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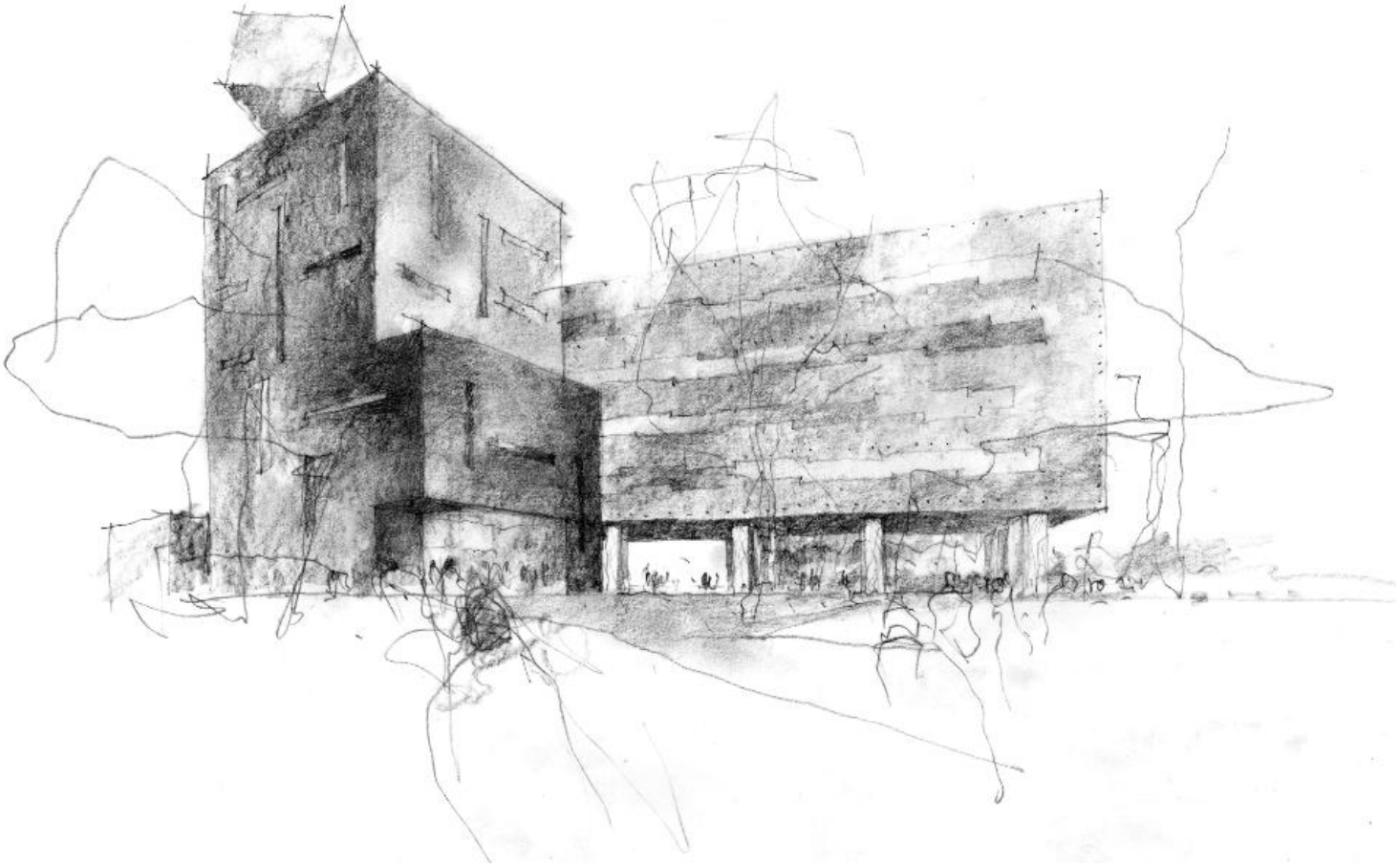
Molecular & Life Sciences Facility

ESD DA Report

1st May 2017



UoW MLS

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Author:	Chris Walker
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Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
Floor 11, 452 Flinders Street
Melbourne VIC 3000
PO Box 312, Flinders Lane
Melbourne VIC 8009 Australia
T +61 3 8668 3000
F +61 3 8668 3001
www.jacobs.com

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02	01/05/17	DA Approval – updates made	CW	MS	CW

Contents

1. Introduction

The University of Wollongong (UOW) has engaged the Jacobs DCM team for the design development and documentation of the proposed Molecular & Life Sciences Facility (MLS) building in the Science Medicine and Health (SMAH) precinct on the university's main campus.

The proposed new building will contain a Cryogenic Transmission Electron Microscope (Cryo-TEM) microscopy suite, other advanced microscopy suites, biological laboratories and accommodation, animal (rodent and aquatic) holding and support facilities and a lab and rooftop platform for Atmospheric Chemistry.

The MLS project has been initiated in order to:

- Support UOW in moving from a global top 2% to a top 1% University, by delivering new transformational, multidisciplinary molecular research with cutting-edge equipment and facilities
- House truly state of the art analytical equipment, including a flagship ultra-high resolution Titan Krios Cryo-TEM, one of only two units in Australia,
- Surpass existing capability for biological single particle analysis at sub-nanometre resolution
- Position UOW with world-class Australian and International molecular analytical research groups with the aim of UOW becoming a node for an Australian Research Council (ARC) funded "Centre of Excellence in Single Molecule and Cell Visualisation"
- Attract, retain and concentrate the best MLS researchers and allow growth in Cell and Molecular Life Sciences, Single Molecule Bio-Physics, and Structural and Computational Biology
- Address a sub-standard animal house, which has had a number of non-compliance issues over the last 5-10 years
- Allow repositioning of existing Atmospheric Chemistry equipment, the potential of which is currently compromised due to its sub-optimal position and lack of expansion capacity.

1.1 Report Format

This report provides a response to the Section 6 requirements of the Environmental Impact Statement (EIS) within the Secretary's Environmental Assessment Requirements. There are three distinct requirements within Section 6, which are addressed individually.

Requirement	Details	Reference
Requirement 1	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	Chapter 2
Requirement 2	Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice	Chapter 4
Requirement 3	Include a description of the measures that would be implemented to minimise consumption of resources, water (including water sensitive urban design) and energy	Chapter 3

2. Sustainability Objectives

The goal of this ESD report is to communicate university, campus, and project-specific sustainability requirements and targets, and assess the current design against these standards.

The primary sustainability benchmark for this design is the University of Wollongong ESD Design Standards which includes requirements for the project site and landscaping, building fabric, building amenities, and electrical, mechanical and hydraulic services. In addition to the Design Standards, the project also falls under a Campus Master Plan which includes several key sustainability targets. The project is also being benchmarked against the Green Star Design & As Built rating system.

The University of Wollongong is targeting a healthy responsible design for the MLS, benchmarked against the Green Star rating system only, rather than a formally certified building. ESD will be considered at all project phases from schematic design, design development, contract documentation, construction and occupation.

2.1 Sustainability Approach

The sustainability approach for the project to achieve the desired outcome is centred on good design driven by passive design principles. The importance placed on sustainability in the schematic design phase of the project will enable passive design principles to influence the overall design and building form. Furthermore, this approach enables environmentally sustainable initiatives to become embedded throughout the design with education and awareness provided to the wider design team from the outset.

The following categories are the driving forces to guide the sustainability outcomes of the design.

Energy and Carbon

By incorporating energy minimisation techniques into the building design, energy intensity will be reduced for the project and the University of Wollongong.

Energy costs are volatile and rising, and excess consumption means a larger carbon footprint. Low energy solutions will reduce operational costs and have a ripple effect with respect to the reduced spatial requirements and cost of mechanical plant.

The design seeks to reduce energy consumption through passive design methods, including natural ventilation, daylighting in appropriate spaces, and an efficient building envelope.

Indoor Environment Quality

High quality internal environments are extremely important in a research and learning environment as they can positively influence health, wellbeing and performance of both staff and researchers. The indoor environment quality (IEQ) is influenced by:

- Air quality;
- Thermal comfort;
- Daylight and connection to the outdoors; and
- Noise and acoustic comfort.

Energy efficiency and good IEQ can be achieved simultaneously through carefully integrated design considerations. For example, good thermal insulation can also act as acoustic insulation. Providing daylighting in perimeter spaces can reduce electric lighting consumption if proper daylighting sensors are place.

Water

Potable water is a limited resource. As populations increase and climate patterns shift, it will be increasingly critical to conserve and recycle water.

Reductions in potable water consumption can be achieved through water efficiency within a project, as well as through the utilisation of reclaimed water sources and planting of native vegetation.

Materials and Waste

In designing a building project for minimal environmental impact it is critical to consider entire building systems, as every building material comes with an environmental cost of some sort. Careful analysis and selection of materials can greatly reduce the life cycle environmental impact. Increasing consumption of materials and resources also generates large amounts of waste - with more effort required to reduce and prevent it.

The university design standards encourage the selection of lower-impact materials, including construction materials with recycled content. The design can also consider the reduction of the amount of waste generated or by recycling as much of the waste generated as possible during construction, procurement and operation.

Ecology

Land transformation affects many of the planet's physical, chemical, and biological systems. Ecological consequences and biodiversity principles must be considered to ensure the site's ecological value is reconciled.

The building is sited on previously developed land and will include green roofs to mitigate heat island effect. Permeable hardscapes and the inclusion of rooftop PV are additional measures that will reduce the site's contribution to the urban heat island effect.

Transport

The University of Wollongong campus contains a successful car-share policy, as well as numerous precinct-wide public transport options that aim to significantly reduce individual car use.

Active transport (cycling and walking) is also encouraged.

3. Sustainability Targets / Benchmarks

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

- Meet the requirements of Section-J of the National Construction Code (NCC) for energy-efficiency in building fabric and building services/systems; and
- Benchmark the design against the Green Star Design & As Built framework.

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 MLS facility is located in Wollongong, NSW. The location of the project is classed under the BCA Climate Zone 5. The following BCA Class classifications apply to the building.

Table 1: NCC BCA Building Class Classifications

Levels	Use	BCA Class
Ground	Labs, Microscopy area Training and reception	8 9b
Level 1	Labs and lab support area Offices Conference	8 5 9b
Level 2	Labs and lab support area Offices and meeting areas	8 5
Level 3	Labs and lab support area Offices and meeting areas	8 5
Level 4	Labs and lab support area	8
Level 5	Plant and rooftop equipment area	8

The proposed MLS project aims to exceed the DTS requirements of Section-J. A JV3 methodology may also be applied to the project to demonstrate the improvement beyond minimum standards.

3.2 Green Star Design & As Built

Green Star Design & As Built assesses the sustainability outcomes from the design and construction of new buildings or major refurbishments, across nine holistic impact categories. Registering a project for Green Star Design & As Built is a commitment to certifying a completed building. This ensures that the finished product delivers sustainable outcomes.

Projects receive a Green Star As Built certification mark to promote their achievements upon practical completion, with an optional Design Review that gives projects the confidence they are on the right track and provides an early opportunity to promote a Green Star commitment. A 5 star Green Star Design & As Built rating requires at least 60 per cent of points available being achieved. The project is targeting to benchmark the MLS design to a level. The below table summarises the Green Star Design & As Built strategy based on the current proposed design, and the additional credits that could be targeted to uplift the design to a 5 Star Design & As Built rating.

Table 2 : Green Star Design & As Built Credit Summary

Credit	#	Sub-Credit	Points Available	Points Targeted	Points TBC
Green Star Accredited Professional	1.0	Accredited Professional	1	0	-
Commissioning and Tuning	2.0	Environmental Performance Targets	-	0	Complies
	2.1	Services and Maintainability Review	1	0	1
	2.2	Building Commissioning	1	1*	-
	2.3	Building Systems Tuning	1	1*	-
	2.4	Independent Commissioning Agent	1	0	1
Adaptation and Resilience	3.1	Implementation of a Climate Adaptation Plan	2	0	2
Building Information	4.1	Building Operations and Maintenance Information	1	1	-
	4.2	Building User Information	1	0	1
Commitment to Performance	5.1	Environmental Building Performance	1	0	1
	5.2	End of Life Waste Performance	1	0	1
Metering and Monitoring	6.0	Metering	-	Complies*	-
	6.1	Monitoring Systems	1	1*	-
Construction Environmental Management	7.0	Environmental Management Plan	-	Complies*	-
	7.1	Formalised Environmental Management System	1	1*	-
Operational Waste	8A	Performance Pathway - Specialist Plan	-	-	-
	8B	Prescriptive Pathway - Facilities	1	0	1
Total			**14**	**5**	**8**
Indoor Air Quality	9.1	Ventilation System Attributes	1	1*	-
	9.2	Provision of Outdoor Air	2	0**	1
	9.3	Exhaust or Elimination of Pollutants	1	0	1
Acoustic Comfort	10.1	Internal Noise Levels	1	1*	-
	10.2	Reverberation	1	1*	-
	10.3	Acoustic Separation	1	0	0
Lighting Comfort	11.0	Minimum Lighting Comfort	-	Complies*	-
	11.1	General Illuminance and Glare Reduction	1	1*	-
	11.2	Surface Illuminance	1	0	1
	11.3	Localised Lighting Control	1	0	0
Visual Comfort	12.0	Glare Reduction	-	-	Complies
	12.1	Daylight	2	0**	1
	12.2	Views	1	0**	1
Indoor Pollutants	13.1	Paints, Adhesives, Sealants and Carpets	1	1*	-
	13.2	Engineered Wood Products	1	1*	-
Thermal Comfort	14.1	Thermal Comfort	1	1**	1
	14.2	Advanced Thermal Comfort	1	0	0
Total			**17**	**7**	**6**
Greenhouse Gas Emissions	15A.0	Conditional Requirement: Prescriptive Pathway	-	-	-
	15A.1	Building Envelope	-	-	-
	15A.2	Glazing	-	-	-
	15A.3	Lighting	-	-	-

Credit	#	Sub-Credit	Points Available	Points Targeted	Points TBC
	15A.4	Ventilation and Air-conditioning	-	-	-
	15A.5	Domestic Hot Water Systems	-	-	-
	15A.6	Building Sealing	-	-	-
	15A.7	Accredited GreenPower	-	-	-
	15D.0	Conditional Requirement: NABERS Pathway	-	-	-
	15D.1	NABERS Energy Commitment Agreement Pathway	-	-	-
	15E.0	Conditional Requirement: Reference Building Pathway	-	Complies**	-
	15E.1	Comparison to a Reference Building Pathway	20	0-6**	2
Peak Electricity Demand Reduction	16A	Prescriptive Pathway - On-site Energy Generation	1 out of 2	0	1
	16B	Performance Pathway - Reference Building	2	-	-
Total			**22**	**0-6****	**3**
Sustainable Transport	17A.1	Performance Pathway	(10)	-	-
	17B.1	Access by Public Transport	3 out of 10	0	-
	17B.2	Reduced Car Parking Provision	N/A	N/A	-
	17B.3	Low Emission Vehicle Infrastructure	N/A	N/A	-
	17B.4	Active Transport Facilities	1 out of 10	-	1
	17B.5	Walkable Neighbourhoods	1 out of 10	0	-
Total			**8**	**0**	**1**
Potable Water	18A.1	Potable Water - Performance Pathway	(12)	-	-
	18B.1	Sanitary Fixture Efficiency	1 out of 12	1	-
	18B.2	Rainwater Reuse	1 out of 12	0	1
	18B.3	Heat Rejection	2 out of 12	0	2
	18B.4	Landscape Irrigation	1 out of 12	1	-
	18B.5	Fire System Test Water	1 out of 12	0	1
Total			**12**	**2**	**4**
Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	0	-	-
	19A.2	Additional Life Cycle Impact Reporting	0	-	-
	19B.1	Concrete	3	2*	1
	19B.2	Steel	1	1*	-
	19B.3	Building Reuse	4	0	-
Responsible Building Materials	20.1	Structural and Reinforcing Steel	1	1*	-
	20.2	Timber Products	1	1*	-
	20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1*	-
Sustainable Products	21.1	Product Transparency and Sustainability	3	1*	-
Construction and Demolition Waste	22A	Fixed Benchmark	-		
	22B	Percentage Benchmark	1	1*	-
Total			**12**	**8**	**1**
Ecological Value	23.0	Endangered, Threatened or Vulnerable Species	-	Complies**	-
	23.1	Ecological Value	3	0	1
Sustainable	24.0	Conditional Requirement	-	Complies**	-

Credit	#	Sub-Credit	Points Available	Points Targeted	Points TBC
Sites	24.1	Reuse of Land	1	1	-
	24.2	Contamination and Hazardous Materials	1	1*	-
Heat Island Effect	25.0	Heat Island Effect Reduction	1	0**	1
Total			**6**	**2**	**2**
Stormwater	26.1	Reduced Peak Discharge	1	1**	-
	26.2	Reduced Pollution Targets	1	1**	-
Light Pollution	27.0	Light Pollution to Neighbouring Bodies	-	Complies*	-
	27.1	Light Pollution to Night Sky	1	1**	-
Microbial Control	28.0	Legionella Impacts from Cooling Systems	1	1*	-
Refrigerant Impacts	29.0	Refrigerants Impacts	1	0	1
Total			**5**	**4**	**1**
Innovation				TBC	2
Total			**10**	**0**	**2**
		Core points	98	28 - 34	54 - 60
		Category % points		29 – 35%	55 – 61%
		Innovation Points	10	0	2
		Total score targeted		**29 – 35%**	**57 – 63%**

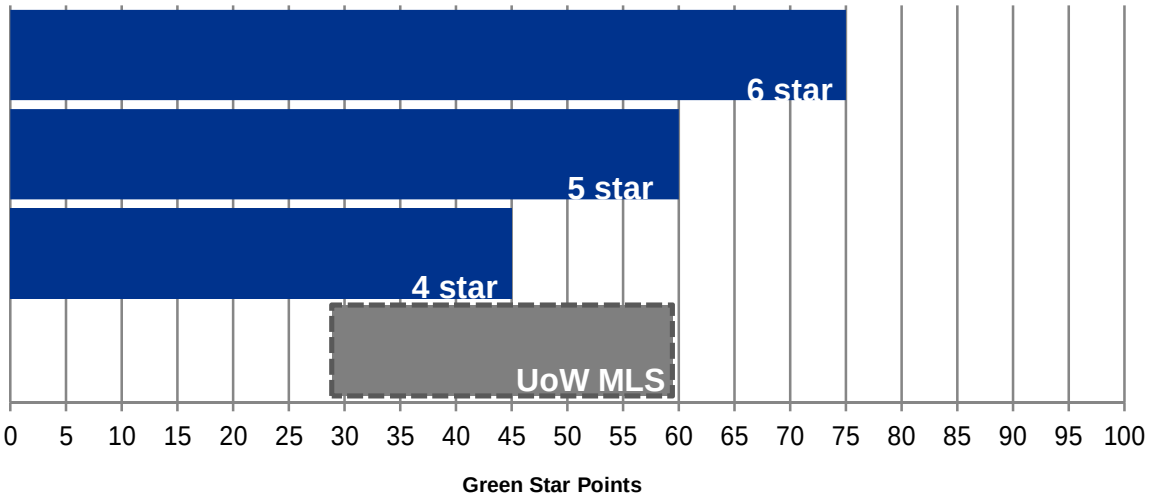

Figure 1: Green Star Design & As Built Credit Summary

The UOW MLS building has the ability to achieve a Green Star points range of 28-60 points depending on the number of TBC points achieved by the design. This will require further analysis during the next phase of the project to confirm compliance against the Green Star credit criteria.