



House of Commons
Transport Committee

All lane running

Second Report of Session 2016–17



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*Report, together with an annex and
formal minutes relating to the report*

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Transport Committee

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Summary

Traffic on the Strategic Road Network is projected to increase by up to 60% by 2040, and traditional motorway widening is a very expensive method of increasing capacity. The Government has therefore been examining other methods, described as Smart Motorways, of which All Lane Running is the latest form. In All Lane Running, the hard shoulder is permanently converted into a running lane. This is a change from previous designs, where the hard shoulder was only used during peak periods or during congestion. We do not support All Lane Running as the attendant safety risks have not been fully addressed.

While the case for increasing motorway capacity is clear, the earlier forms of smart motorway have, by Highways England's own analysis, a lower risk profile than All Lane Running. The type of scheme used on the M42 has a track record of safety and performance, and it is perverse for the DfT to continually lower the standard of the smart motorway specification, while presenting such changes as a logical next step. The permanent removal of the hard shoulder is a dramatic shift from previous smart motorway schemes. There is no one-size-fits-all solution and each proposal needs to be justified on its own terms.

The M42 Active Traffic Management Pilot cost £9.0 million per mile to construct. While it is clear that this is more expensive than the cost of using an All Lane Running configuration, it remains less expensive than traditional motorway widening. Unlike All Lane Running, it maintains emergency use of the hard shoulder using infrastructure that creates a controlled environment. If traditional motorway widening has been rejected as too expensive, then it is the model of the M42 pilot that should be considered the basis of future schemes, rather than a permanent conversion of the hard shoulder into a running lane, an ever-decreasing frequency of emergency refuge areas, and newly introduced hazards impeding emergency and recovery service access to incidents.

The Department should not proceed with a major motorway programme on the basis of cost savings while major safety concerns continue to exist.

1 Background and context

1. Traffic is forecast to increase on all roads, with the Strategic Road Network due to become particularly congested. In 2015, the Department for Transport forecast a growth in traffic of up to 60% from 2010 to 2040 on the Strategic Road Network.¹ One scenario showed that up to 19.5% of the Strategic Road Network could become congested² by 2040.³

2. The Department intends to address the need for more capacity by permanently converting the hard shoulder into a running lane on around 300 miles of motorway. Highways England has a programme of around 30 all lane running schemes to the value of circa £6 billion over the next 9 years⁴ (see Table 1). This programme stretches across this Road Investment Period and the next, and covers over 10% of the motorway network.⁵ It is clear that All Lane Running is considered a settled matter by the Department, though we believe that the argument has not been won, either with ordinary road users or with other stakeholders.

3. We therefore decided to inquire into All Lane Running, and took oral evidence from emergency services, the AA, the RAC, Prospect (representing Highways England Traffic Officers), and vehicle recovery operators. We also received 28 pieces of written evidence. Finally, we took evidence from Highways England and Parliamentary Under-Secretary of State Andrew Jones MP. To everybody who helped with our inquiry, we express our thanks.

Table 1: All Lane Running Schemes, current and planned

All Lane Running Schemes – Open for Traffic	
Scheme Name	Scheme Length (miles)
M25 J5–6/7 (opened in 2014)	12.4
M25 J23–27 (opened in 2014)	16.0
M1 J39–42 (opened in 2016)	6.7
M6 J10a–13 (opened in 2016)	9.6
All Lane Running Schemes – To be added by 2020	
Scheme Name	Scheme Length (miles)
M1 J28–31	18.9
M1	9.1
M62 J18–20	5.1
M3 J2–4a	13.4
M23 J8–10	10.4
M1 J24–25	5.2
M6 J16–19	18.2
M5 J4a–6	8.8
M60 J24–27 and J1–4	7.4
M6 J21a–26	9.9

1 Department for Transport, [Road Traffic Forecasts 2015](#), March 2015, para 15

2 Above 80% capacity

3 Department for Transport, [Road Traffic Forecasts 2015](#), March 2015, table 3.3

4 Highways England ([ALR0011](#)), para 8.6

5 There are 2,300 miles of motorway on the network. Department for Transport, [Road lengths in Great Britain 2015](#), May 2016

M6 J2–4		11.8
M20 J3–5		5.6
All Lane Running Schemes – To be started but not finished by the end of the current Road Investment Period (2015–2020)		
Scheme Name	Scheme length (miles)	Open for Traffic commitment
M4 J3–12	31.8	2021/22
M1 J13–19	36.9	2021/22
M6 J13–15	17.4	2021/22
M27 J4–11	15.2	2020/21
All Lane Running Schemes – To be started but not finished by the end of the current Road Investment Period (2015–2020)		
Scheme Name	Scheme length (miles)	Open for Traffic commitment
M40/M42 Interchange Smart Motorways	7.7	TBC
M53 Junctions 5–11	6.0	TBC
M62 Junctions 20–25	11.9	TBC
M56 J6–8	4.1	2021/22
M3 J9–14	9.3	2021/22
M62 J10–12	8.5	2022/23
A1(M) Jct 6–8	7.5	TBC
M1 Junctions 23A–24	1.5	TBC
M25 Junctions 10–16	19.3	TBC
Further All Lane Running Schemes Announced for Development in next Road Investment Period (2020–2025)		
Scheme Name	Scheme length (miles)	Open for Traffic commitment
M1 Junctions 19–23A	30.9	TBC
M1 Junctions 35A–29	13.7	TBC
M42 Birmingham Box Phase 4	6.7	TBC

Source: Motorways: Written question—[30302](#); Motorways: Written question—[29383](#)

Different types of smart motorway

4. There are several different kinds of schemes that use the hard shoulder as a running lane. At times, these are all referred to as All Lane Running schemes, which causes confusion. In this report, we use the correct nomenclature, where All Lane Running refers to a type of motorway where the hard shoulder is permanently converted into a running lane.

5. All Lane Running is a version of “Smart Motorways”, in which lanes can be individually closed and variable speed limits set. Smart Motorways were previously referred to as Managed Motorways. This is why in some documents All Lane Running is referred to as “MM-ALR” or “SM-ALR”. The conversion of a motorway into a Smart Motorway does not necessarily mean that an All Lane Running configuration is being used, as Smart Motorways are defined by the ability to alter the Variable Mandatory Speed Limits (VMSLs) of the road, and individually close lanes according to circumstances.

6. The simplest type of smart motorway, a “controlled motorway”, retains the hard shoulder entirely, and only installs the new technology. This creates a controlled environment, which has safety benefits. Capacity and traffic flow benefits are achieved by responsive variable speed limits and the ability to close individual lanes. These provisions have existed since 2002 on the M25 J15–16, and numerous schemes have been deployed up to 2012, on the M25 J27–30. As the hard shoulder remains, there is no need for additional provision of emergency refuge areas.

7. The improvements that provide the controlled environment of a smart motorway are not a point of contention. They have a record of performance and have not formed the basis of the majority of concerns raised in evidence. It is the conversion of the hard shoulder, whether temporarily during peak traffic or permanently, that causes us concern. The M42 Active Traffic Management pilot between junctions 3a and 7 was the first scheme in this country to use the hard shoulder in this way. In this scheme, refuge areas were co-located with gantries, nominally at 500m spacing. In this design, there is a maximum speed limit of 60mph when the hard shoulder is in use. As with later designs, there is comprehensive CCTV coverage and a MIDAS system (described in paragraph 15) for quickly detecting incidents. This is by far the most infrastructure-intensive, and therefore expensive, scheme. We also believe that it is the safest scheme currently in operation.

8. Dynamic Hard Shoulder Running schemes are similar to the Active Traffic Management pilot, but make certain adjustments. The spacing between gantries and emergency refuge areas increases to 800–1000m on these schemes, as does the spacing of emergency refuge areas. This type of scheme has been installed on the M1, M4, M5, M6 and M62. As with Active Traffic Management schemes, a solid white line is maintained between the hard shoulder and Lane 1, and the hard shoulder is only used in emergencies.

9. All Lane Running schemes are very different. The hard shoulder is permanently converted into a running lane, rather than being selectively opened during peak times or congestion. This represents a fundamental change in how motorways are set out. The only safe havens available to a vehicle to stop in an emergency are the emergency refuge areas which are spaced at up to every 2.5kms and are no longer co-located with gantries. The national speed limit of 70mph applies, unless reduced for congestion, incident or traffic management. At the moment, All Lane Running schemes only exist on the M25 J5–7, J23–27, the M6 J10a–13, and the M1 J39–42.

10. In 2014, the first sections of motorway using the All Lane Running configuration were opened on parts of the M25, and plans for creation of additional stretches of smart motorway are based on the All Lane Running configuration where possible. Not all roads are capable of being converted into All Lane Running schemes easily or cheaply, as this depends on the strength of the hard shoulder, some of which are too weak to bear the weight of traffic.

11. Parliamentary Under-Secretary of State Andrew Jones MP said “We have had a version of active motorway road management in our system for about 20 years”.⁶ In its written evidence, the Department for Transport told us that the All Lane Running configuration “evolved from successful earlier forms of smart motorway and was the logical next step in a process of incremental improvement”.⁷ It is true that controlled motorways (where the

6 Q121 [Andrew Jones]

7 Department for Transport ([ALR0015](#))

hard shoulder isn't changed at all but new active traffic management measures are put into place) have been in use since 2002. But, All Lane Running, with the permanent removal of the hard shoulder, is a major, fundamental and not incremental change.

12. Given the major change between All Lane Running and that of previous Smart Motorway schemes, the Department is wrong to present this as merely an uncontroversial, incremental step or the logical extension of what has gone before. The permanent loss of the hard shoulder is a radical change and the Department should present it as such.

New technologies and changes made

13. In order to give drivers a less dangerous area to stop in during an emergency if no hard shoulder is available, emergency refuge areas (ERAs) are created. These are lay-bys containing an Emergency Refuge Telephone (ERT). The design requirements and advice surrounding emergency refuge areas are governed by Interim Advice Note 161/13, which gives a design length of 100m, comprising an entry taper of 25m, a stopping area of 30m and an exit taper of 45m, with a width of 4.6m.⁸ The issue of ERAs was a major part of this inquiry, particularly with regard to their frequency and size.

14. Variable Mandatory Speed Limits (VMSLs) indicators are installed on gantries up to 1,200m apart. These may be supplemented by “MS4” verge-side signals which provide additional information about road conditions or incidents ahead on the road. The signal gantries may also display Red X signals to indicate that a lane has been closed. The ability to close an individual lane is essential for the operation of an All Lane Running motorway. Both the variable speed limits and the Red X signals are enforceable by law, although in oral evidence we were told that the ability to prosecute a driver for circumventing a Red X has only come into being very recently.⁹

15. CCTV coverage on current all lane running schemes is intensive, and some areas are doubly covered by cameras. However, the effectiveness of this is limited by the impossibility of watching every area at once—there are simply not enough control centre personnel to watch every stretch of motorway at once.¹⁰ An incident or stopped vehicle would be immediately noticed using full, monitored CCTV coverage. Rather, this should be considered in concert with the MIDAS system, which would initially alert control centre staff to a possible incident.

16. MIDAS (Motorway Incident Detection and Automatic Signalling) is a system which uses inductive loops set under the carriageway to detect stopped traffic. This data is then used to set signals on the motorway. This technology is limited by the fact that it detects passing traffic only, and is therefore unable to detect solitary stopped vehicles. This was mentioned by numerous witnesses as a possible safety risk,¹¹ as the worst case scenario on an all lane running motorway is a vehicle stopped in a live lane, unable to reach an emergency refuge area, during a period of low traffic (e.g. at night). In such a scenario, MIDAS would be unable to detect the vehicle and alert control centre staff. Highways England told us that a new stopped vehicle detection system has been created, which

⁸ Highways England, [Interim Advice Note 161/15](#), November 2015, page 23

⁹ Q53 [Simon Wickenden]

¹⁰ Q30 [Simon Wickenden]

¹¹ See for example: Metropolitan Police Service ([ALR0023](#)), para 6.1; Q57 [Simon Wickenden]; Q82 [Neil Turner]

seeks to address the limitations of MIDAS by use of radar technology. Highways England intends to include it in all future all lane running schemes, and it will be retrofitted to existing schemes.¹²

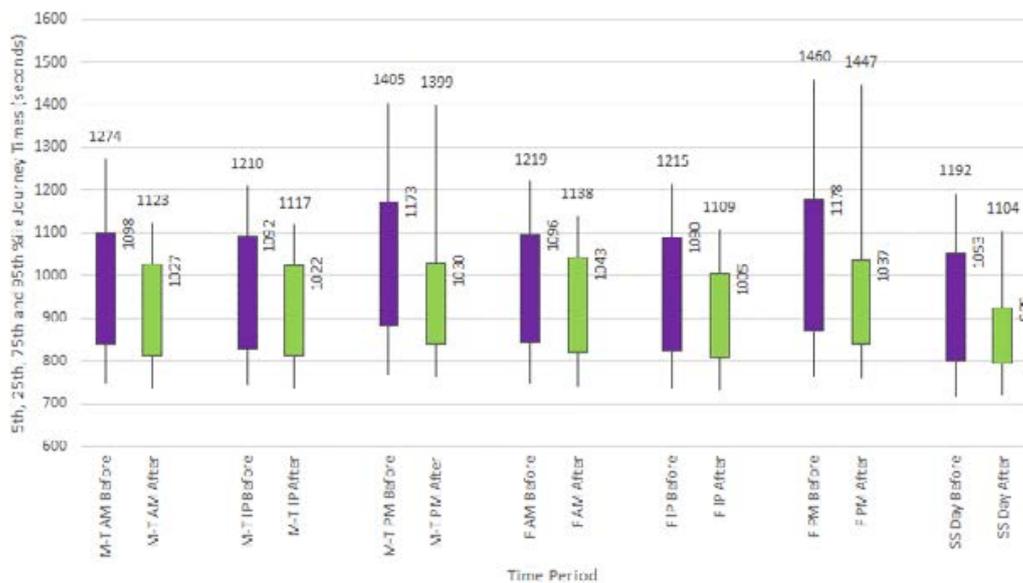
17. Collectively, this infrastructure is intended to create a controlled environment that, considered without the use of the hard shoulder, affords safety benefits to the portion of motorway where it is deployed. This is the “smart” in smart motorways.

Evaluations of current schemes

18. As the All Lane Running schemes on the M1 and the M6 have not been running for a substantial length of time, having both opened for traffic only in 2016, the main sources of results for the All Lane Running configuration are the two schemes on the M25. Both of these are the subject of 12-month evaluations running from April 2014 (when opened) to April 2015. These evaluations covered a variety of measures, including journey time, reliability and safety. The M25 J23–27 scheme evaluation also looked at whether public awareness needs were met; this was not included in the M25 J5–7 scheme’s evaluation.

19. The results have shown that journey time and reliability have improved on both of the M25 schemes. Reliability is measured by taking account of the variance of journey times. If more journeys consistently take the same amount of time, road users are better able to plan, making the journey more reliable and helping road users. Better journey reliability shows that the design is more resilient to temporary disruption. It is not only the extra lane that promotes an improvement in journey time and reliability, as the perception of a controlled environment improves traffic flow by causing vehicles to drive at roughly the same speeds, leading to more reliable journeys.

Figure 1: M25 J23–27: Clockwise Journey Time Reliability Analysis¹³

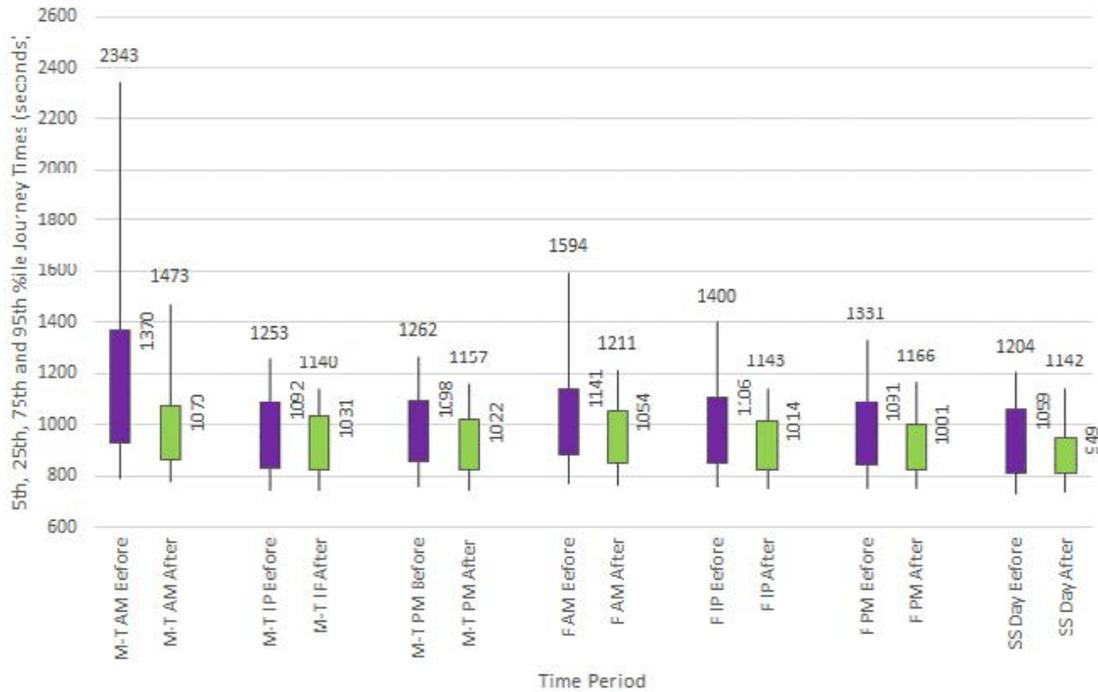


Source: Highways England, [M25 J23–27 Twelve Month Evaluation Report](#), January 2016, p 22

12 Q156 [Mike Wilson]; Q198-9 [Mike Wilson];

13 Definitions: “M-T AM”: Monday-Thursday AM peak, 05:30–10:30; IP: Inter-peak, 10:30–15:00; PM: PM peak, 15:00–22:00

Figure 2: M25 J5–7: Clockwise Journey Time Reliability



Source: Highways England, [M25 J5–7 Twelve Month Evaluation Report](#), January 2016, p 20

20. Journey times shown in Figures 1 and 2 show a marked improvement in reliability—at all times of day, journey times are becoming more predictable, improving conditions for motorists. The anti-clockwise journey reliability analyses show comparable results and have not been reproduced here. On the J5–7 scheme, shown in Figure 2, the most improvement is shown in the periods that were already highly congested, indicating improvement in these journeys, but limited impact on journeys outside of these times.

21. West Midlands Integrated Transport Authority told us that the use of All Lane Running would “address congestion in the short to medium term”, but cited concerns that it could not replace long-term infrastructure investment.¹⁴ Dr David Metz, honorary professor at the Centre for Transport Studies, accepted that All Lane Running increased capacity on the Strategic Road Network, but suggested further attention needed to be given to investment in digital technology.¹⁵ The Transport Planning Society also accepted that All Lane Running would improve motorway capacity, but were concerned that this would lead to “peak contraction”, with more journeys taking place over a shorter period because of the increase in journey reliability; this would offset any reduction in congestion.¹⁶

22. Overall, we conclude that there are journey time and reliability improvements of All Lane Running, and our concern is that the risks arising from converting the hard shoulder into a running lane are an unacceptable price to pay for such improvements.

¹⁴ West Midlands Integrated Transport Authority (ITA) ([ALR0016](#))

¹⁵ Dr David Metz ([ALR0007](#))

¹⁶ Transport Planning Society ([ALR0009](#))

2 Managing risk

23. The hard shoulder has never been a safe environment. Highways England told us that 8% of all fatalities on motorways occur on a hard shoulder,¹⁷ wildly disproportionate to its use. Organisations such as the Survive Group¹⁸ have long campaigned and educated for safety on the hard shoulder, acknowledging that it is not a safe environment. It is, however, a much safer environment than a live lane, even if such a lane is closed with a Red X signal. There is very little chance that a driver will be mistakenly using a traditional hard shoulder as a running lane, whereas this is a relatively common event on a lane closed with a Red X (see paragraph 38). Therefore, the mitigation measures put into place on All Lane Running must show us that they do not make the road any less safe than a traditional dual 3-lane motorway with a hard shoulder (a “D3M motorway” in motorway design terminology).

24. This requirement is the “safety objective” of All Lane Running. There are requirements for the design of roads laid out in the “Design Manual for Bridges and Roads”, one of which is that any motorway design change must have a safety objective, and it must be shown that it is likely to be achieved.¹⁹ The generic safety requirement for All Lane Running, not specific to any particular scheme, is that the average number of casualties per year or per billion vehicle miles is no worse than the safety baseline, which is a D3M motorway.²⁰ In addition, no group of people (e.g. car drivers, pedestrians, HGV drivers, and motorcyclists) can be disproportionately affected in terms of safety and the risk to each group of people must remain tolerable.

25. This safety objective can only be said to be achieved after three years of data are available. This point is acknowledged in Highways England’s written evidence, which told us that “conclusive evidence of the performance of ALR will come with three years of safety data” but they also told us that “evidence to date however gives us the confidence to proceed with our smart motorways programme”.²¹ When questioned about why the Department is going ahead with the rollout without three years of safety data, Andrew Jones told us that “we have had a version of active motorway road management in our system for about 20 years”.²² We do not deny this, but All Lane Running is a fundamentally different proposition, and data gathered from the temporary use of the hard shoulder during congestion should not be used to justify using one year’s worth of data. We are concerned that the London Fire Brigade have revealed that this is precisely what is being done, and that at “meetings around the country”, stakeholders are being told that “this works on the M25”²³ in order to justify national rollout.

26. The fact that Smart Motorways have existed for years on the motorway does not warrant using one year’s worth of safety data on the M25 to justify to stakeholders the national roll out of All Lane Running across the country. The Department needs

17 Highways England (ALR0011), para 3.7

18 A partnership between the police, vehicle recovery operators, and Highways England

19 Highways England, [Design Manual for Bridges and Roads, GD 04/12 Standard for Safety Risk Assessment on the Strategic Road Network](#), November 2012

20 This is calculated by use of “Fatal and Weighted injuries”, in which a serious injury is counted as 1/10th of a fatality, and a slight injury is counted as 1/100th of a fatal injury; Highways England, [Smart motorways all lane running GD04 assessment report](#), p 17

21 Highways England (ALR0011), para 1.9

22 Q121 [Andrew Jones]

23 Q62 [Tim Cutbill]

to present this honestly, as a radical change, and, if intent on going ahead with the deployment of All Lane Running, need to hold back until at least the safety objective of the current schemes is confirmed as having been achieved, which will be after the results of the M25 schemes through to 2017 have been assessed. We believe that a group of road users (recovery personnel) are significantly, disproportionately adversely affected.

Emergency refuge areas

27. As we have noted, the space between emergency refuge areas has increased through each Smart Motorways design, to the roughly 2,500m spacing used in All Lane Running. Refuge areas have not been co-located with gantries since the M42 Active Traffic Management pilot. Slip roads exiting the motorway at a junction are also defined as places of safety for the purpose of calculating the frequency of refuge areas, meaning that they can be used in lieu of a refuge area.

28. In 2012, Highways England produced a paper evaluating the provision of emergency refuge areas for All Lane Running.²⁴ The paper found that “decreasing the frequency of refuge area spacing will not have a significantly detrimental impact on traffic flow, overall safety level or incident numbers”. To support this, the paper looked at the safety performance of 3-lane All Purpose Trunk Roads (APTRs), which have a worse safety performance than motorways, but already have lay-bys at a 2,500m spacing. Comparing these roads to motorways, the paper found that “the [accident and injury] rate on APTR dual 3-lane is only slightly higher than that on D3M [standard 3-lane motorways]”.²⁵ The paper also accepted that APTRs were characterised by a more frequent accidents involving vehicles leaving the carriageway, when compared to motorways with a hard shoulder. While the increase in risk is modest, it is still an increase, and this increase has to be shown to be an acceptable price to pay.

29. A number of witnesses we spoke to expressed support for an increase in emergency refuge areas, not only because they are scarce but also because too many drivers are using the areas outside of emergencies. The RAC and AA gave their support for more frequent refuge areas,²⁶ as did Dave Allen of Prospect, representing Highways England Traffic Officers.²⁷ In written evidence, the Metropolitan Police Service called the design and spacing of emergency refuge areas “inadequate”.²⁸ Dave Gregory, representing vehicle recovery operators, called the spacing a “poor man’s version of the M42” and that recovery operators were “very concerned”.²⁹

30. The 2012 evaluation on the spacing of emergency refuge areas was based on the presumption that there would not be a high level of emergency refuge area misuse. However, this is not the case in the M25 schemes’ 12 month evaluation reports. Across 220 hours of ERA monitoring on the J5–7 scheme, 81% of stops were found to be non-emergencies, rising to 85% on the J23–27 scheme (across 774 hours).³⁰ Particularly concerning was the

24 Highways England, [Managed Motorways - All Lane Running, Evaluation of the provision of Refuge Areas](#), June 2012

25 Highways England, [Managed Motorways - All Lane Running, Evaluation of the provision of Refuge Areas](#), June 2012

26 Q2 [Edmund King]; Q3 [David Bizley]

27 Q77 [Dave Allen]

28 Metropolitan Police Service ([ALR0023](#))

29 Q88 [Dave Gregory]

30 Highways England, [M25 J23–27 Twelve Month Evaluation Report](#), January 2016, p 29; Highways England, [M25 J5–7 Twelve Month Evaluation Report, January 2016](#), p. 26

proportion of HGVs misusing emergency refuge areas. 96% of stops by HGVs on the J23–27 scheme were not an emergency, as shown by the driver leaving the refuge area without leaving the vehicle, or taking a comfort break. Combined with scarce spacing, this level of misuse increases the likelihood that an area will not be available in the event of a genuine emergency.

31. Roughly half of all breakdowns studied on the J23–27 scheme did not reach a refuge area.³¹ We were told by Prospect that “the reality is that whilst many vehicles are capable of this, motorists tend to simply halt the vehicle in lane”.³² This was echoed by Edmund King, who told that Committee that he thought that if people could not see an ERA, they would not continue driving until they found one even if their vehicle was capable of doing so.³³ The RAC conducted a survey of its members, and found that only 28% of those who have broken down on All Lane Running sections of motorway could see an emergency refuge area.³⁴ The AA also conducted a survey of almost 20,000 of its members, finding that 41% would stop as safely as possible as soon as they could, trying to move to the nearside, if they broke down on a section of All Lane Running motorway.³⁵ The level of breakdowns not reaching a refuge area is particularly concerning when one considers that both the AA and the RAC, dominant figures in the breakdown recovery industry, will not attend breakdowns in a live lane, even if that lane is closed with a Red X, unless there is a physical barrier.³⁶ As Prospect told us in written evidence, this can lead to a statutory recovery being used, where regulatory powers are used to remove the vehicle from the highway at the driver’s expense.³⁷ In a written answer to a parliamentary question, the Department for Transport confirmed that there were 592 incidents involving recovery on the sections of motorway using All Lane Running in 2015.³⁸ This was the highest number of incidents involving recovery since Highways England took on Traffic Officer duties in 2007.

32. In their written evidence, Highways England argue that “ALR eliminates non-emergency hard shoulder stops and provides opportunities for drivers to stop off the carriageway in dedicated refuge areas”.³⁹ This statement is meaningless—non-emergency hard shoulder stops are eliminated because there is no hard shoulder. Non-emergency ERA stops, however, are far from eliminated (see paragraph 29). David Bizley and Edmund King told us that there was a lack of understanding among overseas HGV drivers about when it is acceptable to use a refuge area, leading to their use in, for example, cases where a driver needs to make a stop to fulfil their drivers’ hours requirements.⁴⁰ Edmund King said that 22% of AA members said that they “often” see HGVs stopped in emergency refuge areas.⁴¹ TRL told us that while the restrictions on use of ERAs are “well understood” according to their studies, “understanding ALR may be more challenging for those who cannot read English text”.⁴² This could contribute to a high level of foreign HGV drivers using ERAs outside of emergencies.

31 Highways England ([ALR0011](#)), para 6.2

32 Prospect ([ALR0010](#))

33 Q2 [Edmund King]

34 RAC ([ALR0006](#))

35 Automobile Association ([ALR0012](#))

36 Q19 [David Bizley, Edmund King]

37 Prospect ([ALR0010](#))

38 Motorways: Accidents: Written question - [31894](#)

39 Highways England ([ALR0011](#))

40 Q20 [David Bizley, Edmund King]

41 Q20 [Edmund King]

42 TRL ([ALR0018](#))

33. The level of emergency refuge area misuse is unacceptable. When combined with the scarcity of such areas, this can lead to a driver being forced to stop in a live lane in the event of a breakdown. The Department needs to set out what its target is for this level of misuse, how it will reduce this, and in what timeframe it expects this to be achieved.

34. Asked to defend the spacing of emergency refuge areas, Andrew Jones told us that “if you are driving at 60mph, [the spacing] means you are basically 75 seconds away from a refuge”.⁴³ 75 seconds is clearly a very long time to be driving a vehicle that isn’t functioning, making it more likely that a driver with limited ability to keep moving will stop in a live lane. Mike Wilson of Highways England, however, did indicate to us that Highways England was willing to look again at the spacing of refuges, and that all parts of the system are under review.⁴⁴ At the spacing used in the M42 Active Traffic Management pilot (500–800m), a vehicle travelling at 60mph is no more than roughly 30 seconds away from a refuge.

35. Police forces, motoring organisations, and vehicle recovery operators are in agreement. Emergency refuge areas in All Lane Running are placed too scarcely. We were pleased to be told by Mike Wilson that Highways England were open to change on this aspect of the design. The Department should revert to emergency refuge areas spaced at 500–800m, as in the M42 Active Traffic Management pilot.

36. While the total length of emergency refuge areas is specified at 100m, this includes the length of both the entry and the exit taper. Highways England specifies a stopping area of 30m in ERAs, and motoring associations and Vehicle Recovery Operators expressed concern that this was not an adequate size. Both David Bizley of the RAC, Edmund King of the AA, and Richard Goddard cited concerns that HGVs, typically a length of up to 18.5 metres, would not leave enough space for a recovery vehicle.⁴⁵ Tim Cutbill of the London Fire Brigade also pointed out that on some gradients of roads, recovery from an ERA will be even more difficult,⁴⁶ telling us that this challenged the Department’s argument that the success of the M25 scheme can and should be replicated across the country. In any case, a vehicle may not be stopped at the right point of the ERA to leave any space at all, a factor that the road user may not have any control over if they stopped as a result of their vehicle breaking down. Richard Goddard, a vehicle recovery operator, expanded on this, telling us that if a coach or a very large vehicle were to break down, even if it were to reach a refuge area, there is not enough length in the refuge areas for a recovery vehicle to gain momentum, indicate, check and then move safely into a live lane.⁴⁷ In some cases the recovery vehicle has to reverse from a live lane into the refuge area.

37. While the size of emergency refuge areas is the same as that used on All Purpose Trunk Road links, motorways are a different kind of road. The 30m stopping area is putting vehicle recovery operators at risk. That the design has not changed for 10 years is not a reason to maintain it if that design is inadequate. If the Department is going to press ahead with All Lane Running, the opportunity of building new refuge areas

43 Q129 [Andrew Jones]

44 Q140 [Mike Wilson]

45 Q2 [Edmund King]; Q20 [David Bizley]; Q103 [Dave Gregory]

46 Q62 [Tim Cutbill]

47 Q103 [Richard Goddard]

should be used to increase their size, accounting for the fact that broken-down vehicles will not necessarily stop in the optimal part of the refuge area, and that recovery operators need to be able to safely navigate into the area and have space to build up speed to safely enter a live lane. Any gain in capacity is lost if live lanes have to be closed in order to safely recover a vehicle from an ERA.

Public perception, understanding and compliance

38. As well as contributing to the level of misuse of emergency refuge areas, a poor level of communication from the Department may lead to misunderstanding of All Lane Running motorways, or a lack of confidence in their use. A number of individual respondents gave written evidence to the Committee citing their own personal disquiet with use of a motorway without a hard shoulder, citing an “increased sense of risk when travelling, especially at night”⁴⁸, or that they were “terrified”⁴⁹ by the concept of driving without a hard shoulder. We have already mentioned surveys performed by the AA and the RAC of their members. More general results of these surveys found that almost 10% of AA members surveyed would use the leftmost lane, even if it were closed with a Red X, and 85% agree that hard shoulders make motorways safe.⁵⁰ Clearly, the former shows that there is an urgent need for the Department to improve compliance of “Red X” signals, and the latter shows that the Department has yet to win over the public in the debate on the safety of All Lane Running.

39. On Red X signals, data from the M25 evaluations have shown a shocking degree of non-compliance. Both evaluations showed 7% (quoted as 8% in oral evidence) non-compliance of these signals. An average of 4 vehicles per minute during every Red X event were recorded not complying with the signal.⁵¹ If the lane was closed due to an emergency, any one of these vehicles could have struck an obstruction in the closed lane.

40. When asked about non-compliance with Red X signals, Simon Wickenden told us that “there is clearly a need for further education”⁵² and that at the time of his appearance before the Committee “a total of 1,000 warning letters”⁵³ had been sent out in relations to infractions on what is a relatively small section of motorway. This is clearly a tremendous risk, and one which needs to be addressed by both education and enforcement. When we asked Highways England and the Department about this non-compliance, Mike Wilson told us that the rate of non-compliance was “a concern” and that an educational campaign was underway.⁵⁴ He subsequently wrote to the Chair, setting out that Highways England estimates they will issue “between 50,000 and 200,000 letters for red X and hard shoulder misuse offences in the financial year 2016/17”.⁵⁵ While Andrew Jones did tell us that 92% is a very high level of compliance compared to speed limits, he conceded that it was “very low” compared with driving through a red light.⁵⁶

48 Greg Bains ([ALR0001](#))

49 Mrs Mary Tomlinson ([ALR0027](#))

50 Automobile Association ([ALR0012](#))

51 Highways England, [M25 J23–27 Twelve Month Evaluation Report](#), January 2016, p 62; Highways England, [M25 J5–7 Twelve Month Evaluation Report, January 2016](#), p 48

52 Q53 [Simon Wickenden]

53 Q53 [Simon Wickenden]

54 Q157; Q159 [Mike Wilson]

55 Letter from Mike Wilson to Louise Ellman MP dated 1 June 2016

56 Q162-3 [Andrew Jones]

41. **Poor compliance with Red X signals is a grave concern that not only puts motorists at risk, but also places vehicle recovery operators, emergency services, and traffic officers in harm's way. A non-compliance rate of 8% is unacceptable. The Department should continue to publish figures of Red X compliance on existing All Lane Running schemes (and Smart Motorway schemes more generally), and needs to show significant improvement in this area. All lane running cannot be considered to be safe with such dangerous levels of non-compliance with Red X signals.**

42. The twelve-month evaluation into the M25 J23–27 scheme looked into public awareness of the scheme and its rules, and found some disparity among who was most informed. Non-local road users understood the rules of All Lane Running less than local road users, for example only 89% of non-local respondents who had used the scheme understanding that they should not stop in the “hard shoulder” when speed limits are displayed above the lane.⁵⁷ The report also showed that just 27% of respondents were likely to use the former hard shoulder in any case, even if it were open.⁵⁸ The report attributed this to lack of comprehension and driver uncertainty.

43. The perceptions of when it is acceptable to use an emergency refuge area are also worrying, and show a failure to communicate the rules of All Lane Running motorways to drivers, with 85% of non-local road users who had used the J23–27 scheme knowing that ERAs are provided at all. The report found that “Awareness of ERAs and their permitted usage was lowest about non-local road users who use the scheme, which as these are the most intensive users of the scheme could result in inappropriate use of ERAs”.⁵⁹

44. Two awareness campaigns have been launched by the Department to inform drivers of the rules of smart motorways. The “better watch your speed” campaign focused on informing drivers that variable speed limits set on gantries were mandatory and would be enforced.⁶⁰ A subsequent radio campaign informed drivers “If you see a Red X, it means the lane is closed”, which was complemented by posters which said “Never drive in a red X lane”.⁶¹ At this time, there is no published evaluation of these campaigns, although this is not unusual given the short time since their publication.

45. **Regular users of the motorway may become quickly familiar with using a motorway without a hard shoulder, but the occasional user should also be considered. The low level of public awareness surrounding All Lane Running motorways is a potential safety issue. This is a major change to the motorway network, and it is unacceptable that so many drivers are not more informed about the workings of some of the busiest roads in the country. We note that the Department has launched a public awareness campaign and is monitoring its effectiveness. We recommend that, if these schemes are to go ahead, that the Department redouble its efforts to increase public awareness with further, cross-media campaigns to make road users confident of using motorways without a hard shoulder.**

57 Highways England, [M25 J23-27 Twelve Month evaluation report](#), January 2016, p 38

58 Highways England, [M25 J23-27 Twelve Month evaluation report](#), January 2016, p 40

59 Highways England, [M25 J23-27 Twelve Month evaluation report](#), January 2016, p 39

60 Highways England, [“Smart Motorways: better watch your speed campaign”](#), [www.gov.uk](#), July 2015

61 Highways England, [“How to drive on a smart motorway”](#), [www.gov.uk](#), April 2016

46. What has become clear from the written and oral evidence received, as well as by press coverage of the removal of the hard shoulder, is that the Department has not won the argument. It has not succeeded in convincing us, neither has convinced the public. We received written evidence from individuals who expressed concern about driving without a hard shoulder. Respondents said that they were “terrified”,⁶² that there is a “increased sense of risk”,⁶³ or that the scheme was “dangerous” and “a quick fix with many flaws”.⁶⁴ While it is true that this pool of evidence is self-selecting (those satisfied with All Lane Running are less likely to respond), these submissions can also be compared to the Government’s own assessment into the M25 J23–27 scheme. As shown in Figure 3, 28% of all drivers felt less safe using the scheme since All Lane Running. The assessment presented it as a success that “more drivers disagreed than agreed that they felt less safe using the scheme section except disabled drivers”. It is unclear how 28% of drivers feeling less safe, rising to a third or more in specific groups, is anything other than a major concern.

Figure 3: Drivers feeling more safe/less safe using the M25 J23–27 section since All Lane Running.⁶⁵



Source: Highways England, [M25 J23–27 Twelve Month evaluation report](#), January 2016, p 42

47. The AA has also conducted a number of AA-Populus Motoring Panel polls among their members, to gauge the reaction to this policy. In these polls, 59% of drivers said that they will be more nervous driving on a motorway without a hard shoulder, and 85% agreed that hard shoulders help to make motorways safe.⁶⁶

48. If All Lane Running schemes are to go ahead, it is up to the Department to win the argument by addressing public fears. Regardless of whether the Department accepts our argument that the safety case is flawed, the public perception of the safety of All Lane Running sections of motorway should worry the Department. The existing publicity campaigns, which focus on teaching the rules of Smart Motorways, do not address this perception. We are concerned that a perceived lack of safety could make people avoid sections of motorway where All Lane Running is in operation, or feel unduly stressed when they do use them.

62 Mrs Mary Tomlinson ([ALR0027](#))

63 Greg Bains ([ALR0001](#))

64 Chris Mitchell ([ALR0002](#))

65 Highways England, [M25 J23-27 Twelve Month Evaluation Report, January 2016](#), Figure 6-3

66 Automobile Association ([ALR0012](#))

49. **In evaluating the success of its public awareness campaigns, Highways England should consider the reach and exposure of such campaigns in different groups, including disabled, elderly, novice, or drivers of any gender. Drivers are not homogenous and the campaigns should also be assessed on whether those being reached are assured that the new motorways are safe to drive on.**

50. While there is a statutory requirement for a consultation when installing Variable Mandatory Speed Limits, there is no such requirement for consulting on All Lane Running as a whole. When a scheme is put into place, a consultation on the installation of Variable Mandatory Speed Limits is conducted in line with statutory requirements. This was the only part of the scheme that the consultation concluded on; there has been no public consultation on All Lane Running as a whole. A number of respondents to the M25 J23–27 scheme consultation expressed concern over All Lane Running, including the Alliance of British Drivers, the Metropolitan Police Service, and some individual respondents. Despite this, because the consultation was, as per the statutory requirements, only consulting on the installation of VMSLs, the consultation recommended that the scheme continued. Only 56% of respondents to the consultation were supportive of the scheme, but those against were dismissed by the then-Highways Agency, as “the majority of the consultation responses expressed concerns on the workings of the Managed Motorway system rather than the introduction of the [VMSLs]”.⁶⁷

51. The lack of consultation was mentioned by a number of witnesses. The AA called it “surprising” that “such a far reaching change” was pursued without formal consultation at any stage, and that “whilst the agency was open to discussion its policy decision had been made”.⁶⁸ David Bizley said that while there were discussions, they “were more about how to make the best of the design” rather than consulting on whether the design should be implemented at all.⁶⁹ Simon Wickenden of the Metropolitan Police Service also told us that when they were consulted, the design was presented as “analysis complete”.⁷⁰

Highways England GD04 risk assessment

52. Jon Griffiths told us that “the overall risk” to road users is down.⁷¹ This is based on the assessment performed by Mouchel Consulting on behalf of Highways England.⁷² These “GD04” assessments are a requirement, the standard for which is set out in the Design Manual for Roads and Bridges. The assessment came to the conclusion that All Lane Running is likely to meet its safety objective both for all users and for a number of specific groups, including private recovery organisations and emergency services.

53. According to the assessment, the risk of a vehicle stopping in a running lane is the most dramatically increased risk, increasing by 216%. Currently, this event comprises 1.6% of all fatal and serious injury accidents. Mike Wilson told the Committee that “of the 136 hazards we looked at, the risk associated with stopping in a live lane in low-flow conditions

67 Highways Agency, [Summary of Consultation Responses-Controlled Motorways M25 Junctions 23 to 27](#), page 27

68 Automobile Association ([ALR0012](#))

69 Q6 [David Bizley]

70 Q59 [Simon Wickenden]

71 Q137 [Jon Griffiths]

72 Highways England, [Smart Motorways All Lane Running GD04 assessment report](#), August 2015

has increased by 200%, but that risk makes up only 5% of the total risks associated with the operation”.⁷³ We question whether it is acceptable for any particular event to triple in risk, especially where such a risk may result in a fatal accident, as low-flow conditions are often at night. This tripling of the risk is unacceptable for recovery operators and explains why the RAC and AA will not attend live lane recoveries without an impact vehicle.

54. We heard from Simon Wickenden from the Metropolitan Police Service of a particular incident where a car which had apparently stopped in a live lane during the night was struck by another vehicle, on an unlit section of motorway using All Lane Running, and that the Metropolitan Police Service believe it had run out of fuel.⁷⁴ As the MIDAS system cannot detect lone vehicles stopped in a lane, the vehicle was not detected. While there is CCTV coverage, it is not possible for all sections of the motorway to be observed at all times. This was a fatal accident. It was, and remains, a live investigation, and further details of the collision may still come to light. From what is already known and in the public domain, this may have been the result of a combination of risk factors, exacerbated by the lack of a hard shoulder. This is precisely the kind of incident that has, by the Government’s own risk assessment, been made more likely as a result of the implementation of All Lane Running.

55. We accept that other types of risk have been mitigated through the use of the controlled environment. For example, the second highest risk hazard,⁷⁵ “Individual vehicle is driven too fast”, has been reduced by 42%, which the report indicates is due to “considerable benefit from the controlled environment”.⁷⁶ The reductions in risk from the introduction of MIDAS, CCTV coverage and enforcement, and Variable Mandatory Speed Limits are laudable.

56. Decreasing risk in one area does not justify an increase in risk elsewhere. The concept of “overall risk” becomes arbitrary in a system made up of independent factors, especially where the cause of the reductions and the increases in risk are disconnected. As we have set out, it is not necessary to package the loss of the hard shoulder with the controlled environments afforded by smart motorways. In Table 2 below, we consider these two actions separately, and by auditing the risk assessment.

57. Risks in the Highways England assessment that are attributable to the loss of the hard shoulder have been placed in the left column, and those attributable to the installation of the controlled environment (Variable Mandatory Speed Limits, MIDAS, and the ability to close individual lanes) have been placed in the right column. These are two unrelated actions, packaged together artificially to create All Lane Running. By separating them, we can see that the Department is using an action that results in a net decrease in risk (the installation of the controlled environment) in order to justify an action that results in a net increase in risk (the permanent loss of the hard shoulder). The full analysis of whether a risk is attributable to one action or the other can be found in the annex to this report.

73 Q137 [Mike Wilson]

74 Q26 [Simon Wickenden]

75 The highest risk hazard is unchanged, and is related to fatigued drivers being unable to perceive hazards effectively.

76 Highways England, [Smart Motorways All Lane Running GD04 assessment report](#), date, page 27

Table 2: High and medium-scoring hazards changed⁷⁷ by All Lane Running, separated by those related to losing the hard shoulder and those related to the controlled environment

Hazard score and change	Hard shoulder loss	Controlled environment
High-scoring, increase	2	0
Medium scoring, increase	3	1
All increase	5	1
High-scoring, decrease	2	10
Medium-scoring, decrease	6	11
All decrease	8	21
High-scoring, eliminated	0	0
Medium-scoring, eliminated	1	1
All eliminated	1	1
High-scoring, new hazard	1	0
Medium-scoring, new hazard	3	0
All new hazard	4	0

Source: Highways England, [Smart Motorways All Lane Running GD04 assessment report](#), August 2015

58. The majority of “eliminated” and some of the “new” hazards are arguably reclassifications rather than genuine change. The medium hazard shown as having been eliminated due to the loss of the hard shoulder is H148, “Roadworks—short term static on hard shoulder”. This is eliminated because there is no hard shoulder. But hazard H80, “Roadworks—short term static” has increased by 99% due to the increase in the amount of road side infrastructure being installed, such as gantries which need regular maintenance. However, this one-for-one exchange is not the case for all new hazards. For example, the new medium-scoring hazards “Vehicle misjudges entry to ERA”, as well as the hazards of vehicles of all kinds leaving an ERA, cannot be compared to the hazards of a vehicle leaving the hard shoulder due to the significantly smaller distance to accelerate on an ERA. This was of particular concern to vehicle recovery operators, who told us that the dangers of long vehicles in a refuge area were mentioned in consultations, but no changes were made.⁷⁸ Richard Goddard also outlined a possible situation where these types of risk would be particularly dangerous, where “somebody has ignored the red cross [...] or there is fog”,⁷⁹ and that in such a situation the lack of ability for a recovery vehicle to gain speed, possibly while laden with a broken-down vehicle, makes this kind of new hazard particularly dangerous.

⁷⁷ A number of risks were unchanged. Only risks changed are included in this table.

⁷⁸ Q100 [Dave Gregory]

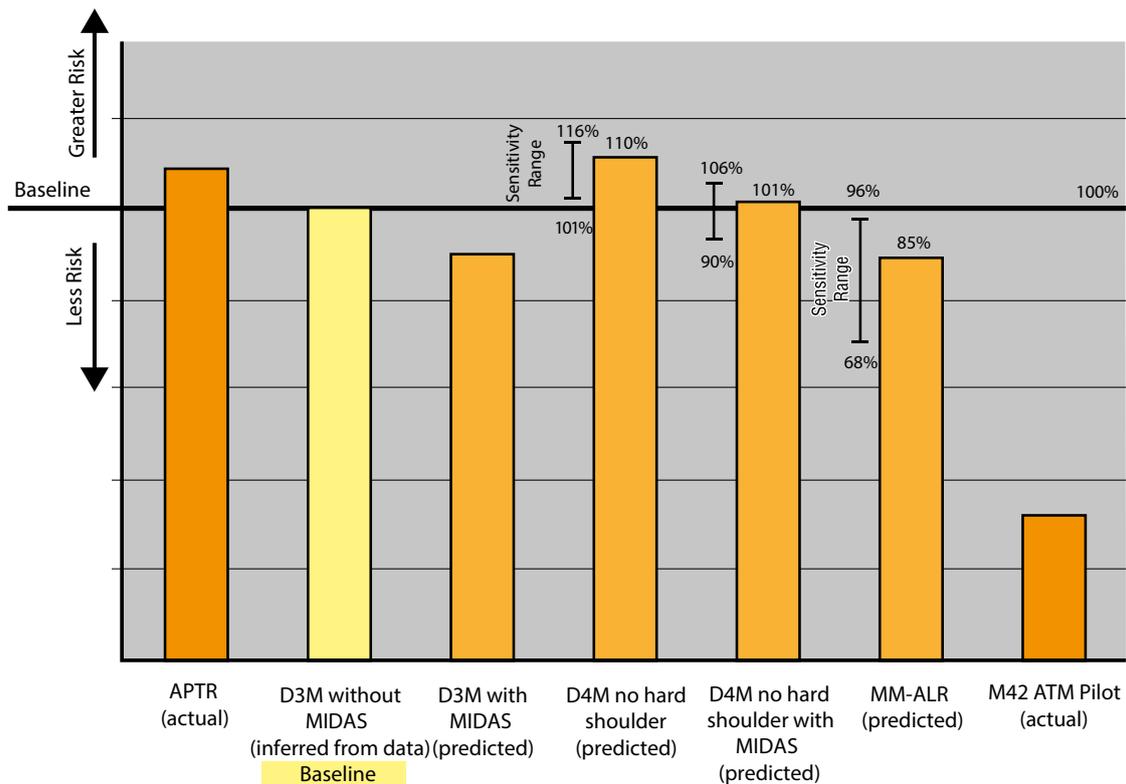
⁷⁹ Q103 [Richard Goddard]

59. Analysing the installation of the controlled environment and the loss of the hard shoulder as two separate actions, rather than the package that the Department has presented them in, a stark picture emerges. The loss of the hard shoulder is responsible for a net increase in risk in existing hazards and a net increase in newly introduced hazards, and the installation of the controlled environment is responsible for a net decrease.

60. **We find that the way that the Department has presented the risks of All Lane Running is disingenuous. The increase in risk caused by the loss of the hard shoulder is not an unfortunate, necessary cost of installing the controlled environment. The two acts are not intrinsically connected. By packaging the two together, the Department has been able to say that “overall risk”, an arbitrary concept, has not increased. The Department cannot decrease the risk of some hazards in order to justify an increase in the risk of other hazards.**

61. The Department’s assessment of the risks of various carriageway configurations found that the M42 Active Traffic Management pilot had a significantly smaller risk profile than any other configuration, including a normal D3M motorway. This is shown in Figure 4. By choosing to disregard this design, and only aiming for a safety baseline of a standard D3M motorway, the Department is actively choosing a less safe option.

Figure 4: Comparison of risk for different carriageway configurations



Source: Highways Agency, [Managed motorways Fact Sheet](#), 2013

Emergency services

62. Without the hard shoulder, emergency services must either continue through the carriageway in the direction of traffic, or make use of the “reverse flow access” procedure in order to reach incidents. During reverse flow access, the motorway will be closed to all traffic and emergency services enter the carriageway from a later junction, driving against the flow of traffic. It is vital that this procedure has the full confidence of the emergency services.

63. The London Fire and Emergency Planning Authority called reverse flow access “time consuming and relatively complicated”.⁸⁰ In particular, they cited concerns regarding the communication protocols between the London Fire Brigade (LFB) and Highways England. In oral evidence, the LFB expanded on this, and we were told that there is not currently a system in place to “satisfactorily” pass information about the incident between fire appliances at the incident and control rooms.⁸¹

64. On reverse flow access, the Metropolitan Police Service told us that “experience to date, confirmed by the M25 live exercise, has demonstrated the risk that such operations entail, a risk which proportionally increases as the distance between junctions or turnaround / access points increases”.⁸² Simon Wickenden told us that reverse flow access cannot be initiated “until we have an individual actually on the scene who is able to stop all further traffic from passing that point”,⁸³ and that if an incident is more serious, and it takes longer to get emergency service traffic to it in the direction of the flow of traffic, this could seriously delay response time. On the M4 there are stretches of motorway up to 15 miles between junctions, which he told us was “much too far” to safely initiate reverse flow access.⁸⁴

65. The Metropolitan Police Service also told us that the “removal of street lighting on links between junctions” was “an aspect of ALR that we have particularly objected to from the start”.⁸⁵ It is true that a great many parts of the Strategic Road Network are unlit already, and while the bulk of the M25 was constructed with street lighting, this is not the case on all motorways. We were told that Highways England told the Metropolitan Police Service that the funds for constructing street lighting would be better used elsewhere.⁸⁶ When these concerns were put to Mike Wilson, we were told that the policy for All Lane Running is no different from the rest of the network, and that lighting is considered on a case-by-case basis.⁸⁷ While the policy may be the same, if it has led to lighting being removed, as stated by the Metropolitan Police Service, this has unnecessarily introduced risk for the sake of cost savings.

80 London Fire and Emergency planning Authority (LFEPA) (ALR0026)

81 Q35 [David Bulbrook]

82 Metropolitan Police Service ([ALR0023](#)), para 9.5

83 Q40 [Simon Wickenden]

84 Q40 [Simon Wickenden]

85 Metropolitan Police Service ([ALR0023](#))

86 Q57 [Simon Wickenden]

87 Q200 [Mike Wilson]

66. The Central Motorway Police Group⁸⁸ broadly welcomed the benefits afforded by the controlled environment, particularly the enforcement technology, as well as seeing the benefits to motorway capacity and journey reliability. However, they also told us that “the spacing of gantries and distance between emergency refuge areas is significantly different to earlier schemes, which is a cause for concern”.⁸⁹

67. The Central Motorway Police Group also pointed out other impacts of removing the hard shoulder on policing activities, telling us that “it is now increasingly difficult to find a safety location to stop a motorist for either a traffic offence or to assist in the investigation of a criminal matter”,⁹⁰ a concern that was echoed by the Metropolitan Police Service, and that the removal of the hard shoulder makes “what was a perfect environment to employ Tactical Pursuit and Containment (TPAC) tactics during pursuits all the more difficult”.⁹¹

68. The permanent conversion of the hard shoulder into a running lane has unnecessarily introduced risks and operational barriers to roads policing activities on motorways. Maintaining the hard shoulder, as in the M42 Active Traffic Management pilot, would mitigate these risks and barriers while still significantly improving capacity.

Highways England Traffic Officers

69. Prospect, the trade union representing Highways England Traffic Officers, gave evidence, focusing on the health and safety implications for traffic officers working on motorways without a hard shoulder. Dave Allen of Prospect told the Committee that there were 600 near misses reported by traffic officers while they were out on active duty, and emphasised that this does not include near misses that have occurred which only involve members of the public.⁹²

70. In contrast to other respondents, Neil Turner (a serving Highways England Traffic Officer) said that All Lane Running was a safer alternative to Dynamic Hard Shoulder Running (including the M42 pilot). He explained that there is an inherent uncertainty in dynamic schemes over whether or not the hard shoulder is being used as a running lane; in All Lane Running it is certain that Lane 1 (the former hard shoulder) is open for traffic unless shown otherwise.⁹³ We think that this is an issue which should be addressed by increased education and enforcement. **Violation of a closed lane is an issue across all designs of Smart Motorway; we do not conclude that the problem would be any better if all Smart Motorway designs were using All Lane Running and, as stated elsewhere, this would mean the permanent loss of the hard shoulder in all schemes, which we oppose.**

71. When questioned on the safety of Traffic Officers, Mike Wilson linked the level of near misses reported by Traffic Officers to the non-compliance of Red X signals, and told us that the rate of near misses has decreased by 15% since the start of the operation of smart motorways.⁹⁴ Highways staff working on motorways, for example putting out cones,

88 Central Motorway Police Group ([ALR0021](#))

89 Central Motorway Police Group ([ALR0021](#))

90 Central Motorway Police Group ([ALR0021](#))

91 Central Motorway Police Group ([ALR0021](#))

92 Q67 [Dave Allen]

93 Q69 [Neil Turner]

94 Q158 [Mike Wilson]

have impact vehicle protection. No impact protection is used routinely when vehicles are stranded in live lanes. We have also been told by the recovery industry of concerns about traffic officers using 4x4 vehicles to recover HGVs.⁹⁵ **It is clear that the issues of Traffic Officer safety and Red X compliance are linked. The Department needs to use all of the three Es—education, enforcement and engineering—to eliminate non-compliance. Penalties for non-compliance should reflect the risk of death or serious injury, driver education courses and public awareness campaigns should explain the dangers, and radar systems used to detect static vehicles should be used to detect moving traffic in closed lanes so that workers can be warned. A better system of coordination and communication will be needed to safeguard the lives of those working on the motorway. The Department must take steps to improve compliance with signals. With 7–8% non-compliance, Traffic Officers are being put at significant risk of death or serious injury.**

95 Association of Vehicle Recovery Operators Ltd. (AVRO) ([ALR0030](#))

3 Costs

72. Highways England claim that the capacity improvements obtained from use of all lane running cost 60% less than traditional motorway widening, and are 40% more cost efficient than only using the hard shoulder at peak times. Overall, this particular claim has not been challenged in the written and oral evidence given to the inquiry.

73. Traditional motorway widening is extremely expensive and disruptive. There is generally no hard shoulder while construction is underway. The precise costs of a motorway widening scheme will vary according to the location, due to differences in landscape, land costs, and the cost of environmental undertaking and mitigation. Traditional motorway widening is now relatively rare. To take an example, the M25 J27–30 motorway widening scheme cost £272.4 million⁹⁶ in 2002 figures (the figures used in the 2014 post-project evaluation). This is roughly £16.2 million per mile.⁹⁷ In 2008, in the same written answer that gave the cost of the M42 Active Traffic Management pilot at £9.0 million per mile, the estimated cost of one mile of standard 3-lane motorway with a hard shoulder was said to be between £21.4 million and £35.0 million.⁹⁸ This puts the cost of traditional motorway widening, both in terms of actual construction cost and the disruption caused, far above the costs of all smart motorway schemes.

74. The M42 scheme is by far the most infrastructure-intensive of the Smart Motorway options, with significantly more gantries and variable mandatory speed limit signs than other types of scheme. It is the most expensive alternative to traditional motorway widening. According to a written answer in 2008, the M42 scheme cost £9.0 million per mile.⁹⁹ This is not adjusted for current prices, which may be very different due to the global financial crisis in the intervening period, but provides a rough estimate which is less expensive than motorway widening, but more expensive than other, less infrastructure-intensive designs of Smart Motorways.

75. All Lane Running is by far the least expensive of the options given. With fewer gantries, refuge areas and signals than other models, the financial savings can be substantial. The actual and projected costs of current and future All Lane Running schemes can be found in Table 4, showing a significant saving against traditional motorway widening and the M42 Active Traffic Management pilot.

Table 4: Current and future MM-ALR schemes to 2020: Costs (actual and projected)

Scheme name	Additional lane miles	Cost	Cost per additional lane mile
M25 J5–6/7	18.6	£121m	£6.51m
M25 J23–27	33.3	£180m	£4.51m
M1 J39–42	13.0	£120m	£9.23m
M6 J10a–13	19.0	£87.5m	£4.61m
M1 J28–31	38.5	£205.8m	£5.35m
M1 J32–35a (2017)	17.9	£106.1m	£5.93m
M3 J2–4a (2017)	26.8	£157.9m	£5.89m
M1 J24–25 (2018)	36.4	£192–274m	£5.27–£7.53m

Source: www.highways.gov.uk; Motorways: Written question – [29383](#); Motorways: Written question – [30302](#). In future projects, only projects where a cost has been published by Highways England have been included.

96 Highways Agency, [Post Opening Project Evaluation, M25 Junctions M27-30 Widening \(Section 4\)](#), December 2014

97 M25 Junctions 27–30 is a 16.8 mile stretch of motorway.

98 Roads: Construction, [Hansard Column 1038W](#), 14 Oct 2008 :

99 Roads: Construction, [Hansard Column 1038W](#), 14 Oct 2008

76. Cost savings are at the heart of the Department's justification for the permanent conversion of the hard shoulder into a running lane. Andrew Jones denied that this was a design "on the cheap", telling us that this was a key ingredient in a £15 billion national strategic road network budget over this spending period.¹⁰⁰ The Government's preference for All Lane Running is based on the fact that extra capacity can be obtained at a 60% lower cost than traditional road widening. The fact that All Lane Running is the least costly of the scheme designs cannot be challenged. That this involves the loss of the hard shoulder, resulting in a risk to safety, is another matter and is not justifiable.

77. We do not support the deployment of all lane running. Given that Highways England's own risk assessments show that other forms of smart motorway are safer than All Lane Running, and still improve capacity, we recommend the design of the M42 Active Traffic Management pilot, or, less preferably, Dynamic Hard Shoulder Running as safer alternatives. The cost saving of All Lane Running cannot justify the increase in risk of certain hazards.

78. The Department would do well to decouple its thinking, and not assume that the loss of the hard shoulder is essential for the installation of a controlled environment. The "smart" in smart motorways does not come from the loss of the hard shoulder, but for motorists this is undeniably the most disturbing aspect of the changes. It could be seen as disingenuous to present this change as part and parcel of "smart" motorways. The Department cannot use a reduction in risk in some hazards to justify an increase in risk in others.

79. It is not justifiable for the Department to go ahead with a major motorway programme with only one year's worth of safety information from the specific design that they have chosen. The All Lane Running design has been chosen on the basis of cost savings, and it is not acceptable for the Department to proceed with a less-safe design, putting people's lives at risk, in order to cut costs.

80. We recommend an immediate halt to the rollout of All Lane Running, and that the proposed schemes be replaced by schemes based on the M42 Active Traffic Management design. That is, a design incorporating the temporary use of the hard shoulder as required, gantries spaced at a distance of 500–800 metres, and emergency refuge areas spaced at the same distance.

100 Q127 [Andrew Jones]

Conclusions and recommendations

1. Given the major change between All Lane Running and that of previous Smart Motorway schemes, the Department is wrong to present this as merely an uncontroversial, incremental step or the logical extension of what has gone before. The permanent loss of the hard shoulder is a radical change and the Department should present it as such. (Paragraph 12)
2. Overall, we conclude that there are journey time and reliability improvements of All Lane Running, and our concern is that the risks arising from converting the hard shoulder into a running lane are an unacceptable price to pay for such improvements. (Paragraph 22)
3. The fact that Smart Motorways have existed for years on the motorway does not warrant using one year's worth of safety data on the M25 to justify to stakeholders the national roll out of All Lane Running across the country. The Department needs to present this honestly, as a radical change, and, if intent on going ahead with the deployment of All Lane Running, need to hold back until at least the safety objective of the current schemes is confirmed as having been achieved, which will be after the results of the M25 schemes through to 2017 have been assessed. We believe that a group of road users (recovery personnel) are significantly, disproportionately adversely affected. (Paragraph 26)
4. The level of emergency refuge area misuse is unacceptable. When combined with the scarcity of such areas, this can lead to a driver being forced to stop in a live lane in the event of a breakdown. The Department needs to set out what its target is for this level of misuse, how it will reduce this, and in what timeframe it expects this to be achieved. (Paragraph 33)
5. Police forces, motoring organisations, and vehicle recovery operators are in agreement. Emergency refuge areas in All Lane Running are placed too scarcely. We were pleased to be told by Mike Wilson that Highways England were open to change on this aspect of the design. The Department should revert to emergency refuge areas spaced at 500–800m, as in the M42 Active Traffic Management pilot. (Paragraph 35)
6. While the size of emergency refuge areas is the same as that used on All Purpose Trunk Road links, motorways are a different kind of road. The 30m stopping area is putting vehicle recovery operators at risk. That the design has not changed for 10 years is not a reason to maintain it if that design is inadequate. If the Department is going to press ahead with All Lane Running, the opportunity of building new refuge areas should be used to increase their size, accounting for the fact that broken-down vehicles will not necessarily stop in the optimal part of the refuge area, and that recovery operators need to be able to safely navigate into the area and have space to build up speed to safely enter a live lane. Any gain in capacity is lost if live lanes have to be closed in order to safely recover a vehicle from an ERA. (Paragraph 37)
7. Poor compliance with Red X signals is a grave concern that not only puts motorists at risk, but also places vehicle recovery operators, emergency services, and traffic officers in harm's way. A non-compliance rate of 8% is unacceptable. The

Department should continue to publish figures of Red X compliance on existing All Lane Running schemes (and Smart Motorway schemes more generally), and needs to show significant improvement in this area. All lane running cannot be considered to be safe with such dangerous levels of non-compliance with Red X signals. (Paragraph 41)

8. Regular users of the motorway may become quickly familiar with using a motorway without a hard shoulder, but the occasional user should also be considered. The low level of public awareness surrounding All Lane Running motorways is a potential safety issue. This is a major change to the motorway network, and it is unacceptable that so many drivers are not more informed about the workings of some of the busiest roads in the country. We note that the Department has launched a public awareness campaign and is monitoring its effectiveness. We recommend that, if these schemes are to go ahead, that the Department redouble its efforts to increase public awareness with further, cross-media campaigns to make road users confident of using motorways without a hard shoulder. (Paragraph 45)
9. If All Lane Running schemes are to go ahead, it is up to the Department to win the argument by addressing public fears. Regardless of whether the Department accepts our argument that the safety case is flawed, the public perception of the safety of All Lane Running sections of motorway should worry the Department. The existing publicity campaigns, which focus on teaching the rules of Smart Motorways, do not address this perception. We are concerned that a perceived lack of safety could make people avoid sections of motorway where All Lane Running is in operation, or feel unduly stressed when they do use them. (Paragraph 48)
10. In evaluating the success of its public awareness campaigns, Highways England should consider the reach and exposure of such campaigns in different groups, including disabled, elderly, novice, or drivers of any gender. Drivers are not homogenous and the campaigns should also be assessed on whether those being reached are assured that the new motorways are safe to drive on. (Paragraph 49)
11. We find that the way that the Department has presented the risks of All Lane Running is disingenuous. The increase in risk caused by the loss of the hard shoulder is not an unfortunate, necessary cost of installing the controlled environment. The two acts are not intrinsically connected. By packaging the two together, the Department has been able to say that “overall risk”, an arbitrary concept, has not increased. The Department cannot decrease the risk of some hazards in order to justify an increase in the risk of other hazards. (Paragraph 60)
12. The permanent conversion of the hard shoulder into a running lane has unnecessarily introduced risks and operational barriers to roads policing activities on motorways. Maintaining the hard shoulder, as in the M42 Active Traffic Management pilot, would mitigate these risks and barriers while still significantly improving capacity. (Paragraph 68)
13. Violation of a closed lane is an issue across all designs of Smart Motorway; we do not conclude that the problem would be any better if all Smart Motorway designs were using All Lane Running and, as stated elsewhere, this would mean the permanent loss of the hard shoulder in all schemes, which we oppose. (Paragraph 70)

14. It is clear that the issues of Traffic Officer safety and Red X compliance are linked. The Department needs to use all of the three Es—education, enforcement and engineering—to eliminate non-compliance. Penalties for non-compliance should reflect the risk of death or serious injury, driver education courses and public awareness campaigns should explain the dangers, and radar systems used to detect static vehicles should be used to detect moving traffic in closed lanes so that workers can be warned. A better system of coordination and communication will be needed to safeguard the lives of those working on the motorway. The Department must take steps to improve compliance with signals. With 7–8% non-compliance, Traffic Officers are being put at significant risk of death or serious injury. (Paragraph 71)
15. We do not support the deployment of all lane running. Given that Highways England’s own risk assessments show that other forms of smart motorway are safer than All Lane Running, and still improve capacity, we recommend the design of the M42 Active Traffic Management pilot, or, less preferably, Dynamic Hard Shoulder Running as safer alternatives. The cost saving of All Lane Running cannot justify the increase in risk of certain hazards. (Paragraph 77)
16. The Department would do well to decouple its thinking, and not assume that the loss of the hard shoulder is essential for the installation of a controlled environment. The “smart” in smart motorways does not come from the loss of the hard shoulder, but for motorists this is undeniably the most disturbing aspect of the changes. It could be seen as disingenuous to present this change as part and parcel of “smart” motorways. The Department cannot use a reduction in risk in some hazards to justify an increase in risk in others. (Paragraph 78)
17. It is not justifiable for the Department to go ahead with a major motorway programme with only one year’s worth of safety information from the specific design that they have chosen. The All Lane Running design has been chosen on the basis of cost savings, and it is not acceptable for the Department to proceed with a less-safe design, putting people’s lives at risk, in order to cut costs. (Paragraph 79)
18. We recommend an immediate halt to the rollout of All Lane Running, and that the proposed schemes be replaced by schemes based on the M42 Active Traffic Management design. That is, a design incorporating the temporary use of the hard shoulder as required, gantries spaced at a distance of 500–800 metres, and emergency refuge areas spaced at the same distance. (Paragraph 80)

Annex: GD04 risk assessment audit

This annex shows the justification for how hazards in Table 2 have been classified as either being attributable to the removal of the hard shoulder, or to the installation of the controlled environment.

The majority of decisions on where to place a hazard in Table 2 are simple, as the GD04 risk assessment¹ provides comments on what impacts a change in risk. These comments are reproduced here. Where additional explanation is required, these have also been included as a justification. We have not aimed to challenge the comments made in the assessment, as the conclusions reached from the data in Table 2 still stand, even if these comments are assumed to be correct.

Table 3: Medium- and high-scoring hazards used in Table 2

Hazard	Scoring	Change	Attributable to	Justification
H37 – Individual vehicle is driven too fast	High	Decrease	Controlled environment	GD04 report: "Considerable benefit from the controlled environment"
H135 – Vehicle stops in running lane – off-peak	High	Increase	Hard shoulder removal	GD04 report: "A substantial increase in the frequency of vehicles stopping in a running lane"
H91 – Tail gating	High	Decrease	Controlled environment	GD04 report: "Considerable benefit from the controlled environment during the peak"
H76 – Rapid change of general vehicle speed	High	Decrease	Controlled environment	GD04 report: "Considerable benefit from the controlled environment during the peak"
H149 – Vehicle drifts off carriageway	High	Both (see justification)	Both	GD04 report: "Traffic travelling closer to edge of the carriageway". This is an increase in risk due to removal of the hard shoulder. GD04 report: "Better controlled environment during peak". This is a decrease in risk due to the controlled environment.
H89 – Sudden weaving at exit point	High	Decrease	Controlled environment	GD04 report: "Some benefit from controlled environment"
H54 – Motorcycles filter through traffic	High	Decrease	Controlled environment	GD04 report: "Benefit from controlled environment"
H13 – Driver loses control of vehicle	High	Decrease	Controlled environment	GD04 report: "Some benefit from controlled environment"

¹ Highways England, [Smart motorways all lane running GD04 assessment report](#), August 2015

Hazard	Scoring	Change	Attributable to	Justification
H120 – Vehicle rejoins running lane	High	Decrease	Hard shoulder removal	GD04 report: “Non-emergency stops are effectively eliminated and most remaining stops will be in refuge areas”
H121 – Vehicle reversing along exit slip	High	Decrease	Controlled environment	GD04 report: “Some benefit from controlled environment”
H103 – Unsafe lane changing	High	Decrease	Controlled environment	GD04 report: “Some benefit from controlled environment”
H112 – Vehicle enters main carriageway unsafely	High	Decrease	Controlled environment	GD04 report: “Some benefit from controlled environment”
H154 – Vehicle stopped on hard shoulder (D3M) or verge (ALR)	High	Decrease	Hard shoulder removal	GD04 report: “Non emergency stops are reduced and most remaining stops will be in refuge areas”
H113 – Vehicle exits ERA	High	New hazard	Hard shoulder removal	GD04 report: “ALR introduced hazard”. ERAs are unrelated to the controlled environment.
H141 – HGV-LGV-Bus exits ERA	Medium	New hazard	Hard shoulder removal	GD04 report: “ALR introduced hazard”. ERAs are unrelated to the controlled environment.
H110 – Vehicle drifts out of lane	Medium	Decrease	Both	GD04 report: “More lanes available for motorists and better controlled environment”
H137 – Debris in running lane (being hit or causing unsafe manoeuvre)	Medium	Decrease	Hard shoulder removal	GD04 report: “More lanes, so evasive action will be easier”
H116 – Vehicle misjudges entry to ERA	Medium	New hazard	Hard shoulder removal	GD04 report: “ALR introduced hazard”. ERAs are unrelated to the controlled environment.
H126 – Vehicle stopped on slip road (off and on slip)	Medium	Increase	Hard shoulder removal	GD04 report: “As there is no hard shoulder under ALR, it is possible that a vehicle may limp to a slip road and then stop”

Hazard	Scoring	Change	Attributable to	Justification
H122 – Vehicle reversing back to exit slip	Medium	Increase	Hard shoulder removal	GD04 report: “An increase in risk off-peak as all lanes are running under ALR”. While using the hard shoulder to reverse on would still be illegal, it would be a non-running lane to use, hence the attribution.
H32 – Health deterioration of vehicle occupant	Medium	Increase	Hard shoulder removal	GD04 report: “Potential increase in risk as more live lane stops”. Live lane stops are made more likely due to the lack of a hard shoulder.
H150 – Vehicle in ERA (or verge) obtrudes into lane 1	Medium	New hazard	Hard shoulder removal	GD04 report: “ALR introduced hazard”. ERAs are unrelated to the controlled environment.
H36 – Incidents or congestion caused in other lanes or carriageway due to rubber necking	Medium	Decrease	Controlled environment	GD04 report: “Some benefit from controlled environment”
H94 – TO arrives, but has difficulty containing the scene	Medium	Decrease	Controlled environment	GD04 report: “More robust and more frequent signalling to protect TO”
H123 – Vehicle reversing up entry slip	Medium	Decrease	Both	GD04 report: “Less congestion expected under ALR, so less need for motorists to reverse back up entry slip”. As “less congestion” can be attributed to either measure, this is attributed to both.
H104 – Unsafe lane changing in the slip road (both off and on slips)	Medium	Decrease	Controlled environment	GD04 report: “Good lane discipline with controlled environment and less congestion”
H2 – Abnormal loads – notifiable	Medium	Decrease	Controlled environment	GD04 report: “Better signalling to advise motorists of the presence of abnormal loads”
H77 – Reduced visibility due to weather conditions	Medium	Decrease	Controlled environment	GD04 report: “Signals can be set to warn/inform motorists”
H99 – TOs/ emergency services not despatched in a timely manner	Medium	Decrease	Controlled environment	GD04 report: “CCTV to inform operators where exactly incident is”

Hazard	Scoring	Change	Attributable to	Justification
H102 – Undertaking	Medium	Decrease	Both	GD04 report: “More lanes available, so less need for undertaking. During peak times, smoother and more even traffic flow reduce need for undertaking”
H80 – Roadworks – short term static	Medium	Increase	Controlled environment	GD04 report: “Increase in equipment contributes to increased number of activities”
H118 – Vehicle on the main carriageway decelerates suddenly	Medium	Decrease	Controlled environment	GD04 report: “Benefit from controlled environment”
H30 – Group of vehicles drive too fast	Medium	Decrease	Controlled environment	GD04 report: “Benefit from controlled environment”
H143 – Motorcycle stopped next to running lanes	Medium	Decrease	Hard shoulder removal	GD04 report: “Non emergency stops are effectively eliminated as there is no hard shoulder to stop on under ALR”
H148 – Roadworks – short term static on hard shoulder	Medium	Eliminated	Hard shoulder removal	GD04 report: “No hard shoulder under ALR.”
H82 – Short duration stops / debris removal by TO / maintenance workers”	Medium	Eliminated	Controlled environment	GD04 report: “This will not occur without Traffic Management and rolling road block”
H153 – Vehicle reversing up hard shoulder (D3M) or lane 1	Medium	Decrease	Hard shoulder removal	GD04 report: “Hard shoulder does not exist for ALR”

Source: Highways England, Smart motorways all lane running GD04 assessment report, August 2015

Formal Minutes

Monday 13 June 2016

Members present:

Mrs Louise Ellman, in the Chair

Robert Fello	Will Quince
Mary Glindon	Iain Stewart
Mark Menzies	Martin Vickers
Huw Merriman	

Draft Report (*All lane running*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 80 read and agreed to.

Annex agreed to.

Summary agreed to.

Resolved, That the Report be the Second Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Monday 27 June at 4.00pm]

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the [inquiry publications page](#) of the Committee's website.

Monday 18 April 2016

Question number

David Bizley, Chief Engineer, RAC, and **Edmund King OBE**, President, AA [Q1–22](#)

Tim Cutbill, Assistant Commissioner, London Fire Brigade, **David Bulbrook**, Operational Resilience Team, London Fire Brigade, **Simon Wickenden**, Road Safety Engineering Officer, and **DCI John Oldham**, Metropolitan Police Service [Q23–64](#)

Dave Allen, Negotiations Officer, Prospect, and **Neil Turner**, Traffic Officer, Highways England and Prospect Health and Safety Officer for Highways England [Q65–83](#)

Monday 9 May 2016

Dave Gregory, and **Richard Goddard**, European Rescue and Recovery Initiative Committee [Q84–119](#)

Andrew Jones MP, Parliamentary Under-Secretary of State, Department for Transport, **Jon Griffiths**, Deputy Director, Road Investment Strategy, Department for Transport, and **Mike Wilson**, Chief Operations Officer, Highways England [Q120–205](#)

Published written evidence

The following written evidence was received and can be viewed on the inquiry publications page of the Committee's website.

ALR numbers are generated by the evidence processing system and so may not be complete.

- 1 Association of Vehicle Recovery Operators Ltd ([ALR0030](#))
- 2 Automobile Association ([ALR0012](#))
- 3 Campaign for Better Transport ([ALR0014](#))
- 4 Central Motorway Police Group ([ALR0021](#))
- 5 Chris Mitchell ([ALR0002](#))
- 6 Department for Transport ([ALR0015](#))
- 7 Dr David Metz ([ALR0007](#))
- 8 Gillian Rouse ([ALR0028](#))
- 9 Greg Bains ([ALR0001](#))
- 10 Highways England ([ALR0011](#))
- 11 IAM ([ALR0017](#))
- 12 ITS United Kingdom ([ALR0020](#))
- 13 London Fire and Emergency Planning Authority ([ALR0026](#))
- 14 Messrs Baker ([ALR0029](#))
- 15 Metropolitan Police Service ([ALR0023](#))
- 16 Mr Angus Gilmour ([ALR0004](#))
- 17 Mr Michael Rawson ([ALR0008](#))
- 18 Mr Phil Eldridge ([ALR0003](#))
- 19 Mrs Mary Tomlinson ([ALR0027](#))
- 20 Muhammad Bhatti ([ALR0005](#))
- 21 Office of Rail and Road ([ALR0013](#))
- 22 Professor Benjamin Heydecker ([ALR0019](#))
- 23 Prospect ([ALR0010](#))
- 24 RAC ([ALR0006](#))
- 25 Stafford Historical and Civic Society ([ALR0025](#))
- 26 Transport for London ([ALR0024](#))
- 27 Transport Planning Society ([ALR0009](#))
- 28 TRL ([ALR0018](#))
- 29 West Midlands Integrated Transport Authority ([ALR0016](#))

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the [publications page](#) of the Committee's website.

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

Session 2016–17

First Report	Operation Stack	HC 65
First Special Report	Road traffic law enforcement: Government Response to the Committee's Second Report of Session 2015–16	HC 132 (HC 518)

Session 2015–16

First Report	Surface transport to airports	HC 516 (HC 995)
Second Report	Road traffic law enforcement	HC 518
Third Report	Airport expansion in the South East	HC 784
First Special Report	Investing in the railway: Network Rail Response to the Committee's Seventh Report of Session 2014–15	HC 347
Second Special Report	Motoring of the future: Government Response to the Committee's Eighth Report of Session 2014–15	HC 349
Third Special Report	Smaller airports: Government Response to the Committee's Ninth Report of Session 2014–15	HC 350
Fourth Special Report	Strategic river crossings: Government Response to the Committee's Tenth Report of Session 2014–15	HC 348
Fifth Special Report	Strategic river crossings: Greater London Authority Response to the Committee's Tenth Report of Session 2014–15	HC 558
Sixth Special Report	Surface transport to airports: Government Response to the Committee's First Report of Session 2015–16	HC 995