Case Study

M6 J21a to J26 Smart Motorway

Multiple SDS Aqua-Swirls® installed in M6 smart motorway upgrade

Image kindly supplied by National Highways.

SDS Products

3 x Aqua-Swirl® AS-6; 3 x Aqua-Swirl® AS-7;
1 x Aqua-Swirl AS-9®.

Client

Costain; WSP.

End Customer

National Highways (formerly Highways England).

Project

£150 million upgrade of a 10-mile stretch of the M6 motorway.

Purpose

To provide 30% additional road user capacity in both directions and ensure faster, safer and more reliable journey times.

Brief to SDS

To protect the local environment from pollution by road runoff.

Timing

March 2021 to Spring 2023.

Project Background Information

The new smart motorway scheme occupies 10 miles of the M6, from Warrington's Junction 21a Croft Interchange in Cheshire to the Orrell Interchange at Junction 26 near Wigan.

The scheme will provide additional capacity by converting the hard shoulder into a new lane for traffic, creating ten new emergency areas and installing road-side technology to manage traffic flows and incidents.

Adding the extra capacity in this way saves time and cost and helps to reduce the road's environmental impact, by removing the need for the additional land that a wider road would require.

Project Objectives

To protect the local environment from pollution by highway runoff.

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Project Requirements

To ensure waterbodies, groundwater and the natural surroundings are protected from contamination by surface water runoff.

Surface Water System Requirements

Whilst no significant adverse effects on surface water, groundwater and flood risk were predicted, the operational Proposed Scheme resulted in an increase in traffic of more than 20% in some links of the traffic model. As a result of consultation of the Highways Agency Water Risk Assessment Tool (HAWRAT) and, following the advice detailed in *"Smart Motorways Treatment of Priority Outfalls"* (Highways England, 2019), SDS Hydrodynamic Vortex Separators (HVSs) were installed on 7 priority outfalls, located between Junctions 22 and 23 and on the slip roads at Junction 21a.

Tests using M-BAT (the Environment Agency's 'Metals – Bioavailability Assessment Tool') revealed that the presence of dissolved zinc and copper would remain within safe levels and that there were no potential changes in groundwater recharge, with the closest groundwater abstraction located 300 metres from the motorway, for use on a golf course.

SDS Product Features

In accordance with Priority Outfalls Interim Guidance, the installation of SDS Aqua-Swirl® HSVs, of varying capacities, within the soft estate is considered to be delivering treatment, without adversely affecting other environmental resources; therefore, the conclusion of "no significant effects from the Proposed Scheme" was reached.

Issues Overcome

Multiple issues have been addressed and overcome by the solution provided by SDS, including the products' resistance to very high peak flow rates during rainfall events (in excess of 300 litres per second in one instance).

Since the HVSs are retrofitted into the existing network it is important that they can be coupled to existing concrete pipes and that their inlet / outlet orientation can be varied.

The products' HDPE structure and comparative low weight comply with weight restrictions on products being offloaded at the side of the motorway, since offload by crane is not possible, and facilitate installation in excavations of up to 6.6 metres in depth.