

# **WATER CYCLE MANAGEMENT REPORT**

For Proposed Childcare Centre

at

10 Ben Bullen Place, Goulburn

Prepared for:

**Greenscape Design**

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L.G.A.	Goulburn Mulwaree Council

## Table of Contents

Introduction .....	3
Existing Site Condition .....	3
Proposed Development .....	4
Stormwater Management.....	4
Overall Stormwater Strategy .....	4
On-Site Detention (OSD).....	5
Water Quality.....	5
Rainwater Re-Use .....	7
Erosion and Sediment Control .....	7
Wastewater.....	7
Conclusion.....	7

## Introduction

As part of the Development Application for the proposed childcare development at 10 Ben Bullen Place, Goulburn; Goulburn Mulwaree Council has requested a Water Cycle Management Report to outline the overall strategy and design approach in relation to the stormwater management of the proposed site.

Engineering Studio has been commissioned by Greenscape Design to undertake the stormwater management plans and report for the proposed childcare development.

This report is to be read in conjunction with the following documentation:

- The stormwater management plans prepared by Engineering Studio Drawing numbers:  
240818 - C00.01, C01.01, C02.01, C02.02, Rev. B

## Existing Site Condition

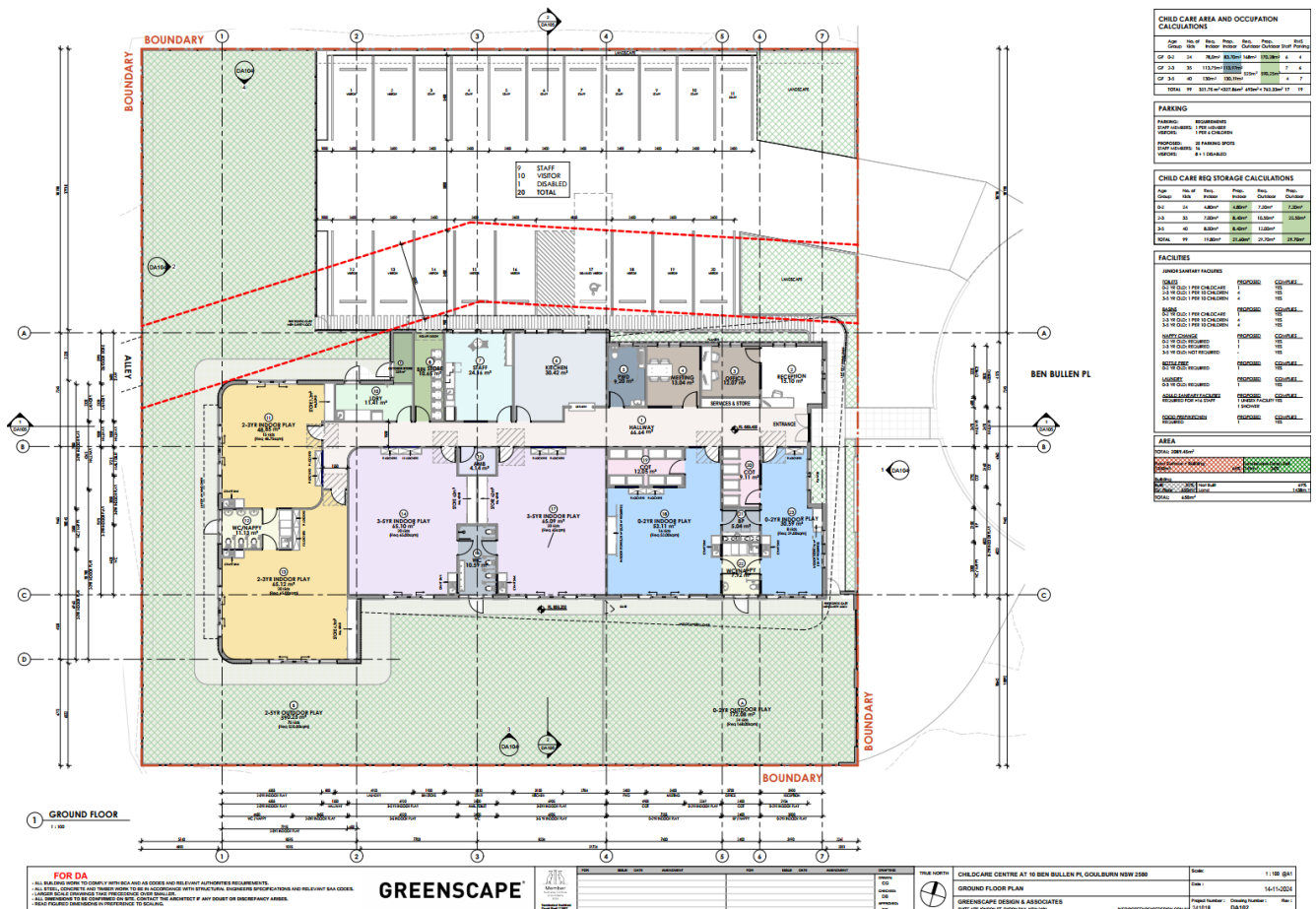
The site, shown in Figure 1, is located on the western end of the cul-de-sac of Ben Bullen Place. Peter Brock Drive. The property is a square parcel of land with boundaries of 45.7m. The total site area is 2090 square metres. A high point is located at the centre of the site and falls in each direction, although the slope towards the northern and western corners is steeper. The site is currently vacant apart from a gravel driveway to the northern corner.



Figure 1 - Site Location

## Proposed Development

The proposed development involves the construction of a single storey childcare centre with associated above ground carparking and landscaped areas. The proposed impervious area of the development is approximately 64%. Please refer to the architectural documentation prepared by Greenscape Design project no. 241018 for details.





### **On-Site Detention (OSD)**

To ensure that the stormwater runoff discharge rate is controlled as a result of the proposed development, an above ground OSD basin is proposed to be constructed within the northern corner of the site, with additional storage provided in the carparking. An assessment of flows has been undertaken using a DRAINS model to ensure post-development discharge does not exceed pre-development runoff rates for all storms from the 0.2EY to 1% AEP. It was determined that 34m<sup>3</sup> storage would be sufficient to ensure runoff rates are limited. Refer to table below and referenced engineering plans for details.

Pre & Post Development Flows					
	0.2EY	10% AEP	5% AEP	2% AEP	1% AEP
<b>Pre-Development Flow (l/s)</b>	7	13	20	31	39
<b>Post-Development Flow (l/s)</b>	7	7	7	10	15
<b>Storage Required (m<sup>3</sup>)</b>	16.72	22.9	29.65	34	34

### **Water Quality**

A MUSIC model has been prepared to assess the pollutant runoff from the site in order to design adequate stormwater quality improvement devices to ensure that stormwater runoff from the proposed development will have a neutral or beneficial effect on water quality in comparison to the pre-development scenario. The site is located within SCA Zone 1 and parameters adopted from WaterNSW MUSIC Modelling guidelines have been adopted.

As the site is currently vacant (apart from the minor gravel driveway encroachment) the pre-development catchment was modelled as 100% pervious. However, this resulted in a basin size of approximately 160m<sup>2</sup> or 8% of the site area and was considered excessive for a relatively low impact development. As such, a 10% impervious area has been adopted in the pre-development case due to the gravel driveway and the existing public thoroughfare that existing on the lot which has resulted in a compacted gravel path through the centre of the property.

To reduce the impact of the proposed development on the water quality of the stormwater runoff, stormwater treatment devices have been provided. A 45m<sup>2</sup> bio-filtration basin and 70,000L rainwater re-use tank are proposed to improve the quality of the stormwater runoff. A MUSIC model has been created to model the effectiveness of the treatment train for the site, refer to figure 1 below.

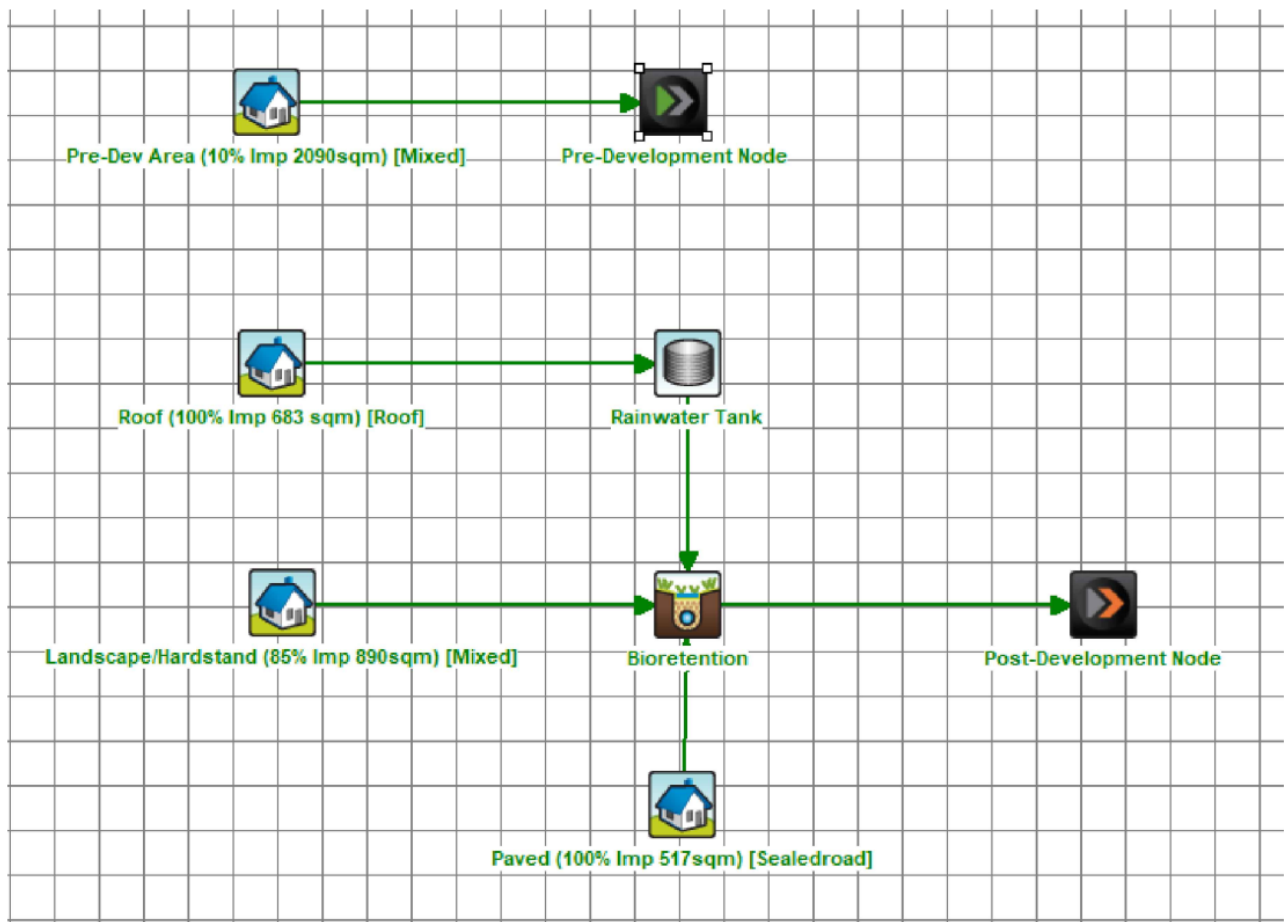


Figure 3: MUSIC model treatment train

The table below summarises the modelled effectiveness of the water quality treatment for the subject site from the MUSIC model. It is demonstrated that the post-development pollutants will be reduced in comparison to the modelled pre-development scenario. The reduction rates for the development in comparison to the scenario where no water quality treatment devices are installed is also shown. Refer to table below and referenced engineering plans for details.

	Pre- Development	Post- Development (Untreated)	Post- Development (Treated)	Reduction % (Pre to Post)	Reduction % (Untreated to Treated)
<b>Total Suspended Solids (kg/yr)</b>	34	190	3.99	88.3	97.9
<b>Total Phosphorus (kg/yr)</b>	0.0705	0.244	0.0684	3	72
<b>Total Nitrogen (kg/yr)</b>	0.543	2.64	0.502	7.5	71
<b>Gross Pollutants (kg/yr)</b>	5.59	38.9	0	100	100

Table 1: Water quality treatment effectiveness

### **Rainwater Re-Use**

To encourage the re-use of water retained on site, Goulburn Mulwaree Council has implemented a policy for Stormwater Drainage & Roofwater Collection Systems. As the policy, a minimum rainwater tank size is required dependent on the proposed roof area at a rate of 1000 litres per 10m<sup>2</sup> of roof area. As the proposed roof is 682.5m<sup>2</sup>, the required rainwater tank size is 68,250 litres. A 70,000 litre rainwater tank is proposed. Refer to engineering plans for details.

### **Erosion and Sediment Control**

As the site area is less than <2500m<sup>2</sup> and the proposed works will involve relatively minor bulk excavation, a sediment and erosion control concept plan has been prepared to ensure that appropriate measures are put into place to control the runoff/ erosion of soil during the construction phase. A combination of sediment fences, sandbag kerb sediment traps and stabilised site access are proposed to reduce the runoff of pollutants and soils during construction.

### **Wastewater**

The proposed development site is within an urban area serviced by a reticulated sewerage scheme. It is anticipated that the current sewer will be extended to allow for the proposed development to be serviced.

### **Conclusion**

Overall, we believe that the stormwater design for the proposed development at 10 Ben Bullen Place, Goulburn follows Goulburn Mulwaree Council's and WaterNSW stormwater design guidelines and controls.

- On-site detention has been provided in an above ground basin to ensure post-development discharge is controlled to pre-development discharge rates
- Water quality treatment devices have been provided to improve stormwater runoff quality which exceed the reduction targets set by council.
- Adequate rainwater re-use storage within a below ground tank is to meet council's requirements.

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