

# ASSESSMENT ON INFLOW AND INFILTRATION IN SEWERAGE SYSTEMS OF KUANTAN, PAHANG

Hiew Thong Yap<sup>a\*</sup>, Su Kong Ngien<sup>a,b</sup>, Saffuan Wan Ahmad<sup>a</sup>

<sup>a</sup> Faculty of Civil Engineering & Earth Resources, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia.

<sup>b</sup> Centre for Earth Resources and Management, Universiti Malaysia Pahang, Lebuhraya Tun Razak, 26300 Gambang, Pahang, Malaysia.

\*Corresponding author (Phone: + 00 (16) 9499790; [yap9636@hotmail.com](mailto:yap9636@hotmail.com)).

---

## Abstract:

Inflow and infiltration is important to be monitored for sewerage systems. The aim of this research is to analyse the relationship between rainfall as well as inflow infiltration in sewerage systems with the flow pattern. Another aspect that will be evaluated is the effect of inflow and infiltration during wet and dry weather in sewerage systems of Kuantan, Pahang. This research is focused more on fieldwork and is divided into several stages such as site information collection, site visit and data collection. Universiti Malaysia Pahang (UMP) is in collaboration with Indah Water Konsortium Sdn. Bhd. (IWK) Pahang branch, where all the information on sites was provided by IWK through meeting on site selection in the early stages. Two sewer pipelines (MH 92a – MH 92b) and (MH 219 – MH 220) were selected at Bandar Putra and Kota Sas respectively. ISCO 2150 and ISCO 4250 Area-Velocity flowmeters, which utilizes ultrasonic technology based on the Continuous Doppler effect, were adopted in this research. ISCO 2150 and 4250 Area Velocity flowmeters were used to collect data in terms of flowrate, velocity and water level in the sewer pipeline. Before flowmeter installation at the selected manhole, calibration was done at the Hydrology and Hydraulic Laboratory in UMP. Besides, ISCO 674 Rain Gauge was also installed in the nearest sewerage treatment plant to collect rainfall intensity data. The rainfall data and flowrate in sewer pipeline were collected by interval of 5 minutes. Based on the result, the average infiltration rate of  $Q_{peak}$  and  $Q_{ave}$  for both locations were 19.3% and 25.4% higher than the 5% and 10% stated in Hammer and Hammer. The flowrate of wastewater in the pipeline was found to be directly proportional to rainfall. The volume of sewage in sewerage system gradually increases when rainfall occurs. This may affect the sewer by reducing its capacity and overloaded the sewerage treatment plant. Overflow of untreated wastewater will spill to road and street, this will result in the wastewater flowing into storm drain and receiving water. Inflow and infiltration is a concern and more comprehensive studies are needed to initiate the review of a revised infiltration rate that is more relevant to the future climate.

**Keywords:** inflow infiltration, rainfall intensity, sewerage system, wastewater