

London to Scotland East Route Strategy Evidence Report April 2014



Document History

London to Scotland East route-based strategy evidence report

Highways Agency

This document has been issued and amended as follows:

Version	Date	Description	Author	Approved by
1	February 2014	Draft for comment	Sarah Garland/ Daniel Gaunt	Victoria Lazenby
2	April 2014	Final version	Sarah Garland	Andrew Butterfield

Table of Contents

1	Introduction.....	1
1.1	Background.....	1
1.2	The scope of the stage 1 RBS evidence report.....	2
1.3	Route description	2
2	Route capability, condition and constraints	6
2.1	Route performance	6
2.2	Road safety.....	19
2.3	Asset condition.....	27
2.4	Route Operation.....	30
2.5	Technology	32
2.6	Vulnerable road users.....	33
2.7	Environment.....	33
3	Future considerations	38
3.1	Overview	38
3.2	Economic development and surrounding environment	43
3.3	Network improvements and operational changes	46
3.4	Wider transport networks	48
4	Key challenges and opportunities	51
4.1	Introduction	51
4.2	Operational challenges and opportunities.....	52
4.3	Asset condition challenges and opportunities	53
4.4	Capacity challenges and opportunities.....	54
4.5	Safety challenges and opportunities	58
4.6	Social and environmental challenges and opportunities	58
4.7	Conclusion	70
	Appendix A Route map	79
	Appendix B Glossary.....	81
	Appendix C Stakeholder involvement.....	83

Tables

Table 2.1	Ten busiest sections on the route	6
Table 2.2	Ten least reliable journey-time locations on the route	7
Table 3.1	Key housing and economic growth proposals	43
Table 3.2	Committed SRN enhancement schemes	46
Table 3.3	Declared pipeline schemes	48
Table 3.4	Committed local transport network enhancement schemes	49
Table 4.1	Schedule of challenges and opportunities	60

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) will inform the investment strategy for our network. This will incorporate operation, maintenance and where appropriate, improvements to proactively facilitate economic growth, whilst delivering the outcomes set out in the five year SRN performance specification for the equivalent period.
- 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 (East) 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 Agency and from our partners and stakeholders outside the 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;
- 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;
- 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 East route is a key section of the SRN, supporting the national, regional and local economies. It provides a link between London and Scotland as well as connecting some of our biggest cities, airports and ports.

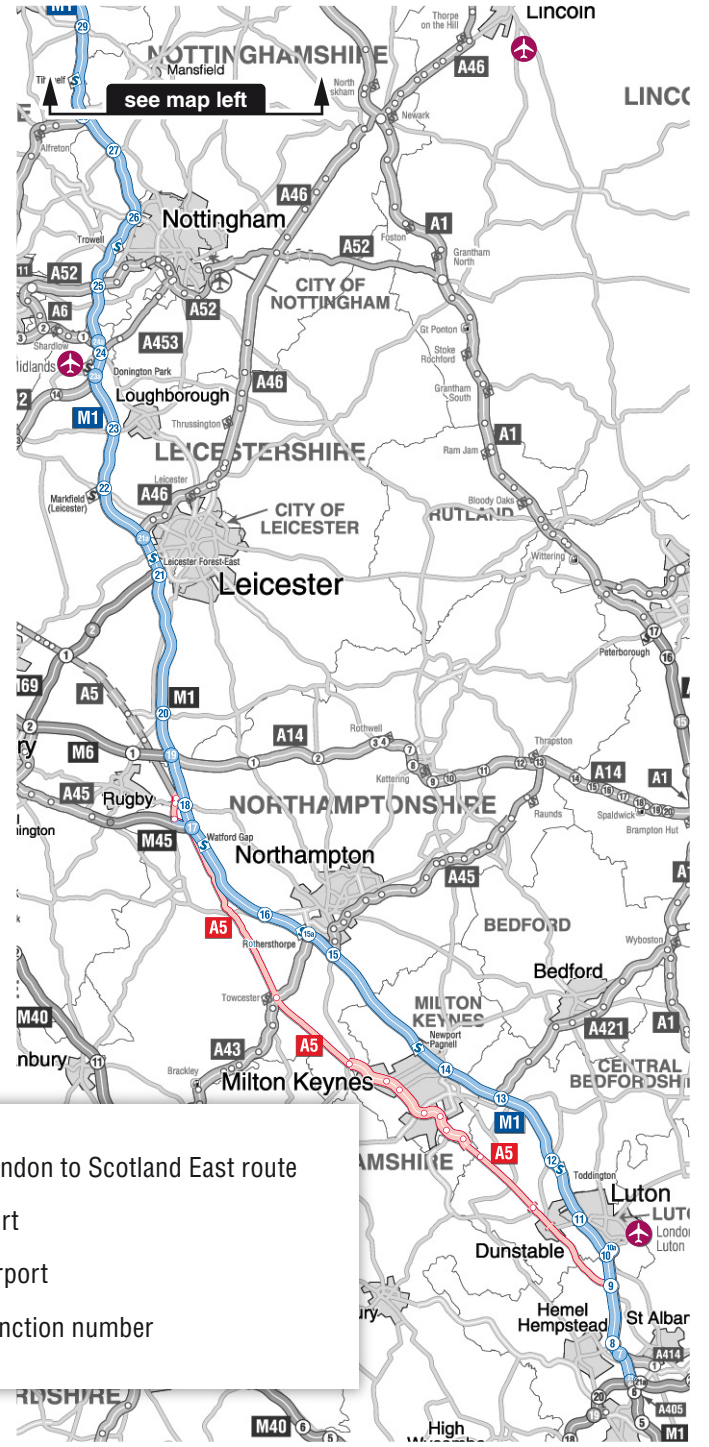
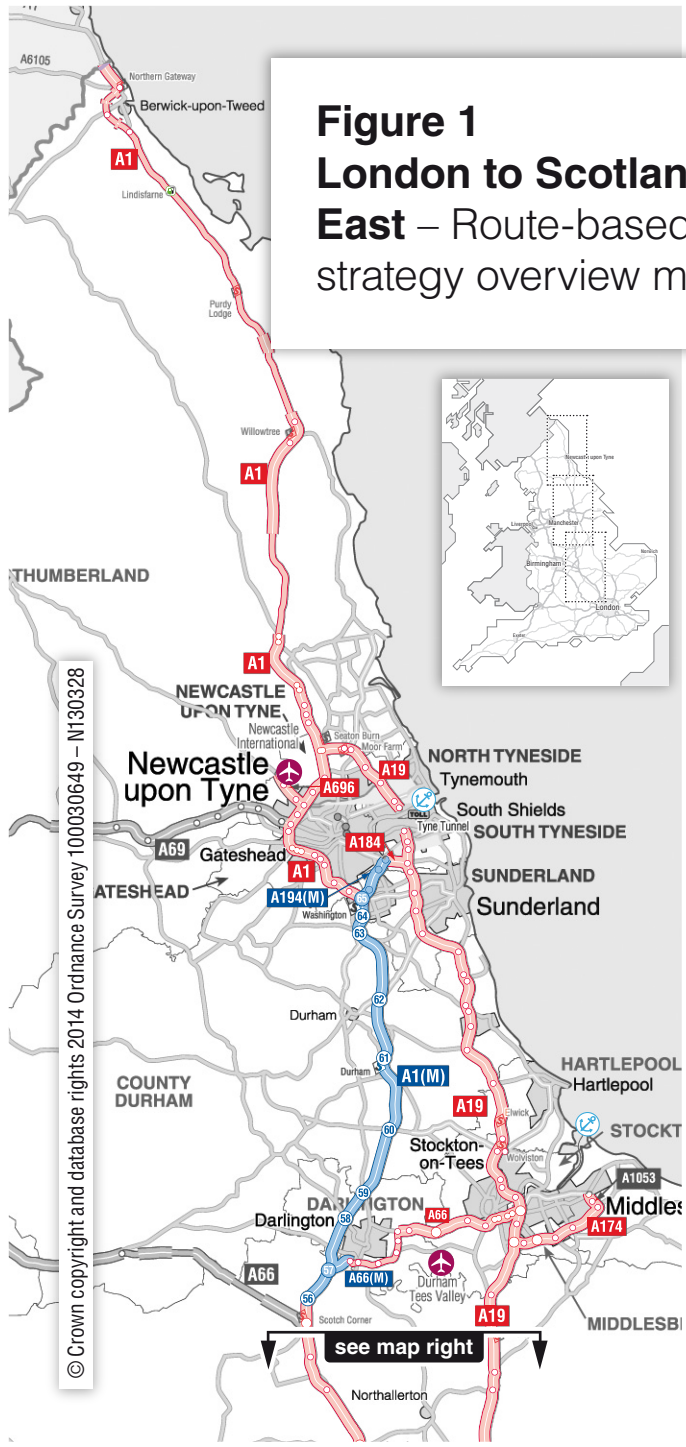
1.3.2 The route comprises the length of the M1 from London to Leeds, where the route follows the A1 and A1(M) to the border with Scotland. It also includes the A5 running in parallel to the M1 from junction 9 at Harpenden to where it joins the M1 at junction 18, the A168 and A19





from Dishforth to north of Newcastle, and supplementary routes serving the Tees Valley and Tyne and Wear conurbations.

- 1.3.3 The M1, A1 and parts of the A19 are part of the Trans-European Network (TEN-T) which is comprised of roads, railways, waterways and airways considered vital for trans-European travel. The full extent of the route can be found in Figure 1.
- 1.3.4 The route links London to the core cities of Nottingham, Sheffield, Leeds and Newcastle, and directly serves the major international hub Port of Tees as well as key national and regional gateways at Luton Airport, East Midlands Airport and Newcastle International Airport.
- 1.3.5 The route between London and Leeds is predominantly made up of three lane and four lane motorway, while from Leeds to Newcastle the route is mostly two lane dual carriageway or three lane motorway. The A5 section to the south of the route is predominantly single carriageway. North of Newcastle, the route is mostly single carriageway with sections of two lane dual carriageway trunk road. Smart motorways are in operation along the M1 around Luton and Nottingham with installation in other areas planned. This is shown in Table 3.2.
- 1.3.6 On an average day, over 31 million vehicle miles are travelled on the route. The route includes a high proportion of long-distance commercial journeys, due to its strategic nature and distribution centres along its length. In a number of areas, particularly around Milton Keynes, south of Leeds, in Tees Valley and around Newcastle and Gateshead, a significant proportion of the traffic is locally based making short trips. Additionally, the A5 through Dunstable and Towcester are also the town's high streets.
- 1.3.7 As a major north-south link, the route plays a very important role in supporting the retail, tourism and leisure industries. There are major shopping centres on the route at Leicester's Fosse Park, Meadowhall in Sheffield and Metrocentre Gateshead; and it serves the Peak District, North Yorks Moors, Yorkshire Dales and Northumberland National Parks. The British Grand Prix in July has a significant impact on the route, and we work closely with stakeholders to ensure disruption is minimised.
- 1.3.8 There are three significant sections of the route maintained and operated on behalf of the Highways Agency under the private finance initiative by Design, Build, Finance and Operate (DBFO) companies. These are:
- M1 A1 Link Road (Lofthouse to Bramham) managed by Connect M1-A1 Ltd;
 - A1 Darrington to Dishforth, managed by Road Management Services (Darrington) Ltd; and
 - A168, A19, A174, A1053 and A66 between the A19 and Teesside Park, which are managed by Autolink Concessionaires (A19) Ltd.
- 1.3.9 This route connects with a number of other routes for which RBS are also being developed. These are:

- London Orbital and M23 Gatwick (where M1 meets M25);
- Felixstowe to Midlands (connects M1 with A421, A45 near Northampton with M1 and crosses at the M1/A14/M6 junction at Catthorpe Interchange);
- Solent to Midlands (the A43 crosses the A5 and meets the M1 at Towcester);
- South Midlands (connects A5 with M1 junction 18, M69 with M1 at Leicester, A42 with M1 junction 23a);
- North and East Midlands (connects A46 and M1 near Leicester, crosses the M1 between Derby and Nottingham);
- London to Leeds (East) (connects at Leeds where the A1 becomes part of the London to Scotland East route);
- South Pennines (connects M18 and A1(M) at Sheffield and Leeds);
- North Pennines (connects A66 and A69 with A1)

Figure 1
London to Scotland
East – Route-based
 strategy overview map



-  London to Scotland East route
-  Port
-  Airport
-  Junction number

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 busiest sections of the London to Scotland East route are mostly between London and Luton. The M1 along this section is a recently widened four lane motorway between junction 6A (M25) and junction 10 (Luton).
- 2.1.3 The M1 between junctions 21 and 21A is a four lane section, where the junctions serve the city of Leicester and connects with the M69 at junction 21, which is a key strategic link between the M6 and M1. This section is a busy link due to its importance for both the local area and for strategic traffic between junctions 21 and 21a.
- 2.1.4 Another key link with the east/west routes is junction 23A which connects the M1 with the A42 and M42. The two junctions of 23A and 24 provide busy connections to cross-country routes and the local road network. East Midlands Airport is also located along this section.
- 2.1.5 The proportion of freight across the route is generally high owing to its strategic nature. The highest proportion of freight for the route is on the A1(M) between junctions 49 and 50 near Ripon and Thirsk, where 47% of total vehicles are classed as freight vehicles; of which 25% are heavy goods vehicles (HGVs) The M1 between junctions 9 and 10 has the third highest proportion of freight for the route, where 42% of total vehicles are over 5.2m long; of which HGVs represent 19%. The A5 around Rugby featured highly in terms of the proportion of freight on the section between the A5 and A428 (east), ranking 6th and 7th on the route and 41st and 45th nationally. This is due to the Daventry freight interchange being close by.
- 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. A more complete list showing all sections among the 10% most trafficked in England is in the Technical Annex.

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 (out of 2497 links)
1	M1 between M1 J7 and M1 J8	84,487	14
2	M1 between M1 J6A and M1 J7	80,647	19
3	M1 between M1 J9 and M1 J8	80,426	20
4	M1 between M1 J8 and M1 J9	79,877	22

5	M1 between M1 J7 and M1 J6A	79,225	25
6	M1 between M1 J10 and M1 J9	76,168	34
7	M1 between M1 J9 and M1 J10	76,025	35
8	M1 between M1 J8 and M1 J7	73,647	47
9	M1 between M1 J21A and M1 J21	67,178	84
10	M1 between M1 J24 and M1 J23A	66,945	88

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 on this route are presented in 2.2 below. This is for the reporting period 1 April 2012 to 31 March 2013.

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 (out of 2497 links)
1	M1 between M1 J10 and M1 J10A (LM151)	51.9%	16
2	A19 between A1290 and A184 (AL1596)	54.1%	21
3	A19 between A194 and A184 (AL547)	55.5%	28
4	A19 between A1056 and A189 (AL1616B)	58.2%	53
5	A19 between A1171 and A189 (AL1304)	59.1%	59
6	A19 between A1130 and A174 (AL1516)	59.8%	69
7	M1 between M1 J41 and M1 J42 (LM231)	61.2%	105
8	A1 between A1 and A694 (AL1210A)	62.1%	131
9	A19 between A1058 and A191 (AL1607)	62.2%	135
10	M1 between M1 J34 S and M1 J34 N (LM213)	62.7%	147

2.1.9 The least reliable section of this route is between junctions 10 to 10A, a spur serving Luton and Luton Airport. The spur is approximately 750 metres long and is a two-lane motorway with roundabouts at each end which reduce the performance of this part of the route when compared other motorways. It carries around 50,000 vehicles per day. The spur forms part of the primary access to Luton Airport, the parkway station for Midland Mainline trains and Luton town centre.

- 2.1.10 Eight of the ten least reliable locations on this route are on the all purpose trunk sections within the Tyne and Wear area. The second and third least reliable sections for the route are on the northbound and southbound approaches to the A19 Testos junction with the A184, which is the location of a pipeline scheme. The fourth and fifth locations are at the A19/A189 Moor Farm junction, which is currently an at grade roundabout, while the ninth least reliable section is also on the A19 north of the Tyne Tunnel at the A191 Holystone junction. Location 8 is on the A1 West of Newcastle, over the Tyne Bridge.
- 2.1.11 Other notable areas of low reliability include the M1 between Wakefield and Leeds (junctions 41 and 42), and over the Tinsley Viaduct in Sheffield (junctions 34 south and north bound). Junction 42 intersects the M62 and is a key strategic junction with Leeds, interfacing with the South Pennines route-based strategy. At peak times this junction suffers from significant congestion and delay.
- 2.1.12 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.
- 2.1.13 The lowest speeds on the route are recorded on the A5 through Dunstable, where the speed limit is 30mph but speeds are typically below 20mph at peak periods. This section of A5 forms Dunstable's high street with all the associated activity of a typical urban shopping street and carries around 18,000 vehicles per day. The main junctions and pedestrian crossings are controlled by traffic signals. It is proposed to de-trunk this section once the A5-M1 Dunstable northern bypass is completed.
- 2.1.14 There are a number of locations on the M1 where average peak hour speeds are substantially below the national speed limit. Much of the M1 between Hemel Hempstead and junction 13 near Bedford experiences significantly reduced speeds during peak periods. The introduction of smart motorway technology has been effective in reducing flow breakdown during the busiest times. The M1 between junctions 23a and 24, near East Midlands Airport, also experiences average speeds at peak times of between 41 and 50mph. The M1 near junction 33 for Sheffield and near junction 41 for Wakefield suffers similarly.
- 2.1.15 Other sections which experience significantly lower average speed at the peak times than the speed limit of the road are on the A19 and A66 around Middlesbrough and Stockton on Tees; on the A174 approach to the A19 in Middlesbrough and on the A66 in Darlington.
- 2.1.16 The A5 through the town of Towcester has a speed limit of 30mph and lower average speeds at peak time than are shown on figure 2.1. This is because the link that the speeds average across are from the A43 to A508 at Old Stratford, and therefore the lower speeds will have been averaged across the whole of this section.

- 2.1.17 On the A19 at Sunderland manufacturing shift changeovers contribute to performance issues outside the periods 7am to 10am and 4pm to 6pm. This is not represented in figure 2.1 as it is based on average speed across these two peak periods.

Figure 2.1
 Network performance 2012/13
 Peak period speeds

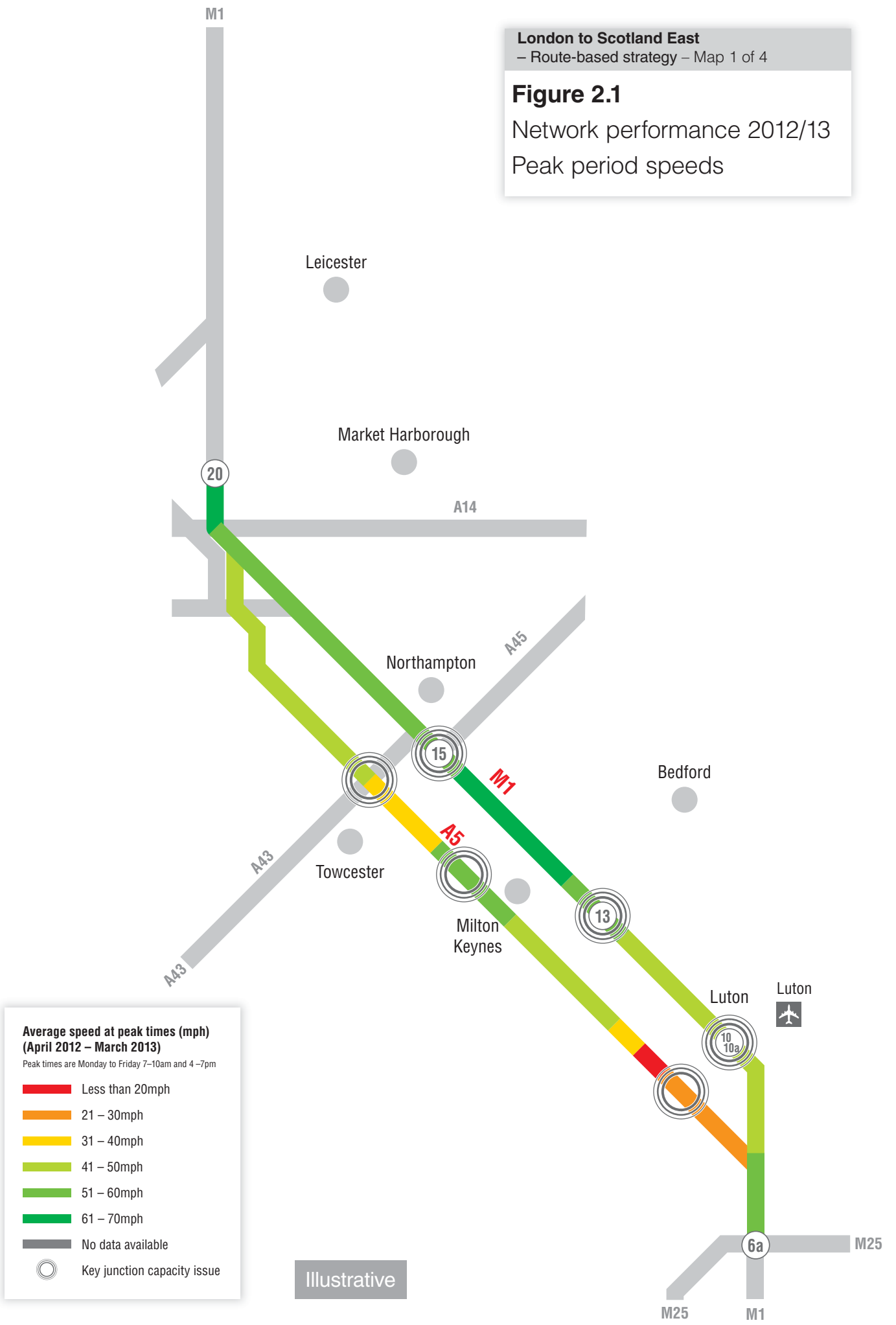
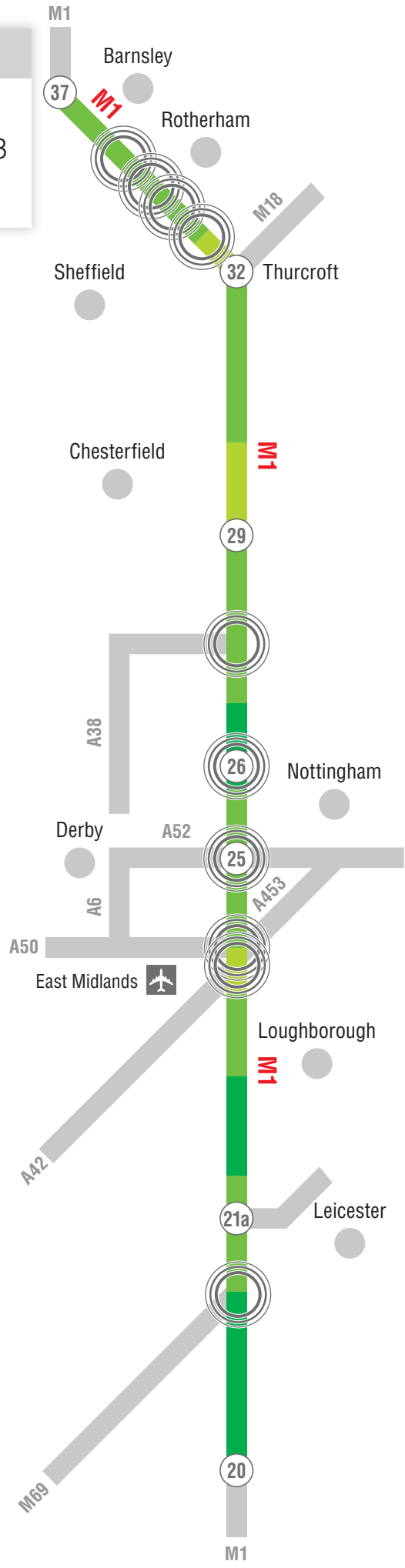


Figure 2.1

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

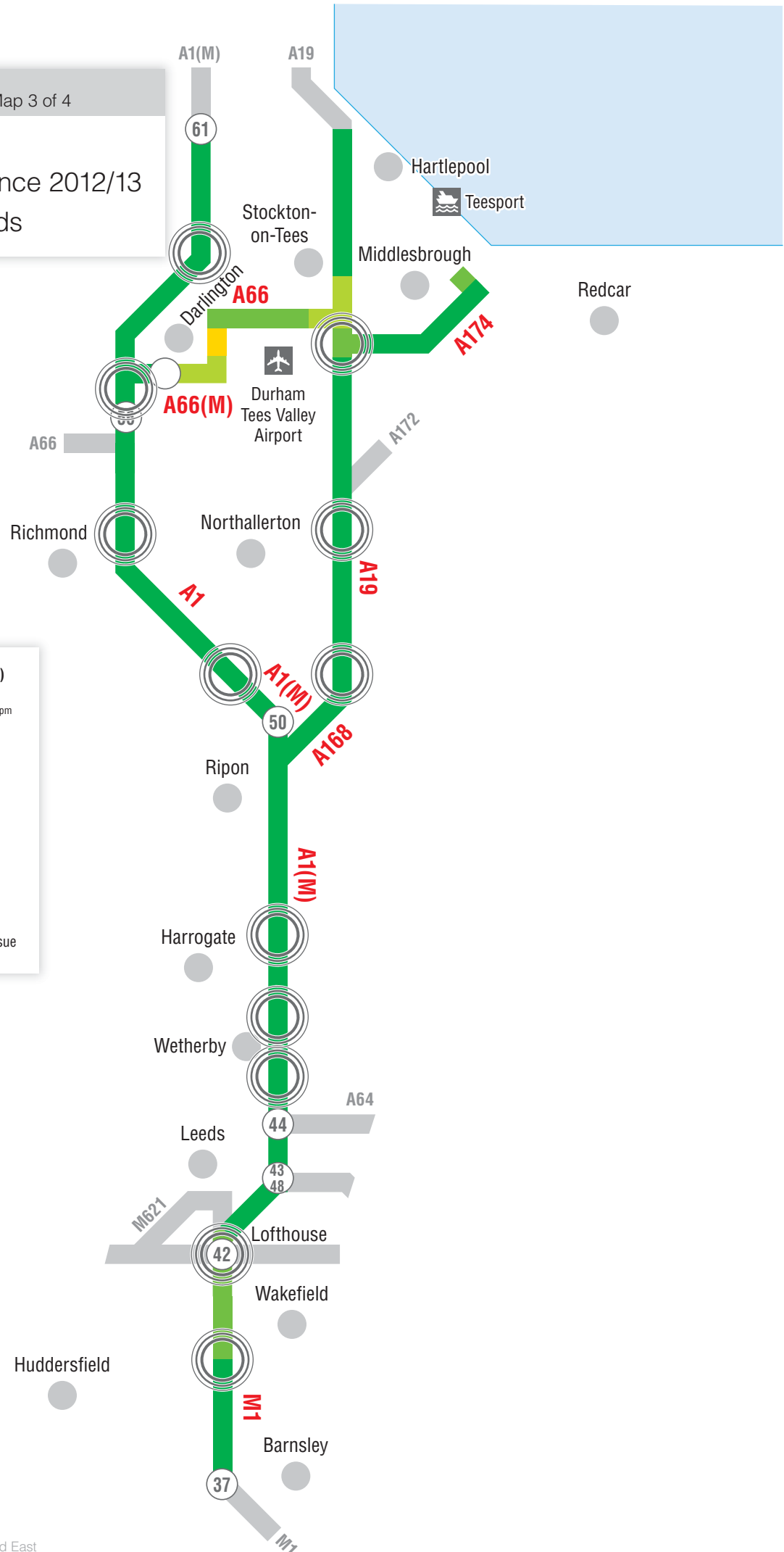


Illustrative

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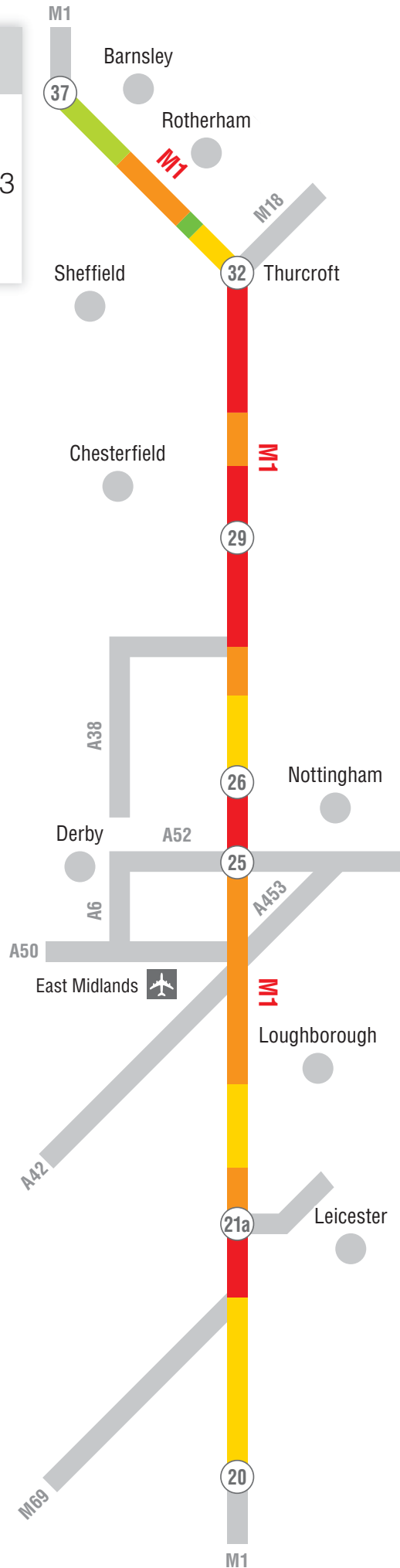
Illustrative

- 2.1.18 The SRN is key in promoting growth of the UK economy, and alleviating congestion can realise economic benefits.
- 2.1.19 Figure 2.2 shows the delay on our network compared with a theoretical free-flowing network.
- 2.1.20 Delays on Figure 2.2 are notable on the M1 between St Albans and the junction with the M6 and A14 (Catthorpe). There are significant delays on this long section and, as indicated above, it has the highest flows for the route, experiencing issues with journey-time reliability. Information relating to the M6 and A14 arms of the Catthorpe junction is discussed in more detail within the Felixstowe to Midlands RBS.
- 2.1.21 On the M1 around Leicester, delays can be seen between junctions 21 and 21a. This is again coupled with the section being one of the top ten busiest sections on the route. There is a mix here between longer distance strategic traffic and those travelling to and from Leicester. There is also a major retail park located near junction 21 called 'Fosse Park.'
- 2.1.22 Between junctions 23a and 25, there are closely spaced junctions serving the major cities of Nottingham and Derby plus the international gateway of East Midlands airport. This section is also a major interchange for some significant east/west routes crossing the M1, including the A42, A50 and A453. We can see from Figure 2.2 that this section experiences delays on what is a complex section of the route. The operation of junction 24 was identified as a high priority at the stakeholder events.
- 2.1.23 East Midlands Airport is dependant on the reliable operation of the M1 and its junctions with the A42, A50, A52 and A453 for passenger and freight accessibility. The vast majority of these freight and cargo trips to the airport take place late at night (normally after 9pm) and early in the morning (between 2am and 5am), with shift patterns for most of the employees on this site, there is no "normal" peak. Also, due to changes in passenger demand there are greater levels of traffic to and from the airport during the summer months.
- 2.1.24 On the M1 at junction 25 (with A38) southbound and junction 28 (Sheffield) northbound, the transition from four lanes to three lanes regularly causes congestion leading to delays.
- 2.1.25 There are substantial delays on the A1 to the west of Newcastle and Gateshead, for which the ongoing feasibility study will consider potential solutions to be delivered within the RBS period.
- 2.1.26 Stakeholders identified a number of locations where Figure 2.2 does not appear to accurately reflect the actual situation, such as on the A19 between the A174 and A689 in Tees Valley.

Figure 2.2
Network performance 2012/13
Delay



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%
- Bottom 20%
- No data available

Explanation of data can be found in the Technical Annex.

Illustrative

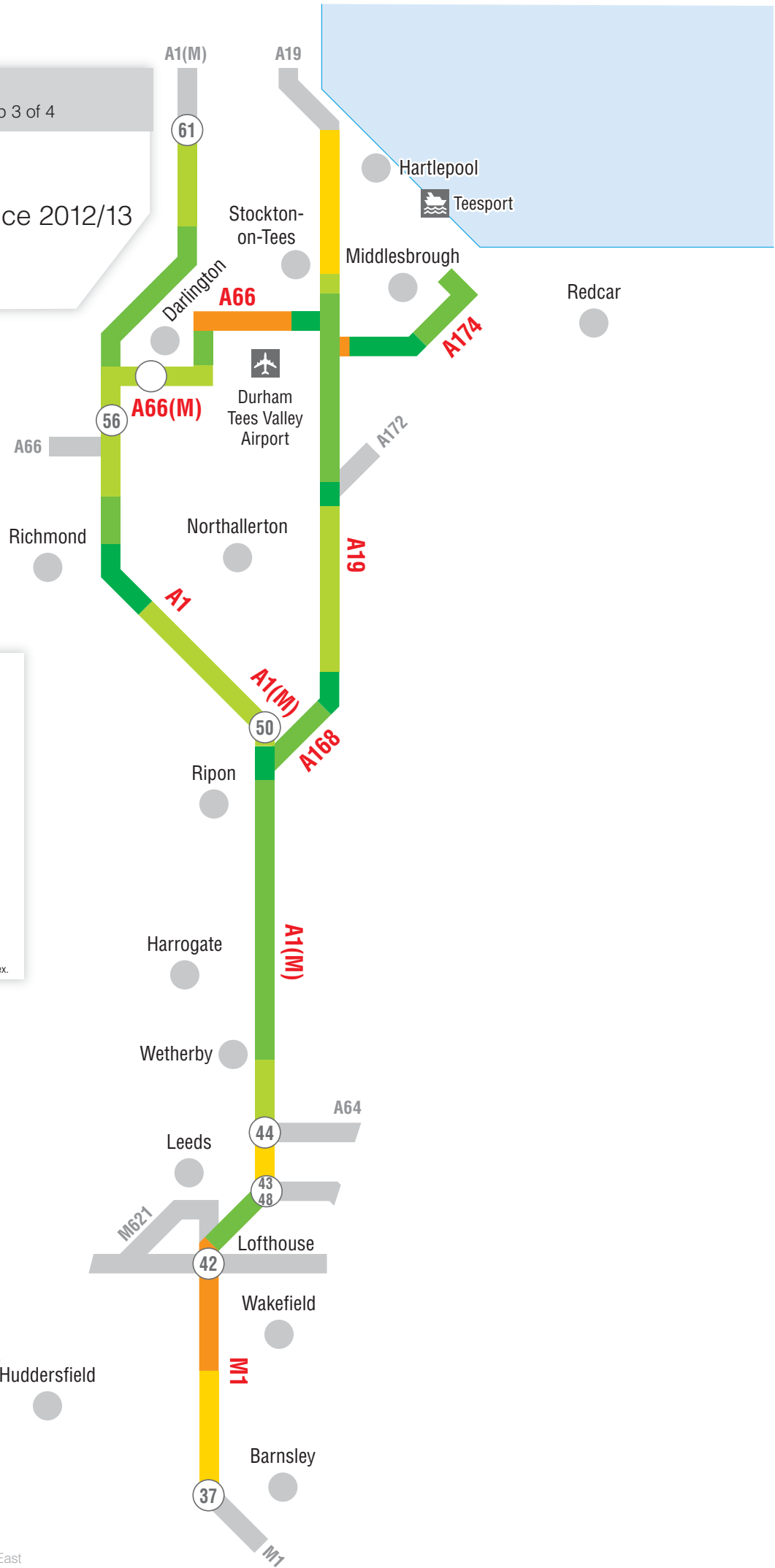
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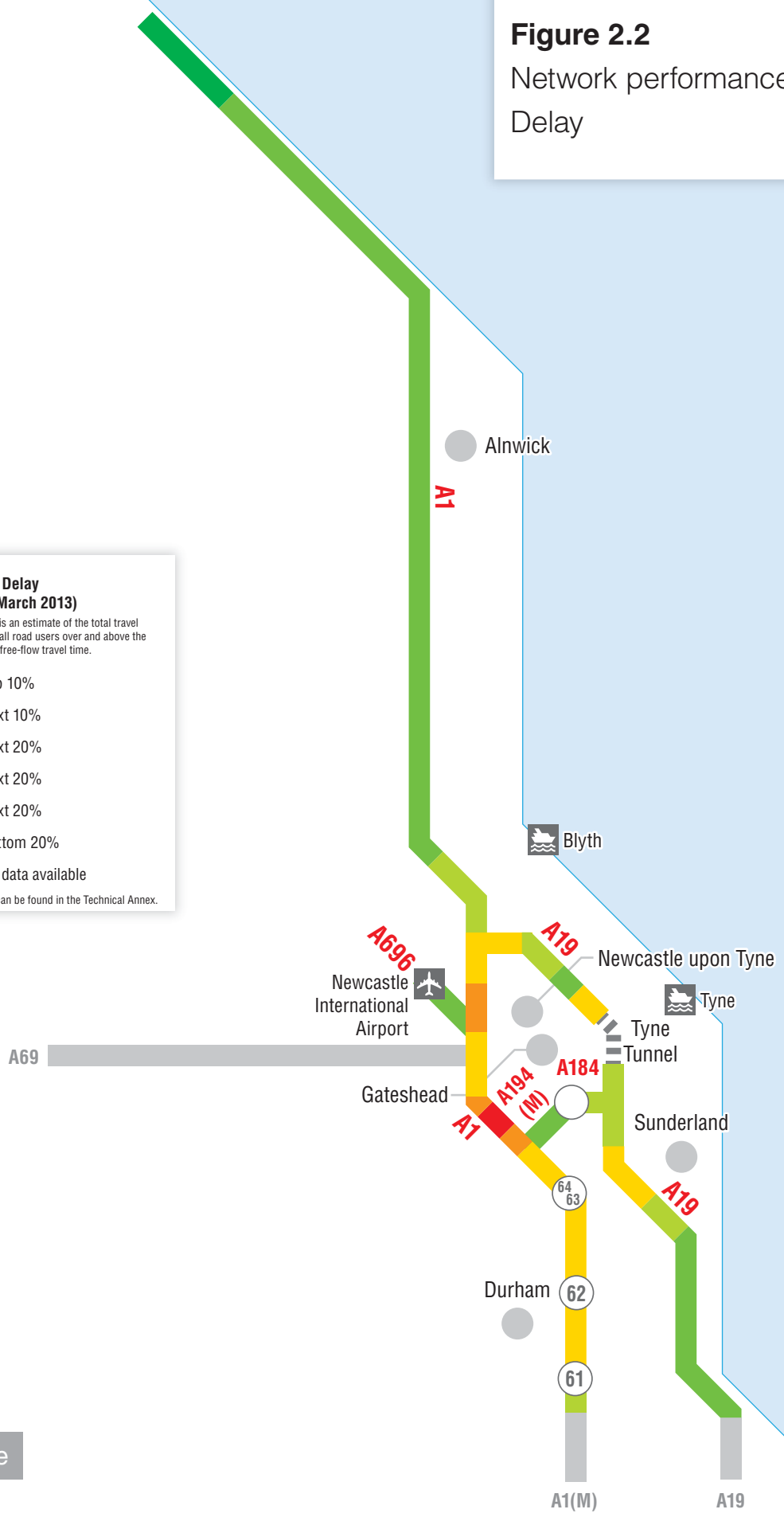
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Illustrative

- 2.1.27 The route has a significant proportion of long-distance journeys which are both commercial and leisure related to the strategic importance of the route, providing a north-south link. Within the major conurbations and on the all purpose trunk road sections, the route also carries a high proportion of local traffic making short trips. Where these two types of traffic interact usually is the cause of congestion along the route.
- 2.1.28 Sections of the route that perform well on multiple measures are the more rural sections of the route, which includes the A1(M), A1 and A19 between the north of Leeds up to Darlington and Middlesbrough. This section performs well in terms of both delays, reliability and average speeds at peak times, although there are some issues relating to the operation of the junctions along this section. The A1, from its junction with the A19 near Newcastle to the Scottish border, is also a more rural route that performs well in terms of delay, reliability and average speeds at peak times.
- 2.1.29 On the route there are two common causes of performance issues; firstly sections of all purpose trunk road network which travels through towns and cities; secondly, on major sections of the route where there is tension between long distance and local traffic. In terms of the first cause of performance issues, the sections of the route that experience these are on the A5 at Dunstable and Towcester, then on the A1 and A19 around Newcastle. At these locations the figures show that poor reliability, delays and low average peak hour speeds are experienced.
- 2.1.30 The second cause of performance problems on the route relates to where the M1 passes major towns and cities and there is a mix of strategic and local traffic, this is particularly an issue for Luton (including junction 10a for Luton Airport), Leicester (junctions 21 to 21a), Derby, Nottingham and Sheffield (from junctions 25 to 32), Leeds (junction 42 with the M62).
- 2.1.31 On the M1 between junctions 23a and 25, this section is integral to the operation of the route as there are significant interactions with other major strategic roads and East Midlands airport. The A42, A50, A52 and A453 are all major cross-country routes linking the East and West Midlands and the junctions where they interact with the M1 are all spaced in close proximity. This means that it is one of the busiest sections of the route, but also with some of the most complex movements for both local and strategic traffic.

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 injury accident 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 6,627 collisions on the route. The number per year has ranged from 1,200 to 1,478 over this 5 year period, but there is no noticeable trend up or down.
- 2.2.5 Of the 6,627 collisions recorded 127 (2%) included fatalities, 725 (11%) included serious injuries and the remaining 5,775 (87%) included only slight injuries. The number of fatalities generally decreases across the 5 year period, with 35 in 2008 and 21 in 2012.
- 2.2.6 Within the 6,627 collisions there were 10,593 casualties, at a rate of 1.60 casualties per collision.
- 2.2.7 In terms of vehicles/road users involved in the collisions:
- 81% involved more than one vehicle;
 - 24% of vehicles involved were HGVs;
 - Where the age of drivers was known 4% were young drivers (aged 16-19); and
 - 9% were older drivers (aged 60 or over).
- 2.2.8 The causation factors for collisions indicate that in the main driver error or behaviour were the main causes. A summary of the main factors are as follows:
- 30% occurred where the driver ‘failed to look properly’;
 - 24% occurred where the driver ‘failed to judge other person's path or speed’;
 - 15% involved ‘loss of control’;
 - 14% were ‘travelling too close’;
 - 12% involved ‘sudden braking’;
 - 11% cited ‘careless, reckless or in a hurry’;
 - 10% involved ‘poor turn or manoeuvre’;
 - 8% were ‘travelling too fast for conditions’
- 2.2.9 Along the route, there are locations where the total casualties per billion miles (2009-2011) is in the top 10% compared to the rest of the SRN. These sections are shown in figure 2.3.
- 2.2.10 The first such section is on the most southern part of the route between junctions 6a and 7, near Hemel Hempstead. This a major section of the

network where the M1 connects with the M25 and it is also the second busiest link on the entire route. Variable mandatory speed limits as part of smart motorways have recently been implemented on this section. As the data in figure 2.3 is up to 2011, the impact of the variable mandatory speed limits will not be reflected on the safety performance of this section.

- 2.2.11 The longest section on the route, which is classed as being in the top 10% of casualties per billion miles, is on the A5 where it connects with the M1 at junction 9 through to Dunstable. This section of the A5 has a history of collisions consistent with an urban high street, although these predominantly result in slight casualties. As discussed above, the speed limit for this section is 30mph but traffic is often travelling at 20mph at peak times; this contributes to the high proportion of slight rather than serious or fatal collisions. On the rest of the A5, junctions are largely at grade T-junctions or crossroads. However, there have been recent fatalities on the A5 around Dunstable which are under investigation.
- 2.2.12 The other sections of the route which are highest for total casualties per billion miles are around Middlesbrough on the A1053 southbound towards A174 Greystones roundabout and on the A19 northbound from A1130 Thornaby to A66. This is the result of typically low speed, shunt-type collisions linked to congestion.
- 2.2.13 M1 junction 21 is a major junction on the route where the M69 connects with the M1 which provides a strategic link with the M6. The junction is also used for local traffic for the city of Leicester and its ring road. This section is ranked 41st for casualty locations across the SRN. The majority of these are due to the queuing of traffic travelling southbound from M1 to junction 21 as the cause of the majority of collisions are rear-end shunts and lane-changing collisions. The queuing at junction 21 and subsequent impact on the safety performance of this section was raised as a concern by stakeholders.
- 2.2.14 The M1 junction 24a to 25 section of the route is ranked 14th nationally. As highlighted above, this section is a complex section of the network with other strategic roads interacting with the M1. At this location around half of the collisions are related to rear-end shunts with the remaining caused by lane-changing and single vehicles losing control.
- 2.2.15 M1 junction 26 near Nottingham is ranked 31st nationally across the SRN and the majority of collisions are rear-end shunts.
- 2.2.16 Many of the safety initiatives led by the Road Safety Partnerships relating to the route are similar in providing education and enforcement campaigns. They are often centred around supporting vulnerable road users and educating road users to support enforcement. In addition the Agency is promoting a road-worker safety campaign, including driver engagement at motorway services areas and the Department for Transport with the 'Think' campaign.
- 2.2.17 Examples of specific campaigns across the route are Northamptonshire's 'Shiny Side Up' initiative (motorbike awareness

campaign) and Leicester and Leicestershire's enforcement initiative the 'Fatal Four' campaign.

- 2.2.18 Two sections of the M1, between junctions 6a and 10 and junctions 10 and 13, have recently been converted to smart motorways. However, only the latter includes hard shoulder running. Stakeholders raised concerns that this has created a level of confusion for drivers and further action is needed to address these interface issues between the two sections. These issues are not reflected in Figure 2.3 as the smart motorways section went operational in 2012, whilst the data is up to 2011. This section of the route will continue to be reviewed as part of the post-opening monitoring process to raise any safety performance issues.
- 2.2.19 Stakeholders expressed concerns about safety on single carriageway sections of the route, due to the dangers associated with overtaking. Our records also show a number of queries about safety at right-turns on rural single and dual carriageway sections, for instance on the A1 at Swarland, near Morpeth.
- 2.2.20 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.

Figure 2.3
 Safety on the network

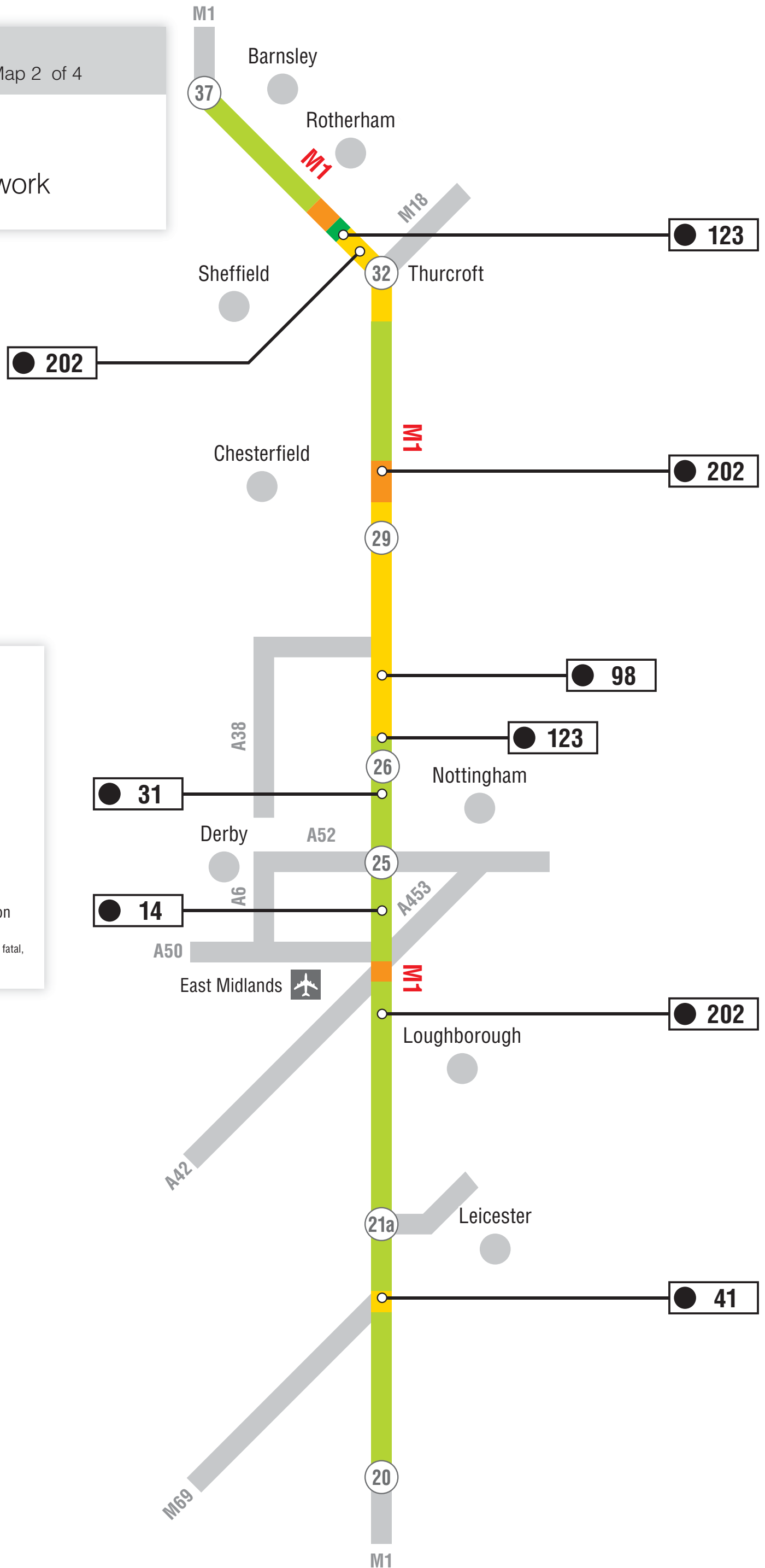


Figure 2.3
 Safety on the network

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

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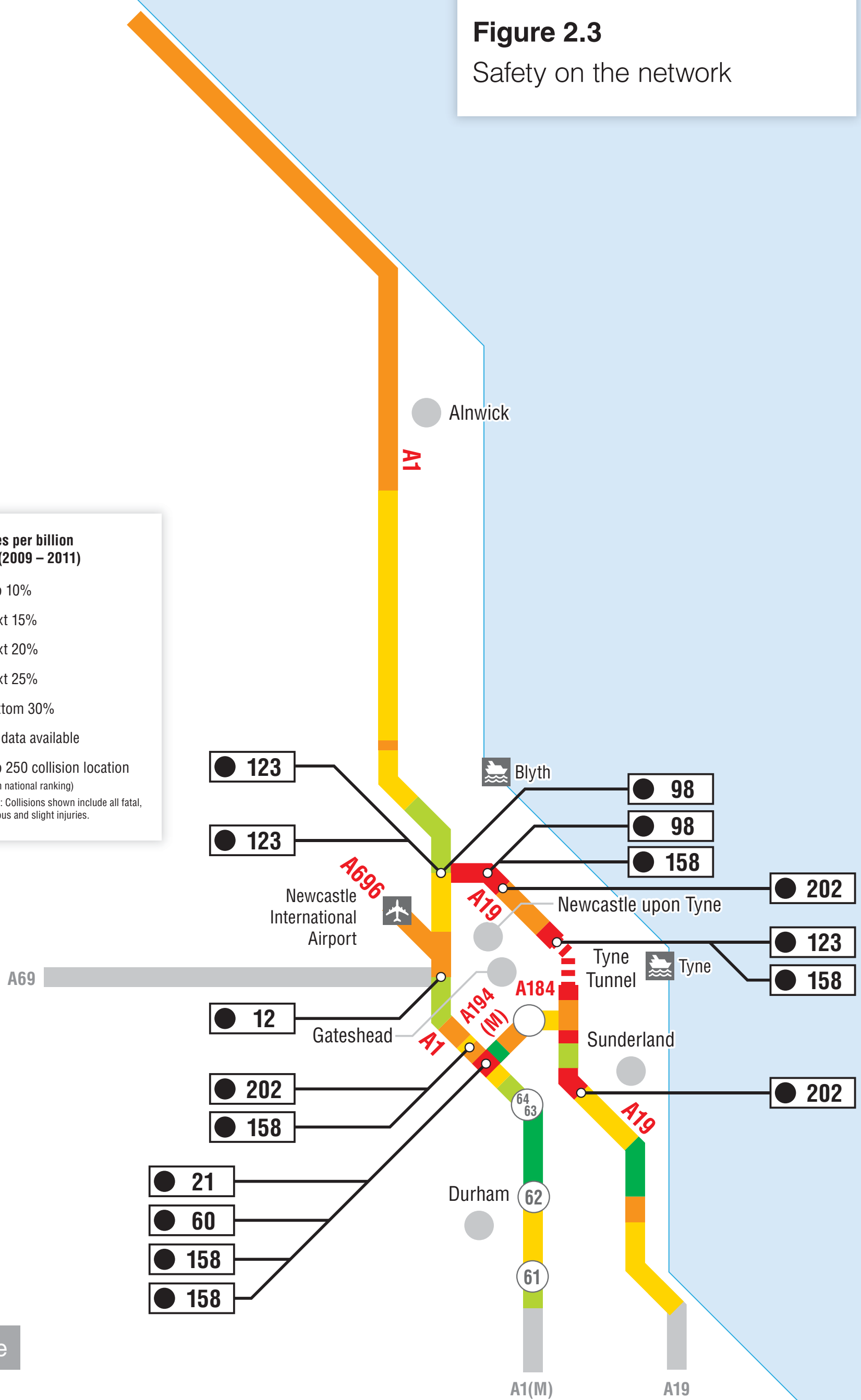
Illustrative

Figure 2.3
 Safety on the network

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- 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 We maintain a National Asset Management Plan as an annual summary of the Agency's network asset inventory and condition. It is aimed at ensuring there is sight of future issues affecting the asset and enabling strategic decision making.

Carriageway Surface

- 2.3.4 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 2020.
- 2.3.5 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 further that the surfacing exceeds its design life. The increasing age of the surfacing could manifest in an increased frequency of maintenance interventions which, if a renewals scheme is not funded, 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.
- 2.3.6 Over the route the surface is primarily long-life surface, with approximately 39% HRA and 61% TSCS. Long-life surface is expected to have an operational life of between ten and fifteen years.
- 2.3.7 Through our ongoing management of the network we maintain a database of surfaces, which is supplemented by regular inspections to inform our plans for maintenance. It is likely that a significant proportion of the network will require resurfacing in the future.

- 2.3.8 The most significant areas requiring resurfacing are on the M1 between junctions 10 at Luton and the Northamptonshire county boundary (between junctions 14 and 15), junctions 19 to 23a and junctions 34 at Tinsley and 39 at Durkar.
- 2.3.9 We also have concrete road surface material but this is only a very small proportion when compared to the length of flexible road surfaces. Concrete surface makes up less than 1% of the carriageway surface. The amount of concrete road surface is also reducing as it is replaced by flexible material at the end of its serviceable life. Concrete is not a material we now use in new carriageway construction on any of the motorway and trunk road network. On the M1 between junctions 43 and 48 there are significant sections of concrete carriageway, which will not be resurfaced during the remaining period of the specific DBFO contract, which ends on 1 April 2026. Similarly, there is a section of concrete carriageway on the A19 west of Billingham which is not expected to require resurfacing before the end of the specific DBFO contract in 2026.

Structures

- 2.3.10 Across the route, there are a number of common issues affecting structures which require substantial ongoing expenditure on remedial maintenance. A large proportion of the network was opened in the 1960s and 1970s, which means that the route has an older average age than the strategic network as a whole. Older structures on the route have therefore deteriorated more than average due to both a longer operational life, and having been constructed to older design standards. Typically, ‘families’ of bridges built to similar specifications share common defects, and many therefore require more frequent monitoring and maintenance.
- 2.3.11 The Catthorpe junction is a major interchange where the M1, M6 and A14 meet. Major work to replace the bridge from the southbound M6 to the M1 southbound was undertaken recently and further works will be completed as part of the major scheme currently in construction. Whilst this means that major maintenance is not expected to be required before 2021 any major works will have a significant impact on the M1 at junction 19.
- 2.3.12 The River Trent floodplain structures on the M1 between junctions 24 and 25 have been identified as requiring significant maintenance interventions. Cracking in the pile caps of the structures is being monitored and detailed assessments are taking place to identify the appropriate intervention. This work will need to take place in advance of the smart motorways scheme between M1 junctions 24 and 25.
- 2.3.13 The maintenance of the structures on the route has the potential to significantly disrupt strategic traffic. These are Catthorpe viaduct (M1 junction 19), River Trent Floodplain viaducts (M1 junction 24 to 25), the M1 Tinsley Viaduct in Sheffield and the A1 Allerdene railway bridge over the East Coast Main Line in Gateshead.

- 2.3.14 Within the Technical Annex, there are a number of other structures along the route which are expected to require significant works in the period to 2021.

Geotechnical

- 2.3.15 The Agency monitors its earthwork asset identifying where any risks to the network exist. The route has a number of specific locations where there is a risk to the earthwork asset.
- 2.3.16 Along large sections of the M1 in the Midlands, the prevalence of Lias Clay materials within the embankments (especially where constructed over 6m in height) is a key maintenance issue. There are also narrow verge widths between the embankment and carriageway which may allow defects to develop along this section.
- 2.3.17 Due to the coal industry in the North East, but particularly in South and West Yorkshire, the M1 is underlain by Coal Measures Geology. Earthworks and structures are therefore at risk from the influence of shallow mine workings and mine shafts, many of which are not recorded.
- 2.3.18 The A1 Morpeth bypass cutting was constructed too steeply for the prevailing ground conditions. A forward programme of remediation is in place and the first phase was completed in April 2012. There are a further three phases in development to solve this issue.
- 2.3.19 Significant heavy rainfall in June and July 2012 has generated several new issues around the A1 Gateshead and Newcastle Western Bypass, with a landslip requiring remediation due to debris affecting the northbound carriageway.

Lighting

- 2.3.20 Generally along the route there are no significant maintenance issues relating to the lighting asset.
- 2.3.21 We have switched off the lights on the M1 from junction 16 to Watford Gap as part of the Midnight Switch Off programme.
- 2.3.22 There are sections of the A1 Newcastle Gateshead Bypass which are currently experiencing problems with the underground cabling network resulting in a number of outages. Plans are in place to carry out further repairs to maintain the integrity of the cabling network.

Other key asset issues

- 2.3.23 Sections of this route serves East Midlands airport where the vast majority of freight vehicle movements take place late at night (normally after 9pm) and early in the morning (between 2am and 5am). Also the peak season for airport travel for passengers is in the summer and for the movement of goods is in the run up to the Christmas holiday. Therefore, consideration is needed for how roadworks are undertaken on the M1 and its junctions with other routes.

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 The London to Scotland East route is a predominantly motorway route and is well served by the Traffic Officer Service. The service operates from three regional control centres and nine outstations located across the route.
- 2.4.4 The M1, the A1 to Seaton Burn north of Newcastle and the A194(M) are covered by Traffic Officer Service patrols providing incident management response. There are however some motorway sections which have a lower level of provision where the Traffic Officer Service does not routinely patrol but attends incidents on those sections of the network: on the M1 between junctions 8 and 9, junctions 14 and 15, junctions 36 and 38 and on the A1(M) between junctions 44 and 46.
- 2.4.5 The remainder of the network is trunk road which the Traffic Officer Service does not patrol, but will provide an on road response in exceptional circumstances.
- 2.4.6 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.
- 2.4.7 The link between M1 junction 20 and junction 21 is just over 11 miles and has no turn around points, which presents issues to incident responders, both in terms of patrol strategy and response times.
- 2.4.8 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.
- 2.4.9 Across the patrolled sections of the route, there are no areas where the duration of incidents is, on average, over 60 minutes. Generally, the longer incidents are either on sections where the Traffic Officer Service do not routinely patrol, on two-lane sections of the route and in areas with particularly high vehicle flows. Some of these sections may also experience longer incident durations as they often involve freight traffic, which has a longer recovery period.
- 2.4.10 Smart motorways is being introduced along this route and once the current programme and proposed pipeline schemes are delivered there

will be the following gaps on the M1; junctions 19 to 24, junctions 35 to 39, and junctions 42 to 48.

Flooding

- 2.4.11 We have a responsibility to reduce flooding. Flooding of the Highways 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.
- 2.4.12 The primary risks related to water on the route are due to flooding on the network in low lying areas, and due to high levels of highway surface water runoff. There have been a number of flooding issues along the M1 in recent years due to severe weather, however there is no evidence that these have had an impact on road users.
- 2.4.13 Due to the topography of the network, there are a number of locations where high rainfall can lead to the capacity of the existing drainage systems being exceeded, contributing to increasing numbers of flooding events. The main areas where this is a concern are on the M1 near Luton, M1 between junctions 15 and 19, A5 from M1 junction 9 to Dunstable, A5 near Milton Keynes, M1 near Brinsworth, Wakefield; the A1 at Catterick; the A66 at Long Newton and the A19 at Billingham and Peterlee. On the A19 at Long Newton, permanent high capacity pumps have recently been installed which should address some of the concerns at this location.
- 2.4.14 Flood risks on the route are generally associated with high levels of surface water runoff. The M1 at Tinsley Viaduct has had a number of floods in the last few years during heavy rainfall, however this is flooding on the road surface due to issues within the drainage system as opposed to flooding from adjacent influences.

Severe weather

- 2.4.15 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.
- 2.4.16 Generally for most of the London to Scotland East route severe weather presents no more of a significant issue than for the strategic network as a whole. Typically for the route it is the northern section which is more susceptible to the impact of severe weather.
- 2.4.17 There have been historic issues between M1 junctions 27 and 30 relating to severe winter weather. This section is notable for a series of steep hills on which large goods vehicles can struggle to maintain traction in heavy snow. Our capability to manage these types of events has increased through making use of reserve gritters, Traffic Officer Service vehicle capability and specialist vehicle recovery contractors.
- 2.4.18 There are a number of areas on the network which are susceptible to disruption due to high winds. Notable locations are on the M1 Tinsley Viaduct in Sheffield, on the M1 near junction 39 and on the A1(M) in County Durham. The most significant concern about high winds is on

the A19 in Tees Valley, where restrictions are imposed on high-sided vehicles using the Tees Viaduct during high winds. In the most extreme weather conditions, high winds can necessitate the full closure of the viaduct.

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, e.g. 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 Much of the route is well served by technology, particularly on the motorway sections. The route benefits from connection to the National Roads Telecommunications Service (NRTS) between the M25 and Leeming Bar on the A1(M), with extension to Barton intended as part of the planned upgrade scheme. NRTS provides a fast, high capacity connection to the Highways Agency's network of regional control centres, enabling the use of services such as CCTV and VMS.
- 2.5.5 On the route north of A1(M) junction 49 (Dishforth), connection is via low capacity copper wires, which are life-expired and increasingly prone to failure. This is likely to require replacement within the period.
- 2.5.6 Smart motorways is in operation on the M1 between junctions 6a and 13 at Luton and junctions 25 to 28 around Nottingham. Further sections of smart motorways will be introduced as described in section 3.
- 2.5.7 Ramp metering, which controls the flow of traffic onto the route during peak periods to improve the flow on the main line, is in operation at a number of junctions along the route.
- 2.5.8 Gaps in the technology provision on this route are along the trunk road sections, particularly on the A5 and A1. The A5 at the southern end of the route has no technology provision, which coincides with poor

performance in terms of delay and average speeds at peak times, particularly at the southern end at the junction with the M1.

- 2.5.9 There is limited technology provision on the A1 north of Leeming and the A168/A19 north of Dishforth. These sections are among the least reliable journey-time locations along the route; as seen in Table 2.2. The lack of technology was raised by stakeholders as a challenge for the route.

2.6 Vulnerable road users

- 2.6.1 For the purposes of the document, vulnerable road users are defined as pedestrians, cyclists, motorcyclists and horse riders.

- 2.6.2 Much of the route is made up of motorway or high standard dual carriageway trunk road with limited access for vulnerable users. On these routes, our main concern relates to facilitating safe movement across the network at junctions and designated crossing points.

- 2.6.3 The A5, through Dunstable and Towcester, is an urban street with homes, shops and businesses. There is extensive pedestrian guardrail and a number of signalised crossings and junctions. This type of environment is now relatively unique as part of the SRN. The A5/M1 link forming a northern bypass of Dunstable is due to be completed in 2015/16, which should reduce the amount of traffic through the centre of Dunstable.

- 2.6.4 In the East Midlands the M1 goes between the major cities of Derby and Nottingham, disconnecting the East and West Midlands. Major employers around M1 junction 24, such as East Midlands Airport, are trying to increase the numbers of staff travelling to work on foot and bicycle as part of their Sustainable Travel Plans. These employers have expressed a desire to improve facilities for vulnerable road users to help achieve their Travel Plan targets.

- 2.6.5 On the A19, there has been a recent trend of collisions involving cyclists, with ten people injured, of which three were serious and three fatal. We are currently working with the police, LAs and local cycling organisations to address this, including promoting to implement a cycle ban on the busiest section of the route between A174 and A189.

- 2.6.6 On the A1 north of Newcastle, there are a number of points where routes for vulnerable users cross the route at grade, on both single and dual carriageway sections. This includes three locations where the A1 is crossed by Route 1 of the National Cycle Network, all of which have central traffic islands installed to minimise the risk when crossing.

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 both the natural and built 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 There are 21 air quality management areas which the route passes close to or through. These are listed in full in the Technical Annex, and are declared by the following authorities:
- St Albans City and District Council
 - Central Bedfordshire District Council
 - South Northamptonshire Council
 - Northampton Borough Council
 - Blaby District Council
 - North West Leicestershire District Council
 - Erewash Borough Council
 - Broxtowe Borough Council (four locations)
 - Bolsover District Council (two locations)
 - Rotherham Metropolitan Borough Council (three locations)
 - Sheffield City Council
 - Barnsley Metropolitan Borough Council
 - Wakefield Council
 - Gateshead Council
 - South Tyneside Council

Cultural heritage

- 2.7.6 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.

- 2.7.7 The M1 was Britain's first full motorway with several sections opened between 1959 and 1967. Archaeological discoveries were made during route construction, including Bronze Age findings at Warren Farm & Hemington, Leicestershire, a Roman kiln in Whilton, Northants, as well as honeycombs of medieval coal pits in Derbyshire.
- 2.7.8 The M1 crosses over a number of canals and railways, particularly in former coal mining areas. It also cuts through or runs past historic estates, parks and medieval deer parks.
- 2.7.9 On the M1 there are a number of registered parks, scheduled monuments and UNESCO World Heritage Sites that have landscape sensitivity. These include Annesley Hall near M1 junction 27, Hardwick Hall near M1 junction 29, and Muscott medieval village near the M1 junction 17 at Daventry. In addition, the A1(M) passes the North Yorkshire Moors National Park.
- 2.7.10 Some of the route follows the historic Great North Road and a former Roman road known as 'Dere Street.' As such, it passes over or close to a large number of cultural heritage sites and buried sections of cultural heritage history. Notable examples are around Catterick where there are several Roman settlements, on the A1 near Newcastle where it crosses the route of Hadrian's Wall, and passes close to the medieval village of North Charlton and Bowes Incline, which formed part of 1826 Bowes Railway, built by George Stephenson.
- 2.7.11 There are also a significant number of listed structures along the route, particularly through Northumberland where there are a number of historic mile posts. On the A66 south of Darlington, the Blackwell Bridge over the River Tees is a Grade II listed structure designed by the architect and civil engineer John Green (1787-1852).

Ecology

- 2.7.12 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.
- 2.7.13 There are several Sites of Special Scientific Interest (SSSIs) along the M1, A1 and A5 which we will carefully consider when planning and delivering maintenance works and schemes.
- 2.7.14 In addition to these sites we have known protected species on land held by the Highways Agency. The route meets or crosses a number of great crested newt sites on the A1/A1(M) and A19 and water vole sites adjacent to the A66 and A1/A1(M). The A1 crosses the River Wansbeck on Morpeth Bypass, which contains regionally important numbers of

white-clawed crayfish, while otters are known to utilise watercourses across the route.

- 2.7.15 Bat and bird boxes have been erected throughout the route within our estate. Monitoring undertaken over several years confirms high levels of use of the boxes.

Landscape

- 2.7.16 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.

- 2.7.17 There are multiple ancient and semi-natural woodlands that the motorway has either severed, such as Parkin Wood to the south of M1 junction 35a, or runs adjacent to, such as The Old Park to the north of M1 junction 36.

Noise

- 2.7.18 Traffic noise arising from the Highways Agency's network has been recognised as a major source of noise pollution.

- 2.7.19 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.

- 2.7.20 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). Within the IAs, those with road traffic noise levels in excess of 76 decibels according to the results of Defra's strategic noise maps are designated as IAs with First Priority Locations (FPLs).

- 2.7.21 Along this route there are a large number of IAs, with 105 FPL sites. These tend to be concentrated in urban areas, particularly where there are large numbers of houses located close to the network, and along sections of network with HRA surface. Within the action plans, the primary measure proposed to remedy problems of noise is the replacement of existing surface with low noise TSCS when it requires renewal. Details of the number of FPLs by district on the route is contained in the Technical Annex.

- 2.7.22 There are also a number of locations on the route where Defra modelling does not identify a particular area as a priority location, but where correspondence with residents, LA officers and elected officials has highlighted a problem. Within these locations we monitor the problem and look for opportunities to take action, such as planning our maintenance to minimise the impact of noise.

Water pollution risk

- 2.7.23 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 an existing potential water pollution risk.
- 2.7.24 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 Officer Service will soon be carrying spill kits within their vehicles to use for such incidents.
- 2.7.25 There are 28 priority outfalls along this route and the locations of these are included within the Technical Annex.

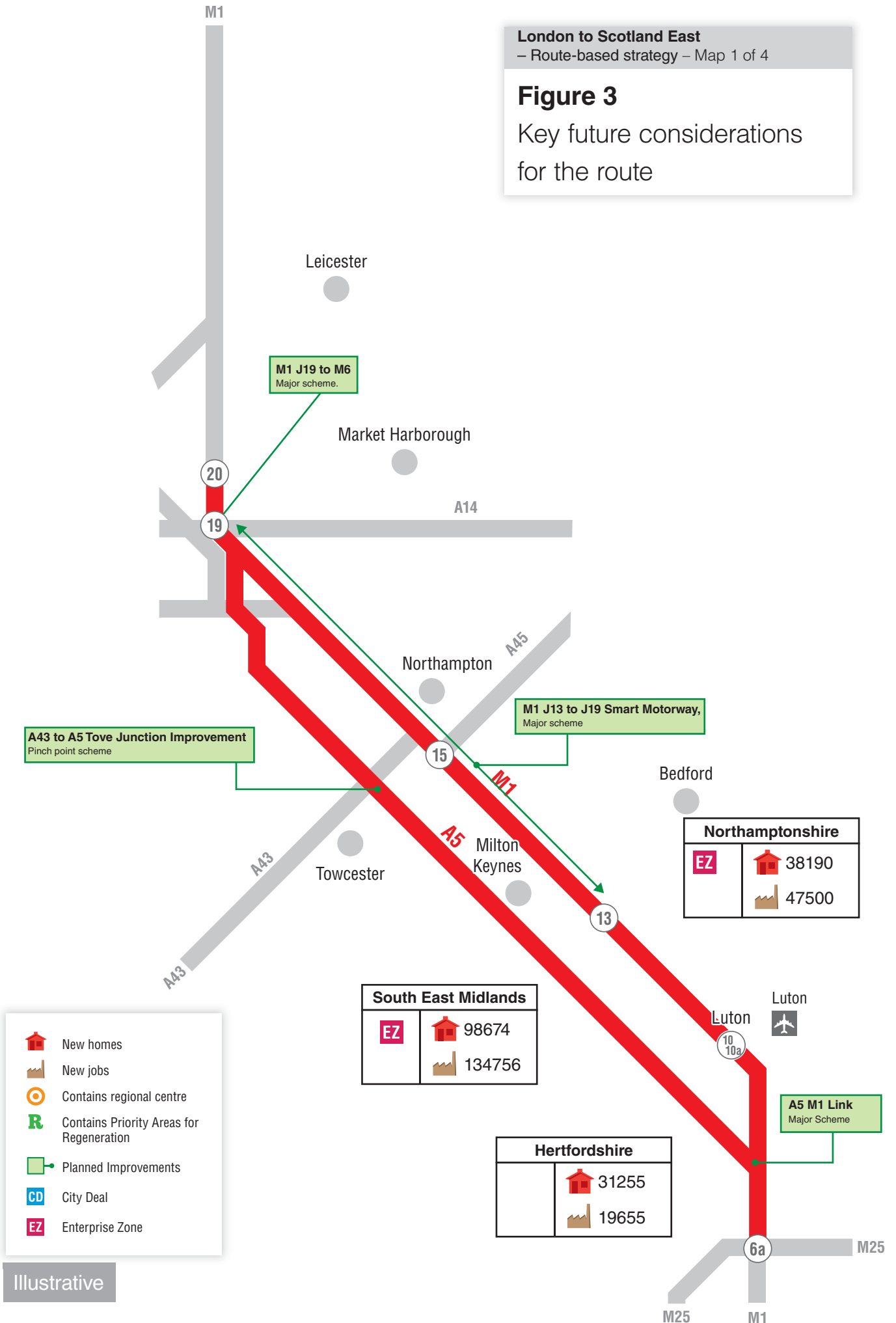
3 Future considerations

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 in the period up to 2021 and the following sections summarise those issues in more detail.

Figure 3
 Key future considerations
 for the route



Illustrative

Figure 3
 Key future considerations
 for the route

Derby, Derbyshire, Nottingham & Nottinghamshire			
			79000
			177000

Sheffield City Region			
			60000
			127000

Leicester & Leicestershire	
	38900
	43000

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

Illustrative

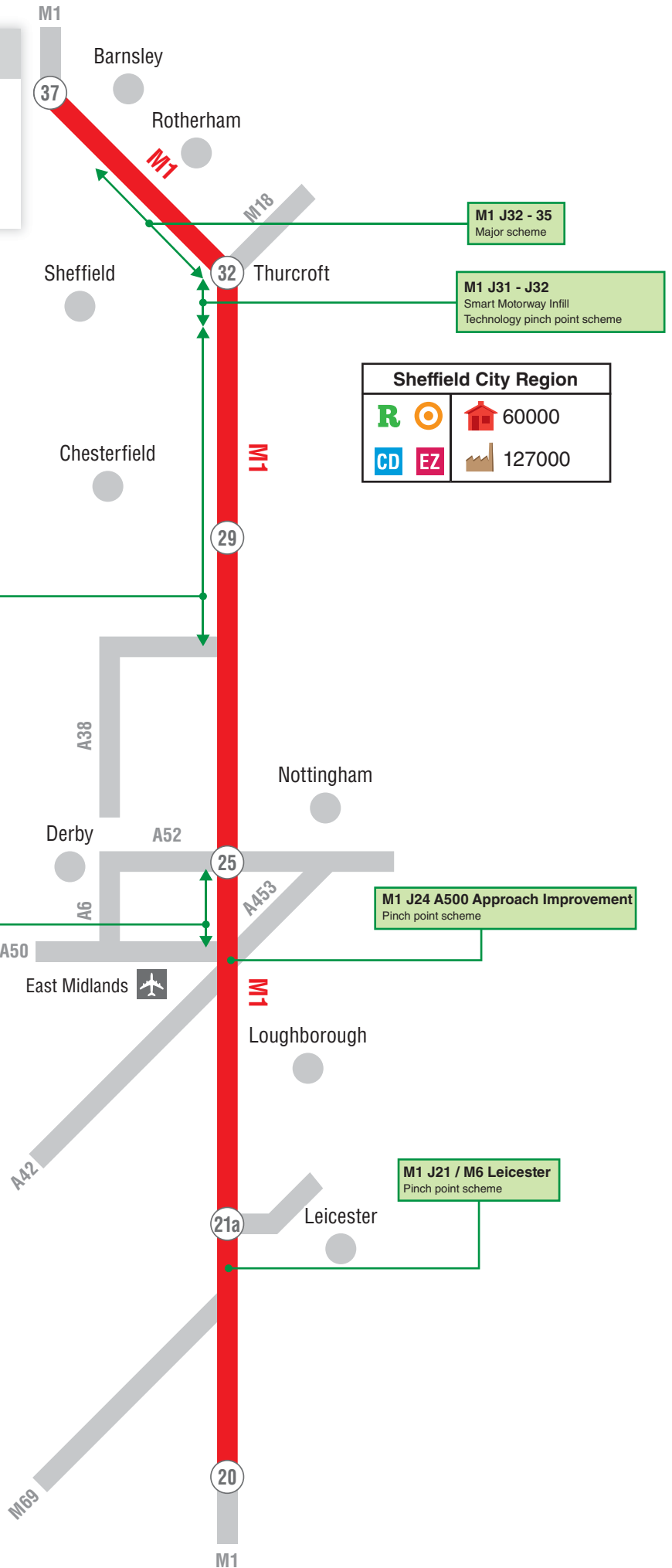
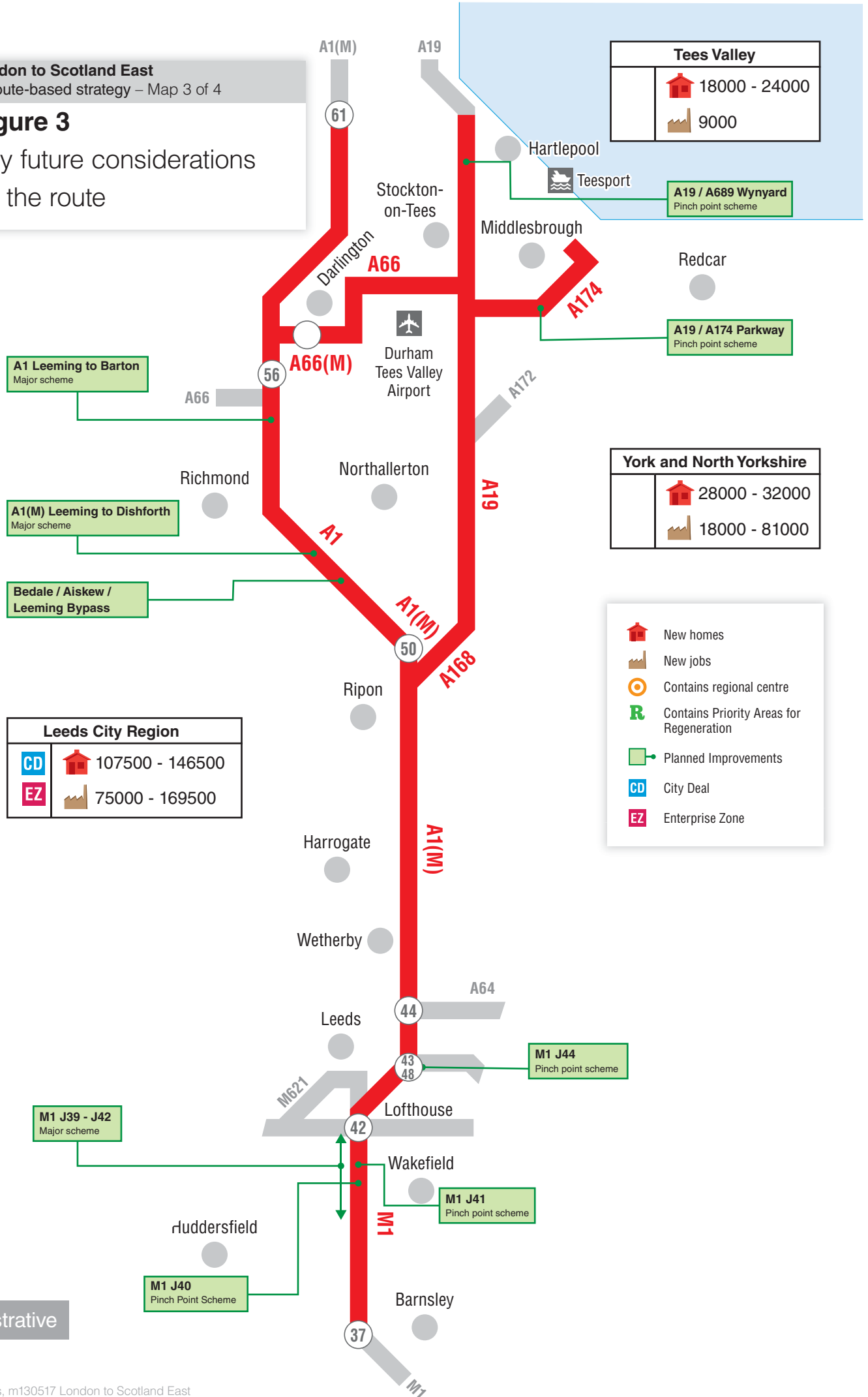


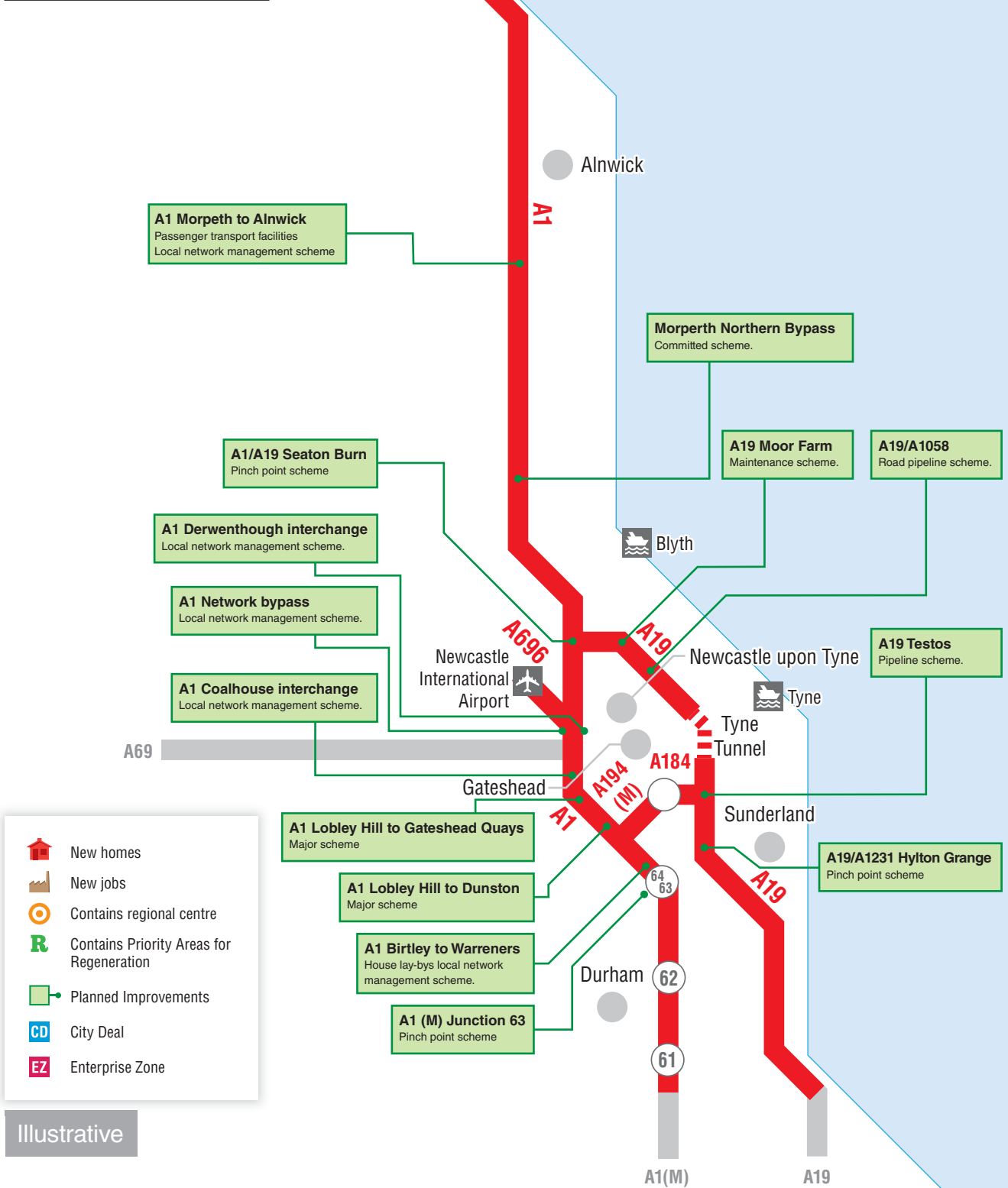
Figure 3
 Key future considerations
 for the route



Illustrative

Figure 3
 Key future considerations
 for the route

North Eastern	
CD	49500 - 52500
EZ	18000 - 71000



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 3.1 summarises the known key housing and economic growth aspirations that would impact on the route, with Table 3.1 below providing more context about some of those key developments 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	
Western Expansion Area, Milton Keynes	Residential and commercial	50 homes	2255 homes	6600 homes and 3450 jobs	A5
Towcester sustainable urban extension	Housing and Employment			2750 homes 3000 jobs	A5
Monksmoor Farm, Daventry	Housing			1000 homes	A5
East of Leighton Buzzard Strategic allocation	Residential and commercial	75 homes	1200 homes	2500 homes and 2400 jobs	A5
Silverstone			185,181m ² of employment floorspace	8,400 jobs (incl by 2021). Additional 39,847m ² of hotel, 127,039m ² of spectator/leisure, floorspace.	A5
Maylands Gateway, Hemel Hempstead	Residential and commercial			400 homes and 5700 jobs	M1 (J7-8)
Luton Airport expansion	Commercial			1700 jobs	M1 (J10-10a)
Century Park, Luton	Commercial			2500 jobs	M1 (J10-10a)
Houghton Regis North Strategic allocation	Residential and commercial	283 homes	2100 homes	5600 homes, 30ha employment land	M1 (J11-12), A5
Luton North Strategic allocation	Residential and commercial		900 homes	2900 homes	M1 (J11a)
Sundon Rail interchange	Commercial		40ha	40ha	M1 (J11a)

Location of Development	Development Type	Anticipated growth			Anticipated Location of Impact on Route
		2011 – 2015	To 2021	To 2031	
Northampton North SUE	Residential and commercial		1525 homes	3500 homes and 10ha	M1 (J15a-16)
Northampton Waterside Enterprise Zone	Commercial			15,000 jobs	M1 (J16)
Midway Park, Northampton	Commercial			2ha lorry park	M1 (J16)
Northampton Kings Heath	Residential			3,000 dwellings	M1 (J16)
Northampton Norwood Farm/Upton Lodge	Residential			3,500 dwellings	M1 (J16)
Daventry International Rail Freight Terminal (DIRFT 3)	Commercial			9000 jobs 731000m ² of distribution land	M1 (J18)
Lubbesthorpe sustainable urban extension	Residential and commercial		4,250 dwellings and 21ha of employment land		M1 (J21)
South east Coalville sustainable urban extension	Housing			3000 homes	M1 (J22)
Loughborough Science and Enterprise Park	Commercial			77ha employment land	M1 (J23)
West of Loughborough sustainable urban extension	Housing and employment		1100 dwellings	1400 dwellings and 16ha of employment land	M1 (J23)
East Midlands Airport	Commercial			6.7million passengers per year (2030), 618,000 tons of cargo per year (by 2035)	M1
East Midlands Gateway Strategic Rail Freight Interchange (SRFI)	Commercial			7237 jobs	M1 (J24)
Infinity Park, Derby	Commercial			87ha employment land	M1 (J24)
Boots Alliance Enterprise Zone, Nottingham	Housing and Employment			1500 homes 20ha employment land	M1 (J25)
Markham Vale Enterprise Zone	Employment			5000 jobs	M1 (J29A)
Waverley New Community and Advanced Manufacturing Park Enterprise Zone	Housing and employment	700 jobs		4000 homes 3000 jobs	M1 (J33)

Location of Development	Development Type	Anticipated growth			Anticipated Location of Impact on Route
		2011 – 2015	To 2021	To 2031	
Lower Don District Masterplan	Housing and employment			1300 homes 4000 jobs	M1 (J34)
Calder Park, Wakefield	Employment	3000 jobs		6000 jobs	M1 (J39)
Snow Hill, Wakefield	Housing and employment			1200 homes 3000 jobs	M1 junction 41
Aire Valley Enterprise Zone, Leeds	Employment			7000 jobs	M1 (J45)
Thorpe Park, Leeds	Employment, retail			6500 jobs 22,300sqm leisure and retail	M1 (J46)
Hitachi, Newton Aycliffe	Employment	730 jobs			A1(M) J59
Newcastle Airport and Great Park	Employment, housing, airport expansion			2500 homes 10000 jobs (NGP) 2000 jobs (Airport)	A1 north of the Tyne
Teesport expansion	Employment, port expansion	215,000TEU 250 jobs		415,000TEU 500 jobs	A1053 and A174, A19 in Tees Valley
Tees Valley Enterprise Zone (12 sites across Tees Valley)	Employment			4000 jobs	Whole route in Tees Valley
Wynyard Park and Wynyard Village	Housing, employment, new hospital			1100 homes 5000 jobs Hospital	A19 through Tees Valley to A689 Wolviston
A19 Ultra Low Carbon Vehicles Enterprise Zone, Sunderland	Employment			1500 jobs	A19 south of the Tyne Tunnel, A184 and A194(M)

3.2.3 Along the route, there are eleven LEPs, as shown in Figure 3, a number of which have designated Enterprise Zones (EZs) affecting the route, and these are shown in Table 3.1 above. Each of the LEPs on the route has submitted a strategic economic plan (SEP) to government setting out their growth aims and aspirations. In some cases, the anticipated scale of growth in housing or jobs is different to that in Figure 3, but they cover a different period and so for consistency 2021 best estimates from the local plan process have been used.

3.2.4 There are eight areas with approval for City Deals along the route. Three areas were in the first wave of city deals which focused on the eight core cities; these were Nottingham City Region, Leeds City Region, Sheffield City Region and Newcastle Region which are shown within figure 3. The Leeds and Sheffield City Region deals included an agreement for a long-term transport devolved funding allocation, while the Newcastle Region deal included a commitment to develop a programme of investment to reduce congestion and journey-times on the A1 Newcastle and Gateshead Western Bypass.

- 3.2.5 City Deals for Milton Keynes, Leicester and Leicestershire, Sunderland and the North East and for Tees Valley are currently subject to negotiation.
- 3.2.6 The route directly serves a number of major ports and airports along the route, which are detailed in section 3.4.
- 3.2.7 Within section 4, there are a number of areas which were highlighted by stakeholders as significant capacity constraints to economic development along the route.

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
Major schemes			
A5/M1 Link, north of Dunstable	Dual two-lane Dunstable northern bypass, running east from A5 to join the M1 at a new junction 11a south of Chalton	2016	Increased capacity & reduced congestion, plus improved access to strategic development sites north of Dunstable
M1/M6/A14 Junction	Major scheme. Junction improvement	Not known	Improvement junction 19 of the M1 motorway and related sections of the M6 motorway and A14 trunk road within the counties of Leicestershire and Northamptonshire.
A1 Leeming to Barton	Major scheme - upgrade to 3 lane motorway	2016	Safety, journey-time reliability
A1 Lobley Hill to Dunston	Major scheme - upgrade to 3 lane motorway	2016	Journey-time reliability, safety, economic growth, capacity
Smart Motorways			
M1 J28 – J31	Major scheme - Managed motorways	2015	Safety, journey-time reliability and economic growth
M1 J32 – J35a	Major scheme - managed motorways	2016	Safety, journey-time reliability and economic growth
M1 J39 – J42	Major scheme - managed motorways	2016	Safety, journey-time reliability and economic growth
Pinch Point Programme			
A5 Tove Roundabout, Towcester	Pinch Point scheme	2015	This work has been designed to tackle congestion by widening the A43 to three lanes through the junction and reducing the size of the central island to accommodate this.

Location	Scheme Type	Completion Year	Anticipated Benefits
M1 Junction 21/M69, Leicester	Pinch Point scheme	Completed	The work is designed to improve the capacity of the junction with carriageway widening and an extra lane being created on the M1 southbound exit slip at junction 21 approach to the island.
M1 J31 – J32	Pinch Point - variable mandatory speed limit	2015	Safety, journey-time reliability and consistency
M1 J33	Pinch Point - junction improvement	2015	Reduce peak hour congestion, improve access
M1 J40	Pinch Point - junction improvement	2014	Congestion, journey-time reliability, safety, economic growth
M1 J41	Pinch Point - junction improvement	2015	Congestion, journey-time reliability, safety, economy, improve access
M1 J44	Pinch Point - junction improvement	2014	Congestion, safety
A19 / A174 parkway	Pinch Point - junction improvement	2014	Congestion, reduce journey-times, economic growth, safety
A19 / A689 Wynyard	Pinch Point - junction improvement	2014	Congestion, reduce journey-times, economic growth, safety
A19 / A1231 Hylton Grange	Pinch Point – junction improvement	2014	Congestion, economic growth
A1 / A19 Seaton Burn	Pinch Point – junction improvement	2015	Congestion, reduce journey-times, economic growth, safety
Significant Local Network Management Schemes			
A1 Coalhouse Interchange	Local Network Management Scheme Widening and signalisation	2015	Reduced congestion and accident risk, and wider economic benefits for the Team Valley Trading Estate.
A1 Derwenthaugh Interchange	Local Network Management Scheme Increased capacity at interchange slip-roads	2014	Reduced congestion and accident risk.
A1 Newcastle Bypass	Local Network Management Scheme Junction Identification Scheme	2014	Reduced accident risk and delays through improved driver information.
A1 Warreners House to Earsdon	Local management scheme Removal of trees	2014	Reduced accident risk and incident related congestion.
A5, Long Buckby Crossroads	Junction improvements and speed limit reduction – S278	2014	Safety benefits associated with speed limit reduction to 50mph
M1 Lubbesthorpe - Bridge to Growth - North of M1 J21	New motorway bridges – S278	2015	Local transport link improvements & wider economic benefits in releasing the development land.
M1 J30 Improvements	Junction Improvements – S278		Signalisation and lining alterations.
M1 J15a Improvements	Junction Improvements – S278		Minor roundabout widening
M1 J15 Improvements	Junction Improvements – S278		Ramp metering on NB onslip.

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
A19 Testos	Improve safety and alleviate congestion on the A19
A19/A1058 Coast Road	Alleviating congestion on the A19 and improving strategic links. This is between Newcastle and South Shields.
M1 junctions south of Rugby (J13-19)	Managed Motorways. Junctions to the East of Milton Keynes to just North of Rugby.
M1 junctions near Long Eaton (J24-25)	Smart motorways. Junctions by Long Eaton.

3.3.3 The HM Treasury report [Investing in Britain's Future](#) also promoted undertaking a number of feasibility studies that the government will undertake to inform potential future investment in highway improvements. The studies relating to this route are:

- A1 North of Newcastle
- A1 Newcastle-Gateshead Western Bypass
- Trans-Pennine routes

3.3.4 These locations are notorious and long-standing hot spots and do not need to await conclusion of these evidence reports. These studies in effect expedite elements of the stage 2 phase of the RBS through the early investigation of specific interventions on these sections of the route. At stage 2, any results available from the feasibility study work will be considered in the context of the emerging strategy recommendations for the entire route, including maintenance, operations and any other enhancements deemed needed along the route, together with the timing of those needs.

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
M1 junction 10a, Luton	Junction improvement	2015	Congestion reduction and capacity increase along M1 J10 to J10a spur, along with improved access to Luton Airport and development sites in Luton
Bedale / Askiew / Leeming Bypass	Part DfT and Part NYCC funded	2016	Redistribution of traffic. No additional traffic.
Morpeth Nothern Bypass	Nationally Significant Infrastructure Project	At planning Inquiry stage	Transfer of a small amount of traffic from other junctions.
Sheffield Bus Rapid Transit	Public transport	2015	Improve capacity, reliability and quality on the bus network for travel into and between Rotherham and Sheffield
Leeds Next Generation Transport	Public transport	2020	The 14.8km trolleybus system will run between the northern and southern edges of Leeds through the city centre.
A1(M) Junction 63, A167 Shields Road and A693 Blind Lane Improvement (Local Pinch Point Scheme)	Local Pinch Point Scheme	2015	More effective operation of A1(M) junction 63 and associated local roads will reduce queuing on the motorway on the approaches to the junction.
A174 in Stockton dualling between Thornaby Road and the A19 (Local Pinch Point Scheme)	Local Pinch Point Scheme	2015	Will enable development to take place, leading to some additional traffic impacting on A19.

3.4.2 The route serves a number of key ports, airports and freight interchanges, which are vital to the success of the economy.

3.4.3 There are three major international airports along the London to Scotland East route. Luton Airport, Newcastle International Airport and East Midlands Airport are respectively the 5, 11 and 12 busiest airports in the UK in terms of scheduled passengers. East Midlands Airport is the second busiest airport in terms of freight.

3.4.4 The operators of Luton Airport, which is an important hub for budget carriers, have announced plans to increase passenger capacity from 12 to 18 million passengers per year by 2031.

3.4.5 East Midlands Airport is located near the A50, south of Derby and Nottingham. In 2013, the airport handled around 4.3 million passengers and 300,000 tonnes of cargo. The draft Sustainable Transport Plan (March 2014), forecasts the airport could achieve throughput of 10 million passengers a year (by 2030) and handle 618,000 tonnes of freight a year (by 2035). The airport is the largest employment site in Leicestershire outside the City of Leicester. Nearly 7,000 employees are based on the airport site and with the increase in throughput it is reasonable to anticipate employment numbers on the airport site will grow by 2030.

- 3.4.6 The operators of Newcastle International Airport have announced plans to grow passenger numbers from 4.3m in 2012 to 8.5m per year by 2030. The airport has daily scheduled services to airports across the UK and Europe including major international hubs at London Heathrow, London Gatwick and Amsterdam, and a daily service to Dubai. Expansion at the airport is likely to significantly affect the operation of the A696 and the A1 Newcastle Gateshead Western Bypass.
- 3.4.7 The container terminal at Teesport is currently undergoing a £29m expansion which will enable it to increase its capacity from 235,000 to 450,000 twenty-foot equivalent units (teu), with long term aspirations to expand further to 650,000 teu. With a substantial proportion of the existing port traffic travelling to its eventual destination by road, this future expansion is likely to significantly affect the operation of the A1053, the A174 and the A19.
- 3.4.8 The route also serves the key national gateway at Port of Tyne, which handled almost 6.5m tonnes of mainly bulk goods in 2012, which is a significant increase from previous years. The locally significant gateway at Port of Blyth handles between 0.7m and 1.5m tonnes per year.
- 3.4.9 The route serves the Daventry International Rail Freight Terminal (DIRFT), located adjacent to the M1/A5 junction and is currently undergoing major expansion, with a further phase of development currently in the planning phase. Initially, 2,000 jobs is expected from the completion of Phase 2, with an additional 9,000 jobs expected by the end of Phase 3.
- 3.4.10 High Speed 2 Phase 2 stations will be built alongside the M1 in the East Midlands at Nottingham and Derby, and in Yorkshire at Sheffield. Although the completion dates (2033) are beyond the scope of this strategy, construction is due to start in 2021. Work to construct stations and the route itself is likely to affect the M1, including potential realignment in some areas. Additionally, construction traffic has the potential to have a negative impact upon the operation of the M1.

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 During the period to 2021, the route will face significant operational challenges associated with the delivery of committed enhancement schemes and pipeline schemes shown in Table 3.2 and Table 3.3. Within the affected areas, the primary operational challenge will be to ensure that the route continues to serve the needs of traffic while major works are carried out.

4.2.2 Significant stretches of smart motorways, hard shoulder running and variable mandatory speed limits, on the M1 will be in operation by 2021 and the affect of gaps on driver behaviour and route operation which will present could present a challenge to route consistency.

4.2.3 As highlighted on Figure 3.1, the route is affected by significant individual development sites and a general growth in housing and employment for its entire length. Certain specific enterprises provide particular operational challenges; for example, on the A19 in Sunderland traffic associated with Nissan Motor Manufacturing UK and Nissan Distribution Centres, which directly employs 6,000 to 8,000 people, causes additional network peak periods outside the normal morning and evening peak periods. Further to any additional capacity requirements, it may be necessary to develop a new operational approach to this part of the network in response to plans to expand capacity at the plant and in the wider area.

4.2.4 The M1 between junctions 23a and 25 is nationally important as it links cross-country routes, both from the local and SRN. East Midlands Airport is also in the vicinity and the junction is an important gateway for Nottingham and Derby. The junction already suffers from congestion and with a large amount of development proposed for the area, including the Strategic Rail Freight Interchange (SFRI) its performance will continue to deteriorate. The SRFI will also result in an increase in HGV traffic and it may be necessary to implement a new operational approach. The operation of this part of the network was considered a priority at the stakeholder events.

4.2.5 Within the stakeholder events, a significant operational consideration was the lack of technology infrastructure and provision on the network north of A1(M) junction 49 (Dishforth). Table 2.2 demonstrates how unreliable many sections of the network are both in Tees Valley and around Tyne and Wear, and the lack of technology provision reduces scope for minimising disruption by providing better information to drivers at key decision points in their journeys.

4.2.6 On smart motorway sections, the additional technology and capacity the new operational regime provides benefits to the road user and the Traffic Officer Service. However, smart motorways does change the

profile of incidents on the network and affects the operational procedures of the Traffic Officer Service.

4.2.7 Other significant concerns raised by stakeholders in a number of areas include the need for more effective working between local highways authorities and the Highways Agency across a range of operational areas. This was particularly important in relation to signing, incident management and event management where there are significant interactions between local and strategic routes. We will continue to work with partners and stakeholders to improve in these areas.

4.2.8 In a number of areas a need to review and better manage diversion routes was highlighted. This includes both tactical diversion routes, which are used to manage traffic during roadworks, and emergency diversion routes, which are used in the event of incidents on the network. While we take all reasonable steps to minimise impacts and review routes on a regular basis, there are a number of areas where communities alongside diversion routes experience negative impacts due to diversions.

4.2.9 The main issues on the A1 Newcastle Gateshead Western Bypass were identified through the earlier pilot route-based strategy report. The primary operational issue identified within the earlier study related to the challenges when managing incidents.

4.3 Asset condition challenges and opportunities

4.3.1 In the period to 2021 there are very significant asset condition challenges which will need to be addressed throughout the length of the route. As detailed in Section 2.3, a very large proportion of the surface will require replacement by 2021.

4.3.2 To the north of the route particularly, maintenance records show that the thin surface course system installed under the current standard tends to deteriorate at a much faster rate than should be expected. Preliminary studies suggest that this is in part due to frequent exposure to low winter temperatures, which causes the binding material to become brittle and more prone to breaking up under normal traffic flows.

4.3.3 There are a large number of structures along the route which provide significant maintenance challenges to 2021 and beyond. Key issues described in Section 2.3 include deteriorating concrete in need of repairs; bearings and expansion joints requiring replacement; deterioration of parapets and failure of bridge deck waterproofing. These issues will require significant expenditure in the short term as well as longer-term investment to remedy the problems.

4.3.4 There are several specific major structural issues which are likely to need to be addressed in the period to 2021:

- The 0.64 mile long Tinsley Viaduct in South Yorkshire requires significant concrete repairs and waterproofing works to the upper level which carries the main line of the M1.

- The Lofthouse interchange of the M1 and M62 in West Yorkshire has a number of structures which require renewal or replacement within the period.
- The Allerdene Railway Bridge which carries the A1 over the East Coast mainline in Gateshead requires significant ongoing maintenance expenditure. The bridge is likely to require major works, including potential replacement, within the period.

4.3.5 Throughout most of the motorway network, the National Roads Telecommunication Service (NRTS) provides high capacity fibre-optic data connection between existing technology, including variable message signs and CCTV, and the Highways Agency's network of regional control centres. However, on the route north of A1(M) junction 49 (Dishforth), connection is via low capacity copper wires which are life-expired and increasingly prone to failure, and therefore this is likely to require replacement within the period.

4.3.6 A further significant issue affecting many areas of the network relates to the condition and capacity of existing drainage systems, which are impacted both by changes to the network and changing weather patterns. In a number of locations such as on the A19 near Billingham, and near Doxford flooding events are occurring more frequently and causing significant disruption to road users.

4.3.7 Managing the impact of maintenance schemes on road users and neighbours will be a key challenge. This route supports a higher level of freight distribution which is likely to continue with the development of Strategic Rail Freight Interchanges near the M1 junction 24 and the operation of East Midlands airport. As these will not necessarily follow the same peaks during the day or the year as 'normal' traffic, further consideration is required to minimize the impact of works.

4.4 Capacity challenges and opportunities

4.4.1 The route is a key north to south corridor, and serves a range of purposes through its length, which are described in Chapter 1 and Chapter 3. Ensuring that the route provides sufficient capacity to accommodate and enable economic growth is one of the fundamental priorities for LAs and other stakeholders across the whole route. The overwhelming majority of comments and evidence from stakeholders related to providing and maintaining capacity on the network overall and in specific locations.

4.4.2 There are a range of capacity challenges across the route as a whole. Many sections of the route have already or are in the process of having installed smart motorways which allow flows and capacity on the main line to be managed to ensure consistent and efficient throughput of traffic. Once the schemes listed in Table 3.2 have been completed, the M1 will be served with smart motorways from the M25 to the M62, except for the sections from junction 19 to junction 24 and from junction 35a to junction 39. In areas served by smart motorways, stakeholders'

priorities were focused on delivering capacity improvements at junctions.

- 4.4.3 Part of the A5, from the northern edge of Dunstable to M1 junction 9 is expected to be detrunked following the completion of the A5-M1 link. However, the A5 from this new link to the southern edge of Milton Keynes suffers serious challenges both in terms of capacity and safety. Indeed, pressures on this section will increase with the completion of the A5-M1 link road which will, in practice, act as a Dunstable northern bypass. One of the main focal points of these challenges is at Hockliffe, where there have been multiple fatal accidents and sustained calls for an A5 bypass.
- 4.4.4 The A5 through Bletchley and Milton Keynes is high-standard, two lane dual carriageway. However, junctions at each end of this section are at grade roundabouts both of which experience extensive congestion. This may be exacerbated following the completion of the A5-M1 link road.
- 4.4.5 Junction 14 of the M1 has in recent years been upgraded but traffic growth has led to a further deterioration of its level of service to the point where it is once again beginning to cause difficulties on the M1 itself.
- 4.4.6 There are a number of sections of motorway and non-motorway trunk road in and around urban areas, where the route performs an important role in serving local commuter and leisure trips, as well as long-distance through traffic. In these areas, the stakeholders' priorities tended to focus on improvements to junctions and additional capacity on particular links. In urban areas served mainly by non-motorway trunk roads, particularly in Tees Valley and Tyne and Wear, this included enhancements to the network to enable it to be used in a manner more similar to a motorway, with support for smart motorway type measures including variable speed limits and CCTV monitoring.
- 4.4.7 Stakeholders have also raised the air quality issues resulting from the A5 running through the historic centre of Towcester in Northamptonshire. This is a point of significant congestion, particularly when there are adjacent M1 closures, which contributes to poor air quality reflected in a designated AQMA. If viability issues can be resolved then an opportunity to address this comes through the Towcester South Extension residential scheme where the development's spine road will offer an A5 relief road around the western side of Towcester removing substantial traffic from the town centre.
- 4.4.8 Stakeholders identified a range of capacity issues regarding the entire length of the M1. A Pinch Point scheme on the M1 at junction 21 is expected to be delivered by March 2015; but stakeholders raised concerns that the junction will continue to experience long term congestion problems, and noted that the poor performance of the junction threatens Leicester's ability to attract inward investment. This also has led to weaving between junctions 21 and 21a, and traffic flowing south onto the M69 queuing on the mainline. Stakeholders also reported that this hotspot is often avoided by long-distance traffic, creating further problems for the local road network.

- 4.4.9 Feedback from stakeholders indicates that junctions 23a and 24 of the M1 should be a high priority due to the East Midlands Airport, East Midlands Gateway Rail Freight Interchange, and the proximity of three cities. It is believed attention and improvement is required to allow future development to be completed and to open up the area for investment.
- 4.4.10 Stakeholders also had concerns over junction 25 of the M1, and either side of the major widening scheme (J25-28). While there are plans to widen the M1 further north and south of this new scheme, the lane drop currently causes very severe congestion issues. Additionally, it is perceived that junction capacity issues remain for this section, which marginalises the benefits of the widening scheme. Proposed development in the A52 corridor and in the wider M1 corridor (Ilkeston and Hucknall areas) will lead to increased traffic demand at the junction which could exacerbate the existing problems.
- 4.4.11 The stretch of the M1 between junctions 26 and 35 was noted by stakeholders as being problematic, particularly in the AM peak. This also has knock-on effects with the A52 into Nottingham and with the A610 at M1 junction 26, a junction which also has congestion issues. There is regular queuing during peak periods at M1 junction 29, where traffic backs up onto the mainline of the M1.
- 4.4.12 M1 junction 29a was opened in 2008 to serve the Markham Vale regeneration development. The junction is already busy at peak times and will come under increasing pressure as further development takes place in the area, including the construction of up to 2,000 houses proposed close to the junction. This has the potential to produce adverse impacts on the operation of the junction, including the M1 off-slips.
- 4.4.13 M1 junction 30 operates within capacity at present, although there are indications that congestion on the local highway network related to strategic traffic can create queuing back through the junction. This could, in turn, cause problems for traffic exiting the motorway if this problem increases as a result of growth in the north Nottinghamshire area.
- 4.4.14 On the M1 through South Yorkshire, the key junctions seen as constraining growth are junctions 33, 34 and 36. At junction 33, Pinch Point and other committed schemes are expected to provide sufficient capacity to accommodate proposed development at the junction. Beyond 2021, junction 33 is likely to require further significant upgrading to accommodate regional development aspirations in full.
- 4.4.15 At junction 34, the committed local scheme to implement bus-rapid transit (BRT) between Sheffield and Rotherham via Meadowhall will include the construction of a new link under the Tinsley Viaduct which acts as a bypass to junction 34 south for through traffic between Sheffield and Rotherham, which currently operates at the limit of its capacity in peak periods. This, along with other recent improvements at the junction and potential developer-funded schemes is likely to address most of the short-term capacity related issues. Within the period of this strategy however, there is potential for significant local road network

problems associated with the construction of BRT and development in the lower Don Valley.

- 4.4.16 At junction 36, the A61 Birdwell roundabout just east of junction 36 in Barnsley causes significant queuing problems which regularly impact on the motorway junction. It is likely that a local road network scheme to increase capacity at the junction will provide a lot of benefit to the operation of junction 36. Although not part of this strategy, queuing on the A61 between the A628 Westwood Roundabout and junction 36 may in future begin to queue back to junction 36 without additional capacity being added to this route.
- 4.4.17 On the M1 around Leeds, significant housing and employment development in the Aire Valley, Thorpe Park and east of Leeds may cause junctions which currently operate within their effective capacities to suffer increasing congestion and delay. These include junctions 42 (discussed further in the South Pennines route-based strategy), up to junction 46.
- 4.4.18 The A19 in Tees Valley between the A174 Parkway junction and A689 Wolviston junction suffers from a range of capacity constraints. While there are Pinch Point schemes at both junctions to address current problems, committed development in the area is likely to require further capacity improvements at junctions, as well as widening in both directions south of Wolviston.
- 4.4.19 Also in Tees Valley, there are a number of junctions on the A66 around Darlington and in Stockton-on-Tees which are likely to require capacity enhancements. Particular junctions acting as constraints to development are the A66/A167 Blands Corner junction, the A66/A67 Morton Palms junction, and the A66 Elton Interchange, all of which are identified as regional investment priorities. On the A174, the Greystones roundabout junction with the A1053 is seen as a major constraint affecting both development in Redcar and Cleveland and access to Port of Tees. At junction 58 of the A1(M), problems at a local road junction in Darlington lead to regular queuing affecting the main line of the A1(M).
- 4.4.20 In County Durham, Tyne and Wear there are a number of junctions with capacity constraints. Between A1(M) junction 62 and A1 at Seaton Burn, these are detailed in the pilot route-based strategy report. On the A19, there are a number of junctions which will benefit from improvement schemes listed in Table 3.2 and Table 3.3. Within the plan period, the key challenge on the A19 is likely to be at the A189 Moor Farm junction, which is an at grade junction, while beyond the plan period development around A1068 Seaton Burn, A191 Holystone and A1290 Downhill Lane may necessitate further intervention. On the A194M the Whitemare Pool junction with the A184 is also a significant current capacity constraint.
- 4.4.21 North of Newcastle, the network is lightly trafficked and there are no locations where capacity is expected to act as a significant constraint to development aspirations within the period to 2021. However, stakeholders expressed support for enhancements to capacity by dualling the remaining sections of single carriageway.

4.5 Safety challenges and opportunities

- 4.5.1 As part of our vision to become ‘The world’s leading roads operator’, one of our goals is that our roads are the safest in the world. As such, we expect to continue to invest in making the network safer so that fewer accidents occur and where they do occur they are lower in severity.
- 4.5.2 Section 2.2 of this report describes the specific locations on the route which are ranked in the top 250 nationally for accidents, and the stretches of route with high levels of accidents. We investigate all parts of our network where the frequency of accidents is higher than would be expected to identify and target improvements.
- 4.5.3 The key safety issues raised by stakeholders affecting drivers and their passengers occur as a result of congestion, with queuing at junctions and merging and weaving when joining or leaving the network. The key issues affecting vulnerable roadusers are highlighted in sections 2.6.

4.6 Social and Environmental Challenges and Opportunities

- 4.6.1 The M1 between junctions 13 and 19 includes several AQMAs of pressing concern. There are plans to convert this section to smart motorway but the air quality issue is deemed sufficiently high priority to influence the phasing of this.
- 4.6.2 Through Sheffield and Rotherham, stakeholders including the LAs have consistently expressed the view that measures to reduce emission of pollutants on the M1 are essential in the short and medium term in order for the authorities to bring them below health-based EU limit values. The Highways Agency is working with the LAs to consider all the options available to it to help achieve this target.
- 4.6.3 Vehicular traffic using the SRN is a source of air pollution, which has an impact on air quality. The Highways Agency approach to air quality is driven by the EU directive on ambient air quality and cleaner air for Europe, which sets limit values for certain pollutants. There are several AQMAs and other sensitive areas for air quality that may impact on the route within the period, which are listed in the Technical Annex. These locations may constrain improvement opportunities on the road network, with schemes needing to demonstrate that air quality will not be worsened by the proposals.
- 4.6.4 Noise pollution associated with the SRN is also a particular challenge when the network is close to populated areas. The stakeholder engagement raised a number of issues regarding noise from both concrete and HRA surfaces in the corridor. This is a particular issue on the A19 near Billingham where there is a substantial section of concrete surface and on the A1 in Northumberland where homes are close to parts of the A1 which still have HRA surfaces.
- 4.6.5 As highlighted in section 2.7, there are a number of areas on the route where it comes into contact with ecologically sensitive locations and species. Although ecological interventions were not highlighted as a

significant priority by stakeholders, where appropriate we will continue to take action on the network to reduce road-related pollution and improve biodiversity.

- 4.6.6 The route includes large sections that are within or on the approach to urban areas. In these locations provision for cyclists and pedestrians is an important challenge for the Highways Agency. Section 2.6 highlighted some key locations where there is frequent interaction between the SRN and cyclists, pedestrians and equestrians, primarily on the A5 in Dunstable and Towcester, the A1 north of Newcastle, and the A19. The stakeholder engagement also raised the issue of severance and difficulty in crossing both Motorways and non-motorway trunk roads at junctions. Key locations raised by stakeholders where this was an issue include at junction 24 of the M1, which is key for accessing the East Midlands airport and major employers around junction 24 from the major cities of Derby and Nottingham.
- 4.6.7 There are a number of locations on the route where people are living adjacent to it and where severance was raised as a particular challenge.

Table 4.1 Schedule of challenges and opportunities

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
Network Operation	Route north of Dishforth	Lack of technology to inform of journey-times, incidents and diversions, lack of ability to manage traffic in Tyne and Wear and Tees Valley. Information needs to be locally relevant.	Yes	✓			Yes			✓
	M1 route south of M6	Need to consider the wider consequences of SRN improvement schemes, e.g. on local roads, and coordination between HA and local highway authorities on delivering schemes	No		✓	✓	Yes		✓	
	M1 route south of M6	Lorry Parking and location of lay-bys is a problem	No	✓			Yes		✓	
	Northamptonshire sections	Within Northamptonshire improvements to the local road could assist the operation of the SRN and therefore the local road and SRN should be considered together	Yes		✓	✓	Yes		✓	
	M1 south of M6	The M1 has problems with post - accident operation	Yes	✓			Yes		✓	
	M1 J13	M1 Junction 13 signage is not positive and clear enough	No	✓			Yes	✓		
	A5 Milton Keynes	A5 MK Stadium Event Management - poor roadside information	No	✓			Yes		✓	
	A5	Suitability of the A5 as a diversion route and the impact on local roads when there is an issue on the M1	No	✓			No			
Asset Condition	M1 (Smart motorways sections)	Ability to maintain the route is constrained by lack of a hard-shoulder and/or limited lane capacity.	Yes	✓	✓		No			
	A1 in the North East	Ability to maintain the route is constrained by lack of a hard-shoulder and/or limited lane capacity.	Yes	✓			No	✓		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	A19	Ability to maintain the route is constrained by lack of a hard-shoulder and/or limited lane capacity.	Yes				No	✓		
	A1/M1 Link	Flood risk in areas of low-lying network or areas with inadequate drainage.	Yes	✓			No	✓		
	A19 Billingham	Flood risk in areas of low-lying network or areas with inadequate drainage.	Yes	✓			No	✓		
	A66 Teeside Park	Subsidence	Yes	✓			Yes	✓		
	Route (structures listed in Technical Annex	Condition of many structures requires increasing maintenance intervention. Potential for major impacts at specific structures listed adjacent.	Yes		✓		No			
	M1 Tinsley Viaduct	Condition of many structures requires increasing maintenance intervention. Potential for major impacts at specific structures listed adjacent.	Yes	✓			No		✓	
	A19 Tees Viaduct	Condition of many structures requires increasing maintenance intervention. Potential for major impacts at specific structures listed adjacent.	Yes	✓			No	✓		
	A1 Allerdene Railway	Weight, width and capacity constraints	Yes	✓			Yes		✓	
	M1 J10 - 15	Areas in which significant quantities of resurfacing is likely to be required	Yes	✓			No			
	M1 J19 - 23a	Areas in which significant quantities of resurfacing is likely to be required	Yes	✓			No			
	A1(M) J56 - 63	Areas in which significant quantities of resurfacing is likely to be required	Yes	✓			No		✓	

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
Capacity	A5 South	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues. Specific junctions listed.	Yes	✓			Yes			✓
	M1 J21 and J21a	The M1 SB between M1 J21a and J21 at peak times is a crucial congestion hotspot. Long distance traffic often avoids it and uses the local road network which creates associated problems. J21's poor performance also threatens Leicester's ability to attract inward investment. Pinch Point delivery by March 2015 but won't address all congestion problems between J21 and J21a. Pinch Point scheme is a short term fix not long term solution.	Yes	✓			Yes			✓
	M1 J24	M1 J24 is a nationally important part of the M1 as it links to the A50 and A453 routes. and with the airport and SRFI in close proximity. On top of this, it is an important gateway for Nottingham and Derby. However the junction suffers from congestion, it has not been improved and with a large amount of development proposed for the area, its performance will continue to deteriorate. A Pinch Point scheme is scheduled at this junction for Summer 2014. This will change the way traffic on the A50 EB enters the M1 SB. A new carriageway will be created through the junction. However Leicestershire County Council does not think that these measures are sufficient in the long term.	Yes	✓			Yes			✓
	M1 J26-25 (S-bound)	Stretch is at a standstill during AM peak, affects the A52 into Nottingham too. J26 (A610) has huge congestion issues as well. 4 lanes into 3 causes bottleneck. M1 J23a-J25 pipeline scheme, ATM will be key also.	Yes	✓			Yes	✓		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	M1, either side of J25-J28	When the M1 goes down to 3 lanes coming into Nottingham city the traffic comes to an absolute standstill. There are the same congestion issues coming out of the city too, with traffic coming to a standstill as soon as the M1 goes back to 3 lanes. M1 J25-28 widening has resolved the capacity issue on the M1 but junction capacity issues remain.	Yes	✓			Yes			✓
	M1 J34 (Tinsley Viaduct)	Congestion due to limited capacity of the junction	Yes	✓			Yes			✓
	M1 J36 (adjacent local road junction)	The future growth in the Dearne Valley is likely to create further congestion at J36	Yes	✓			Yes		✓	
	M1 J42 Lofthouse Interchange	Insufficient capacity on this link – need extra link					Yes			✓
	A19 in Tees Valley (A174 Parkway to A689 Wolviston including junctions and mainline)	Development pressures currently an issue, PPP schemes will address in short term, but not longer term	Yes	✓			Yes		✓	
	A66 around Darlington and Stockton	Development pressures	Yes	✓			Yes			✓
	A1M J58 (nearby local road signals)	Queuing back onto A1(M)	Yes	✓			Yes	✓		
	A174/A1053 Greystones Roundabout	Development pressures and social implications of this	Yes	✓			Yes		✓	
	A19 around Nissan, Sunderland	Capacity Bottleneck: Perception & impacts regional future and existing economy (NISSAN)	Yes	✓			Yes	✓		
	A194M Whitemare Pool	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues. Specific junctions listed.	Yes	✓				✓		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	A19/A189 Moor Farm at grade roundabout	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues.	Yes	✓				✓		
	A1 Newcastle and Gateshead Western Bypass (all junctions)	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues.	Yes	✓				✓		
	M1 J23	Growth in Loughborough and Shepshed will impact on M1 J23; congestion will be experienced, particularly during university semesters	Yes	✓			Yes	✓		
	M1 J25	Concern about delays, due to insufficient capacity. If HS2 station located here more pressure could be put on the junctions. Impact on SRN of reactive development following HS2 stations.	Yes		✓	✓	Yes		✓	
	M1 J28	A multi-module study has shown that a grade separated junction is required at M1 Junction 28	Yes	✓			Yes		✓	
	M1 J29	2000 new homes are planned for the area - this will put more pressure on the junction	Yes	✓			Yes		✓	
	M1 J33	Congestion due to weaving	Yes		✓		Yes		✓	
	M1 J39 to 42	Delays. Currently an issue – managed motorway scheme will alleviate in short term, but may become an issue again in longer term					Yes		✓	
	M1 J45 and 46	Developments leading to congestion				✓	Yes		✓	
	A19 junctions north of Tyne Tunnel	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues.			✓	✓		✓		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	M1 in South Yorkshire and West Yorkshire	Locations where network capacity currently constrains growth at Enterprise Zones and other key development sites.	Yes	✓			No		✓	
	A1 J47 link to A59	Over capacity, constrains Harrogate economy	Yes	✓			Yes	✓		
	A1 J59	Development pressures	Yes	✓			Yes	✓		
	A19 Wynyard	Locations in which congestion is regularly experienced and unlikely to be fully addressed through committed schemes, or where future development is likely to exacerbate existing issues.	Yes	✓			No		✓	
	A19 in Tyne and Wear	At grade junctions lack capacity. Junction improvements needed. Development pressures.	Yes	✓			Yes	✓		
	A1/A696 Roundabout	Risk from future development	Yes				Yes	✓		
	A1 Leeming to Barton	Support for upgrade to Motorway	N/A	✓			Yes			✓
	A1 North of Newcastle	Support for dualling on more of length	N/A			✓	Yes			✓
	A19 Tyne Crossing	Constraints on crossings	Yes	✓			Yes		✓	
	A1 Western Bypass	Interaction between strategic and local traffic	Yes	✓			Yes		✓	
	A1 North of Newcastle	Perception of poor safety for motorcyclists on single carriageway roads	No	✓			Yes	✓		
	A5 in Dunstable	Congestion (including during incidents on M1)	Yes	✓			Yes			✓
	M1 Junctions 13 - 14	Regular congestion	Yes	✓			Yes			✓
	M1 Junction 14	Congestion	Yes	✓			Yes			✓
	A5 / A43 Towcester	Congestion - Abthorpe Roundabout	Yes	✓			Yes			✓

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	M1 and A45 around Northampton	Congestion	Yes	✓			Yes		✓	
	M1 Junctions 13 - 19	Link congestion (concern over how long planned scheme will provide sufficient capacity)	Yes	✓			Yes		✓	
	M1 Junction 13	Junction congestion	Yes	✓			Yes	✓		
	M1 at Daventry	Congestion (around junction 16) and future development pressures	Yes	✓			Yes	✓		
	A5 Hockliffe	Junction congestion	Yes	✓			Yes	✓		
	A5 around Kensworth	Congestion	Yes	✓			Yes	✓		
Safety	M1 J21 and J21a	Southbound traffic getting off onto M69 blocking back on M1 causes safety hazard. Signalisation has improved things but still issues remain. Also the link is short between 21-21a which results in significant weaving. Ranked 41 st in the top casualty locations and majority of collisions are rear-end shunts and lane changing	Yes	✓			Yes		✓	
	M1 J6a to 7	Complex junction where the route connects with the M25. Ranked 7 th in casualty locations across the SRN. Second busiest section of the route. Although the recently introduced variable mandatory speed limits will not be reflected in the safety data within this report	Yes	✓			No			
	A5 Dunstable	A5 travels through Dunstable's high street and has the longest section of casualties per billion miles on the route. Predominantly slight collisions due to the low speeds	Yes	✓			No			
	M1 J24a and 25	Section is ranked 14 th nationally for casualty locations. Complex section of the route where the M1 interacts with other major SRN and strategic local roads.	Yes	✓			No			

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	M1 J26	M1 near Nottingham is ranked 31 st and majority of collisions are related to rear-end shunts	Yes	✓			No			
	Trunk Roads near Middlesbrough	A1053 and A19 high total casualties per billion miles are typically the result of the congestion related collisions	Yes	✓			No			
	A5 south of Milton Keynes	safety concerns (lighting) - around Redmoor Junction	Yes	✓					✓	
	A5 / A421 junction	Safety concerns	Yes	✓			Yes	✓		
Social and environment	M1	Severance created by motorway and junctions for cyclists, pedestrians and equestrians due to factors such as conflict with HGVs at junctions and unsuitable crossing facilities								
	M1 J35 and J36	Severance for Pedestrians	No	✓			Yes	✓		
	A1M	Severance created by motorway and junctions for cyclists, pedestrians and equestrians due to factors such as conflict with HGVs at junctions and unsuitable crossing facilities	Yes	✓			Yes	✓		
	A19 / A66	Severance created by motorway and junctions for cyclists, pedestrians and equestrians due to factors such as conflict with HGVs at junctions and unsuitable crossing facilities						✓		
	A19 in Tyne and Wear	Severance created by motorway and junctions for cyclists, pedestrians and equestrians due to factors such as conflict with HGVs at junctions and unsuitable crossing facilities						✓		
	M1 J33	Weaving between closely-spaced junctions (J33 is top 250 accident location)	No				Yes			✓
	A19 / A168	Use of central reserve gaps for right and U turns creates increased risk of accidents	No	✓			Yes	✓		
	A19 / A66	Suitability of route for cyclists	No	✓			Yes	✓		

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	A1 North of Newcastle	Effect of convoy on single carriageway sections - overtaking etc	No	✓			Yes	✓		
	A1 North of Belford	Cycleway crosses carriageway several times		✓	✓	✓				
	M1 / A46	There are issues relating to water quality; most of the water issues/ flooding come from the carriageway, not from flooding of surrounding rural area. Issues with drainage and ditches on highways.	No	✓			Yes	✓		
	M1 in South Yorkshire	Risk of flooding at low-lying locations	Yes				Yes	✓		
	A19 / A139	Risk of flooding at low-lying locations	Yes		✓		Yes	✓		
	A19 / A690	Risk of flooding at low-lying locations	Yes	✓			Yes	✓		
	A66 Long Newton	Risk of flooding at low-lying locations	Yes	✓				✓		
	Various Sites	Noise at Defra identified locations								
	M1 J33 to J34N	Poor local air quality may be worsened by motorway traffic		✓			Yes			✓
	A1	Need new bridleway links to join up existing network and grade separated links to maintain access to existing minor routes and PROW network	N/A	✓			Yes	✓		
	A1 and A19	Bridge parapet (barrier) height is not appropriate for horseriders					Yes	✓		
	Newcastle / Gateshead	Need a Park and Ride site	No	✓			Yes		✓	
	Various Sites	Need a Park and Ride site	No	✓			Yes			
	Metrocentre	Need to improve access for non-car modes	No	✓			Yes		✓	
	Away from SRN	Poor connectivity to employment		✓			Yes			

	Location	Description	Is there supporting evidence?	Timescales			Was this Identified through stakeholder engagement?	Stakeholder Priorities		
				Short	Medium	Long		Low	Medium	High
	A1 Great Park	Noise and surfacing issues	No	✓			Yes	✓		
	A19 Tees Viaduct	Closure to high-sided vehicles in high winds causes significant impacts on local routes.	Yes	✓			Yes	✓		
	Tinsley Viaduct	High winds	Yes	✓			No	✓		
	M1 J39	High winds	Yes	✓			No	✓		
	All	Lorry parking and the location and availability of lay-bys is becoming an increasing issue. Lay-bys on the SRN are being used increasingly by HGV drivers to take rest breaks which they are required to take by law. However the HGV's often become a target of anti-social behaviour. Recent expansion of parks on A5; similar facilities are required in other areas.	Yes	✓			Yes	✓		
	M1 Northamptonshire	Congestion – calls for a strategic park and ride facility at Watford Gap services	No		✓	✓	Yes		✓	
	A5 through Towcester	Air quality and environmental problems	Yes	✓				✓		
Other										

4.7 Conclusion

- 4.7.1 The London to Scotland East route provides a strategic link between London, Scotland and many key towns and cities, including; Milton Keynes, Leicester, Nottingham, Derby, Leeds, Middlesborough, Newcastle Upon Tyne and Sunderland. It is also important for other major conurbations not served directly by the route. It is a major focus for development across a wide range of these areas.
- 4.7.2 The route serves a number of key national and international gateways including Luton Airport, Daventry Rail Freight Interchange, East Midlands Airport, Newcastle Airport and the Port of Tees.
- 4.7.3 The current capacity challenges are focused on the sections of the route that are around the main towns and cities. These sections accommodate both commuters and strategic traffic. They also tend to be the key areas where economic development is planned.
- 4.7.4 There is already significant investment planned to improve the capacity of the route. This includes upgrading three sections of the M1 in Derbyshire and Yorkshire to smart motorways, a major scheme to upgrade the A1 between Lobley Hill and Dunston, delivery of a new A5 / M1 link north of Dunstable and a major upgrade of the M1, M6 and A14 Catthorpe Interchange in Leicestershire. There are also 13 Pinch Point schemes 9 significant Local Network Management Schemes; the majority of which are targeted to improve capacity at key junctions along the route as well as others that will improve the information provided to drivers. Four pipeline schemes have also been identified for this route including proposals to upgrade two further sections of the M1 to smart motorways (junctions 13 – 19 and junctions 24 – 25) and two capacity improvements for the A19 Testos and A1058 Coast Road. All these improvements are anticipated to address current capacity concerns as well as support economic development over the route-based strategy period.
- 4.7.5 In addition, three feasibility studies covering sections of this route were announced in June 2013. These are for the A1 North of Newcastle, A1 Newcastle – Gateshead Western Bypass and the Trans-Pennine routes. These locations have been recognised as notorious and long-standing congestion hot spots and were identified for further investigation in advance of the conclusions of the route-based strategy evidence reports. However, any results available from the feasibility study work will be considered in the context of the emerging strategy recommendations for the entire route.
- 4.7.6 Currently there are no other improvements planned for other locations where capacity has been identified as a current and future concern, including those identified as a high priority by stakeholders. These include the following:
- Various M1 Junctions including 14, 21, 21a, 24, 24a, 25, 28, 34, 42, 43, 45 and 46;

- A5 junctions at each end of the section through Bletchley and Milton Keynes and the mainline through Towcester;
- M1 mainline from Junction 23a to Junction 24;
- Various A66 junctions around Darlington and in Stockon-on-Tees;
- A1(M) Junction 58;
- A174 / A1053 Greystones Roundabout;
- A19 between the A174 Parkway junction and A689 Wolviston junction;
- A19 / A189 Moor Farm junction; and
- A194(M) / A184 Whitemare Pool Junction.

4.7.7 There may also be value in considering the operation and capacity of the sections on the M1 where there are no current plans to introduce smart motorways. The challenge for this RBS period will be to monitor the impact of the introduction of smart motorways elsewhere on the route to understand whether similar interventions may be appropriate to provide additional capacity, improve safety and provide a more continuous operational framework for the entire length of the M1.

4.7.8 Elsewhere the route tends to perform relatively well when looking at the capacity metrics and only limited development is planned at these locations. It could be argued that development would be more suitable in such areas due to capacity on our network. However there are wider planning considerations which mean that significant development in these areas may not be appropriate.

4.7.9 There is an opportunity to work with developers, LEPs and LAs to secure funding for the delivery of capacity improvements that may be necessary to support economic development.

4.7.10 The route generally performs well for safety, in line with other motorways and high standard trunk roads. The remaining priority safety challenges are particularly focused around the key urban settlements and where there are also performance issues such as journey-time reliability and delays. These include the following:

- M1 where it connects with the M25 at junction 6a;
- A5 at Dunstable;
- M1 southbound at junction 21;
- M1 between junction 24a and 25;
- A19 and A1053 near Middlesbrough;

4.7.11 These locations are predominately complex junctions with multiple vehicle manoeuvres that can lead to collisions. The M1 southbound at junction 21 is subject to regular queuing resulting in late lane changing and rear-end shunts. This was a concern also shared by stakeholders.

- 4.7.12 There are safety issues on the A5, A19 and the A1053. These locations all experience congestion with the majority of collisions being rear-end shunts, resulting in slight injuries.
- 4.7.13 It is anticipated the some of the capacity improvement schemes that are already planned for some of these locations, identified above, will have a positive impact on safety including improving parts of the M1 to smart motorway standard.
- 4.7.14 From an operational perspective, the key issue for the route raised by stakeholders was the lack of technology provision north of Dishforth. This has an impact on our ability to inform drivers whilst on the route about journey times, incidents and diversions.
- 4.7.15 In these areas, the stakeholders' priorities tended to focus on improvements to junctions and additional capacity on particular links. In urban areas served mainly by non-motorway trunk roads, particularly in Tees Valley and Tyne and Wear, this included enhancements to the network to enable it to be used in a manner more similar to a motorway, with support for smart motorway type measures including variable speed limits and CCTV monitoring.
- 4.7.16 The northern section of the route also experiences a lack of technology, particularly on the A1 north of Richmond and the entire length of the A19.
- 4.7.17 The route is predominantly made up of motorway, which is patrolled by the Traffic Officer Service. There are however, some motorway sections which have a lower level of provision where the Traffic Officer Service does not routinely patrol but does attend incidents. These sections include the M1 between junctions 8 and 9, junctions 14 and 15, junctions 36 and 38 and on the A1(M) between junctions 44 and 46.
- 4.7.18 The remainder of the network is trunk road which the Traffic Officer Service does not patrol but will provide an on road response in exceptional circumstances.
- 4.7.19 This route's assets are in reasonable condition. However deterioration is expected over the route-based strategy period. This is particularly the case for the pavement in key areas as sections are expected to reach the end of their design life by 2021. These include the M1 between junctions 10 and 15, junctions 19 to 23a and junctions 34 to 39. Managing the impact of maintenance schemes on road users will be a key challenge.
- 4.7.20 There are also important structures along the route which will require maintenance within the RBS period. These include the M1 structures across the River Trent floodplain near Nottingham, the Tinsley Viaduct on the M1 at junction 34 and the Lofthouse Interchange on the M1 at junction 42. It is anticipated that the Allerdene railway bridge on the A1 near Gateshead will also require significant works, and possible replacement of the bridge, within the RBS period.
- 4.7.21 There are also a number of social and environmental issues that have been highlighted by the evidence and which will require consideration

over this period. In particular, there are 21 AQMAs which the route passes close to or through. These will present a particular challenge as care will be required when developing any improvements to ensure that they do not adversely affect air quality in these areas.

4.7.22 This route is predominantly motorway and therefore the interaction with vulnerable users is less significant than for other routes. However, stakeholders raised concerns about provision for vulnerable users for the trunk road sections; in particular, the A5 in Dunstable and Towcester, the A1 north of Newcastle and the A19.

4.7.23 Noise pollution associated with the SRN is also a particular challenge for those locations where the network is close to populated areas. The stakeholder engagement raised a number of issues regarding noise from both concrete and Hot Rolled Asphalt (HRA) surfaces in the corridor. This is a particular issue on the A19 near Billingham, where there is a substantial section of concrete surface; and on the A1 in Northumberland, where homes are close to parts of the A1 which have HRA surfaces.

4.7.24 The route interacts with the following other route-based strategies:

- Solent to Midlands (the A43 crosses the A5 and meets the M1 at Towcester);
- South Midlands (connects A5 with M1 junction 18, M69 with M1 at Leicester, A42 with M1 junction 23a);
- North and East Midlands (connects A46 and M1 near Leicester, crosses the M1 between Derby and Nottingham);
- London to Leeds (East) (connects at Leeds where the A1 becomes part of the London to Scotland East route);
- South Pennines (connects M18 and A1(M) at Sheffield and Leeds); and
- North Pennines (connects A66 and A69 with A1).

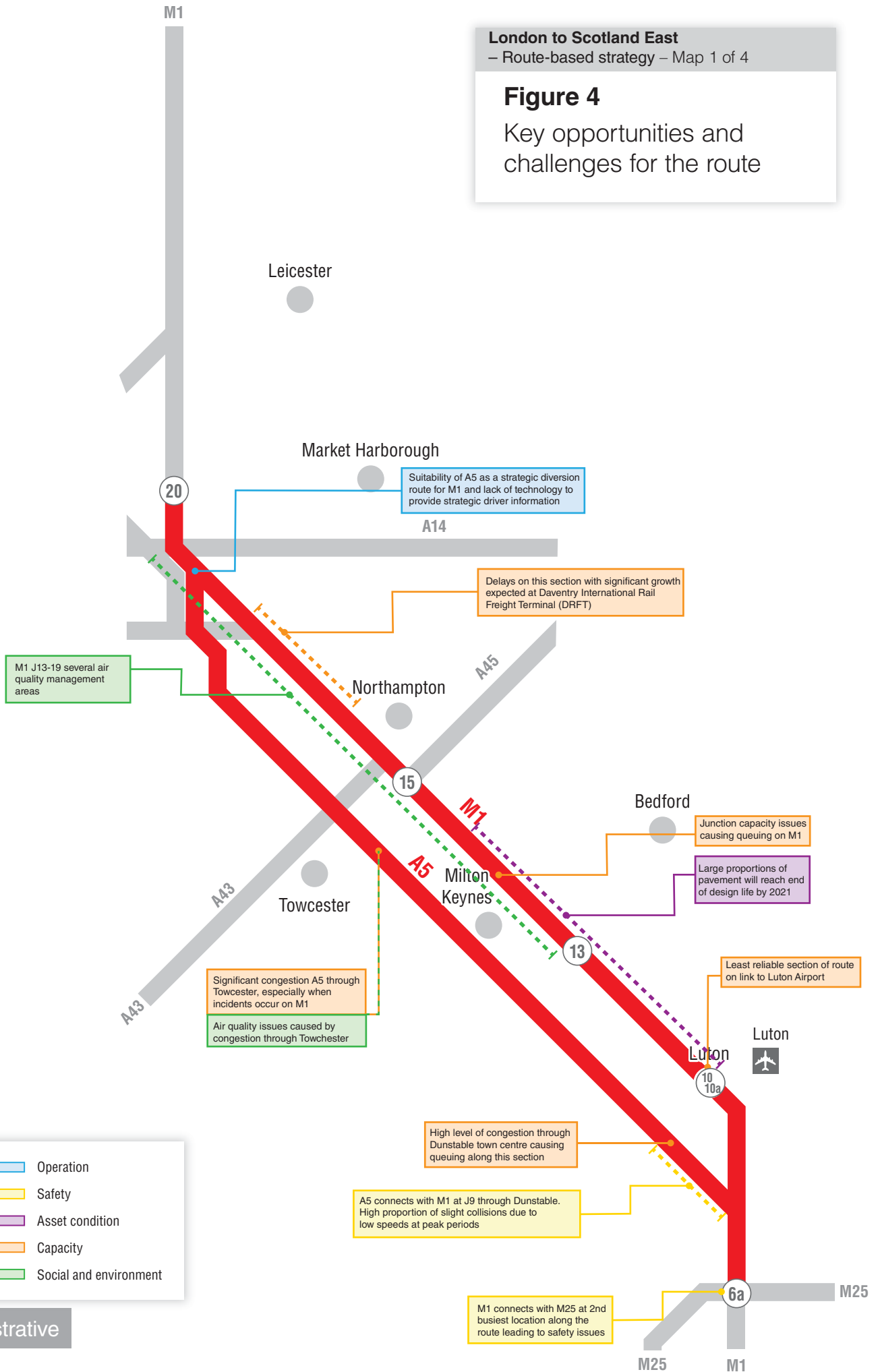
4.7.25 This evidence report has identified a number of key challenges and opportunities for the route over the RBS period. It has shown that capacity, safety and sometimes social and environmental issues often occur in similar locations. There is considerable investment already planned for the route but there are also other further locations that are expected to require consideration for intervention over the route-based strategy period. The majority of these locations were identified as high priorities by stakeholders during the workshops and are as follows:

- Various M1 junctions including 6a, 14, 21, 21a, 24, 24a, 25, 28, 34, 42, 43 and 44;
- A5 junctions at each end of the section through Bletchley and Milton Keynes and the mainline through Towcester;
- M1 mainline southbound from junction 21 and between junctions 23a to junction 24;
- Various A66 junctions around Darlington and in Stockon-on-Tees;

- A1(M) Junction 58;
- A174 / A1053 Greystones Roundabout;
- A19 / A1053 near Middlesbrough;
- A19 between the A174 Parkway junction and A689 Wolviston junction;
- A19 / A189 Moor Farm junction; and
- A194(M) / A184 Whitemare Pool Junction.

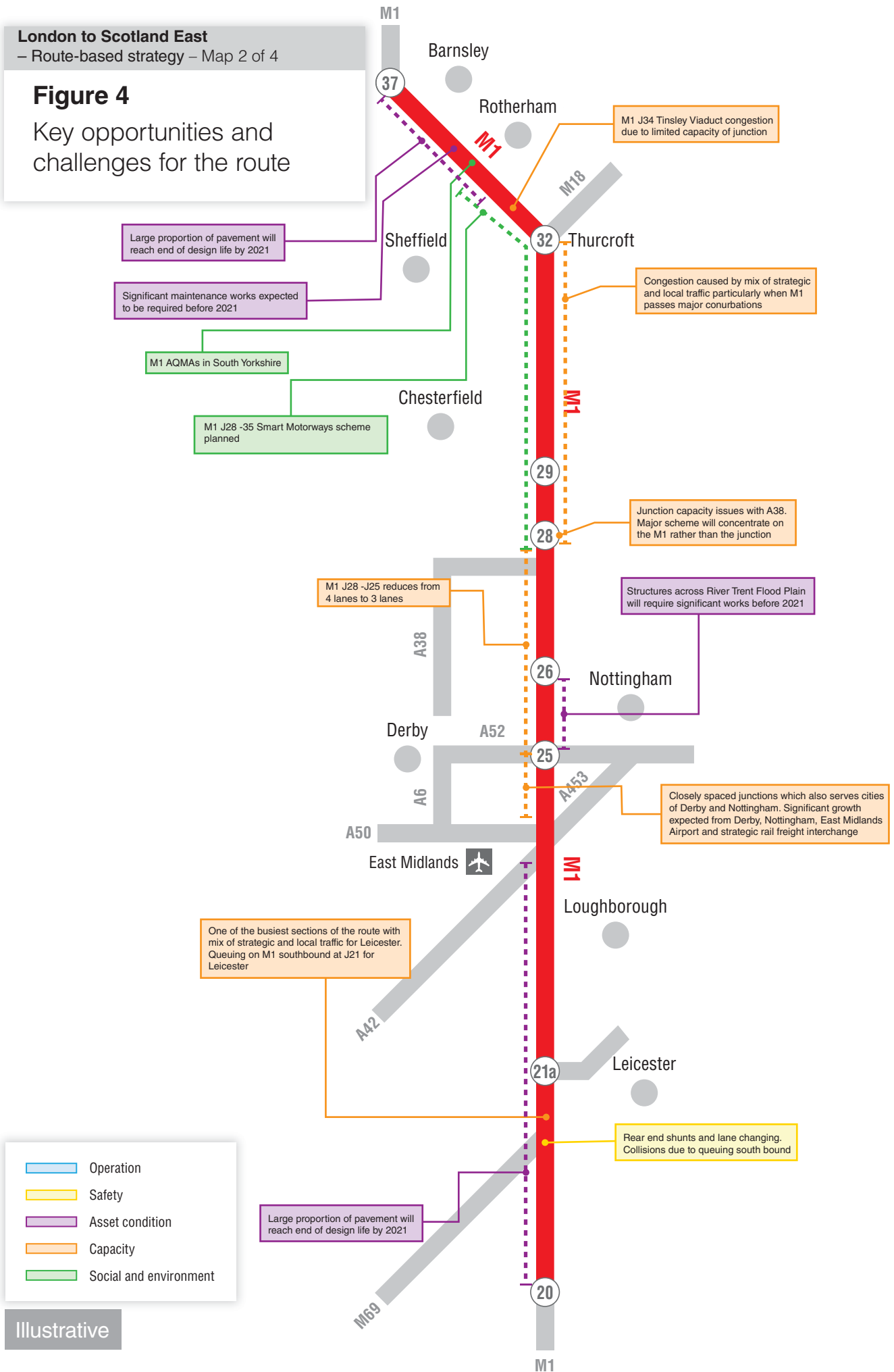
4.7.26 Over the RBS period, it is anticipated that there will also be significant maintenance required to a number of notable structures along the route.

Figure 4
 Key opportunities and challenges for the route



Illustrative

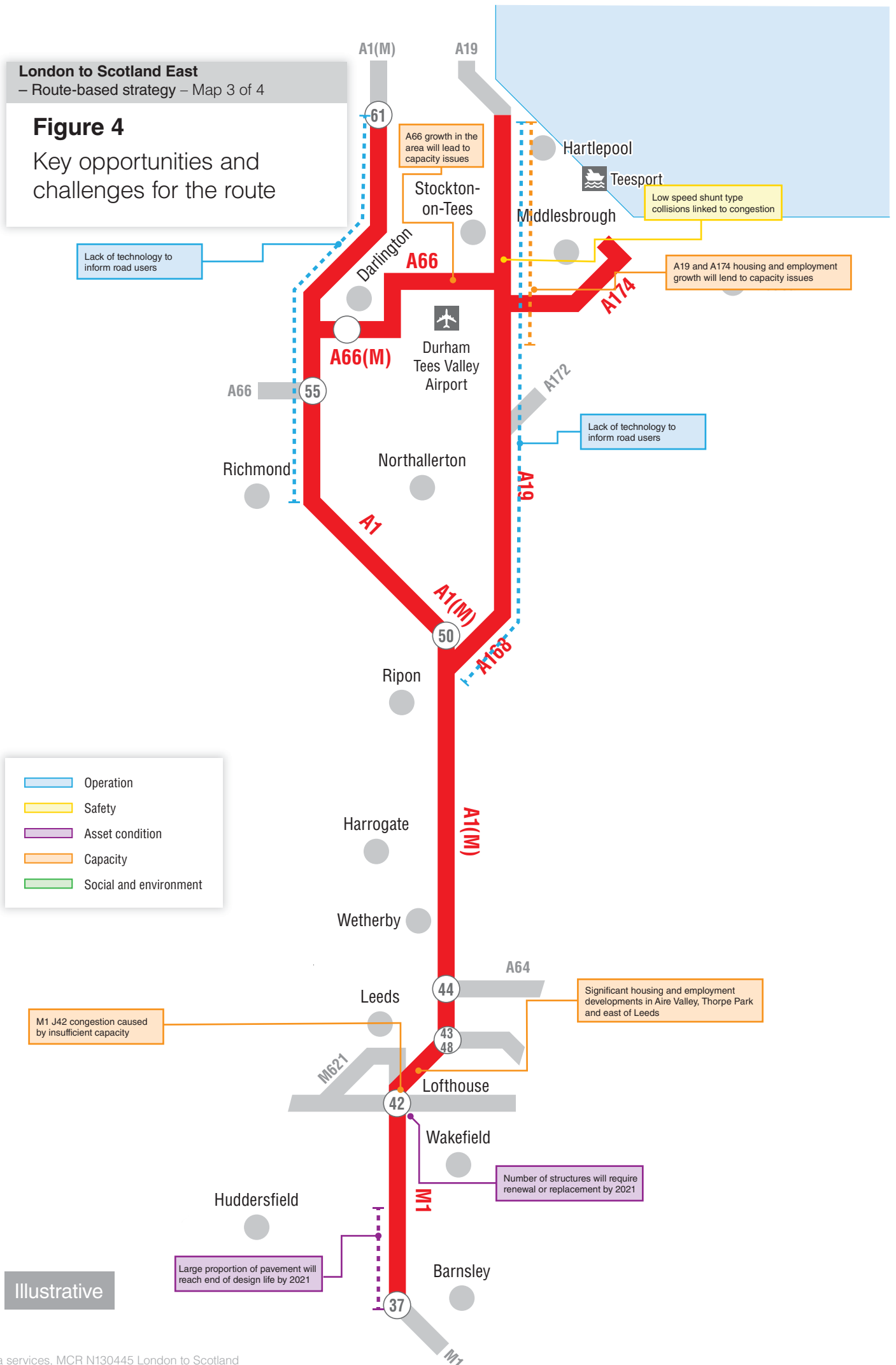
Figure 4
 Key opportunities and challenges for the route



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

Illustrative

Figure 4
 Key opportunities and challenges for the route



Illustrative

Figure 4
Key opportunities and challenges for the route





















Illustrative

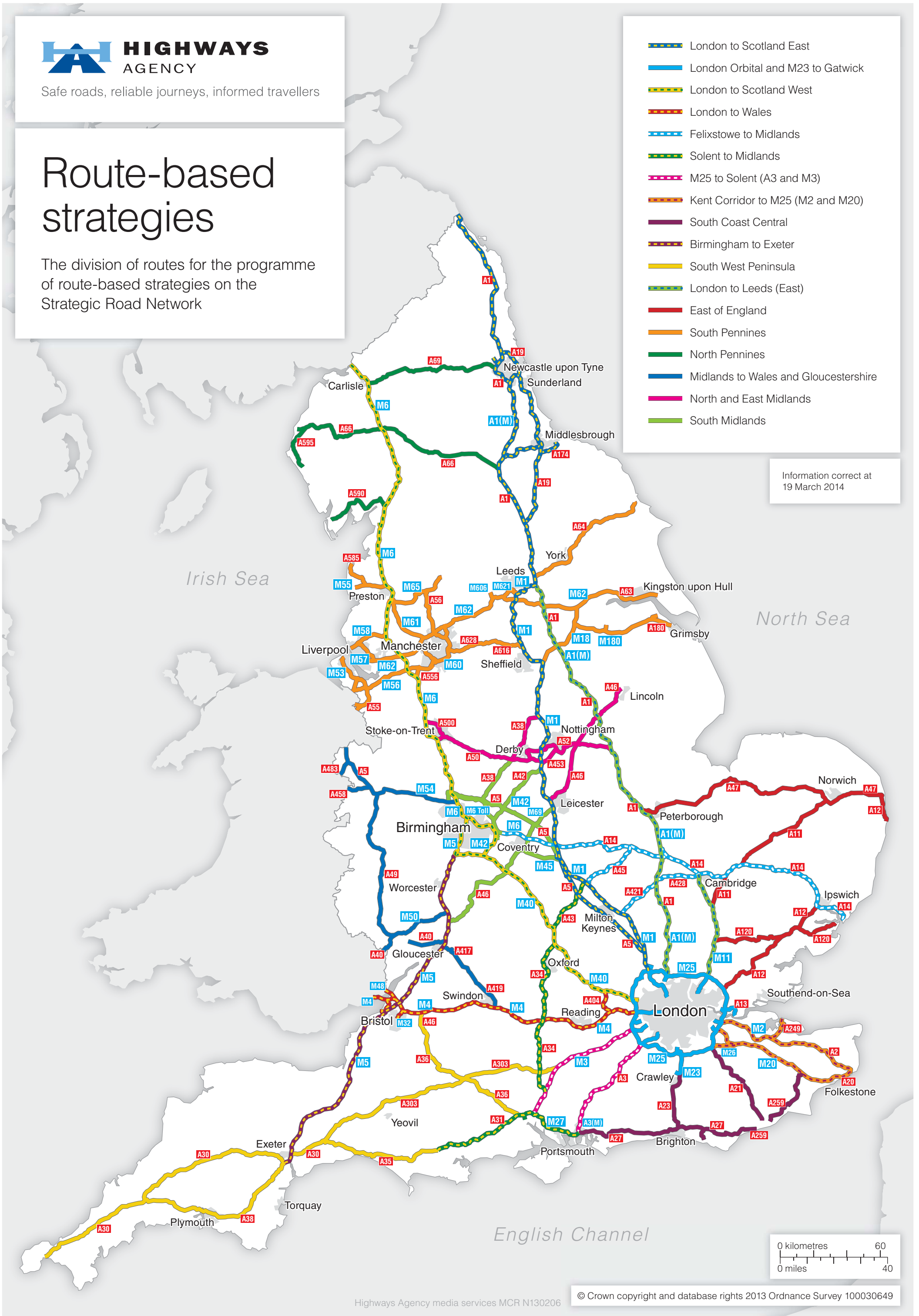
Appendix A Route map

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
BRT	Bus Rapid Transit. See Table 3.4.
CCTV	Closed Circuit Television
Core City	One of the eight largest and most economically important English cities outside London, a group which comprises Bristol, Birmingham, Leeds, Liverpool, Manchester, Newcastle, Nottingham, and Sheffield.
DBFO	Design, build, finance and operate. This refers to roads which were constructed under the private finance initiative.
Defra	Department for the Environment, Food and Rural Affairs
DfT	Department for Transport
FPL	Important Area with First Priority Location. Area identified as an Important Area by Defra which additionally experiences noise of 76dB or higher.
HGV	Heavy Goods Vehicle
HRA	Hot-rolled asphalt. This refers to road surfaces constructed of a bitumen-based asphalt with stone chips rolled into it.
IA	Important Area. Area identified by Defra as being among the 1% of residential sites most affected by noise.
LA	Local Authority
LEP	Local Enterprise Partnership
MIDAS	Motorway Incident Detection and Automatic Signalling
NRTS	National Roads Telecommunications Service. A fast, high capacity, fibre-optic connection to the Highways Agency's network of regional control centres.
Ramsar	Protected wetland sites of international importance, designated under the Ramsar convention,
RBS	Route-based strategy
SAC	Special Area of Conservation. Protected habitat site.
SEP	Strategic Economic Plan
SPA	Special Protection Area. Areas of land, water or sea which have been identified as being of international importance for the breeding, feeding, wintering or the migration of rare and vulnerable species of birds
SRFI	Strategic Rail Freight Interchange
SSSI	Site of Special Scientific Interest. Environmental designation.

Abbreviation	Description
TSCS	Thin surface course system. This refers to surface course materials that are laid at a thickness less than 50mm and which provide a high performance, rut resistant, low noise and skid resistant layer that supports the high volume of traffic found on the SRN.
UNESCO	United Nations Educational, Scientific and Cultural Organization. Responsible for designating and overseeing sites defined as, “superb natural and scenic areas and historic sites for the present and the future of the entire world citizenry.”
VMS	Variable message signs. Signs on which the message can be changed electronically, either as a light matrix or using rotating planks to switch between one or more defined messages.

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 East Technical Annex.

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