Macquarie University

Macquarie University Central Courtyard Precinct (MUCCP) Redevelopment – State Significant Development Application

ESD Report

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1 Introduction

This report supports a State Significant Development Application (SSDA) submitted to the Department of Planning and Environment (DP&E) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Macquarie University (MU) is seeking development consent for the first phase of the Macquarie University Central Courtyard Precinct (MUCCP) redevelopment. Under this application consent is sought for redevelopment of Building C10A, construction of two student accommodation buildings (Buildings R1 and R2) and redevelopment of the landscaped Central Courtyard.

2 Background

MU is a teaching and research institution of international, national and state significance. It is ranked among the top two per cent of universities in the world and holds a 5-star QS rating. MU is renowned for its innovative research and its commercial partnerships, with more than 100 leading companies located on Campus or in the surrounding Macquarie Park high-tech precinct.

The University was founded in 1964 and has since grown into a large research university with over 30,000 students and 3,000 staff. More than $1 billion has recently been invested in MU facilities and infrastructure to ensure students and staff can thrive in an inspiring and technologically advanced learning environment.

In March 2014, MU adopted the 'Macquarie University Campus Master Plan 2014'. The Master Plan builds on the approved MU Concept Plan 2009 and sets out the physical framework to accommodate the University's predicted needs, while ensuring flexibility into the future and enhancing the existing qualities of the University's Campus. Ongoing changes in teaching methodologies, new course opportunities, a desire to increase industry engagement and the potential for commercial opportunities on the Campus were all key considerations in the development of the Master Plan.

3 Site Description

The MUCCP is situated in the centre of the University campus, within Precinct A. The MUCCP currently contains Buildings C9A and C10A (the Student Hub) which are subject to a separate demolition DA to City of Ryde Council, Buildings C8A, C7A and the landscaped Central Courtyard. The MUCCP is a key component of the University campus.

Figure 1 shows the location of the MUCCP within the context of the University campus.

Figure 1 - Location of the site

4 Overview of the Proposed Development

In accordance with the Master Plan, MU has identified the opportunity to move student accommodation to the heart of the campus. The Master Plan also acknowledges the importance of the MUCCP, and the need to retain the Precinct as a key focus of the University's civic and administrative functions, with active edges for retail, and food and beverage uses.

MU is seeking to secure development consent for the first phase of the MUCC precinct redevelopment. Consent is sought for redevelopment of Building C10A (known as 1 Central Courtyard), construction of two student accommodation buildings (R1 and R2) and redevelopment of the landscaped Central Courtyard. The proposal comprises:

- Construction of a new, multi-storey Student Hub (1 Central Courtyard) in place of existing Building C10A, with ancillary retail uses.
- Construction of two student accommodation buildings (Building R1 and R2) to provide approximately 340 student beds and integrated academic uses.
- Redevelopment of the landscaped Central Courtyard.

- Construction of a shared basement including plant, loading and waste management facilities, end of trip facilities and accessible parking.
- Installation of a new substation.
- Installation of utilities and services to accommodate the proposed development.
- Upgrade of the western extent of Science Road to accommodate fire brigade access.
- Tree removal and landscaping.

The extent of the SSDA works is shown in **Figure 2**.

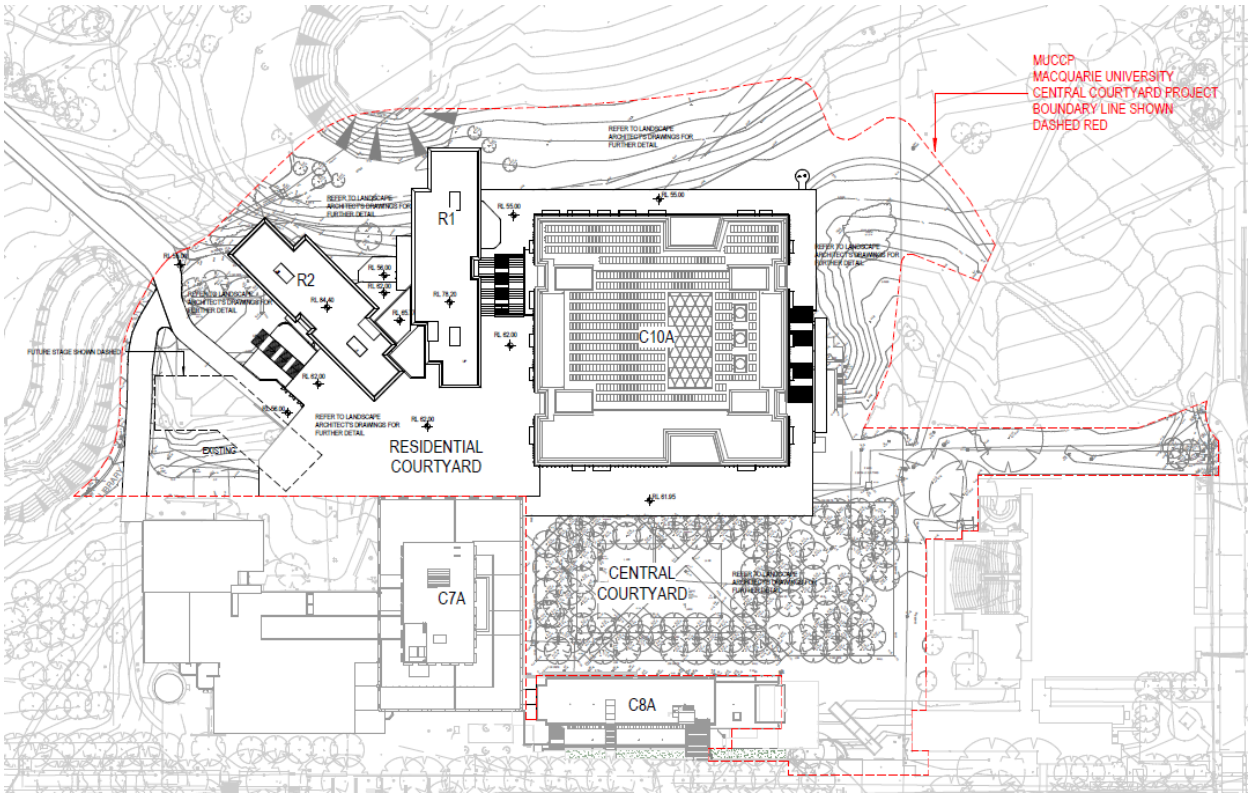

Figure 2 – Extent of the MUCCP SSDA

5 ESD Strategy

Arup has been engaged by Macquarie University as the Environmentally Sustainable Design (ESD) consultants for the MUCCP.

This report outlines the building's ESD initiatives to address the Environmental Planning and Assessment Regulations and outline the ESD principles that are to be applied to the project.

5.1 ESD principles of the Environmental Planning and Assessment Regulations 2000

A summary of the ESD principles outlined in Schedule 2, clause 7(4) of the Environmental Planning and Assessment Regulations is as follows:

- Where possible the design is to be developed to avoid serious and irreversible environmental degradation.
- The design is to maintain or enhance the health, diversity and productivity of the environment for future generations.
- The design is to consider ways to conserve biological and ecological diversity.
- Design decision are to be made with the environment in mind, including how the ongoing operation of systems will impact the environment over the course of the projects lifetime.

5.2 Rating scheme

Although not pursuing a formal certification with the Green Building Council of Australia, the buildings will be targeting an equivalent 5 Stars using the Green Star Design and As Built v1.1 rating tool.

Initiatives commensurate to this equivalence rating are to be included in the design and construction documentation to address sustainability within the built environment.

A 5 Star rating is defined by the GBCA as delivering an outcome equivalent to Australian Excellence.

5.3 Energy

The project will target reducing its carbon footprint by implementing measures to reduce ongoing operational energy.

Such measures being considered include:

- High performing building envelope and shadings to ensure energy consumption for heating and cooling is minimised, including:
  - Solar shading optimised by orientation to address the varying conditions across a building's geometry.
  - Well sealed and insulated facade components to reduce heat loss in the winter and minimise heat gain in the summer.
  - High performance glazing to manage solar and thermal loads through the fabric whilst introducing natural light into spaces.
- Comfort strategies designed to improve the building experience and reduce energy consumptions, including
  - Maximisation of natural ventilation opportunities for areas where less stringent temperature control is required in the student accommodation and in the informal teaching spaces of 1 Central Courtyard.
  - Mixed mode operation to offer flexibility to adopt natural ventilation at times when outdoor air conditions are favourable.
- Design of efficient building services solution:
  - Use of district cooling system for mechanically ventilated spaces (using a precinct wide central chilled water systems) which is more efficient than decentralised systems for individual buildings.
  - Energy monitoring that will enable ongoing tracking of energy consumption that will facilitate the setting and measuring of performance targets. This will encourage the culture of energy-sensitive practices.
  - Installation of efficient lighting systems that make use of available daylight.
  - Installation of efficient equipment that considers ongoing maintenance requirements as part of a whole of life assessment.
- Investment in renewable energy resources via a photovoltaic array installation onsite. This will act to offset site-wide electricity consumption.

The buildings will target a minimum 20% reduction in operational carbon compared to that of a current benchmark building within New South Wales.

5.4 Water

The project will target reducing its ongoing operational water use with the following initiatives being considered to achieve this target:

- Considered landscaping that reduces the need for irrigation.
- Installation of efficient fixtures and fitting that will reduce potable water flow rates from taps, showers, toilets and urinals.
- Rainwater harvesting that collects rainwater for precinct roofs, with the water being used for cooling tower top up to reduce reliance on potable water consumption.
- Water monitoring that will enable ongoing tracking of water consumption that will facilitate the setting and measuring of performance targets. This will encourage the culture of water-sensitive practices.

5.5 Water Sensitive Urban Design

The project supports site wide design initiatives that address Water Sensitive Urban Design (WSUD) principles.

Refer to separate Civil report that has been prepared for this SSDA.

5.6 Wind

Comfort for campus users in terms of environmental wind conditions has been considered in the design of the project.

Refer to separate Environmental Wind Assessment report that has been prepared for this SSDA.

5.7 Waste

The project supports operational policies that reduce the impact of waste generation within the built environment. Policies include provision of adequate waste facilities, education and operational target setting.

Refer to separate Waste Management report that has been prepared for this SSDA.

5.8 Transport

The project supports sustainable transport alternatives to reduce reliance on single person car use. Initiatives include promotion of cyclist facilities and access by public transport.

Refer to separate Transport and Accessibility report that has been prepared for this SSDA.

6 Conclusion

The proposed buildings will target an equivalent 5 Stars using the Green Star Design and As Built v1.1 rating tool to deliver an outcome equivalent to Australian Excellence.

The project addresses the principles of environmentally sustainably design through a number of initiatives including:

- Energy initiatives – maximising the use of passive strategies, high performing façade design and investment in renewable energy technology.
- Water initiatives – reduction in operational water use through efficient (low flow) fixtures and a rainwater harvesting system to supplement cooling tower consumption.
- Waste – providing infrastructure for separation and collection of different waste streams and setting performance targets for recycling and reduction to landfill during operation.
- Transport – promoting alternatives to single driver car use by including end of trip cyclist facilities and educating users of public transport availability.

As such, the project has considered the ecological impact of the construction and operation of the redevelopment. In response, it has introduced design initiatives that facilitate the ongoing health, diversity and productivity of the precinct for future generations, thereby addressing the ESD principles outlined in the Environmental Planning and Assessment Regulations.