Assessment of detection limits of fiber-optic distributed temperature sensing for detection of illicit connections

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ABSTRACT

Distributed Temperature Sensing (DTS) with fiber-optic cables is a powerful tool to detect illicit connections in storm sewer systems. High frequency temperature measurements along the in-sewer cable create a detailed representation of temperature anomalies due to illicit discharges. The detection limits of the monitoring equipment itself are well-known, but there is little information available on detection limits for the discovery of illicit connections, as in sewers mixing and attenuation also plays an important role. This paper describes the results of full-scale experiments aiming to quantify the detection limits for illicit connections under various sewer conditions. Based on the results, a new monitoring setup for (partially) filled sewer conduits has been proposed.

KEYWORDS

DTS, illicit connections, detection limit, temperature monitoring, foul sewer, storm sewer