



# The teacher

In the heart of the University of Melbourne's historic Parkville campus stands the new Melbourne School of Design – a large-scale laboratory for built environment education and research. And as **Sean McGowan** reports, it has already proven to be a great teacher to many.

Although fresh to the academic scene this year, the Melbourne School of Design (MSD) building is actually the culmination of almost eight years of planning by the University of Melbourne and its Faculty of Architecture, Building and Planning.

What began as a conversation between the university vice-chancellor and the faculty in 2007 about creating a building to better accommodate the faculty's 2500-strong staff and students, soon developed into an international design competition that received more than 130 entries from 15 countries.

Held in 2009, the competition brief was to design a new building with a total floor area of approximately 18,000 sq m at a budget of \$90 million.

The project was seen as a “once-in-a-lifetime” opportunity to design and construct a new building that would provide a working environment to encourage high-quality research, teaching and learning.

Ultimately, a design by local firm John Wardle Architects, in collaboration with Boston-based architects NADAAA, was announced the winner of the competition.

The competition jurors noted the quality of the partnership between the two architectural firms.

“The winning design showed a detailed understanding of the teaching and research activities of the faculty, and the potential for contribution to research across the campus,” said the dean of the Faculty of Architecture, Building and Planning, Professor Tom Kvan when the winning design was announced.

The final design includes many pedagogical aspects such as dedicated spaces for research into sustainable precinct design and performance, as well as lecture theatres, a library, exhibition and specialist workshop spaces.

“It was important to the faculty that the building teaches students of the built environment disciplines with an inquisitive mind from the



moment they approached the building,” says Andrew Middleton, development manager for the Faculty of Architecture, Building and Planning.

From the outset, the project sought to target a 5 star Green Star rating, with Umow Lai engaged to steer the project through the environmentally sustainable design and Green Star processes.

However, it was soon evident that the extent of the design initiatives in place would lead to the building ultimately being awarded a 6 star Green Star Design – Education Design v1.0 rating by the Green Building Council of Australia (GBCA).

In doing so, the Melbourne School of Design building also became the first education facility to be awarded the maximum 10 Green Star innovation credits.

Among these was the completion of an extensive EN15978-compliant whole-building, whole-of-life assessment by Umow Lai that considered the embodied carbon impact of the construction process.

But while the 6 star rating is celebrated by the university, Middleton stresses that it was not deemed as important as the pedagogical and teaching opportunities presented by the building.

“It was important to the faculty that the building teaches students of the built environment”

“It is a building that teaches construction, architecture, planning, urban design and landscape architecture, and that is its role,” says Middleton.

“Achieving 6 stars just highlights the commitment of the university and the whole construction and design team to do the best they can.”

## OLD AND NEW

Taking a central position within the university’s historic Parkville campus, the façade of the new building juxtaposes the old with the new.

It combines the original Joseph Reed-designed façade of the former Bank of New South Wales building on its western

side with a modern, parametrically designed perforated zinc solar shading system that wraps around the north, east and south facades.

This high-performance façade reduces solar heat gain, and in turn the building’s cooling demands while also achieving good daylight penetration.

And by providing shading as opposed to glass treatments, the building’s windows are able to feature very clear glass that further enhances daylight levels around the perimeter spaces as well as providing views for the majority of occupants.

To prevent direct sunlight from reaching the atrium floor, laminated veneer lumber (LVL) beams have been used in the space to diffuse light and minimise glare.

## SUSTAINABLE STORIES

According to the faculty’s senior lecturer Dr Dominique Hes, M.AIRAH, opportunities for the building to tell its sustainability story through visual connection were both explored and implemented.

Though some initiatives such as thermal breaks of the façade and thermal ground coupling were cost-engineered out of the project, the building remains a showcase of sustainable building design.



The Studio Hall features three suspended studios that appear to defy gravity. Image: Peter Casamento.

Among its many sustainable design initiatives is a mixed-mode, natural-ventilation system designed by the building services consultant Aurecon that allows the building to be naturally ventilated when conditions are suitable.

As well as providing openable windows, the use of mechanically actuated louvres in studio spaces and open-plan offices allow for cross ventilation to occur.

These spaces then connect through to the large, atrium Studio Hall, which features underfloor air distribution (UFAD) and a passive thermal ventilation stack that pulls fresh air through the building before extracting it at roof level. The default method of operation is to naturally ventilate the building, with heating and cooling being brought on when required.

The building's various lecture theatres are conditioned via a displacement ventilation system. Other spaces feature zone-controlled HVAC and lighting to reduce the building's energy consumption.

Among the Studio Hall's most striking features are the three suspended studios that appear to defy gravity and have been affectionately referred to as "plywood stalactites".

“The default method of operation is to naturally ventilate the building, with heating and cooling being brought on when required.”

He says that such architectural features provide students with significant learning opportunities, particularly around buildability of structure and the materials used.

“With intrigue and curiosity comes learning opportunity,” she says.

However, the building's striking architectural features did present challenges to building services design and installation.

Grant Hillman is construction manager with mechanical services contractor Ellis Air Conditioning. He says such

challenges were overcome via the design and coordination process that the firm's engineering and drafting teams led all other trades through for the duration of the project's construction.

He says the amount of attention paid to this coordination by the design team ensured the impact of services on the building's architecture was minimised.

“This project reinforces the benefits of early design coordination to ensure that appropriate allowances are provided for all services within a building of this type,” says Hillman.

Featuring some aspects of biophilic design, the unique design of these “hanging” studios also plays an important role in managing the acoustics of the large Studio Hall space, where natural ventilation and thermal mass could otherwise have negative implications.

Middleton says the Studio Hall has been celebrated among students as “the place to meet as a group and learn” from what is around them.

To provide further opportunities for learning, all significant energy uses are sub-metered so that building energy use can be monitored and the building tuned



▲ The high-performance façade reduces solar heat gain.

▼ Zinc screens next to the Japanese Garden reduce façade heat load to the MSD.

▼ The Joseph Reed façade has been integrated into the new building. Image: Peter Casamento.



# LESSONS FROM THE ICA

**A.G. Coombs Advisory project engineer**

**James Dalglish shares some of what he learned from the project.**

- 1.** The use of a hybrid ventilation system in the Melbourne School of Design – with its extra dimensions and complexities that needed to be identified, considered, discussed and resolved – confirmed the value of commissioning input as early as possible in the design and construction process.
- 2.** Prior knowledge of the varying student occupation rates throughout the year and differing room usage patterns seen at these types of facilities are important factors that should be carefully considered in commissioning planning, implementation and verification.
- 3.** The original planning and subsequent commitment by all key members of the project team to the post-construction building-tuning process has been fundamental to the successful delivery of the high-quality, high-performance building services at the Melbourne School of Design.

post-occupancy. The building management system (BMS) records and demonstrates the building's performance. Information on the sustainability performance of the building is communicated to the building residents via large poster boards programed by Greensense.

Other important ESD features include a 750,000L precinct-wide rainwater storage solution. This collects rainwater from the roof and hard surfaces surrounding the building.

Located in the basement, this stored water is used by the building's highly efficient water-cooled chillers, as well as for irrigation, and by toilets and urinals.

“The Melbourne School of Design is a teaching and learning building, where architectural and construction students can learn from best-practice examples of passive design, and energy and water-efficient building services,” says Aurecon's lead mechanical engineer Ross McCarthy.

“We worked closely with the architects to locate viewing windows into the basement plant rooms through which students can safely view the central plant. They can learn how much space is required to install the reticulation systems in ceilings by viewing them through mesh ceilings that have been installed in some systems.

“This will allow future generations of architectural students to understand the practicalities of building services design early in their careers.

“The students will also have the opportunity to learn how the building will perform at different times of the day and different times of the year by analysing the



The MSD has earned a 6 star Green Star rating.

data that will be connected from the sensors (energy, water, CO<sub>2</sub>, humidity, temperature and flux) that have been installed throughout the building and its fabric,” McCarthy says.

“By developing a deeper understanding of how the different passive and active control elements work together to provide comfortable and healthy environments for the building occupants, the students

will develop lifelong skills, which will help them to design the sustainable buildings required in a resource and carbon-constrained future.”

## COMMISSIONING TO THE CALENDAR

In order to meet the MAN-4 Green Star requirement, A.G. Coombs Advisory was engaged as the independent commissioning agent (ICA) on the project by Aurecon, on behalf of the University of Melbourne.

The firm provided commissioning advice to the project team from the schematic design stage through to practical completion and post-construction tuning.

“Being involved at this stage allowed us to review the early project design documentation and offer valuable build-ability and commissioning-related advice to the project team that may be incorporated in the subsequent design

stages,” says James Dalglish, project engineer for A.G. Coombs Advisory.

He says that among the advice offered at this early stage was industry commissioning standards and guidelines to be specified in the construction documentation, as well as advice on component additions to systems that might aid the commissioning process and building operation.

Close and effective collaboration between the ICA and key project team members was integral to the “smooth” completion of all commissioning works. This in turn facilitated the completion of the building on schedule, and most importantly brought the desired quality and performance outcomes for the university.

Dalglish says one of the key challenges for the commissioning team was the mixed-mode ventilation design.

“Delivering a high-performing, hybrid ventilation system that uses natural forces as much as possible –



**Mixed-mode ventilation was a challenge for the design team.**

and will only use mechanical power when weather conditions do not support the requirements for user comfort – is always a challenge,” he says.

Detailed post-construction monitoring and logging, detailed user feedback, and tuning were all used to optimise the system for different weather and occupancy situations.

“However, the occupancy of a building of this type is determined by the student calendar and this offers only relatively small windows of opportunity in the post-construction tuning period for identifying system performance levels and making adjustments.”

As part of the ICA role and Green Star process, A.G. Coombs Advisory remains heavily involved in the post-construction 12-month building-tuning process.

Due to the different building occupation rates throughout the calendar year, the usual quarterly review, assessment and discussion around performance has been altered such that the number of meetings increase during peak occupation times so as to quickly identify and rectify performance issues.

## RELATIONSHIP FORMS

Since opening for the beginning of the university year in March, the Melbourne School of Design building has, from all accounts, performed to expectations.

Although fine-tuning and the “tweaking” of controls and parameters to increase performance levels will continue, Hes says all the pedagogical aspects of the building are working well.

“The glimpses provided into other programs – the structure, the mechanical systems etc., – all work very well and have not compromised performance thermally,” she says.

However, Hes says the important lesson here is to understand that building

## THE MELBOURNE SCHOOL OF DESIGN AT A GLANCE

### The personnel

- **Architects:** John Wardle Architects in collaboration with NADAAA (US)
- **Building services:** Aurecon
- **Client:** University of Melbourne
- **Contractor:** Brookfield Multiplex
- **ESD:** Umow Lai
- **Mechanical contractor:** Ellis Air Conditioning
- **Mechanical engineer:** Aurecon
- **Structural engineering:** Irwin Consult
- **Independent commissioning agent:** A.G. Coombs Advisory

### HVAC equipment

- **AHUs:** GJ Walker
- **BMS:** Schneider
- **Chillers:** Daikin
- **Diffusers:** Grilletech
- **Fans:** Pacific HVAC
- **FCUs:** GJ Walker
- **Grilles:** Grilletech
- **Heat exchangers:** Sondex

## JOSEPH REED'S LEGACY

The Melbourne headquarters of The Bank of New South Wales was designed by prolific Melbourne architect Joseph Reed and constructed in Collins Street in 1856.

Featuring a façade that epitomised the mid-nineteenth century “Renaissance Revival” style of architecture popular in Melbourne at the time, the building remained standing until 1932 when it was found to have structural problems beyond repair and was slated for demolition.

However, the building’s original classical façade was preserved and gifted by the bank to the University of Melbourne, where it was erected in 1938. It has since stood as a symbol of Marvellous Melbourne before being recently integrated into the new Melbourne School of Design building.

“There has been a lot of discussion about how the Joseph Reed façade has been integrated into the building,” says the university’s Andrew Middleton.

“It has created a wonderful feeling of nostalgia for alumni . . . and gives them a feeling of belonging. And from a teaching perspective it raises the question of how we, as a society, deal with heritage and old buildings – a dynamic question that would have been lost if the façade had been moved elsewhere on the campus.”

Another very important piece of faculty history that was retained and preserved from the old architectural building was the Japanese Room, which was originally a gift from the government of Japan to the University.

The Japanese Room is an enhanced installation of the 1960s design, with the original designer Professor Shigeru Yura advising the MSD project team on its reassembly in the new space.

The relocation involved dismantling the components of the original room and the garden, preserving and cleaning as many of the materials as possible, including the wallpaper, and reinstating them into the custom-designed space in which daylight illuminates the quality of the design.

users need to build a relationship with new buildings, in much the same way people do.

“If they (building users) are going to be complex systems that interact with their external environment in a mutually beneficial way, then a relationship needs to be formed,” she explains.

“Just like with people, you do not immediately understand why they behave, and respond in a certain way when you meet them.”

And while Hes is confident the new Melbourne School of Design building has the potential to be the most comfortable and healthy building on campus, she says it hasn’t got there just yet.

“It takes time,” she says. ■