

Amity College  
C/- Gran Associates



## Integrated Water Management Plan:

Lots 1 and 2 DP 525996,  
85 Byron Road and 63 Ingleburn Road,  
Leppington, NSW

ENVIRONMENTAL



WATER



WASTEWATER



GEOTECHNICAL



CIVIL



PROJECT  
MANAGEMENT



P1806493JR01V03  
July 2019

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# 1 Introduction

## 1.1 Overview

This stormwater management report has been prepared by Martens & Associates Pty Ltd (MA) to support a state significant development application (SSDA) for a proposed school at 85 Byron Road and 63 Ingleburn Road, Leppington, NSW (the 'site').

The school is proposed to be developed in 8 stages. The stormwater management report is designed to be compatible with this staged approach and should be read in conjunction with MA planset P1806493-PS01.

## 1.2 Project Scope and Aims

This report provides the following:

- Evidence of compliance with Secretary's Environmental Assessment Requirements (SEARs) SSD 9227 as they relate to stormwater management;
- Water quality assessment modelling and results using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) in accordance with Camden City Council Engineering Design Specification (2009).
- Drainage system concept design to cater for the minor system by way of pit and pipe and major system by way of pit and pipe and overflow paths.
- Documentation of water quantity requirements for the development in accordance with SEARs.
- Flooding assessment.
- Sediment and erosion control.
- Water assessment.
- Wastewater assessment.
- Groundwater assessment.

### 1.3 Relevant Planning Controls and Design Principles

The following planning and engineering controls and design principles have been considered:

- Camden City Council (CCC) (2009) – *Engineering Design Specification*.
- Camden City Council (CCC) (2013) – *Local Environmental Plan*.
- Camden City Council (CCC) (2015) – *Camden Growth Centre Precincts Development Control Plan*.
- Greater Sydney Local Land Services (GSLLS) (2015)– *NSW MUSIC Modelling Guidelines*.
- NSW Office of Environment & Heritage (NSW OEH) (2013) – *Guidelines for Development Adjoining Land and Water Managed by DECCW*.
- Parsons Brinckerhoff (2014) – *Leppington Precinct Water Cycle Management Strategy*.

## **2 Site Description**

### **2.1 Location and existing land use**

The site is approximately 2.3 ha per the Total Survey Solutions Plan no 191149-1, and located over Lots 1 and 2 DP 525996, 85 Byron Road and 63 Ingleburn Road, Leppington, NSW within the CCC Local Government Area (LGA). The rural site is predominantly open grasslands. The site is zoned SP2 -Infrastructure and R3 – Medium Density Residential.

The surrounding land uses are primarily rural and rural residential. Camden Valley Way is located approximately 550 m to the south-east.

### **2.2 Topography and Hydrology**

Site elevation is approximately 93.75 m AHD to the site's north western boundary at the existing drainage depression, sloping up to 102.5 m AHD near the southern. There is a ridge running from the southeast to the northwest through the centre of the site. Existing site drainage is generally via overland flow paths to a natural drainage depression at the north eastern boundary for land west of the ridge, and to the northern corner of the lot for land east of the ridge.

## 3 Stormwater Quality Assessment

### 3.1 Water Quality Objective

CCC has provided the treatment objectives for pollutants in Council's Engineering Design Specification (2009). The following water quality objectives are to be achieved by the development when comparing the developed site with and without integration of water quality treatment measures:

- 85% reduction in total suspended solids (TSS).
- 65% reduction in total phosphorus (TP).
- 45% reduction in total nitrogen (TN).
- 90% reduction in gross pollutants (GP).
- The post development duration of stream forming flows shall be no greater than 5 times the pre developed duration of stream forming flows with a stretch target of 1.

### 3.2 Modelling Methodology

#### 3.2.1 Overview

Model for Urban Stormwater Improvement Conceptualisation (*MUSIC*, Version 6.2) was used to evaluate treatment train effectiveness (TTE) and the Stream Erosion Index (SEI).

Modelling has been undertaken in accordance with GSLLS (2015) guidelines with the developed site based on the proposed design for both Stage 1 and the ultimate stage, including water quality treatment devices required to achieve adopted water quality objectives.

The MUSIC model layouts are provided in MA planset P1806493PS01-E700, E710 and E711.

#### 3.2.2 Approach

An iterative approach was used to determine appropriate types, sizes and locations of stormwater treatment devices required to satisfy the adopted water quality objectives.

The MUSIC model includes all areas that are disturbed by the proposed development or drain to a treatment device. All other areas (i.e. where no development is proposed) have been excluded from the model.

### 3.2.3 Climate Data

Pluviograph data was sourced from ewater using the Liverpool (Whitlam Centre) pluviograph. The data was run on a 6-minute time step from 01/01/1967-31/12/1976.

### 3.2.4 Input Parameters

Input parameters for source and treatment nodes are consistent with GSLLS (2015) guidelines and are provided in MUSIC models P1806493MUS02V02 (Stage 1) and P1806493MUS01V03 (Stage final).

### 3.2.5 Catchment Areas

Catchment delineation and impervious fractions are based on the proposed development and concept grading works. Refer to MA planset P1806493PS01-E700, E710 and E711 for catchment boundaries.

## 3.3 Water Sensitive Urban Design Measures

Water sensitive urban design (WSUD) measures are required to satisfy the water quality objectives in Section 3.1 in accordance with Council's Engineering Design Specification (2009) and Leppington Precinct Water Cycle Management Strategy (2014).

The stormwater treatment strategy for the site uses combination of 'at - source' and 'end - of - line' controls to ensure treatment objectives are satisfied. Individual WSUD measures are outlined in the following sections.

### 3.3.1 Stage 1

#### 3.3.1.1 Stormwater360: Enviropod

An Enviropod is proposed to treat gross pollutants in stormwater. The modelled treatment efficiency of the Enviropod is based on the manufacturer's specifications.

The location of the Enviropod is shown on MA planset P1806493PS01-E101.

### 3.3.1.2 Stormwater360: Stormfilter Chamber

Stormfilter devices provide a reduction in nutrient pollutant loads through propriety media filtration. The following was included in modelling:

Tank surface area: 2.2 m<sup>2</sup> (inclusive of cartridges)

No. of cartridges: 2 x psorb cartridges

High flow bypass: 0.0018 L/s

Low flow diameter: 28 mm

### 3.3.2 Stage Final

#### 3.3.2.1 Rainwater Tank

Runoff from designated roof areas will be connected to two rainwater tanks for reuse. The collected water will be reused for landscape irrigation. The following was included in modelling:

- 7 x 10 kL rainwater tank; four located next to the primary hall and three next to the secondary hall.
- An average internal daily reuse rate of 1 kL/day was applied.
- An annual external reuse rate of 450 kL/year (0.4 kL/m<sup>2</sup>/year) was applied and scaled by potential evapotranspiration variations.

#### 3.3.2.2 Stormwater360: Enviropod

Only areas nominated in MA planset P1806493PS01-E710 will be diverted to Enviropods to capture gross pollutants. The modelled treatment efficiency of the Enviropod is based on the manufacturer's specifications.

The location of the Enviropod is shown on MA planset P1806493PS01-E100.

#### 3.3.2.3 Stormwater360: Stormfilter Chamber

Stormwater runoff from the areas nominated in MA planset P1806493PS01-E710 will be diverted to Stormfilter devices. The following was included in modelling:

Tank surface area: 18.7 m<sup>2</sup> (inclusive of cartridges)

No. of cartridges: 25 x psorb cartridges

High flow bypass: 0.0225 L/s

Low flow diameter: 111 mm

#### 3.3.2.4 Bioretention Basins

Stormwater runoff from areas nominated in MA planset P1806493PS01-E710 shall be conveyed by way of pit and pipe to two biofiltration basins. The bioretention basins provide treatment through filtration, evapotranspiration and detention. The biofiltration systems were modelled in accordance with the proposed parameters nominated below and are subject to detailed design:

- Extended detention depth: 0.3 m
- Filter area: 20 m<sup>2</sup> for the total site, basin shown in planset P1806493PS01-E100.
- Filter depth: 0.40 m.
- Saturated Hydraulic Conductivity: 100 mm/hr.
- Total Nitrogen Content: 400mg/kg
- Total Orthophosphate Content: 40 mg/kg

### 3.4 MUSIC Results

MUSIC modelling results for stage 1 (P1806493MUS02V02) and the final stage (P1806493MUS01V03) are provided in Table 1 and Table 2.

**Table 1:** MUSIC TTE results: Stage 1.

Parameter	Sources	Residual Load	Achieved Reduction	Required Reduction	Complies (Y/N)
TSS (kg/year)	296	35.600	88.0%	85%	Y
TP (kg/year)	0.484	0.153	68.3%	65%	Y
TN (kg/year)	2.730	1.370	49.7%	45%	Y
Gross Pollutants (kg/year)	33.600	0.921	97.3%	90%	Y



**Table 2:** MUSIC results: Stage Final.

Parameter	Sources	Residual Load	Achieved Reduction	Required Reduction	Complies (Y/N)
TSS (kg/year)	1860	276	85.2%	85%	Y
TP (kg/year)	3.930	1.310	66.6%	65%	Y
TN (kg/year)	36.100	17.900	50.6%	45%	Y
Gross Pollutants (kg/year)	461	1.050	99.8%	90%	Y

### 3.5 SEI calculations and results

The probabilistic rational method was used to calculate the 1 in 2 years ARI pre-development flow outlined in GSLLS (2015) guidelines. The critical flow was calculated to be 0.108 m<sup>3</sup>/s. This flow was then applied to a generic treatment node to transform flows less than critical flow to 0 m<sup>3</sup>/s and evaluate stream forming flows. Table 3 yields stream forming flows for pre-development (3% impervious) and post development (77% impervious) scenarios with an SEI value less than 5.

**Table 3:** MUSIC stream erosion index results.

Parameter	Pre Sources	Post Sources	SEI	Complies (Y/N)
SEI transformed Flow (ML/yr)	68.8	138	2.01	Y

### 3.6 Conclusion

The modelling results indicate that the water quality objectives will be met by the proposed WSUD measures for both stage 1 and the ultimate stage. The proposed management system is consistent with the principles of Water Sensitive Urban Design as the proposed treatment strategy utilises 'at - source' controls rather than relying solely on end - of - line structures. This approach is considered the most appropriate for the site and will provide an appropriate outcome for receiving environments.

## 4 Stormwater Quantity Assessment

### 4.1 Objectives

Water quantity objectives are to comply with CCC Engineering Design Specification (2009). Site stormwater management has been designed to comply with the objectives of CCC Engineering Design Specification (2009) as follows:

- Drainage system to carry all flows during minor storm events, up to the 2 year ARI event, by way of pit and pipe.
- Drainage system to carry all flows during major storm events, up to the 100 year ARI event, by way of pit and pipe and overland flow.
- Providing stormwater quantity devices outlets outside of preliminary 1% AEP flood extent so as to not be drowned outlets.

### 4.2 Overview

The DRAINS software package (version 2019.03 – 22 March 2019) was used with the ILSAX hydrological engine to satisfy the OSD criteria nominated in Section 4.1. A conceptual pit and pipe system is provided in MA planset P1806493PS01-E100 with hydraulic analysis to be completed at detailed design stage.

### 4.3 Modelling Methodology

Parameters used in the model are consistent with *Australian Rainfall and Runoff (AR&R)* 1987 procedure. Modelling assumptions are derived from the following sources:

- Intensity Frequency Duration (IFD) coefficients were based on the Institution of Engineers AR&R (1987).
- ILSAX parameters for all catchments were based on Council's Engineering Design Specifications (2009) as shown in Table 4.
- Catchment delineation was developed using site survey data, LIDAR data and the proposed drainage system. A layout and table of the post-development catchment assessment has been provided in Plans P1806493PS01-E600.

- o Post-development catchment impervious areas were determined based on development layout design.

**Table 4:** ILSAX hydrology details used in DRAINS modelling.

Parameter	Element	Value
ILSAX parameters <sup>1</sup>	Impervious area depression storage (mm)	1.0
	Supplementary area depression storage (mm)	1.0
	Grassed area depression storage (mm)	5.0
	Soil type	3

**Notes**

1. Camden City Council's Engineering Design Specifications.

#### 4.4 Site Drainage

The proposed concept pit and pipe network for stage 1 and the ultimate stage is provided in MA planset P1806493PS01-E100 and utilises the following system to manage runoff:

- o Development run-off shall be captured by the proposed pit and pipe network and conveyed to a water quality treatment or OSD system prior to discharging offsite.
- o Hydraulic modelling shall be completed at detailed design stage to comply with Camden City Council Engineering Design Specifications (2009) and AS 3500.3.

## 4.5 OSD

OSD storage has been designed for the proposed development to satisfy the objectives in Section 4.1. Further details for OSD for Stages 1-4 and the final stage are provided in MA planset P1806493PS01-E600 with a summary of key components provided in Table 5 and Table 6.

**Table 5:** Summary of OSD basin for Stage 1-4.

Volume (m <sup>3</sup> )	Primary orifice (mm)	Primary Orifice Centre Elevation (mAHD)	Primary Weir (mAHD)	Primary Weir Crest Length (m)
346	320	94.30	95.04	3.6

**Table 6:** Summary of OSD tank for Stage Final.

Volume (m <sup>3</sup> )	Primary orifice (mm)	Primary Orifice Centre Elevation (mAHD)	Primary Weir (mAHD)	Primary Weir Crest Length (m)
530	260	94.50	96.25	3.6

## 4.6 DRAINS Results

A summary of the critical storm runoff results from DRAINS model P1806493DRN01V07 for the 2 and 100 year ARI storm events in Stages 1-4 and the final stage are provided in Table 7 and Table 8 with full results provided in MA planset P1806493PS01-E600.

**Table 7:** Summary of OSD results for Stage 1-4.

Storm Event	Critical Duration	Peak flow (L/s)	Permissible Site Discharge (L/s)	Post < Pre
2	1.5 hr	0.179	0.190	Yes
100	1.5 hr	0.660	0.685	Yes

**Table 8:** Summary of OSD results for Stage Final.

Storm Event	Critical Duration	Peak flow (L/s)	Permissible Site Discharge (L/s)	Post < Pre
2	1.5 hr	0.175	0.190	Yes
100	1.5 hr	0.657	0.685	Yes

## 4.7 Conclusion

The proposed drainage system has been designed to capture and convey site stormwater for stage 1 and the ultimate stage. Hydraulic modelling shall be completed at detailed design stage to comply with Camden City Council Engineering Design Specification (2009) and AS 3500.3. The OSD and water quality (WSUD) elements have been designed to comply with the SEAR's requirements, with further details provided at the detailed design stage.

## 5 Flooding

The current site is partially affected by the 1% Annual Exceedance Probability (AEP) event as shown in Council's mapping in Camden Growth Centre Precincts DCP Schedule 5 – Leppington Priority Precinct (2015), also refer to MA planset P1806493PS01-E100. A compliance assessment demonstrates the development complies with Council's flood requirements, refer to Attachment A: Flood Report.

The proposed flood characteristics are expected to be consistent with the existing conditions, with a very minor loss of flood storage as a result of filling at the site. As the site is to be raised above the flood planning level and the PMF level, the developed site is not considered flood affected. Council's flood mapping suggest that the flood affectation is likely due to the downstream dam (likely to be filled as part of future development). The loss of flood storage is considered to be of immaterial significance as the development occurs on the outer extent of the flood fringe.

## **6 Erosion and Sediment Control Plan**

### **6.1 Overview**

This section details the erosion and sediment controls proposed for the construction phase of the works at the site. To eliminate the discharge of sediment from the site, temporary sediment and erosion controls are to be constructed prior to commencement of any work. The controls are to be installed in accordance with the Sediment and Erosion Control Plans prepared by MA and the requirements of Landcom (2004).

### **6.2 Sedimentation Basin**

Based on the methods provided in the Blue Book, a 180m<sup>3</sup> sedimentation basin is required for the construction phase of the development. The OSD is proposed to be used as the temporary sedimentation basin. Refer to MA planset P1806493PS01-B305 for further details of the calculations.

### **6.3 Erosion and Sediment Control Measures**

The following sediment and erosion control measures are proposed to prevent the pollutants generated from construction activities from adversely affecting the water quality of the receiving environment.

- Sediment fencing shall be used at the downslope end of the site for the duration of all earthworks.
- Proposed site clearance and bulk earthworks shall be undertaken following the implementation of site sediment control fences.
- Stormwater inlets shall be protected by geotextile sediment barriers at all times during work on site.
- All site stockpile areas shall have sediment fencing downslope of them.
- Stabilised site access is to be used at all times during the construction phase.
- Rock check dams is to be used within concentrated flow channels.

## 7 Water Management

The site's water supply comes from two sources: roofwater reuse and town water. Despite roofwater being captured and reused on site, town water is the main water supply for the site.

The site water management and reuse system is summarised as follows:

- Rainwater from the building roofs is to be collected and stored in rainwater tanks and used for outdoor irrigation.
- Town water will be used for amenities, potable uses and to supplement other supplies as required.

For more information on water supply to the site refer to Section 2 of the Infrastructure & Services Report prepared by Erbas.

We recommend that the following water conservation strategies to be investigated at detailed design stage to further reduce the site's town water demands:

- Use of smart water meters;
- Use of flow limited taps and showers;
- Use of drip irrigation; and
- Use of water efficient applications such as dual flushing toilet and waterless urinals.



## 8 Wastewater Management

The site will be connected to Sydney Water sewer main in Ingleburn Road for sewage disposal. No onsite treatment, reuse or disposal is proposed. The connection will require extension of the sewer main in accordance with the Infrastructure & Services Report prepared by Erbas.

We recommend that the following wastewater load reduction strategies to be investigated at detailed design stage:

- o Graywater reuse;
- o Use of water efficient applications which contribute to wastewater loads.

## 9 Groundwater Assessment

The Geotechnical and Salinity Investigation Report prepared by GeoEnviro Consultancy indicates that all boreholes were dry during and shortly after completion of drilling. Therefore, regular encounters with groundwater during construction are not expected.

## 10 Water Cycle Management Strategy Compliance

### Checklist

Water cycle management strategy to be used for the development are provided in Table 9.

**Table 9:** Water Cycle Management Strategy Compliance Checklist (Parson Brinckerhoff, 2014)

Water Cycle Management Objectives	Section of Report	Compliance (Y/N)
<b>1. Stormwater Quantity</b>		
1) Harvest rainwater from roof areas for non-potable internal and external demands.	Section 3.3.2.1	Y
2) Harvest stormwater to reduce the demand for potable water for nonpotable demands as much as possible.	-	N
3) Minimise changes in hydraulic regime to protect stability of waterways and ecosystems within waterways in accordance with requirements for erosion control ratio in the Camden Growth Centres DCP.	Section 4.6	Y
4) Adopt best practice erosion and sediment control techniques during construction.	Section 6	Y
<b>2. Stormwater Quality</b>		
1) Reduce load of urban stormwater pollutants from site to best practice criteria.	Sections 3.4	Y
2) Adopt WSUD elements in the stormwater management system to protect and enhance natural water systems, to reduce stormwater runoff and peak flows, to meet water quality objectives through quality improvement measures.	Section 3.3, 3.4 & 3.5	Y
<b>3. Water Supply</b>		
1) Provide a safe and reliable supply of water.	Section 7	Y
2) Minimise potable water consumption by limiting potable water supply to demands that require potable water.	Sections 3.3.2.1 & 7	Y
3) Maximise re-use of stormwater in urban areas	Section 7	Y
4) Encourage the use of recycled water for non-contact uses.	Section 8	Y
<b>4. Wastewater</b>		
1) Provide appropriate wastewater collection and conveyance system in accordance with Sydney Water Corporation strategy and receiving environment.	Section 8	Y
2) Minimise the generation of wastewater.	Section 8	Y
<b>5. Groundwater</b>		
1) Minimise the impacts of development to groundwater quality and quantity.	Section 9	Y

Water Cycle Management Objectives	Section of Report	Compliance (Y/N)
2) Maintain or restore hydrological regimes to specific groundwater dependant ecosystems.	Section 9	Y
3) To manage and mitigate the impacts of salinity on existing and proposed infrastructure and vegetation.	Section 9	Y
4) Reduce any increase in salt loads to existing watercourses, to prevent degradation of the existing soil and groundwater environment.	Section 9	Y
<b>6. Flooding</b>		
Attenuate stormwater runoff up to the 1% AEP event.	Section 5	Y
Maintain safe flood conveyance through the site for events greater than the 1% AEP.	Section 5	Y
<b>7. Riparian Corridors</b>	-	-
1) Maintain riparian buffer between development and waterways.		
2) Rehabilitate degraded waterways.		
3) Minimise any changes to flow frequency and magnitude.		

## 11 References

- Camden City Council (2009) – *Engineering Design Specification*.
- Camden City Council (2013) – *Local Environmental Plan*.
- Camden City Council (2015) – *Camden Growth Centre Precincts Development Control Plan*.
- DRAINS (2019) – *DRAINS content menu*.
- Erbas (2019) – *Infrastructure & Services Report*.
- Greater Sydney Local Land Services (GSLLS) (2015) – *NSW MUSIC Modelling Guidelines*.
- GeoEnviro Consultancy (2019) – *Geotechnical and Salinity Investigation*. Institution of Engineers, Australia (2006) – *Australian Rainfall and Runoff*.
- Land and Property Information NSW (2016) – *SIX Maps Viewer*.
- Martens & Associates (2019), *Flood Engineering Works for State Significant Development Applications: 85 Byron Road, Leppington, NSW*. (P1806493JC06).
- Nearmaps Site Aerial (2017) – *Nearmaps*.
- NSW Office of Environment & Heritage (NSW OEH) (2013) – *Guidelines for Development Adjoining Land and Water Managed by DECCW*.
- Parsons Brinckerhoff (2014) – *Leppington Precinct Water Cycle Management Strategy*.

## 12 Attachment A – Flood Report

16 July, 2019

Amity College  
c/o Gran Associates  
Attn: Peter Reed

Dear Peter,

**RE: FLOOD ENGINEERING WORKS FOR STATE SIGNIFICANT DEVELOPMENT APPLICATION: 85 BYRON ROAD, LEPPINGTON, NSW**

**OVERVIEW**

Martens & Associates Pty Ltd (MA) have prepared this flood letter to support a state significant development application (SDDA) for a proposed college at 85 Byron Road, Leppington, NSW (the site). Refer to Attachment A for site survey and Attachment B for proposed development layout. This document has been prepared to address comments from Camden Council and the Secretary's Environmental Assessment Requirements (SEARs) with respect to flooding which are provided in Attachment C.

**EXISTING DEVELOPMENT**

The site is located at Lots 1 and 2, DP 525996, is zoned R3 – Medium Density Residential, R2 – Low Density Residential and SP2 – Infrastructure: Educational Establishment, and has an approximate site area of 2.27 ha. There are two existing houses onsite with sheds, and the remainder of the site is grassed. The site grades approximately 6% in the NW aspect, with elevations of 102.5 mAHN in the southern corner of the site, and 94.1 mAHN along the north western site boundary.

**PROPOSED DEVELOPMENT**

Architectural drawings prepared by Gran Associates Australia (Attachment B) indicate that the proposed development will include:

- Establishment of a college, including playground and playfield.
- Construction of a basement carpark.
- Construction of roadworks along the site boundary.

**PREVIOUS FLOOD STUDIES**

A review of previous flood investigations was undertaken to assess likely local flood behaviour and characteristics for the site and the local catchment. Review identified one previous flood studies which would be relevant to this assessment.

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EIS & REF  
Streams & rivers  
Coastal  
Groundwater  
Catchments  
Bushfire  
Monitoring

**Geotechnics**

Foundations  
Geotechnical survey  
Contamination  
Hydrogeology  
Mining  
Terrain analysis  
Waste management

**Water**

Supply & storage  
Flooding  
Stormwater & drainage  
Wetlands  
Water quality  
Irrigation  
Water sensitive design

**Wastewater**

Treatment  
Re-use  
Biosolids  
Design  
Management  
Monitoring  
Construction

**Civil**

Earthworks  
Excavations  
Pipelines  
Roads  
Pavements  
Parking  
Structures

**Head Office**

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MARTENS & ASSOCIATES P/L  
ABN 85 070 240 890 ACN 070 240 890

WMA Water conducted a flood assessment for this catchment on behalf of Camden Council, and summarised the assessment in the report *Upper South Creek Flood Study* (2011), hereafter referred to as the 'WMA flood study'. The WMA flood report figures over the site are provided in Attachment D.

## **SITE FLOOD CHARACTERISTICS**

We note the following regarding the modelled flood behaviour in the existing condition:

- The primary source of site flooding is overland flow from the local catchment, which is approximately 4.7 ha.
- The 1% annual exceedance probability (AEP) flood extents slightly encroaches the site along the north western boundary.
- The 1% AEP flood level is approximately 94.5 mAHD based on the WMA mapping and available LIDAR data (LPI 2011).
- The increased rainfall intensity associated with climate change will likely raise 1% AEP levels by 100-200 mm, to a level of 94.6 – 94.7 mAHD.
- The probable maximum flood (PMF) level is approximately 95.5 mAHD.

We note that the adjoining site currently has a dam along the site boundary, which would likely cause water levels to pond and back up within the dam extents as shown in Attachment E. It is likely that this dam will be filled/removed as part of future development, which would cause flood extents within the local area to decrease, as there would be less localised ponding and instead water would drain directly downstream.

We note that the upstream catchment is subject to future development which may alter the flood regime at the site. However, any future developments will be subject to Council's controls with respect to stormwater discharge, and the location of outlets will likely be consistent with existing drainage depressions. We therefore do not expect that future development will materially affect site flood conditions, rather, peak flows are likely to be maintained due to attenuation through on-site detention (OSD) systems.

Further, as the site is proposed to be raised to approximately 97.5 mAHD along the north western boundary, the site will be well above the PMF level of 95.5 mAHD as well as the 1% AEP flood level + freeboard (95.1 mAHD). The impact of raising the site is considered negligible, as the adjoining site is zoned as RE1 – Public Recreation. Site drainage design will ensure flows are diverted to the same location as for the existing conditions, and basins are proposed to ensure site discharges do not increase for flood extents up to and including the 1% AEP event. Refer to MA planset P1806493PS01 for drainage design plans, which include details of stormwater collection, treatment and detention facilities.



## COMPLIANCE ASSESSMENT

The Secretary of the NSW Department of Planning and Environment (DPE) has consulted with relevant government agencies and has provided environmental assessment requirements for the project (Secretary's Environmental Assessment Requirements – SEARs).

The Camden Council Flood Risk Management Policy (2006) provides development guidelines for flood prone land. The controls defined by the development guidelines matrix table for the proposed development are outlined and addressed in Table 1. We note that:

- The developed site can be classified as 'outer floodplain' which is defined as areas above the 1% AEP flood level to the PMF level.
- The proposed development is a college/education centre which is not explicitly defined in Council's policy, but for the purposes of this assessment is categorised as a commercial land use.

This assessment demonstrates that the proposed development complies with the Flooding Assessment Requirements.

**Table 1:** SEARs for proposed development (DPE 2018).

Flooding Assessment Requirements		Compliance Assessment
NSW Department of Planning and Environment		
The EIS must address the following specific matters: Flooding		
Assess any flood risk on site (detailing the most recent flood studies of the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity.		The site is proposed to be filled to 97.50 mAHD, which is above the PMF of the site. The PMF is defined as the probable maximum flood – and is likely to exceed any changes in climate change, sea level rise, and rainfall intensity.
The 1% annual exceedance probability extent and the location of all proposed on-site stormwater detention/quality control facilities must be provided.		The location of the 1% AEP extent and location of on-site stormwater detention facilities are provided in MA planset P1806493PS01-E100.
Camden Council Flood Risk Management Policy Requirement		
Floor Level		
1. Habitable floor levels are to be equal to or greater than the FPL. The FPL is the 1% AEP flood event level plus a freeboard of 600mm. See glossary for definitions of habitable rooms for residential/industrial/commercial situations.	1)	The 1% AEP peak flood level is approximately 94.50 mAHD and the development is proposed to be filled to 97.50 mAHD, which exceeds Council's 600 mm minimum freeboard requirement.
3. Notwithstanding the provisions of (1), Council may approve additions to existing flood liable industrial/commercial buildings, allowing habitable floor levels below the FPL. The applicant must demonstrate that all practical measures will be taken to minimise the impact of flooding. In determining such an application, Council will assess the application on a merits-based approach with consideration to nature of business, frequency and depth of flooding and whether the raising	2)	As the site is filled above the approximate flood planning level (FPL), this control does not apply.

Flooding Assessment Requirements		Compliance Assessment	
of floor levels will be out of character with adjacent land uses or streetscapes.			
Structural Soundness			
1.	Engineers report required to prove that any portion of a structure can withstand the force of flood water, debris and buoyancy, up to and including the PMF flood event.	3)	The proposed fill renders the site flood free in the PMF, hence this control does not apply.
Evacuation and Access			
1.	Reliable safe access for pedestrians and vehicles required during the PMF flood event.	4)	The proposed site is raised above the PMF level, hence safe access is available.
2.	Consideration required regarding an appropriate flood evacuation strategy and pedestrian/vehicular access route during a flood event up to the PMF. In the case of amenities building, which are not used for any storage or which will not have any valuable chattels permanently located in them, this consideration will not apply.	5)	Buildings on site will not be affected by the PMF, and road access remains available through Byron Road and Ingleburn Road in the PMF event.
3.	The evacuation route from land above the 1% AEP flood level in each proposed allotment in future subdivisions must be contiguous to land not lower than the PMF flood level so as to allow evacuation in extreme events.	6)	As in (5).
Flood Affection			
2.	The impact of the proposed development on flooding elsewhere is to be considered.	7)	While there is filling proposed within the site, it is highly unlikely that the development would have a material impact on the flood storage of the area due to the majority of the site site being outside the mapped flood extents.
Flood Awareness			
1.	Restrictions to be placed on title advising of flood planning levels (floor level) required relative to the 1% AEP flood level.	8)	As the site is being filled to 67.5 mAHD, it is expected that all development floor levels will be above the flood planning level of 65.1 mAHD. A restriction will be placed on the title to this effect.
2.	S149 certificates to notify affectionation by the PMF flood.	9)	The developed site will not be affected by the PMF.
Building Management			
4.	Applicant to demonstrate that potential development as a consequence of a subdivision proposal can be undertaken in accordance with this policy.	10)	Subdivision is not proposed as part of this development.

## SUMMARY

The WMA report was relied upon to assess flood conditions in the 1% AEP and PMF events. We note:

1. The proposed flood characteristics will likely be largely consistent with the existing conditions, and differences due to the proposed development are likely to be negligible.

2. There will be minor flood storage loss as a result of filling the site. However, this is expected to be of immaterial significance due to development occurring primarily outside of extents, the likely future removal of the downstream dam, as well as the connecting watercourse downstream of the site.
3. The site is to be raised above the FPL and PMF level, which will prevent the ingress of flood water.
4. The proposed development is compatible with the flood behaviour at the site.
5. Compliance with Council flooding controls are achieved.
6. Flooding comments raised by Council and in the SEARs have been addressed as part of this assessment.

The proposed development has been designed to ensure compatibility with the existing floodplain environment. As the proposed development has been designed to achieve Council requirements, no further recommendations are considered necessary.

If you require any further information, please do not hesitate to contact the undersigned.

**For and on behalf of**

**MARTENS & ASSOCIATES PTY LTD**



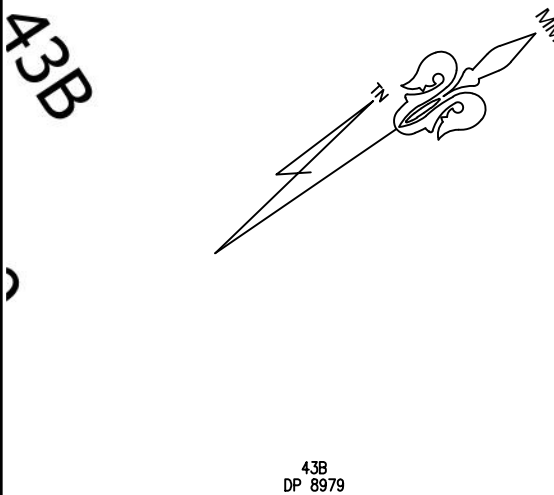
**PAUL DINH**

Civil Design Engineer

## ATTACHMENT A – SITE SURVEY



**NOTE**  
THIS DETAIL SURVEY IS NOT A "LAND SURVEY" AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT, 2002. IF ANY CONSTRUCTION OR DESIGN WORK, WHICH RELIES ON CRITICAL SETBACKS FROM THE STREET OR BOUNDARIES IS PLANNED, IT WOULD BE IMPERATIVE TO CARRY OUT FURTHER SURVEY WORK TO DETERMINE THE BOUNDARY DIMENSIONS.  
BOUNDARIES HAVE BEEN DETERMINED BY SURVEY ON 11/12/2016.  
PRIOR TO ANY CONSTRUCTION WORK, SURVEY MARKS SHOULD BE PLACED TO DEFINE THE PROPERTY BOUNDARIES.  
SERVICES SHOWN ARE INDICATIVE ONLY. POSITIONS ARE BASED ON SURFACE INDICATORS LOCATED DURING FIELD SURVEY. CONFIRMATION OF THE EXACT POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK. OTHER SERVICES MAY EXIST WHICH ARE NOT SHOWN.  
LEVELS ARE BASED ON AUSTRALIAN HEIGHT DATUM (AHD) USING SSM XXXX WITH RL XXXX (AHD).  
RIDGE & GUTTER HEIGHTS HAVE BEEN OBTAINED BY INDIRECT METHOD AND ARE ACCURATE TO ± 0.05m.  
CONTOURS SHOWN DEPICT THE TOPOGRAPHY EXCEPT AT SPOT LEVELS SHOWN THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. THE SPOT LEVELS ARE TRUE FOR THEIR POSITION, AND ARE INTENDED TO BE USEFUL TO REPRESENT THE GENERAL TERRAIN. CARE SHOULD BE TAKEN IF EXTRAPOLATING.  
(C) RIGHT OF CARRIAGEWAY 5 WIDE (DP 773104)  
BASEMENT FOR SERVICES 5 WIDE (DP 773104)  
(D) RIGHT OF CARRIAGEWAY 5 WIDE, 8 WIDE & VAR EASEMENT FOR SERVICES 5 WIDE, 8 WIDE, & VAR EASEMENT TO DRAIN WATER 5 WIDE, 8 WIDE & VAR (R) RESTRICTION ON USE OF LAND



LEGEND	
BENCH MARK	▲ TEL
TELSTRA PIT	⬢ TEL
ELECTRIC LIGHT POLE	⬢ LP
POWER POLE	⬢ PP
SIGN POST	⬢ SP
SEWER INSPECTION PIT	⬢ SIP
SEWER VENT	⬢ SEWER
MANHOLE	⬢ MH
SEWER MANHOLE	⬢ SMH
STOP VALVE	⬢ SV
WATER HYDRANT	⬢ HYD
WATER METER	⬢ WM
GAS METER	⬢ GM
STATE SURVEY MARK	⬢ SSM



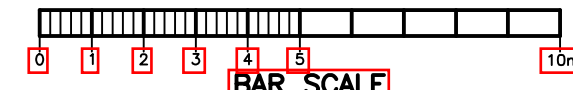
**TSS TOTAL SURVEYING SOLUTIONS**  
ARTARMON | CAMDEN | MANLY VALE

NOTE:  
INFORMATION CONTAINED IN THIS PLAN IS THE COPYRIGHT OF TOTAL SURVEYING SOLUTIONS. THE USE OR DUPLICATION WITHOUT THE WRITTEN CONSENT OF TOTAL SURVEYING SOLUTIONS CONSTITUTES AN INFRINGEMENT OF COPYRIGHT.

REVISION No.	REVISION DATE:	COMMENT:

**LEGEND:**  
EB - EDGE OF BITUMEN  
TB - TOP OF BANK  
BB - BOTTOM OF BANK  
INV - INVERT LEVEL  
WB - BOTTOM OF WINDOW

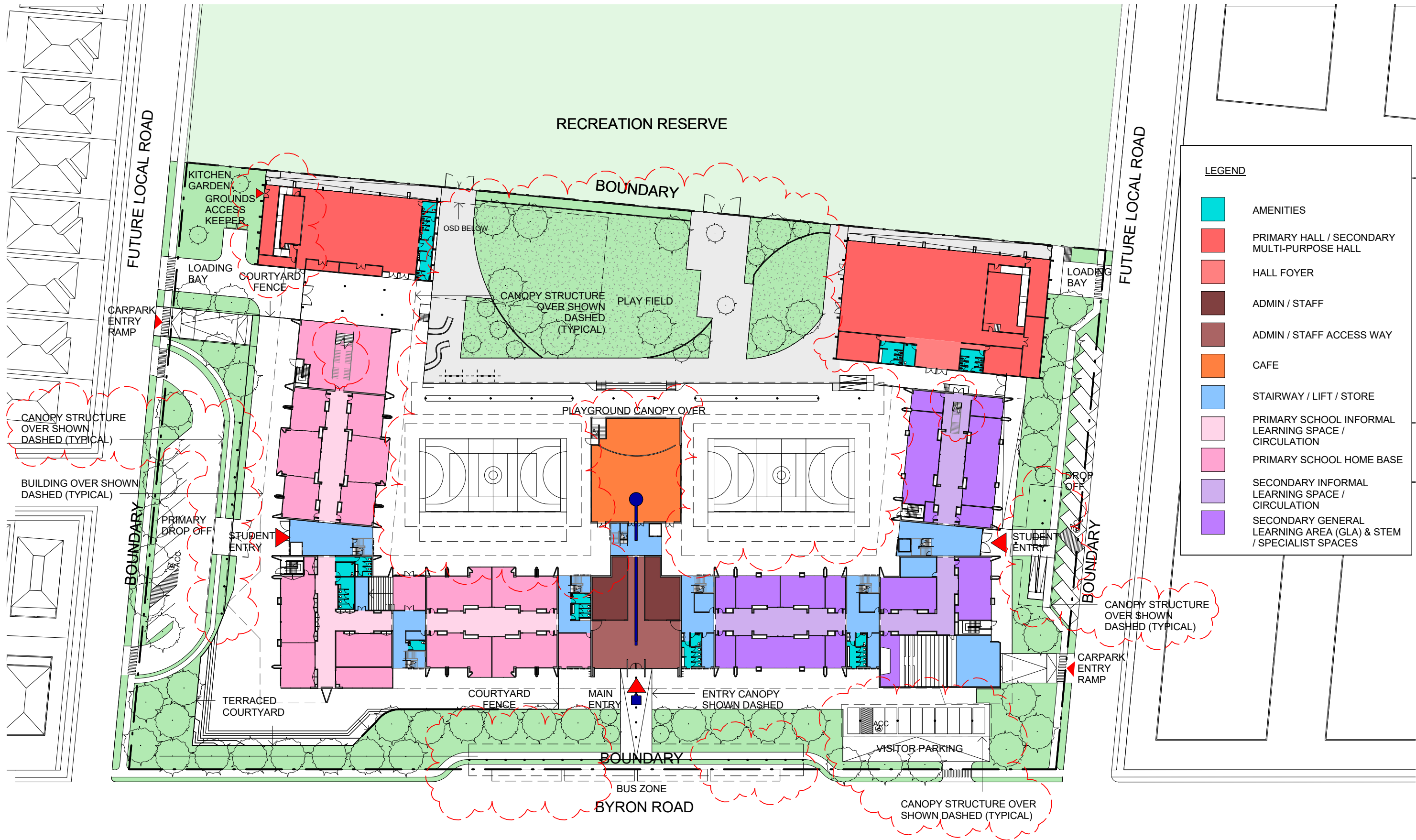
**TO - TOP OF GUTTER**  
**RR - ROOF RIDGE**  
**FL - FLOOR LEVEL**  
**INTV - INVERT LEVEL**  
**ELEC - ELECTRICAL PIT**  
**Ø 4/5/10/H16 - DIAMETER/SPREAD/HEIGHT**

**BAR SCALE**  
PLOTED SCALE 1:100 (A0 SIZE SHEET)

PLAN SHOWING DETAIL & LEVELS OVER LOTS 1&2 IN DP525996		JOB No.: 180370	LGA: CAMDEN
CLIENT: GRAN ASSOCIATES AUSTRALIA		PLAN No.: 180370_A	DATUM: AHD
PROJECT: AMITY COLLEGE LEPPINGTON CAMPUS		DATE: 13/03/2018	SCALE: NOT TO SCALE
ADDRESS: CORNER INGLEBURN ROAD AND BYRON ROAD, LEPPINGTON		DRAWN: MR	CONT. INTERVAL: 0.25m
		CHK: GS	SHEET 1 OF 1



## ATTACHMENT B – PROPOSED DEVELOPMENT LAYOUT



LEGEND

- AMENITIES
- PRIMARY HALL / SECONDARY MULTI-PURPOSE HALL
- HALL FOYER
- ADMIN / STAFF
- ADMIN / STAFF ACCESS WAY
- CAFE
- STAIRWAY / LIFT / STORE
- PRIMARY SCHOOL INFORMAL LEARNING SPACE / CIRCULATION
- PRIMARY SCHOOL HOME BASE
- SECONDARY INFORMAL LEARNING SPACE / CIRCULATION
- SECONDARY GENERAL LEARNING AREA (GLA) & STEM / SPECIALIST SPACES

0 mm 10 mm 30 mm

ON ORIGINAL SHEET

Nº.	DESCRIPTION	DATE
PI	PRELIMINARY ISSUE	16.01.19
P2	PRELIMINARY ISSUE	13.03.19

SCALE	DRAWN BY	CHECKED BY	DATE
1 : 750 @A3	BM/MC	PR	November 2018

PROJ. No.	DRAWING No.	REV.
A1803	DA - 010	P2

GRAN ASSOCIATES AUSTRALIA ARCHITECTS PTY LTD  
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ROZELLE NSW 2039  
PH: +61 2 9818 8437  
FAX: +61 2 9818 8288  
PETER REED ARAIA, AIA NOM ARCH 5377  
ANTHONY KEMENY FRAIA NSW REG No. 4599

PROJECT

AMITY COLLEGE LEPPINGTON

85 Byron Road, Leppington NSW

TITLE:

SITE PLAN

## ATTACHMENT C – AGENCY COMMENTS





**Camden Council**

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Email: [mail@camden.nsw.gov.au](mailto:mail@camden.nsw.gov.au)

DX 25807  
ABN: 31 117 341 764  
Fax: 02 4654 7829

20 April 2018

Navdeep Shergill  
Department of Planning and Environment  
(via e-mail to [navdeep.singhshergill@planning.nsw.gov.au](mailto:navdeep.singhshergill@planning.nsw.gov.au))

Dear Sir,

**RE: Request for SEARs for Proposed New Amity College, 85 Byron Road and 63 Ingleburn Road (SSD 9227)**

**PROPERTY: 85 Byron Road, Leppington  
63 Ingleburn Road, Leppington  
Lots: 1 and 2, DP: 525996**

I refer to your letter dated 6 April 2018 that provided draft Secretary's Environmental Assessment Requirements for the above project and requested Council feedback.

Council officers raise the following additional matters that should be addressed by the applicant and assessed as part of the State Significant development application (DA).

Planning

1. Off-street car parking for the proposed development must, as a minimum, comply with the Camden Growth Centre Precincts Development Control Plan (DCP). The applicable parking rate is reproduced verbatim in italics below:

- *1 space per staff member, and*
- *1 space per 100 students, and*
- *1 space per 5 students in Year 12 where appropriate.*

*A drop off / pick-up area facility of sufficient size to accommodate the forecast demand identified through a traffic and parking report. The resultant layout of the facility is to be to the satisfaction of Council.*

2. The DCP has master planned the site to contain local parts of two local roads. The provision of these roads must form part of the DA for the school.
3. The DA must address the following environmental planning instruments:
  - State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017,





- State Regional Environmental Plan No. 20 - Hawkesbury-Nepean River, and
  - Draft Environment State Environmental Planning Policy.
4. The DA must address the Camden Growth Centre Precincts Development Control Plan.
  5. The site was envisioned to be developed as a public school in accordance with the Camden Growth Areas Contributions Plan (CP). A private school is therefore inconsistent with the CP. In addition, Council notes that the proposed development will not be exempt from the payment of monetary contributions in accordance with the CP.

The applicant must address the CP in preparing the DA.

6. Council strongly recommends that the applicant consult with the Camden Local Area Command (NSW Police Force) in the preparation of the DA.

#### Traffic

7. Council is undertaking assessment for the upgrade of Ingleburn Road. At this stage Council is provisionally progressing traffic signals at the intersection of Ingleburn Road and Byron Road. The applicant should continue to liaise with Council on this matter as the ultimate road geometry may impact upon access to the site.
8. The applicant should carefully investigate facilities for school drop-off and pick-up on Byron Road and minimise impact on through-traffic.
9. Consideration should be given to staggered start and finish times for different stages of the school to reduce traffic impacts.

#### Engineering/Flooding

10. A stormwater management report must be submitted with the DA. This plan must demonstrate a satisfactory design for stormwater management, including interim and ultimate quantity and quality control, in accordance with Council's Engineering Specifications, the DCP and the Precinct's Watercycle Management Strategy.
11. The proposed development must be designed in accordance with the Parson Brinckerhoff Water Cycle Master Plan produced in support of Schedule 5 of the Camden Growth Centre Precincts Development Control Plan (DCP). This should also include consideration of the drainage routes going through the surrounding road network and potentially through the site. The DA should also consider where the DCP shows road networks as these are generally in locations that allow drainage to flow.
12. The DA must demonstrate the following:
  - consideration of existing and future flood levels and provision of appropriate freeboard,





- allowance for road widening due to the future upgrade of Byron and Ingleburn Roads and the intersection of Byron and Ingleburn Roads, and
- how the proposed development will function when adjacent levels change due to changes in the surrounding road network.

13. Engineering plans showing existing and proposed levels, the location of all proposed stormwater pipes and pits, road cross sections, temporary roads, temporary turning heads, longitudinal sections, dimensions of all driveways, aisles and car parking spaces, gradients and swept paths, the 1% annual exceedance probability extent and the location of all proposed on-site stormwater detention/quality control facilities must be submitted with the DA.

14. A flood report, prepared in accordance with Council's Flood Risk Management Policy, must be submitted with the DA. The report must consider mainstream flood levels, account for existing and developed external catchments, ensure appropriate freeboards and allow appropriate grades to the drainage outlets.

#### Environmental/Public Health

15. A salinity assessment must be prepared for the site in accordance with the NSW Environment Protection Authority's Site Investigation for Urban Salinity Booklet. It is important that resistivity is included and that the assessment is undertaken to the maximum depth of the proposed development.

Where aggressive or saline soils are identified a salinity management plan, that addresses construction requirements for all proposed buildings and infrastructure, must be submitted with the DA.

16. The applicant must ensure that the location and layout of any proposed canteen, and any associated bin area/room, can comply with AS 4674 - 2004 - Design, Construction and Fit-Out of Food Premises.

17. Details of how any existing on-site wastewater management systems will be decommissioned must be submitted with the DA.

#### Waste Management

18. The waste management plan for the proposed development must address, but not necessarily be limited to, the following matters:

- waste management for the demolition, construction and operational stages of the proposed development,
- a separate, secure and controlled waste storage area must be provided within the school grounds. This will need to be located in an area that a waste truck can access and ensure that there are no lips, dips or barriers between the waste storage area and the waste collection area,





- collection arrangements for garbage and recycling and estimates of the amount of waste to be generated for each of these waste streams,
- specifications for where and how green waste will be collected and generation estimates, including whether it will be collected by the waste service or managed by a garden contractor,
- potential special wastes to be collected including waste oils, sanitary or some hazardous or biological waste from science classes or a canteen,
- consideration for a waste collection vehicle to collect waste on the site (potentially from a car park or similar area depending upon the choice of bins to be used),
- the applicant may want to use 240L bins for garbage, as these can be distributed through the yard of the school as litter bins or similar, and use bulk bins or a skip bin for recycling,
- swept path diagrams that demonstrate that a 12.5m long, 2.5m wide HRV Austroads template vehicle can access the waste collection area. This includes side loading for 240L bins, rear loading for bulk 660L and 1,100L bins and front loading for all skip bins, and
- waste servicing times should be outside of core hours for the school and especially outside of pick-up and drop-off times for students.

#### Heritage

19. Part of the site is identified as being a moderate Aboriginal archaeological sensitivity area. An Aboriginal cultural heritage assessment, prepared in accordance with the relevant Office of Environment and Heritage guidelines, must be submitted with the DA.

#### Building/Accessibility

20. As the proposed development will likely be a multi-storey construction, the services of an A1 accredited certifier must be engaged to provide a BCA design assessment with particular focus on the requirements of Part D3 Accessibility.

21. An access report, prepared by a suitably qualified access consultant, must be submitted with the DA.

Should you have any enquiries in relation to this matter, please contact Ryan Pritchard, Principal Planner, on (02) 4654 7715 or e-mail [ryan.pritchard@camden.nsw.gov.au](mailto:ryan.pritchard@camden.nsw.gov.au).





Yours Sincerely,

**Mr R Pritchard**  
**PRINCIPAL PLANNER**  
(Planning and Environmental Services)



## Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act*  
Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

<b>Application Number</b>	SSD 9227
<b>Proposal Name</b>	Proposed New Amity College Campus
<b>Location</b>	85 Byron Road & 63 Ingleburn Road, Leppington
<b>Applicant</b>	Amity College
<b>Date of Issue</b>	26 April 2018
<b>General Requirements</b>	<p>The Environmental Impact Statement (EIS) must be prepared in accordance with, and meet the minimum requirements of clauses 6 and 7 of Schedule 2 the <i>Environmental Planning and Assessment Regulation 2000</i> (the Regulation).</p> <p>Notwithstanding the key issues specified below, the EIS must include an environmental risk assessment to identify the potential environmental impacts associated with the development.</p> <p>Where relevant, the assessment of the key issues below, and any other significant issues identified in the risk assessment, must include:</p> <ul style="list-style-type: none"> <li>adequate baseline data;</li> <li>consideration of potential cumulative impacts due to other development in the vicinity (completed, underway or proposed); and</li> <li>measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment.</li> </ul> <p>The EIS must be accompanied by a report from a qualified quantity surveyor providing:</p> <ul style="list-style-type: none"> <li>a detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Environmental Planning and Assessment Regulation 2000) of the proposal, including details of all assumptions and components from which the CIV calculation is derived;</li> <li>an estimate of the jobs that will be created by the future development during the construction and operational phases of the development; and</li> <li>certification that the information provided is accurate at the date of preparation.</li> </ul>
<b>Key Issues</b>	<p>The EIS must address the following specific matters:</p> <p><b>1. Statutory and Strategic Context</b> Address the statutory provisions contained in all relevant environmental planning instruments, including:</p> <ul style="list-style-type: none"> <li>State Environmental Planning Policy (State &amp; Regional Development) 2011;</li> <li>State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017;</li> <li>State Environmental Planning Policy (Infrastructure) 2007;</li> <li>State Environmental Planning Policy No.55 – Remediation of Land;</li> <li>State Environmental Planning Policy No. 64 – Advertising Signage;</li> <li>State Environmental Policy (Sydney Region Growth Centres) 2006;</li> </ul>

	<ul style="list-style-type: none"> <li>• State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017;</li> <li>• State Environmental Planning Policy NO. 20 – Hawkesbury-Nepean River;</li> <li>• Draft Environmental State Environmental Planning Policy;</li> <li>• Draft Remediation of Land State Environmental Planning Policy; and</li> <li>• Camden Local Environmental Plan 2010.</li> </ul> <p><i>Permissibility</i> Detail the nature and extent of any prohibitions that apply to the development.</p> <p><i>Development Standards</i> Identify compliance with the development standards applying to the site and provide justification for any contravention of the development standards.</p> <p><b>2. Policies</b> Address the relevant planning provisions, goals and strategic planning objectives in the following:</p> <ul style="list-style-type: none"> <li>• NSW State Priorities;</li> <li>• Greater Sydney Region Plan, A Metropolis of Three Cities;</li> <li>• NSW Future Transport 2056;</li> <li>• State Infrastructure Strategy 2018 – 2038;</li> <li>• Sydney's Cycling Future 2013;</li> <li>• Sydney's Walking Future 2013;</li> <li>• Sydney's Bus Future 2013;</li> <li>• Crime Prevention Through Environmental Design (CPTED) Principles;</li> <li>• Healthy Urban Development Checklist, NSW Health;</li> <li>• Better Placed – an integrated design policy for the built environment of NSW;</li> <li>• Greater Sydney Commission's Western City District Plan; and</li> <li>• Camden Development Control Plan 2011; and</li> <li>• Camden Growth Centre Precincts Development Control Plan.</li> </ul> <p><b>3. Operation</b></p> <ul style="list-style-type: none"> <li>• Provide details of the existing and proposed school operations, including staff and student numbers, school hours of operation, and operational details of any proposed before/after school care services and/or community use of school facilities.</li> <li>• Provide a detailed justification of suitability of the site to accommodate the proposal.</li> <li>• Provide details of how the school will continue to operate during construction activities of the new primary and secondary school, including proposed mitigation measures.</li> </ul> <p><b>4. Built Form and Urban Design</b></p> <ul style="list-style-type: none"> <li>• Address the height, density, bulk and scale, setbacks of the proposal in relation to the surrounding development, topography, streetscape and any public open spaces.</li> <li>• Address design quality, with specific consideration of the overall site layout, streetscape, open spaces, façade, rooftop, massing, setbacks, building articulation, materials, colours and Crime Prevention Through Environmental Design Principles.</li> <li>• Develop a design report that includes diagrams, illustrations and drawings to clarify the design intent of the proposal that clearly demonstrates how design quality will be achieved in accordance with Schedule 4 Schools – Design Quality Principles of State Environmental</li> </ul>
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	<p>Planning Policy (Educational Establishments and Child Care Facilities) 2017.</p> <ul style="list-style-type: none"> <li>• Detail how services, including but not limited to waste management, loading zones, and mechanical plant are integrated into the design of the development.</li> <li>• Provide detailed site and context analysis to justify the proposed site planning and design approach.</li> <li>• Provide a detailed site-wide landscape strategy.</li> </ul> <p><b>5. Environmental Amenity</b></p> <ul style="list-style-type: none"> <li>• Assess amenity impacts on the surrounding locality, including solar access, acoustic impacts, visual privacy, view loss, overshadowing and wind impacts.</li> <li>• Identify any proposed use of the school outside of school hours (including weekends) and assess any resultant amenity impacts on the immediate locality and proposed mitigation measures.</li> <li>• Detailed outline of the nature and extent of the intensification of use associated with the increased floor space.</li> <li>• Detail amenity impacts including acoustic impacts. High level of environmental amenity for any surrounding residential land uses must be demonstrated.</li> <li>• Detail any proposed use of the school grounds out of school hours (including weekends) and any resultant amenity impacts on the immediate locality and proposed mitigation measures.</li> </ul> <p><b>6. Staging</b></p> <p>Provide details and expected timing regarding the staging of all components of the proposed development.</p> <p><b>7. Transport and Accessibility</b></p> <p>The EIS shall include a Traffic Transport and Accessibility Impact Assessment, which details, but is not limited to the following:</p> <ul style="list-style-type: none"> <li>• accurate details of the current daily and peak hour vehicle, public transport, pedestrian and cycle movement and existing traffic and transport facilities provided on the road network located adjacent to the proposed development;</li> <li>• an assessment of the operation of existing and future transport networks including the bus network and their ability to accommodate the forecast number of trips to and from the development;</li> <li>• details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing and similar schools within the local area;</li> <li>• details of any proposed school bus routes along bus capable roads (i.e. travel lanes of 3.5 metres minimum) and supporting infrastructure (bus stops, bus bays etc);</li> <li>• the adequacy of public transport, pedestrian and bicycle networks and infrastructure to meet the likely future demand of the proposed development;</li> <li>• comparison of the traffic generated by the proposed development against the alternative of planned housing development for part of the site;</li> <li>• an assessment of road safety at key intersection and locations (including but not limited to the Ingleburn-Byron Road and Ingleburn Road-Camden Valley Way intersections) subject to heavy vehicle construction traffic movements and high pedestrian activity;</li> <li>• identification of suitable infrastructure required to ameliorate any impacts on traffic efficiency and to maximise road safety at affected intersections;</li> <li>• the proposed access arrangements (normal and emergency as well as interim access arrangements during any required upgrade works), including car and bus pick-up/drop-off movements, estimated service</li> </ul>
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	<p>vehicle movements, and parking areas for all car user groups (e.g. visitor parking, disabled parking and car share);</p> <ul style="list-style-type: none"> <li>• sustainable travel initiatives for staff, students and visitors, particularly for the provision of a Green Travel Plan and wayfinding strategies;</li> <li>• safe pedestrian and bicycle connections, including pedestrian crossings and refuges and speed control devices and zones;</li> <li>• details of any upgrading or road improvement works required to accommodate the proposed development (including any local road construction that may be required in accordance with Council's DCP);</li> <li>• details of travel demand management measures to minimise the impact on general traffic and bus operations and to encourage sustainable travel choices and details programs for implementation, including the preparation of a Green Travel Plan;</li> <li>• the impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need/associated funding for upgrading or road improvement works, if required. Traffic modelling is to be undertaken using, but not limited to, SIDRA network modelling for current and future years;</li> <li>• assess the impact of the proposed variation in planned subdivision pattern and indicative layout plan on the delivery of surrounding network (where applicable);</li> <li>• prioritisation of active transport initiatives through provision of walking and cycling infrastructure) e.g. segregated paths, bicycle parkin, etc) to and within the site, considering connections and availability of public transport;</li> <li>• proposed number of on-site car parking spaces and corresponding compliance with the Camden Growth Centre Precincts Development Control Plan and justification for the level of car parking provided on-site;</li> <li>• proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance;</li> <li>• details of emergency vehicle access arrangements;</li> <li>• an assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures;</li> <li>• an assessment of cumulative on-street parking impacts of car and bus pick-up/drop-off, staff parking and any other parking demands associated with the development during weekdays and special events;</li> <li>• measures to maintain road and personal safety in line with CPTED principles;</li> <li>• in relation to construction traffic: <ul style="list-style-type: none"> <li>○ an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity;</li> <li>○ details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process;</li> <li>○ details of the anticipated daily and peak hour construction vehicle movements to and from the site, so as to not impact current traffic operations on the road network;</li> <li>○ details of access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle;</li> <li>○ details of temporary cycling and pedestrian access during construction;</li> <li>○ details of proposed construction vehicle access arrangements at all stages of construction; and</li> </ul> </li> </ul>
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- traffic and transport impacts during construction, including cumulative impacts associated with other construction activities, and how these impacts will be mitigated for any associated traffic, pedestrian, cyclists, parking and public transport, including the preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.

→ Relevant Policies and Guidelines:

- *Guide to Traffic Generating Developments (Roads and Maritime Services)*;
- *EIS Guidelines – Road and Related Facilities (DoPI)*;
- *Cycling Aspects of Austroads Guides*;
- *NSW Planning Guidelines for Walking and Cycling*;
- *Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development*;
- *Standards Australia AS2890.3 (Bicycle Parking Facilities)*.

## **8. Noise and Vibration**

Identify and provide a quantitative assessment of the main noise and vibration generating sources during construction and operation, including consideration of any public-address system, school bell and use of any school hall for concerts etc. (both during and outside school hours). Outline measures to minimise and mitigate the potential noise impacts on surrounding occupiers of land.

→ Relevant Policies and Guidelines:

- *Noise Policy for Industry 2017 (EPA)*;
- *Interim Construction Noise Guideline (DECC)*;
- *Assessing Vibration: A Technical Guideline 2006*;
- *Development Near Rail Corridors and Busy Roads – Interim Guideline (Department of Planning 2008)*.

## **9. Ecologically Sustainable Development (ESD)**

- Detail how ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) will be incorporated in the design and ongoing operation phases of the development.
- Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.
- Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice.

## **10. Social Impacts**

Include an assessment of the social consequences of the school's relative location.

## **11. Aboriginal Cultural Heritage**

- Identify and describe the Aboriginal cultural heritage values that exist across the whole area that would be affected by the development, which may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (DECCW, 2011).
- Where Aboriginal cultural heritage values are identified, consultation with Aboriginal people must be undertaken and documented in accordance with the *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW). Detail the significance of cultural heritage values for Aboriginal people who have a cultural association with the land.

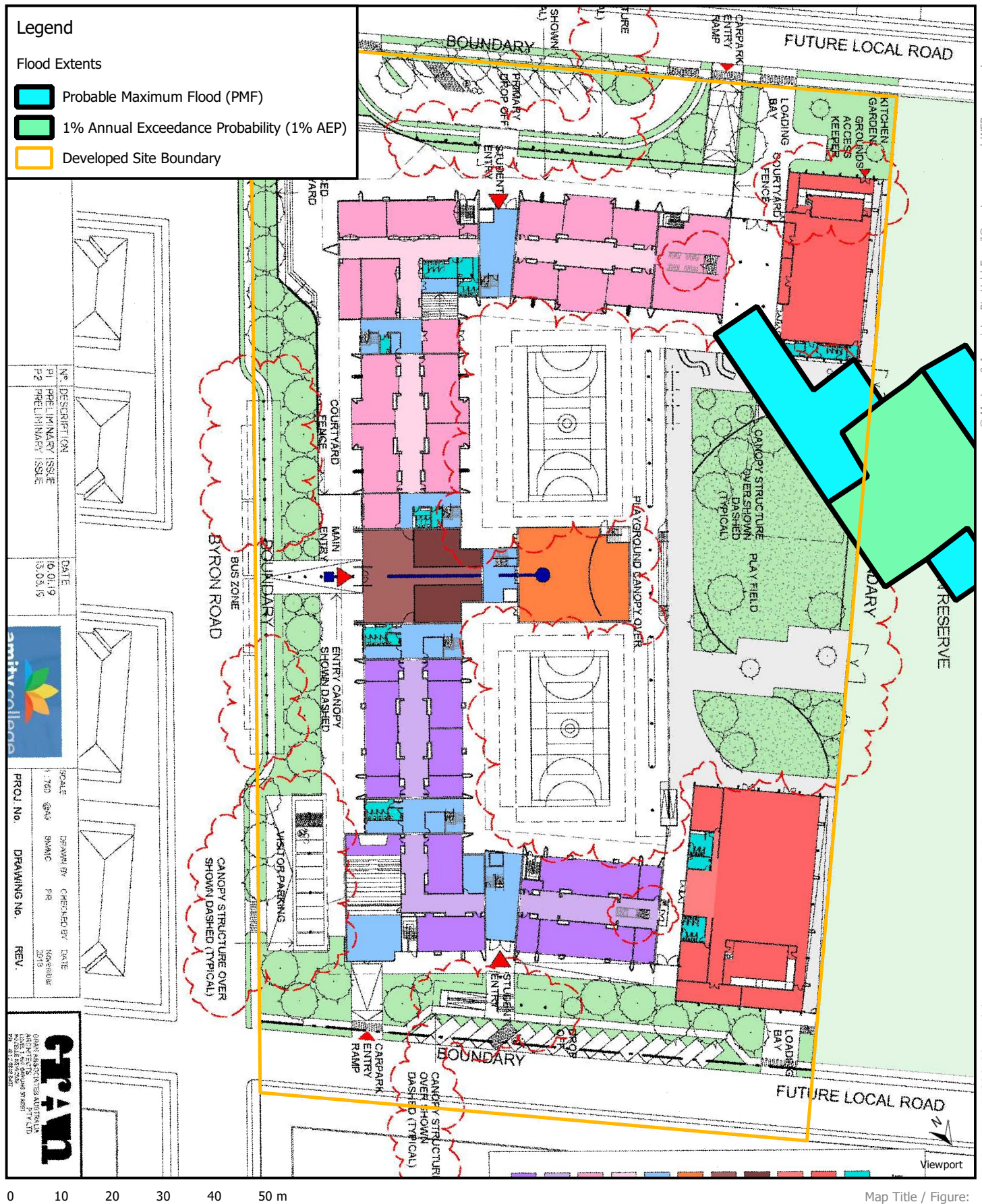
	<ul style="list-style-type: none"> <li>Assess impacts on Aboriginal cultural heritage values and demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH. Please note the Due Diligence assessment process is not appropriate to address the requirements for Aboriginal Cultural Heritage assessment.</li> </ul> <p><b>12. Utilities</b></p> <ul style="list-style-type: none"> <li>Prepare an Infrastructure Management Plan in consultation with relevant agencies, detailing information on the existing capacity and any augmentation requirements of the development for the provision of utilities including staging of infrastructure.</li> <li>Prepare an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.</li> </ul> <p><b>13. Contributions</b> Address Council's Section 94 Contribution Plan and/or details of any Voluntary Planning Agreement, which may be required to be amended because of the proposed development.</p> <p><b>14. Contamination</b> Assess and quantify any soil and groundwater contamination and demonstrate that the site is suitable for the proposed use in accordance with SEPP 55. → Relevant Policies and Guidelines:  <ul style="list-style-type: none"> <li><i>Managing Land Contamination: Planning Guidelines - SEPP 55 Remediation of Land (DUAP).</i></li> </ul> </p> <p><b>15. Salinity</b> Include a salinity report in accordance with the Site Investigation for Urban Salinity Booklet (EPA).</p> <p><b>16. Construction Hours</b> Identify proposed construction hours and provide details of the instances where it is expected that works will be required to be carried out outside the standard construction hours.</p> <p><b>17. Drainage</b> Detail drainage associated with the proposal, including springs, stormwater and drainage infrastructure. → Relevant Policies and Guidelines:  <ul style="list-style-type: none"> <li><i>Guidelines for development adjoining land and water managed by DECCW (OEH, 2013).</i></li> </ul> </p> <p><b>18. Flooding</b></p> <ul style="list-style-type: none"> <li>Assess any 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), including the potential effects of climate change, sea level rise and an increase in rainfall intensity.</li> <li>The 1% annual exceedance probability extent and the location of all proposed on-site stormwater detention/quality control facilities must be provided.</li> </ul> <p><b>19. Waste</b></p> <ul style="list-style-type: none"> <li>Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.</li> </ul>
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	<ul style="list-style-type: none"> <li>Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.</li> </ul> <p><b>20. Biodiversity</b> Advise and provide comment on the current status of the existing biodiversity certification on the subject site as identified in the South West Growth Centre - Biodiversity Certification map under section 43 of the Biodiversity Conservation (Savings and Transition) Regulation 2017.</p> <p><b>21. Sediment, Erosion and Dust Controls</b> Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles. → Relevant Policies and Guidelines:</p> <ul style="list-style-type: none"> <li><i>Managing Urban Stormwater – Soils and Construction Volume 1 2004 (Landcom);</i></li> <li><i>Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA);</i></li> <li><i>Guidelines for development adjoining land and water managed by DECCW (OEH, 2013).</i></li> </ul>
<p><b>Plans and Documents</b></p>	<p>The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Environmental Planning and Assessment Regulation 2000. Provide these as part of the EIS rather than as separate documents.</p> <p>In addition, the EIS must include the following:</p> <ul style="list-style-type: none"> <li>Architectural drawings including but not limited to the following requirements: <ul style="list-style-type: none"> <li>dimensioned including RLs;</li> <li>plans, sections and elevation of the proposal at no less than 1:200 showing furniture layouts and program;</li> <li>site and context plans that demonstrate active transport linkages with existing, proposed and potential footpaths and bicycle paths and public transport links; and</li> <li>detailed annotated wall sections at 1:20 scale that demonstrate typical cladding, window and floor details, including materials and general construction quality;</li> </ul> </li> <li>Artist impressions/architectural renders of the proposal;</li> <li>Site Survey Plan, showing existing levels, location and height of existing and adjacent structures / buildings and boundaries;</li> <li>Site Plans and operations statement demonstrating the afterhours and community use strategy;</li> <li>Site Analysis Plan;</li> <li>Stormwater Concept Plan and Stormwater Management Plan;</li> <li>Flood report prepared in accordance with Camden Council's Flood Risk Management Policy.</li> <li>Sediment and Erosion Control Plan;</li> <li>Shadow Diagrams;</li> <li>View Analysis / Photomontages, including from public vantage points;</li> <li>An integrated Landscape Plan/Strategy (including identification any trees to be removed and trees to be retained or transplanted);</li> <li>Preliminary Construction Management Plan, inclusive of a Preliminary Construction Traffic Management Plan detailing vehicle routes, number of trucks, hours of operation, access arrangements and traffic control measures;</li> <li>Geotechnical and Structural Report;</li> <li>Accessibility Report;</li> <li>Arborist Report;</li> <li>Salinity Investigation Report (if required);</li> </ul>

	<ul style="list-style-type: none"> <li>• Acid Sulphate Soils Management Plan (if required);</li> <li>• Schedule of materials and finishes including a physical material sample board (no larger than A3) with correct proportional representation of materials;</li> <li>• Acoustic Report;</li> <li>• Waste Management Plan;</li> <li>• Fire Safety Measures Schedule;</li> <li>• Green Travel Plan;</li> <li>• Draft Construction Environmental Management Plans and relevant sub plans; and</li> <li>• A report tabling how the project responds to and upholds the design guide for schools as stipulated in Schedule 4 Schools – design quality principles of State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017.</li> </ul>
<b>Consultation</b>	<p>During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular, you must consult with:</p> <ul style="list-style-type: none"> <li>• Camden Council;</li> <li>• Government Architect NSW (through the NSW State Design Review Panel Process)</li> <li>• Transport for NSW (TNSW); and</li> <li>• Roads and Maritime Services (RMS).</li> </ul> <p>Consultation with Council, TfNSW, RMS and Government Architect NSW should commence as soon as practicable to agree the scope of investigation.</p> <p>The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p>
<b>Further consultation after 2 years</b>	<p>If you do not lodge a development application and EIS for the development within two years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.</p>
<b>References</b>	<p>The assessment of the key issues listed above must consider relevant guidelines, policies, and plans as identified.</p>

## ATTACHMENT D – WMA (2011) FLOOD MAP AND PROPOSED DEVELOPMENT LAYOUT

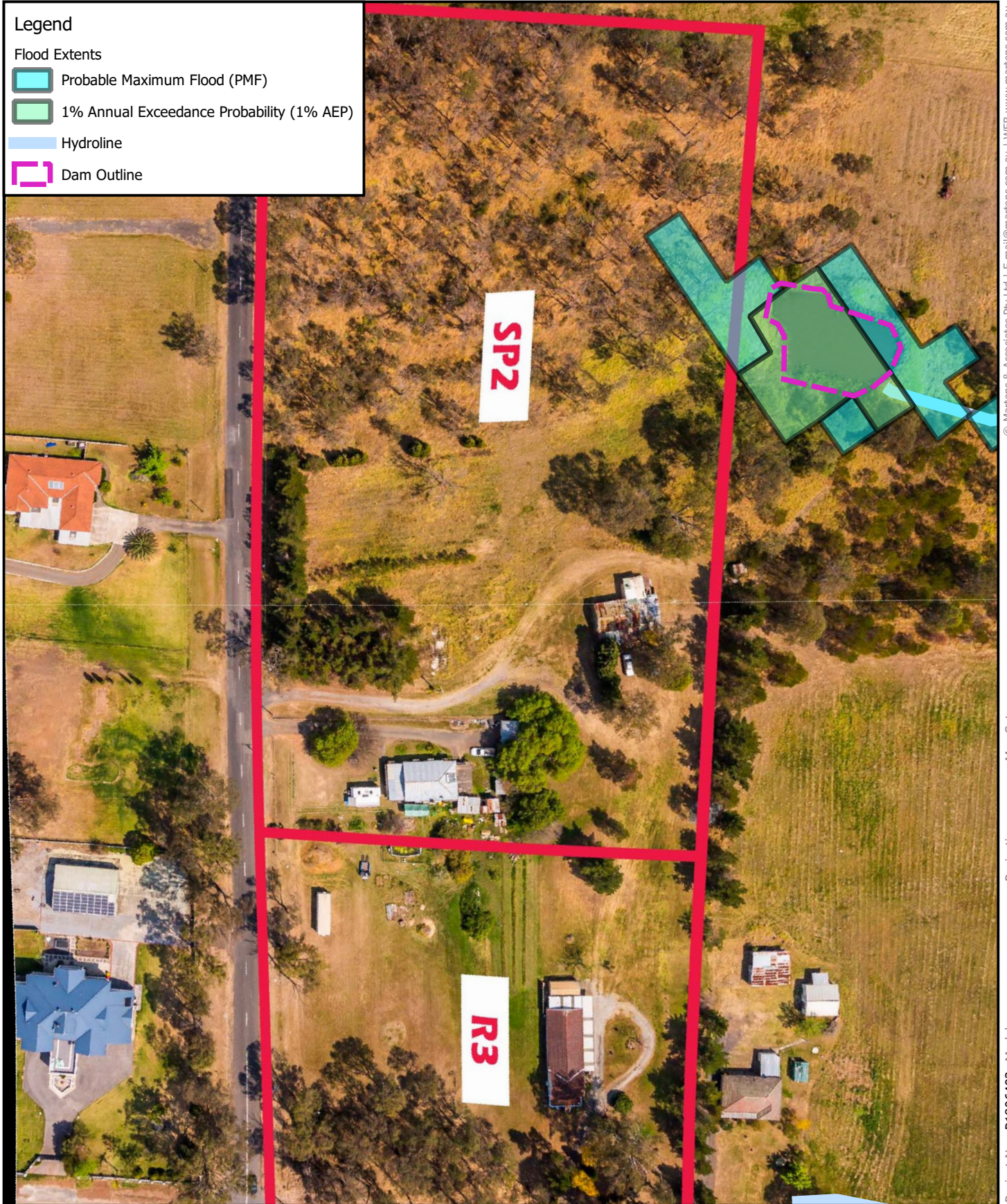




## Attachment D - WMA (2011) FLOOD MAP AND PROPOSED DEVELOPMENT LAYOUT

**ATTACHMENT E – WMA (2011) FLOOD MAP AND AERIAL PHOTOGRAPH OF SITE WITH DAM  
OUTLINE**





0 10 20 30 40 50 m

1:1250 @ A4



Note: Hydro lines obtained from LPI Clip and Ship (2019)

## Attachment E - WMA (2011) FLOOD MAP AND AERIAL PHOTOGRAPH OF SITE WITH DAM OUTLINE

Map Title / Figure:

M01	Map
85 Byron Road, Leppington, NSW	Site
Amity College Leppington Campus	Project
Flood Engineering Works for Development Application	Sub-Project
Amity College	Client
16/07/2019	Date