

# Swanston Academic Building

## Sustainability Overview



# INTRODUCTION

RMIT is urban in orientation and creativity, shaping sustainable cities and drawing inspiration from the challenges and opportunities they provide. RMIT is therefore strongly committed to transforming its own built environment to create sustainable and resilient cities.

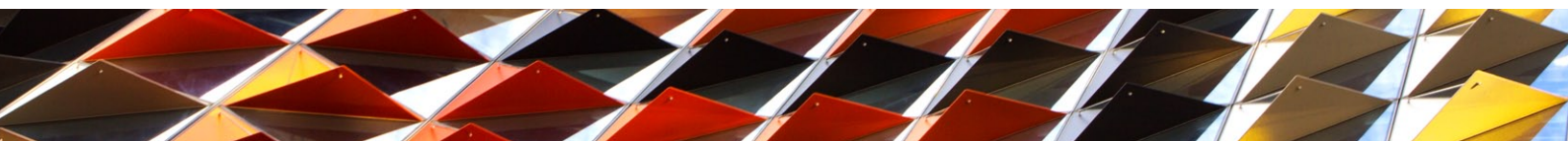
Home to the College of Business, the new and award-winning Swanston Academic Building (SAB) has been developed to meet this changing academic environment. The SAB provides a world-class facility, comprising some 35,000m<sup>2</sup> of floor space over 12 levels and home to 850 academic and administration staff and 6,000 students.

The RMIT campus has a set of unique circumstances that the project needed to address; its location

in the heart of the Melbourne CBD provided an opportunity to be a part of the urban fabric, and also called for the provision of a new model of integration for learning, social and retail spaces (internally and externally) to respond to the student experience needs from 'generation next'.

A key objective for the SAB project was to demonstrate leadership excellence in sustainable design and innovation. Ensuring that the provision and utilisation of physical space delivered low resource consumption – aligning with the University's carbon emissions reduction target.

[www.rmit.edu.au/bus/sab](http://www.rmit.edu.au/bus/sab)



# ALWAYS WORTH A SECOND GLANCE: SAB KEY STATS



Areas	GFA(m <sup>2</sup> )	UFA(m <sup>2</sup> )	UFA/GFA %
Teaching & Learning Spaces	14,637	10,705	73%
Research Spaces	2,191	1,430	65%
Student Amenity & Passive Learning	3,094	2,020	65%
Office Spaces	13,649	7,760	57%
<b>Total</b>	<b>33,571</b>	<b>21,915</b>	<b>65%</b>

## Project Information

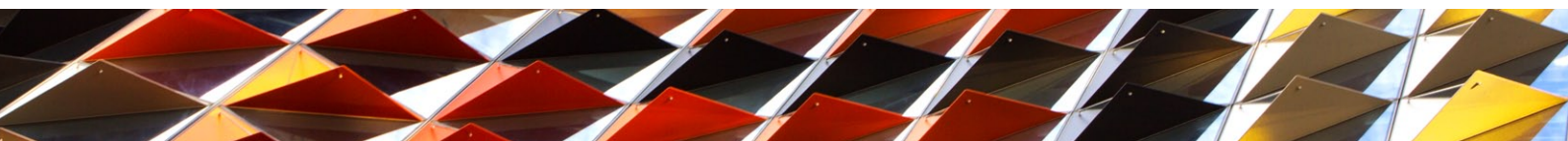
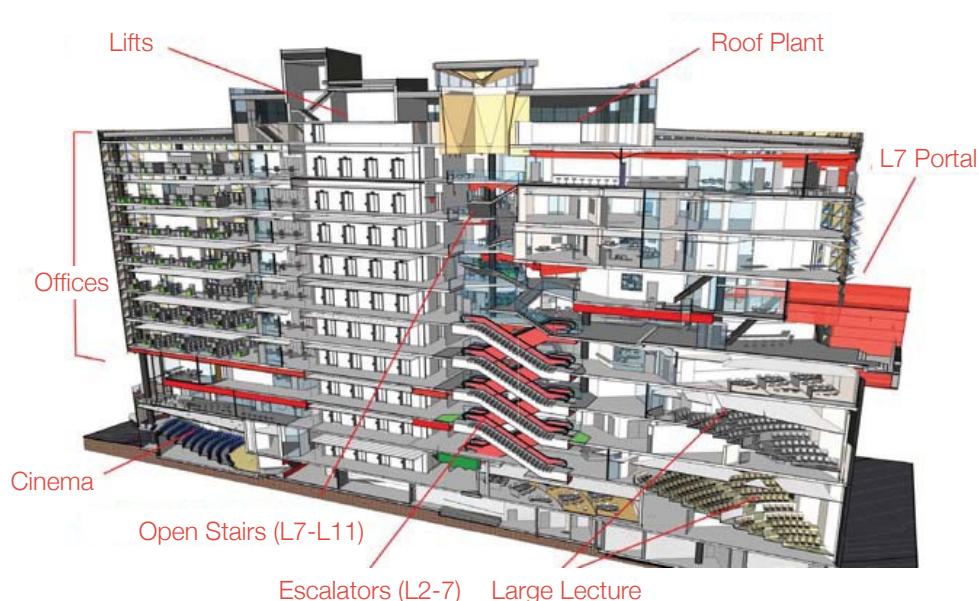
Architect: Lyons Architects  
 Main Contractor: Brookfield Multiplex Construction  
 Status: Completed July 2012

## Space Types

- Cinema
- Project Space
- Interactive Theatre
- Lectorial
- Enhanced Lecture Theatre
- Conversational
- Interactive Tutorial
- Workspace Enabled
- Discursive
- Informal (Student Portals)

## Project Design Principles

- Student portals throughout the building supporting the learning experience.
- Focus on Environmental Sustainable Design (ESD).
- Integration and enhancement of existing landscape features.
- Equality of Access (DDA compliance).
- Connection into existing / future transport nodes.
- Facilitate a sense of place, interaction and engagement between students and staff.
- Utilising a range of approaches, materials and colours to provide a level of difference, ease of maintenance, flexibility and student impact.
- Materials selections to meet best practice environmental standards, including 'Greenstar' requirements and good ESD practice.



# FUTURE FOCUSSED, TODAY

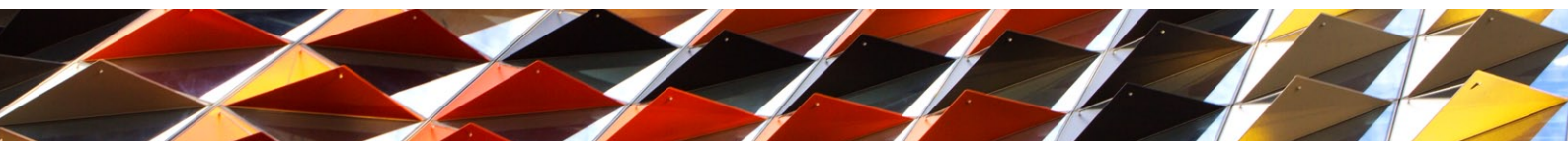
The Swanston Academic Building (SAB), for the College of Business, was a response to RMIT's proposition; how to attract and retain the next generation of students in a completely new pedagogical learning environment, and foster a collegiate atmosphere between academics and students that encourages interaction.

From the outset RMIT defined design principles which directly reflected the University's strategic goals:

- Inspire and encourage student achievement
- Ensuring that facilities exemplify excellence in technology and design
- Developing sustainable modes of operation
- Engage and collaborate with industry and integration with cities

A key objective for the SAB project was to demonstrate leadership excellence in sustainable design and innovation. The building has been awarded a Green Building Council of Australia (GBCA) 5 Star Green Star – Education Design v1 rating for environmentally sustainable design (ESD).

The SAB delivers a carbon intensity approximately 35% lower than average, whilst providing a world leading learning facility with high utilisation rate and exceptionally high user satisfaction. Through a virtual timetabling strategy the project achieved a 15% space saving resulting in \$30 million in cost savings.



# ARE YOU SITTING COMFORTABLY?

The sustainability features in SAB improve user comfort, resulting in higher quality learning outcomes, greater student engagement and space utilisation at an unprecedented level.

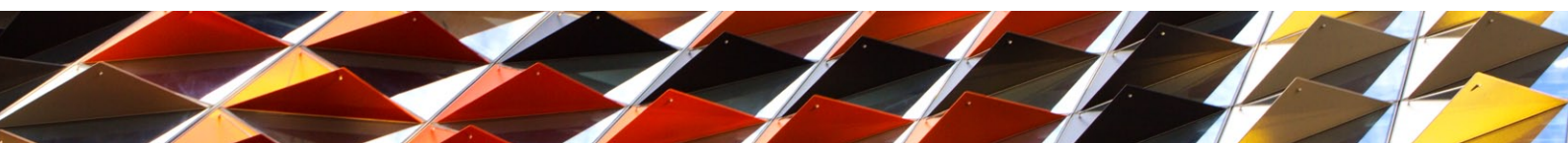
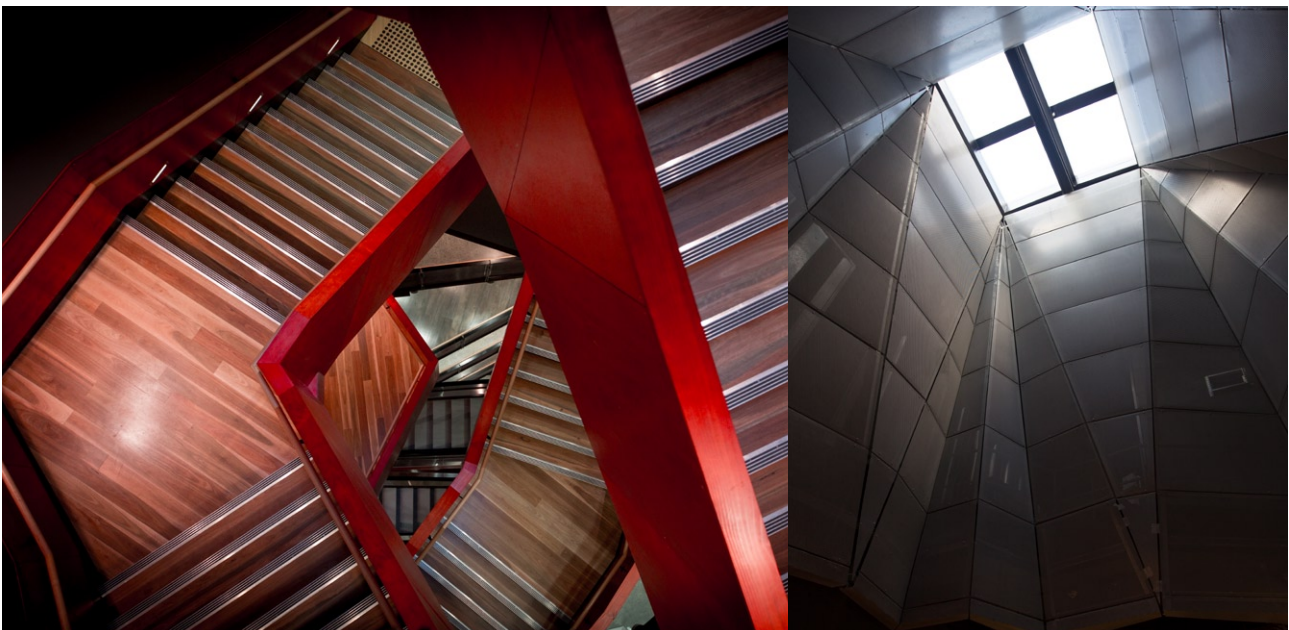
The key sustainability features that are pivotal to the building's design and function include:

- Demand-based Control Ventilation (DCV) technology improves air quality while saving energy.
- A 'virtual' chiller connected to the RMIT precinct central plant provides 15% greater efficiency than standard.
- The Building Management System (BMS) is connected to the timetabling system to provide HVAC, lighting and shading based on outside conditions, room bookings and occupancy levels.
- Rainwater and grey water systems capture water for irrigation and toilet flushing, reducing potable water demand by 90% for landscaping and 60% overall.
- Student portals are naturally ventilated, using a mix-mode system that operates with external weather conditions and student control.
- Student portals and circulation spaces provide a 'breathing building' infrastructure for ventilation, and give access to light and orientation to within the deep floor plate.

- The building has been designed to promote the use of low energy modes of vertical transport – with stairs and escalators located centrally in building under the light filled atrium rather than the lifts which are offset to the side.
- Solar panels are used to preheat the water for the building delivering a much lower energy and carbon intensity than an electric system.
- The innovative façade reduces air-conditioning energy consumption by 10% and restricts 80% direct solar radiation in summer
- Industrial waste products were used during construction and materials were selected based on industry best practice sustainability principles.

Staff and student surveys show a satisfaction rating of 85% on both the space and fitout for the building. 77% of respondents feel that the design, technology and environment within SAB has improved their delivery of learning material and engagement with students.

The first physical room audit for the Swanston Academic Building was conducted in March 2013 with overall frequency of use exceeding the expected frequency modelled through the design process.

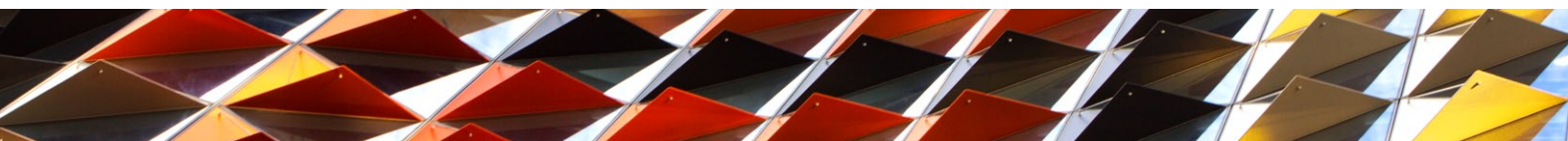


# HERE'S HOW IT WORKS

- Under Floor Air Distribution System (UFAD), which allows fresh air to be delivered to the spaces at a low level through floor diffusers under the seats and extracted at high level, providing a high quality environment with lower energy consumption. Demand-based Control Ventilation (DCV) technology maintains proper ventilation and improves air quality while saving energy.
- The SAB operates a 'virtual' chiller plant infrastructure with chilled water sourced from the central precinct chilled water plant located across Swanston Street. This option is more energy efficient than the installation of a localised solution.
- A Building Management System (BMS) that connects to the timetabling system to provide HVAC, lighting and shading based on outside condition and occupancy levels. The BMS also connects to the energy and water meters and allows real-time monitoring of water, electricity, gas consumption and outdoor conditions.
- An 80kL rainwater tank captures water for irrigation and toilet flushing. Grey water is treated and purified which recycles approximately 8,300 litres of water for toilet flushing. When combined, these initiatives reduce the landscaping potable water demand by 90%.
- The student portals are naturally ventilated, using a mixture of automated systems (opening windows, fans and water misters) that operate with external weather conditions, and allows for student to augment their environment further through timed gas heaters and lighting fixtures. This level of environmental sophistication between automated and user controlled infrastructure is especially innovative, and educates the inhabitants in the same way their learning spaces work – by doing. A series of LCD screens in each portal provides up to date information on how the building works, and the way users can interact with it.
- Solar panels are used to preheat the water for the building, which is then stored in tanks until required. The water passes into a central, internal gas-fired hot water system, which is located within the plant room on the building's roof. The combination of solar preheating and instantaneous gas heating has a much lower energy and carbon intensity than an electric system.



- The Building's façade is comprised of external panels and triangular elements, which provide different degrees of shading based on the orientation of the building. The façade includes 50/50 panels (half glass and half opaque panels) with diagonal sunshades at varying depths, full glazed panels and solid panels.
- Environmentally sustainable materials used in the construction of the building. A portion of the cement used in the construction was substituted with industrial waste products from the demolition on the site.
- Timber used in the building includes re-used timber, post-consumer recycled timber and Forest Stewardship Council (FSC) certified timber. Many of the fit out items used are certified under the Good Environmental Choice Australia (GECA) label.
- As the building occupies a city campus with limited external (green) space, the design adopts a vertical stacking of informal 'open' student spaces, each connected to a central circulation system of escalators and stairs, allowing the outside world in.
- Each floor of the SAB features a double-height student 'portals' breakout space, with bespoke internal finishes and external balconies. This network of portals provide a 'breathing building' infrastructure for ventilation, and give access to light and orientation to within the deep floor plate.



# OUR NEW KID ON THE BLOCK

RMIT University's Infrastructure Plan sets a target for all new development to achieve a 5 Star Green Star rating. The SAB is a \$200M commitment in a 5 year \$600M capital development plan, in which all upgrades and new build have met relevant Green Star or other benchmarks. RMIT is also participating in two Green Star pilots to ensure the industry standards continue to evolve based on action and experience.

As home to the College of Business the ESD features of the building reflect and encourage the development of sustainability disciplines. Producing business graduates with the ability to recognise environmental and social impacts and to provide leadership on sustainable approaches to complex problems.

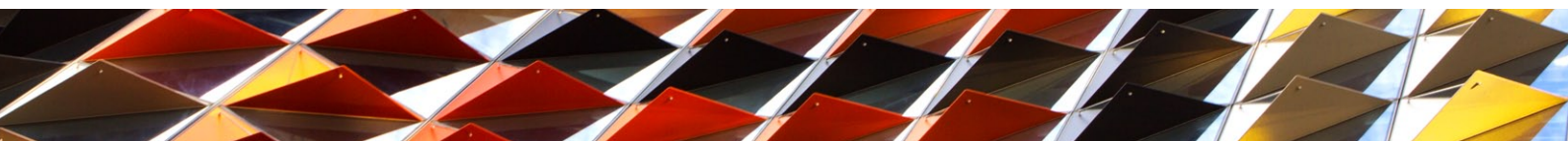
SAB has become a destination for Green Building tours. The GBCA has led several tours through the building since its opening and there have been more than fifty tours from visiting academics, university and

building industry professionals from across the globe.

SAB is now the benchmark for all future building projects across the RMIT and in the tertiary education sector. Its very design enhances the sustainable use of space, energy and water, and promotes a sense of environmental awareness for students, lecturers and visitors alike.

By delivering almost double the Australia-wide university benchmark utilisation for space use, it will create a legacy for better leveraging the financial investment in university infrastructure around Australia and the world.

In order to ensure that the benefits gained by SAB are translated, all innovations have been documented throughout the process and formally endorsed by the University.



# CLEVER THINKING? ABSOLUTELY

## Learning in Future Environments

The SAB design process involved intensive engagement with a broad range of RMIT stakeholders and the trial of 'test spaces' informed the broad palette of teaching and learning spaces in the building.

Complemented by a 'virtual timetabling' project theoretically programmed learning in the building 5 years into the future. This completely new way of forecasting learning spaces, delivered a Gross Floor Area reduction of 15%, preventing wasted space within the final building with a potential cost saving of \$30M.

As a result of this process the learning spaces within SAB are recording significantly higher utilisation rates. This innovation within a dense urban campus will be replicated through all future RMIT developments to ensure the University does more with less.

## Vertical Campus

This innovative use of urban space has been recognised as a quantum leap forward in inner-city university campus design.

The SAB has created a 'vertical campus' which demonstrates that an engaging high rise learning community can be developed in an environmentally responsible way.

A 'Melbourne Laneway' concept was applied to the design, using simple low energy devices such as gas heaters and fans to prolong the outdoor environment condition within the Student Portal and circulation spaces on all levels. The design of the spaces linked to cafes and wireless technologies encourage students to 'own' the spaces beyond scheduled lessons.

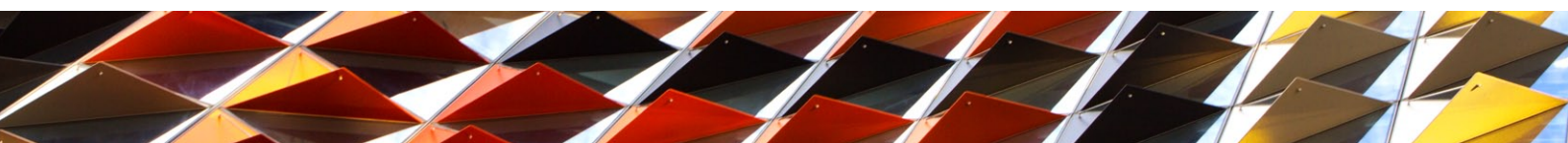
Students using the communal spaces are able to manage their indoor environment through user initiated controls of lighting and heating. The inclusion of learning resource displays provides users with a way of understanding what makes the building environmentally sustainable.

The internal vertical 'street' design creates interaction with the learning spaces through the central circulation. This creates an environment of sharing and collaboration between educators and students who are consistently observing each other's work and one of excitement and a sense of being part of a learning community.

## Community Learning

The SAB provides an excellent opportunity to provide students at RMIT access to the latest ESD case study findings and experience research in action in their own community and environment. SAB is the focus for an 'urban learning lab' designed and implemented by staff of the Sustainable Building and Innovation Group at RMIT. The Lab aims to analyse the effectiveness of the technologies used with SAB, to utilise it for valuable curriculum materials for the next 5-10 years, and longer for RMIT and internationally.

The sustainable philosophy and approach of the University is being extended through a social-sustainability student initiative, Pop Up Shop. The initiative showcases and facilitates the success of a range of small and micro businesses developed by RMIT New Enterprise Incentive Scheme (NEIS) students in the College of Business.





# IT'S NOT JUST ABOUT US



Stakeholder and community management was undertaken consistently throughout the project. The SAB was designed from the ground up, through an innovative technique called 'interactive workshops', which took a vertical slice through the organisation (from student to lecturer to VC) to bring representation from all levels together, therefore giving all users a voice and ownership.

Throughout the design, construction and occupancy phase's staff and students were consulted and informed. Websites, FAQ's, user guides and interactive training workshops were used to inform staff, students and contractors on how to use the building effectively to ensure the green design intent translates into the buildings operational performance.

The Project Team formed partnerships with RMIT's Project Management and Engineering Schools to provide work integrated learning opportunities, tours and guest lectures to students.

RMIT worked closely with the City of Melbourne during the development of the Swanston Walk tram terminus outside the SAB. The design for both the building and the tram stop were integrated to encourage building occupants to use public transport, whilst seamlessly incorporating street furniture and bike parking.

The SAB has now become a pivotal element of the RMIT University's Strategic Plan through its permeability, engagement and integration with the city of Melbourne. It contributes to urban sustainability and culture by delivering model behaviours and solutions to ensure RMIT is recognised as an urban laboratory for excellence in design, creativity and sustainability.

