

CIVIL STORMWATER DESIGN REPORT

**SAMUEL GILBERT PUBLIC SCHOOL,
RIDGECORP DRIVE,
CASTLE HILL**

**Revision 2
October 2018**

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1 INTRODUCTION

1.1 General

This Civil Stormwater Design Report has been prepared for the School Infrastructure NSW to supplement the proposed Civil Development Application (DA) drawings (17787_CC_C000 to 17787_CC_C201) for the proposed additions to Samuel Gilbert Public School at Ridgecorp Drive, Castle Hill. The additions mainly comprise of two 3-storey buildings (building N and P) and a single storey hall (building Q), based on the drawings prepared by Fulton Trotter Architects.

As the proposed additional school accommodation will result in an increase in impervious area, the purpose of this report is to address how the proposed stormwater network design will cater for the additional stormwater run-off.

2 BULK EARTHWORKS

The site has been designed such that the grades are sympathetic to requirements of the end users whilst giving consideration for earthworks quantities. The bulk earthworks for the site has been designed to achieve optimal cut and fill quantities to minimise construction costs and at the same maintaining appropriate grades and minimising heights of retaining walls.

Excavation will be required along the southern side of the site. A combination of batters and retaining walls will be provided in this area.

3 STORMWATER MANAGEMENT

3.1 Introduction

The principles and operation of the proposed stormwater system for the development including water quality measures and the components of the drainage system are detailed on the DA Drawings. Stormwater controls will be implemented that ensure that the proposed development does not adversely impact on water quality of the stormwater system downstream of the site.

3.1.1 Key Issues

The key issues and the proposed mitigation measures to be implemented as part of the proposed development are as follows:

- **Stormwater Quantity** The increased impervious surfaces (such as footpaths and roofs, etc) associated with the development will result in an increase in peak stormwater flows from the site during storm events. The site stormwater system has been designed to safely convey the flows through the site and within the capacity of the downstream system. The design and operation of the proposed stormwater system is described in Section 2.2 below.
- **Water Quality** - Urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. Measures such

as the provision of Enviropod pit baskets in each pit will ensure there is no adverse impact on the downstream drainage system. Section 2.3 further describes the specific implementation of these measures for the proposed development.

3.2 Stormwater Quantity

3.2.1 Catchment Description

The surface levels of the school site generally fall in a southerly direction towards Ridgescrop Drive. The northern, top end of the site is relatively flat and is occupied by the school's playing field. From this point the school grounds fall relatively gently towards the south however towards the southern boundary the site falls away more steeply. The site generally drains as a single surface runoff catchment with two stormwater connection points. The proposed development will create additional impervious area which will lead to increased peak flow and surface runoff, this is addressed by the introduction of an onsite detention tank to limit the permissible site discharge as per Upper Parramatta River Catchment Trust requirements.

3.2.2 Existing Drainage System

There are extensive stormwater infrastructure systems within the site. Based on our observations, the existing stormwater systems generally drain in a direction that catches the stormwater surface runoff catchment. There are however two stormwater connection points to the existing Council stormwater system in Ridgescrop Drive. One is located close to Gilbert Road (which is the road that runs along the eastern side of the site) and the other is located further west along Ridgescrop Drive. There are no apparent stormwater connections to the Council drainage system in Gilbert Road.

3.2.3 Proposed Drainage System

The drainage system for the proposed development will be designed to collect all concentrated flows from new impermeable surfaces such as roof areas and walkways. The proposed drainage system consists of a network of piped drainage system to collect runoff from the developed area and drained into an On-Site Detention (OSD) tank. The OSD has been sized for the proposed development area in accordance with Upper Parramatta River Catchment Trust handbook and will require a volume of 243.02m³. See appendix A for calculation sheet.

3.3 Water Quality

3.3.1 Water Quality Requirements

As previously stated, urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. To limit the impact on the downstream water quality, water quality measures are provided.

It is proposed to provide pit baskets such as Enviropods or an approved equivalent for all grated pits within the walkways. These pit baskets will assist in the water quality treatment for the site by capturing a large portion of gross pollutants, large sediment particles and organic matter that may also contain nutrients.

3.3.2 Sediment & Erosion Control

Sediment & erosion measures will be implemented during construction to ensure there is no off site impact as a result of the construction works. This will be in form of Mesh & gravel Inlet Filter, Geotextile Inlet Filter, Sediment Basin and Sedimentation Fence.

Construction access for the site will be via Ridgecorp Drive, which will be further documented as part of the construction management plan to be provided by the contractor prior to construction certificate.

4 CONCLUSION

Appropriate stormwater management practices will be implemented that minimise the impact of development on the existing stormwater system in terms of water quality whilst ensuring safe and efficient conveyance of runoff.

Whilst it is inevitable that the development will have an impact of the existing landform and stormwater runoff characteristics due to earthworks, change of land-use and changes in impervious areas; by providing a safe and efficient design, and implementing appropriate measures during construction and operation of the development, it can be ensured that there will be minimal impact on the existing environment as a result of the proposed development.

5 References

- Landcom - "Soils and Construction Volume 1 – 4th Edition", March 2004
- Institution of Engineers, Australia - "Australian Rainfall and Runoff 3rd Edition", 1987
- Upper Parramatta River Catchment Trust – On-site Stormwater Detention Handbook, 4th Edition, December 2005

APPENDIX A: UPRCT CALCULATION SHEET

On-Site Detention Calculation Sheet for Upper Parramatta River Catchment HED Secondary Outlet

Project:	UPRCT Handbook			
Site Address	Samuel Gilbert Public School			
Job No:	17787			
Designer:	TC			
Telephone:	9417 8400			

Site Data				
OSD Area:	Upper Parramatta River Catchment			
L.G.A	Baulkham Hills Shire Council			
Site Area	0.5341	ha	5,341	m ²
Total Roof Area	0.3236	ha	3,236	m ²
Area of Site draining to OSD Storage	0.4865	ha	4,865	m ²
Residual Site Area (Lot Area - Roof Area)	0.211	ha		
Area Bypassing Storage	0.0476	ha		
Area Bypassing / Residual Site Area	22.6%			
No. of Dwellings on Site	1			
Site Area per Dwelling	0.534	ha		
Roof Area per Dwelling	0.324	ha		

Basic OSD Parameters					
		Extended Detention		Detention	
Basic SSR Vols	Ext Detention Storage	300	m ³ /ha	Total Storage	455
Basic SRDs	Primary Outlet	40	L/s/ha	Secondary Outlet	150

OSD Tank Bypass				
Residual Lot Capture in OSD Tank	77%			
Adjusted SRDs	33	L/s/ha	105	L/s/ha

OSD Calculations					
		Extended Detention		Detention	
Basic SSR Volume	Ext Detention Storage	160.23	m ³	Total Storage	243.02
Total Rainwater Tank Credits		0.00	m ³		0.00
Storage Volume				Total	243.01
Storage Volume	Ext Detention Storage	160.23	m ³	Flood Detention Storage	82.79
OSD Discharges	Primary Outlet	17.74	L/s	Secondary Outlet	55.96
RL of Top Water Level of Storage		98.650	m		98.650
RL of Orifice Centre-line		96.100	m		96.100
Number of Orifices		1			1
Estimated Downstream Flood Level		0.00	1.5 yr ARI		0.00
Downstream FL - RL of Orifice Cente-line		-96.10	Satisfactory	Satisfactory	-96.10
Design Head to Orifice Centre		2.550	m	TWL Ext Detn Storage - RL Orifice	2.550
Calculated Orifice Diameter		73	mm	Satisfactory	130

Overflow Weir & Freeboard Calculation				
RL of Minimum Habitable Floor Level		99.000	m	
RL of Minimum Garage Floor Level		99.000	m	
Length of Overflow Weir		2.00	m	
Site Runoff Coefficient	Baulkham Hills Shire Council	0.75		
Storm Intensity (5 min 100 yr ARI)		220	mm/h	
Peak Flow over Weir		223.0	L/s	
Depth of Flow over Weir		167	mm	
Freeboard to Habitable Floor		Unacceptable - Min Freeboard = 200 mm	183	mm
Freeboard to Garage Floor		Satisfactory	183	mm