Desalination and Water Treatment
www.deswater.com
32 (2011) 389–396
August
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doi: 10.5004/dwt.2011.2757

Roadside rest area wastewater treatment system: Performance evaluation and improvement

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Received 11 October 2010; Accepted in revised form 1 March 2011

ABSTRACT

The performance of a decentralised sewage treatment plant located at a rest area servicing a major freeway was investigated. Long term monitoring and rigorous analyses undertaken in this study revealed several unique and challenging issues associated with such scarcely studied systems. Data collected over a six month period showed that the raw wastewater strength was well above typical household wastewater characteristics, with the average BOD_5, COD, TOC, TN and TP values of 880, 4900, 350, 238 and 8 mg/L, respectively. The system performance was considerably lower than that expected of a typical wastewater treatment unit. Several shortcomings in design (e.g., inefficient aeration device and return activated sludge system) and inconsistencies in maintenance practice were identified and some remedial measures were proposed and tested. Of particular interest were the increase of the dissolved oxygen (DO) concentration (from 0.5 to 4 mg/L) and the simultaneous significant improvement of COD and TOC removals in the aerobic reactor in response to the redesigning of the aeration system. The removal of nitrogen, however, remained quite low as expected.

Keywords: Decentralised treatment plant; Dissolved oxygen; Mixed liquor suspended solids; Roadside rest area; Wastewater

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