

Impacts Analysis of Sewer Interception System on River Water Quality

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Extended Abstract

A sewer interception system is built to intercept untreated sewage in rainwater drainage systems and to transport it to wastewater treatment plants (WWTPs) before these sewages emit and pollute receiving waterbodies. While the household sewers are completely piped to sewage treatment systems, the interception stations could be retired. The interception systems are commonly used during the construction of public sewer systems because it need decades to accomplish. In this study, the interception system in Taipei City, Taiwan, is demonstrated. The construction of public sewer systems in Taipei City is the first system in Taiwan, and after 40 years, the closing of interception systems was discussed because the household sewer piped ratio increased, and its mission was almost finished. Once the interception stations close, the discharges go to rivers and might contaminate water quality. Therefore, it should be very careful to assess the impacts on river water quality if close the interception stations.

The validated water quality model, the Water Quality Analysis Simulation Program (WASP), was used to simulate the impacts of interception stations on river water quality. In this case, seven interception stations along with Keelung River were assessed. The total BOD pollution loads of the seven interception stations are 1,116 kg/day and the NH₃-N pollution loads are 575 kg/day. The staged-closing strategy of interception stations was finally suggested. The staged-closing strategy of interception stations is a grouped stations strategy. In Stage 1, two interception stations close and discharge to the river, resulting in downstream BOD and NH₃-N in Keelung River could increase by 0.4% and 0.2%. The two stations are located upstream, and pollution loads are relatively less, so the impact on water quality is few. In Stage 2, a total of four stations close. The effect of Stage 2 on river water quality is around 1%. Stage 3 closes all seven interception stations and all discharge to Keelung River. Stage 3 would cause BOD concentration in the river to increase by more than 5%. Regarding the current water quantity and quality of the interception stations, it did not suggest the Stage 3 strategy. This study demonstrated the municipal sewer systems in Taipei City and analyzed the impacts of interception stations on river water quality. The assessment method could be applied to similar cases that seek the alternative operation of sewer interception stations.

Keywords: municipal sewer treatment system, sewer interception stations, river water quality, Water Quality Analysis Simulation Program (WASP).