

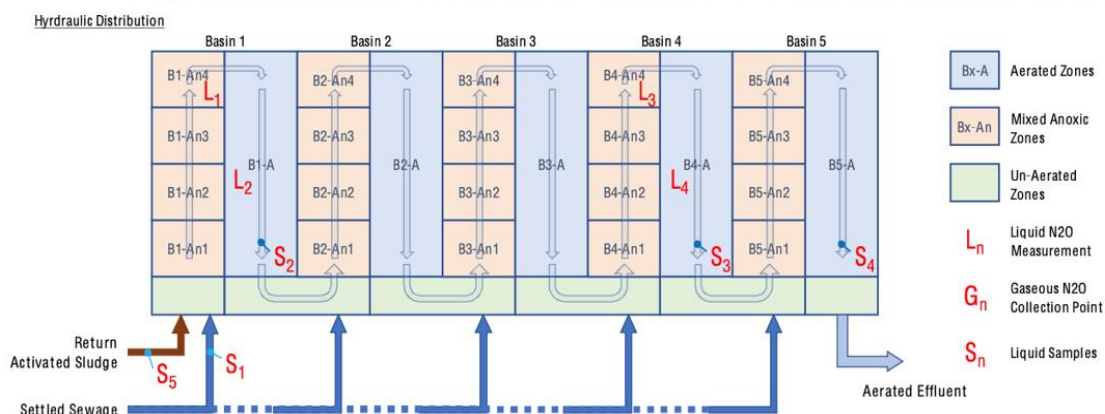
MULTI-CORRELATION ANALYSIS OF N₂O FOOTPRINT VIA BIG DATA TECHNOLOGIES

Abstract

Nitrous oxide (N₂O) has been known as the third most abundant greenhouse gases (GHG) in atmosphere as a by-product during biological nitrogen removal (BNR) process. Thus, its mitigation becomes of primary importance especially for meeting carbon footprint target of wastewater treatment plants (WWTPs). N₂O is generally released as obligatory intermediate in nitrification and denitrification pathways. This coincides with the preliminary assessment conducted by PUB and NUS in 2014, which found most emissions in those pathways and the emission factor of most WWTPs to be below the 1.6% guideline in IPCC. In the effort to identify the N₂O emission and subsequently the mitigation strategies, Hereby, PUB plans to adopt a more robust N₂O monitoring programme at full-scale to identify a more accurate number on the overall N₂O emission at WWTPs.

This project will be a collaboration between Nanyang Technological University (NTU) and Mott Macdonald (MM), led by the Professor Zhou Yan from NTU as PI and MM team as Co-PI. As the biggest WRP in Singapore, Changi Water Reclamation Plant (CWRP) is selected as the site for N₂O monitoring. N₂O emission is monitored in 3 different trains to provide a comprehensive and representative results. Liquid and gaseous N₂O sensors are placed in various points within each train for online monitoring. The study is also complimented by different operational parameters obtained in existing SCADA or periodic sampling. This project spans over 18 months to include a minimal 12-months monitoring period, with the aim to deliver an overall N₂O footprint for CWRP as well as to understand emission pathways and verification study contributing to standard quantification approach development.

N₂O Monitoring Procedure At Changi Water Reclamation Plant (CWRP)



Big data mining



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Aims to:

- Quantify the overall N₂O footprint of CWRP
- Understand correlations between N₂O emissions and plant operations and process control, etc.
- Establish a robust and reliable monitoring regime for nitrous oxide (N₂O) emissions in CWRP