File:SY080112 EA Response

Monday, 7 December 2009

Denton Corker Marshall Pty Ltd,
49 Exhibition Street, Melbourne,
Victoria, 3000.

Attn: Daniel Malone

Dear Sir,

Re: Hunter Medical Research Institute, Lookout Road, Rankin Park, Newcastle. Environmental Assessment Response

In response to the NSW Planning letter reference 09/00887 issued to Mr. David Rann, APP Corporation Pty Ltd, in relation to the Environmental Assessment of the Hunter Medical Research Institute project. We provide the following clarification of the points raised in association with the hydraulic and wet fire services.

NSW Planning Letter, Attachment 1 – Energy and Water Efficiency:

- We confirm hot water shall be provided by solar pre heating plant with gas boost system. The gas boost system is required for periods of poor or no solar gain.

- The development shall incorporate a 150,000 litre rainwater re-use tank for both toilet and urinal flushing. Please refer attached rainwater re-use report.

NSW Rural Fire Service Letter - Condition 3:

- We confirm the water and gas services documentation shall comply with the requirements of section 4.1.3 and 4.2.7 of "Planning for Bush Fire Protection 2006".

Regards,
Steve Paul and Partners

John Cumming
Associate Hydraulic Engineer

STEVE PAUL & SPP PARTNERS
Hydraulic Fire Environmental

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Hydraulic Services

Rainwater Re-Use System Report

Hunter Medical Research Institute

Lookout Road, New Lambton, NSW.

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1 July 2009

File: SY080112 Rainwater Re-Use System Report

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Review and Approval Record:

Rev	Date	Description of Release	Prepared By	Reviewed By	Approved By
A	30/06/09	Draft	JC	BL	BL

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Contents

1 Introduction

1.1 Aims

The aim of this report is to provide an outline of the rainwater re-use system that is proposed for this development. The report should identify principles of operation and indicate the expected functional performance of the system in terms of reducing potable cold water consumption throughout the development.

The proposed rainwater re-use scheme described within this report is in accordance with requirements set down under the Green Star design targets. Specifically, that the rain water re-use system shall be capable of providing 90% of the developments irrigation and toilet flushing water supply requirements.

1.2 Development Description

The proposed development will consist of a new Medical Research building to be constructed on a vacant part of the existing John Hunter Hospital site at New Lambton.

The development will be constructed over 4 levels, and contain a mixture of laboratory and office areas. A commercial kitchen and lecture theatre will be provided on level 4.

1.3 Briefing Documents

The engineering elements considered in this report are based or taken into consideration the following documents:

- Architectural drawings prepared by DCM and S2F Architects.

2 RAINWATER RE-USE METHODOLOGY

2.1 Rainwater Re-Use Systems

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system. Stormwater from the stormwater drainage system can be classified as either rainwater where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

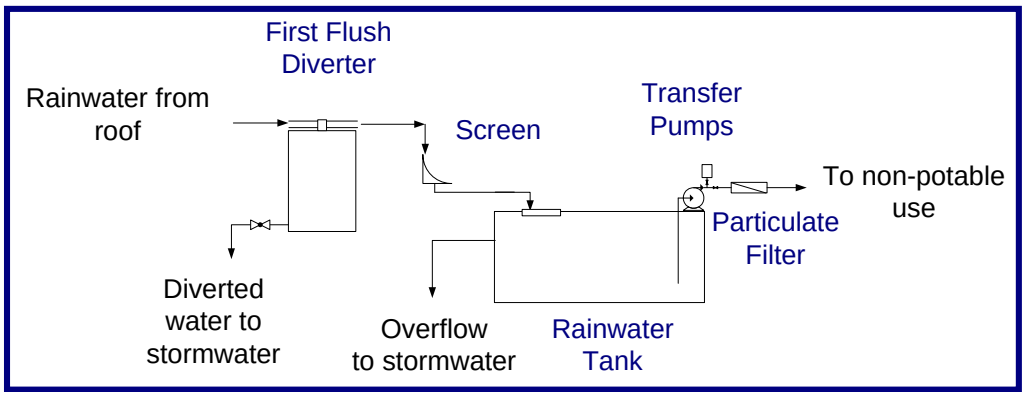
For the purposes of the this development, we refer to a rainwater harvesting system, where the following benefits can be achieved over a stormwater harvesting system;

- Rainwater collected from roof areas is generally less polluted than general stormwater drainage.

In general terms the rainwater harvesting system will be an in-line tank for the collection and storage of rainwater. At times when the rainwater storage tank is full rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system. Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system.

The collected rainwater is not classified in terms of water quality, but the use of rainwater for cooling tower make up water supply, toilet flushing and spray irrigation systems is recommended as safe practice by all Australian Health Departments. Rainwater falling on roofs is soft, clear and generally low in microbial and chemical contamination. Any contamination of rainwater generally occurs during collection and storage.

The use of simple and cost effective rainwater collection and treatment systems ensures reliable operation and water quality for non-potable use. An example of rainwater treatment technology is shown below.



A Rainwater Collection And Treatment System

The objective of rainwater treatment is to maintain a high quality of water in the rainwater storage tank. Rainwater treatment diverts or removes the following contaminants:

- Dust
- Leaves
- Grit and particles

The first 1-5 mm of rainfall falling on roof surfaces wash the majority of contaminants from the roof surface. A first-flush diverter is a collection tank that automatically diverts this contaminated water to the stormwater collection system. The remaining rainfall is directed to the rainwater tank for storage.

Screens are used to stop leaves and debris entering the rainwater tank. Finer screens are used to ensure that insects and animals do not enter the water storage. Depending on the application a tertiary filter may be used to remove grit and fine particles so these do not block irrigation nozzles or toilet inlet valves.

Rainwater harvesting systems can be considered to have the following advantages;

- Collected rainwater is of high quality allowing for uses including toilet flushing, cooling tower make up and un-controlled irrigation.
- Rainwater harvesting can provide a large reduction in potable water consumption.
- Rainwater harvesting is well suited to buildings where the available roof footprint is large for collection of the rainwater.
- Rainwater harvesting systems have a relatively low capital cost.
- Rainwater harvesting systems do not require specialized maintenance.

Rainwater harvesting systems can be considered to have the following dis-advantages;

- Rainwater harvesting systems rely upon favorable climatic conditions.
- Rainwater harvesting systems are relatively inflexible as they rely on gravity discharge from the storage tank.
- Rainwater harvesting systems are relatively inefficient in terms of their spatial requirements due to the need to store larger volumes of rainwater allowing for periods of little or no rainfall.
- Rainwater harvesting systems require a potable cold water supply make up facility for periods when the storage has been exhausted.

3 RAINWATER BALANCE

3.1 Non-Potable Cold Water Requirements

Non-potable cold water consumption within the proposed development has been modelled with the aid of the Green Star rating tool, which is currently in the Pilot stage.

A summary of the model variables is as follows;

- Population based upon staff numbers of 400 people.
- Toilet suites based upon combination 6/3 litre dual flush models.
- Average flush volume taken as one full flush and four half flushes.

Using the potable cold water calculator provided within the Green Star rating tool, we have calculated the daily non-potable cold water consumption for each person to be 12 litres.

Cumulative non-potable water consumption for the development has been calculated as follows;

Non-Potable Cold Water Consuption	**Variables**
Staff Numbers	400
Daily Consumption Per Person	12
Daily Water Consumption (kL)	4.800
Weekly Water Consumption (kL)	33.600
Monthly Water Consumption (kL)	146.000
Annual Water Consumption (kL)	1752

The calculations above demonstrate total non-potable cold water consumption for the development to be 1753.000kL per annum.

3.2 Rainwater Collection

Annual rainwater collection throughout the proposed development has been calculated as follows;

Rainwater Collection	**Variables**
Catchment Area (m2)	3000
Average Annual Rainfall (mm)	1138.5
Average Annual Rainfall Collection (kL)	3415.500
Annual Water Consumption (kL)	1753.000
Annual Re-Use Contribution (%)	195%

The calculations above demonstrate total available rainwater collection for the development to be 3415.500kL per annum.

4 Rainwater Tank Sizing

4.1 Rainwater Tank Size

Rainwater storage tank size has been calculated as follows;

Total Roof Area	4000
Catchment Percentage	75%
Modelled Catchment	3000
Monthly Consumption	146000
Tank Size	150,000

Month	**Rainfall**	**Collection**	**Consumption**	**Balance**	**Tank**
January	89.5	268500	146000	122500	150000
February	108	324000	146000	178000	150000
March	120.8	362400	146000	216400	150000
April	116.6	349800	146000	203800	150000
May	117.4	352200	146000	206200	150000
June	117.4	352200	146000	206200	150000
July	94.9	284700	146000	138700	150000
August	74.8	224400	146000	78400	150000
September	73.5	220500	146000	74500	150000
October	73.3	219900	146000	73900	150000
November	70.5	211500	146000	65500	150000
December	81.8	245400	146000	99400	150000

The calculations above demonstrate that a rainwater storage tank having a minimum of 4 weeks storage capacity (150,000 litres) can sustain non-potable cold supply requirements throughout the development on an annual basis.