27-29 Tryon Road, Lindfield

Water Management Plan
SSD-78669234
Date: 2025.02.27
Prepared by Surex Consulting
For Bridgestone Projects Ltd

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1. Summary

1.1 Introduction

This report also aims to satisfy the requirements as outlined in the NSW Department of Planning for in-fill affordable housing, in particular Water Management Plan.

1.2 Background

This Water Management Report accompanies an Environmental Impact Statement (EIS) pursuant to Part 4 of the Environmental Planning and Assessment Act 1979(EP&A Act), in support of a State Significant Development Application (SSDA) for the construction of the proposed residential flat building, reference SSD-78669234.
This report addresses the Secretary's Environmental Assessment Requirements (SEARs) issued for the project, notably:

SEARs Requirement	Report Section
11. Water Management	**Section 2**

- Detail the proposed drainage design and servicing infrastructure to be incorporated as part of the development (stormwater and wastewater).
- Demonstrate how the development complies with council's drainage requirements and identify proposed stormwater treatment and water quality management measures to minimise adverse environmental impacts.

1.3 Water Consumption

Potable water consumption has been estimated throughout the development for the Base Building Assessment case to be used as a benchmark against which to compare the Efficiency Building Assessment of various potable water consumption reduction strategies that have been proposed.

1.4 Performance Summary

The Efficiency Building Assessment achieves an overall potable cold water consumption reduction of 28% when compared to the Base Building Assessment benchmark. The improvement in water efficiency is achieved via;

1. The installation or more water efficient fixtures and tapware.
2. The installation of a rainwater harvesting system (rainwater tank storage capacity sized to suit BASIX) supplying non-potable cold water to the landscape irrigation.

Option	Description	Annual Potable Water Consumption ion (KL)	Potable Cold-Water Reduction
Base Building Assessment	Base building used for benchmark potable cold-water consumption.	13,717	0%
Efficiency Building Assessment	Inclusion of water efficient fixtures and tapware, non-potable water supply (rainwater harvesting) to irrigation.	10,215	16%

1.5 Compliance Summary

The proposed development will need to comply with the following:

- National Construction Code – Volume 1 and 3,
- Relevant Australian Standards,
- Ku-ring-ga Council policies:
    - Ku-ring-ga Development Control Plan Part J: Building Sustainability 2025.

It is noted that Ku-ring-ga Council does not stipulate any water consumption targets other than compliance with Australian Standards and BASIX.

2. Water Supply

For the Base Building Assessment model, all the water consumed within the development is potable water drawn from the local Authority potable water supply infrastructure. However, not all 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
Irrigation	Non-Potable
Tapware	Potable
Showers	Potable

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

- Potable Authority Mains Water (potable),
- Rainwater Harvesting (non-potable).

2.1 Potable Authority Mains Water

Potable mains water has traditionally been used to meet all water requirements within a building. It is of a quality suitable for drinking and, as a result, exceeds the quality standards necessary for many water-consuming processes within the building.
Despite the implementation of various water-saving initiatives in a development, a potable mains water connection will always be necessary to supply the building's potable water needs. It will also serve as a backup water supply for any non-potable water systems.

2.2 Rainwater Harvesting

Rainwater harvesting involves collecting rainwater from the non-trafficable development's catchment areas. As required by the NCC, Volume 3, rainwater must be collected exclusively from roof areas.
Typically, the rainwater harvesting system consists of an in-line tank for the collection and storage of rainwater. When the rainwater storage tank reaches full capacity, excess water overflows via gravity into the stormwater drainage system. The stored rainwater is then pumped and distributed throughout the development via a dedicated non-potable water reticulation system.
Although the collected rainwater is not formally classified in terms of water quality, its use in irrigation systems is widely regarded as safe practice by all Australian Health Departments. Rainwater falling on roofs is typically soft, clear, and low in microbial and chemical contamination.
Simple, cost-effective rainwater collection and treatment systems ensure reliable operation and water quality for non-potable use. The main objective of rainwater treatment is to maintain high water quality in the storage tank. A typical rainwater treatment process includes the following steps:

1. **Primary treatment** via a first flush system before the water enters the storage tank.
2. **Media filtration** before the water enters the non-potable cold water reticulation system.
3. **UV treatment** before the water enters the non-potable cold water reticulation system.

Rainwater harvesting helps reduce potable water demand within the development and minimizes the overall stormwater runoff. By collecting rainwater from roof areas, rainwater tanks provide a valuable water source for toilet flushing and landscape irrigation.

Advantages of rainwater harvesting systems:

- Collected rainwater is of high quality, making it suitable for irrigation.
- It reduces potable water consumption.
- Ideal for buildings with a large roof footprint for rainwater collection.
- Low capital cost for installation.

Disadvantages of rainwater harvesting systems:

- Dependent on favourable climatic conditions for effective operation.
- Relatively inflexible, as they rely on gravity discharge from the roof collection point to the storage tank.
- Spatially inefficient, requiring larger storage volumes to account for periods with little or no rainfall.
- Requires a potable cold-water supply as a backup when the storage tank is depleted.

2.3 Rainfall Data

Rainfall data for the development has been sourced from the Bureau of Meteorology.

2.4 Catchment Data

Catchment data for the development has been sourced from the architectural drawings prepared by PTW. A summary of the catchment data is as follows;

Total Site Catchment Area	3,011m^2
Harvested Catchment	900m^2
Harvesting Ratio	29%
Run-off Coefficient	0.95

The average irrigation water required with these parameters has been estimated at 16.8kL per week. The average rainfall harvested based on these parameters has been estimated at 17.0kL per week.

*The above is based on minimum 25L/m2/Week of irrigation requirement in landscape areas.

3. Base Building Assessment – Water Consumption Evaluation

3.1 Residential Water Requirement

Residential water consumption for the development, has been modelled based upon following information.

- 3 Star WELS rated water closets, having an average volume per flush of 4 litres.
- 3 Star WELS rated tapware, having an average volume per use of 45 litres (this allows for basin and kitchen sink use for a day).
- 3 Star WELS rated showers, having an average volume per use of 45 litres (this allows for a 5-minute shower). Calculations assume 2 x showers per day per person.
- Occupants each have 2 x WC flushes per day.
- Each Unit will run the 3 Star Dish Washing Machine once per day.
- Each occupant will do 1 x Clothes Washing Machine load per week in 3 Star CWM.
- Irrigation for common landscaping will be based on 25L/m2/week.
- Landscaped area to be irrigated is approximately 675m2.

The total Base Building Assessment Residential water consumption with these parameters has been estimated at 13,717.8kL per annum throughout the development.

4. Sanitary Plumbing and Drainage Concepts

4.1 Authority Sewer Mains and Sewer Connection

There is an existing Sydney Water Corporation (SWC) 225 sewer main that traverses the site servicing the existing dwellings on the site only. We understand that Bridgestone Projects will engage a Water Serving coordinator to liaise with Sydney Water to confirm any infrastructure requirements. Once these are received then we will be able to confirm method of connection. Refer figure 1 for details.

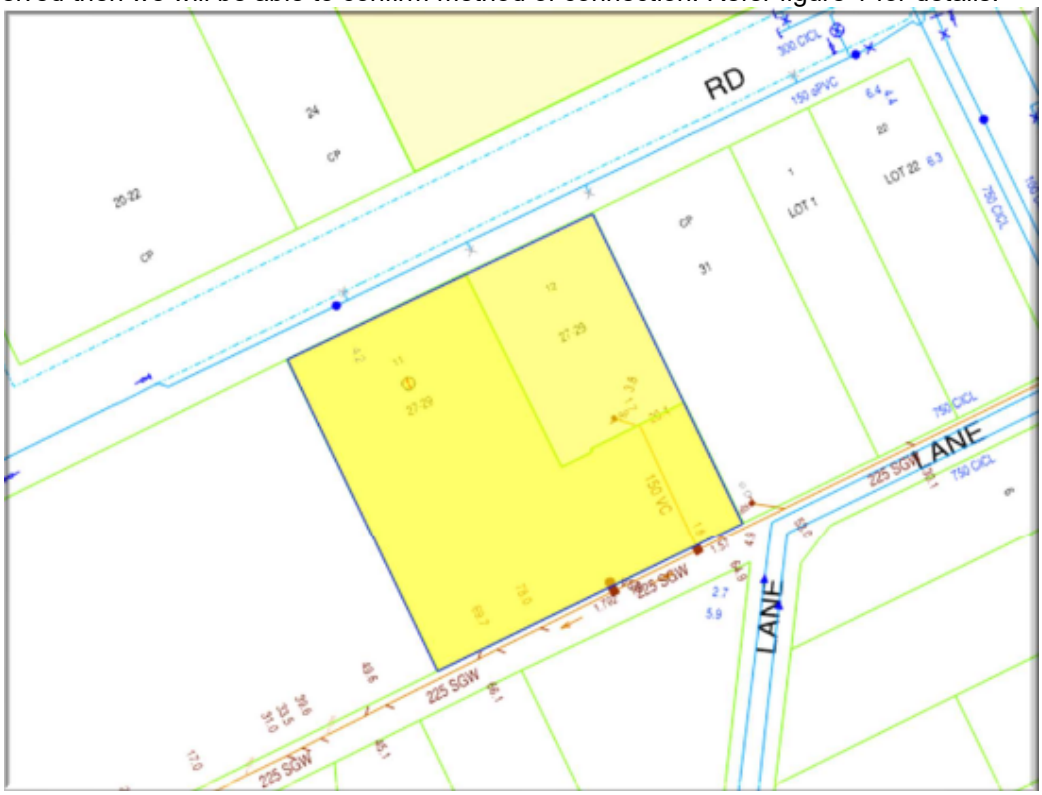


Figure 1 - Sydney Water DBYD

4.2 Sanitary Drainage

A system of sewer drainage will be provided in accordance with NCC and AS3500.2 requirements.
Wastewater produced from sanitary fixtures and appliances within the proposed development shall be combined into common sewer lines before connecting via gravity where possible to the Authority sanitary drainage system.
For areas of the development unable to drain via gravity, a collection well shall be installed complete with dual submersible macerating pumps to transfer sewage into the Authority sewer drainage system. Pumps shall be sized as a duty/standby arrangement whereby each pump has the capacity to provide the full required duty, therefore providing 100% redundancy to the system in the event of a single pump failure. Pumps shall be automatically controlled via a dedicated sewer pump control panel, complete with an interface connection to the Building Monitoring System if any.
Overflow relief devices shall be strategically located within the system to prohibit the unwanted surcharge of sewerage into the building in the event of a blockage in the downstream network.
Vent pipes shall be strategically located within the system to maintain the integrity of fixture trap seals whilst conveying sewer gases to the atmosphere.

4.3 Sanitary Plumbing

A system of sanitary plumbing will be provided in accordance with NCC and AS3500.2 requirements.
Wastewater produced from sanitary fixtures and appliances within the proposed development shall be combined into common sanitary plumbing lines and gravitate to the sewer drainage service.
A ventilation network fitted to the sanitary plumbing network will maintain the integrity of fixture trap seals whilst conveying sewer gases to the atmosphere.
Sanitary plumbing pipework crossing fire compartment boundaries shall be fitted with fire collars.
Sanitary plumbing pipework located within sensitive areas will be acoustically lagged in accordance with the Acoustic Engineer's requirements.

4.4 Sanitary Plumbing and Sanitary Drainage Materials

The sanitary plumbing and drainage systems will be installed with PVC pipework and fittings.

5. Appendix A – Calculations

5.1 3 Stars Rating Base Building Water Consumption Assessment

BASE BUILDING ASSESSMENT	
SHOWERS	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Shower	3 stars
Volume Per Shower	45
Shower Per Day Per Occupant	2
Shower Consumption Per Day(L)	19530
TAPWARE	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Tapware	3 stars
Tapware Volume per Use(L)	45
Tapware Consumption Per Day(L)	9765
WATER CLOSET	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Water Closet	3 stars
Volume per Flush(L)	4
Flushes Per Day(L)	2
WC Consumption Per Day(L)	1736
CLOTHES WASHING MACHINE	INPUT/RESULTS
Number of Occupants	217
Volume per Cycle	117
WELS Rating of CWM	3 stars
CWM cycles per Person per Week	1
CWM Consumption per Week (L)	25389
CWM Consumption per Day (L)	3627
DISH WASHER MACHINE	INPUT/RESULTS
Number of Units	62
Volume per Cycle	8.24
WELS Rating of DISH WASHER	3 stars
DWM Cycles per Unit per Day	1
DWM Consumption per Day (L)	510.88
IRRIGATION	INPUT/RESULTS
Irrigation Rate (L/sq.m./week)	25
Area of Irrigation	675
Volume per week(L)	16875
Daily Consumption	2411
TOTAL CONSUMPTION	RESULTS
Total Daily Consumption (KL)	**38**
Annual Consumption (KL)	**13717**

Notes: Notes:

This calculation does not consider the consumption of any Bath. The variation of tapware would not generally make a substantial difference in consumption.
Irrigation of landscaping within Units is excluded.

5.2 Efficiency Building Water Consumption Assessment

EFFICIENCY BUILDING ASSESSMENT	
SHOWERS	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Shower	4 stars
Volume Per Shower	37.5
Shower Per Day Per Occupant	2
Shower Consumption Per Day(L)	16275
TAPWARE	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Tapware	6 stars
Tapware Volume per Use(L)	22.5
Tapware Consumption Per Day(L)	4882.5
WATER CLOSET	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Water Closet	4 stars
Volume per Flush(L)	3.5
Flushes Per Day(L)	2
WC Consumption Per Day(L)	1519
CLOTHES WASHING MACHINE	INPUT/RESULTS
Number of Occupants	217
Volume per Cycle	82.3
WELS Rating of CWM	4 stars
CWM cycles per Person per Week	1
CWM Consumption per Week (L)	17859.1
CWM Consumption per Day (L)	2551.3
DISH WASHER MACHINE	INPUT/RESULTS
Number of Units	62
Volume per Cycle	5.61
WELS Rating of DISH WASHER	4 stars
DWM Cycles per Unit per Day	1
DWM Consumption per Day (L)	347.82
IRRIGATION	INPUT/RESULTS
Irrigation Rate (L/sq.m./week)	25
Area of Irrigation	675
Volume per week(L)	16875
Daily Consumption	2411
TOTAL CONSUMPTION	RESULTS
Total Daily Consumption (KL)	**28**
Annual Consumption (KL)	**10215**

Notes: Notes:

This calculation does not consider the consumption of any Bath. The variation of tapware would not generally make a substantial difference in consumption.
Irrigation of landscaping within Units is excluded.

Figure 2-Jemena DBYD

5.3 Efficiency Building Water Consumption Assessment

EFFICIENCY BUILDING ASSESSMENT	
SHOWERS	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Shower	5 stars
Volume Per Shower	30
Shower Per Day Per Occupant	2
Shower Consumption Per Day(L)	13020
TAPWARE	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Tapware	6 stars
Tapware Volume per Use(L)	22.5
Tapware Consumption Per Day(L)	4882.5
WATER CLOSET	INPUT/RESULTS
Number of Occupants	217
WELS Rating of Water Closet	4 stars
Volume per Flush(L)	3.5
Flushes Per Day(L)	2
WC Consumption Per Day(L)	1519
CLOTHES WASHING MACHINE	INPUT/RESULTS
Number of Occupants	217
Volume per Cycle	82.3
WELS Rating of CWM	4 stars
CWM cycles per Person per Week	1
CWM Consumption per Week (L)	17859.1
CWM Consumption per Day (L)	2551.3
DISH WASHER MACHINE	INPUT/RESULTS
Number of Units	62
Volume per Cycle	5.61
WELS Rating of DISH WASHER	4 stars
DWM Cycles per Unit per Day	1
DWM Consumption per Day (L)	347.82
IRRIGATION	INPUT/RESULTS
Irrigation Rate (L/sqm /week)	25
Area of Irrigation	675
Volume per week(L)	16875
Daily Consumption	2411
TOTAL CONSUMPTION	RESULTS
Total Daily Consumption (KL)	**25**
Annual Consumption (KL)	**9027**

Notes: Notes:

This calculation does not consider the consumption of any Bath. The variation of tapware would not generally make a substantial difference in consumption.
Irrigation of landscaping within Units is excluded.

5.4 Rainwater Harvesting Data

Please refer rainwater harvesting calculation on how the rainwater tank is reducing the potable water consumption to achieve 50% reduction target by Ku-ring-gai council.

The total water usage annually to irrigate the landscaping is around 874,900L, based on foregoing a minimum total rainwater tank volume, a volume of 37m3 is required to achieve a 50% reduction in runoff days (extra allowance for further landscape areas being irrigated).

Rainwater Tank Sizing Estimates

Date Prepared: 17/07/1905

Project Name: 27-29 Tryon Rd Lindfield

Project Number:

Project Information

Roof Area to rainwater tank

900 m2

Price of Water in Sydney Per Kilolitre = $4.00 2020 - Sydney Water Price

Estimated Population Figures

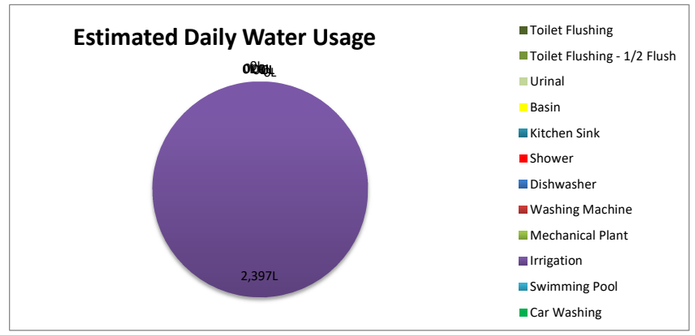
0 Attendance 0 Students 0 Staff

Rainfall Data Location

Marsfield

Rainfall Data History	1970-2008	Years of data recorded
Water Captured Annually =	920,808L	90% of Average Annual Rainfall Capture
Water Captured Monthly =	**76,734L**	**Average Monthly Rainfall Capture**
Water Captured Monthly =	89,370L	Based on wettest month
Water Captured Monthly =	46,260L	Based on driest month

This information is calculated from statistics provided by the Bureau of Meteorology indicating average rainfall for a given area



Water Used	WC - Full	WC - Half	Urinal	Basin	Kitchen Sink	Shower	Dishwasher	Washing Machine	Mechanical Plant	Irrigation	Swimming Pool	Car Washing
Litres of Water Per Usage	6L	3L	1L	2L	10L	90L	15L	50L	L	16825L	143190L	L
Days used per week	7	7	7	7	7	7	3	3	7	1	1	1
Typical usage per Person Per Day	0.5	1	1	2	1	1	1	1	1	1	1	1
Number of people	0	0	0	0	0	0	0	0	0	1	0	0
Total Usage Per Person in one year	0	0	0	0	0	0	0	0	0	52	0	0
Total Usage in one year	L	L	L	L	L	L	L	L	L	874900L	L	L
KiloLitres of Water Per Year	KL	KL	KL	KL	KL	KL	KL	KL	KL	875KL	KL	KL
KiloLitres per month	KL	KL	KL	KL	KL	KL	KL	KL	KL	73KL	KL	KL
	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	MAINSWATER	RAINWATER	MAINSWATER	MAINSWATER

Total amount of Mainswater used Annually 874,900L 875KL *This is if all fixtures are run off Mains water*

Total amount of Rainwater used Annually 874,900L 875KL *Based on selected fixtures*

Total Annual Cost of Mains Water $3,500

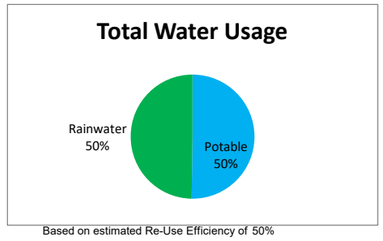
Total Annual Maximum Rainwater Savings $3,683

Potential Annual Rainwater Savings(Fixture Usage) $3,500 Based on Rainwater re-use fixtures used

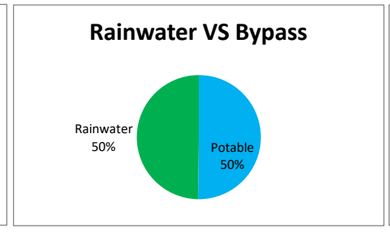
Potential Annual Rainwater Savings(Rainfall Capture) $3,683 Based on rainfall captured achieving 100%

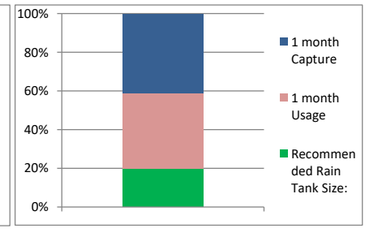
Predicted Annual Water Cost (With Rainwater Savings) $1,724

Predicted Annual Rainwater cost saving $1,776 This does not include rainwater maintenance!



Based on estimated Re-Use Efficiency of 50%





IRRIGATION USAGE ESTIMATES					
	m²	L/m² Per week	Weekly Usage (L)	Weekly Usage(m³)	Monthly Usage (m³)
Communal garden areas	0	25	0	0	0
Communal lawn areas	673	25	16825	17	67
Private garden areas	0	20	0	0	0
				Total	67

Efficiencies

January	February	March	April	May	June	July	August	September	October	November	December
50%	55%	50%	51%	50%	51%	50%	50%	51%	50%	51%	50%

50% Per Year

Overflow Water

43,460L	49,580L	52,190L	52,370L	34,730L	37,160L	34,640L	12,500L	9,260L	19,250L	19,250L	28,070L

836KL Per Year **53% Annual Overflow Reduction**

Recommended Rain Tank Size: 37,000L

Based on Average Monthly usage vs average monthly capture

76,734L 1 month Capture

72,908L 1 month Usage

Note: Rainwater Tank sizing is not an exact science and has been based on information compiled over time within our office. If rainwater tank is full at time of rainfall event then no rainfall can be captured.

6. Conclusion

The implementation of a high star-rated plumbing system, coupled with a harvested rainwater tank, has significantly reduced the total water consumption across the development. By incorporating water-efficient fixtures and fittings, the demand for potable water has been minimized without compromising user comfort. The use of harvested rainwater for non-potable applications such as irrigation, toilet flushing, and cooling systems has further contributed to sustainability efforts. This approach not only conserves municipal water supply but also reduces operational costs over time.

The rainwater harvesting system captures and stores runoff, ensuring a reliable supplementary water source throughout the year. Additionally, the integration of high efficiency plumbing fixtures ensures minimal wastage while maintaining optimal performance. These combined strategies lead to lower water utility bills and improved environmental outcomes. By reducing dependence on mains water, the development enhances its resilience against water shortages and drought conditions.

Moreover, this sustainable water management strategy aligns with green building standards, improving the overall rating and compliance with regulatory frameworks. The long-term benefits include resource conservation, financial savings, and a reduced ecological footprint, making the development both cost-effective and environmentally responsible.