

D14 BUILDING



UNSW
SYDNEY

D14 SUSTAINABILITY REPORT PREPARED FOR UNSW

NOVEMBER 2018

A large, abstract geometric graphic composed of several overlapping, semi-transparent polygons in various shades of green, yellow, and blue, creating a dynamic, layered effect.

lendlease



Document History

Revision	Date	Prepared By	Checked By	Description
01	12-Oct-18	Paul Hover	Daniel Grunbaum	First Issue
02	24-Oct-18	Paul Hover		Updated for Urbis Comments
03	06-Nov-18	Paul Hover	Daniel Grunbaum	Updated for UNSW Comments
04	07-Nov-18	Paul Hover	Daniel Grunbaum	Updated for UNSW Comments

A:\Projects\Committed Projects\UNSW D14\D Reports\Drafts\181107 D14 ESD Report_04.docx

Enquiries

Name: Paul Hover

Position: Senior Environmental Design Consultant

Telephone: 0404 737 389

Email: Paul.Hover@lendlease.com



Table of Contents

1.0 Introduction..... 4

1.1 Site Location..... 4

1.2 Overview of proposed development..... 5

1.3 Purpose of This Report..... 5

2.0 Referenced Documentation 5

3.0 UNSW Project Targets..... 6

4.0 Sustainability Contribution 7

4.1 General ESD..... 7

4.2 Sustainable Building Principles 8

4.3 Building Performance..... 9

4.4 Climate Change 9

5.0 Conclusion 10

1.0 Introduction

This report supports a State Significant Development Application (SSDA) (SSD 9606) submitted to the Minister for Planning pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The SSDA seeks approval for a stand-alone building at UNSW Sydney known as Building D14 as described in the Overview of Proposed Development section of this report.

This Sustainability report has been produced by the Lendlease Applied Insight team to describe the principles to be incorporated into the design, construction and ongoing operation phases of the project to minimise its impact on the environment.

1.1 Site Location

The D14 building is located within UNSW Sydney's (The University of New South Wales) Kensington campus about 7 km south west the Sydney Central Business District. The existing three-storey UNSW Hall building is to be demolished and re-developed with the new D14 building.

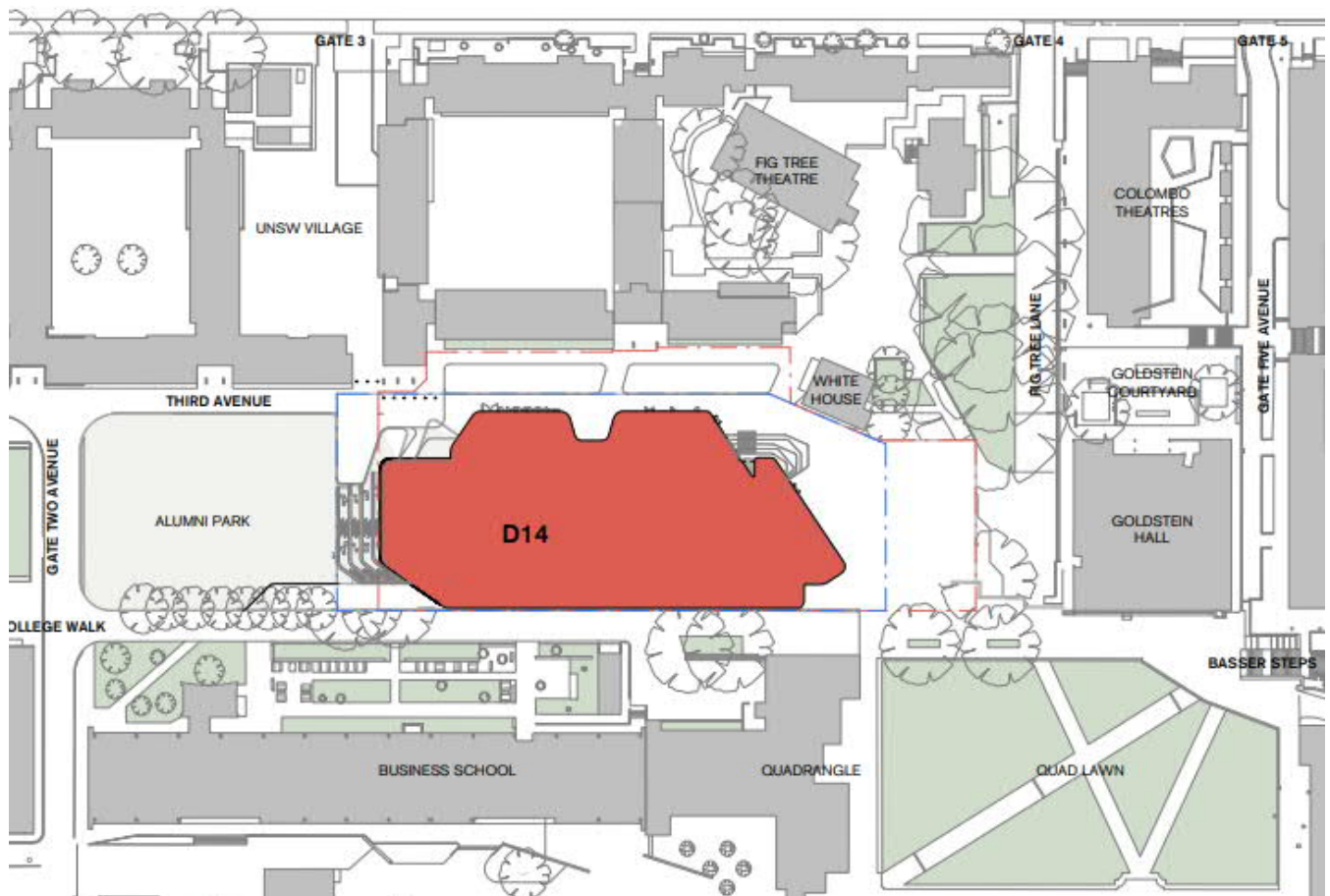


Figure 1: Building D14 Site Location

1.2 Overview of proposed development

The SSDA seeks approval for an eight level (ground plus seven levels) multi-purpose building within UNSW Kensington Campus.

1.3 Purpose of This Report

This report has been prepared to accompany the SSDA for the D14 works at UNSW Kensington Campus. It addresses the relevant Secretary's Environmental Assessment Requirements (SEARs) for the project and outlines the design responses to UNSW Campus targets.

The environmental sustainability initiatives for the development aim to be world class, and will complement work by UNSW in achieving World Class Environments as established in its UNSW 2025 Strategic Plan. The key drivers for this project are to:

- Facilitate campus growth through a vertical environment
- Create built form that connects to an open and connected public realm
- Create multipurpose, inclusive, vibrant and active hubs where the campus community can study, live, work and innovate.

2.0 Referenced Documentation

The following documentation has been reviewed in preparing this report:

Document Number	Revision	Description
ADDA200000 to ADDA99030	02	Planning Application architectural drawings set. Issued 02.11.2018
SK-M001 to SK-M008	01	GMP Issue mechanical services drawings. Issued 05.10.2018.
HYD00000000 to HYD8001033	01	GMP Issue hydraulic services drawings. Issued 05.10.2018.
SK-E000 to SK-E902	02	GMP Issue electrical services drawings. Issued 15.10.2018

3.0 UNSW Project Targets

UNSW has established a number of sustainability targets for the project that form part of the campus-wide UNSW 2025 Strategy for Sustainability. This short overview provides a summary of the alignment of the project against these aspirations.

Reference and Rating

- The proposed design incorporates sustainability initiatives to achieve a minimum of 75 points under the Green Star Design & As Built v1.2 tool.
- The project is designed to achieve high energy performance in operation which will be measured using UNSW's "Whole of System" methodology to enable benchmarking against their existing assets.

Carbon Positive Building

- A 30 kWp rooftop solar photovoltaic array is proposed to support the Campus' Carbon Positive principle.
- Use of sustainable materials including a responsibly sourced, prefabricated cross laminated timber (CLT) structure to significantly reduce embodied carbon of the project.
- Low energy design incorporating external shading, low energy LED lighting, low temp VAV air distribution system and high efficiency cooling and heating plants.
- Extensive and comprehensive energy metering

Water Conscious Campus:

- All water fixtures are to meet or exceed the following WELS ratings:
 - o Taps – 5 Star
 - o Urinals – 5 star
 - o Toilets – 4 star
 - o Showers – 3 star
 - o Dishwashers – 5 star
- Use of borewater for non-potable water end uses such as irrigation and cistern flushing
- Aquifer recharging with storm water

Circular Economy Approach:

- Recycling of construction waste in accordance with the Lendlease Waste Management Plan to target 90%+ diversion of construction waste
- The design will facilitate the separation of waste during operation to enable waste diverted from landfill to be maximised.

Healthy Campus Community:

- End-of-Trip facilities including secure bike storage, lockers and showers are provided on the ground floor
- Ground, level 1 and level 2 are interconnected by a series of stairs central to the floor plate. Level 1 is also connected to the ground plane on the east via a series of 'bleacher' stairs.
- Plantings are proposed for D14 at ground and level 1 terraces.
- Use of native flora.

4.0 Sustainability Contribution

The proposed SSDA will address the relevant Ecologically Sustainable Development (ESD) Planning Secretary's Environmental Assessment Requirements (SEARs) that are summarised as follows:

- Detail how ESD principles will be incorporated into the design and ongoing operation phases of the development.
- Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact.
- Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance
- Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:
 - o Hotter days and more frequent heatwave events
 - o Extended drought periods
 - o More extreme rainfall events
 - o Gustier wind conditions

The following sections summarises how the project will respond to each of the ESD SEARS

4.1 General ESD

SEAR:

Detail how ESD principles will be incorporated in the design and ongoing operation phases of the development

Design Response:

The design of the building focuses on energy and water efficiency, a high quality of indoor environment and carbon reduction in delivery and operation. The project will achieve a 6 Star Green Star rating under the Design and As-Built v1.2 tool which, when accompanied by UNSW's own sustainability requirements, forms the backbone of the ESD principles being considered.

The project is also committed to a comprehensive commissioning and building tuning programme to ensure that the building operates to design intent and a high level of occupant satisfaction as well as energy and water efficiency targets are achieved.

A summary of how the project proposes to address each of the ESD principles is included below:

4.1.1 Precautionary Principle

The development aims to provide high quality amenity for the occupants while minimising or avoiding negative impacts to the environment. All design options have and will be assessed for the impact on the environment and the indoor environment that is created to ensure impact on the environment is minimised and high level of occupant satisfaction is achieved.

4.1.2 Inter-generational Equity

Inter-generational equity is to be maintained or enhanced through inclusion of numerous sustainable features such as:

- A focus on the indoor environment created to increase occupant satisfaction
- Use of low carbon, long life materials and systems such as a cross laminated timber structure.
- Extensive landscaping

- Redeveloping an existing building instead of a green field site.
- Design to optimise energy efficiency and commitment to ensure efficient energy and water consumption in operation.

4.1.3 Biological diversity and ecological integrity

The design respects and responds to the existing landscape and vegetation quality and further improves ecological value by adding diverse landscaped elements such as turf steps, green terraces, and mass planting of native species.

4.1.4 Improved valuation, pricing and incentive mechanisms

- A Green Star rating is being targeted which is considered to be an indication of the environmental value included within the building.
- Environmental targets are to be established and compared against to help drive improved operational performance.
- A comprehensive metering and monitoring system allows system inefficiencies to be identified and rectified to minimise the use of natural resources and associated costs.

4.2 Sustainable Building Principles

SEAR:

Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact.

Design Response:

The project will achieve a 6 star Green Star rating under the Design and As Built v1.2 tool which forms the ESD framework which includes the following features which will contribute to this rating:

- Strong passive design response including external shading, high performance glazing and blinds to minimise energy use, maintain a high standard of thermal comfort, and maintain access to views and daylight.
- The building will utilise superior cooling efficiency relative to packaged type plant that would typically be used for this size of building.
- The use of LED lighting will result in a significant energy reduction relative to fluorescent lighting historically used in this type of application.
- Improved air quality through high ventilation rates and minimising recirculated air. In addition, selection of finishes and adhesives and sealants will minimise VOC and formaldehyde off-gassing
- A timber structure is proposed that will significantly reduced the embodied carbon associated with the project. In addition a Life Cycle Assessment (LCA) is proposed to be carried out to identify design opportunities to further lower embodied carbon of the building.
- Inclusion of a rooftop solar photovoltaic array. Minimum target capacity is 30kWp that is to be confirmed during design development and procurement.
- Improve ecological value of the site area via introduction of planted vegetation
- Utilise bore water wherever possible which will greatly reduce the buildings potable water consumption.

4.3 Building Performance

SEAR:

Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance

Design Response:

Building D14 is to be designed and constructed to achieve a high standard of operational building performance by incorporating the following principles:

- Energy and water efficiency are a primary consideration of the building design.
- A high standard of indoor environment quality with a focus on occupant thermal comfort, daylighting and air quality. In addition, the use of natural materials such as the timber structure that enhances the occupants biophilic response.
- Proposed structure will not only result in reduced embodied carbon, but also reduced waste from site diverted to landfill. The design will also facilitate the separation of waste in operation to reduce waste to landfill.

A climate change risk assessment will be undertaken and mitigation strategies to significant risks will be developed by the project team for consideration during future design stages and operation.

The project team is committed to a building tuning process to ensure that the building operates in accordance with design intent. This will assist in enabling a future Green Star performance rating consistent with the building's capabilities.

4.4 Climate Change

SEAR:

Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:

- Hotter days and more frequent heatwave events
- Extended drought periods
- More extreme rainfall events
- Gustier wind conditions
- How these will inform landscape design, material selection and social equity aspects (respite/shelter areas)

Design Response:

The project team will undertake a detailed Climate Change Risk assessment for the project. The risk assessment process will follow Australian Standard 5334:2013 Climate change adaptation for settlements and infrastructure - A risk based approach, and the Lendlease Corporate Risk Methodology and Framework.

The outcome of the risk assessment will be used to inform the detailed design phase of the project culminating in a detailed Climate Change Adaptation and Resilience Plan. The plan will detail an appropriate design response and action plan to address the future climate change effects on the development its future occupants, stakeholders and surrounding public realm landscape, including:

- Increased average temperatures
- Extended and more frequent heatwaves
- Changes to relative humidity
- Extreme rainfall events
- Increased storm and high wind events
- Extended drought and bushfires / reduced air quality

The current design places a focus on passive design initiatives, high performance façade and a range of energy efficiency measures from LED lighting to smart controls and roof top solar PV.

Consideration has been given to the orientation of the building to maximise the amenity of adjacent public spaces providing undercover, shaded and sheltered public interface zones around the building via the incorporation of loggias, under crofts and awnings for weather protected waiting and walking.

The landscape plans incorporate sheltered seating zones along the mature shade trees and a mix of drought tolerant native and non-native plantings. Final paving selections will be assessed to minimise urban heat island effect with additional zones incorporating timber decking, planting and subsurface irrigated lawn and garden areas using harvested rainwater.

Access to public amenity areas and drinking water stations will also be considered as part of the overall design including an assessment of awnings and building shade structures to ensure they are appropriately engineered for high wind and storm events and capable of shedding hail and debris. Hydraulics design will consider guidance contained in Chapter 6 of the Australian Rainfall and Runoff guidelines to cater for predicted rainfall events guiding overall culvert and pipe sizing as well as the appropriate mix of onsite retention and rainwater harvesting. A 31kL water tank for storing a combination of rainwater and borewater will be used for toilet flushing, cooling tower make up and irrigation within the building, reducing potable water demand in times of extended drought.

5.0 Conclusion

The D14 SSDA supports the sustainability aspirations set for the UNSW campus and addresses the project SEARs.

The D14 project aims to deliver a sustainable building, minimising environmental impacts in delivery and operation. The proposed timber structure will result in significant embodied carbon savings and significantly reduce waste from site to landfill. In operation, the building will have the potential to achieve a high level of energy efficiency, reduced potable water use and minimisation of waste to landfill. Occupant amenity will be maximised through careful design considerations to maintain thermal comfort, maximise daylight whilst reducing glare and achieving a high level of air quality.