

# Study on Main Pathways of Organic Matter and Nutrients Loads including Waste Disposal Site Leachate in an Urban Watershed in an Emerging Country in Southeast Asia

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## 1. Background and Objectives

In Da Nang city, located in the center of Vietnam, water environment pollution is increasing due to rapid economic development and population growth. The main objectives of the thesis, <sup>i)</sup>are to investigate the distribution of organic matter and nutrients in the Phu Loc river basin, an urban watershed, and <sup>ii)</sup>to estimate the main load pathways and the contribution ratio considering the leachate of waste disposal sites.

## 2. Materials and Methods

Investigations were conducted in Phu Loc river basin (catchment area: 34.7 km<sup>2</sup>) by taking samples from environmental waters, water treatment facilities, tap waters, household graywater, combined sewer overflows, road runoff and rain water in Aug.~ Nov. 2018 and Sept.~ Oct. 2019. Samples were analyzed at Da Nang University of Science and Technology. Ignition loss was measured as an organic matter index based on the sewage test method and total nitrogen (TN) and total phosphorus (TP) were measured as a nutrient index by spectrophotometer (HACH). The load was

calculated by multiplying the water circulation (a) and the detected concentration.

## 3. Results and Discussion

**Figure 1** shows annual water circulation flow (a), organic matter (b), TN (c) and TP (d) material flows in the Phu Loc river basin, in Da Nang City. The estimated flow per year was  $430 \times 10^5 \text{ m}^3 \text{ y}^{-1}$ \* flowing from the urban area to the Phu Loc river as road runoff (a). The biggest loading routes were observed as road runoff from urban area for organic matter  $1,228 \times 10^3 \text{ kg y}^{-1}$ \*\* (b) and for TP  $3,342 \times 10 \text{ kg y}^{-1}$ \*\*\* (d), effluent from waste disposal site for TN  $1,675 \times 10^2 \text{ kg y}^{-1}$ \*\* (c).

## 4. Conclusion

The main pathways to the Phu Loc river were TN (45 %) flow from waste disposal site and organic matter (70 %) and TP (70 %) flow from urban runoff. To reduce the pollution load to the Phu Loc river, the performance of leachate treatment plant and technical interventions to reduce urban runoff loads should be improved effectively.

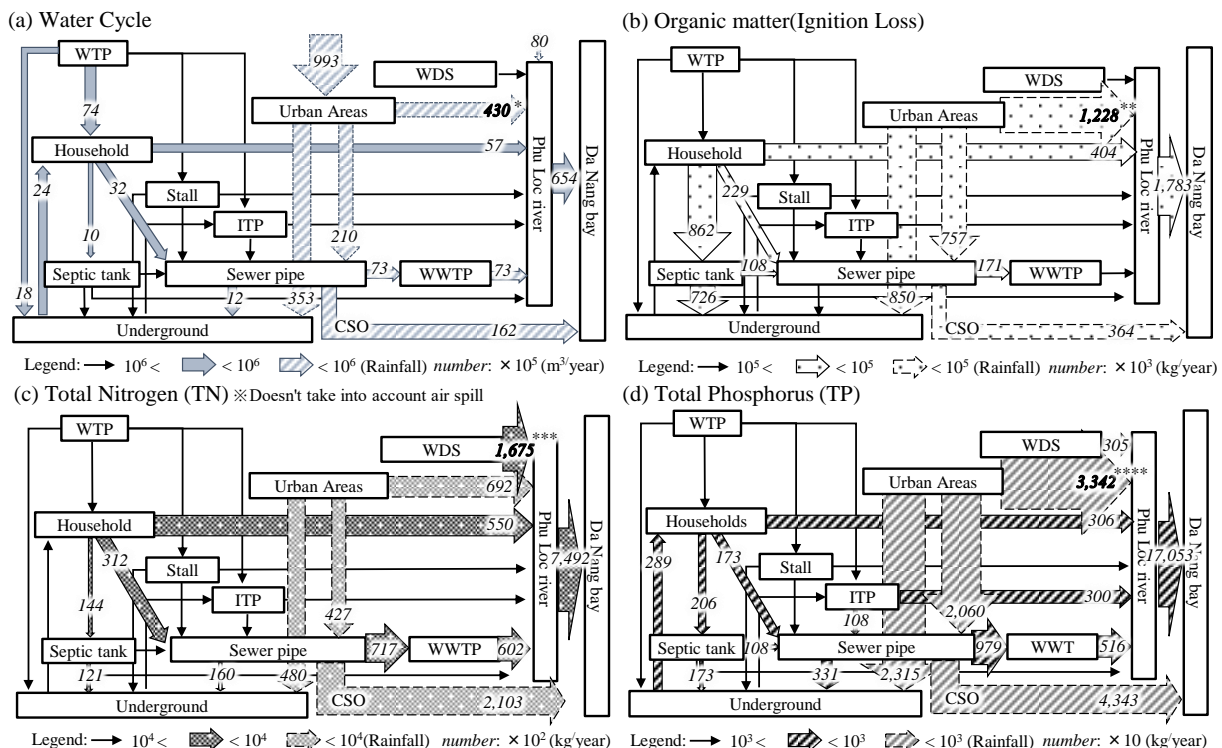


Fig.1 Annual water circulation flow (a), organic matter (b), TN (c) and TP (d) material flows in the Phu Loc river basin, in Da Nang

※) WTP (Water Treatment Plant), ITP (Industrial Treatment Plant), WWTP (Waste Water Treatment Plant), WDS (Waste Disposal Site), CSO (Combiner Sewer Overflow)