

1200 Buildings ▶

CASE STUDIES

131 Queen Street

131 Queens Street is an example of retrofitting an energy efficient mechanical system into an old building with a complicated ownership/tenancy structure.



Built

Originally early 1900's - new floors and façade built in 1930 - 1950's over two stages.

NLA

5830 m²

Tenancy

Offices, Buddhist Art Gallery and Café. Turf Accountants Bar & Restaurant.

Building owner

11 different owners, forming an Owners Corporation

Property manager

Quayles OCM

Refurbishment project timelines

2008-2011

Project team

Quayles OCM
Quantum Facility Management
WSP Lincoln Scott
AE Smith
BENT Architecture (Green Roof design)

NABERS Energy

Current: 0
Target: 4.0

NABERS Water

NA

Key refurbishment features

- Sealed roof membrane
- High efficiency chiller
- Variable speed drive (VSD), air handling unit (AHU)
- Economy cycle
- Digital Building management system (BMS)
- Award winning rooftop garden

Energy saving

Not yet known

Water saving

Not yet known

Greenhouse saving

Not yet known

Project costs

\$1.5 million

Annual saving

Estimated \$50,000



History

The Victoria Club was founded in 1880 by bookmakers who broke away from Tattersalls Subscription Betting Rooms. At the club, the card was called and bets were settled.

The Victoria Club flourished and by 1926 had purchased quarters at 131 Queen Street where it stayed for about 60 years.

On 21 April 1976 its settling day was brutally disturbed by the Great Bookie Robbery, during which a well-organized gang of six stole between six million and \$12 million. The men; Prendergast, Kane, Kane and Lee, rented an office in the same building and hid the money there while making a fake getaway in a van. The money was never recovered and although Lee was charged he was later acquitted. None of the others were ever convicted. Lee was killed by police in 1992 during a heist at Melbourne Airport.

Lee's lawyer Phillip Dunn, QC, revealed the details of the crime in the mid-1990s, including the identities of all those involved. Prendergast disappeared in 1985 and the rest of the gang had all been murdered by the end of 1987.

As no one was ever jailed or convicted, the Great Bookie Robbery remains technically an unsolved crime.

Background

Originally built in the early 1900s, 131 Queen Street is now classified by the Building Trust as a 'building of interest.'

The original building was an emporium of three storeys, but in the 1930s and 1950s, another eight levels were added in two stages. A completely new façade was constructed in 1955, architecturally reflecting the bygone period of the eighteenth century.

The building now boasts the Turf Accountants Bar and Restaurant downstairs, an art gallery, tea rooms and prayer room owned by the International Buddhist College of Victoria and Open University Australia on the two lower floors.

The ownership of the building is unusual because it is owned by 11 independent organisations on a strata-titled basis with the majority being owner-occupied. Tenancies range from multiple floors to a single office.

The eleven floors have a total of 5830 m² net-lettable area (NLA), which includes the basement, mezzanine and upper ground floor, plus eight levels of office space.

Since the 1940s, there have been various upgrades and modifications to the mechanical systems in the building with heating, ventilating, and air conditioning (HVAC) introduced in 1977.

Amanda Black, one of the owners, is the Owners Corporation (OC) Manager, supported by Building Manager Peter Maskiell and Ashley Wakefield from Quantum Facility Management Direct.

The refurbishment project began in 2008 and is due to be completed in 2011.



Objectives

There were three main objectives in retrofitting the building:

- to completely bring to standard the safety and essential services (smoke detectors, fire equipment, fire and smoke doors)
- to convert it to a green building, aiming for a 4.0 - 4.5 star National Australian Built Environment Rating System (NABERS) rating
- to significantly reduce running costs by focusing on preventative maintenance.

Planning

The refurbishment process began when the building management team conducted an investigation in 2008 into every aspect of the building - its essential services (fire procedures and equipment), HVAC and plant rooms.

The investigation found there was no current essential services certificate of compliance or any indication of when compliance had last been achieved.

The team took on board the accumulation of many years of tenant complaints, particularly about the air conditioning. They talked to contractors and examined all the building documents. They found that the servicing was not being conducted properly, so opted to change the contractors.

The new contractors delivered a report on the HVAC which indicated the system was well past its use by date; was very energy inefficient and was not providing tenant comfort. It was a centralised system that had been installed in the 1970s, and broke down at least once a week. A lot of money was being spent continually fixing it because preventative maintenance was not conducted.

Building management compiled their findings in a report to the owners' Annual General Meeting in 2009. The report contained recommendations and quotes, foremost amongst which was the need to make sure the building met the regulations on essential services (safety) and fire systems.

It was not easy to get all the owners to agree on all issues. The Buddhist College and Open Universities Australia had already spent a lot of money upgrading their part of the building out of frustration with the general building up-keep.

It took about 12 months to get all the owners to agree, by providing information and reiterating the benefits of investing heavily in the future of the building. The management team could show what was wrong and what needed to be fixed, but they had to justify why the retrofit was necessary. A good deal of their argument was based on personal safety, the wellbeing of occupants and ensuring the owners recognised their obligations under various Acts.

When agreement was finally reached, the operations team applied for and received a Green Building Fund grant from the Australian Government of \$500,000.



As part of this process, an assessment was conducted and the building received a zero NABERS rating. The retrofit cost about \$1.6 million, which included a completely new fire panel and HVAC system as well as installation of energy efficient light fittings and globes in the majority of the common areas. The HVAC upgrade also necessitated an increase in the capacity of the mains cable to the new roof plant and equipment and provided the opportunity to install safety switches to the main electrical switchboard, which had been of concern to owners for many years.

The OC hired an engineering contractor, Lincoln Scott, to produce a set of tendering documents and design specifications for the upgrade of all the mechanical systems. The tender received applications from four companies. To meet Green Building Fund conditions, the project had to be completed within 12 months, which also included the commissioning.

The planning took about six months to accomplish and with hindsight, the OC would have preferred more time at this crucial stage. A suggestion along these lines will be made to AusIndustry in the final submission regarding the Green Building Fund.

Implementation

AE Smith was appointed as the successful major contractor.

The project took about eight months to complete. The old HVAC system was disconnected in October 2010.

To minimise disruption to the occupants, the majority of the HVAC upgrade was done at night which unfortunately added to the overall project cost but was unavoidable in a fully occupied building.

The project is currently in the commissioning, fine-tuning and balancing stage, now that the installation of all systems has been completed.

Building

The top six floors of the building that face east receive the hot morning sun in mid-December and January. Four large buildings provide shade on the other sides.

The project team considered tinting the east facing windows, but this was considered too expensive. This option may be revisited at another time though industry speculation regarding the redevelopment of the south east corner of Bourke and Queen streets may see the matter taken out of the owners' hands should those buildings be increased in height.

The rooftop membrane of the building had to be redone as a result of rust found within the concrete which was leaking water into the building. Very little preventative maintenance had been conducted for years, and the tenants below were constantly complaining of rainwater seeping into their space.

There was no need for any other internal work other than replacing the air conditioning ducting on some of the floors.

With the change of HVAC, the upper floor plant room has been significantly reduced in size, and the additional space will be used as an office for the operations team.



HVAC

The HVAC refurbishment was complicated in that the first and second floors had installed their own system during refurbishment in 2005. A separate system, which serviced the basement, foyer and upper ground level, had undergone significant repairs in 2009 and the owners are committed to also replacing this system when the funding and operational needs are established as a second stage project.

For floors three to eight, a completely new HVAC system was installed with the plant operating from the rooftop. It is a combined electrical and gas centralised system, which features:

- a high-efficiency electric chiller
- air handling with variable speed fans
- six zones across each floor that can be independently controlled
- an economy cycle managed by the digital control system where outside air is brought in if it is cooler than set point; the damper is automatically opened to draw in fresh air from outside
- heating using a gas boiler to pipe hot water through the building, coils in the floors and air that blows over these.

Energy load

There are few common areas where lighting can be made more efficient, and it is difficult to impose lighting solutions upon all the owners and tenants because they pay for their electricity costs independently.

Nevertheless, the stairwells and common area hallways have all be fitted with T5 fluoro lamps, and motion sensors have been installed at all possible points.

Water

The common areas of the building have very low levels of water consumption, so this has not been given attention at this stage.

Waste

The waste program is limited by the owner and tenant structure of the building. There is a tendency from the past for occupants to follow their own arrangements. The building management team encourages waste recycling, and is promoting a 'family feel' for the building to encourage owners to feel that they share the whole building, not just occupy one space within it.



Environment

In 2009 the Committee for Melbourne's Future Focus Group, a professional development program for young leaders, initiated a competition (Growing Up) for the design and installation of a green roof on a Melbourne commercial building.

The building at 131 Queen Street, and its winning design by BENT Architecture, best exemplified the environmental and amenity benefits, as stated by the chair of the judging panel and Victorian Government Architect, Geoffrey London.

The rooftop garden at 131 Queen St was opened in July 2010.

Tenants in the building can use the rooftop for lunch, meetings, private functions and the building Christmas party. The rooftop garden is open to the general public on Melbourne Open House weekends.

The garden has a gazebo and BBQ area, low maintenance herb garden and small plants including lavender, a lemon tree, olives and strawberries. The roof cannot bear larger trees because of the weight. A volunteer gardener (with help from the building management team) looks after the garden.

The roof garden provides many benefits including: mitigating against the urban heat island effect; provides a filtration system for storm water, insulates the upper floor of the building and provides a green recreational space for building occupants.

At the rooftop garden launch, City of Melbourne Lord Mayor Robert Doyle commented:

'Roof tops make up 17 per cent of total land area in the city. This project will capture the imagination of Melburnians, proving that nature can co-exist with the built environment. This green roof is a practical example of the benefits of environmental sustainability and gives the owners, tenants and visitors to 131 Queen Street a whole new space in which to meet'.

Building management and controls

A Building Management System (BMS) was installed along with a digital control system throughout the building. This system senses the building's indoor environment, and starts the air conditioning when it is necessary. This is very different to the old system, which was on a timer system and came on whether it was needed or not.

The BMS has a graphical interface with diagrams of each floor zone, chillers, boilers and air handlers. It enables tracking of the system seven days per week and provides comprehensive reports on the energy consumption of all components. Part of the upgrade also included the fire dampers panel. It is intended that the BMS will also be used to measure the energy consumption of the building and provide invaluable data to the owners for base building and individual tenancy benefit.



Challenges

The most challenging part of the refurbishment project, was communicating with the eleven owners and relaying information to them so that they were fully aware of the condition of the building and to get their initial agreement to go ahead with the works. The owners had to be convinced that the fire and mechanical systems were no longer repairable.

The building management team also had to ensure that on behalf of the owners they were getting value for money. It was an expensive outlay, and it was particularly important for the investor owners to ensure there would be a return on their investment.

Managing the building during the works was also a challenge due to occupancy. A high level of communication was necessary to inform the tenants when work was on and keep them up to date with what was happening.

An older building such as this always provides challenges. In this case, as it was a fully tenanted building the ability to house the construction workers and their equipment was limited. The project team had to hire a space with kitchen and toilets, which was quite an expensive undertaking.

Another issue was revealed with the upgrading of the fire panel. It was discovered that although this was upgraded, it was not compatible with the older technology such as the damper, so this had to be upgraded as well.

Outcomes

Energy

No formal measures are available as yet because 12 months of data is required. However, the owners are confident that a 40 per cent reduction in electricity costs will be achieved.

Water

Water usage in the building is already very efficient and no plans for improvement are proposed at this stage.

Social

Green garden amenity has provided many new social opportunities for owners and tenants.

Maintenance

The new plant and equipment will yield significant savings on maintenance.

Commercial

Estimated \$50,000 per year saving on the energy bill and reduced maintenance bills.



Overall

The building management team is very pleased with the overall outcome, although they are yet to conduct a formal NABERS Energy assessment.

Lessons

The main lesson to be taken out of this project is the need to make time in the planning stage for research. Unfortunately for 131 Queen St, this stage was stressful because of the conditions of the AusIndustry grant and the complex construction of the building over three stages over the last 100 years.

The Green Building Fund grant, while providing a life line to this ageing building, also presented a challenge to the owners. The grant is released in three stages, 20 per cent on commencement, 60 per cent on practical completion and the balance of 20 per cent some 12 months after practical completion. For many owners, without very careful planning, this could create cash flow problems.

The future

The commissioning of the building is almost complete. The commissioning documentation will be passed on for the approval of the Engineers WSP Lincoln Scott and any minor adjustments required will be undertaken by AE Smith to the satisfaction of all parties involved.

In twelve months' time, another NABERS Energy assessment will be conducted, and this will be submitted to the Green Building Fund so that the reduced carbon emissions can be confirmed and the final instalment of the grant released.