If a building becomes architecture, then it is art. Clearly, if a building is not functionally and technically in order, then it isn't architecture either – it's just a building.
Arne Jacobsen

Mechanical Engineering
Lighting Design
Sustainable Design
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SUSTAINABLE DESIGN

STEENSEN VARMING

UTS Central
DA - ESD Report

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1.0 Executive Summary

This report has been prepared by Steensen Varming, for inclusion in the Development Application submission for the UTS Central project to be located at the UTS City Campus, Broadway Precinct.

The key intent of this report is to provide a response to the environmentally sustainable design (ESD) criteria stated in the project's Secretary's Environmental Assessment Requirements (SEARs).

The SEARs have been issued by JBA on 11.12.2015, and consists of the following requirements for energy efficiency and ESD:

6. Ecologically Sustainable Development (ESD)

Secretary's Environmental Assessment Requirements	**Response**
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.	Refer to section 4.0
Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice.	Refer to sections 5.0
Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy.	Refer to sections 4.1 – 4.5
Consideration of the relevant policies and guidelines	Refer to section 3.0

UTS has a strong focus on sustainability, and this has been noted as a key project priority for the design team. This report presents a concise summary of the design decisions made during the Schematic design stage, and outlines the key ESD opportunities and initiatives that are likely to be implemented into the project. The strategies presented in this report are based on the current architectural design developed by FJMT and Lacoste Stevenson and Darryl Jackson Robyn Dyke Architects.

To ensure a sustainable outcome, the following are some of the key strategies being addressed by the proposed design:

- Incorporate a high-performance building envelope, to ensure energy efficiency as well as occupant comfort (including thermal, visual and acoustic comfort);
- Incorporate appropriate passive and active design strategies to ensure a low-energy as well as low-maintenance design outcome;
- Adopt water sensitive urban design principles, such as rainwater and stormwater capture and reuse; and
- Adopt practices to minimise demolition, construction and operational waste including recycling at least 80% of demolition and construction waste; and
- Undertake a whole-building life-cycle assessment to ensure efficient use of materials with a reduced-environmental impact.

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To benchmark the environmental performance of the building, UTS is aspiring to utilise the Green Star Design and As-Built (DAB) V1.1 tool developed by the Green Building Council of Australia.

- For Building 2, a formal certification of 5 Star Green Star DAB rating is being targeted;
- For the extension to the building 1 podium on the Broadway frontage, there is no formal target. However, the principles of Green Star being applied to Building 2 will be incorporated where applicable. (The reason for this approach is because Green Star ratings can only be achieved for a complete building, whereas the extension to the Building 1 Podium only involves partial refurbishment of an existing building).

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2.0 Introduction

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

The SSD Application relates to the Concept Plan Approval for the University of Technology Sydney (UTS) City Campus Broadway Precinct, which was approved in December 2009 (MP08_0116).

The proposed works relate specifically to the UTS Central Project, more specifically the extension of Building 1 (podium) and redevelopment of Building 2 at the City Campus, Broadway Precinct.

As the development has a capital investment value of more than $30 million as an educational establishment, it is identified as State Significant Development under the *State Environmental Planning Policy (State and Regional Development) 2011*, with the Minister for Planning the consent authority for the project.

This report has been prepared having regard to the Secretary's Environmental Assessment Requirements issued for the project.

2.1 Background

UTS recognised the need to upgrade the City Campus back in 2000, and undertook a number of master planning projects culminating in the *City Campus Masterplan 2020.* This provides a framework for the refurbishment of existing and new building works across the campus in providing improved facilities, and to accommodate future student and staff growth.

The long term strategic vision for UTS is 'to be one of the world's leading Universities of Technology'.

On 23 December 2009 a critical step in realising UTS's vision and identity for the Broadway Precinct was realised, with approval of the UTS City Campus Broadway Precinct Concept Plan (BPCP) – approved under the former Part 3A of the EP&A Act (MP 08_0116). The approved Concept Plan supports the significant redevelopment of the Broadway Precinct providing for new buildings, alterations and additions to existing buildings, along with associated landscaping and public domain works.

Since approval of the Concept Plan in 2009 UTS has secured the necessary detailed planning approvals and delivered a number of state of the art and iconic learning, research and social facilities, across the Broadway Precinct, including:

- Faculty of Engineering and IT Building, designed by Denton Corker Marshall Architects.
- Multi-Purpose Sports Hall.
- Alumni Green, designed by ASPECT Studios Landscape Architects.

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- Faculty of Science and Graduate School of Health Building, designed by Durbach Block Jaggers in association with BVN Architecture.
- Library Retrieval System.
- Great Hall and Balcony Room Upgrade, Designed by DRAW Architects in association with Kann Finch Architects.

As part of the staged delivery of the Concept Plan and as expected in its natural evolution, there have been a number of modifications. Of note, Modification No 5 to the Concept Plan provides for the complete redevelopment of Building 2, including additional floors above a new podium building.

2.2 Overview of Proposed Development

This SSD Application seeks approval for the following components of the development:

- Site preparation works, including demolition and clearance of existing Building 2 down to approximately ground level and associated tree removal;
- Retention and re-use of existing basement Level 1 and Level 2;
- Construction and use of a new podium building fronting Broadway (Building 1 extension and new Building 2);
- Construction and use of new floors above new Building 2 podium;
- Public domain improvements surrounding the site;
- Landscaping works to roof levels;
- Retention of existing vehicle access and parking arrangements; and
- Extension and augmentation of physical infrastructure / utilities as required.

The new floor space will accommodate a range of educational and ancillary educational uses, such as:

- Library
- Research
- Teaching Space
- Informal Learning Space
- Student Centre
- Student Union Spaces
- Food and Beverage Outlets
- Academic (including Faculty space)

A more detailed and comprehensive description of the proposal is contained in the Environmental Impact Statement (EIS) prepared by JBA.

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UTS Central is located at the corner of Jones Street and Broadway.

UTS Central will provide a new public image for UTS along Broadway, while maintaining connections with immediate campus surroundings, such as Building 1, Library Retrieval and storage (LRS) and Alumni Green.

The design team aims to incorporate sustainable design principles into the design of the building fabric, building services and plant to maximise energy efficiency and optimise sustainability performance in operation.

A climate responsive and energy efficient design solution is being developed, to ensure a high environmental outcome for the building.

To maximise plant efficiency, the proposed buildign will be connected to the centralised services infrastructure (i.e. the existing Campus Central Energy plant).

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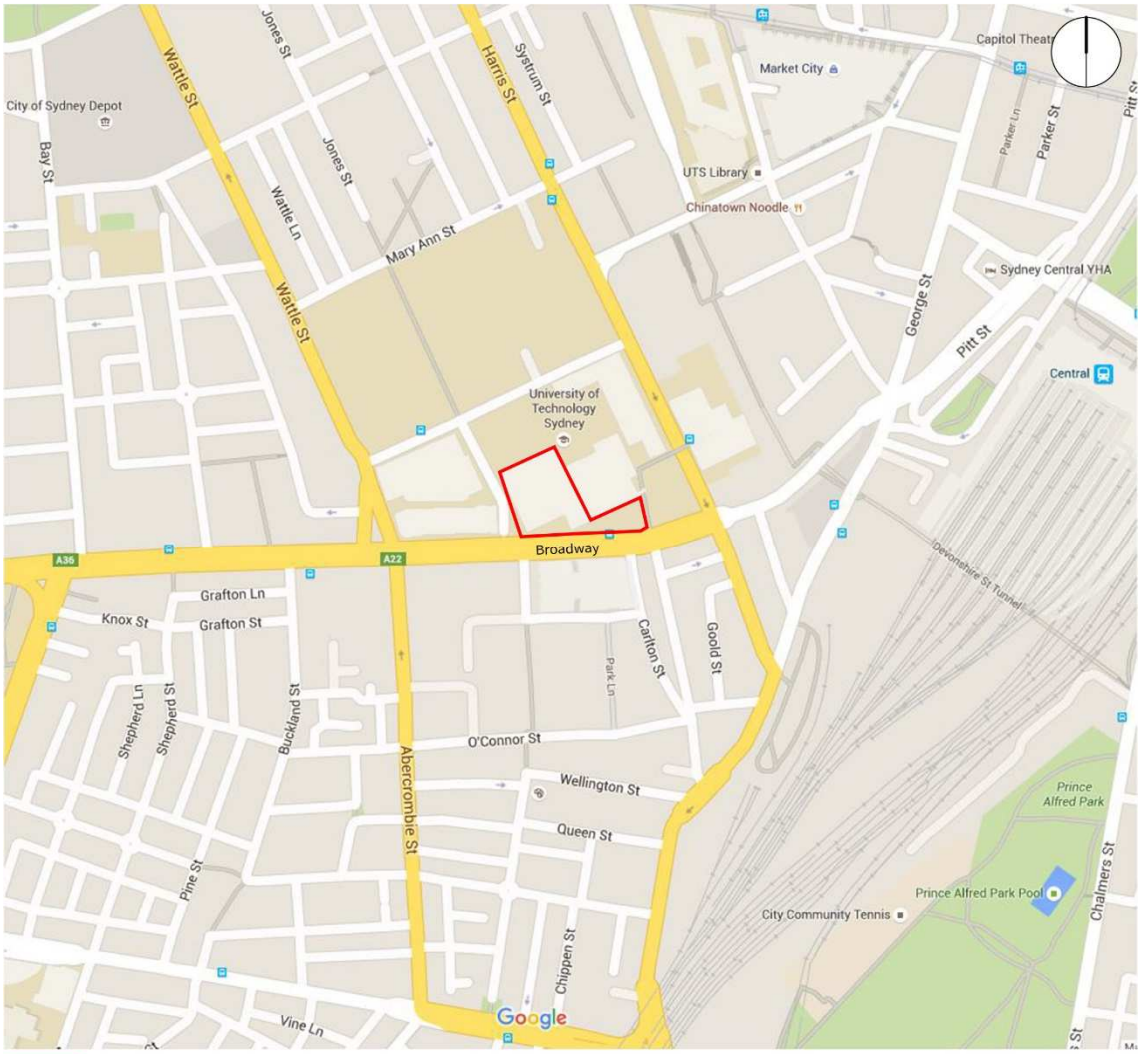
2.3 The site

The Broadway Precinct of the UTS City Campus is located on the southern edge of the Sydney Central Business District with frontages to Broadway, Thomas, Wattle and Harris Streets (see **Figure 1**). Central station is located less than 500m to the east.

More specifically the UTS Central project site relates to Building 1 (excluding the Building 1 tower) and Building 2 of the Broadway Precinct, refer to **Figure 2**.



The Site

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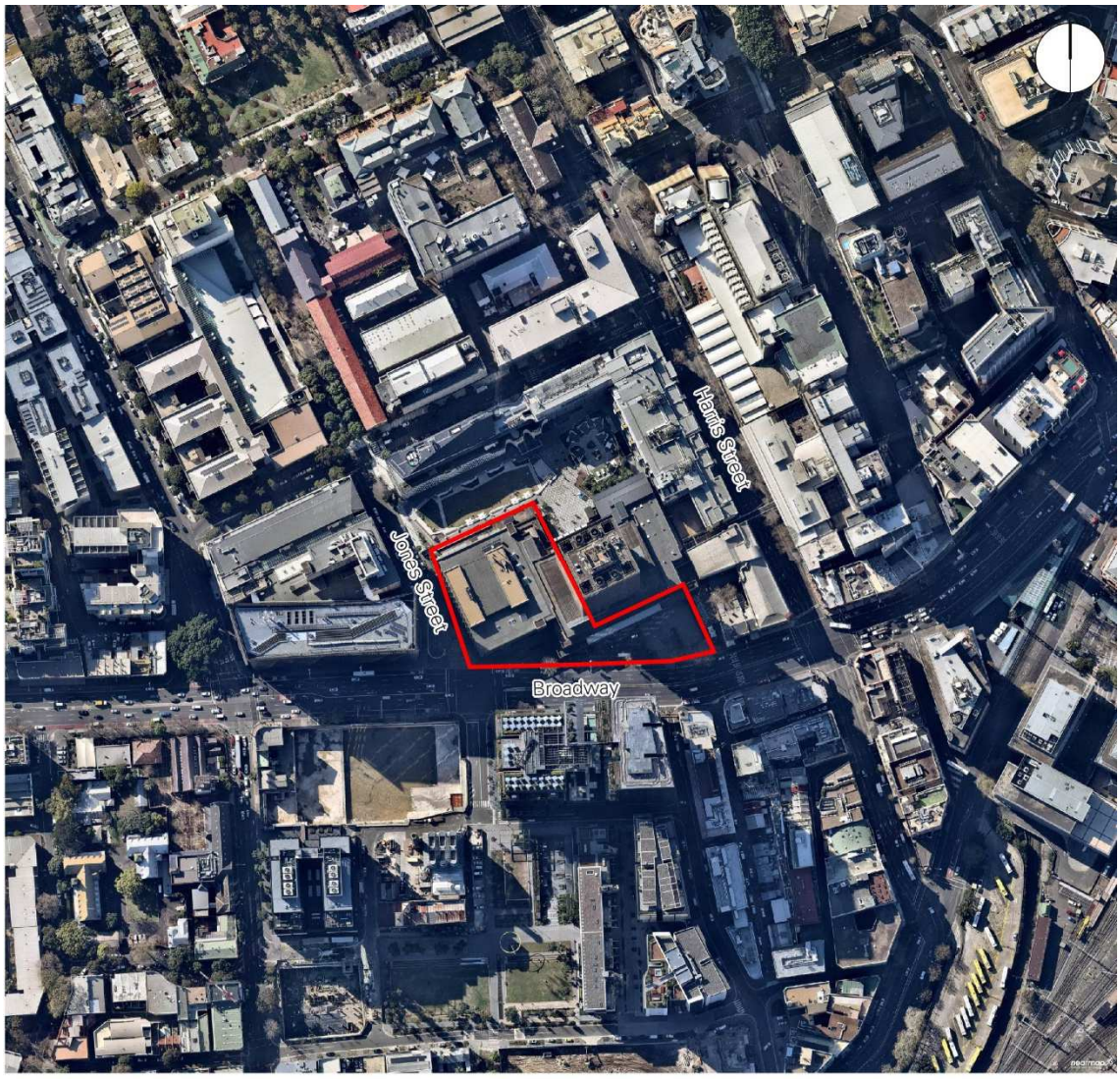

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3.0 Targets / Benchmarks

In addition to the Secretary's Environmental Assessment Requirements (SEARs), the following environmental targets are being aspired by the University:

- Exceed the requirements of Section-J of the National Construction Code (NCC) for energy-efficiency in building fabric and building services / systems
- Certified Green Star 5 Star Rating for Stage-1, as per the Green Star Design and As-Built V1.1 rating tool.

3.1 NCC Section-J

Section-J of the National Construction Code (Previously known as the Building Code of Australia) 2015 relates to "energy efficiency" of buildings". Section J is a minimum performance target for standard buildings, and specifies minimum performance targets known as deemed-to-satisfy (DTS) requirements, for building fabric and services.

The proposed UTS Central project aims to exceed the DTS requirements of Section-J. A JV3 methodology is being applied for the project to demonstrate the improvement beyond DTS.

Any improvement in energy-efficiency beyond the minimum requirements of Section-J, will also contribute towards the project's Green Star energy score.

3.2 Green Star

During the Schematic Design phase, several workshops have been conducted to determine the appropriate Green Star target for Building 2. A cost / benefit analysis was undertaken and it was determined that a 5 star certified Green Star Design & As-Built rating was feasible and will be pursued.

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4.0 Sustainability Approach

Sustainable building design involves a holistic and integrated design approach, which builds on an increased awareness of site opportunities, form and function, to encompass and target a broad range of sustainable design initiatives, specifically targeted at:

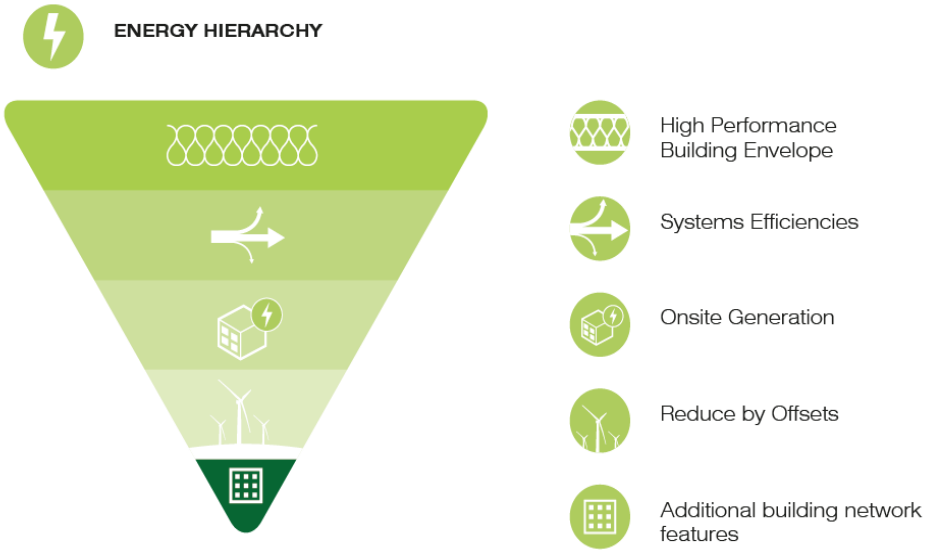
- Energy and water conservation
- Material selection
- Emissions reduction; and
- Waste reduction.

The above approach has been taken to ensure the ESD strategies proposed meet the SEARs and Targets/benchmarks discussed in the previous section (section 3.0).

4.1 Energy

Proposed approach to sustainability and energy related systems is based on applying an "energy hierarchy" methodology.

The energy hierarchy methodology has the reduction of energy use as its first priority, and then seeks to meet the remaining energy demand by the most efficient means available, before the inclusion of on-site generation and importation of green power.



The following initiatives are being considered for the proposed design:

- **High performance building envelope,**

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The proposed high performance façade is a key element of the building. It comprises of effective double glazing and interstitial shading devices, to provide solar and noise control, while maintaining a visual connection to the external environment.

The shading that will be integrated within the envelope will restrict summer sun but would allow low-angle winter Sun for passive solar heating.

- **Zoning of HVAC and lighting services** – Zoning of HVAC and lighting services will be incorporated to avoid energy wastage.
- **High efficiency plant and associated controls**
- **Enhanced commissioning** – UTS are committed to implement enhanced commissioning of building services, along with quarterly fine tuning to ensure that the systems perform at their optimum capacity.

  An independent commissioning agent will be appointed by the University to provide specialist guidance to the design team and the contractors.
- **Efficient Lighting Controls** – Preference will be given to the installation of LEDs, T5 or equivalent energy efficient lighting and controls.

4.2 Water

Water efficiency is another key aspect of sustainable design. For the proposed UTS Central project, major uses of water would include:

- HVAC systems;
- Landscape irrigation; and
- General water demand (domestic hot and cold water, toilet flushing and cleaning/maintenance)

The following hierarchy is being applied to the project:

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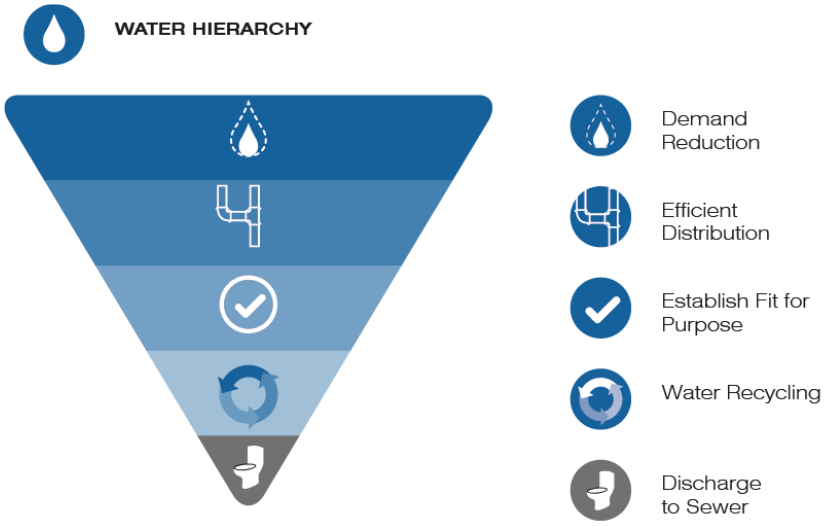

The following strategies are being considered to reduce water consumption.

- **Efficient fixtures / fittings**: Installation of high-efficiency fixtures and fittings, within one star of the best available WELS rating
- **Low-water landscaping** - Landscaping to consist of low-water demand species and xeriscaping
- **Rainwater Reuse** - Rainwater collection and reuse systems is being considered
- **Efficient HVAC systems** - Incorporation of efficient HVAC systems with a reduced water demand, where feasible
- **Other water reuse strategies -** Water reuse strategies such as condensate recovery and fire-system test water will be considered where feasible.

4.3 Materials

Selection of environmentally-preferable materials is a key priority for the project, because building materials consume energy and natural resources during its manufacture and for their transportation to the construction site.

Preference will be given to materials that are non-toxic, contain high-recycled content and/or highly recyclable. The following strategies are being considered:

- **Materials with low VOC content -** VOC off-gassing from internal materials and finishes is very harmful to occupant health and productivity.
  The design team will ensure that flooring, paints, adhesives and sealants are specified to meet low VOC requirements (as per Green Star VOC targets).
- **Formaldehyde Minimisation** - All engineered wood products will be specified to either have low formaldehyde emissions or contain no formaldehyde.

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- **Insulation ODP** – All thermal insulation products (used within both HVAC ductwork and building envelope) will be specified to be of zero ODP type. (i.e. avoid the use of ozone depleting substances in both its manufacture and composition).

- **Locally manufactured materials -** Preference will be given to locally manufactured products wherever feasible, in order to reduce their embodied energy and associated GHG emissions.

4.4 Emissions

Proposed design aims to ensure reduction of all forms of emissions, including watercourse pollution, light pollution and ozone depletion.

The following initiatives are being considered to preserve site quality and reduced stormwater pollution:

- **Pollution of night sky** will be minimised by ensuring that the electric lighting within the site will not cause any direct beam of light into the night sky. Light pollution can disturb the habitat of migratory birds and impacts the behaviour of nocturnal animals in the site vicinity.

- **Emissions from HVAC refrigerants** and insulation products have the capacity to damage the ozone layer. For the proposed design, refrigerants with low ODP will be specified and installed within all the proposed HVAC systems.

- **Water Sensitive Urban Design (WSUD)** integrates water cycle management with urban planning and design. The aim of WSUD is to manage the impacts of stormwater run-off from the development to protect and improve waterway health by replicating the natural water cycle.

  As part of the WSUD, a **storm water pollution prevention plan** will be developed and implemented. This would contain measures to prevent storm water contamination, control sedimentation and erosion during construction and operation of the building, such as rainwater reuse etc.

4.5 Waste reduction

The following initiatives are being considered to minimise waste during construction and operation phases:

- **Construction waste management** - During the construction phase, a project-specific construction waste management plan(WMP) will be developed and implemented by the Head contractor. This is to ensure that recycling of waste from demolition and construction is maximised, and that the volume of demolition and construction waste ending up in landfill is minimised.

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The sub-contractors will be instructed to send the recyclable resources recovered from demolition and construction back to their manufacturers and suppliers for recycling / reuse where possible.

- **Operational waste management** - To ensure recycling of operational waste, a dedicated storage space will be provided for locating recycling bins.

The University implements sustainable waste management principles, in the following order of priority, to avoid, reduce, reuse, recycle and finally dispose of remaining non-recyclable and hazardous waste in a responsible way.

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5.0 Green Star

Green Star is an environmental rating tool developed by the Green Building Council of Australia (GBCA) that has a holistic approach over a wide range of issues that address sustainability, from water to energy, materials to indoor environmental quality (IEQ) and also considers management practices.

UTS is targeting a certified 5 Star rating for Building 2, under the new Green Star Design and As-Built tool.

The rating tool consists of 9 categories, namely:

- Management
- IEQ
- Energy
- Transport
- Water
- Materials
- Land use and ecology
- Emissions and
- Innovation

A preliminary feasibility analysis has been undertaken during schematic design phase, and the requirements are being addressed in the proposed design.