

**A study on the Efficiency of Dandora Domestic and Industrial Wastewater
Treatment Plant in Nairobi**

Hellen Apondi Sewe

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ABSTRACT

Nairobi's wastewater stabilization ponds (also known as Dandora Wastewater Treatment Plant) are located 30 km to the East of the city, and they discharge into Nairobi River, and finally into Athi River. The plant has eight series, comprising of 38 ponds, and has expanded significantly since its establishment in 1978. Treatment in ponds is achieved by waste stabilization. In 2009, a study was done to establish the efficiency of this wastewater treatment plant and to assess whether the final effluent met the required standards for Kenya. Grab samples were collected at the inlet and outlet of the treatment plant, and also from the discharge points of each pond in 4 series. Wastewater samples from the ponds were analyzed in the chemistry laboratory of Jomo Kenyatta University of Agriculture and Technology (JKUAT), at Kenya Industrial Research and Development Institute (KIRDI) laboratories, Nairobi City Water and Sewerage Company (NCWSC) laboratories and also at the Mines and Geology labs. Dissolved Oxygen (DO) content in the dry season was below the 5.0 mgO₂/L requirement for discharge into surface waters. DO content during the wet season ranged between 2.76 and 19.77 mgO₂/L. The Biological Oxygen Demand (BOD₅), Chemical Oxygen Demand (COD) and Total Suspended Solids (TSS) in the final effluents did not meet the design expectation of 20 mgO₂/L, 280 mgO₂/L and 30 mg/L respectively. BOD₅ concentration ranged between 29.90±8.20 and 92.44±5.08 mgO₂/L and removal efficiency from the series ranged between 90.12 and 97.10 %. TSS in the final effluent ranged between 46.10 and 107.8 mg/L in dry season and 78.22 and 120.89 mg/L in the wet season. The % reduction was from 76.70 to 90.00%. The Total-Phosphorus (T-P) concentration ranged between 7.00 and 75.80 mgP/L (compared to a standard of 2 mgP/L), and the removal efficiency was 13.70% to 78.26 %. Total-Nitrogen (T-N) ranged between 29.11 and 61.35 mgN/L in the dry season (compared to a standard of 2 mg N/L), and 92.73 and 366.42 mgN/L in

the wet season. Nitrates (NO₃-N) ranged from 50.33 to 334.42 mgN/L in the wet season (compared to a standard of 18 mg N/L). Cd, Mn and Pb levels were above the Kenya guideline standards of 0.01, 0.2 and 0.01 mg/L respectively, for discharge into the environment and surface water. Cd ranged from 0.025 to 0.033 mg/L, Mn concentrations were from 0.085 to 0.748 and Pb concentrations were between 0.083 and 0.332 mg/L. The treated effluent failed to meet the required standards for discharge into surface water bodies. It is recommended that measures should be put in place to improve the final effluent quality. Separation of industrial waste from domestic waste and regular maintenance of the plant are necessary.