and South Country – A4114
- Kingswinford to Halesowen – A4101

As part of setting out the baseline position for the KRN, a workshop was held with the Cycling Officers from across the local highway authorities; the issues, challenges and existing provision along each route has been identified and can be found within each of the route reports.

Figure 6 - West Midlands Strategic Cycle Network



Overview

The day to day operation of the West Midlands KRN remains under the control of the individual local authorities, with WMCA taking a strategic management and coordination role across the region. There are four urban traffic management control centres across the West Midlands metropolitan area. However, there are currently a number of challenges relating to the urban traffic control systems which in many cases are not delivering the high level of functionality required.

Network Resilience

Recent incidents in the West Midlands have shown that there is a greater need for improved coordination between all stakeholders including local authorities, Highways England, operators of the M6 Toll, Network Rail, utility companies, bus and train operators. There are significant benefits that can be realised by greater coordination during incidents that impact both the KRN and the Strategic Road Network (SRN). The development of the KRN and the associated responsibilities and functions of the Mayor of the West Midlands provides an opportunity to drive changes to improve coordination between multiple agencies to provide better management of the network.

When large events like a demonstration or a major incident occurs such as the discovery of an unexploded bomb in Birmingham in May 2017, the police will invoke the Tactical Co-ordination Group (TCG). This is the drawing together of all of the Category 1 & 2 responders, as well as charitable agencies, into a purpose built control room at the West Midlands Police training centre at Edgbaston to share knowledge and work together.

The main stakeholders in the West Midlands, including local authorities, TfWM, police and emergency services, are currently developing a set of incident management protocols aimed at improving the way incidents are managed on the local network.

Highways England
West Midlands Regional
Control Centre

The West Midlands KRN despite comprising 7% of the overall network carries 50% of all traffic. Substantial volumes of traffic are represented by commuter trips into the largest strategic centres which contribute to the overall congestion on the network. To understand how these journey are undertaken and the role the KRN plays in facilitating them, consideration has been given to the last Census (2011)[vi] data regarding where people live in the West Midlands metropolitan area and how they choose to travel to work. There are limitations with the data shown to the right as it does not include journeys by walking, tram or cycling. In addition, there are a small number of trips into Dudley that are not included and the decline in bus base public transport during the period since the census should be a consideration. The data reveals the following:

Additional consideration has been given to where people travelled from to access these jobs and this is provided within the Technical Annex of this report.

Table 5 - Journeys To Work

Strategic Centres	Jobs	Travelled To By Car	Travelled To By Train	Travelled To By Bus
Birmingham	114,070	49%	25%	26%
Brierley Hill	12,820	82%	-	18%
Coventry	19,133	70%	6%	24%
City of Wolverhampton	12,122	71%	5%	24%
Dudley	14,257	85%	-	15%
Solihull	11,453	70%	5%	25%
Walsall	17,535	77%	1%	22%
West Bromwich	17,779	82%	-	18%

Brief Synopsis

There is no railway station in Brierley Hill and the majority of residents commute by car.

There is no railway station in Dudley town centre and the majority of residents commute by car.

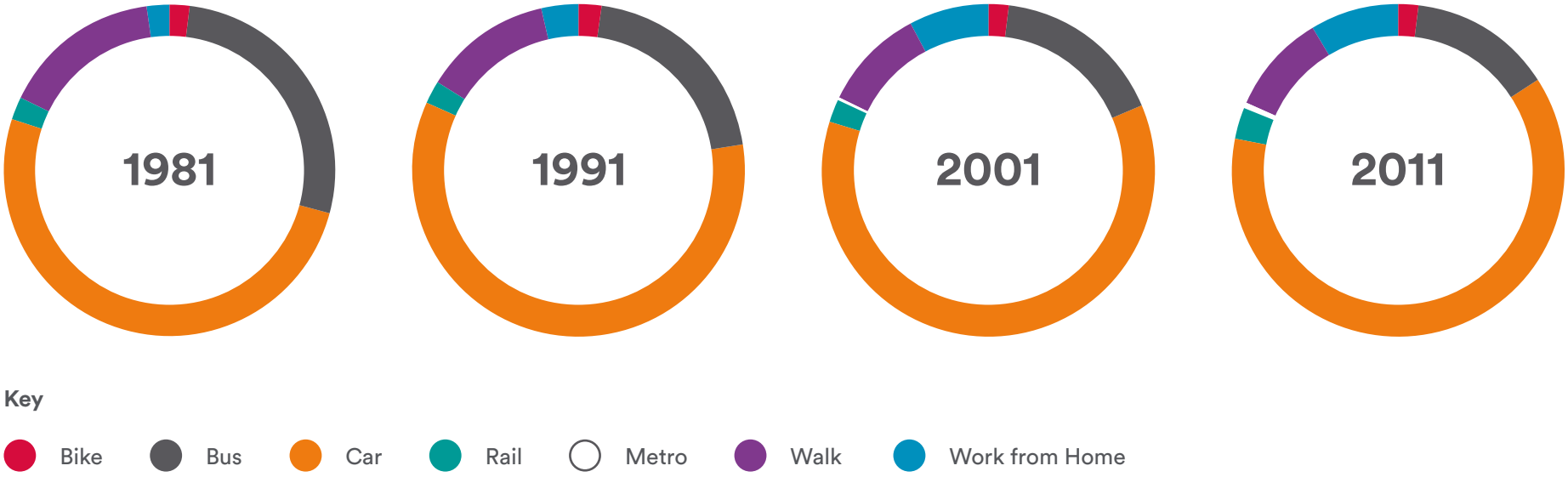
The West Bromwich railway station was replaced by West Bromwich Central tram stop with figures not included.

The majority of all strategic centres commuter journeys are made by car.

The majority of public transport commuting is made by bus.

Data gathered from past census years has shown a modal shift in the behaviours of commuter's journey choices to work. Between 1981 and 2011, there has been a continued reduction in the use of buses and walking to travel to work. Car use has increased year on year and the introduction of metro figures in 2001 has seen a slight rise in 2011.

Figure 7 - Journey To Work Mode Shift By Census Year



Public Health

Within the West Midlands there are areas of both good and poor health and these are quantified using healthy life expectancy as a measure. Across the metropolitan area, this prediction changes within each of the seven local authority boundaries, but on average, the healthy life expectancy for men and women is 61.5 and 62.3 respectively. The Movement for Growth Health and Transport Strategy[vii] sets out additional details relating to the factors influencing this measure. Closing the gap in health inequalities and increasing the healthy life expectancy by 2030 is a key objective of the WMCA's Strategic Economic Plan.

Particulate Matter

Particulate Matter are small particles suspended in the air which present great health risks to the West Midlands, especially to children. In 2015, it was estimated that traffic was responsible for around half a quarter of all manmade matter of 2.5 microns ($PM_{2.5}$)[viii] , with the wearing down of tyres, breaks and roads contributing to around half of this amount.

Nitrogen Dioxide (NO_2)

Nitrogen Dioxide is a product of combustion, including those that occur in car engines. In high concentrations, it can cause people's airways to become inflamed. There is a legal target to reduce roadside concentrations of NO_2 to 40µg/m^3 by 2020[ix]. The Department for Environment, Food and Rural Affairs (DEFRA) air quality models of roadside concentrations have estimated that each of the constituent members of the WMCA currently have roads above this limit.

Noise

Traffic noise arising from the KRN and the Strategic Road Network is a major source of noise pollution across our region. All constituent authorities and Highways England take practical steps to minimise noise and disturbance arising from the road network. This includes making more use of noise reducing technologies as these emerge within the sector. Night time noise is usually measured as an annual average between 11pm and 7am. During this period, exposure to average noise levels of around 55db and above are considered by the World Health Organisation as increasingly dangerous to public health. This is slightly quieter than many fridges. Over 200,000 people in Birmingham and the Black Country are exposed to average road traffic noise above this level at night.[xi]

Within each of the 23 route reports, evidence has been provided by Public Health England which shows the associated health and social care issues currently experienced within the population surrounding each route. It is recognised that the KRN has an important role to play particularly regarding preventing ill health with interventions that could contribute to improving multiple health issues.

Air Quality

Improving the quality of life of everyone who lives or work in the West Midlands is the vision of our Strategic Economic Plan. While there are many harmful pollutants in the outdoor air, pollutants from road traffic and specifically traffic on both the KRN and the Strategic Road Network through our region where the largest volumes are carried, pose significant risks to achieving the vision.

The West Midlands has significant air quality problems. Every year there are between 2,000 and 2,400 attributable deaths caused by air pollution[xii]. This is a huge health issue for people in the region, increasing the risk of lung disease and heart disease. In addition to the need to improve the impact on health from poor air quality, there are exceedances of the annual mean legal limit for one pollutant (nitrogen dioxide (NO_2)) across the West Midlands which must be addressed. There are parts of our region where considerable action such as the introduction of Clean Air Zones is required to improve air quality.

Local Air Quality Management

DEFRA is the Government Agency responsible for discharging the national functions related to air quality management and which coordinates the Local Air Quality Management (LAQM)" regime[1]. Through the LAQM system, local authorities are required to assess air quality in their area and designate Air Quality Management Areas (AQMA) if improvements are deemed necessary. Where an AQMA is designated, local authorities are required to produce an air quality Action Plan describing the pollution reduction measures it will put in place. **Table 6** gives a summary of the current AQMAs in existence in the WMCA area:

The evidence gathered has also revealed that there is a need for a consistent and agreed approach to air quality modelling to inform future interventions on the KRN. At present there is no consistent local air quality model covering the seven constituent authorities.

Table 6 - AQMAs In The WMCA Area

Local Authority	AQMA Declared	Description	Pollutants	Date Declared
Birmingham City Council	Yes	Whole district	NO_2 and PM_{10}	2005
City of Wolverhampton Council	Yes	Whole district	NO_2 and PM_{10}	2005
Coventry City Council	Yes	Whole district	NO_2	2009
Dudley Metropolitan Borough Council	Yes	Whole district	NO_2	2007
Sandwell Metropolitan Borough Council	Yes	Whole district	NO_2	2005
Solihull Metropolitan Borough Council	No	N/A	N/A	N/A
Walsall Metropolitan Borough Council	Yes	Whole district (NO_2) and a discrete 1.5-2.0 acre area (PM_{10})	NO_2 and PM_{10}	2006 (NO_2) and 2008 (PM_{10})

[1] https://laqm.defra.gov.uk

Overview

The constituent authorities of the WMCA have a statutory duty to maintain their highway infrastructure in a safe condition. This also includes carrying out routine maintenance of highway assets which could include up to 12 specific groups. An Asset Management Plan is produced by each local authority which aims to ensure that any future issues with the assets could be addressed in a proactive way. For the purposes of this report, we have focussed on three main substantive assets: carriageways, footways and structures (bridges). Each local authority was asked to provide data on these three assets and where this was readily available it has been included in the individual route reports.

Carriageway Condition

The Movement for Growth survey conducted in January 2017 identified the critical importance of the quality of road surface on the KRN to the experience of all road users and has an important role to play in reducing noise pollution. Poor carriageway condition, which can usually be in the form of cracked/potholed road surfaces or loose stones and debris, can create congestion through required roadworks and lead to delays. In the West Midlands this impacts on individuals through reduced productivity, increased fuel consumption, delayed deliveries and damage to vehicles. Over the past three years there has been significant investment through the government's Challenge Fund and this has led to improvement across the whole of the KRN. To determine the condition of carriageways local authorities in the WMCA area undertake surveys of the network in a forward direction one year and a reverse direction the following year.

Footway Condition

While there has been significant investment in carriageways in the West Midlands, the level of investment on footways has been comparatively lower. There are many locations across the KRN where survey data shows there is a need for reconstruction (e.g. Sandwell's data shows 15% (130 of 855km) of high amenity footway are structurally unsound). The condition of footways across the KRN is a major deterrent to walking and cycling along many of the routes.

Structures

With a few exceptions, it has not been possible to gather a complete picture of the location and condition of all bridges across the KRN. However it is noted that there is a broad age range distribution of many of these structures and ownership can vary depending on whether they are located over a railway line.

EV CHARGING INFRASTRUCTURE

In July 2017 the government announced plans to ban new diesel and petrol cars from 2040. Plans to decarbonise transport and to improve air quality is increasing the demand for low emission vehicles. Electric and plug in hybrid personal vehicles require charging infrastructure and the expectation is that these facilities are provided at strategic locations including Park and Ride sites. There are currently 77 electric vehicle charging points (EVCPs) across the WMCA area. Transport for West Midlands provide EVCPs at the following railway station Park and Ride sites in the region:

- Bromsgrove Park and Ride (4 bays)
- Longbridge Park and Ride (2 bays)
- Rowley Regis Park and Ride (2 bays)
- Solihull Park and Ride (2 bays)
- Tile Hill Park and Ride (2 bays)
- Yardley Wood Park and Ride (2 bays)

The registration figures from the Office for Low Emission Vehicles show that during the first quarter of 2017 there were 2,704 new registrations of electric and plug in vehicles in the West Midlands, the highest figure for any UK region. This demand and the strategic location of the West Midlands as a potential recharging hub means there is an opportunity to greatly increase this portfolio.

West Midlands Urban Traffic Management Control (WM UTMC)

The WM UTMC major scheme provided an holistic approach to reducing congestion and effective traffic management across the seven West Midlands' local authorities. The scheme was implemented through the West Midlands Traffic Management Project Board and focused on 21 strategic routes across the conurbation. These routes were selected to ensure the greatest benefit from the scheme, with focus on key strategic network routes and major congestion hotspots.

Key assets delivered included:

- 59 traffic signal junctions upgraded;
- 43 routes by wireless telecoms connecting to:
  - 470 traffic signals,
  - 99 Variable Message Signs,
  - 172 Journey Time Monitoring Systems
  - 344 Above Ground Detection cameras

Strategic route appraisals:

- 55 VISSIM strategic route models developed that enable traffic modelling scenarios to be undertaken to determine optimised operating protocols; and
- A common database providing interoperability between operators within the West Midlands Conurbation enabling strategic management of the West Midlands highway network.

The location and condition of the technology assets introduced as part of the WM UTMC project has been considered as part of this baseline report. Where the details were readily available these have been included on **Figure 4** in the relevant route report.

The success of these assets was dependant on the requirement for normal operational Urban Traffic Control (UTC) systems to be operating at a relatively high-level of functionality. This functionality also provided significant benefits in the management of network resilience and will do so in the future during a period of unprecedented infrastructure investment. The sensor data and communications networks within the UTC system is exploited by travel user apps, journey routing and predictive models, monitoring & evaluation/systems performance tools, message broadcast to vehicles and cooperative vehicle to infrastructure use cases.

Intelligent Transport Systems Health Check

Each local authority has been contacted to understand how their Intelligence Transport Systems (ITS) assets are currently managed and the service requirements of the operational teams. The ITS health check has shown inconsistencies in the communications reliability across the conurbation, the lack of usage of a database (CDB) and the partial management of faulty detection assets.

Overview

Our Strategic Economic Plan sets our vision for improving quality of life of everyone who lives and works in the West Midlands. Through our Devolution Deal and working collaboratively with all partners, we have an opportunity to tackle major issues in order to achieve our ambitious plans. There are significant investment plans by all major infrastructure providers that will likely impact on the performance of the KRN across the region including but not limited to the following.

High Speed 2 (HS2)

On 23 February 2017 HS2 was granted Royal Ascent for the construction of Phase One London to West Midlands. This first phase will link London and Birmingham with new stations at Old Oak Common in West London, and Curzon Street in Birmingham and Birmingham Interchange with UK Central. The Interchange will serve a wide are aof the West Midlands providing access to HS2 for Solihull, Coventry, Kenilworth, the east side of Birmingham, Sutton Coldfield, Tamworth and Nuneaton. It will also provide access to the National Exhibition Centre (NEC), Birmingham International railway station and Birmingham Airport.

Highways England Road Investment Strategy

The motorway network around the West Midlands is vital to the overall economic success of the region. The delivery of the Road Investment Strategy (RIS) and asset renewal schemes has a major impact on route choice and the KRN provides additional capacity as required during construction periods. Junction 6 of the M42 connects the motorway to a key KRN route (A45) to the east of Birmingham. There are plans to rebuild this junction during RIS 1 (2015 – 2020) which will certainly cause congestion and delays on the strategic road network and the KRN.

Additionally, Junction 10 of the M6 currently experiences significant congestion and traffic delays, particularly during morning and evening peak times. This has a major impact on the Black Country Route (A454), the number one route on the KRN for freight movements. Highways England is working collaboratively with Walsall Council to deliver the scheme within the RIS 1 period.

UK Central

Significant private investment is currently being attracted to UK Central, which is a destination ranked in the top 10 for UK businesses. Located in Solihull, the site is currently home to the National Exhibition Centre, Resorts World, Jaguar Land Rover and is the planned home for HS2 Central Interchange. UK Central aims to create a new mixed use destination to live, work, innovate, rest and play. Achieving this ambition will also bring additional pressures onto the surrounding road network including the KRN.

Birmingham Airport

Birmingham Airport is now the seventh largest airport in the UK and in 2014 handled more than 9.7 million passengers and saw an increase in long haul flights. With the extension of the runway, this is creating more opportunities for exploring long haul destinations which will likely increase the demand for air travel.

The airport currently has excellent surface access by road and public transport. It is at the centre of the national rail and motorway network and is directly served by the KRN – UK Central to Brownhills route (A452), the Coventry to Birmingham (A45) route, the M42 and Birmingham International railway station.

According to the airport's Surface Access Strategy, car travel was the dominant mode chosen for journeys to the airport by passengers in 2015, accounting for more than 43% of journeys. Additionally, car journeys also accounted for 69% of employee travel, which is more than all other modes combined.

Commonwealth Games

In 2022 Birmingham will host the Commonwealth Games, with events being held at venues across the city with an expected 500,000 to 1 million visitors across the region. The current venues include the NEC Area, Arena Birmingham, Symphony Hall and Coventry Indoor Arena. Although 95% of the venues are already in place there is a requirement to build new venues such as the Sandwell Aquatics Centre and refurbish current venues such as Alexander Stadium.

Coventry City of Culture

In December 2017 Coventry was named the UK's City of Culture for 2021. The award aims to boost investment in the local economy with a £3 million award grant and the Warwickshire region will see the introduction of multiple music, arts, theatre and film events with an estimated 2.55 million visitors expected.

Other investments

Future private sector investment in commercial and employment sites, from the UK and overseas, is subject to market forces and macro-economic considerations, but these are difficult to predict.

CONCLUSION

Our evidence indicates that parts of the KRN are already experiencing congestion and capacity problems, particularly access to our major strategic centres. This will be further exacerbated with any increase in traffic volumes, without prior intervention. There are many junctions and links on the KRN that are currently at capacity and is performing well below the travelling public's expectation.

Traffic congestion remains an area of significant concern for drivers as does maintenance and upkeep of roads. It should also be noted that 44% of weekday peak time users said they built in extra time into their journeys to allow for delay/congestion. Without further investment on the KRN, it is likely that the customer ratings provided as part of this evidence will worsen.

The bus remains a vital part of keeping the West Midlands moving and moves more people than any other mode. However, high levels of traffic congestion has impacted on bus journeys and average bus speeds are well below the overall network speed.

In Great Britain, the total number of all casualties has been in decline with the total number of fatalities remaining consistent between 2014-2016. However, both figures have remained fairly consistent in the West Midlands.

Due to the changes of reporting systems adopted by police forces across Great Britain further differences in data regarding serious injury casualties is expected to be continued in 2017 figures.

Cycling on the KRN remains a real challenge and careful consideration must be given to how the Strategic Cycling Network across the region emerges and can be safely provided where necessary on the KRN.

The current operation of the KRN remains in the ownership of local authorities and further work is required to enhance the capability for more effective management of the routes. In addition, to provide the WMCA with the ability to accurately identify where investment is required and for better understanding of the major issues, it is imperative that the data which informs our evidence and future investment plans is accurate and consistent. The 23 route reports will show that in some cases there has been a lack of data particularly around the state of technology on the network. There is also a lack of performance data relating to links and junctions across the KRN. To allow the WMCA to effectively manage and coordinate the KRN a high level of intelligent data is required to improve our evidence and to better understand our assets, as such we are actively working with the local authorities to achieve this.

The environment in the West Midlands affects everyone who lives and works here. There is now a need for major policy decisions to influence air quality which is continuing to cause premature deaths. Additionally, the role of the KRN in facilitating a new regime of intervention capable of meeting the public health need is essential consideration for any future Highways Investment Plan.

Finally, improving connectivity across the wider region is key in achieving the vision of a sustainable transport network ensuring network resilience and driving growth throughout the West Midlands conurbation, impacting the lives of millions of people across the region.

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