

Stormwater Management Plan

The New Primary School at Warnervale,
75 Warnervale Road, Warnervale,
NSW 2259

80818098-01

Prepared for
Billard Leece Partnership

5 August 2019



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1 Background Information

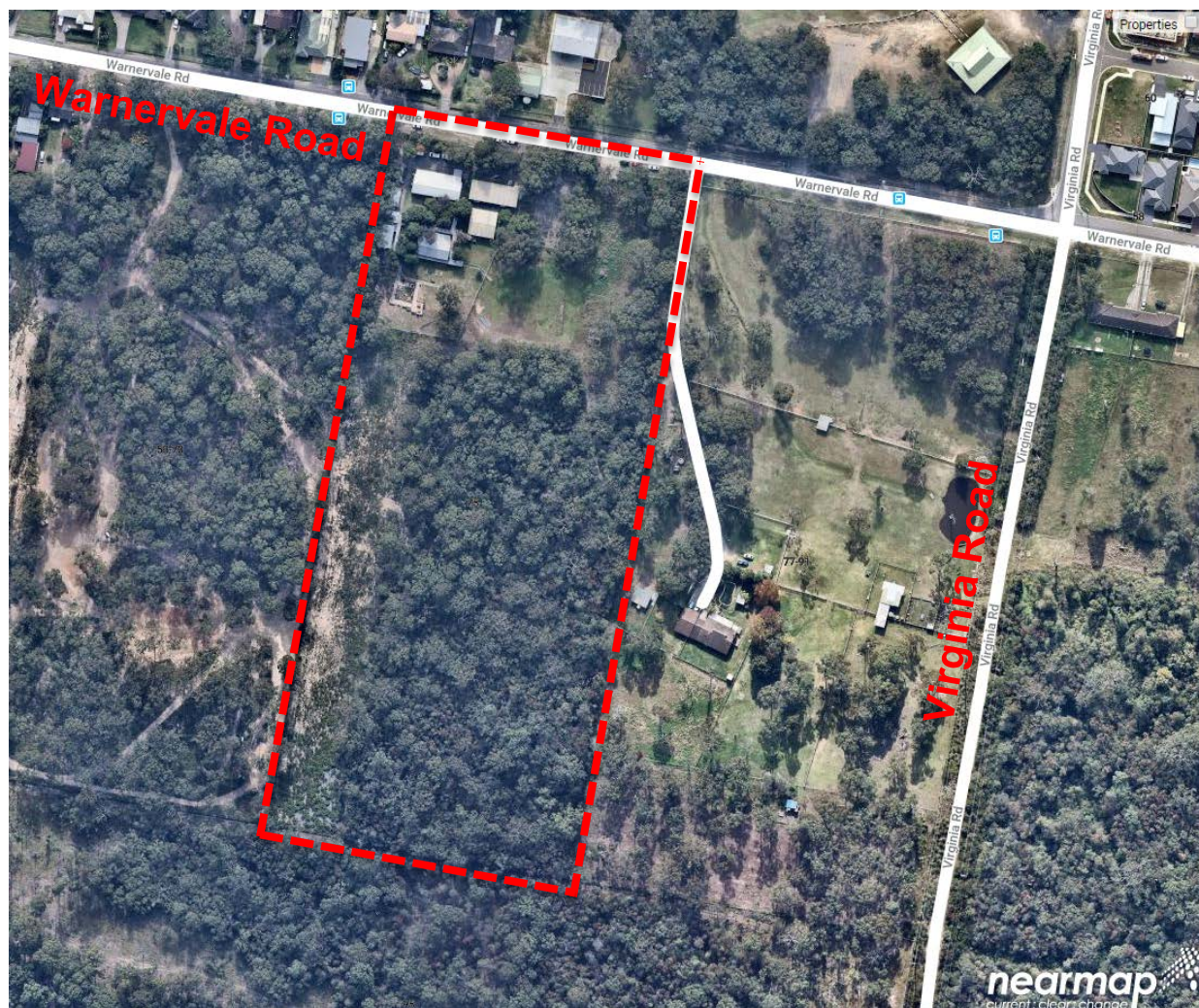
Cardno (NSW/ACT) is engaged by Billard Leece Partnership to prepare a Stormwater Management Plan for the proposed development of the New Primary School located on 75 Warnervale Road, Warnervale, NSW. The purpose of this report is to provide an insight into the proposed Stormwater Concept Plan. The Stormwater Management Plan has been prepared in accordance with the requirements of Central Coast Council's planning and development guidelines and Record of Advice of the pre-DA meeting.

2 Site Context

The existing site is located on 75 Warnervale Road, Warnervale NSW, approximately 700m east of Warnervale Railway Station and 5km north of Wyong city centre. The site is approximately 45320 m² in size, including area for the New Primary School in Warnervale in current development proposal and future expansion demountable zones. The northwest corner of the site is currently occupied by Old Warnervale Public School which will be demolished in its entirety. Below is the aerial view of the existing site.

The site is approximately at 18m AHD on average and grades down at approximately 4.8%, from west boundary towards east boundary, with minor undulations and mounds present at multiple locations.

Figure 2-1 Existing Site (Source - Nearmap 2019)



Based on desktop flood study and Central Coast Council engineer's email, it has been confirmed that the site at 75 Warnervale Road, Warnervale is not impacted by a 1% AEP flood event and hence no flood controls are applicable. More detailed information can be accessed from the online flood mapping tool provided by Central Coast Council.

The proposed site is shown as Figure 2-2 below.

Figure 2-2 The Proposed Site



A 3-D image depicts the main entrance off Warnervale Road as shown in Figure 2-3.

Figure 2-3 3-D School Image



The key features of the redevelopment involves the demolitions of all existing structures. The following facilities/features are proposed as part of the new school construction:

- New core 35 hall,
- New core 21 administration and staff Building,
- New core 21 OOSH,
- New core 21 canteen,
- New core 21 library,
- New core 21 (2x) special programs,
- New Teaching Spaces 20 (Includes 2 special education teaching spaces),
- New core 21 student amenities,
- New core 21 cola,
- Consideration for future expansion,
- Staff carpark 21 spaces,
- Visitor 5 spaces,
- Accessible 2 spaces,
- Related Road works and drop off /pick up zone,
- New games court

3 Proposed Development

The proposed development will consist of demolitions of existing Old Warnervale Public School and construction of the New Primary School. The construction works include:

- Demolition works;
- Shoring works;
- Bulk earthworks;
- Construction of new buildings;
- Construction of new external carpark and pick up/drop off zone;
- Construction of stormwater drainage system;
- Construction of water quality treatment;
- Construction of car entry/exit off Warnervale Road;
- Construction of pedestrian entry/exit off Warnervale Road;
- Construction of external landscaping and pavements;
- Construction of new service delivery road;
- Road expansion and roundabout insertion on Warnervale Road.

4 Stormwater Drainage Requirements and Water Sensitive Urban Design Objectives

4.1 Stormwater and Environmental Management Philosophy

In preparing the Stormwater Management Plan, we have followed Central Coast Council's Civil Works Specification - Design Guideline 2018: Section 10. Stormwater Drainage Design.

The general philosophy outlined by Council's planning and development guidelines is listed below:

- To reduce the peak flows from the site to Council's drainage system.
- To reduce the probability of downstream flooding.
- To minimise run-off volumes and replenish ground water.
- To provide drainage systems that integrates into Councils existing drainage network with minimal impact on existing users.
- To provide drainage systems that are low maintenance and long lasting.
- To prevent, or at worst minimise release of pollutants from the developed area.
- To provide drainage systems that incorporate rainwater tanks or other systems to reduce the development's reliance on mains supplied water.
- To encourage the production of high quality drainage plans that can be quickly assessed.
- To provide clear understanding of the information and documents that must be submitted with the drainage plans.
- To provide drainage systems that improve the natural environment, or at worst have nil, or minimal impact on the surrounding environment.

4.2 Summary of Treatment Targets of WSUD and Performance Criteria of Drainage System

Stormwater drainage requirements and Water Sensitive Urban Design (WSUD) objectives are specified in Central Coast Council's Civil Works Specification - Design Guideline 2018: Section 11. Water Sensitive Urban Design (WSUD) and MUSIC Modelling Guidelines.

Treatment targets and performance criteria for the drainage system and WSUD are summarised in Tables 4-1 to 4-2 below. The actual performance of the treatment will be finalised in the detailed design stage.

Table 4-1 Treatment Targets for Stormwater Quality

Pollutant	Performance Requirement (Targets)	Performance Achieved
Gross Pollutants	90% reduction in the Post development mean annual load	100% reduction in the mean annual load
Total Suspended Solids	80% reduction in the Post development mean annual load	80.9% reduction in the mean annual load
Total Phosphorous	45% reduction in the Post development mean annual load	66.1% reduction in the mean annual load
Total Nitrogen	45% reduction in the Post development mean annual load	50.6% reduction in the mean annual load
Hydrology	The post- development peak discharge must not exceed the pre-development flows for the 5,20,& 100 % AEP event	The post development flow is less than pre development flow for the 5, 20 & 100 % AEP event.

Table 4-2 Performance Criteria for Stormwater Drainage Design

Component	Performance Criteria
ARI design event for internal piped drainage system	1 in 20 years
ARI design event for roof drainage	1 in 20 years
ARI design event for surface runoff	1 in 100 years
ARI design event for overland flow	1 in 100 years
ARI design event for onsite detention	1 in 100 years
Discharge to kerb and gutter connections	25 L/s max

5 Description of Proposed Stormwater System

The building floor levels have been set at the proposed values in order to protect the buildings from water ingress from surface flows during large storm events (up to ARI = 100 years) and other occurrences when the capacity of the in-ground pits and pipes system has been exceeded (e.g. due to full or partial blockage of the system).

The proposed stormwater system for the site can be described as follows:

- All roof rainwater is to be collected and piped directly into rainwater tanks through the roof drainage systems, which consists of gutters and downpipes.
- Overflow from the rainwater tank will be piped into an overflow pit, conveyed by underground pipe system, to the filtration chamber in the OSD tank and the clean water will be discharged to the adjacent gravel road.
- Surface stormwater from the carpark catchment will be collected by the kerb inlet pit located in the carpark kerb area, and then conveyed by the in-ground pipe system. The water will flow through the Ocean Guard with 200 micron bags located in the kerb inlet pits to provide higher water quality and the storm filter located in on-site detention tank before discharging water to the adjacent gravel road.
- Surface water from the Games Court will be collected by the 200 mm wide grated drain along the Games Court and discharged to grated pit via pipe system. Grated inlet pit is connected to on-site detention tank storm filter chamber for water filtration via underground pipe system.
- Stormwater in the central landscaped area will be collected by the surface inlet pit, and then directed into the filtration chamber in on-site detention tank.
- On-site detention system is designed for up to 100-year ARI storm events. In case of exceedance of the storm, events greater than 100-year ARI, allowance of 100 wide slots @ 2000 c/c through barrier balustrade will be made to direct overflow to adjacent gravel road.
- Dimensions of downpipes, stormwater pipes, stormwater pits will be determined in the detailed design stage.
- All installations of above stormwater system will conform to the Central Coast Council's planning and development guidelines and appropriate Australian Standards.

6 Rainwater Harvesting

Rainwater tanks are required by Central Coast Council for this New Primary School development to reduce adverse impacts like increased runoff and frequent overland flows caused by increasing impervious areas.

Locally harvested rainwater is the primary source of non-potable water and a supplementary supply to potable water for proposed development, to minimise the impact of stormwater on water receiving facilities and to meet Central Coast Council's water conservation controls.

Rainwater system is proposed by Northrop Consulting Engineers and is outside the scope of this report.

7 Stormwater Quality

Stormwater quality requirements as per Central Coast Council's Civil Works Specification (concept previously summarised in Section 4) have been incorporated into the overall stormwater management design for the site. As a minimum, stormwater runoff generated from any storm event up to 1 in 20 years ARI within the development must be captured for treatment prior to being discharged from the site. The captured water must be treated to meet the pollutant discharge requirements set out in Table 4-1.

Water quality measures adopted on the site will be modelled using MUSIC software in detailed design stage. The results will show the performance of the nominated treatment trains on the removal of nutrients and suspended solids. Details of water quality control devices will be specified to meet the treatment targets in Table 4-1.

8 Stormwater Quantity

Central Coast Council requires the detention basin for the New Primary School development, to limit flooding and downstream flow rates to pre-development quantity for both minor and major system of design AEP.

Detention Basin aims to retain stormwater on the site through the temporary storage of roof or surface water runoff and then slowly discharge treated stormwater to drainage system with controlled rate same or less than pre-development flow rate with the use of orifice control.

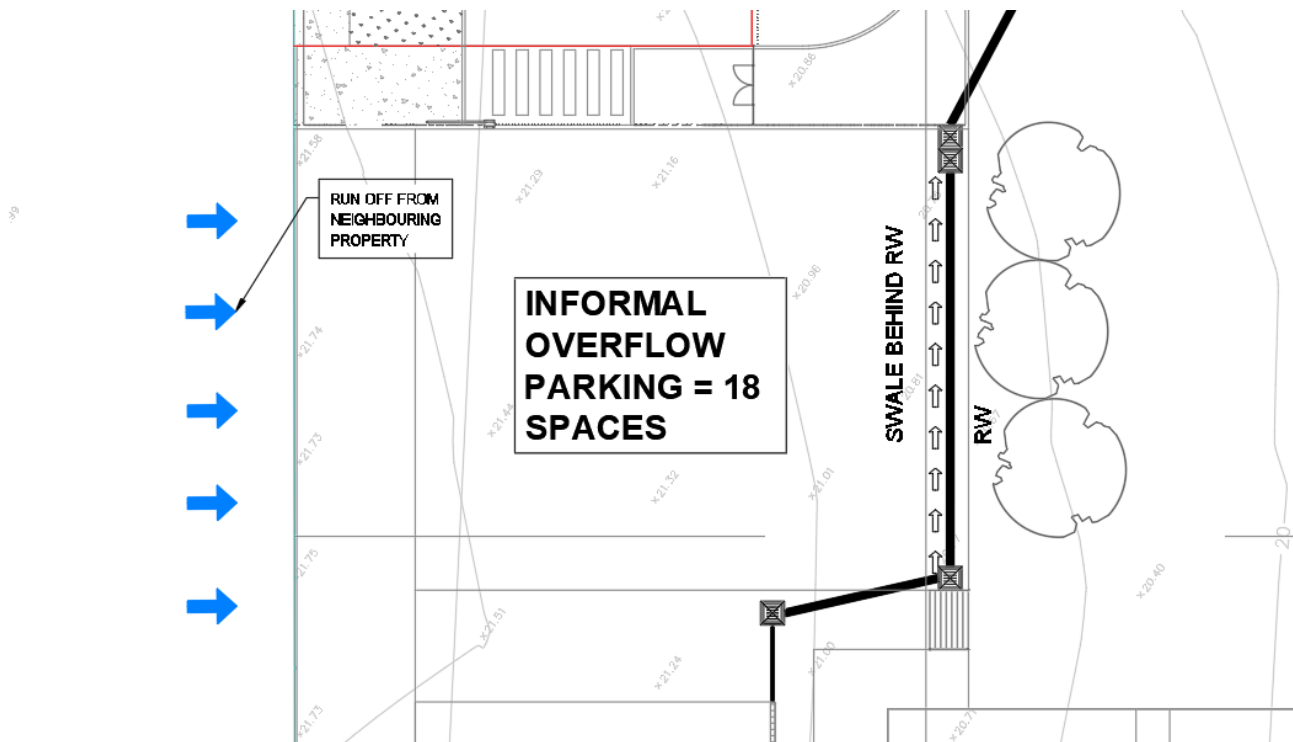
The detention tank size (30M x 5M x 1.6M deep) is designed for 100yr ARI event. A series of 100mm wide slots at 2000c/c through barrier balustrade are provided to allow for overflow for storm event ARI > 100 years.

9 Overland Flow Study

Overland flow from the upstream neighbouring property will be collected by the swale system located along the informal overflow parking spaces and conveyed via surface inlet and pipe system to the on-site detention filtration chamber where storm filter is placed and then clean water will be discharged at a controlled rate same or less than pre-development flow to the adjacent gravel road.

Approximately 20m of upstream overflow flow from neighbouring site will be collected in the swale system near informal parking spaces as shown in below figure.

Figure 9-1 Overland Flow Study from Upstream Property



10 Construction Phase Erosion and Sediment Controls

A construction phase erosion and sediment control plan has been developed. The plan demonstrates the proposed method of soil management and its implementation in accordance with details suggested by The Blue Book - Managing Urban Stormwater: Soils & Construction by Landcom.

The construction phase approach adopted for this site incorporates principles recommended by the NSW Department of Housing, namely:

- Plan for erosion and sediment control concurrently with engineering design and in advance of earthworks proper assessment of site constraints and integration of the various needs;
- Minimise the area of soil exposure;
- Conserve the topsoil where possible;
- Control water flow from the top of the development area, such as:
 - Divert clean runoff above uncovered areas
 - Reduce slope gradient and length
 - Minimise runoff to non-erodible velocities
 - Trap soil and water pollutants
- Immediate Rehabilitation of effected land.

The proposed construction entry, site fence, silt fence, silt traps and sand bags effectively reduce erosion hazard and prevent soil, building material and pollutants from leaving the site and entering waterways.

11 Maintenance

Maintenance of concrete pits, pipes and paved flow paths will be minimal as they are generally self-cleansing, and hence only involve occasional cleaning. Regular inspections of water quality control systems and the absorption tank should be carried out to ensure satisfactory performance of the drainage systems proposed. Maintenance should occur on a 3 months basis or after major storm events.

Table 11-1 Summary of Inspection and Maintenance Activities

Element	Activity and Interval
Stormwater grates, rainwater inlets from roof gutters, podium slab, grated drains etc.	Remove any accumulated debris. Note that debris may be on both sides of the grate for pits.
Stormwater pits	Remove any accumulated debris. Note that debris may be in the pit invert or affecting inlet or outlet pipes.
Ocean Guards, Psorb cartridges etc.	Inspection, maintenance and cleansing method are in accordance with manufacturer's specifications.

Note that the above intervals are indicative only. Maintenance frequencies and requirements are site specific and vary dependent on pollutant loading. Maintenance activities may be required in the event of an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

The above table will be reviewed and updated (if required) when particular WSUD devices are determined after the MUSIC modelling of the site.

12 References

Central Coast Council Civil Works Specification - Design Guideline 2018, August 2018.

Central Coast Council Online Mapping Tool 2018.

Central Coast Council Pre-DA Meeting Record of Advice.

Managing Urban Stormwater: Soils & Construction by Landcom, March 2004.

NSW MUSIC Modelling Guidelines by BMT WBM Pty Ltd, August 2015.

Wyong Development Control Plan 2013.

APPENDIX

A

CONCEPT CIVIL ENGINEERING
DRAWING LIST FOR SSDA
SUBMISSION

No.	Drawing Title	Drawing No.	Revision
1	COVER SHEET & LOCALITY PLAN	80818098-01-CI-0001	4
2	CIVIL CONSTRUCTION NOTES	80818098-01-CI-0002	4
3	SITE PLAN – LAYOUT 1	80818098-01-CI-1101	4
4	SITE PLAN – LAYOUT 2	80818098-01-CI-1102	4
5	STORMWATER PLAN – LAYOUT 1	80818098-01-CI-1201	4
6	STORMWATER PLAN – LAYOUT 2	80818098-01-CI-1202	4
7	STORMWATER SCHEDULES	80818098-01-CI-1204	4
8	SEDIMENTATION AND EROSION CONTROL PLAN – LAYOUT 1	80818098-01-CI-1401	4
9	SEDIMENTATION AND EROSION CONTROL PLAN – LAYOUT 2	80818098-01-CI-1402	4
10	STORMWATER DETAILS – SHEET 1	80818098-01-CI-2201	4
11	STORMWATER DETAILS – SHEET 2	80818098-01-CI-2202	4
12	SEDIMENTATION AND EROSION CONTROL DETAILS	80818098-01-CI-2401	4