

Green Square Integrated Community Facility and School



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School Infrastructure

NSW



Civil SSD Report

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Revision: 04

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Report Amendment Register

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1. Executive Summary

Meinhardt - Bonacci has prepared Civil Schematic Design Report for Green Square Public School in response to Secretary’s Environmental Assessment Requirements (SEARS). In particular, the report outlines how the site addresses Drainage (condition 17), Flooding (condition 18) and Sediment, Erosion and Dust Controls (Condition 20). On-Site Stormwater Detention and Stormwater Quality Treatment/Improvement measures have been included in the proposed stormwater drainage network (Section 4.1 & 4.2 of the report). FFLs and site levels have been set above the estimated 1% AEP flood level to ensure the flood risk is minimised (Section 4.3). Sediment, erosion and dust controls are proposed to minimise and manage the generation of off-site transmission of sediment, dust and fine particles (Section 4.4).

Table 1. SEARS Response

SEARS Item No.	SEARS Item	Response in Page
17. Drainage	<p>Detail measures to minimise operational water quality impacts on surface waters and groundwater and to maximise on-site water infiltration.</p> <p>Stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties. WSUD infrastructure and canopy tree planting must form part of the stormwater plans where appropriate.</p> <p><u>Relevant Policies and Guidelines:</u> Based on the Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)</p>	<p>10-11</p> <p>11-13</p>
18. Flooding	<p>Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005) and Council’s Interim Floodplain Management Policy, including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include design solutions for mitigation. The development is also required to consider Section 5.13 of the Architectural Design Competition Brief for the GSICFS dated October 2019 and prepared by Urbis.</p>	13-14
20. Sediment, Erosion and Dust Controls	<p>Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles.</p> <p><u>Relevant Policies and Guidelines:</u></p> <ul style="list-style-type: none"> Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom) Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA) Guidelines for development adjoining land and water managed by DECCW (OEH, 2013) 	14-15

2. Introduction

Bonacci Group (NSW) Pty Ltd has been engaged by School Infrastructure NSW to provide civil consultancy services for the proposed development on Green Square Integrated Community Facility and School (GSICFS).

The Report outlines the proposed stormwater drainage networks, water quality and quantity control strategies as well as flood risk assessment and erosion & sediment controls for development of Green Square Public School and new public domain works within the proposed new development lot.

The following relevant existing documentation has been referenced for the proposed design:

- SSDA Architectural Plans by BVN, 05th March 2021,
- Survey Plan by CMS Surveyors, 26th June 2020,
- Green Square Town Centre EIPD, Package 4A by AECOM, 10th June 2016,
- Public Domain Co-ordination Plan by JMD design, dated, 8th May 2015,
- Detail Survey including in ground services by Landscape Surveys, 27th October 2014,
- Remedial Action Plan (Ref: 58719/129939) by JBS&G, 18th June 2020,
- Geotechnical Investigation (Ref: 31170LMrpt) by JK Geotechnics, dated 28 February 2018,
- Alexandra Canal Catchment Flood Study Model Update by WMA Water, dated February 2020 and
- Alexandra Canal Catchment TUFLOW flood mode provided by City of Sydney Council.

3. Site Description

3.1. Location

The proposed development is located on the northern portion of the former South Sydney Hospital Site, Zetland. The Campus is bordered by Portman Street to the west, Joynton Avenue to the east, Hansard Street to the south and the future Zetland Avenue to the north. The proposed site is located within the City of Sydney Council Local Government Area (LGA). The locality map of the site is shown in Figure 1 below.

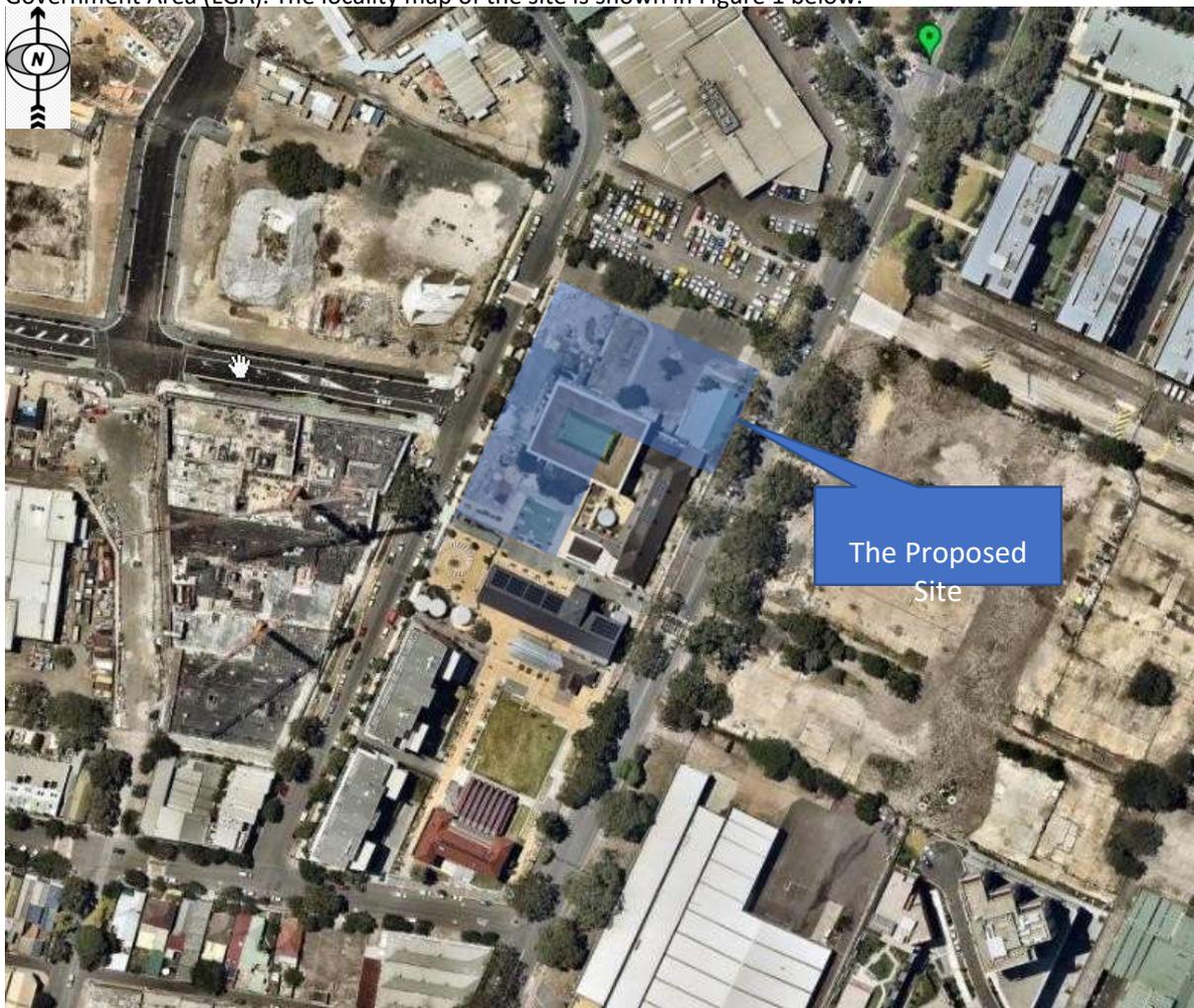


Figure 1 Aerial View of proposed Green Square Public School (Source: Google Maps)

3.2. Topography

The site gently grades to the north towards the proposed future Zetland Ave. The site ultimately drains to Sheas Creek and Alexandra Canal.

See Figure 2 for survey by C.M.S. Surveyors dated 26th June 2020.

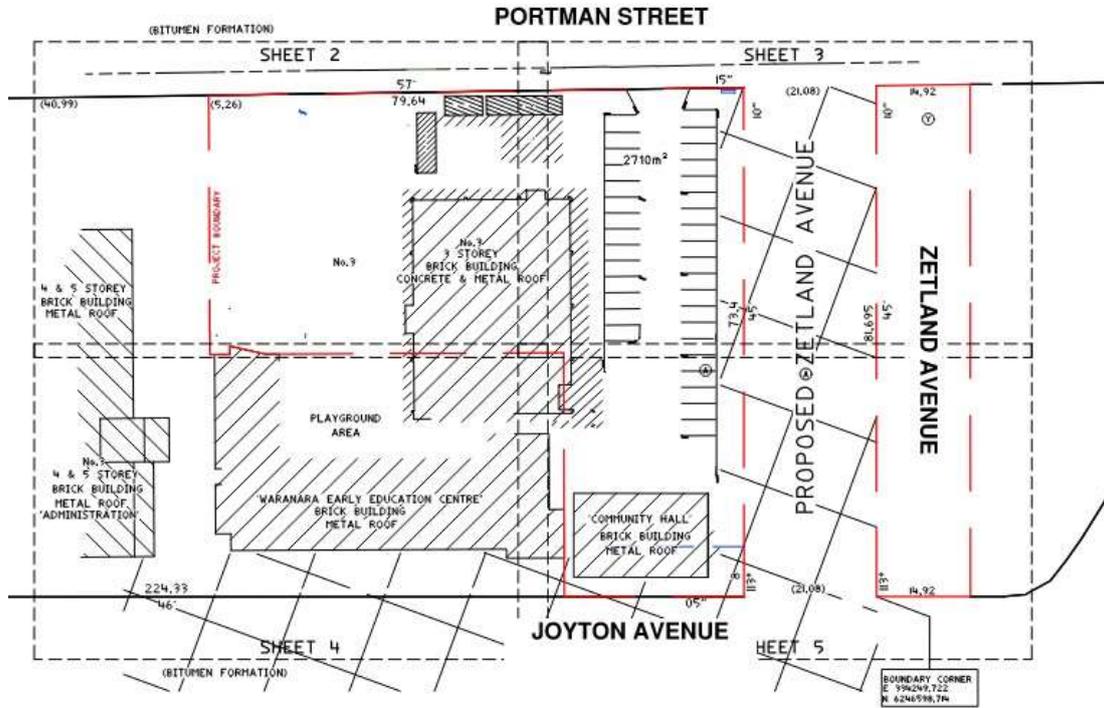
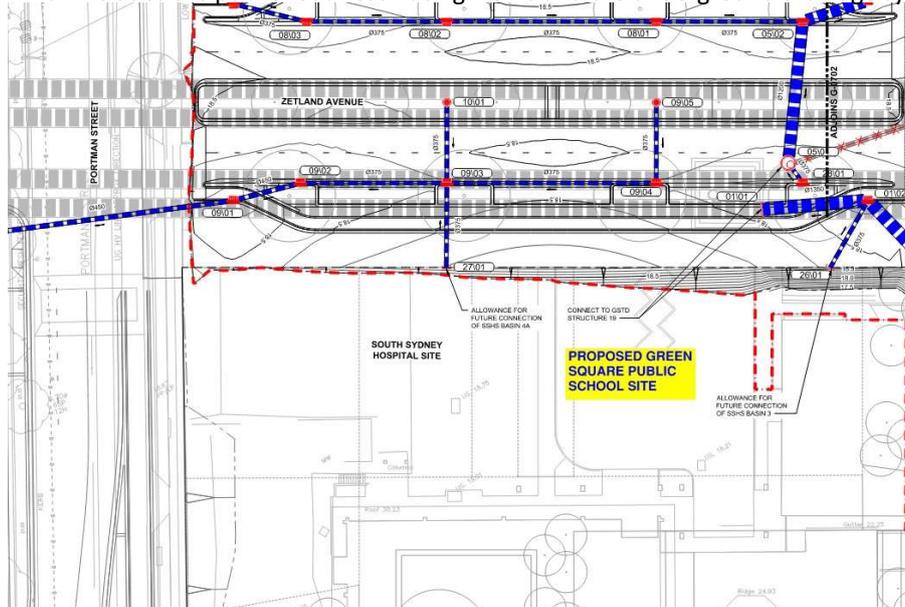


Figure 2 Survey by C.M.S. (26th June 2020)

A civil works package has been provided for the construction work being carried out on Zetland Avenue and Joynton Ave, which includes the public road resurfacing works and the underground drainage system upgrade.



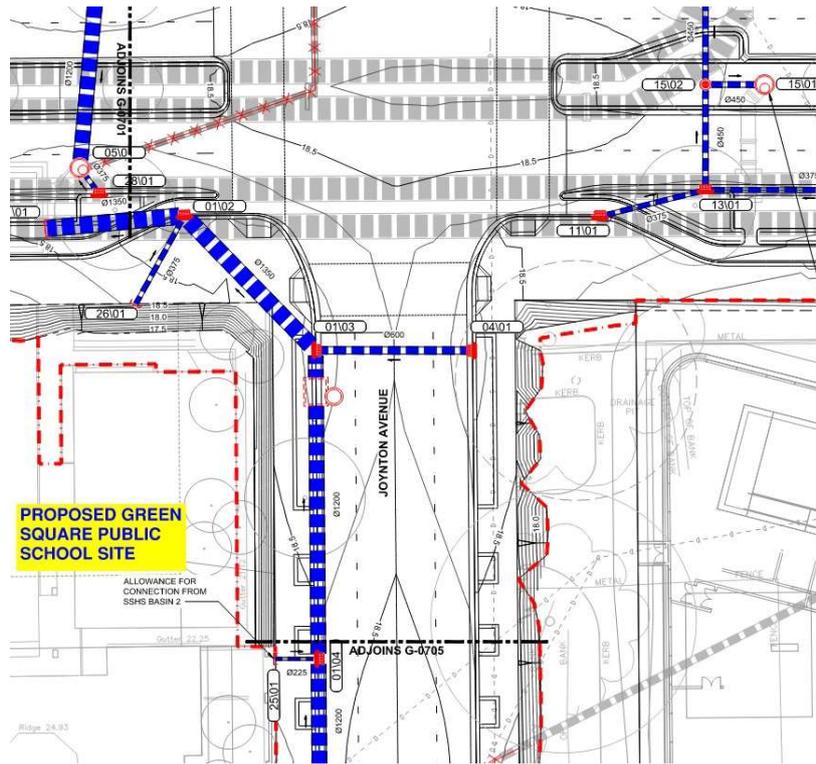


Figure 4 Public Road Works by AECOM (10th June 2016)

4. Proposed Development

The development is known as the Green Square Integrated Community Facility and School. This is a joint project between School Infrastructure NSW and the City of Sydney Council.

The development will comprise a four storey building made up of various indoor and outdoor functional spaces including:

- Primary education facilities for up to 600 kindergarten to year 6 students
 - o Indoor and outdoor learning spaces
 - o Administration and staff rooms
 - o Library and School community hall
- shared multi function spaces within for school and community use
 - o 2 x multipurpose community facilities rooms to be operated solely by City of Sydney
 - o 2 x multipurpose rooms to be shared by the City of Sydney and the primary school
- At ground level there is:
 - o play spaces which will be a shared use between school and community.
 - o multipurpose games court

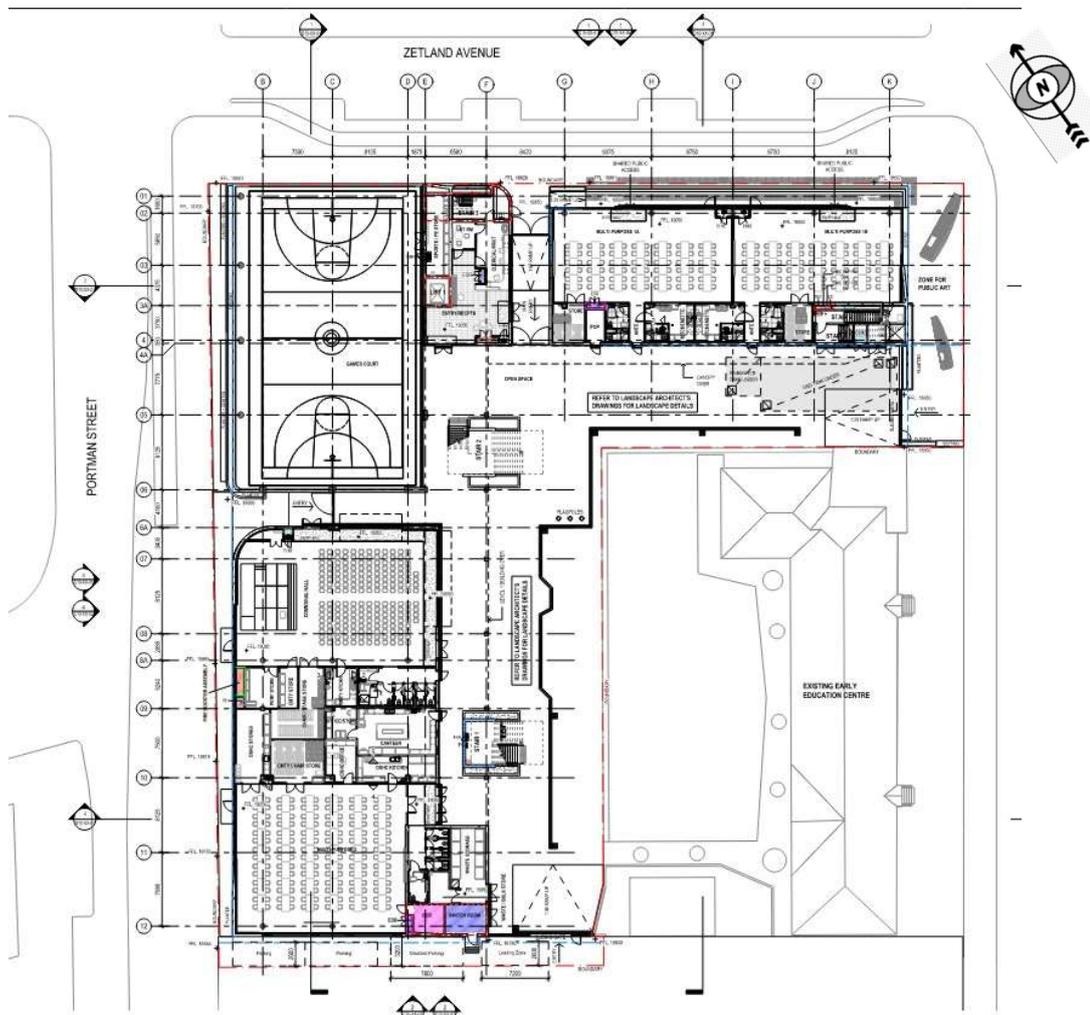


Figure 5 Architectural Ground Floor Plan (by BVN dated 12th March 2021)

4.1 Stormwater Drainage

The proposed future development is within the Green Square and West Kensington catchment. The proposed development lot is approximately 4700m² and ultimately drains to Sheas Creek.

It is proposed to raise the existing ground level for flood control requirement. A stormwater pit and pipe drainage system is proposed to service the school buildings and associated infrastructure and drain to the proposed Joynton Avenue stormwater network. The preliminary concept stormwater strategy for the site is shown in Figure 6 below, and in **Appendix A**.

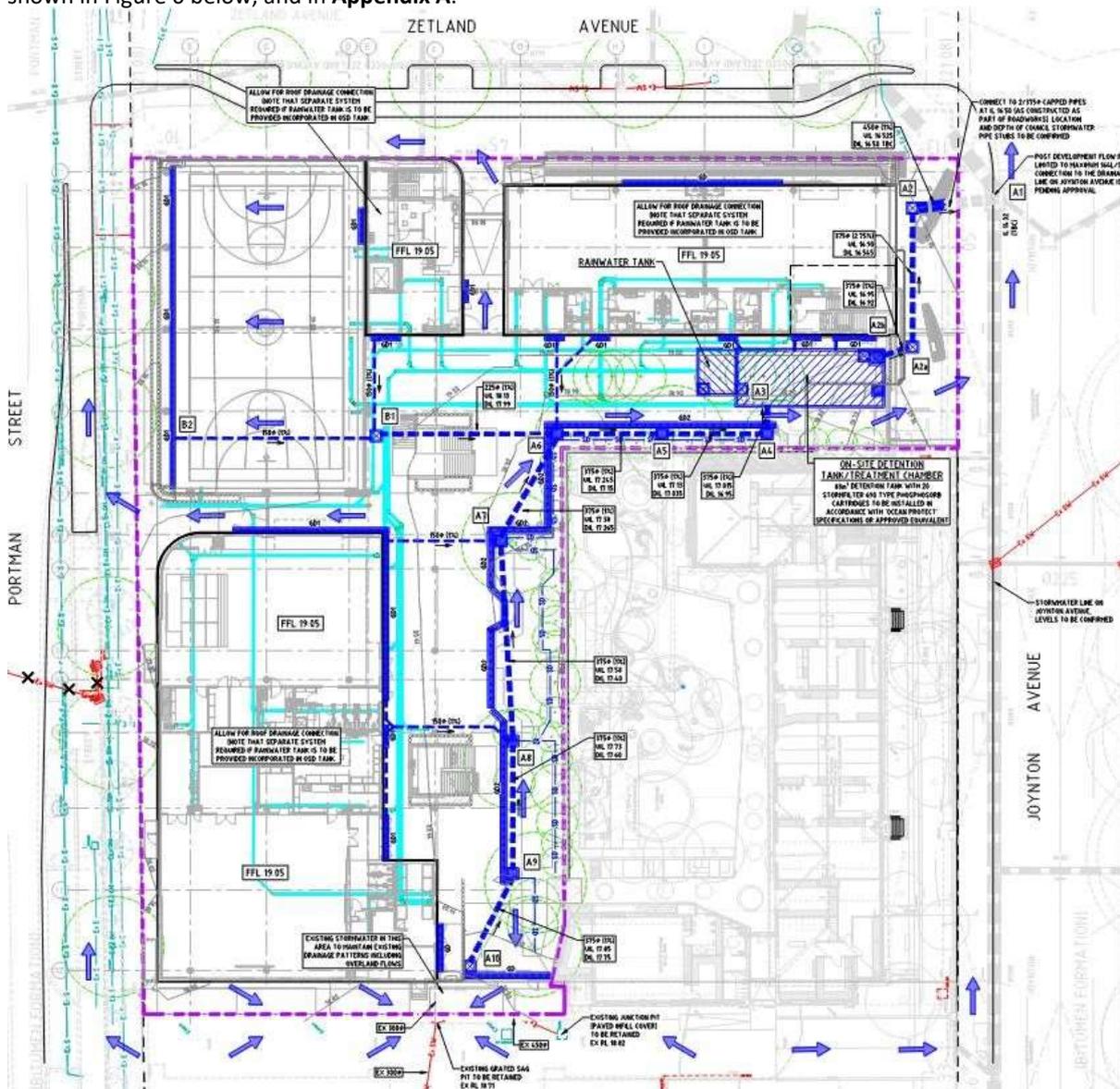


Figure 6 Stormwater Strategy

The stormwater drainage systems have been designed to cater for design storms up to and including 20 year ARI (5% AEP) storm events as per City of Sydney Council DCP 2012 and Sydney Water requirements. The peak discharge flow rates are to meet the required Permissible Site Discharge (PSD) rate set by Sydney Water at 164 L/s.

City of Sydney Council has advised that Sydney Water are to approve any additional discharge into the existing street stormwater network. In accordance with Sydney Water On-Site Stormwater Detention Guide (2014), an

on-site detention system is required for all education buildings or structures, therefore because of the change in development, Sydney Water would view this a new development enquiry.

The inground drainage system is to convey stormwater to the inground on-site detention (OSD) system located east of the site. The outlet from the OSD tank is proposed to make connection to the existing stormwater drainage on Joynton Avenue.

The overland flows for storm events up to the 100 year ARI are to be directed to the north to Zetland Avenue and to the east to Joynton Avenue. The proposed grated trench drains should be cleaned, every 12 months, to ensure the efficiency of the drainage system.

Sydney Water has provided information about the Permissible Site Discharge (PSD) and Site Storage Requirement (SSR). Based on the architectural plan, by BVN dated 29th July 2020, the following information was provided to Sydney Water:

- Total site area: 4728.9 m²
- Pre-development impervious area: 3783.12 m²
- Post development impervious area: 4492.0 m²

Based on the above information, Sydney Water advised a detention system with minimum volume of 83 m³ is to be placed on site to limit the peak flows discharging from the site and (with a Permissible Site Discharge of 164 L/s). Sydney Water further suggested approval for the OSD would only be given as part of the Section 73 application for this development. Correspondence with Sydney Water is shown in **Appendix B**. The minimum detention tank size is subject to change based on different landscape and architectural layouts.

A hydraulic analysis has been carried out using DRAINS modelling software, both the existing and proposed conditions have been modelled and the results are as shown below:

- 272 L/s flow rate during 100 year ARI storm event under existing condition;
- 172 L/s flow rate during 20 year ARI storm event during existing condition.

With the on site detention system in place, the flow rates has been limited to the flowing:

- 134 L/s flow rate during 100 year ARI storm event under post-development condition;
- 125 L/s flow rate during 20 year ARI storm event under post-development condition.

On-Site Detention tank ensures the post-development stormwater flows are limited to the Sydney Water acceptable levels.

4.2 Water Quality

The water quality treatment measure for the proposed development for GSICFS is designed to satisfy all the requirements set by *City of Sydney Council Development Control Plan 2012 Section 3: General Provisions*. The City of Sydney Council's Water Sensitive Urban Design (WSUD) policy is listed below:

"Development of a site greater than 1000sqm must undertake a stormwater quality assessment to demonstrate that the development will achieve the post-development pollutant load standards indicated below:

- a) *Reduce the baseline annual pollutant load for litter and vegetation larger than 5mm by 90%;*
- b) *Reduce the baseline annual pollutant load for total suspended solids by 85%;*
- c) *Reduce the baseline annual pollutant load for total phosphorous by 65%; and*
- d) *Reduce the baseline annual pollutant load for total nitrogen by 45%."*

Currently the site does not have any stormwater quality treatment measures. The proposed strategy provides water quality measures specifically for the new school and associated infrastructure. The proposed water quality treatment/improvement strategy for the site is the provision of stormfilters - stormwater filtration units installed inside the Detention Tank and, enviropods – baskets installed in stormwater pits to capture gross pollutants traps, rubbish,...The proposed water quality treatment elements have been modelled using MUSIC [Version 6.3] software as shown in Figure 9.

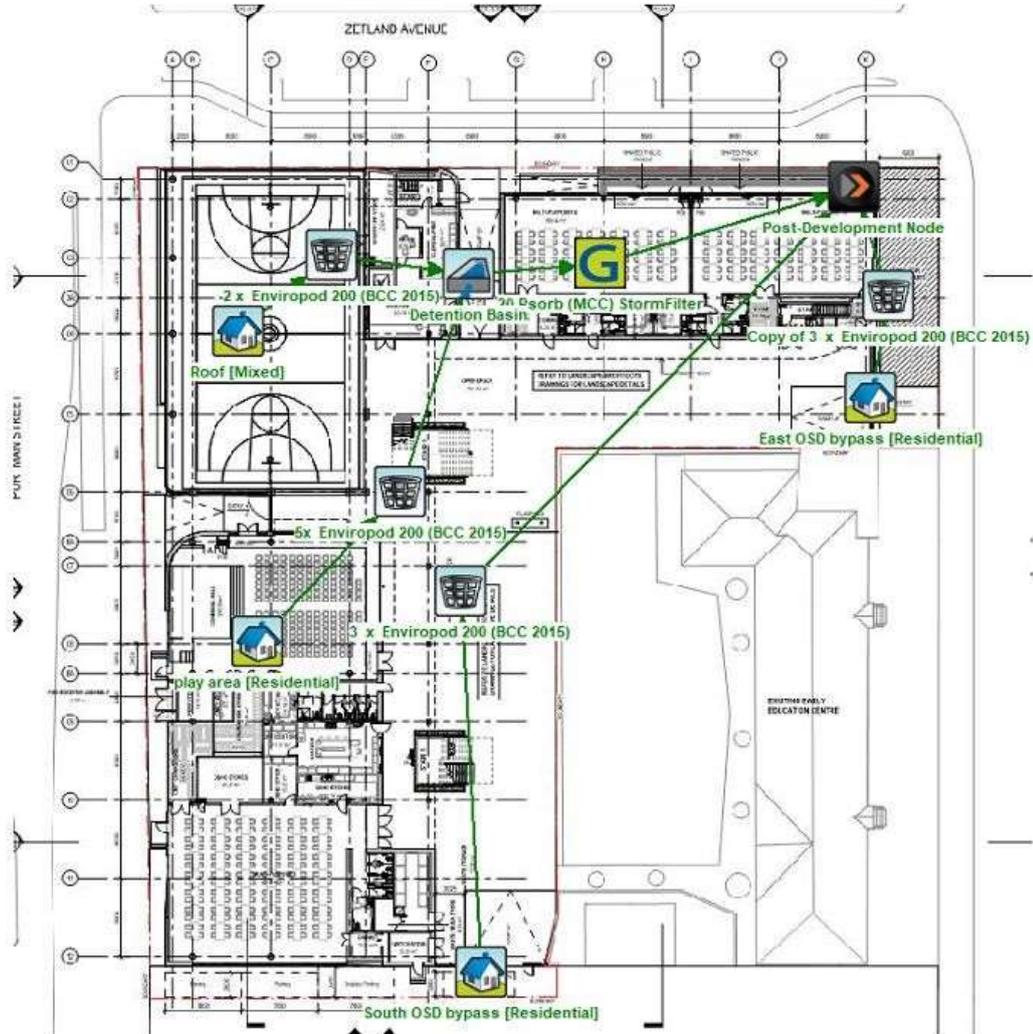


Figure 7 Water Quality Strategy in MUSIC

Results in Figure 8 show reduction in pollutant loads which are greater than the reduction targets set by Sydney Water.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.84	2.84	0
Total Suspended Solids (kg/yr)	563	73.4	87
Total Phosphorus (kg/yr)	1.07	0.23	78.5
Total Nitrogen (kg/yr)	7.62	3.34	56.2
Gross Pollutants (kg/yr)	87.4	0.697	99.2

Figure 8 MUSIC Modelling Results

The stormwater treatment train ensures minimum impacts on the surface water and groundwater by reducing the pollutant loads shown above. Landscaping including proposed trees maximises on-site water infiltration.

4.3 FLOOD RISK ASSESSMENT

The existing site is affected by 1% AEP event as shown in figure 8-A below extracted from Green Square Catchment- Flood Plain Risk Management Plan dated July 2013.

City of Sydney Council provided Flood Plain Management Plan: Floodplain Catchment: Alexandria Canal, published on 24 August 2016. This Management Plan is based on a comprehensive catchment-wide Alexandria Canal Catchment Flood Study and incorporated recent development within the catchment. The study developed two scenarios:

- The Base Case (2013); and
- The Ultimate Development 2017 Scenario, which incorporates several recent constructed developments and some proposed (approved) future developments.

For this project, the Ultimate Development 2017 Scenario has been adopted as the “Existing Scenario” with the updated drainage system and public road works. After the initial review of the TUFLOW model provided by City of Sydney, the base ground surface levels set up were extracted from the TUFLOW model and used to see that the model was built using the ground surface levels, as shown below in Figure 9, which is consistent with the levels shown in the Green Square Town Centre Plan, Package 4A by AECOM.

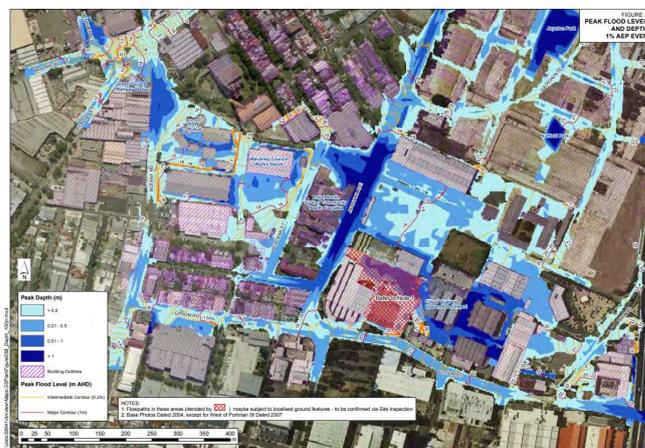


Figure 8-A- Peak Flood Levels in the Area

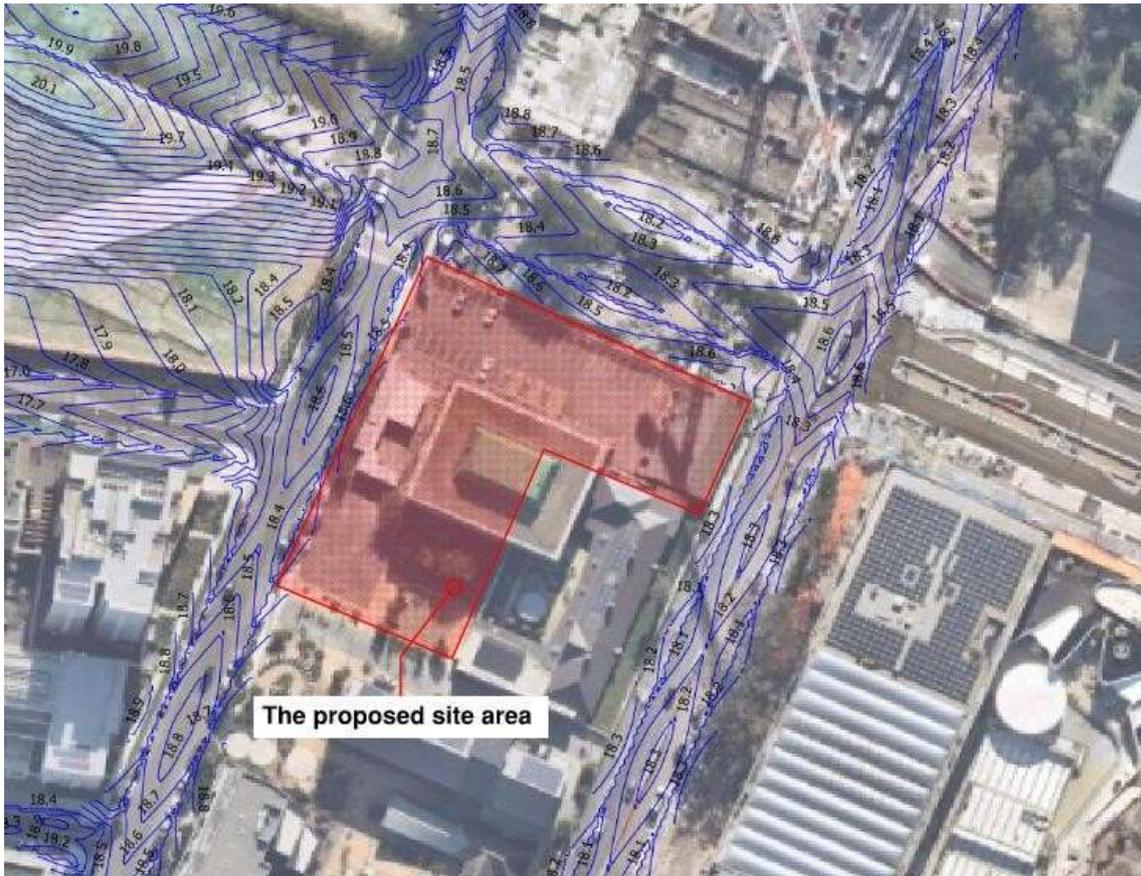


Figure 9 Screenshot from TUFLOW Model

Maximum 1% AEP flood level along Joynton Ave is 18.55. The City of Sydney Interim Floodplain Management Policy (IFMP) requires that all school and childcare facilities to be located above the 1% AEP plus 500mm freeboard. For commercial premises, the IFMP recommends a merit-based approach with a minimum requirement of 1% AEP as a flood planning level.

Considering the dual use nature of the ground floor, being school premises during school hours and community facilities at all other times, it is general practice that the worst case of the various uses governs the finish floor requirements. For school premises, the flood controls generally apply to the buildings housing classrooms and not open space areas and ancillary buildings. Therefore, the finished floor levels (FFL) are set at minimum 1% AEP flood level (RL 18.55) plus 500mm freeboard, equating to an RL of 19.05. This is up to 800mm higher than existing ground level.

To protect the proposed buildings, the surrounding public domain is designed to direct surface runoff away from the building entry points and into the proposed site stormwater pit and pipe system.

Alexandra Canal Catchment Flood Study has considered climate change in the form of increase in rainfall intensity. The study shows an increase of 0.1m to 0.3m as a result of increased rainfall. The study also shows that there was no increase in flood level due to the projected sea level rise. This will be readily accommodated through the use of appropriate Flood Planning Level freeboard- 500mm in this case as per council guidelines.

No material flood risk is expected for this site considering raised floor levels to avoid flood.

4.4 Erosion, Sediment and Dust Control

Erosion, sediment and dust control measures for the site will be implemented during construction. The design of these measures is to be in accordance with the *Managing Urban Stormwater – Soil & Construction Volume 1* (Landcom, 2004). Refer to **Appendix A** civil drawings for sediment and erosion control plans.

For erosion, sediment and dust control of the site, the following measures are suggested to minimise the risk of sediment's laden runoff being discharged from the site:

- A sediment fence/hoarding to be provided around the site.
- Catch drain (or diversion bund) diverting external catchment away from site.
- Temporary access to site with shaker pad to minimise tracking and assist with potential air quality issues.
- Water cart to spray excavated surfaces to reduce dust pollution.
- An indicative stockpile area with sediment fence around it during construction. The stockpile must be located out of water flow paths (and be protected by earth banks/drains as required).
- Geotextile inlet pit filters or sandbags to be placed around existing stormwater pits.
- All disturbed areas are to be stabilised within 14 working days of the completion of earthworks. All disturbed areas are to be protected so that the land is permanently stabilised within six months.
- Sediment removed from any sediment trapping device shall be relocated where further pollution to downslope lands and waterways cannot occur.
- Drainage pits are to be protected in accordance with the final approved Sediment and Erosion Control Plan, to minimise risk of stormwater carrying sediment entering the drainage system.
- Trapped sediment shall be removed from areas subject to runoff or concentrated flow, after rainfall events.
- Trapped sediment shall be removed where the capacity of sedimentation trapping devices fall below 60%.
- Revegetation schemes are to be adhered to and any grass coverings are kept healthy, including watering and mowing.

The above suggestions have been developed based on the recommendations in the following documents:

- Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom)
- Approved Methods for the Modelling and Assessment of Air Pollutants in NSW(EPA)
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013)

Appendix A - Civil Drawings

Appendix B - Correspondence with Sydney Water

Eve Wu

From: Stormwater <Stormwater@sydneywater.com.au>
Sent: Thursday, 23 July 2020 1:59 PM
To: Eve Wu
Subject: RE: Green Square Public School - OSD and PSD requirements

[External Email] - Be Cautious with Links and Attachments.

Eve,

The On Site Detention requirements for the 4,728.9 square meters site at 3 Joynton Avenue, Zetland (Green Square Public School) , are as follows:

- On Site Detention 83 cubic meters
- Permissible Site Discharge 164 L/s

The approval for the On Site Detention would only be given as part of the Section 73 application for this development. The On Site Detention is to be designed according to the above values and submitted to Sydney Water for approval with the Section 73 application. The following details are to be included in your submission for On Site Detention approval:

- Location of the On Site Detention in relation to the development
- Location of the On Site Detention in relation to overall stormwater network of the property
- Plan and Elevation of the On Site Detention tank with all dimensions
- Orifice plate calculation

Best Regards

Planning and Technical, City Growth and Development

From: Eve Wu [mailto:Eve.Wu@meinhardt-bonacci.com]
Sent: Thursday, 23 July 2020 9:57 AM
To: Stormwater <Stormwater@sydneywater.com.au>
Subject: Green Square Public School - OSD and PSD requirements

Hi Sydney Water/Jeya,

We are working on the Green Square Public School for NSW Department of Education. The development involves the construction of new buildings and demolition of old buildings. We have the following information to calculate PSD and SSR:

- Development address: Green Square Public School, 3 Joynton Avenue, Zetland NSW 2017
- Total site area: approximately 4728.9 m²
- Existing pre-development impervious area: 3783.12 m²
- Proposed post-development impervious area: 4492.0m²

Please let me know if above information is enough for PSD and SSR calculation.

Regards,

Eve Wu
Civil Design Engineer
[We Have Moved! - Please Update Your Records](#)



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