



## Street Tree Planting and WSUD to Increase Tree Growth and Stormwater Treatment: A Street Experiment

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There is substantial work being undertaken in Melbourne and across the globe to implement Water Sensitive Urban Design (WSUD) and reduce the degradation of urban streams. At the same time as implementing WSUD, there has also been a recent focus on addressing the Urban Heat Island Effect. This is leading many municipalities across Melbourne to increase street tree numbers and developing urban forest strategies in a bit to increase canopy cover and combat the urban heat island effect.

Stormwater control measures (SCMs) that include street trees could provide a solution to achieving both these aspirations at the same time. However, there is currently a lack of field data on the implementation of such systems. Further work is required to understand the design characteristics required in order manage the water balance within these pits to promote tree growth at the same time as achieving stormwater management objectives.

To address these objectives, we have undertaken a research project using a streetscape experiment of newly planted street tree pits in Brunswick (City of Moreland). These tree pits included five alternate designs, each employing different techniques to modify the water balance in Melbourne's clay-based soils, and in turn have different effects on tree growth. Over a period of two years we characterised the soil water balance of these experimental tree pits and measured the effect of this water regime on tree growth to (i) identify conditions required to optimise tree growth and canopy cover and (ii) quantify the runoff reduction performance.

We found inundation rather drought to be the dominant water balance state in clay based soils and that controlling the period of inundation was critical to tree growth performance. When inundation in street tree WSUD systems was managed, we could achieve significantly increased tree growth over a regular street tree planting. Both system drainage design and tree species selection to cope with high water levels provide opportunities in this scenario, but solutions will differ according to soil type and climate. This presentation will discuss these findings from this research and the practical implications they have to street tree design guidelines, runoff modelling performance for urban catchments and strategies for WSUD implementation in urban areas.