



Performance of granular medium filtration and membrane filtration in treating stormwater for harvesting and reuse

Benjamin Kus^a, Mohammad Johir^a, Jaya Kandasamy^a, Saravanamuthu Vigneswaran^{a,*}, Hok-yong Shon^a, Robert Sleigh^b, Glen Moody^c

^aFaculty of Engineering and IT, University of Technology, Sydney, P.O. BOX 123, Broadway, NSW 2007, Australia
Tel. 612 95142641; Fax: 612 95142633; email: s.vigneswaran@uts.edu.au

^bSteri-flow Filtration Systems, 32 Heath Street, Lonsdale SA 5160, South Australia

^cKogarah Municipal Council, 2 Belgrave Street, Kogarah, NSW 2217, Australia

Received 13 August 2011; Accepted 8 November 2011

ABSTRACT

This paper discusses laboratory scale and pilot scale treatment systems used to treat water from a stormwater canal in Carlton, Sydney. The laboratory scale pre-treatment systems investigated included flocculation, GAC filtration and fibre filter prior to laboratory scale steriflow stainless steel membrane filter. The results showed that these pre-treatments improved the quality of the filtrate as measured by the turbidity and TOC removal efficiency. The use of pre-treatment improved the TOC removal efficiency from 10% to 90%. Among the three pre-treatment methods, GAC filter resulted in the highest TOC removal efficiency (88%). Pilot scale experiments were also carried out using stainless steel membrane filtration and GAC filtration at Carlton, Sydney. Pilot scale experiments showed that the Steri-Flow membrane filter treatment without any pre-treatment achieved an effluent filtrate turbidity of between 0.79–0.99 NTU which were well below the 5 NTU ADWG (2004) limit [1]. The influent raw stormwater had generally low concentrations of heavy metals. Following membrane filtration the concentration of all heavy metals were reduced to very low levels and well within the ADWG (2004) [1] limits. The membrane filter could not remove TOC in significant amounts. GAC adsorption used as post-treatment following Steri-flow membrane treatment effectively reduced the TOC influent feed levels. GAC filtration of stormwater provided a 70% removal of organics. It removed all types of organic. The GAC filter did not provide any further improvement to the turbidity level or heavy metal concentration following treatment with the Steri-flow membrane system.

Keywords: Filtration; Membranes; Flocculation; Stormwater; Water harvesting; Organics

*Corresponding author.