

University of Wollongong
Western Building
ESD SSDA Report

Rev B | 31 October 2017

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 256822-00

Arup
Arup Pty Ltd ABN 18 000 966 165



Arup
Level 10 201 Kent Street
PO Box 76 Millers Point
Sydney 2000
Australia
www.arup.com

ARUP

Contents

	Page	
1	Introduction	1
	1.1 SEARS	1
2	Ecologically Sustainable Development	2
	2.1 Definition	2
	2.2 Principles of ESD	2
3	Context	2
4	ESD Focus Areas	3
	4.1 Energy	3
	4.2 Water	4
	4.3 Transport	5
	4.4 Materials	5
	4.5 Societal	6
5	Conclusion	6

1 Introduction

This Ecologically Sustainable Development (ESD) report has been prepared on behalf of University of Wollongong (UOW) in support of a SSDA to be submitted to the NSW Department of Planning.

The proposal seeks to approval for a new Western Building to house The Arts English and Media (TAEM) School and the Health and Society (HAS) School and the School of Geography and Sustainable Communities (SGSC). These are currently spread across the UOW Wollongong Campus, in either aging facilities or temporary buildings on the Campus.

The new Western Building will be a landmark development for the University of Wollongong (UoW) campus. It will be located adjacent the campus Ring Road at the western end of the campus. The proposed project will accommodate the diverse functions of The Arts English and Media (TAEM) School and the Health and Society (HAS) School and the School of Geography and Sustainable Communities (SGSC) into a collaborative and engaging hub that will support the ambitions of next generation research and learning. Functions accommodated include specialist teaching spaces, academic and professional staff workplace, informal collaboration spaces as well as other support spaces. The proposed building will be circa 10,000sqm gross floor area across four levels plus a plant level.

UOW understands the importance of ESD and is keen for it to play an important role in shaping the development of the new Western Building. The University has a strong commitment to sustainability, as evidenced by their publically available Environmental Management Plan. This document together with the university's Strategic Plan are used as the key drivers in preparing this application.

At this stage of the project cycle, the focus is on setting frameworks in place that will ensure that the core principles of ESD are implemented in the future development. It provides the design team with the instruments to review and rate their proposal for this new facility. Prescriptive ESD design features are avoided in favour of an integrated ESD process which will allow the project architects to achieve their intended aesthetic and to permit optimal performance.

1.1 SEARS

The SEARS for the new development have been issued, and this report responds specifically to the following condition:

6. Ecologically Sustainable Development (ESD)

- *Detail how ESD principles (As defined by 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.*

- *Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice.*

Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.

2 Ecologically Sustainable Development

2.1 Definition

The Australian Government formalised the term *ecologically sustainable development* in their ESD National Strategy of 1992 as:

Development that improves the quality of life both now and in the future, in a way that maintains the ecological processes on which life depends.

As part of the strategy, they recognised that there could be no single definition for ESD and so the focus should be on intergenerational equity of environment, economy, and society. In developing the ESD Strategy for the new Western Building, each element is tested against both the definition and the intent.

2.2 Principles of ESD

The University of Wollongong is keen for the development to be progressed according to the Principles of ESD, as stated by The Hon. Justice Brian J Preston (2006). These principles include application and understanding of:

1. Sustainable use
2. Integration
3. Precautionary principle
4. Inter-generational and intra-generational equity
5. Conservation of biological diversity and ecological integrity
6. Internalisation of external environmental costs

Each of these principles has a scope of coverage which extends well beyond that of a typical development such as the new Western Building. However, it is envisioned that these principles should be an overarching guide for the development of the project.

3 Context

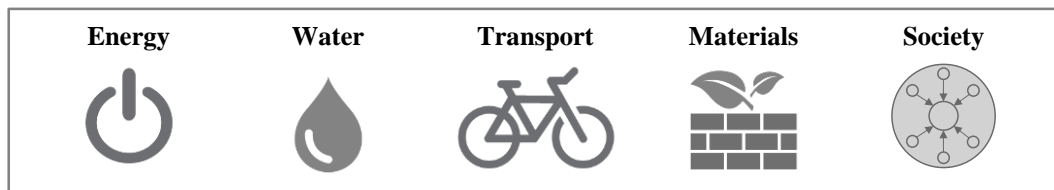
In developing the ESD Strategy, the design team has reviewed planning controls to identify how the development can be closely integrated. Key documents that have been referenced in the development of the proposed ESD Strategy include:

- Wollongong City Council, Development Control Plan, Chapter A2 Ecologically Sustainable Design
- Wollongong City Council, Local Environmental Plan 2009
- University of Wollongong, Environmental Management Plan 2014-2016

Elements from each of these documents have been integrated to ensure that the development approach is synergistic. In addition, sustainable development rating tools such as Green Star and NABERS have been reviewed to identify appropriate metrics and frameworks for integrating sustainability into the development.

4 ESD Focus Areas

At a high-level, a number of key ESD focus areas have been identified for the development of the Western Building project. Each of these focus areas is addressed separately in the following sections which highlight the current ESD initiatives, aspirations, and simple frameworks that can be used to drive the ESD Strategy.



4.1 Energy

A standard and well established approach to energy savings will be used to first lower the energy requirements of the building as much as possible, and then to design the remaining systems as efficiently as possible. This approach is depicted in Figure 1.

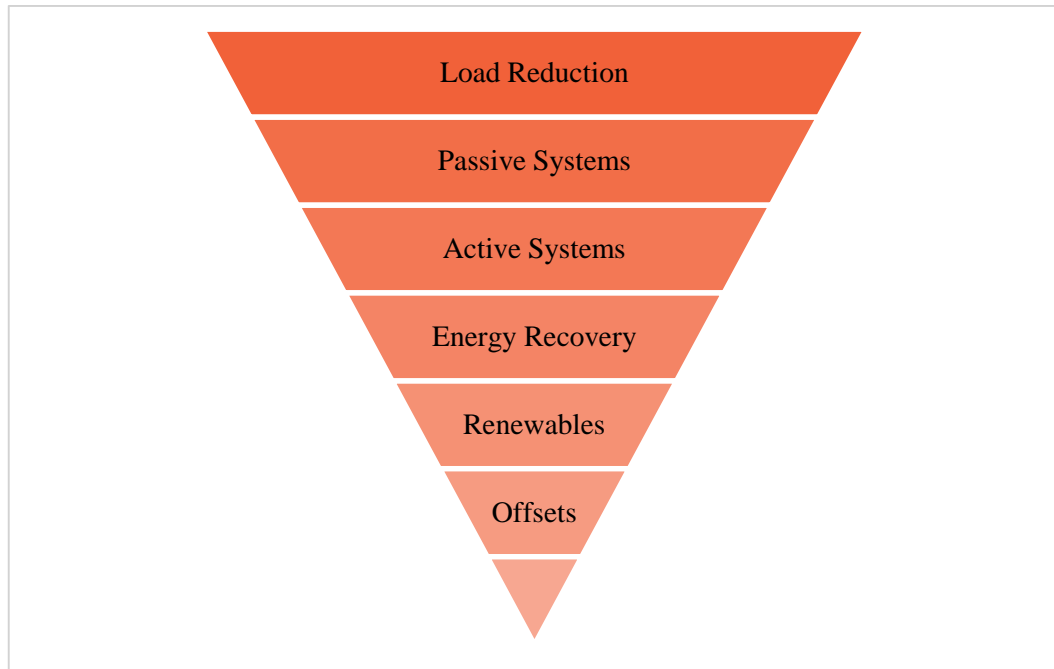


Figure 1: Energy Approach

A balanced approach of glazed and opaque facades is proposed. This will be capable of blocking or allowing solar loads as needed and insulating the interior spaces to a sufficient level. Passive shading structures that have been optimised for the building and climate, combined with high performing glass, are strategies that will be investigated. Interior lighting systems will also be designed to be as efficient as possible, so as to not unnecessarily increase cooling loads.

Heating and cooling systems are then only required to meet a minimum load and can be tailored to provide the high level of controllability often desired in a education facility, and can operate in the most energy efficient way possible. Efficient, centralised air handling systems are proposed to deliver amenity with minimal energy impact.

As the system design is developed, appropriate targets in line with best practice for university buildings will be proposed. The design's performance will may then be benchmarked against energy efficiency ratings such as NABERS Energy for Office and Green Star for Education.

4.2 Water

The approach for water will be similar to energy; first aim to reduce the demand of the building and then, increase the efficiency of the water delivery systems as much as possible. This is depicted in Figure 2 as the water approach. The primary water uses in this type of building are the general fixtures, plant irrigation, and cooling tower make-up water. Low-flow fixtures that still provide sufficient pressure are very successful in reducing demands. For vegetation, native species from dryer climates require less water than others, and compared to misting system, more efficient drip systems will be reviewed. Finally, cooling tower water usage is best reduced by lowering the cooling demand of the HVAC system,

as discussed in Section 4.1. Following that, high quality cooling towers provide efficient cooling using the minimum amount of water.

Similar to the energy approach, targets will be set to encourage water efficiency.

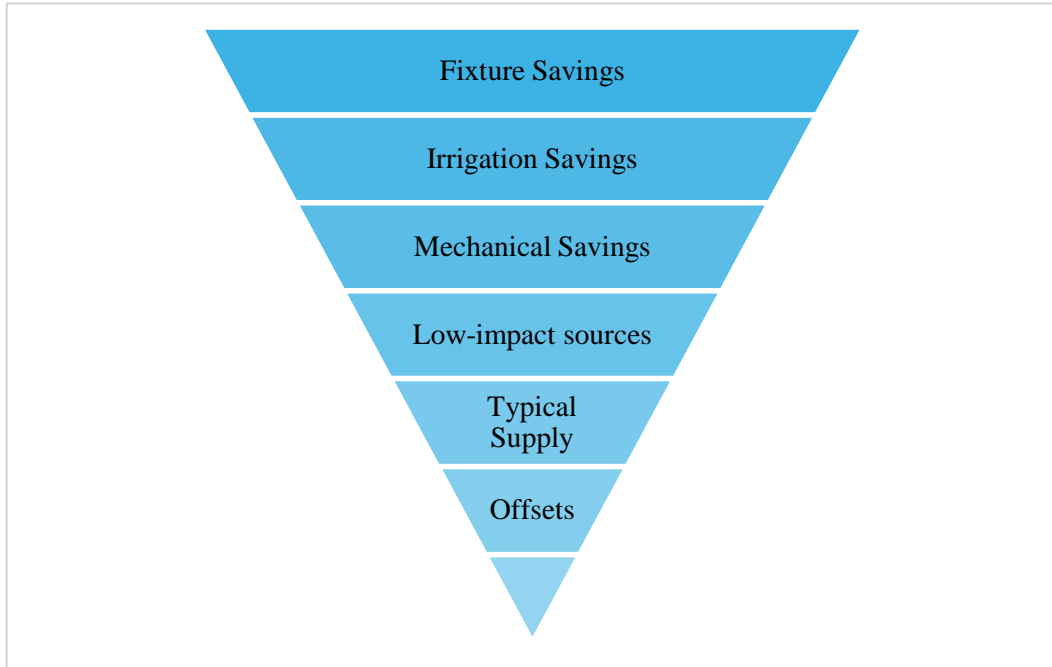


Figure 2: Water Approach

4.3 Transport

Situated in the core of the University of Wollongong's main campus, the building will leverage the existing transport networks. Collocating three existing schools in the new building result in no net increase in overall student numbers, and a small increase in staff numbers.

Locating the currently disparate facilities associated with The Arts English and Media (TAEM) School and the Health and Society (HAS) School and the School of Geography and Sustainable Communities (SGSC) in one building will result in lower intra-campus travel. No new car parking is proposed within the development site, meaning that the development will not encourage new car trips to campus. The additional parking demand from this development will be catered for by the additional car parking proposed in the University Master Plan. Facilities for cyclists are being provided to encourage staff bike commuting.

4.4 Materials

Embodied energy and carbon is an often overlooked but highly important factor when constructing a building, especially of this scale. This is a new construction building, and so the reuse of existing materials is unlikely. As such, care should be taken to use low impact materials with the shortest possible delivery distance that still meet design requirements.

4.5 Societal

This project is located in the heart of the university campus. It is therefore of high importance that the local neighbourhoods, and not just the students and staff who use the building, are improved by it. The design will aim to increase the beauty of the local area with its elegant design, minimize its impact following all of the above sections, and to provide a functional space within the current campus footprint.

5 Conclusion

This report presents an integrated ESD process which will allow the project design team to achieve their intended aesthetic and to permit optimal performance. Frameworks for the following items are addressed in the report:

- Energy minimisation and efficiency
- Water use minimisation through efficiency and reuse
- Transport planning
- Operational and construction materials reduction and tracking
- Societal sustainability

Successful implementation of the frameworks presented in this report will result in a feasible development, which has reduced impact on the environment and provides improved societal outcomes for the local area.