Using traffic signals to influence driver behaviour and reduce speeding

Introduction

The Wiltshire and Swindon Road Safety Partnership has been seeking to focus on engineering and education solutions to improve road safety throughout the Borough rather than by relying on enforcement measures.

This leaflet outlines a proposal for a pilot study, reflecting this change in emphasis, to ameliorate vehicle speeds using traffic signals and Intelligent Transport System (ITS) tools. Schemes of this nature are used in other parts of Europe but as yet there are no schemes in the UK.

Two sites in Swindon have been chosen for a pilot study, and this leaflet explains how the pilot study will work.
The Locations

The two locations that have been chosen for the pilot study are:

- Thamesdown Drive (Callington Road junction); and
- Queens Drive (Whitbourne Avenue junction).

Both these roads have a speed limit of 40 mph and are subject to significant numbers of speeding vehicles. Both junctions have also suffered injury accidents of varying severity during the period August 2005 – August 2010. These factors have been included in the site assessment and are some of the reasons these sites have been chosen to form part of the pilot study.

Speed statistics:

- Thamesdown Drive - 67% of vehicles exceed 40 mph
- Thamesdown Drive - 15% of vehicles exceed 48 mph

- Queens Drive - 38% of vehicles exceed 40 mph
- Queens Drive - 15% of vehicles exceed 44 mph

Controlling vehicle speeds using traffic signals, that turn to red will reduce the number of speeding vehicles. Accidents are also expected to reduce in number and severity.

A further reason for using these locations for the pilot study is that the traffic signals at these junctions are MOVA controlled. MOVA is the name given to a type of very responsive traffic signal system, making implementation of the pilot easy and cost effective, and minimising disruption to traffic.
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**How does it work?**

A specialist piece of equipment connected to the traffic signal system called a Data Logger will record the speed of all vehicles that pass. Vehicles passing at a speed above the specified threshold speed are identified as speeding, triggering the traffic signals at the junction to turn from green to red.

To ensure that speeding vehicles have enough time to safely stop when the signals change to red, the Data Logger is located well in advance of the junction.

Vehicles that are travelling within the speed limit when they pass the Data Logger do not trigger the signals to change to red. Therefore, vehicles travelling within the speed limit will not affect the operation of the junction.

Automatic Number Plate Recognition (ANPR) cameras will be linked to the Data Recorder. The cameras will recognise emergency service vehicle number plates and ensure that a red signal is not triggered for emergency service vehicles.

The pilot study will initially operate on Thamesdown Drive and Queens Drive. The trial will highlight vehicles travelling in excess of a defined speed threshold in a northbound direction at both locations. Vehicles on Callington Road and Whitbourne Avenue will not be subject to the trial.

Observed speed data for Thamesdown Drive and Queens Drive suggests that the signals are likely to operate to their usual phasing in the AM and PM peak when vehicles are likely to be travelling well within the speed limit. The speed amelioration is therefore likely to be effective at off-peak times when traffic volumes are lower and vehicle speeds are higher.

The ANPR cameras will be used to prevent disruption to traffic lights if congestion occurs. If queues do form, the MOVA traffic signal system will very quickly adjust signal times to clear the traffic. The impact on journey times is therefore expected to be positive rather than negative. Trials have proved that effective management of vehicle speeds can increase road capacity and reduce accidents.
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**Expected outcomes from the study**

Results from similar schemes in Europe suggest that speeding will reduce, promoting a reduction in accidents and queuing. The traffic signal systems will be able to be remotely adjustable to ensure settings are appropriate.

**Improved Pedestrian safety**

The Thamesdown Drive pedestrian facility is a staggered crossing, so pedestrians negotiate each direction of traffic independently via the central refuge. Therefore, when pedestrians cross the northbound carriageway when speeding vehicles trigger an early red signal, they will not come into conflict with southbound traffic that may still be moving. The Queens Drive junction does not have a pedestrian crossing so there is no impact at this location.

**Next steps**

Before the scheme can be implemented a robust set of baseline data on vehicle behaviour will be collected to enable the scheme to be efficiently set up.

Micro-simulation modelling has been used to test the proposals a movie clip of the model can be provided if required. The design drawings identify the optimum location and positioning of the required equipment and the new settings required for the traffic signals.

The baseline data collected in advance of scheme implementation will also enable comparison with post-implementation data in order that the effectiveness of the scheme can be measured.

**Implementation and Monitoring**

After implementation a period of approximately one month will be allowed to elapse, to enable the traffic behaviour to normalise and settle down, before monitoring data is collected.

Data will be collected for four weeks and compared with the baseline data to measure the effectiveness of the scheme. Three distinct areas will be monitored:

- Vehicle speeds;
- Junction delays;
- Road safety and conflicts; and
- Red light compliance.

**Vehicle speeds**

The Data Logger will capture the speeds of all vehicles. ANPR cameras will also be used in order that average speed data can be recorded for each vehicle. This data will be used solely to calculate average vehicle speeds, and not to pinpoint specific vehicles.

**Road safety and conflicts**

Police accident data will be collected. A conflict survey will be undertaken to record accidents, near misses and any other incidents.

**Junction delays**

The data collected by the ANPR cameras will enable journey times to be recorded on the approaches to the junction. The MOVA traffic signal system will produce junction delay data including lane occupancy data and signal stage timings information.

**Red light compliance**

Specialist equipment at the traffic signals will record the number of vehicles that fail to stop when the traffic signals are red.