Thames Tideway Tunnel not necessary to meet UK or EU water standards?

Prof Chris Binnie, MA, DIC, HonDEng, FREng, FICE, FCIWEM

The sewerage system of central London combines foul and storm water into a single combined pipe resulting in combined sewer overflows (CSO) of polluted storm water into the Tideway during storms. The European Urban Waste Water Treatment Directive (UWWTD) has the objective "*to protect the environment from the adverse effects of waste water discharges."* The European Court of Justice found (Case C□301/10, 18 October 2012) that the UK Government did not comply with this Directive in respect of the Thames Tideway, and there is the possibility of it being fined for the breach until the water quality complies.

The upgrading of the London sewage treatment works at Mogden and Beckton was completed in 2013 and 2014, and the construction of the Lee Tunnel is nearing completion, at a combined cost of about £1.2bn. Contracts are due to be placed shortly for the construction of the 25km long Thames Tideway Tunnel (TTT) costing £4.1bn at 2011 prices.

Dissolved Oxygen: Fish were considered to be the most representative measure of the environment and dissolved oxygen standards were set for them under my chairmanship. **The latest information from the 9 Automatic Quality Monitoring Stations on the Tideway is that the dissolved oxygen in the Tideway now meets the standards set for it.** In addition the upper Tideway now meets the Water Framework Directive (WFD) dissolved oxygen (DO) standard for good condition and, once the Lee Tunnel is operational at about the end of 2015, halving the storm overflow volume, there is every likelihood that the middle/lower Tideway will also meet the WFD good dissolved oxygen condition.

Spill frequency: The UWWTD allows CSO spills to occur during "*unusual rainfall*" events, frequency unspecified. During the UWWTD infraction proceedings the EC, as quoted by the Advocate General, "*does not propose a strict 20 spill rule but points out that the more an overflow spills...the more likely it is that the overflow's operation is not in compliance with Directive 91/271*." **Thus the EC appears prepared to consider more than 20 spills/year as acceptable,** provided there is no significant environmental impact on the receiving water, as is now the case in the Tideway.

Whilst the current situation is a maximum annual average of some 50 modelled spills a year, the *base case is that, with the Lee tunnel operational in late 2015, the modelled spill frequency then drops to about 40 spills/year. TW state the model input data is not sufficiently comprehensive. The models over-predict dissolved oxygen failures and almost certainly over-predict spill frequency.*

Thus actual spill frequency is probably in the 30s/year. Although the automatic quality data is not available before 2014, the Environment Agency's records of Tideway fish kills over 10 years show only one related to overflows from the collecting system and that of only one fish. If the European Commission seeks to impose fines for continuing failure to meet UWWTD requirements the best defence would be to show that data relating to actual as opposed to modelled conditions shows very limited environmental harm, An excessive cost defence is therefore available. No such defence was proposed in Case C301/10 because DEFRA's 2011 business case suggested benefits of £3bn to £5bn from the Tideway Tunnel alone. This was a subjective valuation, based on inaccurate information.

Alternative measures: There are many measures which can be used to reduce spill frequency further, including removal of restrictions, real time control, local sewer separation near the Tideway, local detention tanks, infiltration into the terrace gravels and, in the longer term, green roofs, and Sustainable Drainage Systems (SUDs). In combination, used where they are most cost effective, these should almost certainly meet the UWWTD spill frequency at far lower cost and sooner than the TTT. However they have not been looked at in this way.

Conclusions and recommendations: There are other factors in the WFD which mean that the Tideway status remains at “moderate”. Is it sensible to spend some £4bn on a scheme that will still not result in the WFD requirement of “good” status being met?

Thus, before the tunnel is finally authorised, a full updated and independent assessment is needed as to whether a combination of measures without the TTT would be sufficient to meet the UWWTD. That could save £3bn. The Government could then apply to the European Commission to minimise or avoid the fines.

Reference: Thames Tideway - current need for the tunnel, by Prof Chris Binnie FREng, FICE. 5th May 2015