ELECTRONIC SPEED CONTROL SIGNING

Executive Summary

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Mouchel
St John's House
Queen Street
Manchester
M2 5JB

T 0161 832 4542
F 0161 835 2038
W www.mouchel.com

SIAS transport planners

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SCOTTISH EXECUTIVE

Executive Summary

Mouchel were commissioned by the Scottish Executive Development Department (SEDD) to undertake a study, co-funded by the EU within the STREETWISE project, to determine whether the experience in use of mandatory variable speed limits, such as those employed under the M25 Controlled Motorway Scheme is transferable and likely to be of benefit, primarily to reduce congestion, on the strategic motorway/trunk road network in central Scotland.

The study was to be conducted in 2 phases:

- Phase 1 - Ascertain whether there were potential benefits; and if there were:
- Phase 2 - Carry out an attitudinal study

For phase1 the following road networks were considered:

- **A720 Edinburgh City Bypass** - from A8 Gogar Roundabout to the Gilmerton Junction in both directions;
- **A90/M90 approach to the Forth Road Bridge** - from Halbeath Junction to the A8000 Interchange (will include the A8000 Link Road as a committed scheme) in the southbound direction;
- **M80/M8 Corridor** - including the Stepps Bypass from the A80 and up to junction 15 on the M8 in the westbound direction;
- **M77/M8 Corridor -** encompassing the M77 from Newton Mearns to Kingston Bridge in the northbound direction and the M8 through Glasgow from Helen Street Junction to Baillieston in both directions

The effects of variable speed control were assessed using Paramics, a micro simulation programme. Two separate speed control strategies were evaluated for each road network:

- **Fixed** - activate speed limits for a given time over a given stretch of road; and
- **Pseudo-Dynamic** - synthesise variable limits by changing the speed limit in various steps along the length of the route.

Generic costs for each modelled motorway section of the network were based on a standard M25 gantry spacing of 1km.

Costs for a scheme utilising post mounted controlled motorway indicators (CMIs) were also developed as a lower cost alternative for dual carriageway sections.

Costs were also developed for the following speed control strategies:

- *Fixed Control without MIDAS (Motorway Incident Detection and Automatic Signalling)* - This option would allow the setting of mandatory variable speed limits in a fixed control strategy. However, the absence of comprehensive traffic data from MIDAS would mean that it would not be able to properly monitor the effects of the speed control system.

- *Fixed Control with MIDAS* - This option would allow the setting of mandatory variable speed limits in a fixed control strategy with the added benefit of allowing monitoring to be undertaken.

- *Pseudo-Dynamic Control with MIDAS* - MIDAS would be required to implement a pseudo - dynamic strategy, which would automatically set the variable speed limits in response to traffic conditions.

A Cost Benefit Analysis was undertaken where applicable, using the journey delay savings data obtained from the Paramics model and a summary of the findings for each of the networks assessed is as follows:

- **A720 Edinburgh City Bypass** (total section length - 7.8km) - drivers merging with the mainline flow at Dreghorn and Lothianburn are the primary cause of the breakdown in flow. Speed control combined with ramp metering may address this problem.

- **M90/A90 Forth Road Bridge Approach** (total section length - 10.9 km - the Forth Road Bridge acts as a 'bottleneck' at this location in the morning peak and as such there is little or no opportunity for the head of traffic to dissipate (as occurs on the M25). Although a potential for a small reduction in mean delay of 1 second was identified if dynamic speed control strategy were employed this was not considered significant enough to justify implementation.

- **M77/M8 Corridor** (combined network length - 12.6km) - the constraints imposed by the Kingston Bridge and merging traffic are the main causes of congestion on this network and once this develops there is little opportunity for the head of traffic generated to dissipate. A small overall reduction in overall mean network delay of 3 seconds (1%) was identified this was not considered significant enough to justify implementation. The modelling did however identify some potential improvement in journey times on the M8 when modelled independently with an average of 34 seconds (from 9 min. 38 sec. to 9 min. 04 sec.) over the 4.4km being identified in the am peak. Particular features of the network would need to be taken into consideration when assessing the impact on congestion and as such would require more detailed modelling to determine the overall position.

- **M80/M8 Corridor** (combined network length - 16.9km) - although the overall mean network delay for the am peak increases by 12 seconds when the M80 was modelled separately it exhibited a potential improvement in journey time of 44 seconds (from 10 min. 51 sec. to 10 min. 07sec.) over the 7km. Particular features of the network would need to be taken into consideration when assessing the impact on congestion and as such would require more detailed modelling to determine the overall position.

The report concludes that:

- Although initial modelling did not identify any areas of the Scottish Trunk Road Network investigated where mandatory Electronic Speed Control Signing strategies could be economically justified, it did identify individual key sections of the network where potential improvements in journey time could be realised. Particular features of the network would need to be taken into further consideration when assessing the overall benefits/disbenefits and impact on congestion.

- To realise any potential benefits of Electronic Speed Control Signing, it should be considered as part of a more comprehensive traffic management strategy possibly combining ramp metering and elements of Active Traffic Management (ATM), such as deployment of Incident Support Units and the construction of emergency lay -bys on non hard shoulder sections

- Before taking forward any such initiatives more detail modelling would be required over the areas identified in the report.