

Hydraulic & Wet Fire Services

Water Management Report

Kmart Development

Eastern Creek

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1 INTRODUCTION

1.1 Background

Australand Holdings Limited (the Client), have commissioned SPP Group Pty Ltd (the Hydraulic & Wet Fire Consultant) to prepare a Water Management Report for submission in association with a Development Application for the proposed Kmart Development at Eastern Creek.

1.2 Aims

This report identifies and evaluates measures for the reduction of potable water consumption within the hydraulic and wet fire services installed throughout the proposed development. Water conservation measures for the proposed Kmart development must be demonstrated to meet the following criteria;

- A 35% potable cold water consumption reduction in accordance with the Water Sustainability Statement of Cooperation determined between Sydney Water and Australand Holdings Limited.
- Measures in accordance with Clause 7.2 - Water Conservation, of SEPP 59 – Eastern Creek Precinct Plan (Stage 3)
- Measures in accordance with Clause 20 – Ecologically Sustainable Development, of the State Environmental Planning Policy (Western Sydney Employment Area)
- Measures in accordance with Clause 22 – Rainwater Harvesting, of the State Environmental Planning Policy (Western Sydney Employment Area)

1.3 Briefing Documents

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

- Development Application architectural drawings prepared by Australand Holdings Limited.
- Draft Director Generals Requirements
- SEPP 59 – Eastern Creek Precinct Plan (Stage 3) 14 December 2005
- State Environmental Planning Policy (Western Sydney Employment Area) 2009

2 BASE DESIGN DATA

2.1 Location & Development Description

The development site is located within Stage 3 of the Eastern Creek industrial development by Australand Holdings Limited. This site has a total area of 107,094m², upon which it is proposed to construct an office/warehouse development in accordance with the following area schedule;

Warehouse Area	48,850m ²
Office Area	1,140m ²
Despatch office Area	285m ²
Receiving Office Area	285m ²
Gatehouse Area	25m ²
Pump Room Area	50m ²
Fire Control Centre Area	25m ²
Total Building Area	51,635m²

2.2 Building Population

Building population for the proposed Kmart development at Eastern Creek, has been modelled based upon Version 1 the Green Star Industrial Potable Water Calculator. Specifically the base model has been developed upon following information;

- Total office floor area 1,735m².
- Total warehouse area 49,850m².
- 24 hours per day, 7 days per week operation throughout.
- Office population based upon 1 person per 43.475m², (calculated to achieve the total office staff of 40 advised by Kmart)
- Warehouse population based upon 1 person per 276.944m², (calculated to achieve the total warehouse staff of 180 advised by Kmart)
- These population assumptions provide for a conservative estimate of the weekly population as equivalent populations are also assumed over weekend periods.

2.3 Rainfall Data

Rainfall data for the proposed Kmart development has been sourced from the Bureau of Meteorology, specifically from the Prospect Reservoir weather station. A summary of the rainfall data is as follows;

January Mean Rainfall	93.9mm
February Mean Rainfall	96.6mm
March Mean Rainfall	95.7mm
April Mean Rainfall	74.0mm
May Mean Rainfall	72.1mm
June Mean Rainfall	75.1mm
July Mean Rainfall	57.2mm
August Mean Rainfall	50.5mm
September Mean Rainfall	47.2mm
October Mean Rainfall	59.2mm
November Mean Rainfall	72.1mm
December Mean Rainfall	75.0mm
 Mean Annual Rainfall	 868.9mm
 Mean Rain Days > 1mm	 84

2.4 Catchment Data

Catchment data for the proposed Kmart development has been sourced from the architectural drawings prepared by Australand Holdings Limited. A summary of the catchment data is as follows;

Total Roof Area	49,850m ² (warehouse only)
Collectable Catchment	15%
Catchment Area	7,477.5m ² (minimum roof area required to be connected to rainwater tank)
Run-off Coefficient	0.8

The total available rainfall harvesting supply with these parameters has been estimated at 91.92kL per week throughout the development.

3 Water Supply Options

For the Base Case model, all of the water consumed within the development is potable water drawn from the local Authority potable water supply infrastructure. However not all of the processes generating water consumption throughout the development require a water supply of potable quality (suitable for drinking).

A summary of the water quality requirements for the various building uses detailed within this report is provided below;

Building Use	Water Quality
Toilet Flushing	Non-Potable
Urinal Flushing	Non-Potable
Tapware	Potable
Showers	Potable
Irrigation	Non-Potable
Fire Services	Non-Potable

The range of potential water supply options considered within this report are listed below;

- Potable Authority Mains Water (potable)
- Non-Potable Authority Mains Water (non-potable)
- Stormwater Harvesting (non-potable)

3.1 Potable Authority Mains Water

Potable mains water is traditionally used to supply all of the water requirements within a building. It is of a quality suitable for drinking, and therefore exceeds the quality requirements of many water consuming processes within a building.

Regardless of various water saving initiatives that may be employed within a development, a potable mains water connection will always be required to supply the potable water requirements of the building and to provide a back-up water supply to any non-potable water supplies sources.

3.2 Non-Potable Authority Mains Water

Non-potable mains water is available in some locations and can be used to supply all of the non-potable water requirements within a building. It is of a quality unsuitable for drinking, and therefore requires careful planning regarding its application and integration into developments in order to avoid cross connections and potential contamination of any potable water supplies.

Non-potable mains water cannot be considered for the proposed Kmart development, as the local water supply authority do not currently provide a non-potable water supply.

3.3 Stormwater Harvesting

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

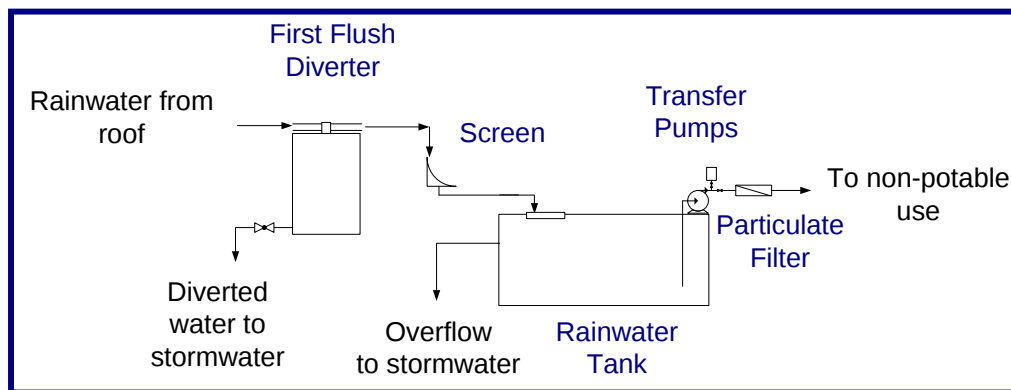
- Rainwater collected from roof areas is generally less polluted than general stormwater drainage.

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.

The use of rainwater harvesting reduces potable water demand within the development, and the amount of stormwater runoff generated by the development. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

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 roof collection point to 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.

4 Base Case Evaluation

4.1 Base Case Indoor Water Requirements

Indoor potable cold water consumption for the proposed Kmart development at Eastern Creek, has been modelled based upon Version 1 the Green Star Industrial Potable Water Calculator. Specifically the base model has been developed upon following information;

- 3 Star WELS rated water closets, having an average volume per flush of 4 litres.
- 3 Star WELS rated urinals, having an average volume per flush of 2 litres.
- 3 Star WELS rated tapware, having a flow rate of 9 litres per minute.
- 3 Star WELS rated showers, having a flow rate of 9.0 litres per minute.
- Assuming 1 credit points for the Tra-3 option

The indoor water demand with these parameters has been estimated at 55.220kL per week throughout the development.

4.2 Base Case Outdoor Water Requirements

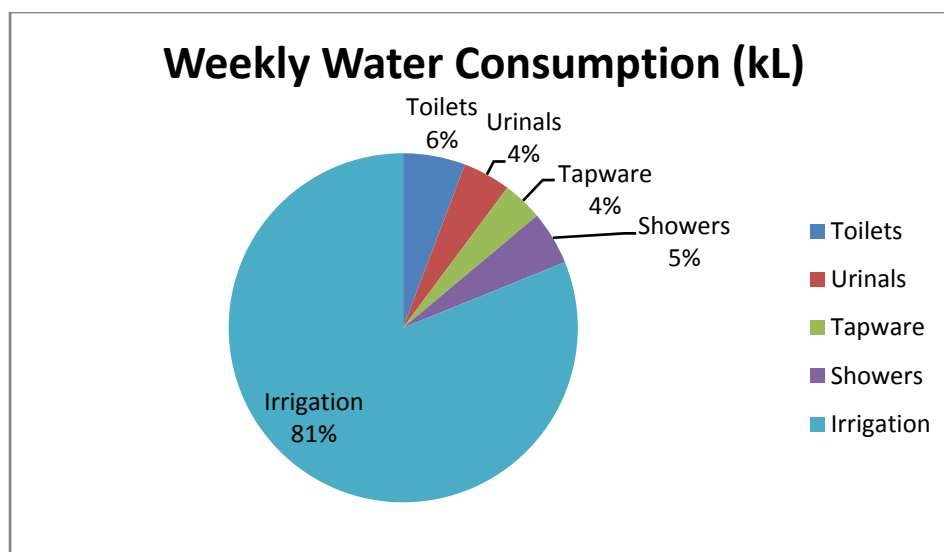
Water consumption within each landscape irrigation system varies depending upon the nature of the irrigation system, species of planting, and the prevailing climate. For the proposed Kmart development the base case outdoor water demand has been developed using following information;

- Irrigation area of approximately 9,500m²
- Irrigation rate 25mm/m²
- Irrigation application once a week

The outdoor water demand with these parameters has been estimated at 237.500kL per week throughout the development.

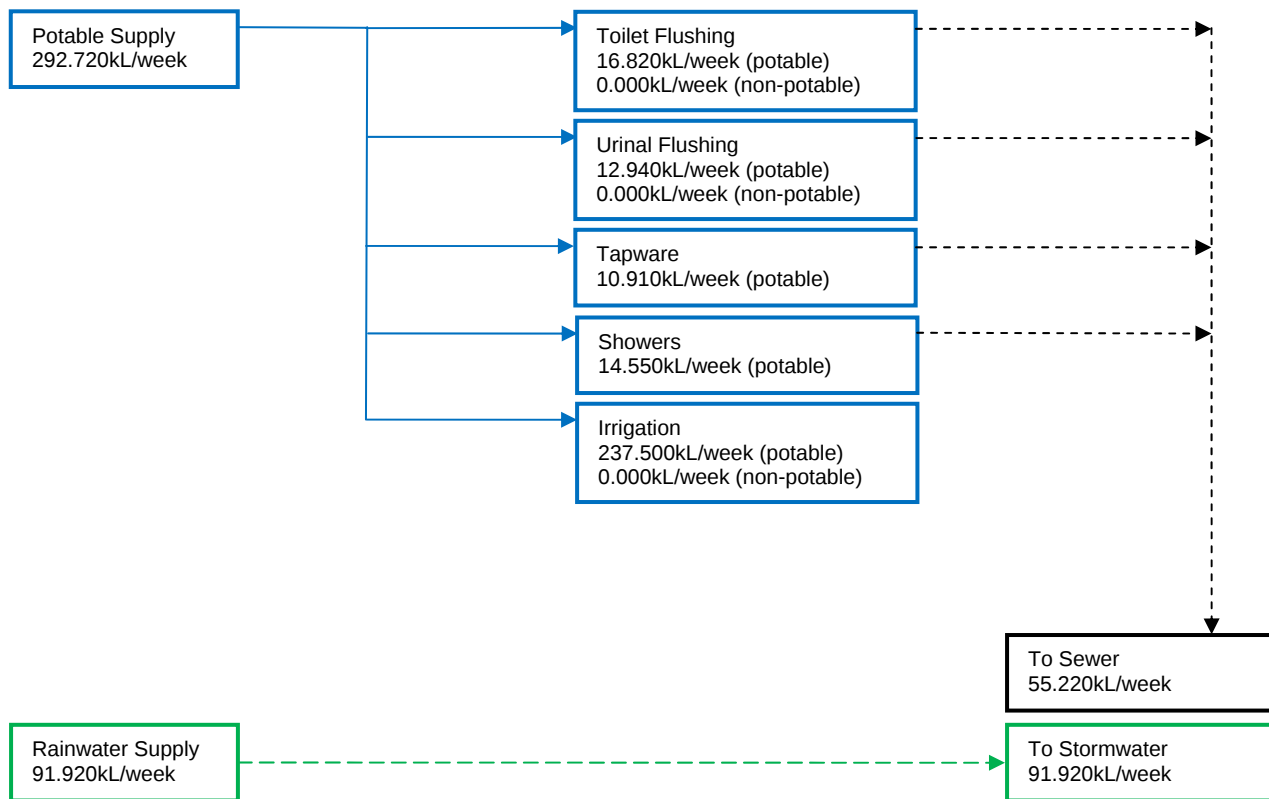
4.3 Total Base Case Water Consumption

Based on the estimated indoor water requirements of 55.220kL per week, and the estimated outdoor water requirements of 237.500kL per week, the total base water consumption for this development will be 292.720kL per week.



Base Case Water Consumption

4.4 Base Case Water Supply Schematic Diagram



4.5 Overview

- Potable water from the Authority mains is supplied for all water consumption.
- A rainwater harvesting system is not provided.
- 3 Star WELS rated toilets have been included.
- 3 Star WELS rated urinals have been included.
- 3 Star WELS rated tapware has been included.
- 3 Star WELS rated showers have been included.
- 1 Credit for the Tra-3 option has been included.
- Landscape irrigation water supply is provided from the potable water supply.
- Mechanical services water supply is provided in accordance with WAT-4 requirements.
- Fire services test water is recycled in accordance with WAT-5 requirements.

4.6 Environmental Assessment

Potable Water Consumption	292.720kL/week
Wastewater Discharge	55.220kL/week
Stormwater Discharge	91.920kL/week

5 Water Efficiency Evaluation

5.1 Water Efficiency Indoor Water Requirements

Indoor potable cold water consumption for the proposed Kmart development at Eastern Creek, has been modelled based upon Version 1 the Green Star Industrial Potable Water Calculator. Specifically the water efficiency model has been developed upon following information;

- 4 Star WELS rated water closets, having an average volume per flush of 3.5 litres.
- 5 Star WELS rated urinals, having an average volume per flush of 1 litres.
- 5 Star WELS rated tapware, having a flow rate of 6 litres per minute.
- 3 Star WELS rated showers, having a flow rate of 9.0 litres per minute.
- Assuming 1 credit points for the Tra-3 option

The indoor water demand with these parameters has been estimated at 43.010kL per week throughout the development.

5.2 Water Efficiency Outdoor Water Requirements

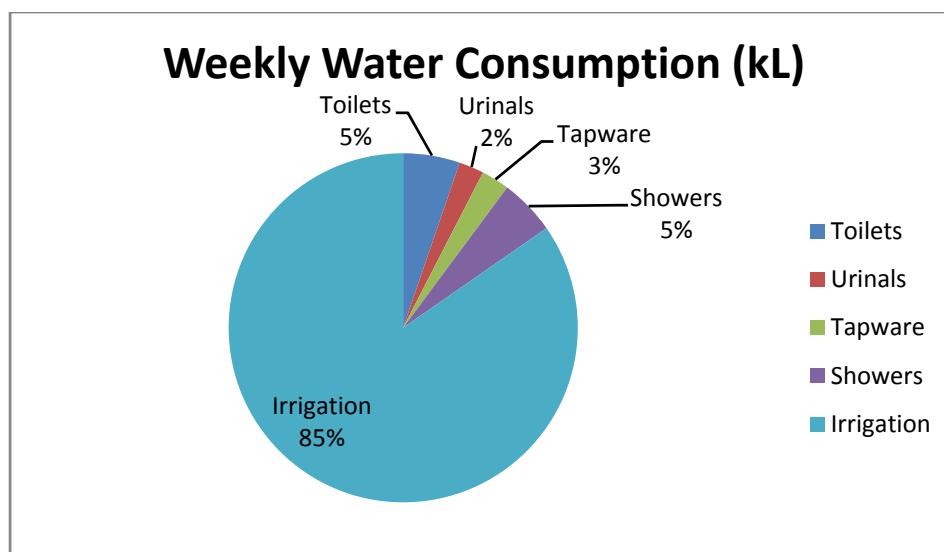
Water consumption within each landscape irrigation system varies depending upon the nature of the irrigation system, species of planting, and the prevailing climate. For the proposed Kmart development the water efficiency outdoor water demand has been developed using following information;

- Irrigation area of approximately 9,500m²
- Irrigation rate 25mm/m²
- Irrigation application once a week

The outdoor water demand with these parameters has been estimated at 237.500kL per week throughout the development.

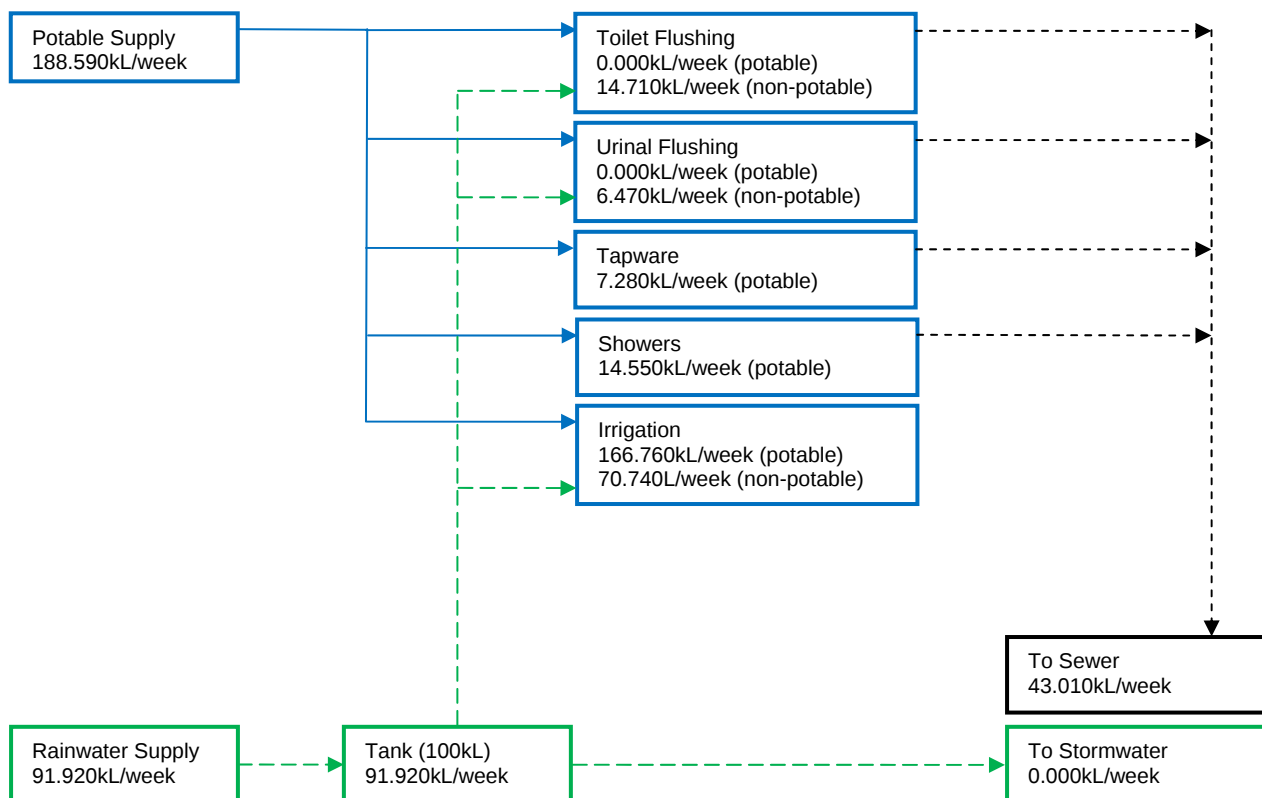
5.3 Total Water Efficiency Water Consumption

Based on the estimated indoor water requirements of 43.010kL per week, and the estimated outdoor water requirements of 237.500kL per week, the total water efficiency model water consumption for this development will be 280.510kL per week.



Water Efficiency Water Consumption

5.4 Water Supply Schematic Diagram



5.5 Overview

- Potable water from the Authority mains is supplied for all water consumption.
- A 100kL rainwater harvesting system is provided.
- 100% of toilet flushing requirements are supplied by rainwater harvesting.
- 100% of urinal flushing requirements are supplied by rainwater harvesting.
- 4 Star WELS rated toilets have been included.
- 5 Star WELS rated urinals have been included.
- 5 Star WELS rated tapware has been included.
- 3 Star WELS rated showers have been included.
- 1 Credit for the Tra-3 option has been included.
- 29.7% of landscape irrigation requirements are supplied by rainwater harvesting.
- Mechanical services water supply is provided in accordance with WAT-4 requirements.
- Fire services test water is recycled in accordance with WAT-5 requirements.

5.6 Environmental Assessment

Potable Water Consumption	188.590kL/week Saving 104.130kL/week 35.5% of base case mode
Rainwater Water Consumption	91.920kL/week 100.0% of available supply
Wastewater Discharge	43.010kL/week Saving 12.210kL/year 22.1% of base case model
Stormwater Discharge	0.000kL/week Saving 91.920kL/week 100.0% of base case model

6 Summary

We recommend that the following water efficiency measures be incorporated into the proposed Kmart development;

- A rainwater harvesting system including a 100kL rainwater storage tank.

We confirm that the recommended water efficiency measures will meet the required performance benchmarks for this development as follows;

Requirement	Recommended Measures	Comment
35% reduction of potable cold water consumption in accordance with the Water Sustainability Statement of Cooperation determined between Sydney Water and Australand Holdings Limited.	100kL Rainwater Harvesting System 4 Star WELS rated toilets throughout the development. 5 Star WELS rated urinals throughout the development. 5 Star WELS rated tapware throughout the development. 3 Star WELS rated showers throughout the development.	Recommended water efficiency measures have been demonstrated to achieve an 35.5% reduction in potable cold water consumption.
Clause 7.2 - Water Conservation, of SEPP 59 – Eastern Creek Precinct Plan (Stage 3) a) Development should incorporate water efficient fixtures such as taps, showerheads, and toilet suites (cisterns and urinals). The fixtures must be rated to at least AAA under the National Water Conservation Rating and Labelling Scheme	Star WELS rated toilets throughout the development. 5 Star WELS rated urinals throughout the development. 5 Star WELS rated tapware throughout the development. 3 Star WELS rated showers throughout the development.	Recommended WELS ratings for fixtures and tapware comply with this requirement.
Clause 7.2 - Water Conservation, of SEPP 59 – Eastern Creek Precinct Plan (Stage 3) b) Development Applications are required to submit a Site Water Management Plan that investigates, and where feasible, provides for the integrated management and use of water.	Adoption of this Water Management Report	This Water Management Report addresses the integrated management and use of water throughout the development.
Clause 20 – Ecologically Sustainable Development, of the State Environmental Planning Policy (Western Sydney Employment Area) The consent Authority must not grant consent to development on land which this Policy applies unless it is satisfied that the development contains measures designed to minimise; (a) The consumption of potable water (b) Greenhouse gas emissions	100kL Rainwater Harvesting System 4 Star WELS rated toilets throughout the development. 5 Star WELS rated urinals throughout the development. 5 Star WELS rated tapware throughout the development. 3 Star WELS rated showers throughout the development.	Recommended water efficiency measures have been demonstrated to achieve an 35.5% reduction in potable cold water consumption.
Clause 22 – Rainwater	100kL Rainwater Harvesting	Recommended water efficiency

Harvesting, of the State Environmental Planning Policy (Western Sydney Employment Area) The consent Authority must not grant consent to development on land to which this Policy applies unless it is satisfied that adequate arrangements will be made to connect roof areas of buildings to such rainwater harvesting scheme (if any) as may be approved by the Director General	System	measures include a rainwater harvesting system in accordance with this requirement.
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7 Appendix A – Rainfall Data

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Climate statistics for Australian locations

Monthly climate statistics

All years of record

Site information

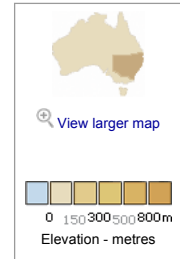
Site name: PROSPECT RESERVOIR
Site number: 067019
Latitude: 33.82 °S **Longitude:** 150.91 °E
Elevation: 61 m
Commenced: 1887 **Status:** Open
Latest available data: 02 Jun 2010

Additional information

[Additional site information](#)

Nearest alternative sites

1. 067026 SEVEN HILLS (COLLINS ST) (5.7km)
2. 067119 HORSLEY PARK EQUESTRIAN CENTRE AWS (6.2km)
3. 066046 PARRAMATTA (8.0km)



☐ ☐ ☐ **View:** ☒ Main statistics ☐ All available | **Period:** Use all years of data | **Text size:** ☒ Normal ☐ Large

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Temperature														
Mean maximum temperature (°C)	28.3	27.9	26.3	23.7	20.3	17.3	16.8	18.7	21.3	23.7	25.3	27.4	23.1	44 1965 2010
Mean minimum temperature (°C)	17.6	17.7	16.1	13.0	10.0	7.4	6.1	6.8	9.4	12.1	14.2	16.3	12.2	44 1965 2010
Rainfall														
Mean rainfall (mm)	93.9	96.6	95.7	74.0	72.1	75.1	57.2	50.5	47.2	59.2	72.1	75.0	868.9	123 1887 2010
Decile 5 (median) rainfall (mm)	72.6	73.1	77.5	54.8	39.9	39.0	32.9	30.9	40.9	43.4	60.1	57.0	843.5	123 1887 2010
Mean number of days of rain ≥ 1 mm	8.0	8.2	8.3	7.0	6.5	6.9	5.6	5.8	6.2	6.8	7.2	7.5	84.0	123 1887 2010
Other daily elements														
Mean daily sunshine (hours)														
Mean number of clear days	6.6	5.0	6.7	8.8	9.0	10.0	11.3	13.2	11.4	8.3	6.8	7.1	104.2	33 1968 2001
Mean number of cloudy days	12.6	11.7	11.7	8.0	9.5	8.3	6.6	6.3	7.1	9.2	10.6	10.5	112.1	33 1968 2001
9 am conditions														
Mean 9am temperature (°C)	21.3	21.0	19.6	16.9	13.5	10.7	9.6	11.1	14.5	17.4	18.4	20.6	16.2	41 1968 2010
Mean 9am relative humidity (%)	75	79	79	77	80	79	76	70	65	65	70	70	74	36 1974 2010
Mean 9am wind speed (km/h)	7.5	7.0	7.3	8.0	7.7	8.1	8.2	9.3	9.8	10.0	8.5	8.2	8.3	43 1965 2010
3 pm conditions														
Mean 3pm temperature (°C)	26.8	26.3	24.8	22.4	19.2	16.5	15.9	17.4	19.6	22.1	23.4	25.9	21.7	33 1968 2001
Mean 3pm relative humidity (%)	52	54	55	52	57	55	50	45	45	46	50	49	51	28 1974 2001
Mean 3pm wind speed (km/h)	12.7	12.4	12.0	11.5	10.3	12.3	12.4	14.3	15.3	15.4	14.4	14.5	13.1	30 1968 2001

red = highest value blue = lowest value

Product IDCJCM0028 Prepared at Thu 03 Jun 2010 04:25:00 AM EST

Monthly statistics are only included if there are more than 10 years of data. The number of years (provided in the 2nd last column of the table) may differ between elements if the observing program at the site changed. More detailed data for individual sites can be obtained by contacting the Bureau.

Related Links

- This page URL: http://www.bom.gov.au/climate/averages/tables/cw_067019.shtml
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8 Appendix B – Base Case Green Star Summary

Green Star – Industrial v1

Points Achieved

1

Potable Water Calculator

Outputs from this calculator required for Ene-Conditional Requirement and Ene-1: Greenhouse Gas Emissions.

The annual domestic hot water usage figures determined in this calculator **must be used in the energy modelling required for Ene-Conditional Requirement and Ene-1: Greenhouse Gas Emissions** to estimate the domestic hot water energy requirement of the Proposed and Standard Practice Buildings. For more details see the Green Star - Industrial v1 Greenhouse Gas Emissions Calculator Guide, available www.gbca.org.au.

The estimates of annual hot water consumption usage of the Proposed Building are based on the water efficiency of the fittings entered into this calculator. The estimates for the Standard Practice Building are based on the Standard Practice Building's fittings - for further details see the Green Star - Industrial v1 Potable Water Calculator Guide, available www.gbca.org.au.

	Proposed Building	Standard Practice Building
Annual Domestic Hot Water Usage (L/year)	663,981	663,981

NOTE: THESE FIGURES CAN ONLY BE USED IF the 'Building input, areas and operation' and 'Water consumption due to fittings' sections of THIS CALCULATOR are FULLY COMPLETED.

BUILDING INPUT, AREAS AND OPERATION

Space Type	Area (m ²)	Days of Operation	Schedule of operation	Maximum Design Occupancy used in water use calculations (m ² /person) (Enter manually OR use default)	
				Manual entry	Default Design Occupancy
Office	1735	7 days a week	24 hour work space	43.375	Manually entered figure is used in the calculations
Warehouse	49850	7 days a week	24 hour work space	276.944	Manually entered figure is used in the calculations
Manufacturing/Process Area		Please Select	Please Select		5
Laboratory/Clean room/Workshop		Please Select	Please Select		10
Kitchens		Please Select	Normal working day for Kitchen		10
Retail/Factory Shop/Showroom		Please Select	Normal working day for Retail/Factory Shop/Showroom		5

Washdown		Please Select	Normal working day
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WATER CONSUMPTION DUE TO FITTINGS:

	Water Efficiency (Enter manually OR nominate WELS star rating)		Resulting water efficiency used in calculator (l/min, except for toilets, L/flush)	Percentage of Each Type	Calculated Water Consumption (kL/week)
	Manual entry from Manufacturer's data sheet (l/min, except for toilets, L/flush)	WELS Star rating selection			
Toilets					
Standard		3 Star	4.0	100%	
Water Efficient		4 Star	3.5	0%	
<enter description>		Select star rating			
<enter description>		Select star rating			
Total				100%	16.82

Are Urinals installed?	Yes
------------------------	-----

Urinals				
Standard		3 Star	2	100%
Water Efficient		5 Star	1	0%
<enter description here>		Select star rating		
<enter description here>		Select star rating		

Urinals on auto timer	Enter average L/flush			
	Enter number of urinals on autotimer			
	Enter percentage of urinals on auto timer			
Total			100%	12.94

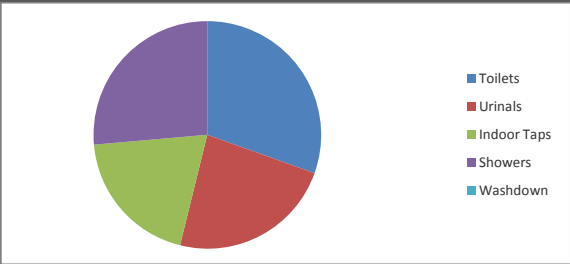
Indoor Taps				
Standard		3 Star	9	100%
Water Efficient		5 Star	6	0%

<enter description>		Select star rating			
<enter description>		Select star rating			
			Total	100%	10.91

	Shower Demand: cyclists and gym users		Tra-3: 1 credit achieved (or gym provided)		
Showers					
Standard		3 Star	9	0%	
Water Efficient		3 Star	9	100%	
<enter description>		Select star rating			
<enter description>		Select star rating			
			Total	100%	14.55

Washdown	L/min	Number of Hoses	
<enter description>			
<enter description>			
<enter description>			
<enter description>			
	Total	0	0.00

Toilets	16.82
Urinals	12.94
Indoor Taps	10.91
Showers	14.55
Washdown	0.00
Total Water Consumption (kL/Week)	55.22



WATER RECYCLING AND REUSE

Predicted Recycling Water Demand other than Fixtures and Fittings

Is recycled water used for Irrigation, heat rejection or fire system testing? (if "Yes", enter below TOTAL water demand regardless of whether the source of this water will be recycled or mains water)	Yes
Enter TOTAL water demand for irrigation (kL/week)	237.5
Enter TOTAL water demand for heat rejection (kL/week)	0
Enter TOTAL water demand for fire system testing (kL/week)	0

RAINWATER

Are there any rainwater collection and re-use systems installed that comply with local EPA requirements?	No
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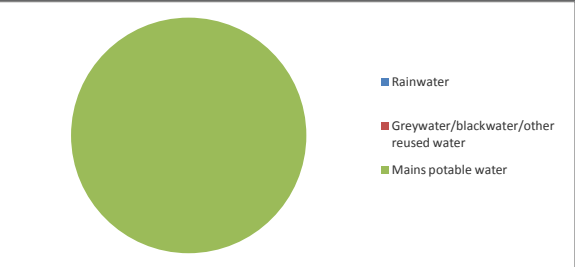
GREYWATER AND BLACKWATER AND OTHER REUSED, NON-MAINS, WATER

Potable water reduction due to Reuse of Greywater and Blackwater or other non-mains water

Are there any greywater/blackwater collection and re-use systems installed, or other reused (non-mains) water supplied to the site, and, if yes, do these comply with local EPA requirements?	No
---	----

RESULTS

Rainwater Greywater/blackwater/other reused water Mains potable	Potable water demand from toilets, urinals, indoor taps, showers and washdown (kL/week)	55.22
	Rainwater used for toilets, urinals, indoor taps, showers and washdown (kL/week)	0.00
	Greywater/blackwater/other reused water used for toilets, urinals, indoor taps, showers and washdown (kL/week)	0.00
	Estimated Total Potable Water Consumption (kL/week)	55.22



Points Achieved	1
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Points Allocation	
kL/week	Points Achieved
55.22	1
48.31	2
41.40	3
34.49	4
27.58	5

9 Appendix C – Water Efficient Green Star Summary

Potable Water Calculator

Outputs from this calculator required for Ene-Conditional Requirement and Ene-1: Greenhouse Gas Emissions.

The annual domestic hot water usage figures determined in this calculator **must be used in the energy modelling required for Ene-Conditional Requirement and Ene-1: Greenhouse Gas Emissions** to estimate the domestic hot water energy requirement of the Proposed and Standard Practice Buildings. For more details see the Green Star - Industrial v1 Greenhouse Gas Emissions Calculator Guide, available www.gbca.org.au.

The estimates of annual hot water consumption usage of the Proposed Building are based on the water efficiency of the fittings entered into this calculator. The estimates for the Standard Practice Building are based on the Standard Practice Building's fittings - for further details see the Green Star - Industrial v1 Potable Water Calculator Guide, available www.gbca.org.au.

	Proposed Building	Standard Practice Building
Annual Domestic Hot Water Usage (L/year)	569,127	663,981

NOTE: THESE FIGURES CAN ONLY BE USED IF the 'Building input, areas and operation' and 'Water consumption due to fittings' sections of THIS CALCULATOR are FULLY COMPLETED.

BUILDING INPUT, AREAS AND OPERATION

Space Type	Area (m ²)	Days of Operation	Schedule of operation	Maximum Design Occupancy used in water use calculations (m ² /person) (Enter manually OR use default)	
				Manual entry	Default Design Occupancy
Office	1735	7 days a week	24 hour work space	43.375	Manually entered figure is used in the calculations
Warehouse	49850	7 days a week	24 hour work space	276.944	Manually entered figure is used in the calculations
Manufacturing/Process Area		Please Select	Please Select		5
Laboratory/Clean room/Workshop		Please Select	Please Select		10
Kitchens		Please Select	Normal working day for Kitchen		10
Retail/Factory Shop/Showroom		Please Select	Normal working day for Retail/Factory Shop/Showroom		5
Washdown		Please Select	Normal working day		

WATER CONSUMPTION DUE TO FITTINGS:

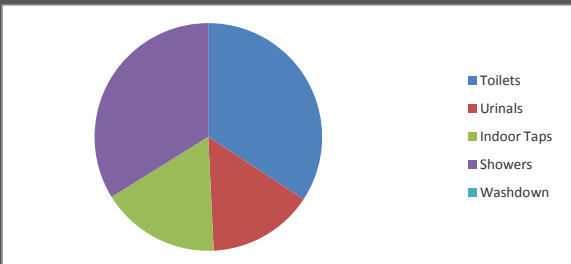
		Water Efficiency (Enter manually OR nominate WELS star rating)		Resulting water efficiency used in calculator (l/min, except for toilets, L/flush)	Percentage of Each Type	Calculated Water Consumption (kL/week)
	Manual entry from Manufacturer's data sheet (l/min, except for toilets, L/flush)	WELS Star rating selection				
Toilets						
Standard			3 Star	4.0	0%	14.71
Water Efficient			4 Star	3.5	100%	
<enter description>			Select star rating			
<enter description>			Select star rating			
				Total	100%	
		Are Urinals installed?		Yes		
Urinals						
Standard			3 Star	2	0%	6.47
Water Efficient			5 Star	1	100%	
<enter description here>			Select star rating			
<enter description here>			Select star rating			
		Urinals on auto timer		Enter average L/flush		
				Enter number of urinals on autotimer		
				Enter percentage of urinals on auto timer		
				Total	100%	
Indoor Taps						
Standard			3 Star	9	0%	
Water Efficient			5 Star	6	100%	

<enter description>		Select star rating			
<enter description>		Select star rating			
			Total	100%	7.28

Shower Demand: cyclists and gym users			Tra-3: 1 credit achieved (or gym provided)		
Showers					
Standard		3 Star	9	0%	
Water Efficient		3 Star	9	100%	
<enter description>		Select star rating			
<enter description>		Select star rating			
			Total	100%	14.55

Washdown	L/min	Number of Hoses			
<enter description>					
<enter description>					
<enter description>					
<enter description>					
		Total	0	0.00	

Toilets	14.71
Urinals	6.47
Indoor Taps	7.28
Showers	14.55
Washdown	0.00
Total Water Consumption (kL/Week)	43.01



WATER RECYCLING AND REUSE

Predicted Recycling Water Demand other than Fixtures and Fittings	
Is recycled water used for Irrigation, heat rejection or fire system testing? (if "Yes", enter below TOTAL water demand regardless of whether the source of this water will be recycled or mains water)	Yes
Enter TOTAL water demand for irrigation (kL/week)	237.5
Enter TOTAL water demand for heat rejection (kL/week)	0
Enter TOTAL water demand for fire system testing (kL/week)	0

RAINWATER

Are there any rainwater collection and re-use systems installed that comply with local EPA requirements?	Yes
Do you want to use the Green Star Simple Rainwater Calculator?	Yes

Please use the Simple Rainwater Calculator below

Simple Rainwater Calculator

Monthly Average Rainfall (mm) - Link to Bureau of Meterology: http://www.bom.gov.au/climate/averages/			
January	93.9	July	57.2
February	96.6	August	50.5
March	95.7	September	47.2
April	74	October	59.2
May	72.1	November	72.1
June	75.1	December	75
		Yearly Raindays >1mm	84

Rainfall collection area (m2)		7477.5
Run-off co-efficient	Flat non-absorbent roof < 30° Pitch	0.8
Storage capacity (kL)		100

Rainwater Uses

Percentage of toilets flushed using rainwater	100%
Percentage of urinals flushed using rainwater	100%
Percentage of indoor taps using rainwater	0%
Percentage of showers using rainwater	0%
Percentage of washdown using rainwater	0%

Percentage of irrigation using rainwater	100%
Percentage of heat rejection systems using rainwater	0%
Percentage of fire system testing using rainwater	0%
Rainwater uses for any other purposes (kL/week)	0

Documentation must be provided that the harvested rainwater is treated to a water quality that is fit for its purpose.

Rainwater available for ALL uses (kL/week)	91.92
Rainwater available for fittings (toilets, urinals, showers, taps, washdown) (kL/week)	0.00

Rainwater used by fittings (toilets, urinals, showers, taps, washdown) (kL/week)	0.00
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Rainwater demand from irrigation, heat rejection, fire system testing and other purposes, is greater than total rainwater supply.

	Demand for rainwater (kL/Week)
	14.71
	6.47
	0.00
	0.00
	0.00
Subtotal	21.18
	237.50
	0.00
	0.00
	0.00
Subtotal	237.50
Total Demand for rainwater (kL/week)	258.68

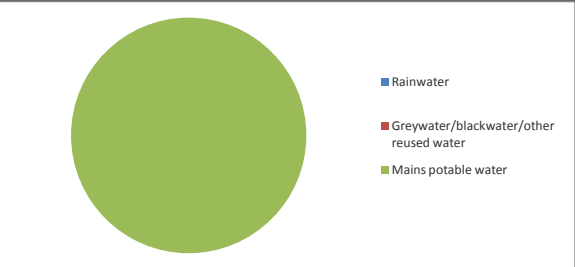
GREYWATER AND BLACKWATER AND OTHER REUSED, NON-MAINS, WATER

Potable water reduction due to Reuse of Greywater and Blackwater or other non-mains water

Are there any greywater/blackwater collection and re-use systems installed, or other reused (non-mains) water supplied to the site, and, if yes, do these comply with local EPA requirements?	No
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RESULTS

Rainwater Greywater/blackwater Mains potable	Potable water demand from toilets, urinals, indoor taps, showers and washdown (kL/week)	43.01
	Rainwater used for toilets, urinals, indoor taps, showers and washdown (kL/week)	0.00
	Greywater/blackwater/other reused water used for toilets, urinals, indoor taps, showers and washdown (kL/week)	0.00
	Estimated Total Potable Water Consumption (kL/week)	43.01



Points Achieved	2
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Points Allocation	
kL/week	Points Achieved
55.22	1
48.31	2
41.40	3
34.49	4
27.58	5