Despite its prime location, for many years the corner of Bourke and William streets in Melbourne’s CBD was somewhat neglected. Once home to bluestone wool stores built in the 1800s, it now features two highly rated buildings. Sean McGowan reports.

Collectively known as the CBW project – the initials standing for (the) Corner of Bourke and William – the development of 181 William Street and its counterpart at 550 Bourke Street added over 75,000 sq m NLA of A-grade office and retail space to Melbourne's law and finance district when completed in August 2008.

Although both buildings achieved 5 star Green Star Design v2 and As-Built v2 ratings, the project’s credentials were further enhanced recently with 181 William Street achieving a 5 star NABERS Energy rating, and 550 Bourke Street receiving a 4.5 star rating.

It is an outstanding result for a project that was first conceptualised in 2003, pre-dating the development of the Green Star and NABERS rating systems.

The 7000 sq m site bounded by Bourke, William and Little Bourke streets, as well as Ramsay Lane to the west, originally consisted of seven separate titles and an existing building.

Cbus, the industry superannuation fund for the construction, building, infrastructure and allied industries, bought the site in 1998.

The façade was designed to not only reduce the load on mechanical services to heat and cool the buildings, but also allow sufficient natural light to penetrate the floor plate required.

In its place now stand two impressive towers – one 26 storeys high with approximately 5000 sq m of retail space on its ground and mezzanine levels facing William Street. The smaller tower, spanning 19 storeys, fronts Bourke Street. Both also feature three levels of basement car parking.

Developed by Cbus Property, a wholly owned subsidiary of Cbus, the CBW project was built by Brookfield Multiplex and designed by architects Bates Smart, SJB and NH Architecture.

Norman Disney & Young (NDY) was appointed services consultant on the project, overseeing the design of mechanical, electrical and hydraulic services, as well as lifts, fire engineering and protection, security, AV, and ESD, including Green Star.

D&E Air Conditioning, part of the Hastie Group, was appointed mechanical contractor, and Jones Lang LaSalle was appointed facility manager.

GREEN STAR, THE EARLY YEARS

The project’s concept design phase began in 2003 when NDY involved the Department of Environment – now Sustainability Victoria – to investigate...
innovations and other sustainability initiatives for the site. It then worked with the Rocky Mountain Institute in Boulder, Colorado (US) to put the buildings’ design through a peer-review process.

Given the infancy of the Green Star rating system when detailed design commenced in 2005, the aim of achieving 5 star Green Star Design and As-Built ratings for both buildings presented an enormous challenge to the entire project team.

“It was difficult to achieve the 5 star rating, as it was still new to the entire project team in 2006, and there were also some teething issues with complicated development … at the time,” explains Evalin Ling, associate and ESD consultant at NDY.

“Technology also limited our ability to achieve some of the Green Star aims, and there were several developmental restrictions, too. Some design initiatives were relatively new to Australia, and it was not clear at the time if the contractor would be able to deliver these.”

A number of energy-efficient designs were incorporated into the project, all contributing to the 5-star Green Star targets. Ling says this often required the design team to walk a fine line of balancing competing aims.

For instance, the façade was designed to not only reduce the load on mechanical services to heat and cool the buildings, but also to allow sufficient natural light to penetrate the amount of floor plate required.

The resulting solution was the use of high-performance glass and spandrel panels, with 700mm upturns on each level.

“The supply air temperature has been designed to reset based on the average zone temperature of selected zones, providing a balance of control and energy efficiency.”

A VAV air conditioning system was also selected as the most energy-efficient solution for a commercial office of this size at the time. This was despite the emergence of new technologies promising greater efficiencies.

Ling says the VAV technology was proven to be energy-efficient and less of a risk than technologies such as chilled beams, which at the time were relatively new in Australia. They were also expensive and offered little to no performance examples upon which the design team could draw.

“Hand in hand with the VAV system, we included carbon dioxide sensors and a monitoring system incorporated into the BMS to assist in controlling the indoor environment for occupants while having the ability to reduce energy wastage,” Ling says.

SAME, SAME, BUT DIFFERENT

The same system design was applied to both buildings, although it varies in size, because one building is larger than the other. Zoning of air distribution is also different, given the two differently shaped footprints, and the fact 550 Bourke Street is shaded by the larger 181 William Street.

Shared services remain limited only to some car park ventilation and ancillaries.

The William Street building is serviced by low and high-rise air-handling plant on levels 4 and 27, respectively, with the chiller plant consisting of four screw chillers operating in a variable primary-flow system.

AHUs have been zoned for the north-west and south-east perimeters of each floor plate, as well as internal zones, providing 10°C supply air to the perimeter and 14°C supply air to the internal VAVs.

Ceiling swirl diffusers were selected for efficient air distribution – the first time...
they were used on a large-scale project in Victoria. The supply air temperature has been designed to reset based on the average zone temperature of selected zones, providing a balance of control and energy efficiency.

And while at present it’s all stick and no carrot for the contractors, our experience at CBW has shown that incentives could potentially provide even better outcomes for developers.

Additionally, through the provision of a 50 per cent increase over minimum fresh air requirements to both buildings, the indoor air quality exceeds minimum benchmarks, complemented by the use of low-VOC materials and dedicated tenant exhaust risers.

Computational fluid dynamics (CFD) modelling was utilised to optimise air distribution, as well as to justify the use of natural smoke venting – in lieu of mechanical smoke exhaust – of the covered Goldsborough Lane, which runs between the buildings.

Modelling was also used to demonstrate compliance with several of the Green Star credits. Ling says given CFD modelling packages were still being developed at the time, and some teething problems with the software developer, its use was limited.

**NOT SO BASIC BLACK**

Perhaps the highlight innovation of the project was the incorporation of a 100,000 litre shared black water treatment plant (BWTP), designed to treat and reuse 90 per cent of the water collected onsite.

The BWTP design incorporates both biological and membrane treatment processes, and uses energy-efficient systems including variable speed drives to allow pumps to operate in the most energy-efficient manner possible.

Reverse osmosis was added to further purify the recycled water to Class A standard, in order to serve 100 per cent of the buildings’ toilets and fire protection system testing, as well as 25 per cent of the building’s cooling tower water.

According to Ling, an onsite water recycling system was required to maximise the Green Star points available under the water category, and helped overcome the project’s ineligibility for points in other areas.

It was estimated to save 25 million litres of potable water each year, with water-efficient fixtures and fittings, as well as extensive water metering, adding to the building’s water – saving potential.

Other environmental initiatives included the use of solar domestic hot water preheat panels, highly efficient T5 light fittings, small lighting zones and the extensive use of motion detectors.

Another technology implemented – in fact, this was the first Victorian edifice to feature it – was destination-control lifts, where passengers register their floor call before entering the lift.

This not only reduced the number of lifts required in each building, but also cuts down on energy, maintenance and materials.

These have been shown to improve occupant amenity through reduced round-trip times.

**DELIVERING THE DESIGN**

The site itself presented numerous challenges for those working on it, including mechanical services contractor D&E Air Conditioning.

According to ESD manager James Hattam, the pace at which the project progressed...
during construction meant maintaining a high level of quality during installation was challenging for D&E project manager Gary Bell.

Although the 550 Bourke Street building commenced construction some four months after 181 William Street, the two buildings were largely built simultaneously, requiring careful management.

“The builder and D&E set it up as two separate jobs, with construction teams allocated to each building,” explains Hattam. “Logistically this worked well, with four cranes and plenty of loading and unloading space available.”

Hattam says D&E also provided value engineering to NDY’s mechanical services design to ensure that in addition to the Green Star ratings, the contracted target of a 4.5 star NABERS Energy rating for 181 William Street could be achieved.

This was a commitment made by Cbus Property to the building’s major tenant, IAG Insurance.

At the time, the NABERS program remained voluntary, and a commitment agreement was entered into with all sub-contractors to deliver the rating at 181 William Street only. No commitments or goals were set for the Bourke Street building.

Upon reaching completion in late 2008, a collaborative approach was agreed to and developed by all stakeholders to tune the building to meet the NABERS target. Monthly meetings were held and chaired by Michael McAlindon of Jones Lang LaSalle, the buildings’ operations manager.

This was supported by an administrative process to track progress and tuning changes over a 12-month period.

“Exceeding the 4.5 star target and delivering a 5 star NABERS rating can be solely contributed to the collaborative

The buildings feature destination-controlled lifts.
committee approach that was adopted during the NABERS tuning phase,” Hattam says. “Without it, the NABERS outcome could not have been achieved.”

The central role of a BMS in the commissioning and tuning of a building, and the fact the BMS contract fell under the mechanical contractor’s umbrella dictated that D&E remain on the project long after occupancy. D&E had a lead role to play in achieving the NABERS rating over the requisite 12-month monitoring period. Among the many hurdles in the way of achieving this was determining the demarcation between defect and tuning, and the loss of some early tuning changes made to the BMS during a power outage.

Hattam says the coordination and integration of metering for all services, and the NABERS requirement for a meter validation plan – not defined at the design-development stage – also proved challenging to overcome.

The basements are shared by retail on the ground floor and by the two buildings in terms of parking, security, communications, loading, services and storage. Defining title boundaries and freezing them therefore proved difficult to achieve.

Hattam says both he and the company gained invaluable experience from the CBW project – experience it now draws regularly.

Since the boundaries were not able to be defined until after practical completion, additional costs were incurred. And the splitting of distribution boards with additional metering was required to correctly apportion tariffs. Despite the challenges, Hattam says both he and the company gained invaluable experience from the CBW project – experience it now draws on regularly.

He says that given the NABERS ratings are now a mandatory component of the Commercial Building Disclosure program, recent contracts dictate an extended defects and liability period, until such time as the outcome is achieved.

“Buildings capable of [only] achieving ratings are now a thing of the past,” Hattam says. “And while at present it’s all stick and no carrot for the contractors, our experience at CBW has shown that incentives could potentially provide even better outcomes for developers.”

At the time of achieving a 5 star NABERS Energy rating in July last year, 181 William Street was at the top of a list of published rated buildings in Melbourne’s CBD to have the lowest CO2 emissions per square metre, per annum (CO2e/m² pa).

It was also the only building with a published rating in the Melbourne CBD to have achieved 5 star certification without being supplemented by green power. Hattam says it also disproved the myth that VAV air conditioning systems could not deliver a rating beyond 4 stars. Such credentials are a remarkable achievement for a project that was conceived well before such ratings were established.

And it might now be said that after for some considerable time housing buildings that didn’t quite match the uptown CBD address, the corner of Bourke and William is now home to structures worthy of their prime location.