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# Ecolibrium

Floth

Office ace

69 Robertson St shines.





# Street-smart performer

Embracing the opportunity to walk their own talk, a sustainable building consulting firm has left no stone unturned in the design and construction of its new zero-carbon headquarters in Brisbane.

**Sean McGowan** takes a look at a building that has set new sustainability benchmarks.

Given the opportunity, how would you design your own office building? How far down the sustainability road would you take it?

And more to the point, how much of your own money would you be prepared to spend?

These are the questions the team at Floth Sustainable Building Consultants, an AIRAH company member, asked when considering the future of a 520 sq m site at 69 Robertson Street in Brisbane's Fortitude Valley.

Having owned the property since 2000, the company had explored a range of

options for more than a decade before deciding in 2014 to construct a new, purpose-built head office on the site.

And presented with the chance to be both client and consultant, Floth made a commitment to explore all options to find the best and most cost-effective solutions for the building.

"As sustainable building consultants, we undertook to 'walk the talk' by testing and optimising the building design and construction against the latest sustainable building rating systems, while minimising additional cost," says R. Glenn Ralph, M.AIRAH, Floth's managing director.

‘ 69 Robertson Street was also the first project to gain a 6 star NABERS Indoor environment (IE) rating ’

The resulting building has set new sustainability benchmarks, not least because it was the first (and remains the only) commercial office building to receive a Green Star Design and As-Built v1.1 certified rating in November 2015. The fact it achieved a top-of-the-shelf 6 star rating makes the achievement all the more impressive.

By virtue of its final design, construction and operation, it is also the first building

to publicly adopt the Australian Sustainable Built Environment Council (ASBEC) Zero Carbon Standard Building definition.

In practical terms, this means the building’s inherent energy efficiency is supported with on-site renewable energy generation. Any final carbon offset is met by the renewable supply of 100 per cent accredited GreenPower, in accordance with ASBEC’s definition.

69 Robertson Street was also the first project to gain a 6 star NABERS Indoor Environment (IE) rating in May 2016.

## ADAPTABILITY

When Floth made the decision to base itself at 69 Robertson Street in Fortitude Valley, the firm’s immediate objective was to achieve the most sustainable office building possible, at market value.

“The drive was not to increase project budget but to focus more on conscientious design that would be better for the building over the entire life of the building,” says Anthony Marklund, Floth’s ESD principal.

Embracing the opportunity to act as both client and consultant, the Floth team chose to retain design responsibility while handing the design-and-construct contract to the builder, James Trowse.

The success of past collaborations led to VAE Group being appointed as mechanical services contractor.

For architect MONDO, the constraints of the 520 sq m zero-lot line were immediately evident.

“The site is small, narrow, long, and the outlook is west to the front and has an apartment building overlooking the back,” says MONDO founder and director, Ray Sweeney.

MONDO’s architectural design consists of three storeys of office space over a ground-level garage, with a total lettable area of 1042 sq m.

The fully finished first floor tenancy offers 373 sq m NLA, while Floth occupies levels two and three – spanning 351 sq m and 317 sq m NLA respectively.

The original design brief for the building was founded on the latest design science

The office’s plants are provided supplementary watering via a rainwater collection system.



## COVER FEATURE



The solar PV system accounts for nearly 20,000kg of reduced gas emissions per annum.

for sustainable buildings at the time, and targeted a 6 star Green Star Office v3 rating. But as the project commenced construction, the release of the new Green Star Design and As Built v1.1 rating tool forced a rethink.

“A testament to the design leadership and audacity of the project team is that

when originally designing the building, the Green Star Design and As Built rating system didn't exist,” says Marklund.

“But we were able to test the design and upgrade to the new rating system once we knew we could achieve our goals without affecting the project cost. Working with James Trowse under a design-and-

construct contract allowed us to easily agree to these changes.”

Road-testing the new rating tool provided Floth with vital experience in applying the next generation of Green Star to a project. The project team's adaptability enabled it to claim a first in full certification.

“We saw this as a clear progression from our previous firsts, which included the first 6 star Green Star Office As Built v2 and Office Design v3 ratings in Queensland, achieved for Green Square North Tower and 180 Brisbane respectively,” Marklund says.

The addition of a 6 star NABERS Indoor Environment rating, and meeting ASBEC's standard definition of a zero-carbon building was also regarded as vital in attracting a quality tenant for the building's first floor.

And such credentials would only help to future-proof the building's long-term value.

Thermal and acoustic comfort to the occupants in the office was a key driver in design:



## CLIENT AND CONSULTANT

As client, services engineer and ESD consultant, Floth worked hand-in-hand with the architect to provide detailed

input into their design, specifications and final material selections.

But according to Sweeney, Floth's greatest input was to buy into the architect's design vision for the site

and collaborate on integrating environmental and engineering elements into that vision.

"The greatest challenge in being both the client and the consultant is knowing when to be one and not the other," he says. "Floth is a busy environmental practice so finding time to spend on your own project is always demanding."

The building form adopts a contemporary concrete and glass aesthetic, with bespoke glazing applied to the north-west facade to "ameliorate the impacts of the afternoon sun" while still providing an outlook to the city landscape.

Raw forms have been juxtaposed by the high-performance glass and prefinished cladding elements to blend into the local streetscape.

The site dimensions presented a number of challenges to the architectural team, least of which was the design of the building's entry.

“The greatest challenge in being both the client and the consultant is knowing when to be one and not the other”

“Creating a legible entry on an 11m frontage, where 6m is devoted to car access, was a challenge,” says Sweeney.

“The design solution employs a finely detailed vertical entry element that makes the stairs and elevator legible and beautiful from the street.”

The introduction of daylight and an external connection to the heart of the office space on levels 2 and 3 has been achieved by the inclusion of a generous light well in between the buildings on the north side.

This feature has created a central courtyard and atrium with vertical gardens (designed by landscape architect Trevor Lynch). This is used to filter the overlooking impacts of the apartments to the rear.

Outdoor balconies have been integrated into every level of the building, featuring green trellis walls planted with drought-tolerant climbing vines. Internally, planter boxes have also been installed on every level.

Though plants have been carefully selected to thrive without additional irrigation, the building features a rainwater collection system that provides for supplementary watering when required.

## INDOOR ENVIRONMENT

Floth specified a variable-refrigerant-flow (VRF) heat-recovery HVAC solution and comprehensive building automation system.

Featuring high coefficient-of-performance (COP) condensers, the selection of heat-recovery VRF followed the consideration of a variety of other potential concepts.

“A high degree of thermal and acoustic comfort to occupants in the space, with a high per cent increase in outside air delivered to the occupants, was required,” says Marklund.

Ultimately, the VRF solution met Floth’s requirements for cost-effective, energy-efficient, reliable and quiet air conditioning across the three office floors. This system is also used to cool the communication/server room on the rooftop level.

Heat recovery between indoor units is carried out in centralised two-pipe branch controllers, allowing energy recovery to be diverted and redirected to the branch that required either cooling or heating. This reduces overall running costs and lifts operational COPs.

Marklund says a combination of standard and 100 per cent fresh-air ducted indoor units operating at low fan speeds means the heat-recovery VRF is able to efficiently and quietly accommodate the increase of outdoor air load requirement. It can also deliver high thermal comfort to occupants.”

Indoor air quality initiatives include outdoor air systems sized to provide 50 per cent improvement to outdoor air rates. These are controlled in response to space CO<sub>2</sub> sensors to maintain no more than 800ppm CO<sub>2</sub> in each zone.

The carpark also features a CO-controlled ventilation system.

The provision of a high-level interface between the air conditioning system and the building management control system (BMCS) was also considered important.

To this end, control flexibility is provided via the system’s proprietary central controller. A BacNET interface to a computer-based control system allows full control and monitoring.

“Floth acted very mutually on the project, and were well supported by the project manager, Russell James,” says Jarryd McDonald, commissioning manager for VAE Group.

He says the shift in Green Star targets made documentation challenging, but that this was overcome by the collaborative approach taken by the project team.

## INNOVATION AT 69 ROBERTSON

In addition to being the first building to achieve a 6 star Green Star Design and As Built v1.1 certified rating, and 6 star NABERS Indoor Environment rating, the project is also targeting a Green Star – Performance rating, a LEED rating and the WELL New and Existing Interiors certification.

“Under Green Star, we targeted the maximum 10 points for the Innovation category,” says Floth’s ESD principal Anthony Marklund.

Innovations were carefully selected to be both practicable and affordable, thereby avoiding the costly or exotic solutions often referred to as “green bling”.

Five key innovations selected were Peak Energy Demand Reduction, Contractor Education, Market Intelligence and Research, Market Transformation, and Energy Metering Integrity.

The building energy model was shown to reduce the peak electrical demand below that of an equivalent code-compliant building. This was largely achieved through a combination of building fabric thermal performance improvement, selection of the energy-efficient HVAC system, high-efficiency lighting fixtures and the solar PV system.

These combine to account for a total of 40.8kW, corresponding to 43 per cent peak energy demand reduction.

Floth used the Building Services Research and Information Association’s (BSRIA) Soft Landings Framework to guide the building’s commissioning and tuning processes. The framework has been designed to solve the performance gap between design intentions and operational outcomes.

“This framework is transformative,” says Marklund, “and could change the regulatory environment behind commissioning as it becomes increasingly incorporated in projects,” says Marklund.



“It was one of the smoothest Green Star projects we have undertaken,” McDonald says, “because all parties were focused on a common outcome.”

## MODELLED OUTCOMES

Energy modelling was conducted to analyse the building design and engineering services systems, as well as to verify the resulting sustainability outcomes for the building.

This modelling predicted a 53 per cent reduction in operational carbon emissions from facade and integral building services improvements compared to an equivalent building code-compliant “reference building” model.

“In this way, an investment of under \$30,000 in a 15kWp roof-mounted solar photovoltaic (PV) system was able to further offset 28 per cent of the building’s predicted operational energy,” says Marklund.

The solar PV system directly reduces greenhouse gas emissions by 19,380kg CO<sub>2</sub>-e per annum. This significantly exceeds the Green Star innovation credit requirement of 10 per cent onsite renewable contribution.

“Notably, the free electricity generated by the system will more than offset the additional operational cost of the purchased GreenPower,” adds Marklund.

The solar PV system is supported by solar thermal collectors, which provide domestic hot water to the building.

Cumulative and live building data is displayed on educational foyer screens, and is also viewable on mobile devices via a web-enabled app.

A comprehensive life-cycle assessment (LCA) with the whole-of-building modelled as defined in EN15978 was also undertaken during the design process.

This recognised the building’s energy and water efficiency, and pervasive use of sustainable products and responsible building materials. The majority of the structural materials were able to be sourced locally, including masonry from Ormeau and raw materials extracted from the Gold Coast area.

According to Marklund, the LCA is an innovation challenge under the Green Star legacy tools including Office v3, and as such is less commonly undertaken.

“The 60-year LCA exceeded the maximum Green Star compliance requirements for the full seven available credits,” he says.

“The third-party peer-reviewed LCA predicted an extraordinary 252 per cent cumulative reduction of the environmental impacts in accordance with the Green Star rating tool. At 122 per cent beyond the maximum credit criteria of 130 per cent cumulative impact reduction, the environmental benefit beyond the maximum Green Star benchmarks have almost been doubled.”

## TAKING PULSE

69 Robertson Street has been fully serviced and fitted out, including Floth’s integrated fitout across levels two and three, for a very cost-effective \$2,200 per sq m GFA in total.

“The fact that the final project cost sits toward the lower end of the resulting combined base building and fitout standard build benchmark cost range of \$2,100 to \$2,800 per sq m GFA, while delivering unmatched sustainable design and performance, demonstrates that the project has comfortably met or exceeded the building’s planned objectives,” says Marklund.

As well as being named a finalist at last year’s AIRAH Awards 2016, the project has won numerous awards. This includes the 2016 World Green Building Council

Asia Pacific Network (APN) Leadership in Sustainable Design and Performance Award – Commercial Category.

“The success of this project is testament to a design brief that dared to reach for the stars from the outset, and the engagement of a progressive, collaborative and flexible high-performance project team,” says Marklund.

“Under these circumstances, and with your finger on the sustainability pulse, it is possible to upgrade a project to the newest ESD rating schemes during construction without adding significant cost.” ■

## 69 ROBERTSON STREET, FORTITUDE VALLEY AT A GLANCE

### The personnel

- **Architect:** MONDO Architects
- **Building services:** Floth Sustainable Building Consultants
- **Client:** Floth Sustainable Building Consultants
- **Contractor (builder):** James Trowse
- **Electrical services contractor:** Stowe Australia
- **ESD:** Floth Sustainable Building Consultants
- **Hydraulics services contractor:** Hollywood Plumbing (Qld)
- **Mechanical services contractor:** VAE Group
- **Project manager:** Russell James

### HVAC equipment

- **BMS:** Distech Controls
- **Diffusers:** Polyaire
- **Fans:** Pacific HVAC
- **Grilles:** Polyaire
- **Metering:** VRT
- **Sensors:** Distech Controls
- **Solar PV:** Infinity Power
- **Solar thermal hot water:** Rinnai
- **VRF system:** Mitsubishi Electric