

London to Scotland West Route Strategy Evidence Report April 2014



Document History

London to Scotland West route-based strategy evidence report

Highways Agency

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1 Introduction

1.1 Background

- 1.1.1 The Highways Agency is responsible for planning the long term future and development of the strategic road network (SRN).
- 1.1.2 Route-based strategies (RBS) represent a fresh approach to identifying investment needs on the SRN. Through adopting the RBS approach, we aim to identify network needs relating to operations, maintenance and where appropriate, improvements to proactively facilitate economic growth.
- 1.1.3 The development of RBS is based on one of the recommendations included in Alan Cook's report [A Fresh Start for the Strategic Road Network](#), published in November 2011. He recommended that the Highways Agency, working with local authorities (LAs) and local enterprise partnerships (LEPs), should initiate and develop route-based strategies for the SRN.
- 1.1.4 The then Secretary of State accepted the recommendation in the Government's [response](#) (May 2012), stating that it would enable a smarter approach to investment planning and support greater participation in planning for the SRN from local and regional stakeholders.
- 1.1.5 The Highways Agency completed the following three pilot strategies which have been published on the [Highways Agency website](#):
- A1 West of Newcastle;
 - A12 from the M25 to Harwich (including the A120 to Harwich); and
 - M62 between Leeds and Manchester.
- 1.1.6 Building on the learning from those pilot strategies, we have divided the SRN into 18 routes. A map illustrating the routes is provided in Appendix A. The London to Scotland West route is one of that number.
- 1.1.7 RBS are being delivered in two stages. Stage 1 establishes the necessary evidence base to help identify performance issues on routes and anticipated future challenges, takes account of asset condition and operational requirements, whilst gaining a better understanding of the local growth priorities.
- 1.1.8 In the second stage we will use the evidence to take forward a programme of work to identify possible solutions for a prioritised set of challenges and opportunities. It is only then that potential interventions are likely to come forward, covering operation, maintenance and if appropriate, road improvement schemes.
- 1.1.9 The RBS process will be used to bring together national and local priorities to inform what is needed for a route, while delivering the outcomes in the performance specification.

1.1.10 Using the evidence base and solutions identification studies, we will establish outline operational and investment priorities for all routes in the SRN for the period April 2015 – March 2021. This will in turn feed into the Roads Investment Strategy, announced by the Department for Transport in [Action for Roads](#).

1.2 The scope of the stage 1 RBS evidence report

1.2.1 During the first stage of RBS, information from both within the Highways Agency and from our partners and stakeholders outside the Highways Agency has been collected to gain an understanding of the key operational, maintenance and capacity challenges for the route. These challenges take account of the possible changes that likely local growth aspirations, or wider transport network alterations will have on the routes.

1.2.2 The evidence reports:

- Describe the capability, condition and constraints along the route;
- Identify local growth aspirations;
- Identify planned network improvements and operational changes;
- Describe the key challenges and opportunities facing the route over the five year period; and
- Give a forward view to challenges and opportunities that might arise beyond the five year period.

1.2.3 The 18 evidence reports across the SRN will be used to:

- Inform the selection of priority challenges and opportunities for further investigation during stage 2 of route-based strategies; and
- Inform the development of future performance specifications for the Highways Agency.

1.2.4 A selection of the issues and opportunities identified across the route are contained within this report, with a more comprehensive list provided within the technical annex. This is for presentational reasons and is not intended to suggest a weighting or view on the priority of the issues.

1.2.5 The evidence reports do not suggest or promote solutions, or guarantee further investigation or future investment.

1.3 Route description

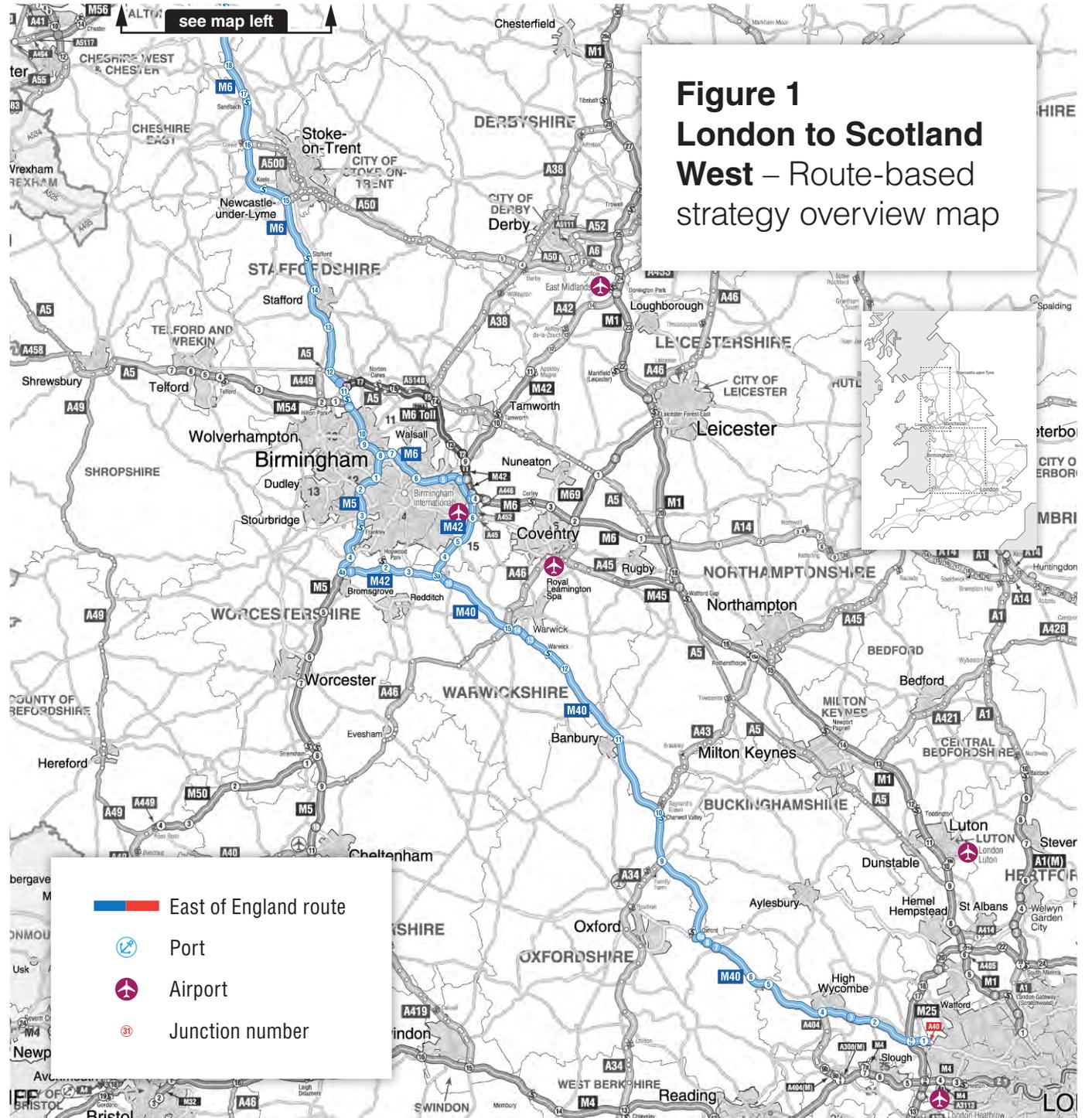
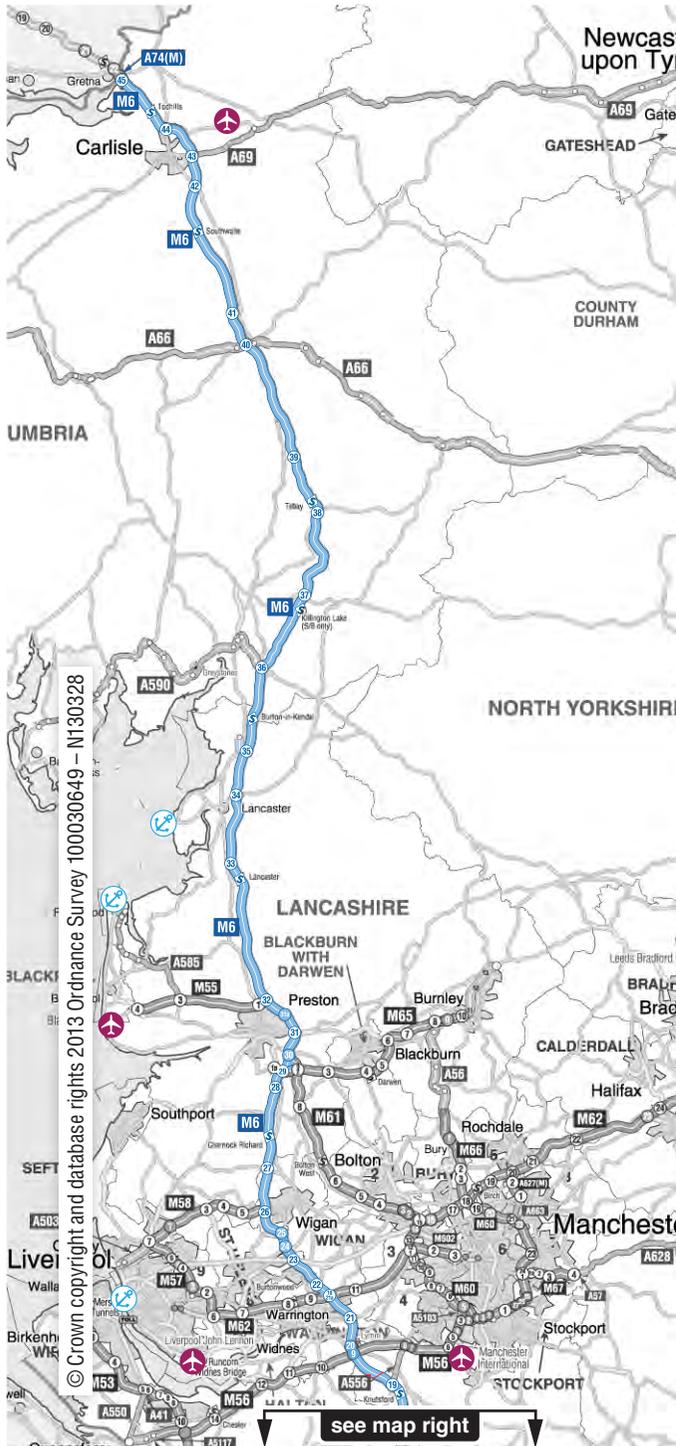
1.3.1 The London to Scotland West route comprises the whole of the M40 from London to Birmingham where it meets the M42 and from here to the M6 up to the border with Scotland, including the section around Birmingham commonly called the Birmingham Box. This route forms part of the North Sea - Mediterranean corridor, which is part of the Trans-European Network core network.

1.3.2 The route is a high standard network with sections of three and four lane motorways. Smart motorways are well established on this route, with the

Active Traffic Management pilot (now called smart motorways) on the M42 in operation since 2006. Further smart motorways are currently being installed in several areas along the M6.

- 1.3.3 The route links London to the core cities Birmingham, Stoke-on-Trent, Manchester, Preston and Carlisle as well as key international gateways at Birmingham Airport and Manchester Airport.
- 1.3.4 On an average day over 10 million vehicle miles are travelled on the route. A high proportion of journeys on the route are long-distance commercial and leisure related trips. Whilst in a number of areas, particularly around the major conurbations of Birmingham, Stoke-on-Trent and Manchester, a significant proportion of the traffic is locally based, making short trips.
- 1.3.5 As a major north-south link, the route plays an important role in supporting the distribution of goods and strategic traffic from London and the southern ports up through the Midlands and the North West to the Scottish border. The route is key to the economic prosperity of the West Midlands and North West of England.
- 1.3.6 The route also supports the retail, tourism and leisure industries through serving the key cities and major towns along the route. There are major shopping centres and major venues on the route at Bicester Village near junction 9 of the M40, the National Exhibition Centre in Birmingham and Wednesbury Retail Park near junction 9. Major tourist destinations near the route include the National Parks of the Peak District, Lake District and Yorkshire Dales as well as the more traditional destinations such as Blackpool on the Fylde Coast. Last year alone some 5 million overnight visitors and some 33 million day trippers visited Cumbria.
- 1.3.7 The journeys described above have a seasonal impact on the route. Increased traffic is experienced on the route due to tourism during the summer break and the major sporting stadiums along the route in major cities through the football season.
- 1.3.8 There is one section of the route maintained and operated on behalf of the Highways Agency under a private finance initiative by Design, Build, Finance and Operate (DBFO) company. This is a large proportion of the M40 from junction 1 (the junction with A40 at Denham) to junction 15 (the junction with A46 at Warwick).
- 1.3.9 The M6 Toll connects the M6 junction 4 near Coleshill to junction 11a north of Wolverhampton, providing effectively a bypass of Birmingham. The toll road construction is funded, operated and maintained, by Midland Expressway Limited which has a government commission to do so until 2054.
- 1.3.10 This route connects with a number of other routes for which RBS are also being developed. These are:
- London Orbital and M23 to Gatwick (connects with this route at the M25);
 - London to Wales (meet at junction 4 of the M40 with the A404);

- Solent to Midlands (there are connections with the route between the M40 and the A34 and A43 near Oxford);
- South Midlands (connects with the A46 near Warwick, M42 at the top of Birmingham Box and with the A5/A449 at M6 junction 12);
- Birmingham to Exeter (connects with the route at the south west corner of the Birmingham Box);
- Midlands to Wales and Gloucestershire (the M54 meets the M6 at junction 11);
- Felixstowe to Midlands (connects at the eastern side of the Birmingham Box at M6 junction 3a);
- North and East Midlands (connects with the route at Stoke-on-Trent at M6 junction 15 and 16);
- South Pennines (this east to west route connects with the M6 near Manchester and Preston); and
- North Pennines (the M6 connects with the A590, A66 and A69 at the northern section of this route).



2 Route capability, condition and constraints

2.1 Route performance

- 2.1.1 The SRN comprises only three per cent of England's road network, but it carries one-third of all traffic. Around 80 per cent of all goods travel by road, with two-thirds of large goods vehicle traffic transported on our network.
- 2.1.2 The routes busiest sections are along the M6 where it passes close to the major conurbations of Birmingham, Manchester, Liverpool and Preston. This reflects where long distance traffic meets more localised and commuter traffic. It also reflects where many of the journeys on the route start or end.
- 2.1.3 The strategic nature of the route is reflected in the high proportion of goods vehicles on the route with the highest proportion on M6 between junctions 19 and 20A with 56% of total traffic being freight vehicles, 24% of which are heavy goods vehicles (HGVs) (over 6.6m in length).
- 2.1.4 The M6 around the Birmingham Box features heavily in the most trafficked sections of the route, with the M6 between junctions 9 and 8 being the busiest and ranked 26 out of 2475 links on the SRN. Near junction 9 is a major retail park at Wednesbury and between 8 and 9 is where two major motorways meet, M6 and the M5 at Ray Hall. Due to the queues on the local road network at junction 10 near Walsall, traffic generally looks to use junction 9 to access the M6 which also accounts for sections including junction 9 being the some of the busiest along the route.
- 2.1.5 Further north, the M6 between junctions 20 and 21a also features heavily in the most trafficked section of the route. Here traffic joins the route from the major conurbations of Manchester and Liverpool as well as from much of north Cheshire and North Wales. Junction 20 is where the M56 motorway (serving North Cheshire, South Manchester and North Wales) and M62 motorway (serving Merseyside, North Manchester and other transpennine destinations) meet the M6.
- 2.1.6 The ten most trafficked sections of this route are presented in Table 2.1. This is for the reporting period 1 April 2012 to 31 March 2013.

Table 2.1 Ten busiest sections on the route (1 April 2012 to 31 March 2013)

Rank	SRN section	Annual Average Daily Traffic (AADT)	National Rank
1	M6 between M6 J9 and M6 J8	79,148	26
2	M6 between M6 J8 and M6 J9	78,020	29
3	M6 between M6 J21 and M6 J20	77,349	31
4	M6 between M6 J20 and M6 J21	77,317	32
5	M6 between M6 J7 and M6 J6	75,768	36

6	M6 between M6 J21 and M6 J21A	74,877	39
7	M6 between M6 J21A and M6 J21	74,126	45
8	M6 between M6 J20A and M6 J20	72,927	50
9	M6 between M6 J10 and M6 J9	71,890	58
10	M6 between M6 J9 and M6 J10	71,385	64

- 2.1.7 However, busy roads in themselves don't necessarily represent an issue – our customers' experience of driving on the network is important to us. The [Strategic Road Network performance specification 2013-15](#), sets us high level performance outcomes and outputs under the banner of an efficiently and effectively operated SRN. We currently measure how reliable the network is based on whether the 'journey' time taken to travel between adjacent junctions is within a set reference time for that period, ie 'on time'.
- 2.1.8 The ten least reliable journey-time locations of this route are presented in Table 2.2. This is for the reporting period 1 April 2012 to 31 March 2013.
- 2.1.9 The least reliable sections of the route are centred on Birmingham and the commonly known Birmingham Box which consists of M6 junction 4 to 8, M5 junction 1 to 4a and M42 junction 1 to 7a. Recently there has been road works on the M6 between junctions 5 and 8 which will have had an impact on the operation of the whole of the box and influenced the pattern of road users journeys, particularly long distance and strategic traffic which could alternatively use the other side of the box.
- 2.1.10 Junctions 6 to 8 on the M6 are the most unreliable links on the whole route and are ranked highly when compared with the rest of the SRN. These are the main junctions to access Birmingham city centre and the north east area of Birmingham.
- 2.1.11 At junction 1 of the M5 is access to West Bromwich and also the football stadium for West Bromwich Albion. Junctions 1 to 2 of the M5 are also known as Oldbury viaduct. This section leads up to the major interchange with the M6 motorway and the tensions between local and long distance traffic are demonstrated in its unreliability.
- 2.1.12 The M42 between junctions 3 and 3a is the interchange where the M40 and the M42 merge. The split of the three lane section into lanes for two motorways can cause congestion, resulting in the unreliable journey times.
- 2.1.13 The M6 between junctions 20 and 21a, which explained above, is one of the busiest sections of the route but also performs relatively well in terms of journey time reliability achieving between 70-79% in terms of the on-time reliability measure.

Table 2.2 Ten least reliable journey-time locations on the route (1 April 2012 to 31 March 2013)

Rank	Location	On-time reliability measure	National Rank
1	M6 between M6 J6 and M6 J7	27.0%	2
2	M6 between M6 J7 and M6 J8	31.7%	3
3	M6 between M6 J9 and M6 J8	48.3%	7
4	M6 between M6 J10 and M6 J9	54.5%	23
5	M6 between M6 J8 and M6 J9	59.2%	61
6	M5 between M5 J2 and M5 J1	63.0%	164
7	M5 between M5 J1 and M5 J2	63.3%	176
8	M42 between M42 J3A and M42 J3	65.2%	268
9	M42 between M42 J3 and M42 J3A	66.0%	321
10	M6 between J10A and M6 J10	66.1%	331

- 2.1.14 Figure 2.1 illustrates the average speeds during weekday peak periods between 1 April 2012 and 31 March 2013. The peak periods are generally the busiest periods on the network and help us to understand the impact of the worst congestion on customers' journey times. Figure 2.1 also shows any known performance or capacity issues where the local road network interfaces with the route.
- 2.1.15 Generally the route performs well in terms of the average speed at peak times, operating close to the national speed limits. As can be seen in the reliability of journeys table above, the majority of issues are around Birmingham (particularly to the north east of Birmingham on the M6) and to a lesser extent, Stoke-on-Trent and near Manchester.
- 2.1.16 The lowest average speeds on the route (between 21-30mph) are between M6 junctions 5 and 6 (Gravelly Hill interchange), plus between M6 junctions 9 and 10 (near Walsall). These are key junctions for local traffic for commuting and visiting the retail park at Wednesbury (M6 junction 9).

Figure 2.1

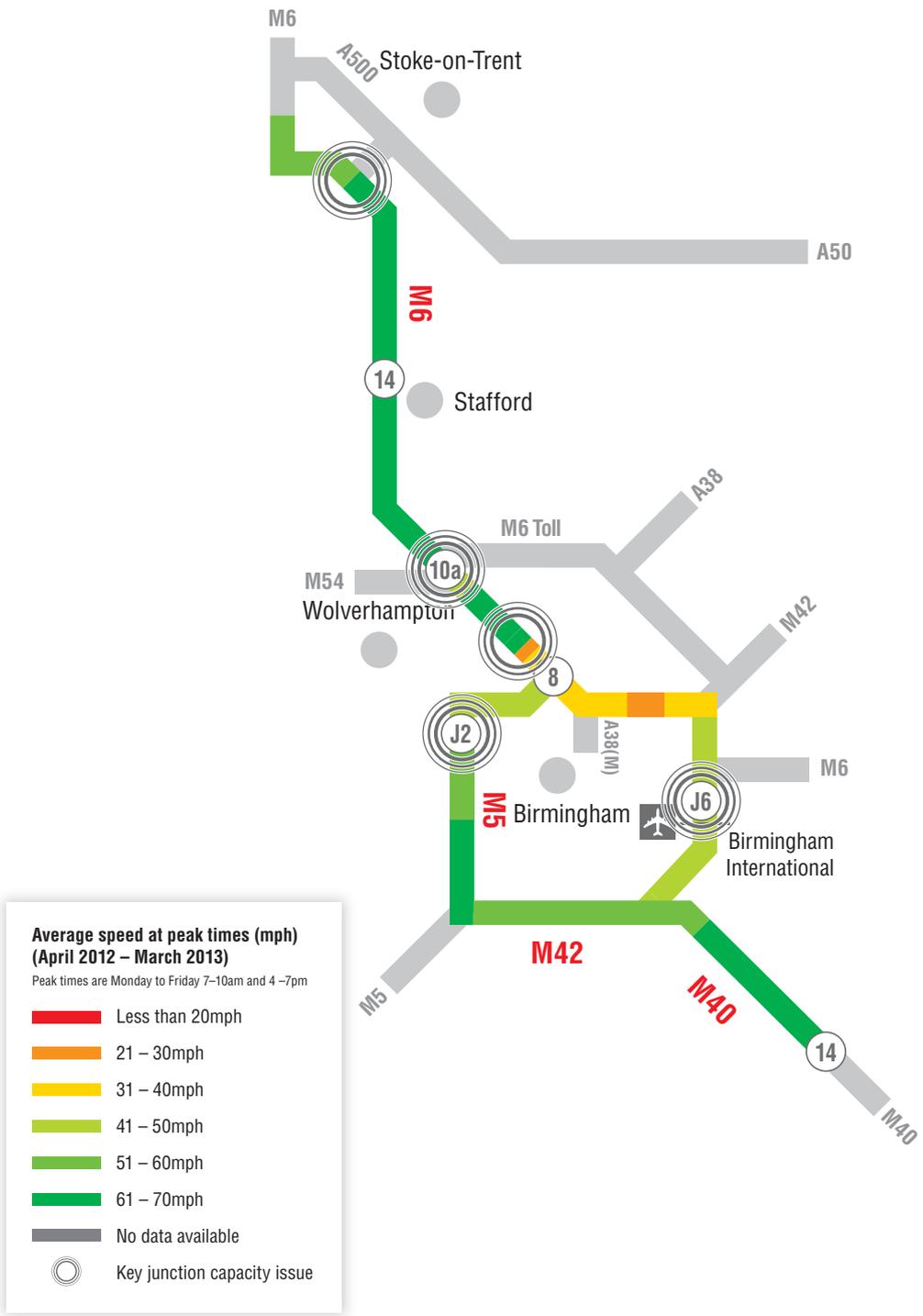
Network performance 2012/13
 Peak period speeds



Illustrative

Figure 2.1

Network performance 2012/13
Peak period speeds



Illustrative

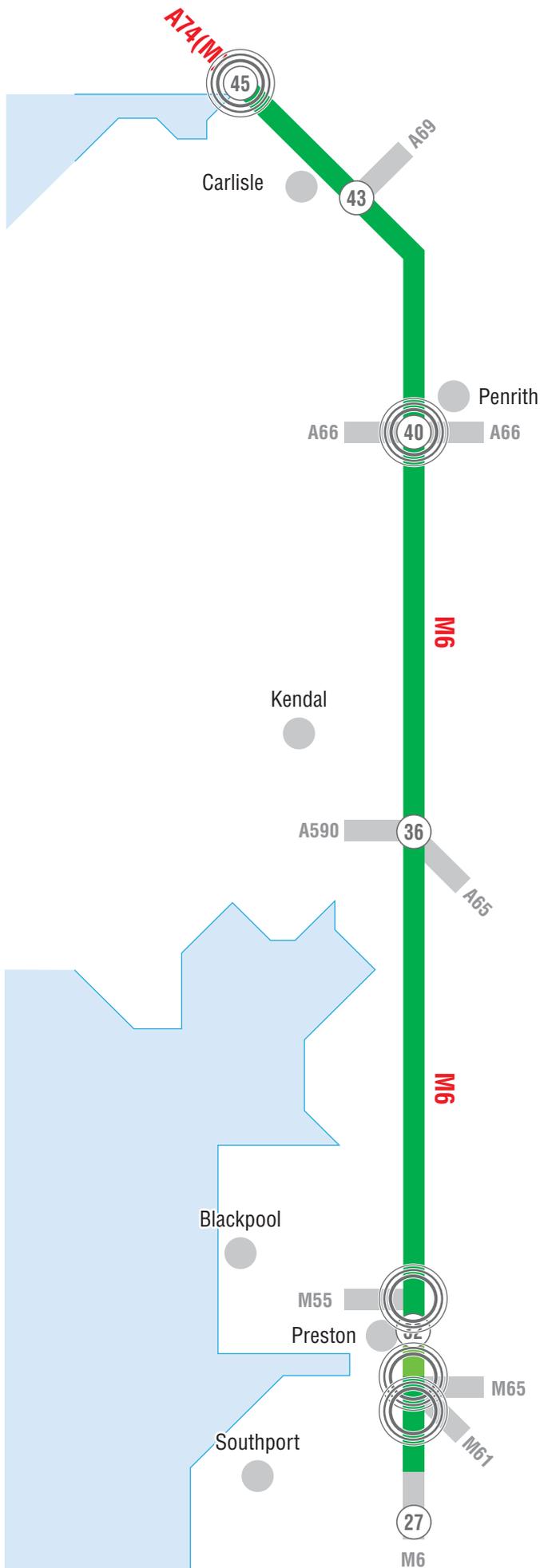
Figure 2.1

Network performance 2012/13
 Peak period speeds



Illustrative

Figure 2.1
 Network performance 2012/13
 Peak period speeds



Average speed at peak times (mph)
 (April 2012 – March 2013)
 Peak times are Monday to Friday 7–10am and 4–7pm

- █ Less than 20mph
- █ 21 – 30mph
- █ 31 – 40mph
- █ 41 – 50mph
- █ 51 – 60mph
- █ 61 – 70mph
- █ No data available
- Key junction capacity issue

Illustrative

- 2.1.17 The SRN is key in promoting growth of the UK economy, and alleviating congestion can realise economic benefits.
- 2.1.18 Figure 2.2 shows the delay along the route compared with a theoretical free-flowing network.

Figure 2.2

Network performance 2012/13
 Delay



Illustrative

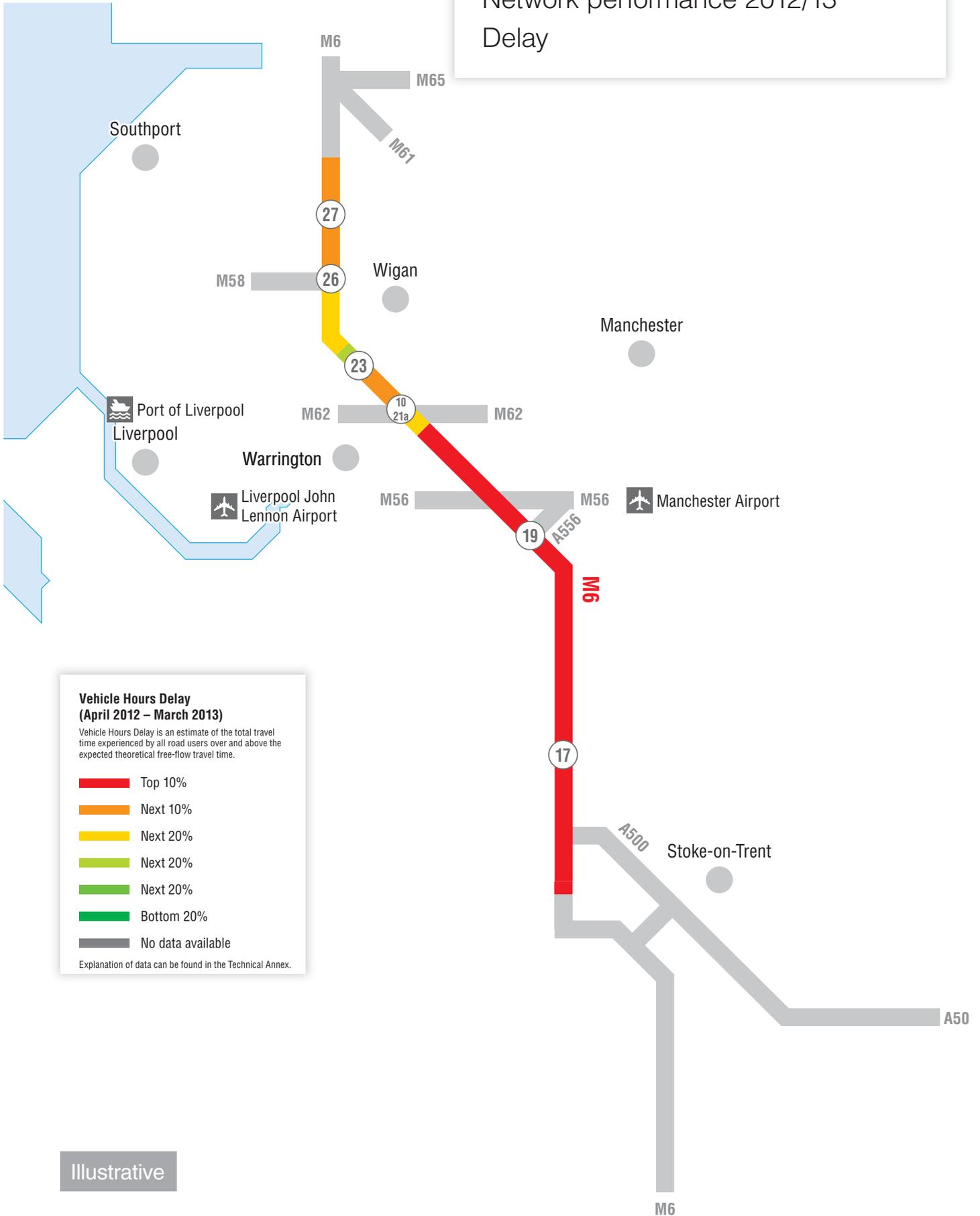
Figure 2.2
Network performance 2012/13
Delay



Illustrative

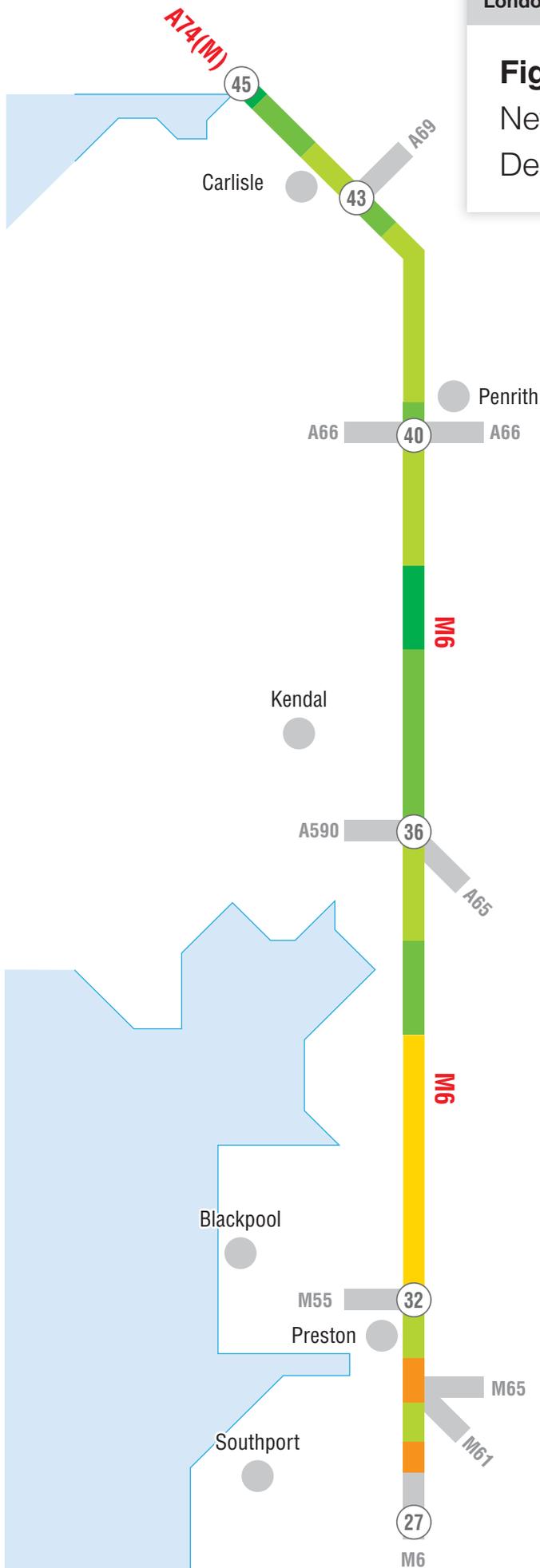
Figure 2.2

Network performance 2012/13
Delay



Illustrative

Figure 2.2
Network performance 2012/13
Delay



**Vehicle Hours Delay
(April 2012 – March 2013)**

Vehicle Hours Delay is an estimate of the total travel time experienced by all road users over and above the expected theoretical free-flow travel time.

- Top 10%
- Next 10%
- Next 20%
- Next 20%
- Next 20%
- Bottom 20%
- No data available

Explanation of data can be found in the Technical Annex.

Illustrative

- 2.1.19 Sections that perform well within this route and are generally more rural in location such as the midsection of the M40 and at the northern end of the M6 to Scotland. From junction 5 of the M40 (near Stokenchurch) to junction 15 (with A46 at Warwick) the route performs relatively well compared to the rest of the route and the SRN on journey time reliability, average speeds within the peak and delay. However, there is evidence of queuing at junctions 14 and 15 which occur on the hard shoulder and so will not be identified as part of traffic monitoring on this section. This is with the exception of the section of the M40 between junctions 9 and 10 which is operating with the highest category of delay compared to the rest of the SRN. This is due to the addition of traffic from the A34/A43 corridor.
- 2.1.20 The northern section of the route from Preston (M6 junction 32) to the Scottish border performs well compared to the rest of the route. The sections have high average speeds during the peak, lower delays and more reliable journeys compared to the rest of the SRN. There are some junction capacity issues where the route interacts with the local road network on this northern section; however, they currently have a relatively limited impact on the route based on the available evidence.
- 2.1.21 Sections that experience significant congestion on this route are generally around major cities and towns. The exception to this is northbound from junction 4 of the M40 (Handy Cross) where capacity issues partly caused by a lane drop through the junction causing queuing on the M40. The junction is a key strategic interchange with the A404 which links the arterial routes of the M40 and M4 between London and Bristol. The proximity of the M25 corridor and commuting into London exasperates road conditions in this general area.
- 2.1.22 The M40 between junctions 8 and 10 provides access to Oxford and Bicester. Strategic traffic from the A43/A34 corridor mixes with significant local commuting trips creating specific capacity issues between and at junctions 9 and 10 as shown on Figure 2.1.
- 2.1.23 The section of route from the Birmingham Box all the way up to Manchester suffers from significant delay and congestion in comparison with the rest of the SRN. This is particularly apparent in the peak periods and affects not just the carriageway but the operation of junctions along this section as well.
- 2.1.24 Where the route passes through or close to highly urbanised areas peak hour congestion at a number of key interchanges and junctions is experienced.
- 2.1.25 Access to the football stadia in Manchester and Liverpool has also proved to affect traffic flows and congestion on the route. Indeed, an embargo preventing any maintenance activity on the route for four hours after a match has ended has been in place for a number of years. Without such an embargo significant delays have been seen to occur.

2.2 Road safety

- 2.2.1 As a responsible network operator and through the [Strategic road network performance specification 2013-15](#), the Highways Agency works to ensure the safe operation of the network.
- 2.2.2 By 2020, [The strategic framework for road safety 2011](#) forecasts the potential for a 40% reduction of the numbers killed or seriously injured on the roads compared with 2005-2009. We are working toward this aspirational goal.
- 2.2.3 Figure 2.3 illustrates the rates of injury accidents and the top 250 casualty locations on the SRN between 2009 and 2011. Injury accidents are collisions where people were injured and their injuries were slight, serious or fatal. Damage only incidents have not been included. The top 250 casualty locations have been calculated nationally, and are based on the number of casualties which occurred within a distance of 100m. Locations with the same number of casualties have been given a “joint” ranking and therefore, there may be some locations with the same rank number.
- 2.2.4 Between 2008 and 2012 there were 4,693 collisions on the Route. The number per year has ranged from 1073 to 798 over this 5 year period and there is a noticeable downward trend.
- 2.2.5 Of the 4,693 collisions recorded 99 (2%) included fatalities, 521 (11%) included serious injuries and the remaining 4073 (87%) included only slight injuries. The number of fatalities appears to have steadily dropped across the 5 year period, with 26 in 2008 and 17 in 2012.
- 2.2.6 Within the 4,693 collisions there were 7,945 casualties, at a rate of 1.69 casualties per collision.
- 2.2.7 In terms of vehicles/road users involved in the collisions:
- 77% involved more than one vehicle;
 - 29% of vehicles involved were HGVs;
 - Where the age of drivers was known 3% were young drivers (aged 16-19); and
 - 10% were older drivers (aged 60 or over).
- 2.2.8 The causation factors for accidents indicate that in the main driver error or behaviour were the main causes. A summary of the main factors are as follows:
- 26% occurred where the driver ‘failed to look properly’;
 - 24% occurred where the driver ‘failed to judge other person's path or speed’;
 - 21% involved ‘loss of control’;
 - 17% were ‘travelling too close’;
 - 12% involved ‘sudden braking’;
 - 11% involved ‘Poor turn or manoeuvre’

- 10% cited 'Careless, reckless or in a hurry'
- 10% were travelling too fast for conditions;
- 8% cited 'slippery road';

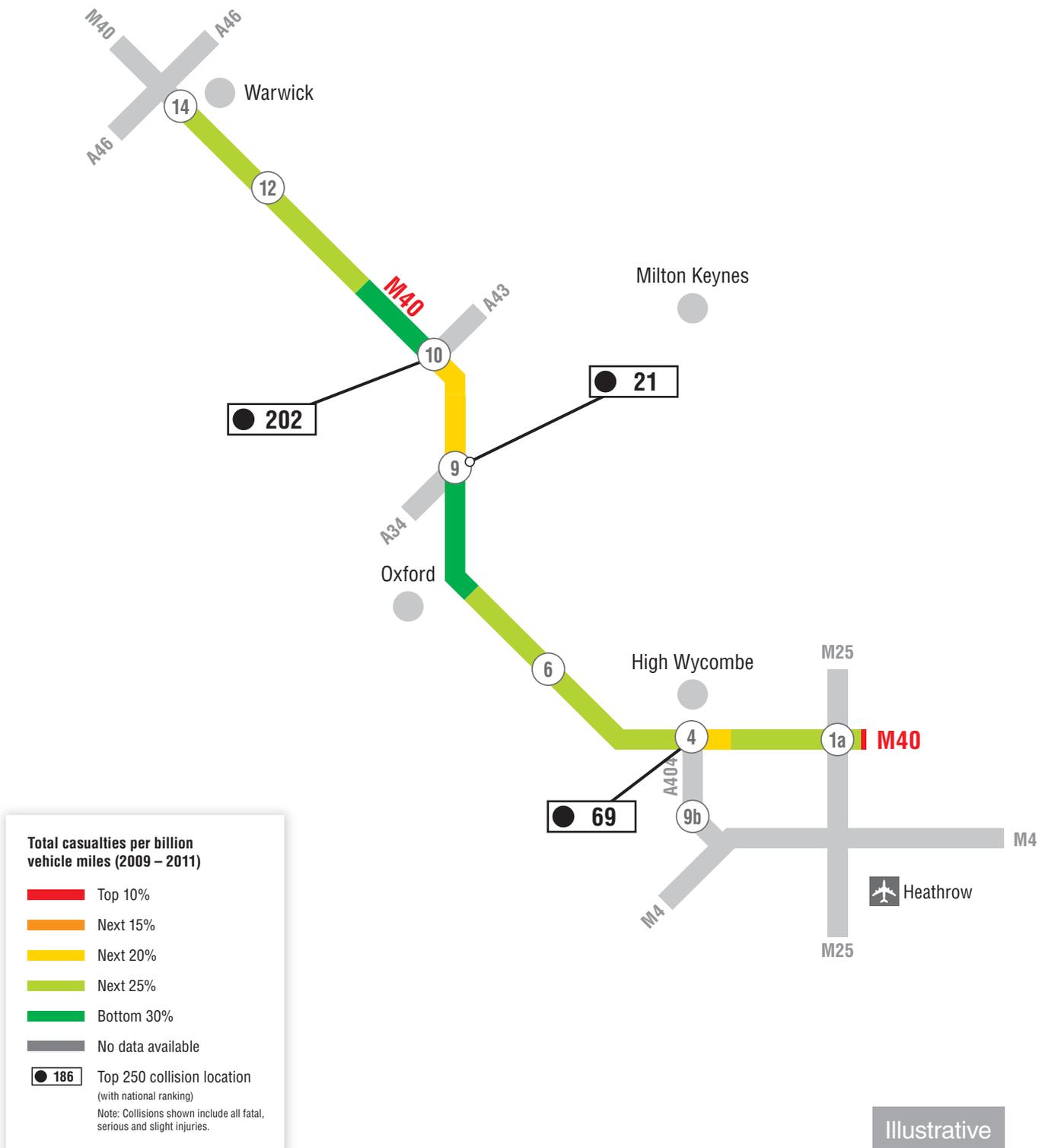
- 2.2.9 The overall safety performance of this route is good, however from the information available there are safety performance issues at a number of junctions along the route. In terms of casualties per billion vehicle miles the performance of all the sections of the route, which includes the M40, M42, M5 and M6 falls mainly within the lowest risk categories (Figure 2.3).
- 2.2.10 There is a very short section of the M6 in the vicinity of junction 5 where the performance is poorer with the highest category of casualty rate over the section towards the junction with the M42. In addition there are a number of discrete locations along the route where the accident statistics are concentrated. The most prominent are at M6 junction 16, 19 and 23, which are all in the top 100 casualty locations. Near the M6 junction 8 with the M5, M6 near junction 9 and M6 junction 15 around Stoke-on-Trent are in the top 250 casualty locations.
- 2.2.11 The Technical Annex provides additional detailed performance figures for the route which include collision numbers summary, collision rates per 100 million miles summary, casualty numbers, and slight casualty rates per 100 million vehicles. These performance figures demonstrate good performance for this route over the base line figures over the 2005-09 average.
- 2.2.12 A number of problem junctions and killed or seriously injured (KSI) cluster sites on the route have been highlighted and actions proposed. Some of these actions are proposed studies and reviews, but some actions indicate resolution will be an outcome of various schemes proposed in the future. The top 10 motorway links identified as having problems are on the M6 whereas junction problems are identified on the M6, M42, M40 and M5. Full details are included in the Technical Annex.
- 2.2.13 Many of the safety initiatives led by the various Road Safety Partnerships along the London to Scotland West route are similar in nature providing education and enforcement campaigns. They are often centred around supporting vulnerable road users and educating road users to support enforcement. The Highways Agency works closely with these groups. In addition the Highways Agency is promoting a road worker safety campaign including driver engagement at motorway services areas and the Department for Transport with the 'Think' campaign.
- 2.2.14 While we aim to reduce the numbers killed or seriously injured using and working on the SRN, we will always identify more safety interventions than our budget allows us to implement. We use a prioritisation process to help us and we review this regularly to ensure we are targeting the locations with the greatest opportunity to save lives and reduce the severity of injury.

London to Scotland West

– Route-based strategy – Map 1 of 4

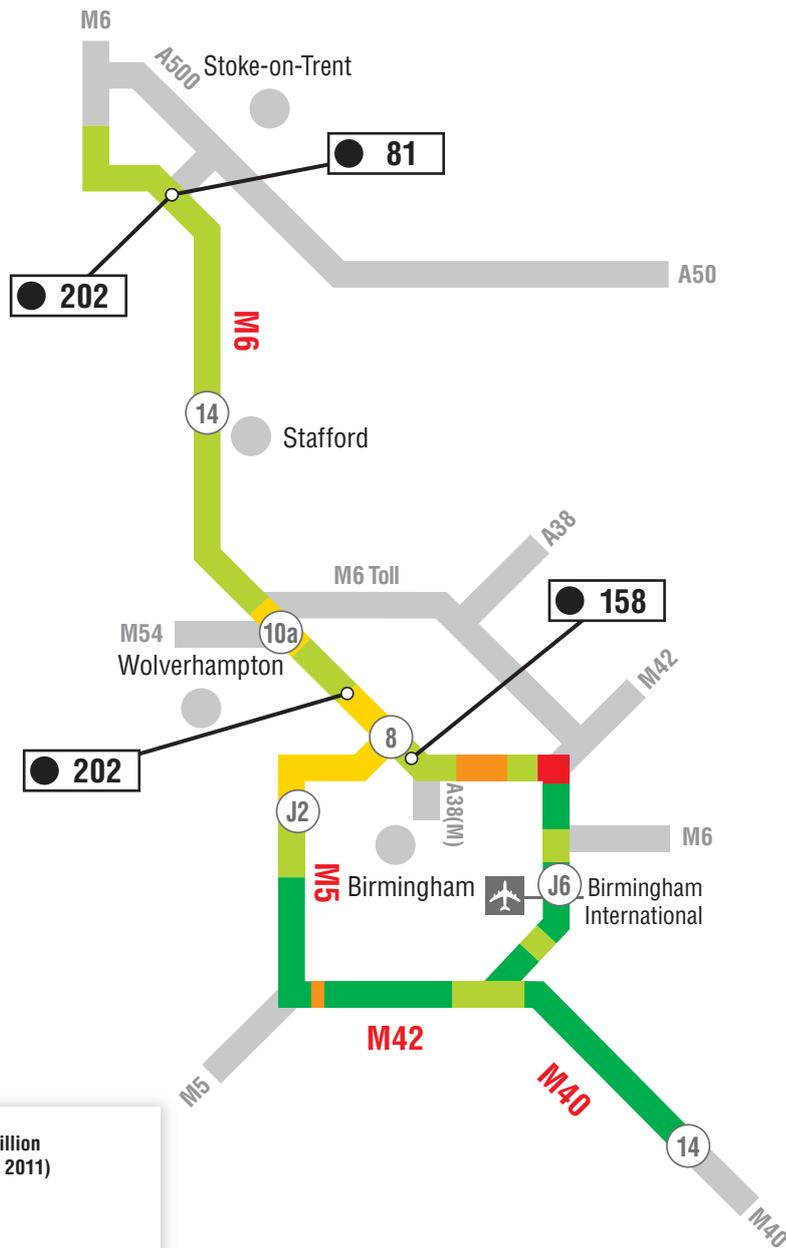
Figure 2.3

Safety on the network



Illustrative

Figure 2.3
 Safety on the network



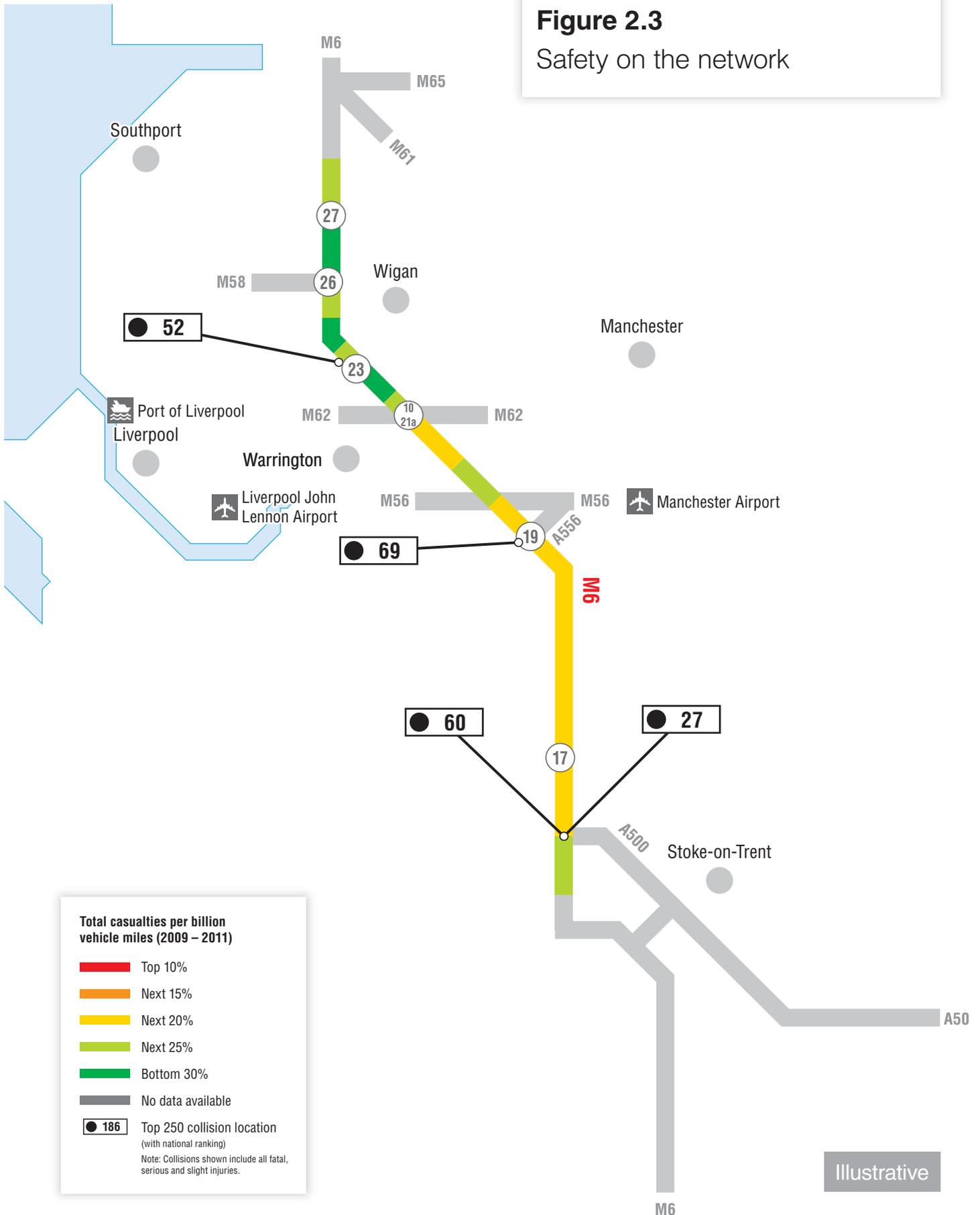
Total casualties per billion vehicle miles (2009 – 2011)

- Top 10%
- Next 15%
- Next 20%
- Next 25%
- Bottom 30%
- No data available
- 186 Top 250 collision location (with national ranking)

Note: Collisions shown include all fatal, serious and slight injuries.

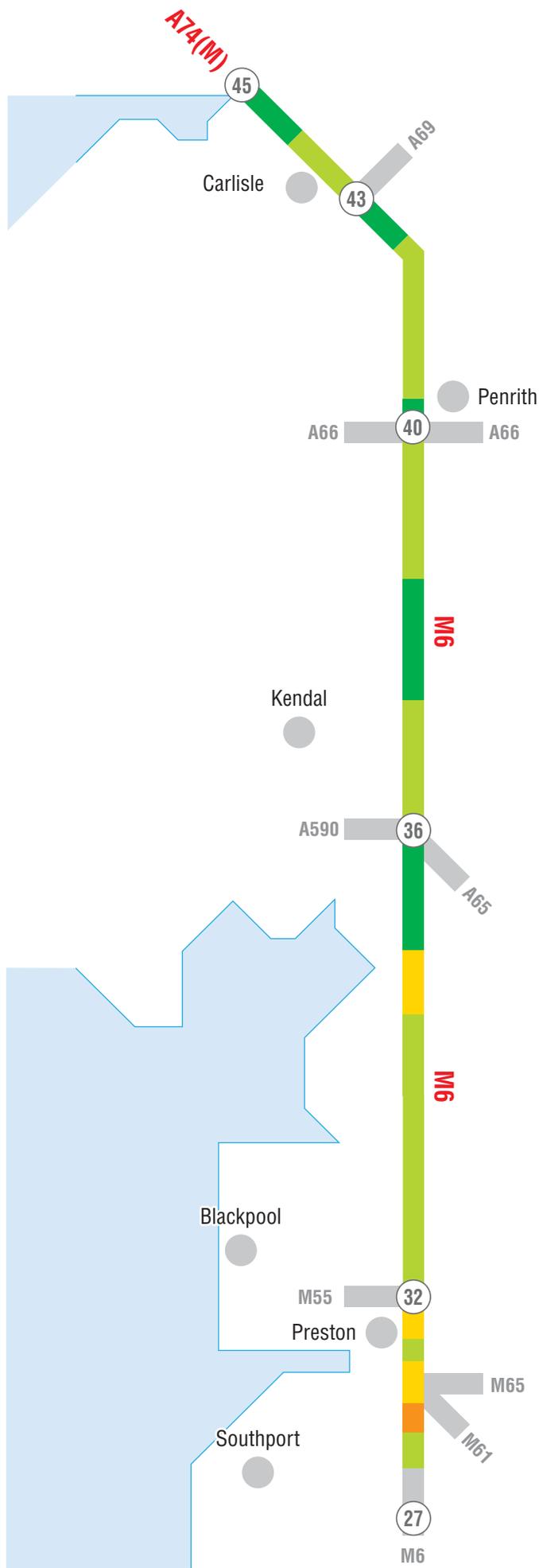
Illustrative

Figure 2.3
 Safety on the network



Illustrative

Figure 2.3
 Safety on the network



Total casualties per billion vehicle miles (2009 – 2011)

- Top 10%
- Next 15%
- Next 20%
- Next 25%
- Bottom 30%
- No data available

● 186 Top 250 collision location (with national ranking)
 Note: Collisions shown include all fatal, serious and slight injuries.

Illustrative

2.3 Asset condition

- 2.3.1 We carry out routine maintenance and renewal of roads, structures and technology to keep the network safe, serviceable and reliable. We also ensure that our contractors deliver a high level of service on the SRN to support operational performance and the long-term integrity of the asset.
- 2.3.2 From new, assets have an operational 'life' within which, under normal conditions and maintenance, the risk of failure is expected to be low. Beyond this period, the risk of asset failure is expected to increase, although for many types of asset the risk of failure remains low and we do not routinely replace assets solely on the basis that they are older than their expected operational life. We use a combination of more regular maintenance and inspection along with a risk-based approach to ensure that assets remain safe while achieving value for money from our maintenance and renewal activities.
- 2.3.3 At the southern part of the route, the M40 is managed by UK Highways M40 Limited; a design, build, finance and operate (DBFO) company operating on behalf of the Secretary of State. This section runs from junction 1 (the junction with the A40 at Denham) to junction 15 (the junction with the A46 at Warwick). All maintenance along this section is the responsibility of the DBFO company who have a duty to hand back the road in a serviceable condition, in accordance with requirements by the end of the contract in 2027.
- 2.3.4 A programme of works will be agreed prior to hand back of the road following detailed inspections of the road and major structure to ensure that the required standard for asset condition on hand back is achieved at the end of the contract.

Carriageway Surface

- 2.3.5 The road surface on the SRN is primarily surfaced with two types of flexible bituminous materials, namely Hot Rolled Asphalt (HRA) which has an approximate design life of 25 years and Thin Surface Course System (TSCS) with a lower construction cost and shorter design life of 10-15 years. Large tranches of HRA were laid in the 1990s and TSCS tranches laid in the 2000s resulting in a significant proportion of the network reaching the end of its design life by 2021.
- 2.3.6 It should be noted that, although carriageway surfacing may be identified as reaching or exceeding its design life, the surfacing will not necessarily require treatment at this point. Carriageway surfacing that is beyond its design life is at a higher risk of failure, with such risk increasing the longer the surfacing exceeds its design life. The increasing age of the surfacing could manifest in an increased frequency of maintenance interventions, which may result in a higher cost both financially and in terms of disruption to road users to maintain the asset in a safe and serviceable condition.
- 2.3.7 In terms of pavement asset condition about three quarters of the route is predicted to reach the end of its design life by 2021. The remaining

quarter is located in discrete sections spread across the route as a whole. There is a risk that a percentage will also reach the end of its design life by 2021 due to high levels of traffic on this route and the impacts of severe weather.

- 2.3.8 In considering specific areas, the full section of the route between junctions 16 (Stoke/A500) and 31 (Preston) is likely to need some form of resurfacing by 2021. Further north the need for wholesale resurfacing becomes less apparent. A number of interventions undertaken over recent years has pushed back the need for further resurfacing in the short term. However, by 2021 resurfacing is likely to be needed on large parts of the section between junctions 32 and 33 and between junctions 35 and junction 36.
- 2.3.9 The route has experienced higher than normal percentages of potholes over the last 2 years mainly due to adverse winters in 2009 and 2010.
- 2.3.10 Some sections of the SRN have concrete road surface material which is no longer a material we use in carriageway construction. This route does not have concrete surfacing.

Structures

- 2.3.11 The M6 past Preston was the first section of motorway to be built in the UK, opening in 1958. Many further sections of it opened in the early 1960s. The structures along the M6 through Birmingham include approximately 13 miles of elevated motorway this is the longest length of elevated motorway within the country.
- 2.3.12 The majority of the M6 and M5 was constructed in the 1960s and 1970s, this means the route has an average age that is older than the rest of the strategic network. Older structures on the route will have therefore deteriorated more than average due to both a longer operational life, and having been constructed to older design standards.
- 2.3.13 The M40 and M42 sections of the route are of slightly more recent construction. The design standards used will have avoided some of the problems inherent in earlier sections of the network.
- 2.3.14 There are a number of structures along the route which are expected to require significant works in the period up to 2021. M6 junctions 5 and 6 (Bromford viaduct and Gravelly Hill interchange) and M5 junctions 1 to 2 (Oldbury viaduct), are identified as requiring necessary work that will be potentially disruptive to traffic flow.
- 2.3.15 Further north, and due to the uncertainty surrounding a number of widening proposals over the last 15 to 20 years, the structures between junction 16 and junction 20 of the M6 have received the minimum amount of necessary maintenance activities. It will be essential for work to be undertaken on these structures by 2021 to ensure that they continue to be 'fit for purpose'.
- 2.3.16 In general terms there is a high proportion of ageing bridges and large culverts along the route which are in a poor condition mainly due to exposure to severe weather and age.

- 2.3.17 The severe winter weather in 2009/10 and 2010/11 contributed to an acceleration in the number of structural defects occurring, which is taken into account within the forward programme of surveys and maintenance.

Other key asset issues for routes

- 2.3.18 There are geotechnical issues evident at M42 Dale Lane Tip, where landfill gas, and risks of pollution to surrounding water courses require management. Further north, the section between junctions 24 and 27 on the M6 crosses the location of many known and probable mine workings. However, the route as a whole has a relatively low geotechnical risk level.
- 2.3.19 The route has long sections of unlit carriageway. It does though have lighting on the majority of the Birmingham Box, and between junction 20 and junction 32. However, between M5 junctions 2 to 4 and 4a to 6, M6 junction 27 and 32 the lighting is switched off between the hours of midnight and 5am. M6 junction 15 to 16 has undertaken a full switch off of the lighting. The section between junction 22 and junction 26 has also been identified as suitable for switch off and this is programmed to take place in 2014/15.
- 2.3.20 There are indications that road lighting and traffic sign equipment are deteriorating along the route presenting a renewal need which would benefit from early intervention to manage disruption on the route.
- 2.3.21 The drainage system along the route tends to work reasonably well given the age of the asset. However, there are a few problem locations. These include the area within junction 18 and the area just south of junction 19. Both locations get overwhelmed in severe weather. The area close to junction 19 appears to be related to the inability of the drainage system to cope with water from adjacent land. This can lead to a significant build up of water on the hard shoulder at the bottom of the south bound access slip. In the winter months this can lead to ice forming with requires additional daily treatment.
- 2.3.22 The A38 Tame Valley Viaduct is owned and maintained by Birmingham City Council and with the need for major maintenance works on this stretch anticipated by 2021 these works will require careful management to reduce the impact this will have on both networks.

2.4 Route operation

Incident Management

- 2.4.1 We work hard to deliver a reliable service to customers and to reduce the number and impacts of incidents on road users.
- 2.4.2 Across the whole network, the Highways Agency Traffic Officer Service responds to around 20,000 incidents each month. We measure how effective we are at managing incidents by looking at the time incidents affect the running lanes.
- 2.4.3 This route is largely motorway standard and so full operational coverage is provided along the route by the Traffic Officer Service. This coverage

includes information services, strategic and tactical overviews and dedicated Traffic Officer Service on-road incident management response. Where routes don't have dedicated patrols incident management response is provided.

- 2.4.4 We have a good understanding of the types of incidents which are quick to clear up and those which take longer. In general, there are far more incidents which don't affect the running lanes for very long, and mostly these are caused by breakdowns in the live lanes, debris or damage only collisions. The longest duration incidents are mostly caused by infrastructure issues, such as road surface repairs, bridge strikes, barrier collisions and spillages.
- 2.4.5 We continue to work with our partners in the emergency services to reduce the impacts on our network from serious collisions and long-duration incidents.
- 2.4.6 Generally the route performs well regarding average lane impact with most of the route with average incident impact of less than 30 minutes. This is attributed to, not just dedicated patrols by the Traffic Officer Service but also the high level of technology, including variable speed limits to manage flow and associated safety benefits. Further information on technology provision along the route is in section 2.5.
- 2.4.7 Even though the Birmingham Box experiences the lowest reliability on the route, this can be attributed to the volume of traffic rather than our ability to manage incidents.
- 2.4.8 Given the traffic volume on much of the route, even with the generally short average duration of incidents, their impact, even when they are cleared, can have a significant impact on traffic on the route. It is not unusual for delays of many hours to occur on the route following an incident.

Flooding

- 2.4.9 We have a responsibility to reduce flooding. Flooding of the Highway Agency network impacts upon network performance and the safety of road users. Flooding off the network has an impact on third parties living adjacent to the network.
- 2.4.10 This route lies within the Severn River Basin District and the Humber Basin District. In total the M6 between junctions 12 and 16 passes over or alongside in the region of 100 water bodies, and from these arise 4 flooding hotspots. Along the M40 there are 18 water bodies intersecting or running adjacent to the route and giving rise to some flooding, similarly along the M42 there is some localised flooding hotspots.
- 2.4.11 Based on recorded flooding incidents, we have identified those parts of the network that are at risk of repeated flooding. Over 30 sites have been identified as flooding hotspots north of junction 16.

Severe Weather

- 2.4.12 The Highways Agency aims to minimise where possible the impacts of severe weather, i.e. strong winds and snow, on network performance and the safety of road users.
- 2.4.13 Some roads along the network are more susceptible to severe weather than others. The M6 junction 10 to 12 is susceptible to snow and ice as it is on a significant gradient, the M6/M42 Interchange is more prone to experience fog and mist due to the water bodies in that area.
- 2.4.14 The M6 at Shap is particularly susceptible to snow due to its high altitude. There are also a number of sections along the route as a whole that are exposed to high winds. These include sections of the lower lying, but open, parts of the route through the Cheshire Plain, over Thelwall Viaduct (near Warrington between M6 junctions 20 and 21) and through the exposed sections of the route north of junction 36.
- 2.4.15 Other hotspots for severe weather have also been identified along the M42, at junctions 1 and 2 where snow and ice can impact on a significant gradient, and M42 junctions 1 to 3a and M6 junction 4a to 8 at certain times of the year can be subject to low sun glare.

2.5 Technology

- 2.5.1 The Highways Agency works hard to deliver a reliable service to customers through effective traffic management and the provision of accurate and timely information. We provide information to our customers before and during their journeys.
- 2.5.2 We monitor key parts of our network using CCTV and use sensors in the road to monitor traffic conditions. These are used by our National Traffic Operations Centre and seven Regional Control Centres to provide information to customers before their journeys, eg on the [Traffic England website](#) or through the [hands-free traffic app](#) for smartphones. Whilst on the network, we also inform our customers using variable message signs (VMS).
- 2.5.3 Technologies such as overhead gantries, lane specific signals and driver information signs also forms part of how we can operate our network efficiently. In some locations we have controlled motorways, which is where we can use variable mandatory speed limits to help keep traffic moving. Smart motorways use both variable mandatory speed limits and the hard shoulder as an additional live traffic lane during periods of congestion. Ramp metering manages traffic accessing the network via slip roads during busy periods to help avoid merging and mainline traffic from bunching together and disrupting mainline traffic flow.
- 2.5.4 There is significant technology provision provided on the route between London and Preston, including the Birmingham Box. This is due to the highly trafficked nature of the route and includes the installation of smart motorways around Birmingham. Smart motorways is in operation on the M40 junction 16 to the junction with the M42, M42 junction 3 to 3a (variable mandatory speed limits) with dynamic hard shoulder running in

operation on the M42 junction 3a to 7, M6 between junctions 4 to 5 and 8 to 10a. The implementation of further sections of smart motorways on the M6 is set out in section 3.3.

- 2.5.5 This technology provision includes the ability to inform drivers with local and strategic information relevant to their journeys with variable message signs. The collation of this information is further aided through the use of MIDAS (Motorway Incident Detection and Automatic Signalling) to provide real time traffic information and the provision of CCTV to understand what is happening on the network. The fibre optic cable network also extends as far as junction 32, just north of Preston.
- 2.5.6 Beyond junction 32 the technology coverage is sparse. There are single VMS signs approaching junctions 36, 38, 39, 40 and 43 but only very limited CCTV coverage. Indeed, there is no CCTV coverage beyond junction 36. This makes incident management and network operation particularly difficult, especially during periods of extreme weather.
- 2.5.7 Ramp metering is widely used along the route and in particular on access slip roads between junctions 16 and 25. Beyond junction 25 only the southbound on slip at junction 31 has ramp metering. However, with development pressure it is likely that some more of the junctions in the Preston and South Ribble areas may benefit from its installation in the future. At junction 21a (Croft Interchange) a trial of motorway to motorway ramp metering is proposed. This is due to be operational by 2016.
- 2.5.8 The A38(M) Aston Expressway, from the M6 at junction 6 into Birmingham city centre, is maintained and managed by Birmingham City Council as the local highway authority. The Highways Agency is contracted by the City Council to set and maintain the signs and signals on the gantries which operate the 'tidal flow' system on their behalf.

2.6 Vulnerable road users

- 2.6.1 The London to Scotland West Route is crossed by a number of National Cycle Routes. However, these cycle routes do not tend to interact directly with the route. All crossings tend to be on quieter local highways and as a result utilise existing structures provided to allow those local highways to cross the line of the motorway. Indeed, none of the National Cycle Routes that cross the London to Scotland West Route pass through any motorway junctions.
- 2.6.2 The Highways Agency has been working with Sustrans to identify a prioritised list of locations which have the potential to most improve connectivity and accessibility for cyclists along the SRN. As part of that work the Highways Agency is progressing a number of schemes and feasibility studies.
- 2.6.3 Along the London to Scotland West Route no improvement schemes are planned prior to the RBS period. However, a number of feasibility studies will be progressed and these include the following areas:
- M5 Tame Valley Aquaduct;

- M5 Brandan Footbridge; and
 - M6 junction 19 (as part of the A556 M6 – M56 study)
- 2.6.4 The London to Scotland Route West is crossed by a number of long distance National Cycle Routes. These include:
- Route 57, crossing the M40 at Wheatley near Oxford where it runs along Waterperry Road;
 - Route 51 crosses the M40 at junction 9 near Bicester where it runs along the A34 and A41;
 - The Coast to Coast Cycle Route, which crosses the M6 at junction 40 (Penrith); and
 - Hadrian's Cycle way, which crosses the M6 between junction 43 and junction 44 near Carlisle.
- 2.6.5 The route is also crossed by two National Trails. These are The Ridgeway and Hadrian's Wall Path. The Ridgeway crosses the M40 just south of junction 6, near Lewknor and Hadrian's wall path crosses the M6 between junctions 43 and 44 near Carlisle. However, as with the National Cycle Routes, both paths use existing structures provided to allow local highways to pass below the route.
- 2.6.6 A significant number of issues for cyclists and vulnerable road users in particular have been highlighted in the Lancashire and Cumbria areas. These issues predominantly focus around junctions where the motorway slip roads interface with the local road network. Indeed, it is noted that such issues are not restricted to the Lancashire and Cumbria areas. This is an issue that affects many junctions along this route. Stakeholders representing the views of cyclist and vulnerable road users have highlighted this as a deterrent to the use of these modes near to and across our network.

2.7 Environment

- 2.7.1 As a responsible network operator and through the [Strategic Road Network performance specification 2013-15](#), the Highways Agency works to enhance the road user experience whilst minimising the impacts of the SRN on local communities and the environment.

Air quality

- 2.7.2 We recognise that vehicles using our road network are a source of air pollution which can have an effect on human health and the environment. We also appreciate that construction activities on our road network can lead to short-term air quality effects which we also need to manage.
- 2.7.3 The Highways Agency is committed to delivering the most effective solutions to minimise the air quality impacts resulting from traffic using our network. We will operate and develop our network in a way that works toward compliance with statutory air quality limits as part of our broader [Environmental Strategy](#).

- 2.7.4 A simple indicator of poor air quality is where a LA has declared an Air Quality Management Area (AQMA). An AQMA is a location – a whole, or a part of a LA - where air quality strategy objectives have been exceeded. Nitrogen dioxide, and to a lesser extent, particulates, are the main concerns for this route.
- 2.7.5 The M6 from Stoke-on-Trent to Birmingham section travels through four AQMAs within the South Staffordshire, Walsall, Sandwell and Birmingham sections. All four areas have been declared for levels of nitrogen dioxide (NO₂).
- 2.7.6 Moving north, the M6 runs through two further AQMAs. The first is very small and encompasses the farm that sits next to the motorway at Oak Tree Lane just north of junction 18. A larger AQMA covers the M6 from junction 20 all the way through to junction 27. It also passes through an AQMA at junction 44, where the A7 meets the M6 near Carlisle. The route also encroaches into the AQMA declared for the A556, which runs for its full length from M6 junction 19.
- 2.7.7 All of the above locations include predicted exceedences of NO₂.
- 2.7.8 The route also encompasses the M42 which falls within the Birmingham box. The M42 passes through two AQMAs at Lickey End at the junction on the M42 and off route the A38 through Bromsgrove has been declared for levels of Nitrogen Dioxide. The A38 is regularly used by local traffic travelling as an alternative route from the M42 to the M5.
- 2.7.9 Stonebridge AQMA is located in the area of Coleshill bounded by Stonebridge Road, Coleshill Heath Road, the M42 Motorway, M6 Motorway and junction 4 of the M6.
- 2.7.10 The whole of the M40 between junctions 1 and 5 have been identified by South Bucks District Council and High Wycombe District Councils as an area where NO₂ levels are likely to be exceeded; this has resulted in two AQMA's being declared split by the district boundaries.

Cultural heritage

- 2.7.11 The Highways Agency is committed to respecting the environment across all its activities and to minimising the impact of the trunk road on both the natural and built environment. Wherever possible, balanced against other factors, Agency schemes are designed to avoid impacts on cultural heritage assets. These are described as a range of geographical components of the historic environment which have been positively identified as having a degree of significance meriting consideration in planning decisions.
- 2.7.12 The Ancient Monuments and Archaeological Area Act, 1979 provides legislative protection to a selection of archaeological sites and monuments considered to have national importance.
- 2.7.13 Along this route there are a number of legally protected monuments and other areas of cultural heritage interest. These include registered Parks and Gardens at Keele Hall (Newcastle-under-Lyme), Trentham Gardens (Stoke-on-Trent), Witton Cemetery (Birmingham near M6 junction 6) and Great Barr Hall (Birmingham near M6 junction 7).

- 2.7.14 A Woodland Trust Site known as Duddas Wood is also close to the route on the M6 near junction 7, and in addition, the Monuments of Low Borrowbridge Roman Fort (located just south of Tebay), Castle Howe Motte & Bailey (at Tebay), Gunnerkeld Concentric Stone Circle (just north of Shap) and Mayburgh Henge (just south of Penrith) are located adjacent to the route.
- 2.7.15 The UNESCO Frontiers of the Roman Empire (Hadrian's Wall) World Heritage site also passes directly under the route just north of Carlisle. The remnants of Hadrian's Wall and Vallum (earthen rampart) are included within the World Heritage designation. The World Heritage Site incorporates a wide buffer zone to both sites which extends north from junction 43 for nearly 3 miles.
- 2.7.16 There are no scheduled monuments near to the M40 and the M42 hosts one National Trust site: the 15th Century home of Baddesley Clinton.

Ecology

- 2.7.17 The Highways Agency's activities, including road construction projects and maintenance schemes, have the potential to impact on protected sites, habitats and species. We aim to minimise the impact of our activities on the surrounding ecology and wherever possible contribute to the creation of coherent and resilient ecological networks by maximising opportunities for protecting, promoting, conserving and enhancing our diverse natural environment.
- 2.7.18 The River Eden Special Area of Conservation (SAC) crosses under the M6 north of Carlisle. This is close to where the river outfalls into the Solway Estuary which is a designated Ramsar site as a wetland of international importance. Near to junction 39 at Shap the M6 divides in to split carriageways and is surrounded by the Asby Complex SAC. This has been designated for its habitats and species at a European level.
- 2.7.19 Wreay Woods Nature Reserve lies adjacent to the southbound carriageway of the M6 near to junction 42 and further areas of ancient woodland belts are also located near to the route. The most significant of these lie between junctions 41 and 42 and between junctions 32 and 33 and have been wooded continuously since the early 1600s. The route also passes the Manchester Mosses SAC near to junctions 21a and 21.
- 2.7.20 There are a number of Sites of Special Scientific Interest (SSSIs) affecting the northern section of the route. These include the Upper Salway Flats and Marshes, Crosby Gill SSSI and Crosby Ravensworth Fell (both near to junction 39). Tebay Road Cutting SSSI and Langdale, Bowerdale and Carlin Gill SSSI lie immediately to the west of the M6 south of junction 38. Farleton Knott SSSI lies between junctions 36 and 35a and Red Scar and Tun Brook Woods SSSI passes beneath the M6 between junctions 31a and 31. Woolston Eyes SSSI in Warrington runs underneath the M6 near to Thelwall and Oakhanger Moss SSSI runs alongside the M6 in Cheshire midway between junctions 17 and 16.

- 2.7.21 Further south, the M42 runs adjacent to Kingsbury Water Park a designated Country Park and three SSSIs all related to the River Blythe.
- 2.7.22 In Buckinghamshire the M40 crosses the Chilterns Area of Outstanding Natural Beauty (AONB) between junctions 4 and 6. Within the AONB running close to the south of the M40 lies the Aston Rowant National Nature Reserve (NNR).

Landscape

- 2.7.23 Roads and other transport routes have been an integral part of the English landscape for centuries. However, due to large increases in traffic, combined with modern highway requirements, they can be in conflict with their surroundings. We are committed, wherever possible, to minimise the effect of our road network on the landscape.
- 2.7.24 The route passes through three Areas of Outstanding Natural Beauty (AONB). These include the Forest of Bowland AONB south east of Lancaster, the Arnside and Silverdale AONB north of Lancaster and the Solway Coast AONB north of Carlisle.
- 2.7.25 The route passes close to the Manchester Mosses SAC between junctions 21 and 21a. It also passes adjacent to both the Lake District National Park and Yorkshire Dales National Park. Indeed, proposals are currently underway that aims to join the two national parks. This in turn will place the M6 directly within one or both of these National Parks.
- 2.7.26 While the M42 does not pass through or run adjacent to any AONBs it is neighboured by, or within conservation areas such as the Worcester and Birmingham Canal in the Bromsgrove District and the neighbouring Borough of North Warwickshire. Much of the landscape is mature and well integrated into the surrounding countryside.

Noise

- 2.7.27 Traffic noise arising from the Highways Agency's network has been recognised as a major source of noise pollution.
- 2.7.28 We take practical steps to minimise noise and disturbance arising from the road network. This includes providing appropriate highway designs and making more use of noise reducing technologies.
- 2.7.29 In 2012, Defra completed the first round of noise mapping and action planning which identified the top one per cent of noisiest locations adjacent to major roads. These were based on the conditions in 2006. The locations in this top one per cent are known as Important Areas (IAs).
- 2.7.30 The 2002 EU Environmental Noise Directive (END) introduced a requirement for five yearly cycles of noise mapping and action planning for major sources of noise, including road traffic. There is a legal duty on authorities such as HA to implement the national noise action plans as policy. As a result, the Highways Agency is required to investigate all the IAs identified by Defra, with priority on investigating IAs with First Priority Locations (FPLs). The Highways Agency is then required to consult with LAs on the outcomes of these investigations and finally,

forward plan any noise mitigation measures that the investigations have identified.

- 2.7.31 The M6 from junction 12 to 16 has 12 FPLs and between junctions 16 and 45 there are 90 IAs, of these 38 are considered to be FPLs.
- 2.7.32 The M42 extends into the West Midlands North Agglomeration for Noise action plans; however it does not pass through any first priority locations.
- 2.7.33 Noise is a significant issue along the M40 with three FPLs situated in vicinity of the Longbridge at junctions 15 and 19 and IAs between junctions 3 and 8.

Water pollution risk

- 2.7.34 We have a duty not to pollute water courses and ground water. We have identified those highway discharge locations across our network where there is a potential water pollution risk.
- 2.7.35 The identification and control of areas of potential pollution are essential, when a spillage incident or flooding takes place across the network, it is necessary to ensure pollution controls are in place. The Highways Agency has pollution control tools in place across its network these include spill pod kits located at strategic areas of the network, and valve control over many of its balancing ponds. As further resilience the Highways Agency's Traffic officers will soon be carrying spill kits within their vehicles to use for such incidents.
- 2.7.36 There is a noticeable water outfall location on the M6 south of Tebay. Here the motorway crosses and re-crosses the River Lune a number of times. An interceptor was installed at Borrowbeck Bridge in 2010, to intercept run off, however at most other structures in this section run off still flows directly into the Lune. The Highways Agency's baseline assessment of water outfalls has though not determined that a significant risk currently exists for these outfalls.

3 Future considerations

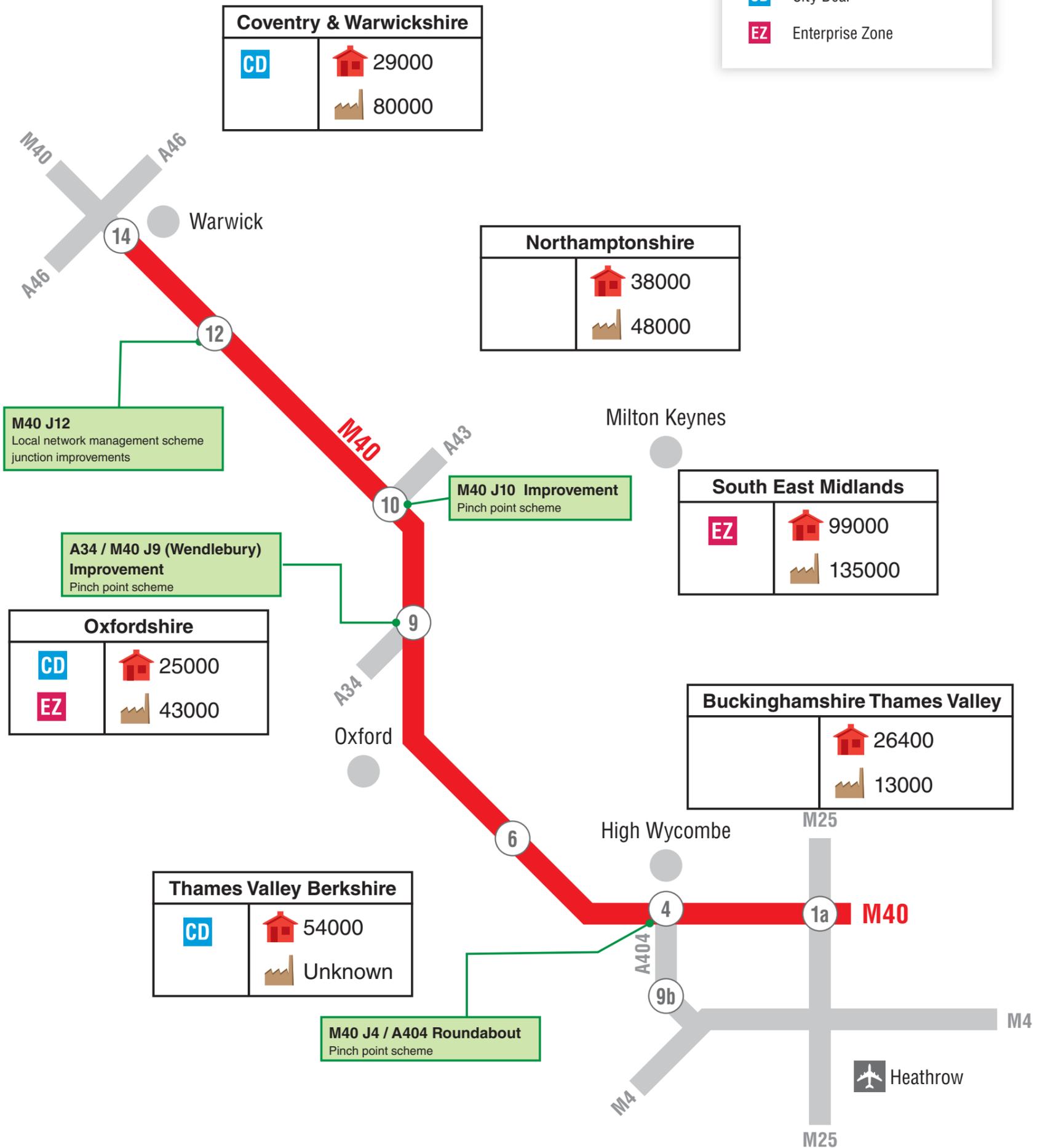
3.1 Overview

- 3.1.1 There is already a lot known about the planned changes to and around the route. LAs and the development community are already pushing forward the delivery of their housing and economic growth aspirations, as set out in their local plans. The Highways Agency has a large programme of schemes it has to deliver, plus an even larger programme of pipeline measures that could come forward after the general election. LAs, together with port and airport operators, are progressing measures to improve the operation and performance of their transport networks and facilities.
- 3.1.2 All of these issues have the potential to directly influence the ongoing performance and operation of the route. Figure 3 summarises the anticipated key future issues and the following sections summarise those issues in more detail.

Figure 3

Key future considerations for the route

-  New homes
-  New jobs
-  Contains regional centre
-  Contains Priority Areas for Regeneration
-  Planned Improvements
-  City Deal
-  Enterprise Zone

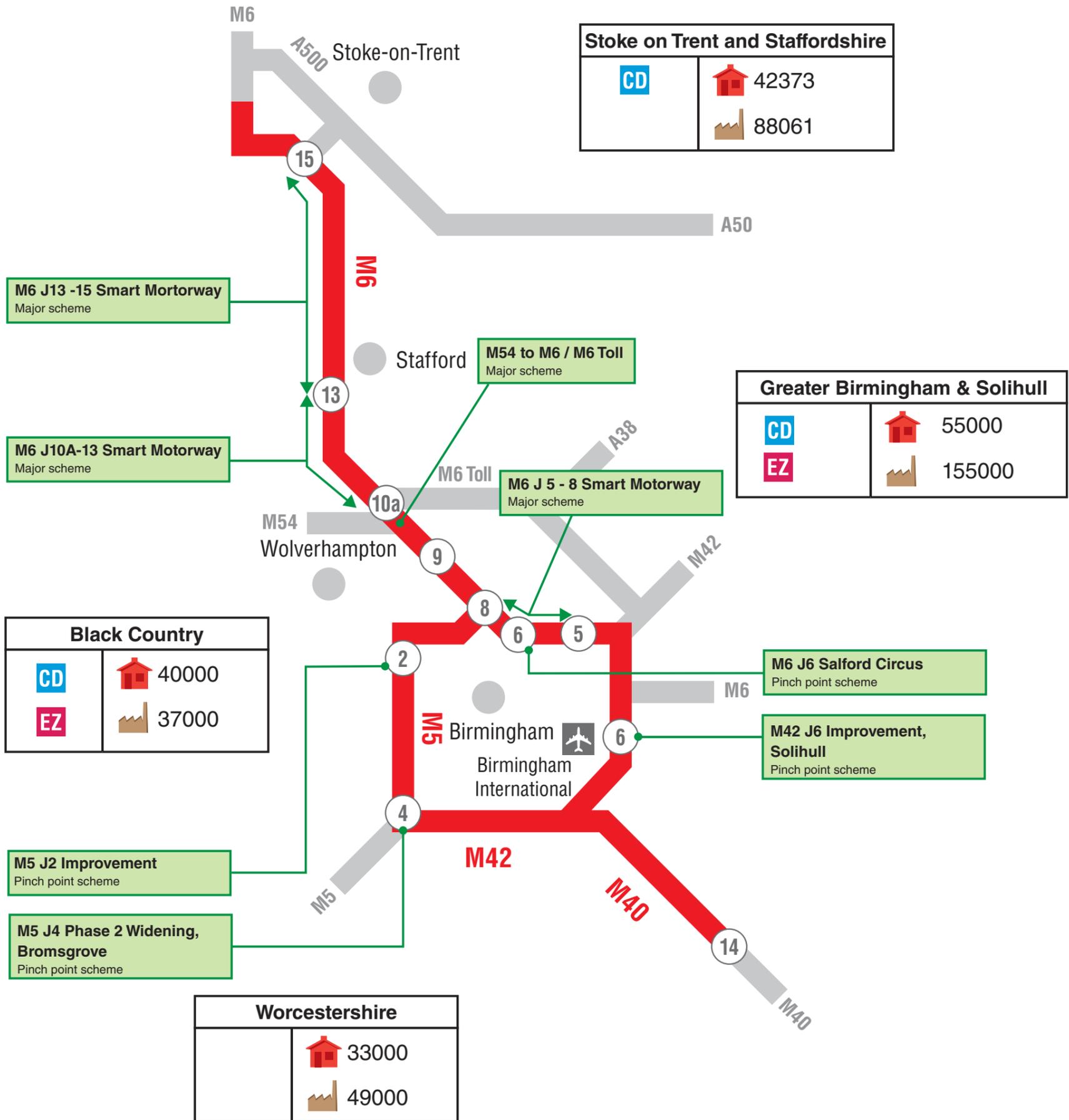


Illustrative

Figure 3

Key future considerations for the route

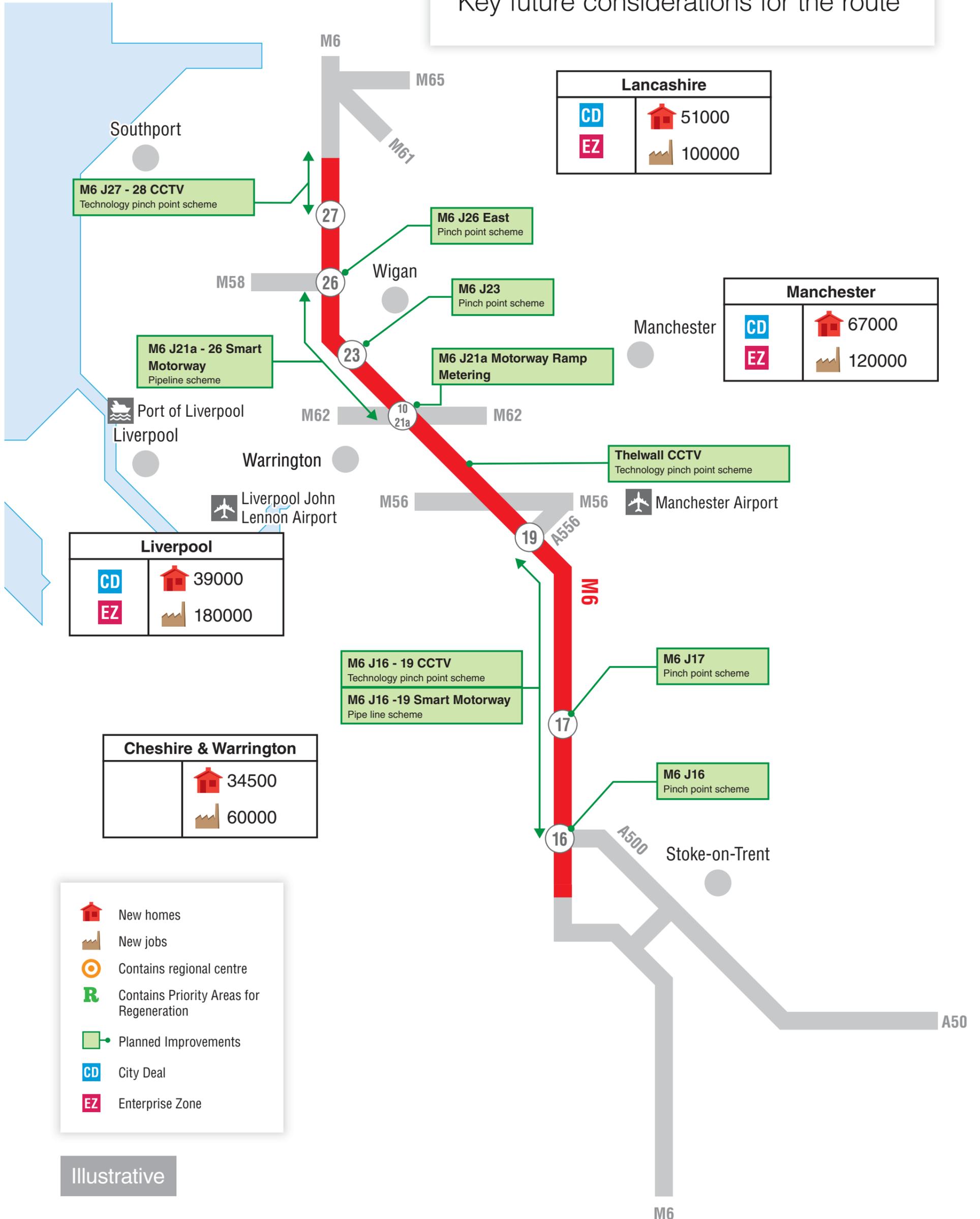
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Illustrative

Figure 3

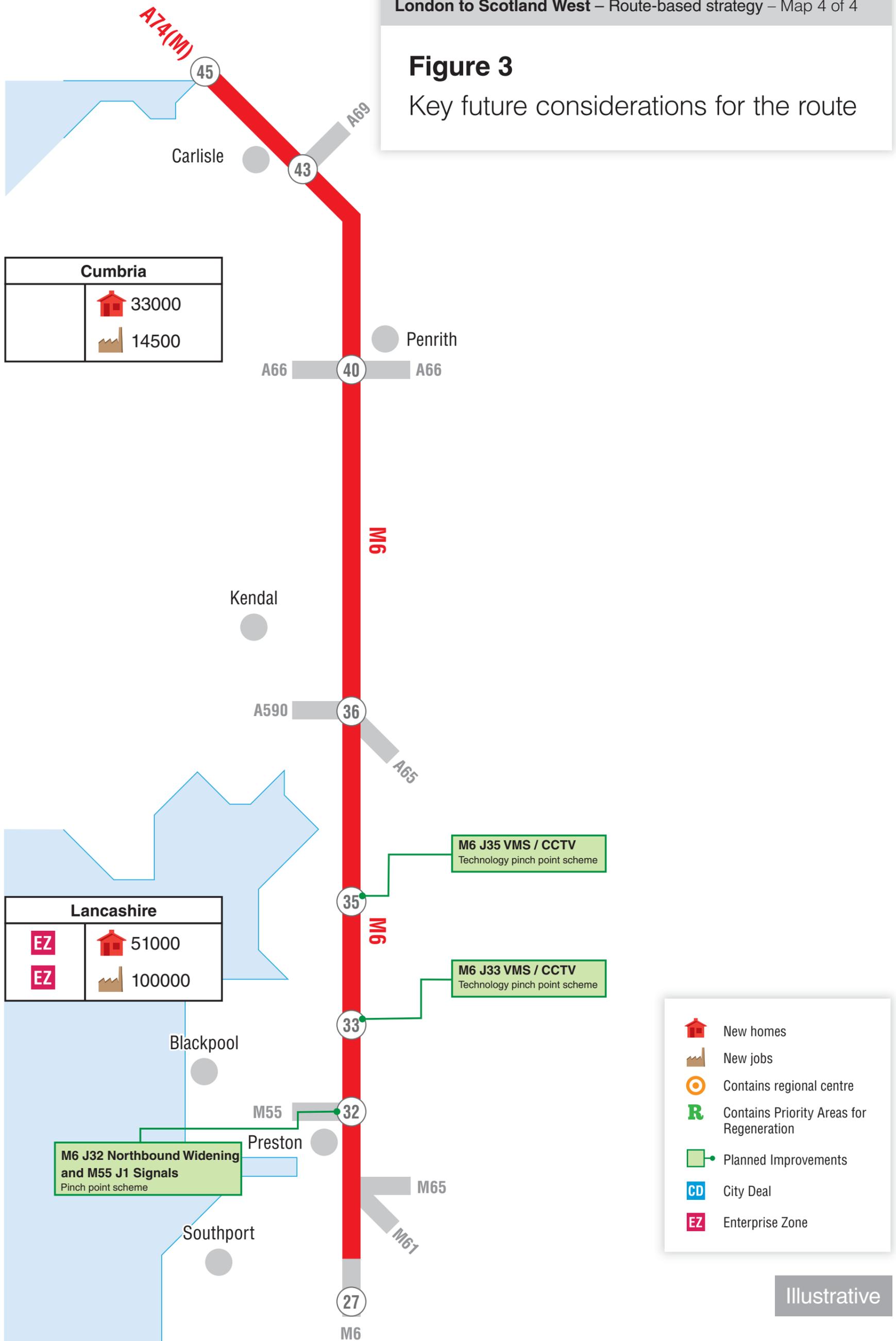
Key future considerations for the route



Illustrative

Figure 3

Key future considerations for the route



Illustrative

3.2 Economic development and surrounding environment

3.2.1 A key aspect of managing the route effectively will be ensuring that it is capable of supporting future local housing and economic growth aspirations. This will involve preparing the route through effective management and public investment to be in the best possible position to cater for the planned demands placed upon it, whilst ensuring that the developments themselves effectively mitigate their local impacts.

3.2.2 Figure 3 summarises the known key housing and economic growth aspirations that would impact on the route, with Table 3.1 below providing more context about the nature, scale and timing of the proposals.

Table 3.1 Key housing and economic growth proposals

Location of Development	Development Type	Anticipated growth			Anticipated Location of Impact on Route
		2011 – 2015	To 2021	To 2031	
Pinewood studios	Commercial		100,000m2 3000 jobs		M40 J1
Oxford Northern Gateway	Commercial		20,000m2 (by 2016)	55,000m2 (Total by 2026)	M40 J9
Kingsmere, South West Bicester Phase1	Residential	1585 homes			M40 J9
Graven Hill, Bicester	Residential		1900 homes (by 2018)		M40 J9
North West Bicester Eco Town	Residential and commercial		393 houses (Phase 1 to 2018)	5,000 homes 5,000 jobs (Up to 2035)	M40 J9 & 10
RAF Upper Heyford	Residential and commercial		1,075 homes and 1,777 jobs	761 homes 1500 jobs	M40 J9 & 10
Bicester Business Park	Commercial			3,850 jobs	M40 J9
Central M40 Development	Commercial	1,000 jobs			M40 J11
Gaydon Proving Ground	Commercial			1,963 jobs	M40 J12
Gaydon/ Lighthorne Heath	Residential		1,900 homes	An additional 2,900 new homes planned for after 2028	M40 J12
South of Warwick and Leamington	Residential			5,500 homes	M40 J13 and J14
Tournament Fields, Warwick	Commercial		1,455 jobs	1,823 jobs	M40 J15

Longbridge Regional Investment site, Longbridge	Commercial			10,000 jobs 2,000 homes	M5 J4 and M42 J2
UK Central, Solihull	Commercial			60,000 jobs by 2035	M42 J3a to J7
Birmingham International Airport	Commercial		19,340 jobs		M42 J6
Birmingham City Centre Enterprise Zone	Commercial			40,000 jobs	Birmingham Box
Darlaston Enterprise Zone (part 1 of 2 sites for Black Country EZ)	Commercial	1918 jobs	7,127 jobs		M6 J9 and J10
I54 enterprise zone (part 2 of 2 sites for Black Country EZ)	Commercial	1400 jobs	2,900 jobs	3,466 jobs	M6 J10a
Primepoint 14, Stafford	Commercial		2,767 jobs	5,534 jobs	M6 J14
South East Cheshire Development Sites including Basford East & West			10,000 jobs	25,000 jobs	M6 J16 and J17
Manchester Airport & Airport City Enterprise Zone	Commercial		7,000 jobs	11,500 jobs	M6 J19
Warrington Development Sites, including Omega & Parkside	Residential Commercial	1,100 homes	4,000 homes 16,500 jobs	5,000 homes 21,000 jobs	M6 J20 to J22
Port of Liverpool Expansion (including Port Centric Developments)	Commercial		5,000 jobs		M6 J26
Cuerden Strategic Employment Site	Commercial		1,000 jobs		M6 J29
Preston City Centre	Commercial		6,000 jobs	8,000 jobs	M6 J29, M6 J31
Samlesbury & Wharton Enterprise Zones, Lancashire	Commercial		3,000 jobs	6,000 jobs	M6 J31 and J32
Preston East Employment Area	Commercial		6,000 jobs		M6 J31a and M6J32
North Preston Area housing	Residential		4,000 homes	6,000 homes	M6 J32
Lancaster University Innovation Park	Commercial		1,000 jobs		M6 J33
South West Cumbria Development sites (including Barrow and Ulverston)	Residential Commercial	400 homes	1,500 homes 1,500 jobs	3,000 homes 2,000 jobs	M6 J36

Kendal Development Sites	Residential	300 homes	1,600 homes	2,200 homes	M6 J36
	Commercial		1,500 jobs	2,000 jobs	
North West Cumbria Development Sites (including Sellafied)	Commercial	1000	14,000 jobs	15,000 jobs	M6 J40
Penrith Development Sites	Residential		1,600 homes	2,400 homes	M6 J40
	Commercial		1,000 jobs	1,400 jobs	
Carlisle Development Sites (Inc MOD Site at Longtown)	Residential (City)	2,300 homes	4,600 homes	8,500 homes	M6 J42, J43 and J44
	Commercial (City)	800 jobs	1,600 jobs	2,200 jobs	
	Commercial (District)	1180 jobs	2,360 jobs	5,000 jobs	M6 J45

- 3.2.3 Along the route there are eleven Local Enterprise Partnerships, and six Enterprise zones which are shown in Table 3.1 above.
- 3.2.4 There are seven areas with approval for City Deals along the route. Two areas were in the first wave of City Deals which focused on the eight core cities; these were Greater Birmingham and Greater Manchester. Preston has also now received City Deal status.
- 3.2.5 City deals for the Black Country, Coventry and Warwickshire, Oxford and Central Oxfordshire, and Stoke and Staffordshire are currently subject to negotiation.
- 3.2.6 Accumulative levels of growth along the M40 will have an impact on its operation and is of concern to the stakeholders. The existing local highway network is at capacity at peak times and the prospect of additional growth will exasperate conditions. In South Bucks proposals at Pinewood Studios which is currently subject to a planning appeal will require junction improvements
- 3.2.7 In High Wycombe constraints of the green belt together with the effects of the topography limits opportunity for growth to the M40 corridor without additional capacity at the M40 junctions, or the provision of an additional junction.
- 3.2.8 A key priority for stakeholders in Oxfordshire is significant levels of growth in and around Bicester which will place capacity issues for the M40 junction 9 and the A34. Whilst a Pinch Point scheme will provide some capacity, stakeholders are concerned that this is insufficient. Banbury to the north is expected to deliver 6,000 homes by 2031 putting pressure on M40 junction11.
- 3.2.9 With regard to M40 junction10 specifically, stakeholders noted that the current junction layout is insufficient to facilitate future growth, is highly constrained and leads to substantial delays. It was identified as being a very high priority by delegates at the Oxford workshop (along with junction 9) as a constraint to future development in the Motorsport Valley and North Oxfordshire.

- 3.2.10 Delegates at the Kettering workshop also identified congestion at M40 junction 10 and the section of the A43 between the M40 and Brackley as suffering from existing capacity and operational issues.
- 3.2.11 Development south of Warwick, and between Warwick and Leamington Spa is close to junction 14, while a new settlement at Gaydon/Lighthorne Heath will run alongside junction 12.
- 3.2.12 Junction 6 of the M42 was repeatedly raised by stakeholders as having a widespread impact on the feasibility of future development, and congestion for the wider SRN. Currently the junction and surrounding sections of the M42 are operating at capacity. The proposed developments will have a critical role in both the local economies of Solihull, including Birmingham more widely, and nationally. Both Birmingham airport and the National Exhibition Centre (NEC) have aspirations for further expansion. Coupled with the proposals by Solihull LA for UK Central and the proposed HS2 station at junction 6 (with over 6,500 new parking spaces) the future capacity of the network in this area will be key to unlocking local and national growth. A corridor study of the M42 between junctions 3a and 7 is planned to be carried out in 2014.
- 3.2.13 A Pinch Point scheme at M42 junction 6 is planned for delivery by March 2015 which is forecast to provide capacity to accommodate traffic growth until 2017. From 2017, it is anticipated that HS2 is due to make additional alterations to this junction.
- 3.2.14 A further area of concern for some stakeholders was the M5/M42 Bromsgrove Area. A great deal of future capacity is needed here to facilitate future growth in housing and employment sites.
- 3.2.15 A key priority for stakeholders is the significant growth of Wolverhampton North i54, Walsall and Darlaston (together known as the Black Country Enterprise Zone) which were considered likely to have significant impact on the SRN, in particular for this route junction 9 and 10 of the M6. One already identified congested stretch, M6 junction 10a to M5 junction 3, will be affected by both of these developments.
- 3.2.16 Future SRN links, such as the M54-M6 link will make existing land and developments more attractive, as well as reducing congestion on the local road network.
- 3.2.17 Stakeholders also considered that congestion and delays on the M6 between junctions 13 and 19 have a detrimental effect on the economy and attractiveness of the area to further investment. Evidence shows that there are current performance issues both on the carriageway and at junctions.
- 3.2.18 Further housing development, such as 10,000 houses in Staffordshire will create additional transport demand according to stakeholders. It is unlikely all the residents will work in Stafford so this will add pressure to the strategic network during peak periods for commuting traffic.

3.3 Network improvements and operational changes

3.3.1 The Highways Agency is already delivering a large capital programme of enhancement schemes nationally. This includes Major Schemes greater than £10m in value, plus smaller enhancement schemes including the current Pinch Point Programme. Table 3.2 below summarises the current committed enhancement schemes proposed along the route, which have also been represented on Figure 3.

Table 3.2 Committed SRN enhancement schemes

Location	Scheme Type	Completion Year	Anticipated Benefits
M40 J4/A404 Handy cross roundabout	Pinch Point scheme	2014	Installing SCOOT (Split Cycle Offset Optimisation Technique) to reduce congestion at this roundabout, SCOOT has proved to be an effective and efficient tool for managing traffic on signalised road networks.
A34/M40 J9 (Wendlebury) Improvement, Bicester	Pinch Point scheme	2014	Improvements to the operation of the junctions to reduce congestion on A34 northbound and A41 southbound
M40 J10 improvement	Pinch Point scheme	2014	Support the significant link between the M40/A34 and M1/A45/A14 routes through capacity improvements and signalisation
M40 J12	Local network management scheme	2015	Improvements to capacity on slip road and installation of traffic signals to provide improved access to local employment sites
M42 J6 improvement, Solihull	Pinch Point scheme	2015	Tackle congestion by widening sections of the roundabout at this junction.
M6 J5-8, Birmingham	Major scheme, smart motorways	2015	Smart motorways help relieve congestion by using technology to vary speed limits and allow use of the hard shoulder as a running lane
M6 J6 Salford Circus	Pinch Point scheme	2015	Installation of traffic signals at the junction with sensors to control traffic flows at busy periods
M5 J2 improvement, Sandwell	Pinch Point scheme	Completed	Work included widening the northbound and southbound exit slip roads by one lane and associated drainage, street lighting and signing improvements.
M5 J4 phase 2 widening, Bromsgrove	Pinch Point scheme	2015	The work has been designed to tackle congestion by widening the junction and creating a new lane.
M6 J9 improvement, Walsall	Pinch Point scheme	Completed	Reduce congestion and delay by installing traffic lights with sensors and renewed road markings
M6 J10a-13	Major scheme, smart motorways	2015	Smart motorways help relieve congestion by using technology to vary speed limits and allow use of the

			hard shoulder as a running lane
M6 J16 improvement	Pinch Point Scheme	2014	Improved flow and journey time reliability. Supports growth around Crewe and South Cheshire / North Staffordshire.
M6 J17	Pinch Point Scheme	2014	Improved flow and journey time reliability. Supports growth in Sandbatch, Congleton and South Cheshire.
M6 J16 - 19 CCTV	Technology Pinch Point	2014 / 15	Improved route and incident management.
M6 Thelwall	Technology Pinch Point	2014 / 15	Improved flow and journey time reliability. Improved incident management.
M6 J21A/M62 J10 Motorway – Motorway Metering	Local Network Management Scheme	2016	Experimental Scheme to improve flow & journey time reliability through the junction by speed management.
M6 J23 Enhancement	Pinch Point Scheme	2015	Improved flow and journey time reliability.
M6 J26 East Roundabout	Pinch Point Scheme	2015	Congestion reduction and improved journey time reliability on this important access route to the M6 from the Port of Liverpool supporting growth throughout north west England and development aspirations in West Lancashire.
M6 J27 - 28 CCTV	Technology Pinch Point	2014 / 15	Improved route and incident management.
M6 J32 Northbound Widening & M55 J1	Pinch Point Scheme	2015	Capacity improvement scheme to relieve congestion on the M6 and M55 motorway and support the strategic development of the North Preston area, including the Enterprize Zone at Warton.
M6 J33 VMS / CCTV	Technology Pinch Point	2013 / 14	Improved route and incident management.
M6 J35 VMS / CCTV	Technology Pinch Point	2014 / 15	Improved route and incident management.

3.3.2 [The 2013 Spending Review](#) and subsequent report from HM Treasury [Investing in Britain's Future](#) referenced a series of potential new pipeline

schemes for the SRN. Table 3.3 below provides a summary of the pipeline improvement schemes that would impact this route, subject to value for money and deliverability.

Table 3.3 Declared pipeline schemes

Location	Scheme Description
M6 J13 – 15	Smart Motorways, between the junctions with Stafford to Stoke-on-Trent
M6 J16 – 19	Smart Motorways, from Stoke-on-Trent to Manchester
West Manchester junctions (M6 J21a-26)	Smart Motorways, between the junctions with the M62 and M58 near Wigan

3.4 Wider transport networks

3.4.1 The June 2013 report from HM Treasury [Investing in Britain's Future](#) also listed the local transport schemes either completed, under construction or due to start before May 2015. Table 3.4 below lists the schemes from that report that will influence the ongoing operation of this route, plus any other funded local network commitments that will be delivered before 2021.

Table 3.4 Committed local transport network enhancement schemes

Project	Scheme Type	Completion Year	Anticipated Impacts on the Route
M6 J10	Road	2019	To increase capacity, reduce delay and facilitate investment in the Darlaston Enterprise Zone by rebuilding the structures over the motorway and improving adjacent junction on the local highway network
Basford West Spine Road	Road - Tranche 1 Local Pinch Point	2014	Greater connectivity between the A500 and the centre of Crewe. Possible increase in flow to M6 J16.
A500 Widening Scheme.	Road - Tranche 2 Local Pinch Point	2014	Additional capacity, likely to increase flows through M6 J16.
Northwich Town Centre Gyratory and Leicester Street Roundabout.	Road - Tranche 2 Local Pinch Point	2015	Limited direct impact.
Mersey Gateway (PFI)	Road	2016/17	This route will relieve the congested and ageing Silver Jubilee Bridge at Halton and will provide an additional crossing of the River Mersey and Manchester Ship Canal. In doing so it should offer some relief to the M6 in the Thelwall area (J20-J21A).
A49 Marus Bridge Congestion Improvements	Road - Tranche 3 Local Pinch Point	2015	Reduce congestion and improve connectivity between M6 J25 and Wigan Town centre on the A49 corridor. Potential to increase flows at M6 J25, however will also improve

			egress away from this junction on the local road network.
Broughton Bypass, Preston	Road	2017	Likely to improve operation of M55 J1 and improve flow and journey time reliability on M6 approaching J32.
Preston City Deal Transport Improvements – includes new junction 2 on to M55 and a new distributor road to the west of Preston	Road/Public Transport	2019-2021	Likely to have a positive impact on M55 at J1 and on the approaches to the M55 from the M6.
Heysham Link	Road	2016	New link from M6 to the Port of Heysham. Will impact on J34 of the M6 and improvements at this junction are to be incorporated into the scheme.
Penrith access to Employment Sites	Road – Tranche 4 Local Pinch Point	2015	Scheme to improve access to key employment sites in Penrith. Likely to impact on M6 J40.

- 3.4.2 Birmingham International Airport is located next to junction 6 of the M42 (with A46). The airport forecasts a growth from 11.5m per annum in 2010 to 15.3m passengers per annum by 2015, and 27.2m by 2030. From 2026, it is expected that Birmingham Interchange HS2 station and the airport will be accessed through the same junction separate to the current M42 junction 6.
- 3.4.3 Growth at both Liverpool John Lennon Airport and Manchester Airport is also likely to add pressure to the route, particularly given the importance of Manchester Airport as a regional hub for both passenger journeys and freight. Whilst neither of these airports access the route directly, their impact, particularly from Manchester Airport, will affect its operation.
- 3.4.4 The Port of Liverpool is also forecast to grow significantly over the next five years. The port is currently preparing major expansion proposals to enable it to cater for larger “post panamax” size vessels. This in turn will significantly increase the amount of freight the port can handle and will increase the number of trips on to the route via junction 26. The M6 is seen as key to the operation and future growth of both this port and of the Port of Heysham further north.

4 Key challenges and opportunities

4.1 Introduction

4.1.1 It is not possible to show all the challenges and opportunities identified in this evidence report. This chapter shows a selection based on those where our internal and external stakeholders viewed these as a priority and these are supported by evidence. A full list of all the identified challenges and opportunities are provided in the Technical Annex.

4.1.2 Figure 4 summarises some of the key issues and challenges that the route will experience during the 5 years from 2015, with the following sections and Table 4.1 explaining these issues and challenges in more detail.

Timescales

4.1.3 To understand the timescales of when the key challenges identified become critical and when opportunities on the route could be realised, the following definitions have been made in Table 4.1:

- **Short Term:** current
- **Medium Term:** before March 2021
- **Long Term:** not before 2021

4.1.4 These timescale categories provide guide for informing when a future intervention may be required to meet the anticipated future operational performance needs, or when interventions may be needed to help facilitate local housing and economic growth aspirations.

Local Stakeholder Priorities

4.1.5 Input from stakeholder and road user groups linked to the route have been used to inform the development of this evidence report. This included getting their views on what they deemed to be the priorities within their area and identifying their “top priorities” locally. This has been collated according to the route to which those views related.

4.1.6 Table 4.1 presents a summary of whether the challenges and opportunities identified were a priority for our stakeholders in their particular area. This exercise does not seek to prioritise the challenges and opportunities along the length of the route by trying to compare one issue against another, but reports the feedback from local discussions.

4.1.7 This picture of stakeholder priorities is subjective and has been informed by discussions regarding the top priorities locally at the stakeholder events, and in conversations with stakeholders who couldn't attend the events.

4.1.8 We recognise that the picture we build through this categorisation will be influenced by the representatives and organisations we have engaged with, and that consequently we may not have achieved a statistically balanced view and certain priorities may not have been identified as a

“top priority”. We will be conscious of the limitations of the reporting of stakeholder priorities as we move into the second stage of RBS.

4.2 Operational challenges and opportunities

- 4.2.1 The route is well served by the Traffic Officer Service and currently performs well in terms of the average duration of incidents. Management from the National (Birmingham) and South Mimms Regional Control centres of the M40 results in a gap in service between junctions 5 and 9. This provides a challenge to improve the service in this area.
- 4.2.2 From the stakeholder events, it was agreed that there is a need for better incident management, an increase in TOS resource and more reliable traffic information being available. However, data on the average duration of incidents suggest that the network does perform relatively well, although the impact of these incidents affects more road users due to the high flows on this route.
- 4.2.3 Our ability to inform road users of traffic conditions and provide strategic information along the route is good. This is due to the significant technology equipment along the route and with the installation of smart motorways around Birmingham and dynamic hard shoulder running on the M42 and M6. It was queried at the stakeholder workshop why smart motorways are not being installed on M6 between junctions 15 and 16 and this may be an opportunity to ensure route consistency, however this issue was seen as a low priority by stakeholders.
- 4.2.4 It is recognised that there are significant gaps in technology provision on the northern part of the route, beyond junction 32 of the M6. This makes managing the network in what can be quite isolated and exposed locations difficult, particularly during incidents and severe weather events.

4.3 Asset condition challenges and opportunities

- 4.3.1 The challenges for this route centre on aging infrastructure that will need an increasing number of interventions as the asset condition deteriorates. The key area for the assets on this route is pavement condition and managing the high number of structures.
- 4.3.2 The priority and number of concerns raised by stakeholders on the condition of the assets within the route were low. There were greater concerns regarding the capacity on the route, especially in and around towns and cities, and where significant maintenance is required, there is a challenge to manage the impact of road works.
- 4.3.3 The challenge with the whole of the section forming the Birmingham Box is that it is strategically key and any interventions here are likely to have an impact on a large number of road users (table 2.1). This includes the Ray Hall and Gravelly Hill Interchanges, and the M6/M42 junction all of which are locations where we see high traffic flows, some unreliability and significant future growth in and around Birmingham.

- 4.3.4 In terms of pavement asset condition about three quarters of the route is predicted to reach the end of its design life by 2020. The remaining quarter is located in discrete sections spread across the route as a whole.
- 4.3.5 It is also clear that there is a need to undertake some significant structural maintenance activities along the route by 2021.
- 4.3.6 Smart motorways are continuing to be introduced on this route and raises challenges and opportunities for the current maintenance regime. These sections of the route will no longer have a hard shoulder following the introduction of all lanes running which will have an impact on how our maintenance providers set out and manage road works. There is an opportunity for interrogating the use of technology provided on these sections to support road works and minimise the requirements for maintenance interventions.

4.4 Capacity challenges and opportunities

- 4.4.1 On this route there are current capacity challenges which have been evidenced in this document and raised by stakeholders. Also, stakeholders have raised with us where they think the priorities and timescales for opportunities to support growth.
- 4.4.2 The route is likely to come under significant pressure as growth aspirations along the route are realised. Indeed, to support that growth some considerable improvements to both main line capacity and key junctions will be required.
- 4.4.3 Along the route links and junctions around the major towns and cities are performing poorly when compared to the rest of the route. This is due to the high volume of traffic these sections carry. It is also, at these locations where there are significant aspirations from stakeholders on supporting future growth.
- 4.4.4 To the southern end of the route, stakeholders have highlighted the conjunction/interaction of several Route Based Strategies (RBS), including the London to Wales and London Orbital RBS'. Care will need to be taken to ensure that the emerging strategies reflect the needs of the various corridors. This is particularly important in considering the potential effect of increased capacity of Heathrow airport currently being considered by government.
- 4.4.5 The highest priorities from stakeholders were junction 4 of the M40 (where the A404 links the M40 and the M4) which is a key strategic junction; and the M42 and M6 around Birmingham. There are current performance issues at this junction owing to limited junction capacity. Local aspirations for growth in the High Wycombe area are focused near the M40 at junction 4. This demonstrates the attractiveness of being in close proximity to the SRN.
- 4.4.1 Stakeholders also highlighted the effects of growth in Cherwell, in and around Bicester. It is unlikely that there is sufficient highway capacity at M40 junction 9 and consideration will need to be given to how growth can be delivered whilst maintaining the integrity of the A34 and the M40

junction. Opportunities should be considered in conjunction with the Solent to Midlands corridor RBS which covers the A43 between M1 junction 15a south of Northampton and M40 junction 10 near Bicester, as well as a section of the A34 between M40 junction 9 (near Bicester) and Oxford.

- 4.4.2 There are significant growth aspirations around Birmingham and the roads on the Birmingham Box up to the M6 junction 10a. Stakeholders raised this location as a high priority, both now and from 2015 to 2021 over the period of the RBS, due to the Birmingham Box supporting economic growth both locally, regionally and at a national level. The Birmingham Box serves Birmingham city and the major conurbations of Solihull, Wolverhampton and Walsall as well as Birmingham Airport. As set out in Chapter 2, these sections currently experience capacity issues on both the links and at the junctions and the challenge is to manage pre-existing issues as well as supporting significant additional growth which is expected.

4.5 Safety challenges and opportunities

- 4.5.1 Generally the route performs well as a high standard motorway route, with discrete locations where there are clusters of injury incidents which are set out in section 2.2.
- 4.5.2 The primary safety issues raised by stakeholders were those affecting vulnerable users, and those affecting vehicle occupants. For the vulnerable road users, the issues highlighted in sections 2.2 and 4.4 are also highlighted as important safety issues. For vehicle occupants, the main issues are those that occur as a result of congestion, with queuing at junctions and merging and weaving when joining or leaving the network.
- 4.5.3 The concerns identified by stakeholders about the London to Scotland West route focused on operational capacity and the detrimental effects of congestion on the route reliability, safety and environmental effects and its ability to support economic development in the pipeline.
- 4.5.4 Relatively few location specific priorities were raised by stakeholders, the highest of these were the M6 between junctions 15 (Stoke-on-Trent) and 20 (junction with the M56), which was considered to be an issue not just now but also from 2015 to 2021.

4.6 Social and environmental challenges and opportunities

- 4.6.1 The route goes through many towns and cities and has an impact on the environment at these locations, especially where congestion is already an issue. As the route is generally rural in nature there are many sensitive areas that the route passes through and has an impact on. Stakeholders were keen that more consideration is given to location specific factors and the type of vulnerable user using the crossings.
- 4.6.2 The highest priority that was raised in relation to social and environmental impacts of the route was through Birmingham.

Stakeholders felt that the route has a significant impact on noise, air quality and light pollution.

- 4.6.3 Whilst accessing or crossing the SRN on this route were not raised specifically by stakeholders, the route passes through many towns and cities and so it is anticipated the route does have an impact on non-road users.

Table 4.1 Schedule of challenges and opportunities

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Network Operation	M6 J15-16	Smart motorways will be provided in the surrounding sections why not this section?	Partial	X	X		✓	✓		
	M6 from J32 to Scottish border	Incident management and response times. Impact on reliable journey times and investment in diversion routes. An example of this is the M6/M65 near Preston Low bridge on Sutton Weaver bridge (diversion route)	Yes	X			✓		✓	
	Ribble Crossing (M6 South of Preston)	M6 is only strategic crossing of the Ribble. If this section is blocked traffic can't cross river	Yes	X			✓	✓		
Asset Condition	Birmingham Box to M6 J10	Structures on this section will need significant further work with the potential to cause significant disruption as the busiest sections of the route (section 2.3)	Yes	X	X		X			
	M6 J16-20	Significant interventions will be required on the structures within this section	Yes	X	X		X			
	M6 J16-31, J32-33, J35-36	Pavement is expected to reach the end of its design life for these significant stretches (section 2.3)	Yes	X	X		X			
	M6 J18-19	Drainage issues are having an impact on the carriageway of the M6 especially during severe weather	Yes	X			X			

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Capacity	M40 J4	Roundabout is an issue: its complexity and a lack of data, combined with a public perception that it is a pinchpoint. The junction has limited capacity. Growth plans for High Wycombe are focused near the motorway.	Yes	X			✓			✓
	M40 J9	Whilst a Pinch Point scheme is being delivered, there will be sufficient medium/long capacity to support growth	Yes		X	X	✓		✓	
	M42 J1-3a	Planned development with affect local and strategic routes to the north of Redditch. Pressure on the SRN result in knock on problems for A38 problems – particularly serious in Bromsgrove. Lack of smart motorways on this section contributes to congestion	Yes	X		X	✓			✓
	M42 J6	The junction is in the heart of the country so is nationally significant. However it suffers from congestion and will continue to do so with the level of growth allocated for this area. This would make journey times unreliable and could have a negative impact on the economy.	Yes	X	X	X	✓	✓		
	M5 J3-5	Pressure on the SRN result in knock on problems for A38 problems – particularly serious in Bromsgrove.	Yes	X			✓			✓
	M6 / M6 Toll	M6 Toll empty while M6 congested	Partial	X			✓		✓	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
	M6 J10a-8 / M5 J1-3	Strategic congestion and journey time issues northbound and southbound on these sections with particular congestion issues at the southbound M6 J10a-10 and at the intersection of M6 with M5. These sections are already at capacity. This can have a knock on effect to local traffic at junctions and impacts local economies	Yes	X			✓			✓
	M42 (from junction with M40 to junction with M6)	The Local Enterprise Partnerships' Strategic Economic Plan will have a major impact on growth and employment. This will require highway capacity, particularly on the strategic routes/junctions Key site is UK Central – the M42/Solihull corridor in the vicinity of M42 J5 and J6 and M6 J4 Birmingham City Centre enterprise zone is major growth area and will affect traffic growth. M42 J6 Runs at 98% capacity and is often gridlocked. Not seasonal – remains constant. Concerns for future Solihull Gateway/Airport expansion.	Yes	X	X	X	✓			✓
	M6 J9 to 10A	There are two Local Enterprise Zones in the black country: (DSDA Walsall and i54 Wolverhampton) that will introduce significant growth and travel demand on SRN	Anticipated growth maps, Black Country LEP	X	X	X	✓	✓		
	M6 between junction with A500 and J20	Increased capacity provided through introduction of hard shoulder running.	Yes	X			✓			✓
	M6 Corridor (Cheshire East)	Maintaining flow and access for travel within the NW and further afield.	Yes	X			✓			✓

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
	Lack of smart motorways by Stoke-on-Trent (M6 J15)	Potential bottleneck on the network with planned schemes either side of this location	Yes	X			✓		✓	
	Access to Manchester	Noted that the county as a whole depends on access to Manchester via M6, M61 and A56/M66. Congestion in Greater Manchester affects Lancashire	Yes	X			✓		✓	
	M6 / M65 (Preston)	Various future development pressures with additional traffic demands: - Cuerden / Bamber Bridge - City Deal	Yes		X		✓			✓
	M6 J28	Future development pressures at Buckshaw Village- development not yet built out. Local network will become over capacity and have subsequent impacts on the SRN.	Yes		X		✓			✓
	M6 / M61 Merge Northbound	AM Peak congestion issues – due to the layout of the merge / driver behaviour issues	Yes	X			✓		✓	
	M56 to M6 South	Lack of direct link at this point	Yes	X			✓		✓	
	M6 J26	Capacity and operation post-proposed improvements schemes	Yes		X		✓		✓	
	M6 J25	Southbound on only junction – N/B traffic requires long detour to J26; S/B on requires detour to J2 through an urban area.	Yes	X			✓		✓	
	M6 (Cheshire to Staffs)	Congestion / delay	Yes	X			✓		✓	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Safety	M40 J4	Weaving (possibly due to signing for 2 lanes vs 3 lanes) and the reduction in on line capacity through the junction is resulting in queuing and safety concerns	Yes	X			✓	✓		
	M6 J4-5	Compared to the rest of the network is in the highest category of collision rates across the SRN	Yes	X			X			
	M6 J15 Stoke-on-Trent	Safety Issue Junction is ranked in the top national 250 collision cluster sites across the SRN	Yes	X			✓	✓		
	M6 J19	Congestion and high accident record experienced at junction. Reported to experience the highest accident rate in the country.	Partial	X			✓			✓
	M6 J15 to J20	Accident and incident hot spot. Accidents / incidents along the M6 cause congestion and encourage drivers onto the local highway network. This results in congestion on the local highway network. M6 J16 and J19 are ranked in the top national 100 collision cluster sites across the SRN	Yes	X			✓			✓
	M6 J23	Ranked in the top national 100 collision cluster sites across the SRN	Yes	X			X			

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short-term	Medium-term	Long-term		Low	Medium	High
Social and environment	All	Flood risk map shows flooding issues to be a lot less extensive than the Environment Agency have ascertained. Need to improve forward planning of maintenance to address environmental damage caused by flooding at bridges and culverts. Night maintenance has improved network performance. Need to consider Water Framework Directive when planning new roads. Possible need for new drainage technology	Yes	X	X	X	✓		✓	
	Birmingham	Need to address the impact that high levels of transport movements have on noise/air quality/light pollution.	Yes	X			✓		✓	
	M6 J19	Congestion and air pollution experienced between and around this junction. To improve air quality, congestion needs to be addressed. Noise is less of an issue due to car technology.	Yes	X			✓		✓	
	All	Air Quality. Significant issue along much of the route.	Yes	X			✓			✓
Other	-	-	-	-	-	-	-	-	-	-

4.7 Conclusion

- 4.7.1 The London to Scotland West route is made up of motorways, the M40, M6 and M5 and it forms part of the Trans European Network. The motorways are 3 and 4 lanes with several sections upgraded to smart motorways and more planned. The route links major cities to the capital as well as being one of two key north - south arteries.
- 4.7.2 The evidence compiled about this route shows that the current capacity challenges tend to focus around the major urban centres. These are also the areas that are attracting future development aspirations, which is likely to exacerbate the existing challenges as new growth happens.
- 4.7.3 The M40 around junction 4 (Handy Cross) regularly has queuing at peak times and is also the focus of planned future growth aspirations. Stakeholders recognised this issue as a priority for future capacity enhancements to support economic development in the area. There is a Pinch Point scheme being implemented through the current programme to be completed by 2015, this will address current capacity issues. However, it is felt that the scale of new development proposed in the area alongside general traffic growth will mean that this scheme is unlikely to provide sufficient capacity.
- 4.7.4 The M40 between junctions 9 and 10 (Oxford and Bicester) is used by strategic traffic and by local commuters and tourists to the area. Evidence has identified that there are current capacity issues and the challenge is to identify suitable capacity enhancements that can also support planned future growth.
- 4.7.5 Evidence and local stakeholder feedback identified the Birmingham Box as being a very busy and unreliable section of the route, serving both longer distance strategic trips and a large number of local commuter journeys. Significant new development is also planned in Birmingham, Solihull and the Black Country, including a number of Enterprise Zones, which will further increase demands on key links and junctions around the Birmingham Box.
- 4.7.6 A key location will be the M42 between the M40 and M6 through Solihull, which supports Birmingham Airport, the NEC, plus key business parks and major developments in Solihull. Evidence and stakeholder feedback both confirm that although the introduction of smart motorway technology on this stretch of the M42 significantly improved its operation, the planned scale of new development in the area, including the new HS2 Station and UK Central, will require further capacity enhancements, particularly around junction 6. The Secretary of State for Transport has already promoted a study into the network needs for this part of the route that will get underway in early 2014. The outcomes of that study should inform the future strategy for this part of the route.
- 4.7.7 Other key capacity issues around the Birmingham Box evidenced and identified by stakeholders include;

- the M5 and M6 through the Black Country (junction 2 of the M5 through to junction 10a of the M6), particularly at M6 junction 10 and M5 junctions 1 and 2;
- the M6 between junctions 6 and 8; and
- the M40/M42 merge.

- 4.7.8 Stakeholders raised concerns that the M6 Toll is underutilised and they suggested that the performance of other routes, such as the M6, could be improved if the M6 Toll was to be made more attractive to traffic. Stakeholders identified this as one of the highest priorities for this route. The challenge will be how to increase utilisation given that the M6 Toll is a privately operated toll road on a 50 year concession that is not due to expire until 2054.
- 4.7.9 The M6 between junctions 14 and 21a serve major urban centres at Stafford, Stoke-on-Trent, Crewe and link via the M62 to Greater Manchester and Merseyside key conurbations. Much of this section is already planned to be developed to smart motorway standard. However, the section between junctions 15 to 16 has currently not been identified as a potential future smart motorway. This may present a challenge due to a lack of strategic highway capacity continuity between the Midlands and the North West.
- 4.7.10 The evidence compiled in this report shows that the safety challenges are predominantly focused at junctions and that the main line generally performs well.
- 4.7.11 Two junctions on the M40 (junction 4 and junction 9) are in the top 100 casualty locations nationally, along with four junctions on the M6 (junctions 9, 15, 16 and 19). Pinch Point schemes are currently being developed for implementation by 2015 at M40 junctions 4 and 9, M6 junction 16, plus a CCTV scheme on the M6 between junction 16 and 19. Although originally developed to enhance capacity, these improvements may also help to improve safety and trends should be monitored after the schemes have been implemented.
- 4.7.12 From an operational perspective, the route performs well due to significant coverage from the Traffic Officer Service. This is demonstrated by incident durations generally being under 30 minutes.
- 4.7.13 A technology gap could be created on the M6 between junctions 15 and 16, if smart motorways are rolled out on the rest of the M6 between the Midlands and the North West. This could create operational difficulties around maintaining consistent messages to road users, particularly if the current safety challenges identified at junctions 15 and 16 persist.
- 4.7.14 Stakeholders also raised a lack of technology on the M6 between junction 32 and the Scottish border as an issue and the usage of the diversion route between junction 32 and 33. There is no evidence to support this as these sections of the route perform well in terms of delays and average speeds at peak times.
- 4.7.15 The evidence compiled in this report shows that the majority of the asset is in reasonable condition. There are particular concerns of life expired

pavement on the M6 between junctions 16 and 31 and also between junctions 32 to 33 and junctions 35 to 36.

- 4.7.16 The smart motorway schemes currently being constructed on the M6 between junctions 5 and 8 and 10a and 13 in the West Midlands are replacing surfacing, where appropriate.
- 4.7.17 There are particular challenges with the structures asset on the M6 between junction 5 and 6 and the M5 between junctions 1 and 2. Delivering cost effective maintenance solutions that aim to minimise disruption to road users will be the key challenge for these structures.
- 4.7.18 The bridge structures supporting junction 10 have also been identified as requiring significant maintenance works within the life of the route based strategy. There may be an opportunity at this location to link these necessary maintenance works with any capacity enhancements that are progressed to support the Black Country Enterprise Zone referenced earlier.
- 4.7.19 The evidence presented in this report also shows a number of social and environmental issues to consider. For example, the route passes close to large residential and employment areas via the Birmingham Box, with the associated noise and air quality issues that come with such proximity. There are also air quality concerns around M6 junction 19, which are currently felt to be related to congestion at this location.
- 4.7.20 Neighbours have raised concerns about noise in some locations along the route where there is concrete surfacing, for example on the M42 and on the M6 through Staffordshire. When the road surface deteriorates, there will be an opportunity to address these concerns through a road surfacing maintenance scheme.
- 4.7.21 This route interacts with 10 other route-based strategies:
- London Orbital and M23 to Gatwick – where the M40 connects to the M25 at junction 16;
 - London to Wales – via the connection to the A404 at M40 junction 4;
 - Solent to Midlands – where the A34 connects at M40 junction 9 and the A43 connects at M40 junction 10;
 - South Midlands – there are various routes connecting to the route in the West Midlands;
 - Felixstowe to Midlands – connecting to the Birmingham Box at M6 junction 4;
 - Midlands to Wales and Gloucester –via the M54 at a southbound only connection at M6 junction 10a;
 - Birmingham to Exeter – connecting to the Birmingham Box at M5 junction 4a;
 - North and East Midlands – connecting to the M6 at Stoke-on-Trent via the A500 at junctions 15 and 16;

- South Pennines – various connections to the M6 in the North West, including the strategic connection to the M62 at the M6 junction 21a Croft Interchange; and
- North Pennines – various connections to the M6, including the A590 and A66 key tourist gateways into the Lake District at M6 junction 36 and junction 40.

4.7.22 Capacity issues on the route are taking priority with stakeholders over operational, safety and asset condition issues. However, evidence is suggesting a number of specific pavement and structures issues will need to be tackled during the period of the route-based strategy (up to 2021).

4.7.23 The evidence and feedback from stakeholders has also shown that there are locations with a combination of capacity, condition and sometimes environmental issues, which if the right solutions can be identified could be tackled through single interventions. Of particular note within this report that it is expected will require consideration before 2021 are:

- Capacity issues on the M40 around junctions 4, 9 and 10;
- Capacity issues around the M42 between the M40 and the M6, particularly around M40 junction 6;
- the M5 and M6 through the Black Country (junction 2 of the M5 through to junction 10a of the M6), particularly at M6 junction 10 and M5 junctions 1 and 2;
- the M6 between junctions 6 and 8;
- Capacity and structural maintenance issues on the M5 and M6 in the Black Country;
- Safety and technology operational and capacity issues on the M6 around Stoke-on-Trent between junctions 15 and 16; and
- Pavement resurfacing needs on the M6 in the North West.

Figure 4

Key opportunities and challenges for the route

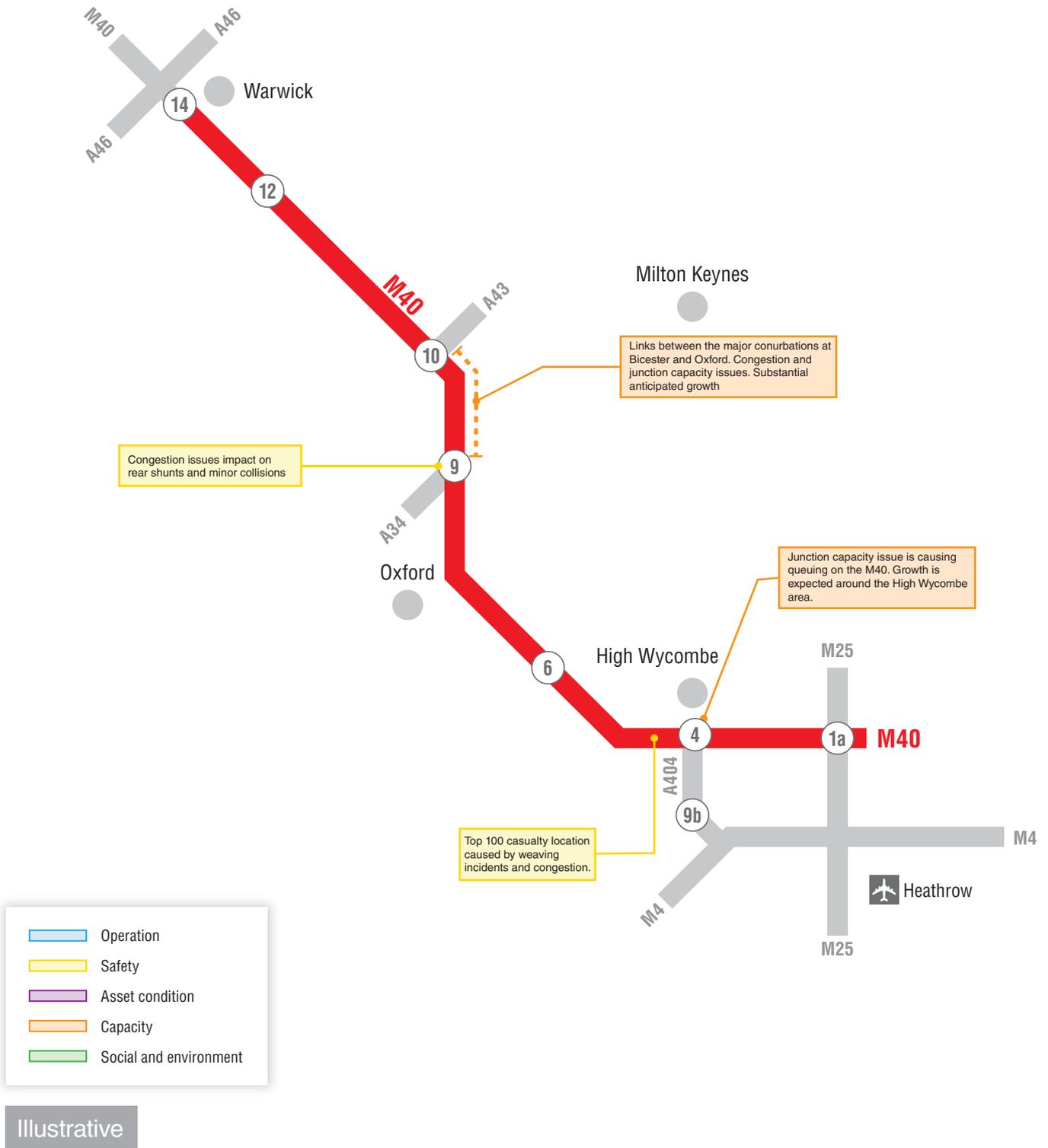
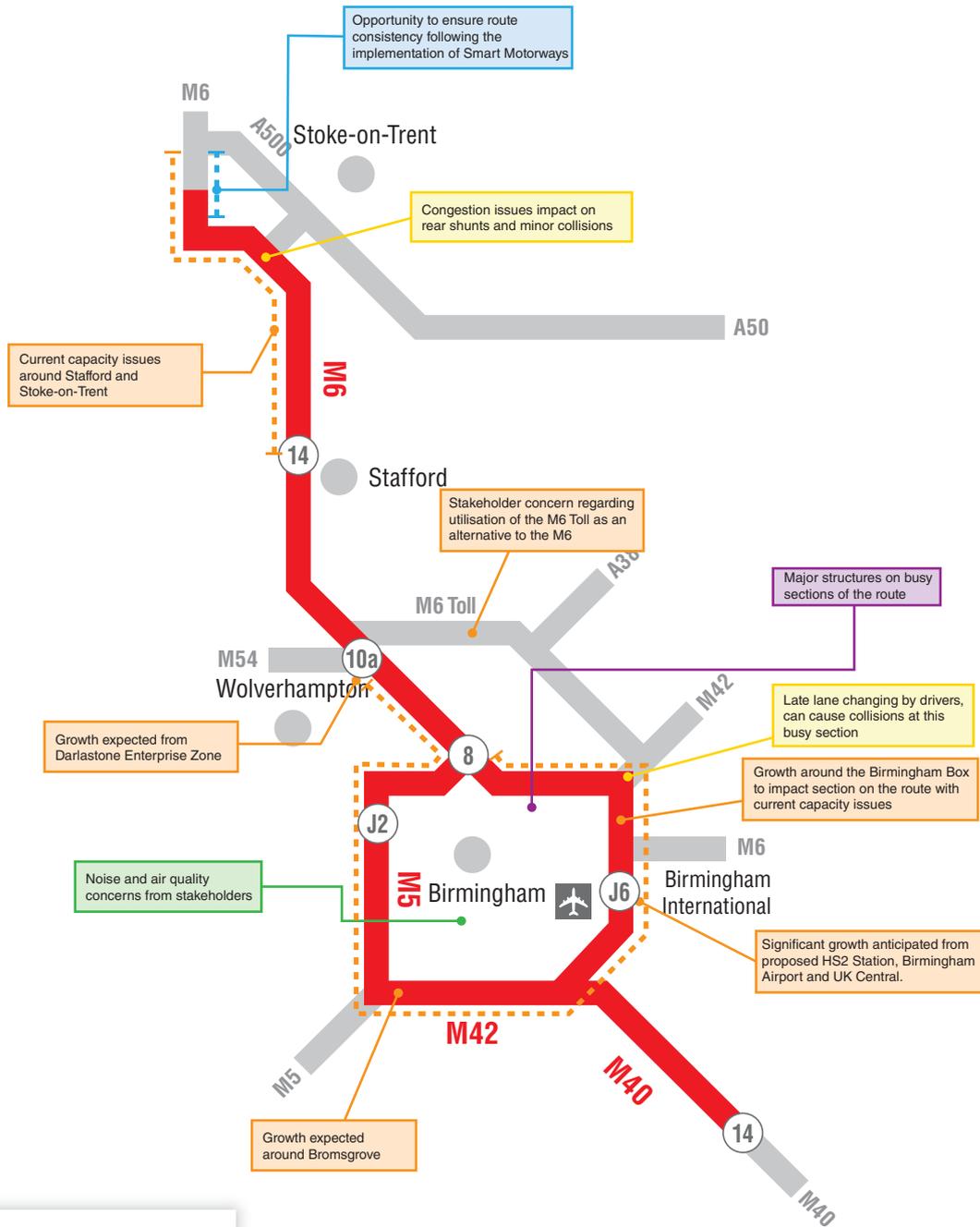


Figure 4

Key opportunities and challenges for the route



- Operation
- Safety
- Asset condition
- Capacity
- Social and environment

Illustrative

Figure 4

Key opportunities and challenges for the route

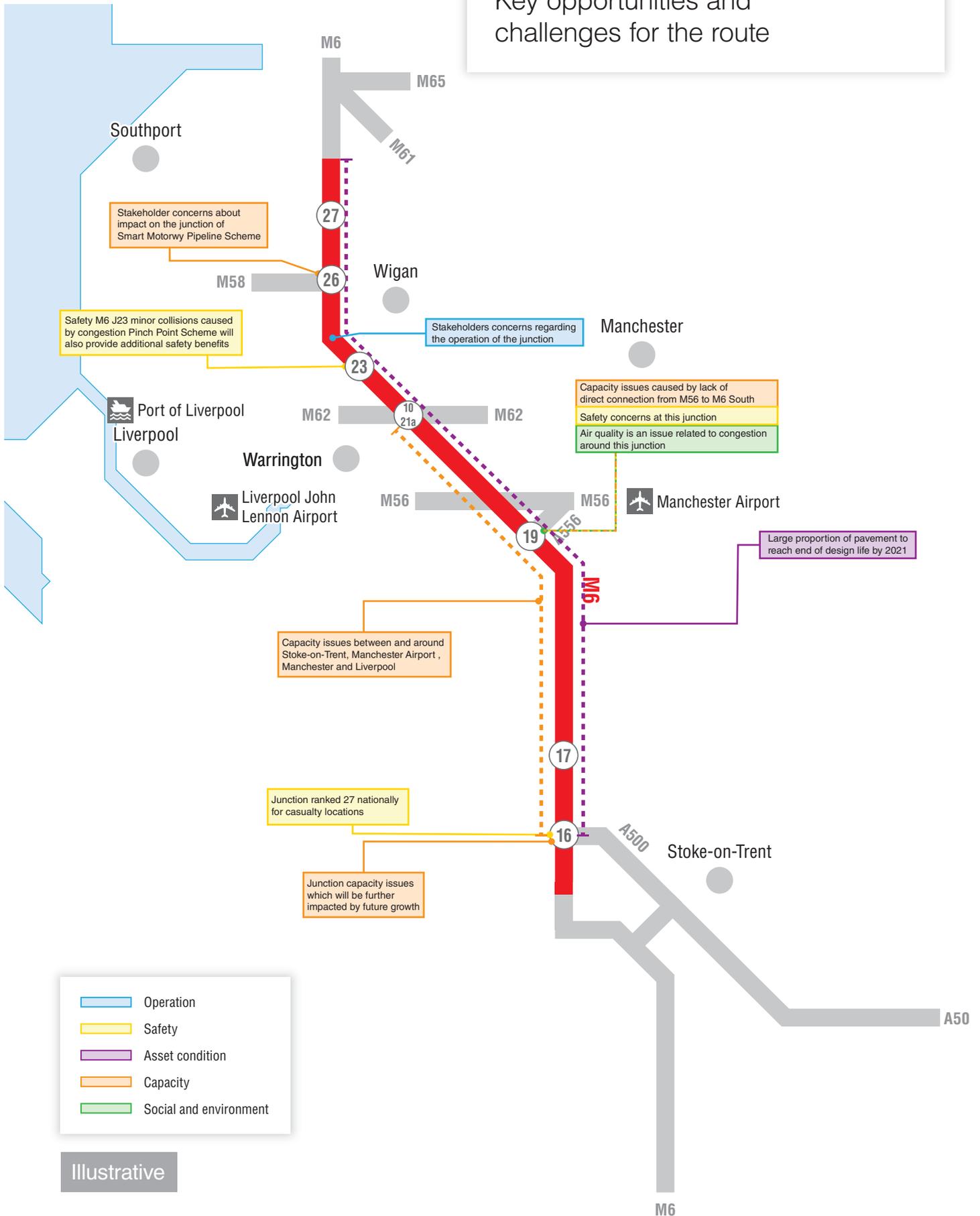
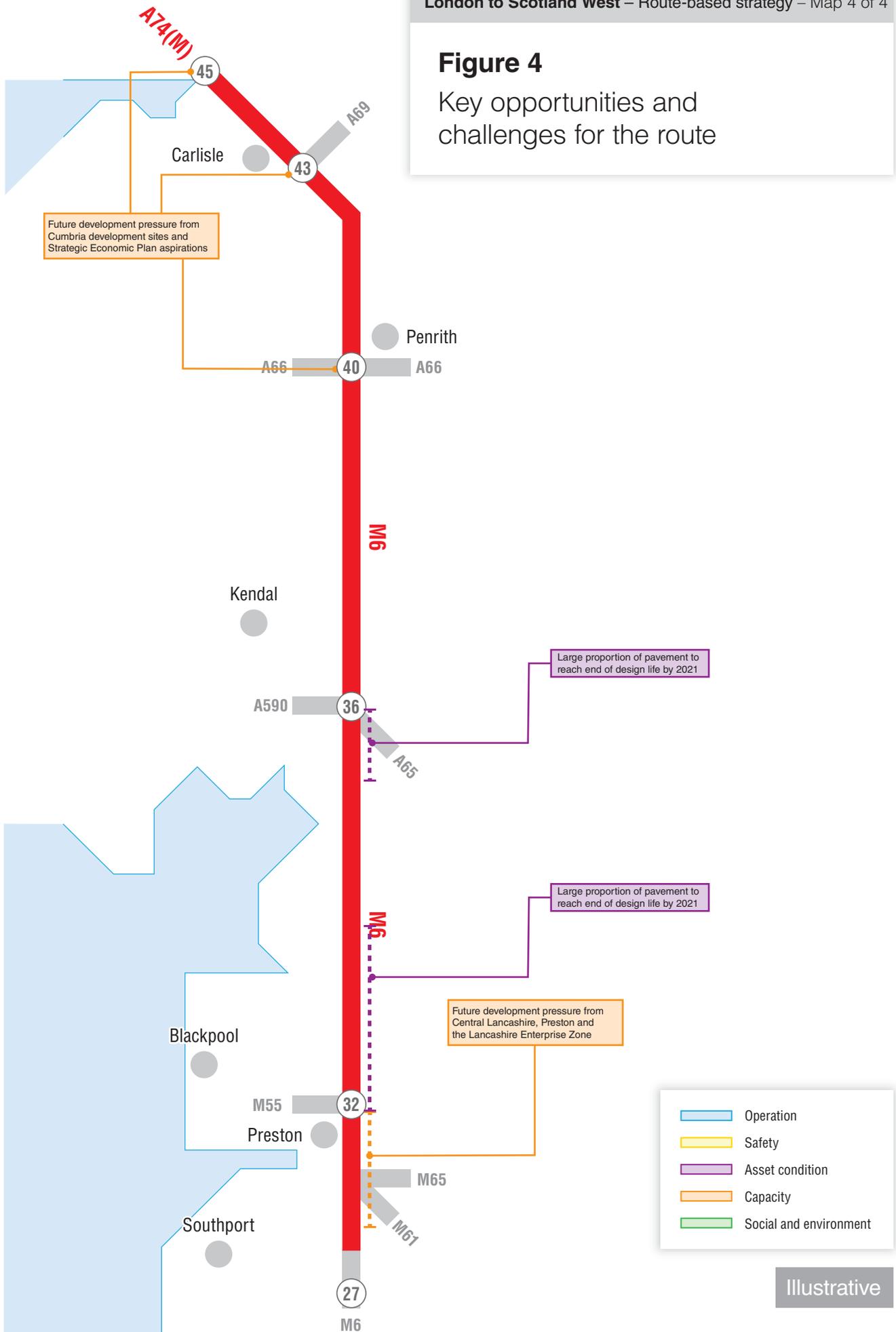


Figure 4

Key opportunities and challenges for the route



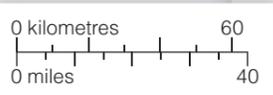
Appendix A Route map

Route-based strategies

The division of routes for the programme of route-based strategies on the Strategic Road Network

-  London to Scotland East
-  London Orbital and M23 to Gatwick
-  London to Scotland West
-  London to Wales
-  Felixstowe to Midlands
-  Solent to Midlands
-  M25 to Solent (A3 and M3)
-  Kent Corridor to M25 (M2 and M20)
-  South Coast Central
-  Birmingham to Exeter
-  South West Peninsula
-  London to Leeds (East)
-  East of England
-  South Pennines
-  North Pennines
-  Midlands to Wales and Gloucestershire
-  North and East Midlands
-  South Midlands

Information correct at 19 March 2014



Appendix B Glossary

Abbreviation	Description
AADT	Annual Average Daily Traffic
ANPR	Automatic Number Plate Recognition
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
CCTV	Closed circuit television
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
END	EU Environmental Noise Directive
FPL	First Priority Location
HRA	Hot Rolled Asphalt
IA	Important Area
KSI	Killed or Seriously Injured
LAs	Local Authorities
LEPs	Local Enterprise Partnerships
MIDAS	Motorway Incident Detection and Automatic Signalling
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NTOC	National Traffic Operations Centre
RBSs	Route-based strategies
RCC	Regional Control Centre
SACs	Special Areas of Conservation
SPA	Special Protection Area
SRN	Strategic Road Network
SSSI	Sites of Specific Scientific Interest
TEN-T	Trans European Transport Network
TSCS	Thin Surface Course Treatment
TOS	Traffic Officer Service
VMS	Variable Message Signs

Appendix C Stakeholder involvement

Further information on those stakeholders who were involved in the stakeholder events can be found within part B of the London to Scotland West Technical Annex.

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