

## 9 OPERATION OF THE SCHEME

### 9.1 Why and when do the variable speed limits apply?

- 9.1.1 Approximately 130,000 vehicles use junctions 3 to 12 of the M4 on a daily basis. The motorway currently experiences significant congestion during peak times, which causes significant delay. The introduction of VMSL will improve journey time reliability and safety, and reduce congestion.
- 9.1.2 When the traffic flows on the links increase to a level likely to cause congestion, the VMSL will be implemented.

### 9.2 How do the variable speed limits work?

- 9.2.1 During normal motorway operation, the AMI and VMS will remain blank in respect of speed limits and the motorway will operate as shown in Figure 4239. When no speed limits are displayed, the national speed limit will apply.



Figure 4139 Blank signals in normal traffic conditions

- 9.2.2 When VMSL are operational, clear instructions will be given to drivers via speed limit signs. These will be displayed ~~on post-mounted AMI signals (where provided),~~ via speed limit signs displayed on the AMI signals above the main carriageway and on the verge mounted variable message signs. This is illustrated in Figure 4340. The speed limit displayed will take account of prevailing traffic conditions and will be automatically calculated through a radar detection system or alternatively set by the RCC at South Mimms. The VMS located on gantries or on the verge will provide further information to drivers.

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Figure 4240 Smart motorway operating with VMSL

### 9.3 How will speed enforcement work?

9.3.1 Enforcement of VMSL will be carried out using a combination of gantry-mounted and verge mounted speed enforcement equipment, and traditional enforcement by the Police. The speed limits can vary due to traffic conditions, and the cameras are activated when they detect a vehicle travelling in excess of the speed limit.

### 9.4 What happens in the event of an accident or breakdown?

9.4.1 During incident management the AMI and VMS will be set to protect the scene of an incident and assist the access of emergency services and other core responders such as the Traffic Officer Service.

9.4.2 On the AMI, speed limits and lane availability will be indicated through the use of VMSL and lane divert arrow signals (with flashing amber lanterns) and Red 'X' signals (with flashing red lanterns) as shown in Figure 4441.

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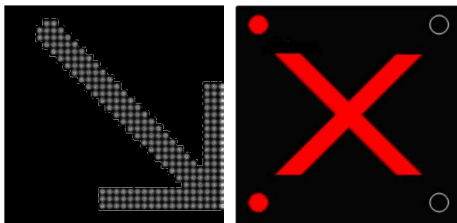


Figure 4341 Red X (STOP) and a lane divert signals

9.4.3 Appropriate supporting information will be displayed on the VMS to further encourage compliant driver behaviour. Modifications to the signal control software will enable a single VMS to display three simultaneous elements: in addition to the speed restriction and supporting text legend, the sign will also be able to display either a warning pictogram (typically a 'red triangle') or lane closure 'wicket' aspect, as indicated in the examples in Figure 4542.



Figure 4442 Typical VMS displays

9.4.4 Evidence from the M42 pilot scheme demonstrates that using the hard shoulder as a running lane has not compromised safety. It is expected that the frequency of breakdowns in live lanes will be substantially less (The M42 pilot found breakdowns approximately halved (Ref 18)) than the existing frequency of breakdowns on the hard shoulder, as a significant proportion of breakdowns will be able to get to an ERAEA.

9.4.5 However, some broken down vehicles will not be capable of travelling to an ERAEA and will come to a stop in a live running lane. The extra controls provided through smart motorway features will mitigate this risk, by being able to detect vehicles through the stopped vehicle detection system, queue protection system, use of full CCTV coverage to find vehicles -and the ability to set lane closures to protect vehicles.

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9.4.6 The stopped vehicle detection system will utilise new radar units monitoring the motorway in both directions for vehicles that have stopped, typically within 20 seconds, and will alert a control room operator who can see the incident on camera, close lanes and dispatch a Highways England Traffic Officer to attend the stopped vehicle.

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### 9.5 What is Ramp Metering and how does it work?

9.5.1 Ramp Metering ("RM") is a form of traffic control that utilises traffic signals on the motorway merges to restrict the flow of vehicles entering the motorway to a prescribed rate, so as to reduce congestion and turbulence at merge points. There are six existing RM sites within the Scheme; these are located at:

- a) M4 J5 westbound;
- b) M4 J6 westbound;
- c) M4 J6 eastbound;

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- d) M4 J7 eastbound;
- e) M4 J8/9 eastbound; and
- f) M4 J12 eastbound.

9.5.2 All of the existing RM sites (~~with the exception of junction 12 eastbound~~) currently pass ~~the operational criteria and they will be retained.~~ Junction 12 eastbound is at the end of ~~the removed from the scheme.~~

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