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STORMWATER REPORT

BUDAWANG SCHOOL
MILTON, NSW

Revision 2
April 2021

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PROJECT VERIFICATION

Project Title	Budawang School
Document Title	Stormwater Report
Project Number	20971
Description	20971 Stormwater Report
Client contact	Mark Reynolds - Schools Infrastructure

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Prepared By	Thomas Rozehnal	
Checked by	Andrew Francis	
Issued by	Thomas Rozehnal	
File Name	20971 Stormwater Report rev 1	

Document History

Date	Revision	Purpose	Recipients	Format	Checked
12/03/2021	01	For Approval	Ben Marshall	PDF	A.F
16/04/2021	02	For Approval	Ben Marshall	PDF	A.F

Executive Summary

This Stormwater Management Letter has been prepared by Henry & Hymas to supplement condition 16 of the SEARs for the proposed Budawang School located at Croobyar Rd, Milton. This letter documents the engineering design process in order to maintain adequate stormwater quantity and quality controls in accordance with the SEARs and Council's requirements.

The Report has been prepared to provide context on local stormwater for the site, investigate the interaction of the development with local drainage downstream of the site, and to outline how the proposed development meets all regulatory drainage requirements.

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1. EXISTING DEVELOPMENT

The development site (DP1192140) has an area of approximately 10,206m^2. This is one portion of an existing larger site however for the purposes of this letter will be called 'the site' This is shown as the yellow area within Figure 1. For this letter we will take North as up the page as shown in Figure 1. The development site generally falls from the Eastern boundary (Princes Highway) to the Western boundary with levels that range from RL52.70 to RL47.80. The existing site currently consists of various impervious surfaces such as driveway/roofs with an overall impervious/pervious ratio of about 29%/71%.

Figure 1 - Site location *(Source: Six Maps – NSW Department of Lands)*

As stated above the site falls from east to west. This is via a natural valley (green arrows) at approximately the midpoint of the site which drains to a head wall and 750mm diameter pipe system under the existing access road before discharging into a natural water course. The building and asphalt areas within the site are drained via an existing pit and pipe stormwater system to the natural watercourse.

There are two other areas within Figure 1. The blue area is the location of the proposed roundabout which gives access to the site. The red area is where a temporary access road (to the existing high school) and part of the proposed bike track area will be located. These areas have been hatched separately as they will be considered separate to the site. These two areas will be discussed further below.

2. PROPOSED DEVELOPMENT

The proposed school consists of five building/blocks; of which two are homebases/class rooms, one library, one multi-purpose hall and a hydrotherapy block alongside play areas and a carpark. The proposed buildings encompass the majority of the site, with access to the carpark from the existing access road off Croobyar Road and the new roundabout.

2.1 WATER QUANTITY

The majority of the site will be captured by a series of stormwater pits and pipes draining into a stormwater treatment system followed by an On-site Stormwater Detention (OSD) tank located half under Block A (library) before ultimately discharging into the existing 750mm diameter stormwater pipe which discharges under the existing access road and into the natural watercourse. This below ground Water Quality/OSD tank system can be seen on drawing 20971_CC_C201.

In accordance with Shoalhaven City Council 'Chapter G2: Sustainable Stormwater Management and Erosion/Sediment Control', OSD will be incorporated to match the post development peak flow with the pre-development peak flow. This drainage system was modelled using the DRAINS computer program to determine the pre and post developed flows. The following table displays the site discharge rate for the 5, 20 and 100 year ARI storm event.

ARI (year)	Pre-Development (L/s)	Post Development (L/s)
5	170	170
20	297	235
100	458	427

As mentioned above, the red and blue areas in Figure 1 have been omitted from site area calculations. Because of the levels that these two areas are at we cannot physically drain these areas up to the OSD and water quality tank. We have however done a review on these areas and it is evident that post development the impervious area percentage will be at or lower than the pre developed percentage. The use of these two areas will also be similar to the pre developed scenario so it can be inferred that there will not be an increase in water quantity and there will not be an increase in pollutants coming off these areas.

2.2 WATER QUALITY

Stormwater carries pollutants that it has picked up from the surfaces it has come into contact with. This creates a risk of contamination to downstream habitats. A treatment train can be implemented to protect against this risk of contamination. A treatment train consists of more than one mechanism that removes pollution; in our case a series of treatment devices

are used. The treatment train is effective because the different treatment devices in series overlap in the pollutants they remove thus providing a more thorough treatment with redundancies along the treatment train.

The first element along the treatment train will be providing rainwater tanks for the two homebases. The captured rainwater will be used for toilet flushing and irrigation. These elements have been designed by the Hydraulic Engineer. These tanks were not modelled in MUSIC giving a more conservative result in terms of pollutant removal.

Ocean Protect pit baskets will be installed in surface inlet pits around the site. 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. As shown in the music model a minimum of thirteen (13) pit baskets will be installed. Refer to Civil drawings for the pits that will contain the baskets.

10x 690mm Ocean Protect Stormfilters (Psorb Filter media) cartridges will be installed within the OSD tank and be used to treat the developed site. This secondary treatment device is used to treat a majority of the nutrients (phosphorus and nitrogen) being generated on-site.

A MUSIC model was generated to model this treatment train and the results can be seen in the below table. See Appendix A for the MUSIC modelling layout.

Pollutants	Target (%)	Results (%)
Gross Pollutants	90	93.3
Total Suspended Solids (TSS)	80	81.6
Total Phosphorus (TP)	45	64.4
Total Nitrogen (TN)	45	45

Further the results in the table above also meet the targets in column B of the Greenstar Technical Guideline (below).

Table 26.2 Pollution Reduction Targets

Pollutant	Reduction Target (% of the typical urban annual load)		
	A	B	C
Total Suspended Solids (TSS)[1]	80%	80%	90%
Gross Pollutants	85%	90%	95%
Total Nitrogen (TN)[2]	30%	45%	60%
Total Phosphorus (TP)[2]	30%	60%	70%
Total Petroleum Hydrocarbons[3]	60%	90%	90%
Free Oils[3]	90%	90%	98%

Figure 2 – Greenstar Pollutant Reduction Targets *(Source: Greenstar Technical Guidelines)*

As described in section 2.1 the red and blue areas from Figure 1 have been omitted from the water quality modelling due to the constraints of draining these to the OSD and water quality chamber. These areas will however have a lower impervious percentage when compared to the existing scenario and hence it can be inferred that there will be no increase in pollutants from those areas.

3. CONCLUSION

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

Whilst it is inevitable that the development will have an impact on 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.

I am an appropriately qualified and experienced person in this field and as such have a capacity to certify on behalf of Henry & Hymas Consulting Engineers that the design and performance of the design systems generally and in our opinion comply with the above and which are detailed on the civil drawings.

Yours faithfully,

THOMAS ROZEHNAL
For, and on behalf of,
H & H Consulting Engineers Pty Ltd

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APPENDIX A: MUSIC MODEL LAYOUT