INTERIM ADVICE NOTE 87/07

THE PROVISION OF SIGNAL GANTRIES FOR MOTORWAYS WITH FOUR OR MORE RUNNING LANES

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1. Introduction and scope

New motorways with four or more permanent running lanes and existing motorways widened to four or more permanent running lanes shall be provided with signal gantries spaced at intervals suitable for implementing Variable Mandatory Speed Limit (VMSL) operation.

New and existing motorways with two or three permanent running lanes where the business case has determined that the provision of VMSL will be beneficial within the next 15 years shall be provided with signal gantries spaced at intervals suitable for implementing VMSL operation.

VMSL operation requires the provision of speed limit traffic signs for indicating that a specified maximum speed limit other than the national speed limit is in force.

Controlled Motorways (CM) are motorways provided with lane indicators over each permanent running lane to provide VMSL operation. CM operation is regularised by legislation, for example; the M25 Motorway (Junctions 10 to16) (Variable Speed Limits) Regulations 2001 – SI 2001 No 3763.

Active Traffic Management (ATM) motorways are motorways provided with lane indicators over each permanent running lane, as CM, but with an additional lane indicator over the hard shoulder. The hard shoulder may only be used as a running lane as stated in legislation, for example; the M42 (Junctions 3A to 7) (Actively Managed Hard Shoulder and Variable Speed Limits) Regulations 2005 - SI 2005 No 1671.

This interim advice note states the standard of provision of signal gantries for VMSL operation.

2. Background - maximum distance between gantries

The current standard signalling provision for motorways having four or more running lanes is gantry mounted lane signals [ref TD 46 para 3.11]. Between junctions, the gantries are spaced at 1000m (+0%, - 20%) [ref TD 46 para 3.26(c)]. The desired distance is 1000m; the minimum distance is 800m.

Lane signals for this standard provision display warning and informatory aspects. For example, "50" displayed on a lane signal means that a temporary maximum speed of 50 mph is advised.

Lane signals for VMSL are called indicators and can display mandatory speed aspects. For example, "50" within a red ring displayed on an indicator means the temporary maximum speed limit is 50mph. The 50mph is enforceable.

The regulatory status of some of an indicator's aspects and the potential for prosecution for non-compliance determines that the spacing of gantries for VMSL is more critical than for gantries 'only' showing warnings and information.

Traffic Advisory Leaflet 1/95 (TAL 1/95) provides advice on recommended distances between consecutive mandatory speed signs for a variety of road types. Although motorways equipped for VMSL operation are not included, a desired distance between consecutive signs of 800m is considered to be consistent with TAL 1/95. The maximum distance shall not exceed 1000m. These distances apply to both lit and unlit motorways.

The provision of 2x12 Message Signs mounted at the same height as the lane signals/ indicators remains as TD 46.

3. Background - minimum distance between gantries

A regulatory aspect displayed on an indicator is effective from its location to the location of the next downstream indicator displaying a regulatory aspect or a fixed 'national speed limits apply' sign or the end of the VMSL section of carriageway. The distance between the two is not legally defined. The requirement is that they are placed at regular intervals. Nevertheless the prime intent of VMSL operation is to manage speed through information, not via prosecution. It follows that to achieve maximum effectiveness through information, that motorists have regular and ideally constant access to the information conveyed by the indicators.

The 'constant access' to information may be considered as providing a constant sight line to an indicator; i.e. a motorist can always see, but not necessarily read, an indicator. Additionally, always having an indicator in view or knowing that one will shortly come into view, discourages drivers from increasing speed after passing one gantry and braking before the next; the "surfing" effect.

Constant visual access to an indicator will result in gantries spaced at 500m - the conspicuity limit of an indicator. This limit refers to physical visibility. However between gantries four behavioural characteristics occur that justify an increase to the 500m spacing.

- The first is the residual influence of a gantry, which may extend to where the driver perceives to be the limit of the enforcement camera. This is assumed to be in the order of 50 to 100m beyond the gantry.
- The second is self-compliance, which is developed over time and dependent upon positive driver response to VMSL.
- The third is that VMSL only operates when lane occupancy is sufficiently great that headway cannot be maintained at the national speed limit. At 50mph, lane occupancy will be in the order of one vehicle per 40m or less. At this occupancy rate a few vehicles travelling at the displayed speed, especially if they are HGVs, will encourage compliance by all.
- Similar to overloading drivers with too much sign and signal information on a single gantry, gantries in quick succession can also overload drivers.

From experience of the M25 CM scheme, a minimum distance of 100m in which the next gantry is not conspicuous from the immediately previous indicator has not prejudiced operation.

4. Gantry spacing

4.1 Gantry mounted indicators shall be provided over each running lane as stated in TD 46 paragraphs 3.26(a) and 3.26(b). For ATM motorways the hard shoulder may be used as a running lane.

4.2 Intra junction gantries shall be provided where the distance between the confirmatory gantry [re TD 46 para 3.26(b)] and the first gantry following the junction merge [re TD 46 para 3.26(a)] is greater than 1000m. The intervisibility requirement does not apply to intra junction gantries at grade separated junctions where the main line has overbridges passing over.

4.3 Inter junction gantries shall have a desired spacing of 800m, a maximum spacing of 1000m and a minimum spacing 600m. The spacing shall maintain the intervisibility

requirement. A departure from standard shall be sought if the intervisibility requirement results in spacing below 600m.

4.4 The intervisibility requirement is the provision of an unobstructed sight line of at least 500m to the next indicator in the same lane measured from a point in the centre of the same lane 100m downstream from the previous indicator.

4.5 The intervisibility requirement on a left hand curve with 'n' running lanes is the provision of an unobstructed sight line of at least 500m to the next 'n' and 'n - 1' indicators measured from a point in the centre of lane 1 100m downstream from the previous lane 1 indicator.

4.6 The intervisibility requirement on a right hand curve with 'n' running lanes is the provision of an unobstructed sight line of at least 500m to the next lane 1 and lane 2 indicators measured from a point in the centre of lane 'n' 100m downstream from the previous lane 'n' indicator.

4.7 For ATM motorways the indicator over the hard shoulder is counted as lane 1.

4.8 Sight lines shall not pass outside the highway boundary.

4.9 Where gantries cannot be provided that comply with the above criteria departures from standard shall be sought.

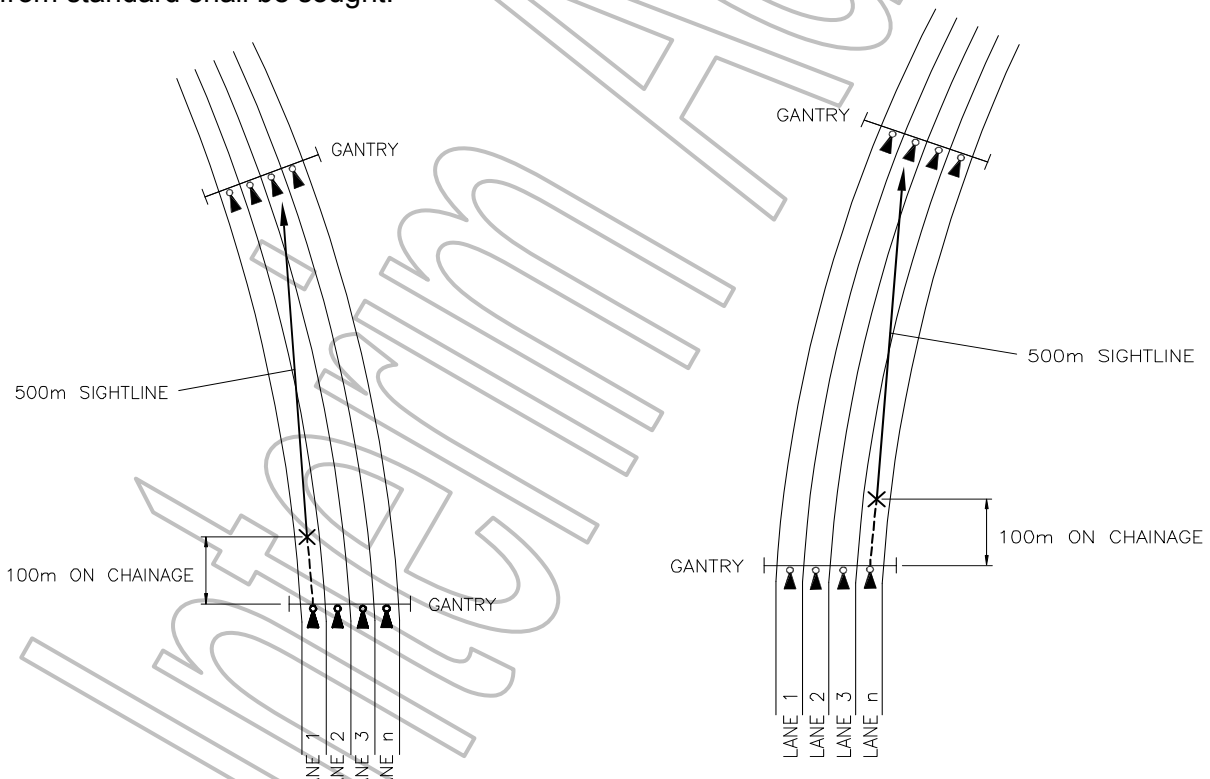

Figure 1
Illustration of paragraphs 4.5 and 4.6 requirements