

climate  
ready



**Darling Quarter**  
Building highlights an innovative functionality

**horiso®**



**Owners** - Australian Prime Property Fund Commercial (APPF Commercial), in joint venture with an institutional investor.

**Architects** - Francis-Jones Morehen Thorp (FJMT)

**Facade Design** - Permasteelisa

**Facade Consultant** - Norman Disney and Young

**Management Construction and Design** - Bovis Lend Lease taking on responsibility for the project's design management, project management and construction, and the project's development services provided by Lend Lease.

**Awards** - Darling Quarter has received a number of awards and has been highly commended for its sustainable design, development and architecture.

- 6 Star Green Star Office as Built version 3 rating.
- 6 Star Green Star - V2 Office Design certified rating.
- 5 Star NABERS Energy and Water Rating.
- AILA New South Wales Chapter Awards Excellence in Design Award 2011
- Asia Pacific Property Awards 2012 including Office Development and Office Interior categories.
- Winner of the 2012 Urban Land Institute awards
- Banksia Built Environment award.
- National Urban Design Award.

## A harmonious triumph connects the city to the waterfront.

Twin low-rise winged towers taper from the city skyline to the waterfront in a showcase of world-class technology, design and environmental principles. The Darling Quarter precinct is a triumph of technology as the irregular curved design of the building ensures that no two facades are the same.

The two eight storey buildings with around 55,000 square metres of office space and 800 underground car spaces were designed campus-style to reactivate the precinct as a public space and encourage pedestrian flow into the area. Darling Quarter joins the south end of Darling Harbour to the city with an interactive work and play area for the local community. The precinct has consequently improved social activation and combined commercial, retail and leisure facilities with a pedestrian link to Darling Harbour.

“One of the biggest challenges with such transmissive facades was that they required highly detailed sun shading....” Andrew Vatiliotis, General Manger - Permasteelisa

Darling Quarter, located in the south-eastern corner of Sydney's Darling Quarter precinct, was a major \$500 million rejuvenation of the 1.5ha site formerly occupied by SEGA World Sydney.

### Slow off the mark

In 2007 the Sydney Harbour Foreshore Authority (SHFA) held a competitive tender for the redevelopment for what was then described as a "dead precinct". Lend Lease and Architects, Francis-Jones Morehen Thorp (FJMT), won the tender with Bovis Lend Lease taking on responsibility for the project's design management,

project management and construction. The project's development services were provided by Lend Lease. However, the project's initial contract was just signed as the global financial crisis hit worldwide. Darling Quarter stakeholders grew cautious, as worldwide financial markets dived and property developments were abruptly curtailed. Lend Lease hesitated with any initial works until a tenant had been secured.

Meanwhile, Commonwealth Bank executives decided to house 6,000 employees from six different precincts in Sydney and were looking for a suitable site. Darling Quarter's development had the potential design philosophy that supported CBA's corporate commitment to reducing their environmental impact and committed to a 13 year lease of the new buildings.

### Darling Quarter begins

In September 2008 work on the site began. The redevelopment consists of two main divisions; Commonwealth Bank Place housing commercial buildings, car parks, theatre and retail facilities and the public domain sector including a "state of the art" public park and a new and improved pedestrian access.

“By building new technologies and sustainability principles into the fabric of the building, we've created a space that's more flexible, more comfortable, more productive and less damaging to the environment. Freeing our people from their desks empowers them to choose how best to achieve their daily objectives while taking a more collaborative and creative approach to their work, while still enabling them to find the privacy they need to focus on complex tasks or confidential material.”

### Suzanne Young -

Executive General Manager, Commonwealth Bank Corporate Services.



The primary purpose of the building envelope was to maximise views and availability of daylight while controlling the solar loads. FJMT's design project team initial ideas involved cladding the western facade with external timber plantation blinds and opting for 63 per cent clear Visible Light Transmission glass. This almost clear glass had never been used before in a commercial building with a western elevation at these latitudes. Internal solar glare could become a significant issue, given the facade's expanse. The twin building atriums also included massive skylight ceilings with large panels of curved glass, while below office and meeting areas had been designed with glass partitions facing the naturally lit atriums.

### The Horiso technology and solar control capabilities

Horiso's proven collaborative approach, innovative problem solving and advanced motorised control technology on large scale building projects prompted Lend Lease to commission the company to address Darling Quarter's specific solar control challenges. The process involved addressing the three areas; the western glass facade, atrium skylights and the central atrium perimeter areas; vital to accomplishing the 6 Star Green Star rating.

*Top left: Preliminary rough sketch of the Darling Quarter concept. Courtesy of FJMT Architects ©.*

*Above: Darling Quarter after dark. An artist's impression of the Darling Quarter proposal. Courtesy of FJMT Architects ©.*



The result involved three solar control systems, integrated with motorised control to effectively manage the buildings' requirements.

Horiso Speciality Timber Blinds were finally selected for the western facade and installed internally. A unique tension blind system was developed for the atrium skylight ceilings and roller blinds were designed for the central atrium perimeter areas.

“The project team wanted to harmonise the western facade with the public space, by having timber shading on the outside of the facade. However, to ensure adequate maintenance of the timber shading, these devices were in the end placed inside the facade. So we incorporated a very light glass so that the timber elements would still be visible from the outside.”

**David Rolls -**

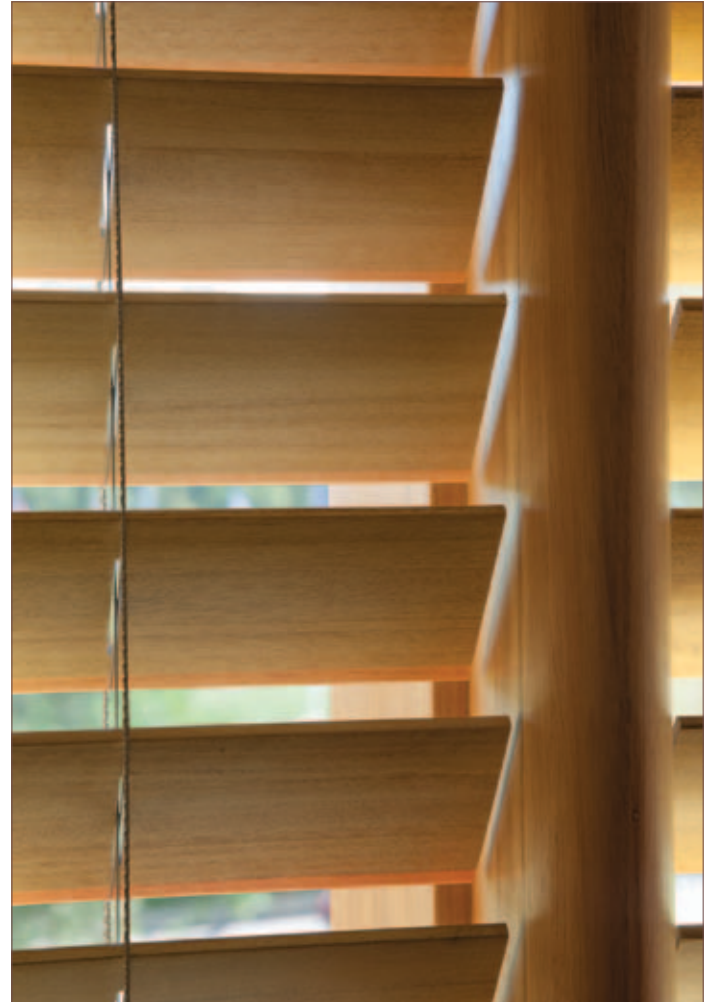
Lend Lease Managing Director for Australian Development.

In total, 25,000 linear metres of timber venetian blinds were installed on the western side of the two building facades. The blind sections are synchronised and automatically tilt in response to the exact position of the sun throughout the day. This Horiso control system is based on an intelligent motor controller pre-programmed with other building control requirements - including both the geographical location and physical orientation of the building's curved design. It operates in conjunction with sun-tracking software that enables individual blinds to react to the variations of the sun's angle of incidence throughout the year. This ensures the blinds' tilt position is optimised to control internal daylight, glare and thermal heat

gain for maximum energy efficiency and comfortable work conditions.

To conceal the control motors, Horiso custom designed the headrail to seamlessly integrate with the timber venetians.

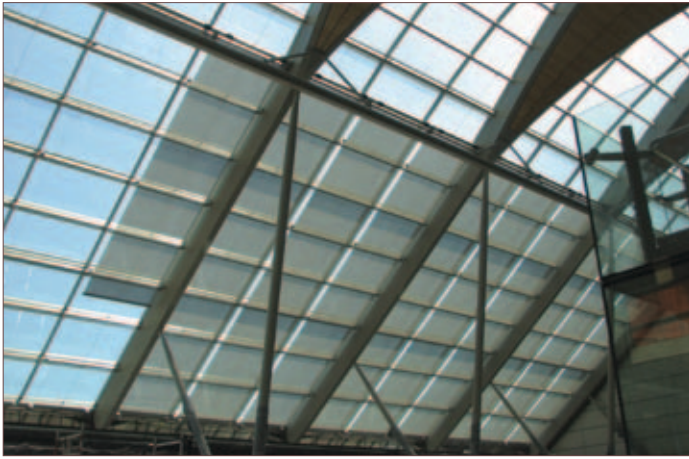
Sourcing an appropriate timber was challenging. Cottonwood, a poplar plantation timber was finally selected. An advanced lamination technique increased its strength while still maintaining the desired weight, enabling control of the venetian blinds across their wide spans. In addition, the timber was stained with a semi-gloss finish to achieve the colour required for the overall external effect.



*Above left: Darling Quarter's western facade.*

*Above top: An overall view including the undulating roof design.*

*Above: View from a conference room facing west.*



*Above: The unique Tension Blind System during installation.  
Top: The atrium's unique tension blind system completed.  
Right: Roller blinds on office and meeting levels.*

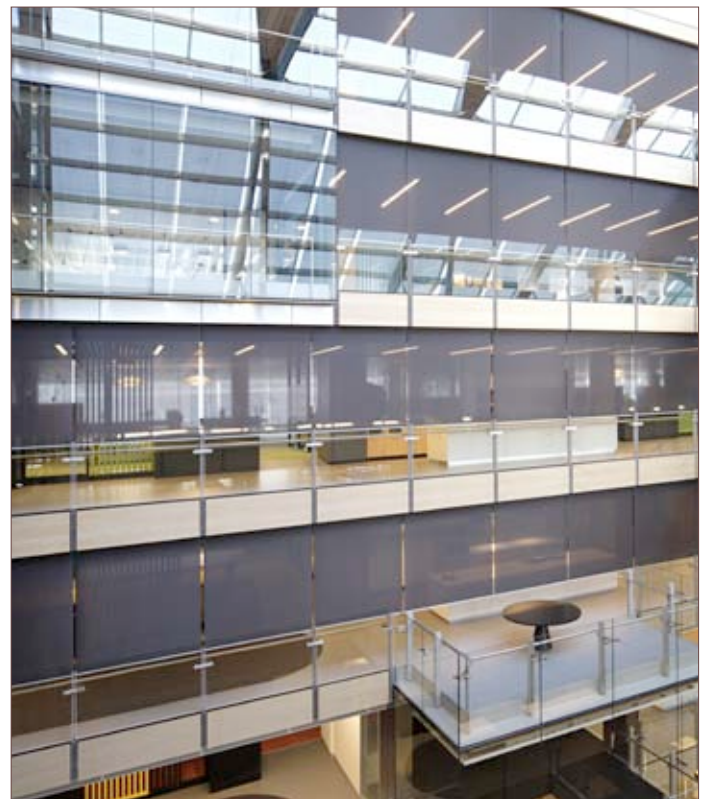
The dramatic triple-height atrium is one of the central design elements of the project and not only forms a breath-taking feature in Commonwealth Bank Place, it is also integral in the project's lighting, heating and cooling system.

The atrium's curved ceiling design incorporating shaped glass panels required the solar control system to be carefully considered, designed and thoroughly tested before installation.

Horiso's efforts culminated in a unique tension blind system, technically advanced to retract precisely, preventing any fabric sagging or operation difficulties over the entire length.

While the blinds are lowered, the fabric openness allows light filtration and minimises solar gain. Access for installation was difficult with an atrium height equivalent to 8 storeys, a span of 56 metres across and a pitch of 37°. Overall, the actual size of the tension system has never been achieved before on a building worldwide - 14 metres long by 3.2 metres wide. The Southern building blinds were also shaped to ensure they accurately fitted the curve of the ceiling's skylight panels.

The 229 Horiso Internal Roller Blinds on the office levels in the atrium areas were made from fabric specifically manufactured for the project. These blinds control the glare from the transported natural light and are integrated with the audio visual system, whereby the blinds will automatically close when the audio visual device is activated.



“With the ever increasing challenge to find the best ways to utilise space in our cities, Darling Quarter is an important example of industry working collaboratively with government to push the boundaries and set a new benchmark for the creation of urban precincts for people to work, visit and enjoy.”

**Mark Menhinnitt** -  
CEO, Lend Lease  
Australian business.

## Project Collaboration

Apart from the initial project collaboration between Lend Lease and the Sydney Harbour Foreshore Authority, from a technical point of view, the collaboration required to undertake the integration and delivery of differing design and technology elements, was a multilevel achievement. Consultation, sharing of information and feedback were key factors to Darling Quarter's overall success.

Turner Bros., an internationally recognised Australian company was contracted to project

manage the solar control system components. This entailed sourcing solutions for the various area requirements and supervising the manufacturing, delivery and installation of the shading systems. Turner Bros. delivered the highly technical and environmental criteria products for the project on schedule in the tight scheduled time frames.

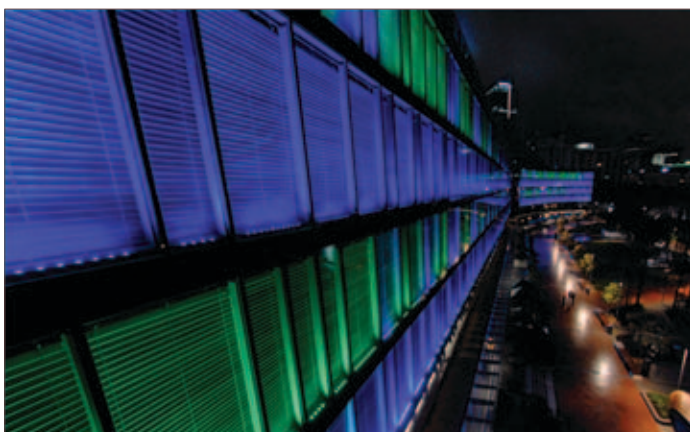
## Light show integration

Another technical achievement, is the spectacular light show installation on Darling Quarter's western facade - Luminous. Bruce Ramus, the Creative Director describes the concept as being “A new way to design and shape the urban space we inhabit. It is a large scale interactive public park canvas”. The application required the development of a compact luminaire that would fit in the limited space between the glass and timber venetian blinds. The positioning of the luminaires as well as the optics within each luminaire was of equal importance. The result was a minimally designed fitting that also housed the control equipment that runs along the windowsills. Video content is run through the fittings by a specifically designed algorithm distinguishing the true white in the LEDs, providing the sophisticated colour palette, a world first achieved by Klik Systems.

Each window represents a pixel of the overall image and when viewed from a distance forms the clear animated picture spectacle.

“To bring light to the community, to allow the community to play with light and create art for themselves. It's about light and playfulness.”

**Bruce Ramus** -  
Creative Director -  
Luminous.



The Speciaty Timber Venetians serve a vital purpose reflecting light from the luminaires which are angled upwards with a 10° spreader lens. This concept contains the light within the facade to minimise direct light toward the viewers, dramatically increasing the impact of the light show across the two facades.

Locals can use the specially designed consoles on the Darling Quarter forecourt or their smart phones to compose music which is then integrated via graphic synchronisation. This allows the sound based designs to be visualised, creating individualised light shows. Amusement seekers from around the world can also access the Luminous technology online.

*Previous page: Various views of the colourful imagery created on the western facades at Darling Quarter.*

## Other 6 Star Green Star building features

“Being awarded the water recycling licence and achieving a 6 Star Green Star - Office Design V2 certified rating, are significant milestones for Darling Quarter and will offer real benefits to Sydneysiders and tenants for years to come”

**Rod Leaver** -  
Lend Lease, CEO.

### Recycled water plant

Lend Lease was awarded the water recycling licence as part of the 2010 NSW Metropolitan Water Plan to aid in the development of a long term strategy for Sydney's water supply. Veolia Water Solutions and Technologies designed, built, installed and operate the recycled water plant that treats 245,000 litres of effluent per day by drawing waste water from the nearby Sydney Water main sewer to produce around 60 million litres of high quality

recycled water for toilet flushing, irrigation of landscaped areas and the cooling tower's make-up water.

### Tri-generation energy

Mpower implemented and integrated two 400 kilowatt MWN natural gas generators in a tri-generation system. The two generators have a

electrical efficiency of 42.2 per cent and supplies hot water to an absorption chiller which at maximum capacity supplies 500 kW of cooling for chilled water for the air conditioning systems. The system is integrated into the Building Management System and its Energy and Water Management System.

These integrations mean power consumptions of the buildings base loads can be monitored, while controlling generator output to maximise energy efficiency.

[www.horiso.com.au](http://www.horiso.com.au)

Images and content references:

Lend Lease

FJMT

DesignBuild

Growatt

CBA Newsletter

Luminous website.

### Darling Quarter Environmentally Sustainable Design Achievements

- Infrastructure designed to achieve a reduction of 2,460 tonnes of carbon emissions per year.
- Natural light optimised to reduce energy loading costs.
- Solar control systems optimise thermal heat gain and solar glare reductions.
- Water consumption reduced by 92 per cent.
- Tri-generation plant generates electricity for air conditioning systems.
- 300,000 litre rain water harvesting tank.
- 245,000 litre blackwater treatment facility with recycled water supplied for public use.
- Low VOC materials usage contributing to a healthier interior environment.
- Chilled beam technology - rising warm air is cooled via chilled water piping and recirculated with lower energy costs.
- Approximately 80 per cent of construction waste recycled.

### Key building facts

- Twin 8 storey buildings.
- Prime location with easy access to CBD.
- 55,000 square metres of office space.
- 800 underground car spaces.
- Premium grade office design.
- “Hot desking” office design layout.

- Campus-style precinct design to reactivate the area with multiple uses.
- Retail areas on ground floors.
- Workplace for over 6,000 employees.
- TV screens in foyer display energy usage and other green information.
- Public leisure centre comprises of a 4,000 square metre children's playground and entertaining area.