Woolacotts.
CONSULTING ENGINEERS

School Infrastructure NSW

Centre of Excellence in Agricultural Education (CoE)

Integrated Water Management Report

20-307 | 29th June 2021 | SSDA Submission

Contents

Document control

Rev	Date	Revision details	Approved	Verified	Prepared
A	28.04.21	SSDA Submission	JAS	JC	AP
B	03.05.21	Revised section 3.0		JC	AP
C	29.06.21	Minor Amendments			AP

1.0 Introduction

Woolacotts Consulting Engineers have been engaged by the Department of Education (DoE) to prepare an Integrated Water Management Report for the proposed Centre of Excellence in Agricultural Education (CoE).

The new proposed Centre of Excellence in Agricultural Education (CoE) is to be located within the Western Sydney University site off Vines Drive, Richmond ('The Site'). Londonderry Road is located to the west of The Site and Vines Drive is located to the north-east of The Site. The total lease area is approximately 11.37ha. Refer to Figure 1 below for the site location and extent.

The proposed high school includes a single-story complex of 6 buildings and ancillary structures located mainly over the eastern side of the site.

The purpose of this report is to detail the following:

- Proposed alternative water supply (i.e. rainwater harvesting)
- Proposed end uses of potable and non-potable water (including irrigation and toilet flushing)
- Water sensitive Urban Design measures

Figure 1 – Site location

2.0 Existing Site Conditions

The proposed site is adjacent to the Western Sydney University Village at the north-east and Anglicare Carol Allen House at the north-west. The total lease area is approximately 11.37ha. The site is generally flat with a gentle slope that falls towards the southern boundary of the site.

The site is largely used for agricultural purposes and there are several swales that run across the site from the north-east boundary to an open channel watercourse along the south-west boundary.

3.0 Proposed Development

The proposed development involves the construction and operation of a new Centre of Excellence (CoE) in Agricultural Education on a leased land parcel within the Western Sydney University (Hawkesbury Campus) site, Richmond NSW.

The CoE will provide new agricultural / STEM teaching facilities with general learning and administration spaces to be utilised by rural, regional, metropolitan and international school students. The CoE will accommodate up to 325 students and up to 20 employees consisting of farm assistants, administration staff and teachers and up to five (5) itinerant staff members. The CoE will also include short-term on-site accommodation facilities for up to 62 visiting students and teaching professionals from regional and rural NSW.

The CoE will include five science laboratories, ten general learning spaces, practical activity teaching areas, seminar, botany room, administration block and accommodation facilities. It will also include covered outdoor learning areas, dining / conference hall, canteen and kitchen, agricultural plots, significant landscaping spaces, car parking and provision of necessary infrastructure.

The proposed development has been designed to be well integrated into the Western Sydney University site, having due regard for scale, bulk and orientation of existing buildings. The educational facilities will display linear open building forms in single story design with open spaces and lightweight construction techniques. The site is benefitted by Blue Mountains views to the west and the building and landscape plans have incorporated viewing opportunities into the design.

Refer to Figure 2 below for the proposed Site Plan.

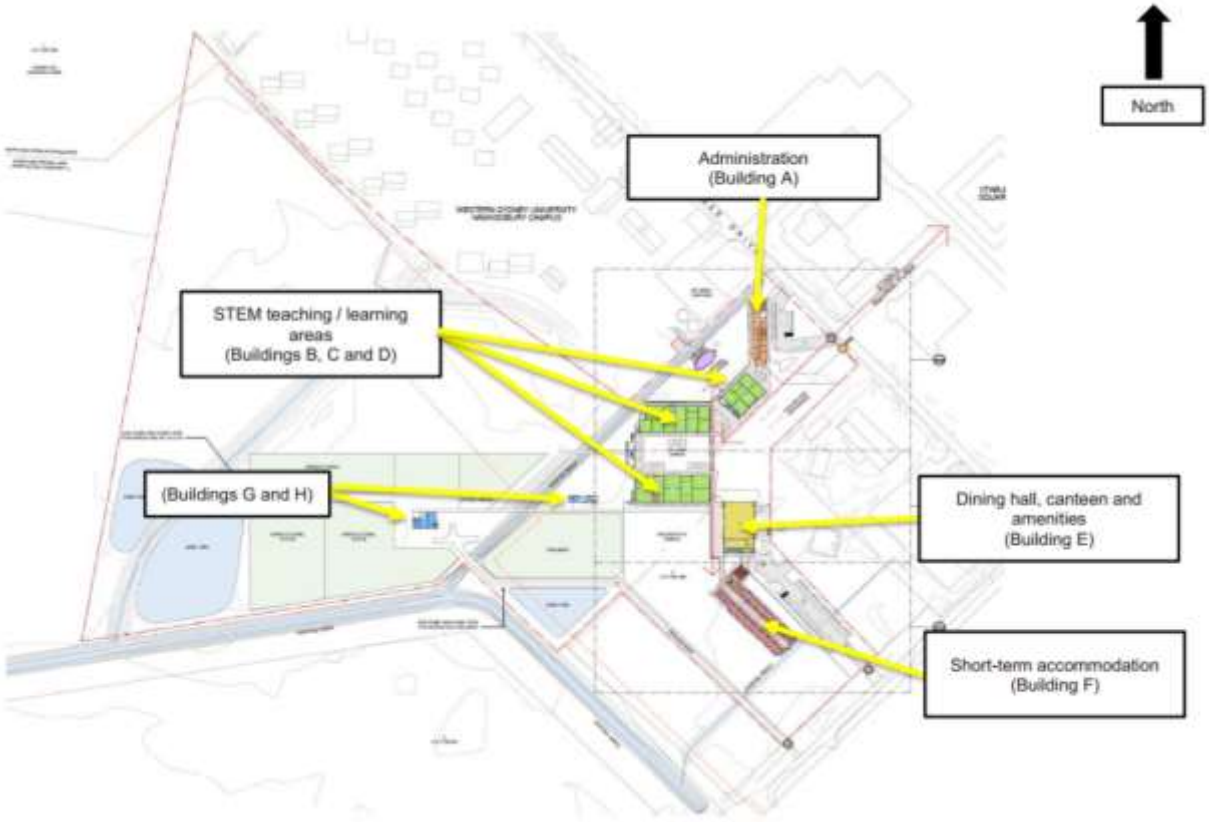

Figure 2 – Proposed Site Plan

4.0 Integrated Water Management Plan

4.1 Existing Environment

4.1.1 Catchment Hydrology and Hydrogeology

The *Flood Impact Assessment Report (dated 28th April 2021, Revision A)* shows that the pre-developed site is impacted by overland flow flooding from the 1 in 100 year flood event. Refer to the *Flood Impact Assessment Report* for further details.

The Site contains filling at depths of approximately 1.0m to 1.5m below natural ground level. Beneath the layer of topsoil / filling is alluvial soils underlaid by either gravels or weathered bedrock. Refer Section 4.1.4 for groundwater conditions.

4.1.2 Soil Conditions

The Site contains ‘very loose’ to ‘loose’ topsoil / filling at depths of approximately 1.0m to 1.5m below natural ground level. Beneath the layer of topsoil / filling is alluvial soils which comprise of ‘very stiff’ to ‘hard’ clays / silty clays and ‘medium dense’ to ‘very dense’ clayey sands / silty sands. The alluvial soils reach depths of approximately 17m to 19m below natural ground level. Beneath the soils is assumed to be either gravels or weathered bedrock.

For further information on the soil profile refer to the *Additional Geotechnical Investigation* report (dated January 2018).

4.1.3 Vegetation Cover

The site is currently covered by typically medium-long length grass and shrubs. The site has a number of existing trees around the lease boundary and internally adjacent the grassed swales.

4.1.4 Ground Water

Groundwater testing suggests that perched groundwater exists within the soils and that the regional groundwater table is deeper than observed. Long term monitoring will be required to confirm groundwater levels.

For further information on the groundwater conditions refer to the *Additional Geotechnical Investigation* report. (dated January 2018).

4.1.5 Site Constraints

The major site constraints identified for this site include:

- Several existing grassed swales dividing up the site (traversing north-east to south-west). Due to the invert levels of these swales new stormwater pipes cannot traverse underneath them. As a result, the proposed stormwater network is divided up into sections.
- There are no existing stormwater pits to connect the new system into, therefore discharge of the post-developed site's stormwater will need to drain into the existing grassed swales to the south-west.

4.1.6 Water Quality Conditions

The Site has historically been used for agricultural purposes. In addition to agricultural use, a southern portion of The Site appears to have been backfilled with demolition waste and is contaminated.

Zinc and copper contamination was observed in the groundwater. However, the concentration of these contaminants is typical within the Sydney basin and are still relatively low in absolute terms. As such, the concentrations of Copper and Zinc are considered insignificant for the proposed development.

For further information on the contamination refer to the *Detailed Asbestos Delineation Investigation* report (January 2018) and the *Detailed Site Investigation* report (dated March 2021).

4.2 Site Stormwater Discharge

Stormwater runoff from all pervious and impervious surfaces within the proposed development will generally be collected by an in-ground pit and gravity pipe system. The in-ground pit and pipe system has been sized to accommodate the 5% AEP (20-year ARI) storm flows for the site.

In the event of the in-ground system blockage or a major storm event greater than the 5% AEP (i.e. storm events up to and including the 1% AEP), overland flow paths have been provided around the proposed buildings to safely convey flows to the south-west.

The proposed stormwater system will connect into the existing grassed swales to the south-west. For more detail on the site's stormwater management system refer to the *Civil Engineering Report* by Woolacotts.

4.3 Objectives and Performance Standards

4.3.1 Water Consumption

Water consumption may be proposed through the use of latest technology water saving devices (subject to the project requirements) such as:

- Dual flush toilets
- Flow limited taps
- Hose tap irrigation for landscaping

In addition to this, a rainwater collection and reuse tank may be used to collect clean rainwater for toilet flushing and irrigation of landscaping subject to project requirements.

5.0 Water Sensitive Urban Design Measures

5.1 Rainwater Reuse

It is proposed to provide a rainwater collection and reuse to collect clean rainwater for toilet flushing and irrigation of landscaping, subject to project requirements. Refer hydraulic report for further information.

5.2 On-Site Retention/Detention

It is proposed to provide three above ground basins to limit post developed flows leaving the site to predeveloped conditions. Refer to the *Civil Engineering Report* by Woolacotts for further information on the above ground retention / detention basins.

5.3 Erosion and Sediment Control

During construction, erosion and sediment control measures will be provided in accordance with the requirements of “Managing Urban Stormwater Soils and Construction, 4th Edition (Blue Book)”. These measures will include silt fences on the low side of the site and silt traps at stormwater pits. Dust control measures will also be provided.

Other measures to be provided on site during construction include construction exits for all vehicles leaving the site, and revegetation of the site as soon as practicable. Erosion control measures must be inspected and maintained after each rain event and at intervals not exceeding two weeks.

Refer to the *Civil Engineering Report* by Woolacotts for further information on the proposed sediment and erosion control measures.

5.4 Stormwater Quality / Treatment

The quality of stormwater runoff from the site will be improved using WSUD principles such as:

- Biofiltration
- Grassed swales
- Open turf areas
- All grated inlet pits will have gross pollutant traps, to remove gross pollutants prior to site discharge
- Collection, reuse, and bypass of clean roof water (subject to project requirements)

The above proposed treatment devices are incorporated within the system design to achieve an overall reduction in annual pollutant loads as summarised below:

- 45% reduction in Total Nitrogen (TN)
- 65% reduction in Total Phosphorus (TP)
- 85% reduction in Total Suspended Solids (TSS)
- 90% reduction in Gross Pollutants

Refer to the *Civil Engineering Report* by Woolacotts for further information on the proposed WSUD measures for this site.