

# Addendum 1

ARUP

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| To      | Penrith City Council   | Date<br>3 February 2017    |
| Copies  | Dan Howard, DLR  | Reference number<br>249780 |
| From    | Kate Buckle - Arup   | File reference             |
| Subject | Response to Council's request for further Rainwater Harvesting information |                            |

During Penrith City Council's preliminary assessment of the Development Application, it was highlighted that "insufficient information was provided in relation to rainwater harvesting to demonstrate compliance with Council's water conservation requirements". Further information has been provided throughout this Addendum to demonstrate compliance with Penrith City Council's WSUD Requirement 3.1.

## 1 Introduction

As part of Penrith City Council WSUD requirements, developments WSUD measures are required to incorporate Water Conservation, Stormwater Quality, and Stormwater Quantity measures. The Water conservation requirements and design measures are detailed below.

## 2 Design Requirements

The water conservation measures are designed in accordance of the City of Penrith's WSUD Policy, with specific requirements and details detailed below:

# Memorandum

| Performance Criteria   | Design Comments   |
|--|---|
| All buildings installing any water use fittings must demonstrate minimum standards defined by the Water Efficiency Labelling and Standards (WELS) Scheme. Minimum WELS ratings are 4 star dual-flush toilets, 3 star showerheads, 4 star taps (for all taps other than bath outlets and garden taps) and 3 star urinals. Water efficient washing machines and dishwashers are to be used whenever possible | All sanitary fittings and fittings to be installed will achieve WELS ratings and meet the requirements of the Plumbing Code of Australia (Volume 3 of NCC). The WELS ratings nominated are achieved. Note that this industrial facility contains no washing machines.   |
| To install rainwater tanks to meet 80% of non-potable demand including outdoor use, toilets, and laundry.  | <p>The rainwater tank is designed to connect to all non-potable fixtures (WC flushing, hose taps for plant room, washdown and irrigation purposes).</p> <p>Tank demand will meet more than 80% of the non-potable water demand (see below).</p> <p><u>Note:</u></p> <ul style="list-style-type: none"><li>• There are no cooling towers or laundry in the facility.</li><li>• During dry period, supply will be augmented with potable water.</li></ul> |

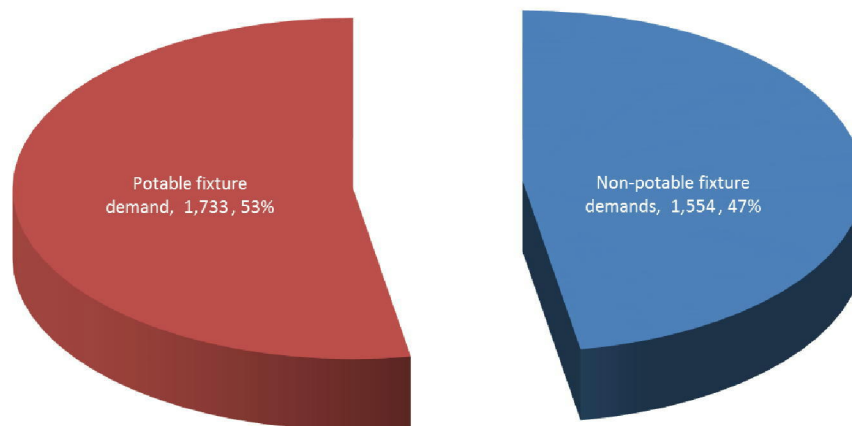
## 3 Rainwater Tank Design Calculations and Solutions

The building will harvest rainwater from a roof catchment of approximately 5,000m<sup>2</sup>. The volume of water that the catchment can harvest has been determined using the past 50 years of daily rainfall data as recorded by the Bureau of Meteorology (BOM). Using an extensive data set aims to account for Sydney's cyclical long term rainfall patterns (e.g. La Niña and El Niño cycles).

Arup has used a proprietary analysis calculator to assess day by day supply, demand and shortfall/surplus for rainwater. The calculator shows that in absence of HVAC cooling towers, bathroom flushing is the only significant non-potable water demand. The following figure/tables summarise the results of the analysis. It is recognized that the following figures are preliminary and subject to further development during Design Development.

# Memorandum

|                                     |           |            |
|-------------------------------------|-----------|------------|
| Rainwater harvested in 50 years     | 311,000   | kL/50 year |
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| Demand for 50 years                 | 20,000    | kL/50 year |
| Potable water consumed              | 17,000    | kL/50 year |
| % of recycled demand met            | 81%       |            |
| % of recycled water overflowed      | 90%       |            |
| volume of recycled water overflowed | 4,509,000 | L/year     |
| % of time tank empty                | 16%       |            |
| % of time tank full                 | 26%       |            |
| Rainwater Tank Size                 | 15        | KL         |



Based upon the analysis, a 15 KL tank is required to meet 80% of the non-potable demand for the proposed development. The building's roof water will be collected and discharged via gravity into the rain water storage tank. The tank shall be placed on the northwest side of the site, as shown on the Architectural Site Layout. It is noted that the rainwater tank size will be adjusted throughout detailed design to ensure that compliance with Council requirements is achieved.