

Case Study

M4 Smart Motorway, Berkshire

UK's first installation of BBA-certified Weholite pre-fabricated chambers



Image kindly supplied by Balfour Beatty.

Weholite Systems

Weholite Pollution Control Chambers.

Client

Balfour Beatty Vinci Joint Venture.

End Customer

Highways England.

Project

Upgrade of the M4, between Junctions 3 at Hayes and 12 at Theale, to a smart motorway.

Purpose

The redeveloped M-way will provide much needed additional road user capacity, ensure faster and safer journey times, and also facilitate economic growth within the region.

Brief to SDS / Weholite

To provide a pollution control management system, installed in the verge, to prevent contamination of the surface water runoff.

Timing

September to October 2019 (westbound phase 1).

Project Background Information

Much of the M4 currently suffers from heavy congestion, often in excess of 130,000 vehicles per day, which leads to unpredictable journey times. Traffic flows are forecast to further increase to 160,000 over the next 20 years.

Improvement of the M4 to a smart motorway will help to relieve this congestion by permanently converting the hard shoulder to a running lane and using technology to monitor traffic flow and set variable speed limits accordingly.

At 32 miles, this is the longest smart motorway project in England to date.

Project Objectives

To ensure any surface water runoff, that is contaminated by pollutant spills from the carriageways, is prevented from entering the natural surroundings.

Project Requirements

To introduce within the existing structure of filter drains an environmentally safe surface water storage and drainage solution.

Surface Water System Requirements

Due consideration has been given to groundwater Source Protection Zones ("SPZs"), which extend over the Scheme footprint, indicating the relatively high vulnerability of aquifers (particularly the Chalk) to potential contamination. The Scheme has been assessed as unlikely to have a detrimental impact upon the existing surface and groundwater resources.

The Scheme design includes replacement of the existing drainage system where required and additional storage within the drainage system to maintain current discharge rates to outfalls. The existing central reservation drainage system will be replaced with surface water channels or linear drains, and some sections of the verge drainage will also be replaced with new linear drains.

Weholite Product Features

If there is a pollutant spill on the motorway a valve diverts the runoff into the Weholite tank; fitted with a penstock, the tank is then emptied by a tanker to avoid the spill entering the waterways.

Of particular benefit to this project, the Weholite systems were supplied in three-piece assemblies, with pre-fabricated chambers, enabling a much faster and safer installation than conventional products.

Issues Overcome

As part of the Development Consent Order (DCO) planning process, a full Environmental Impact Assessment was carried out and has been used to inform the design of the project.

Since the Scheme involves minimal additional impermeable areas, and discharges will essentially be limited to current rates, the adopted mitigation measures will ensure that any impacts on the water environment, in terms of surface- and ground- water quality, drainage and flood risk, will be negligible.

Glenn Boyd, Verge Manager, Balfour Beatty, said:

"The Health & Safety aspect of the Weholite system has been a huge benefit. Since the chambers were supplied pre-formed with an orifice plate and penstock arrangement, there was no need for site gangs to provide formwork onsite in the trench. Due to their light weight, the units could be easily handled without the requirement for specialist lifting plans, again reducing time and risk within the trench. By using Weholite, the first system has been installed in less than three days, shaving around two-and-a-half months off the programme and delivering potentially significant commercial savings."



Smart Motorway works on the M4 westbound between junctions 11 to 12.



Smart Motorway works on the M27.