

Comparison of On-Site Stormwater Detention Policies in Australian and Brazilian Cities

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Abstract : In recent decades, On-site Stormwater Detention (OSD) systems have been implemented in many cities around the world. In Brazil, urban drainage source control policies were created in the 1990's and were mainly based on OSD. The concept of this technique is to promote the detention of additional stormwater runoff caused by impervious areas, in order to maintain pre-urbanization peak flow levels. In Australia OSD, was first adopted in the early 1980's by the Ku-ring-gai Council in Sydney's northern suburbs and Wollongong City Council. Many papers on the topic were published at that time. However, source control techniques related to stormwater quality have become to the forefront and OSD has been relegated to the background. In order to evaluate the effectiveness of the current regulations regarding OSD, the existing policies were compared in Australian cities, a country considered experienced in the use of this technique, and in Brazilian cities where OSD adoption has been increasing. The cities selected for analysis were Wollongong and Belo Horizonte, the first municipalities to adopt OSD in their respective countries, and Sydney and Porto Alegre, cities where these policies are local references. The Australian and Brazilian cities are located in Southern Hemisphere of the planet and similar rainfall intensities can be observed, especially in storm bursts greater than 15 minutes. Regarding technical criteria, Brazilian cities have a site-based approach, analyzing only on-site system drainage. This approach is criticized for not evaluating impacts on urban drainage systems and in rare cases may cause the increase of peak flows downstream. The city of Wollongong and most of the Sydney Councils adopted a catchment-based approach, requiring the use of Permissible Site Discharge (PSD) and Site Storage Requirements (SSR) values based on analysis of entire catchments via hydrograph-producing computer models. Based on the premise that OSD should be designed to dampen storms of 100 years Average Recurrence Interval (ARI) storm, the values of PSD and SSR in these four municipalities were compared. In general, Brazilian cities presented low values of PSD and high values of SSR. This can be explained by site-based approach and the low runoff coefficient value adopted for pre-development conditions. The results clearly show the differences between approaches and methodologies adopted in OSD designs among Brazilian and Australian municipalities, especially with regard to PSD values, being on opposite sides of the scale. However, lack of research regarding the real performance of constructed OSD does not allow for determining which is best. It is necessary to investigate OSD performance in a real situation, assessing the damping provided throughout its useful life, maintenance issues, debris blockage problems and the parameters related to rain-flow methods. Acknowledgments: The authors wish to thank CNPq - Conselho Nacional de Desenvolvimento Científico e Tecnológico (Chamada Universal - MCTI/CNPq Nº 14/2014), FAPEMIG - Fundação de Amparo à Pesquisa do Estado de Minas Gerais, and CAPES - Coordenação de Aperfeiçoamento de Pessoal de Nível Superior for their financial support.

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