

New Public School, Smalls Road, Ryde

Water Management Plan Report

Prepared for:

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1. Introduction

The purpose of this report is to advise on the proposed hydraulic reticulation strategy for the provision of:

- Rainwater/Stormwater Harvesting & Treatment
- Irrigation Water Supply
- Recycled water supply for sanitary toilet flushing

2. Executive summary

This report has been produced to summarise the overall re-use water management strategy for the proposed master plan layout regarding the New Public School, Smalls Road premises. The outcomes of this report will determine the scope of works and corresponding responsibilities for the respective parties.

3. Proposed Development

3.1 Property Detail

The site is located at 12 Smalls Road, Ryde. The site is located within the City of Ryde Area. The site covers an area of approximately 0.57 Ha.

The site is composed of three individual lots that include

- Lot 1 DP797483,
- Lot 1 DP797484,
- Lot 8 DP 821649.

The site is currently in use and in operation by the Department of Education.

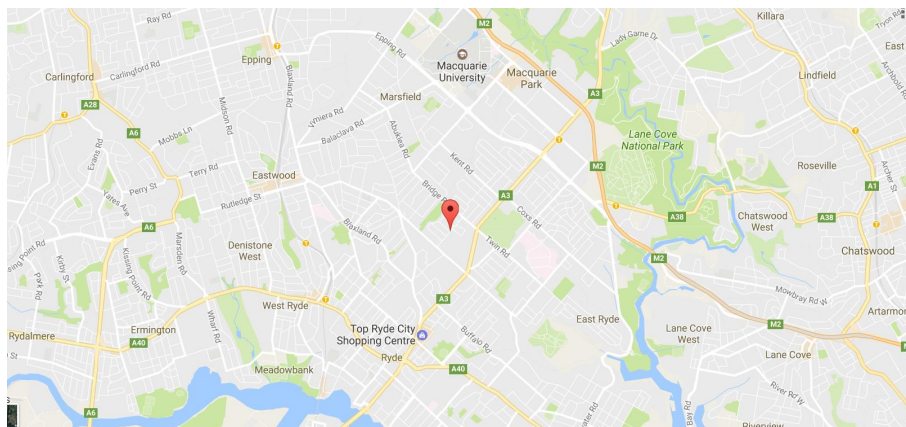


Figure 1 –Site Context

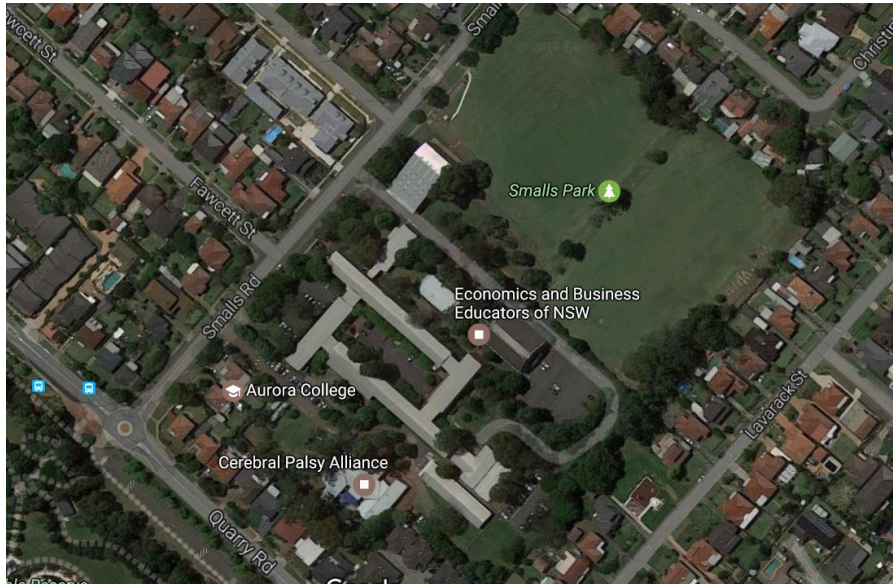


Figure 2 –Project Location

4. Basis of Information

This report is based on the following sources of information:

- Dial Before You Dig information
- Services Survey information
- Proposed Site Plans and relevant information provided by Conrad Gargett Architects
- Green Star and ESD Report prepared by Conrad Gargett Architects

Limitations of this report are as follows:

- All information provided by others, particularly verbal information has been taken at face value.
- No formal discussions with Authorities (feedback only available through a formal submission)

5. Hydraulic Services

5.1 Rain Water Reuse

5.1.1 Proposed Reticulation

It is proposed to harvest and maximize the use of rainwater from new proposed school building roof. The rainwater harvested from the roof can be used for irrigation and toilet flushing within the development. The harvesting tank will require treatment and pressure boosting (pump outs) before reticulation.

5.1.2 Rainwater reuse Potentials

The harvested rainwater can be used for two main purposes, toilet flushing and irrigation. The anticipated average water demand for toilet flushing of the development based on school's capacity of 1000 students plus 70 staff is close to 2,700,000 liters annually.

Annual water consumption for irrigation purposes is expected to be close to 18,000,000 liters.

The Green Star and ESD report drafted by Conrad and Garget architects nominates 10L/sqm of Gross Floor Area as the benchmark for Water Credit points and considering the total GFA of 6,460 a 65 kL rainwater harvesting tank will satisfy this requirement.

Considering the average rainfall intensity in Sydney during different months, a 65,000 liters rainwater re-use tank will cater for %28 (on average) of the total toilet flushing and irrigation demand.

Increasing the capacity of the tank will allow to harvest larger volume of water during the period of rainfall and hence will increase the overall water re-use capacity for the school. A number of calculations were performed to determine the optimum capacity of the rainwater harvesting tank for the project. According to this study, a 200,000 liters tank will maximize the use of rainwater by catering for 85% of the total toilet flushing and irrigation demand.

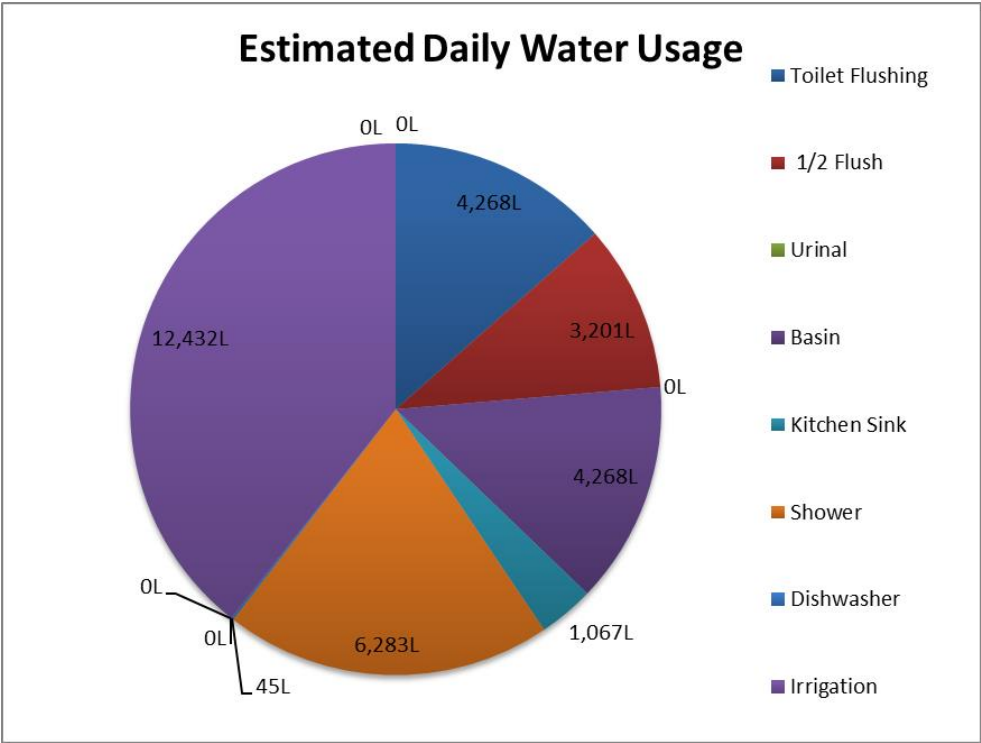
We anticipate the incoming rainwater lines to be pre-treated with a first flush device and a gross pollutant trap to remove any large debris before entering the harvesting tanks.

The pressure boosting service will require automatic backwash filtration to eliminate any clay or debris entering the reticulated rainwater re-use system.

6. Appendices

6.1 Water Usage Calculations

Estimated Water Usage										
Predicted Population Figures =	0	Residents	1000	Students		70	Staff			
One kilolitre is 1,000L										
										
	RAINWATER	RAINWATER	RAINWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	RAINWATER	RAINWATER	RAINWATER
Water Used	Toilet Flushing	1/2 Flush	Urinal	Basin	Kitchen Sink	Shower	Dishwasher	Washing Machine	Mechanical Plant	Irrigation
Litres of Water Per Usage	4L	3L	1L	2L	10L	90L	15L	50L	L	12466L
Days used per week	7	7	7	7	7	7	3	0	0	7
Typical usage per Person Per Day	1	1	0	2	1	1	1	1	1	1
Number of people	1,070	1,070	1,070	1,070	107	70	7	0	0	1
Total Usage Number Per Person in one year	389480	389480	0	778960	38948	25480	1092	0	0	364
Total Usage in one year	1,557,920L	1,168,440L	0L	1,557,920L	389,480L	2,293,200L	16,380L	0L	0L	4,537,624L
KiloLitres of Water Per Year	1,558KL	1,168KL	0KL	1,558KL	389KL	2,293KL	16KL	0KL	0KL	4,538KL
Litres of Water Per Day	4,268L	3,201L	0L	4,268L	1,067L	6,283L	45L	0L	0L	12,432L
Rainwater Used	1,558KL	1,168KL	0KL	0KL	0KL	0KL	0KL	0KL	0KL	4,538KL



6.2 Rainwater re-use based on 65kL harvesting tank

	Tank Size:	65,000L											
	Area:	Sydney											
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	102.5	117.9	130.3	128.1	121.5	130.6	97.6	81.9	69.2	77	83.6	78.1	1215.7
	246000L	282960L	312720L	302640L	291600L	313440L	234240L	196560L	166080L	184800L	200640L	187440L	2917680L
Average Daily Usage	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L
Average Daily Capture (Based on Tank Size)	2097L	2321L	2097L	2167L	2097L	2167L	2097L	2097L	2167L	2097L	2167L	2097L	2139L
Average Daily Capture (Based on Roof Area)	7935L	10106L	10088L	10088L	9406L	10448L	7556L	6341L	5536L	5961L	6688L	6046L	8017L
Efficiency Based on Roof Capture	40%	51%	51%	51%	47%	52%	38%	32%	28%	30%	34%	30%	40%
Efficiency Based on Tank Size	11%	12%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Daily Overflow	5,839L	7,784L	7,991L	7,921L	7,318L	8,281L	5,459L	4,244L	3,369L	3,865L	4,521L	3,950L	
Monthly Overflow With Usage	181,000L	217,950L	247,720L	237,640L	226,600L	248,440L	169,240L	131,560L	101,080L	119,800L	135,640L	122,440L	
Daily Overflow Without Any Usage	7,935L	10,106L	10,088L	10,088L	9,406L	10,448L	7,556L	6,341L	5,536L	5,961L	6,688L	6,046L	
Monthly Overflow Without Any Usage	246,000L	282,960L	312,720L	302,640L	291,600L	313,440L	234,240L	196,560L	166,080L	184,800L	200,640L	187,440L	
Annual Overflow With Usage	2,139KL												
Annual Overflow Without Any Usage	2,919KL												
Annual Overflow Reduced By	26.7%												

6.3 Rainwater re-use based on 200kL harvesting tank

	Tank Size:	200,000L											
	Area:	Sydney											
	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	102.5	117.9	130.3	128.1	121.5	130.6	97.6	81.9	69.2	77	83.6	78.1	1215.7
	246000L	282960L	312720L	302640L	291600L	313440L	234240L	196560L	166080L	184800L	200640L	187440L	2917680L
Average Daily Usage	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L	19901L
Average Daily Capture (Based on Tank Size)	6452L	7143L	6452L	6667L	6452L	6667L	6452L	6667L	6452L	6667L	6452L	6667L	6581L
Average Daily Capture (Based on Roof Area)	7935L	10106L	10088L	10088L	9406L	10448L	7556L	6341L	5536L	5961L	6688L	6046L	8017L
Efficiency Based on Roof Capture	40%	51%	51%	51%	47%	52%	38%	32%	28%	30%	34%	30%	40%
Efficiency Based on Tank Size	32%	36%	32%	33%	32%	33%	32%	32%	33%	32%	33%	32%	32%
Daily Overflow	1,484L	2,963L	3,636L	3,421L	2,955L	3,781L	1,105L	OL	OL	OL	21L	OL	
Monthly Overflow With Usage	46,000L	82,960L	112,720L	102,640L	91,600L	113,440L	34,240L	OL	OL	OL	640L	OL	
Daily Overflow Without Any Usage	7,935L	10,106L	10,088L	10,088L	9,406L	10,448L	7,556L	6,341L	5,536L	5,961L	6,688L	6,046L	
Monthly Overflow Without Any Usage	246,000L	282,960L	312,720L	302,640L	291,600L	313,440L	234,240L	196,560L	166,080L	184,800L	200,640L	187,440L	
Annual Overflow With Usage	584KL												
Annual Overflow Without Any Usage	2,919KL												
Annual Overflow Reduced By	80.0%												