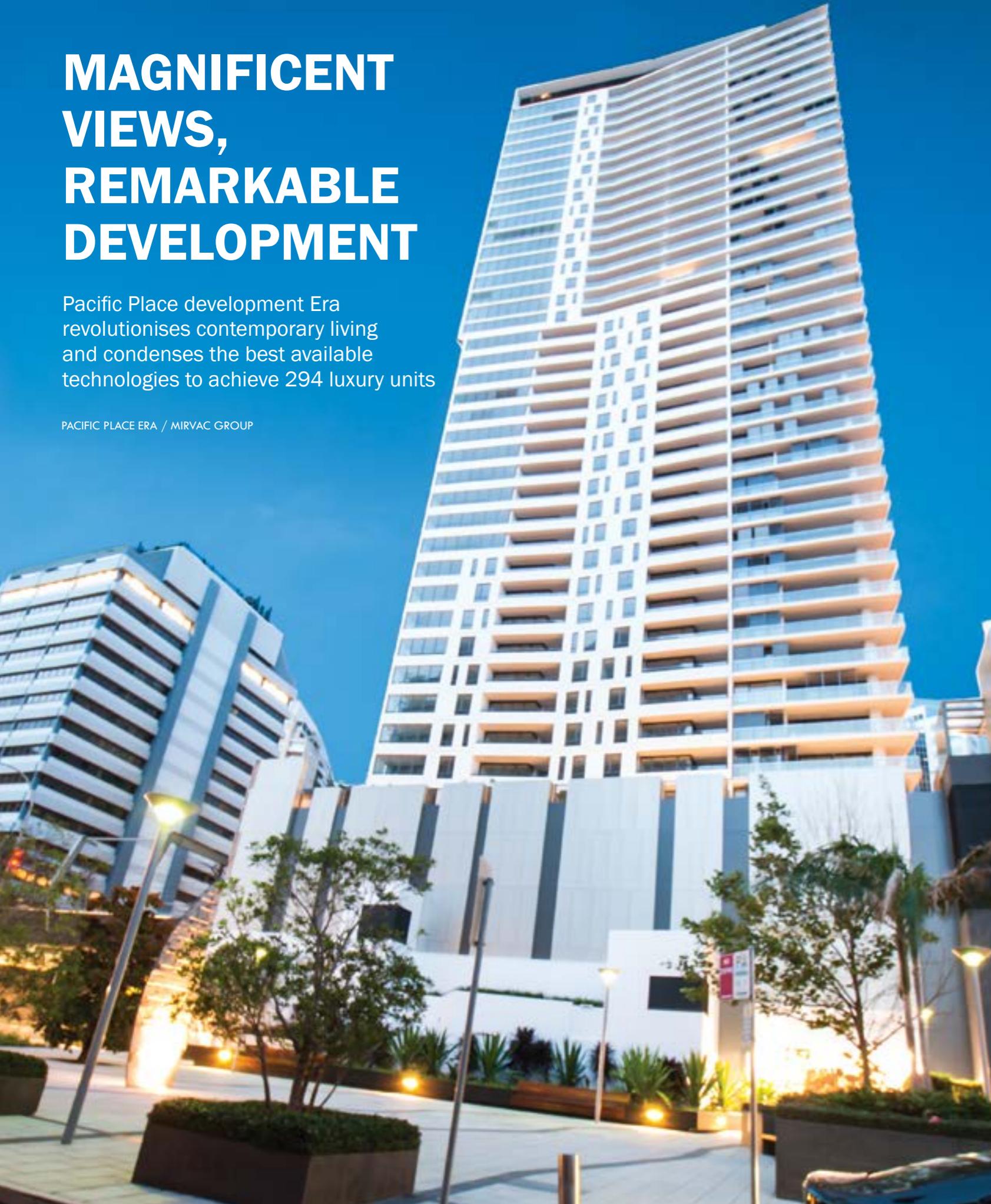


MAGNIFICENT VIEWS, REMARKABLE DEVELOPMENT

Pacific Place development Era revolutionises contemporary living and condenses the best available technologies to achieve 294 luxury units

PACIFIC PLACE ERA / MIRVAC GROUP



Standing on the roof of "Era" in Pacific Place, towering above all the surrounding buildings, one can see the city of Sydney, the landmark Harbour Bridge, then beyond to the Pacific Ocean. Looking down one realises the building is just a stone's throw from the railway station and the centre of Chatswood. When completed in February 2014, 'Era' was the highest building in Chatswood and the second highest residential floor space outside the Sydney CBD.

Construction on 'Era' began in July 2011. The construction cost of the project is \$160m and the end project value \$320m. "3.5 months from receiving development approval, we had shovels in the ground and had sold over 90% of stock," said a spokesperson from Mirvac. 'Era' is the 5th and last building in Mirvac's Pacific Place Project in Chatswood. One of the major difficulties that Mirvac overcame was building 'Era' over and adjacent to the railway. This involved forward planning. Mirvac built a tunnel over the railway adjacent to 'Era' after extensive consultation with Rail Corporation NSW in 2001, the year construction of the first building in the Pacific Place project was underway.

'Era' consists of 7 levels of basement car park with a total of 332 car spaces, 5 commercial levels with a double glazed curtain wall façade and 37 residential levels consisting of precast concrete panels and glazed balconies. The ground floor has 2

shops and 2 lobbies, one for the residential tower and one for the office suites. Above this, there are 4 levels of commercial space containing 50 small 'A Grade' office suites.

The residential levels contain 294 apartments. The building is serviced by 4 high speed lifts. Amenities for residents will include a large heated swimming pool, fully equipped gym, sauna, BBQ area. There will also be a private landscaped garden on top of the railway tunnel integrating the landscaping with the rest of the Pacific Place precinct. A public park will also be built adjacent to Railway Street. Of particular interest, is that 'Era' is one of the first buildings in Chatswood to have a high speed internet provision (NBN) to all apartments and office suites.

The architects, Mirvac Design and the builders Mirvac Group came together early in the design process so that economies in construction time could be incorporated into the building design. Each floor of prestressed concrete is constructed to a 4 day cycle, made possible by quick setting concrete, modular formwork and the precast panels of the floor below. The hoist position was carefully considered and an internal lift was commissioned early, so that workmen working on the upper levels could be transported independently of those completing the office suites and apartments on lower levels. Mirvac has taken an innovative approach to the design of precast panels by having

the panel manufacturer install the windows. The precast panels then come to site with windows in place. This is a huge advantage in a very high building with 1200 precast panels.

Mirvac overcame the challenge of providing a mix of apartment size by designing 3 residential zones which are articulated on the facades. The lowest and the immediate zones consist mainly of 1 and 2 bedroom apartments, and the top zone consists of 3 bedroom apartments with upgraded appliances and luxurious finishes. Living areas are orientated to maximise sunlight and views. Particular attention was given to the reduction of sound transmission. Walls between apartments comprise advanced Hebel construction, with insulation and plasterboard supported on framing to provide additional acoustic separation. Windows have acoustic seals and where necessary, services such as plumbing pipes will be wrapped in sound absorbing material while ceilings were individually, acoustically designed.

"Mirvac describes itself as "one of the leading brands in the Australian residential development industry" with "a proven track record of delivering innovative and quality products".

For more information contact Mirvac Group,
Level 26, 60 Margaret Street Sydney 2000,
phone 02 9080 8000, www.mirvac.com





Raines Carpets Pty Ltd is the supplier and installer of carpet to the apartments, lobbies and commercial areas at 'Era' Pacific Place. The company specializes in all aspects of flooring works in the commercial, industrial and residential sectors.

Founded by the Raines family, the company commenced operations in 1980 and has 35 employees. Raines Carpets can provide a complete flooring solution which includes initial design, procurement, complete project management, supply, installation and maintenance. The company can assist clients to satisfy all approval and documentation requirements to meet applicable Australian Standards and Building Codes.

"In the Pacific Place project, Raines Carpets exceeded the client's programme schedule," says David Raines, the Executive Director. "Our core values are, integrity, win-win strategic partnerships, making a positive difference and exceeding our clients expectations. Professional project management is a core component of the service package Raines Carpets provides."

Raines Carpets Commercial Division operates out of a modern, purpose designed facility in the Sydney suburb of Banksmeadow, which is furnished with modern cutting machinery and IT applications to ensure consistency. Their state of the art IT estimating and cutting applications ensure that all team members involved in the project are kept up to date as the project progresses.

The majority of their installers are employees. Raines Carpets have made this investment to ensure quality control throughout all projects.

Raines Carpets has a site survey and sign-off process in place. The site survey process is designed to assist them in obtaining high quality site information, thereby minimising the need for rework, and to provide better quality information to ensure the best service each time. The site sign-off procedure assists them in

measuring the quality of the completed project. This process requires the Raines Carpets representative and the client to inspect, approve and sign off on the quality of the completed project. This procedure also provides the client with the opportunity to provide feedback on the finished product and service.

Raines Carpets can supply and install carpet to projects nation wide. The company's installers are proficient in a broad range of flooring installation methods including conventional carpet, direct stick carpet, dual bond carpet, Axminster, carpet tiles, vinyl and timber. Raines Carpets is experienced in custom made carpets and rugs and carpet repairs.

Some of the large residential projects Raines Carpets have successfully completed in 2013, in NSW include 'The Gantry' project, consisting of 225 apartments in Camperdown for Parkview Constructions and the 275 apartments at Wentworth Point Marina for Billbergia Constructions. Large residential projects Raines Carpets have successfully completed in 2014 in the ACT includes the 40 apartment 'Habitat' in Braddon, and the 240 apartment 'Sentinel' in Belconnen, for Morris Construction Pty Ltd.

Some of Raines Carpets commercial projects include 143 Turbot Street, Brisbane an office building refurbishment for Greenday Construction Pty Ltd and the Virgin Australia Lounges in Sydney, Melbourne, Canberra and Cairns for Built (NSW) Pty Ltd. As well as Telstra's offices in Canberra, ACT.

Raines Carpets prides itself on being both "skilled and capable".

For more information contact Raines Carpets Pty Ltd, Head Office and Commercial Showroom, Unit 8, 3 Exell St, Banksmeadow NSW 2019 Australia, phone 02 9316 8030, fax 02 9666-6170, mobile 0404 555 540, email draines@rainescarpets.com.au, www.rainescarpets.com.au

Below Opus International Consultants designed and documented the engineering to the eastern and western sides of Pacific Place Era.



Opus International Consultants provided the structural engineering design and documentation on Mirvac's latest high rise development on Sydney's North Shore, the 49 storey Era, in the heart of Chatswood's retail and commercial district. The \$160m development is a spectacular design statement containing 295 residential units, 4 levels of commercial space, ground level retail space, and 7 levels of basement car park. A swimming pool and gym are also among the facilities included on Era's commercial levels.

The Opus team, led by Principal Structural Engineer, Don Le-Huu, also designed and documented the shoring along both eastern and western sides of the property, adjacent to the railway, and also provided supervision services during construction. The basement covers the entire site between the street boundaries and the adjoining Railway Enclosure Structure so this was a particularly critical stage of the design.

One of the key challenges of the project overcome by Opus was the difficult task of aligning the vertical elements through 49 floors. "It's a tricky exercise to get a column grid to align through all the different floor layouts to avoid transfer structures, but we managed to achieve it," says Don Le-Huu. Opus used Revit drafting software to simplify the complexity of the project and identify service clashes before



The other key challenge for the design team on this project was the break up of the pouring of the floor slabs. During the construction phase, the client opted to break up the pouring of each floor slab into multiple pours in order to achieve maximum design efficiency. To accommodate the client's decision to break up the pours for each floor, the Opus team was flexible enough to provide the further analysis necessary to determine a structurally feasible break up of the slab pours, even once the project was well into the construction phase.

The end result was a lean, efficient structural design for the project, achieved as a result of the detailed analysis and re-analysis of the design elements. Opus provided detailed design and finite element analysis including post-tension analysis and this ensured that the client's stringent deflection parameters were incorporated early in the design process, enhancing Opus' ability to meet the client's timelines.

For more information contact Opus International Consultants, Consulting Engineers, Level 13, Tower 2, 475 Victoria Avenue, Chatswood NSW 2067, phone 02 9325 5600, fax 02 9904 6777, email michael.skeggs@opus.com.au, www.opus.com.au

construction began. "Revit has revolutionised the way infrastructure projects are designed," says Mike Skeggs, Opus' Sydney Business Manager. "There are significant time savings to be gained by utilising this technology. By utilising Revit's features, we can identify conflicts between services at the early stages of design far more quickly and it has allowed us to create a more efficient, streamlined design process."

Gleaming white kitchen bench tops and breakfast bars, complimenting white cupboards, beautifully finish the kitchens in the completed 1 and 2 and 3 bedroom apartments on the lower residential floors at "Era" Pacific Place. Vanity bench tops made of engineered stone compliment the tiles, fixtures and fittings to create a harmonious look for the bathrooms.

Interior Marble Pty Ltd. manufactured and installed the engineered stone vanity and kitchen bench tops for "Era" Pacific Place using Caesarstone® and Fasa stone. The company which has been in business for 25 years specialises in stone vanity and kitchen bench tops, fireplaces, fountains in stone, stone cladding and sandstone projects for residential and commercial projects.

All Interior Marble's 20 employees have worked on the "Era" project either on manufacture in their plant at Silverwater, or on installation on site. Interior Marble recently purchased a new CNC Bridge Saw from Italy. This large piece of equipment allows them to precisely programme every cut on their stone slabs. The new equipment has increased their efficiency to produce good quality workmanship.

"Our speed, efficiency and the quality of work that was produced on the "Era" project we see as an achievement for Interior Marble," said a spokesperson for the company.

Interior Marble is currently working on manufacturing and installing vanity and kitchen bench tops in Mirvac's Pinnacle Apartments at Rhodes. Other current projects include work at Freehills in Castlereagh Street, and No. 8 Chifley Square in Sydney. Interior Marble manufactured and installed the solid, round, stone columns at Westfield East Gardens. The company is also working on the manufacture of stone for the external works at Canberra Airport.

For more information contact Interior Marble Pty Ltd, 6 – 8 Churchill Street, Silverwater NSW 2128, phone 02 9748 0077, mobile 0414 690 299, fax 02 9748 0088, email maurice.gorga@interiormarble.com.au

Below Douglas Partners supplied specialist geotechnical consulting for each stage throughout the Pacific Place Era construction.



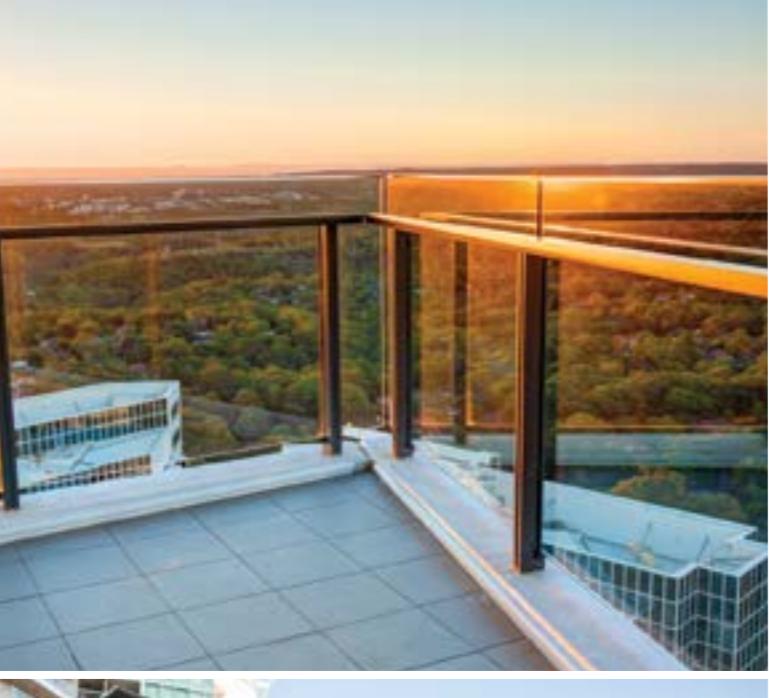
Douglas Partners has worked closely with Mirvac Constructions as a specialist geotechnical consultant for each stage of the Pacific Place development in Chatswood since the 1990s. This development precinct has included several high rise buildings with deep basement excavations predominantly through Ashfield Shale. Ashfield Shale presents challenges for the design and construction of shoring. It can be highly fractured, unpredictable and have random, discontinuous jointing and major through-going faults. Bulk excavation for the final building (Era) was completed in 2012. It included a seven level basement excavation directly adjacent to the railway line and excavation directly adjacent to pad footings for the neighboring high rise building. Douglas Partners carried out geotechnical investigations and designed the anchor support for the various shoring systems. To satisfy RailCorp requirements, Douglas Partners carried out full-time supervision of the excavation and shoring construction for about 8 months.

Due to space and access constraints, the shoring included anchored shotcrete panel walls constructed in stages below the railway line and the northern boundary adjacent to the high rise building. Excavation below the pad footings for the adjacent high rise building was also

staged to allow progressive installation of permanent anchors below the footings. Anchored bored soldier pile walls were used adjacent to the roads. All anchors extending below the railway corridor were designed and installed as permanent anchors (design life of 100 years) for which ongoing monitoring is required.

Douglas Partners experience with deep basement excavations in the Chatswood area provided a detailed understanding of the design and construction issues associated with a major excavation in proximity to critical infrastructure. Douglas Partners expertise and presence on site during excavation meant that adversely inclined joints and wedges of rock were identified at critical stages and able to be refined and the shoring design, sequencing, and installation of additional rock bolts was effectively carried out. This reduced the risk of unacceptable movement. The excavation was completed successfully with shoring wall movements maintained within expected limits and no adverse impacts to surrounding infrastructure and buildings.

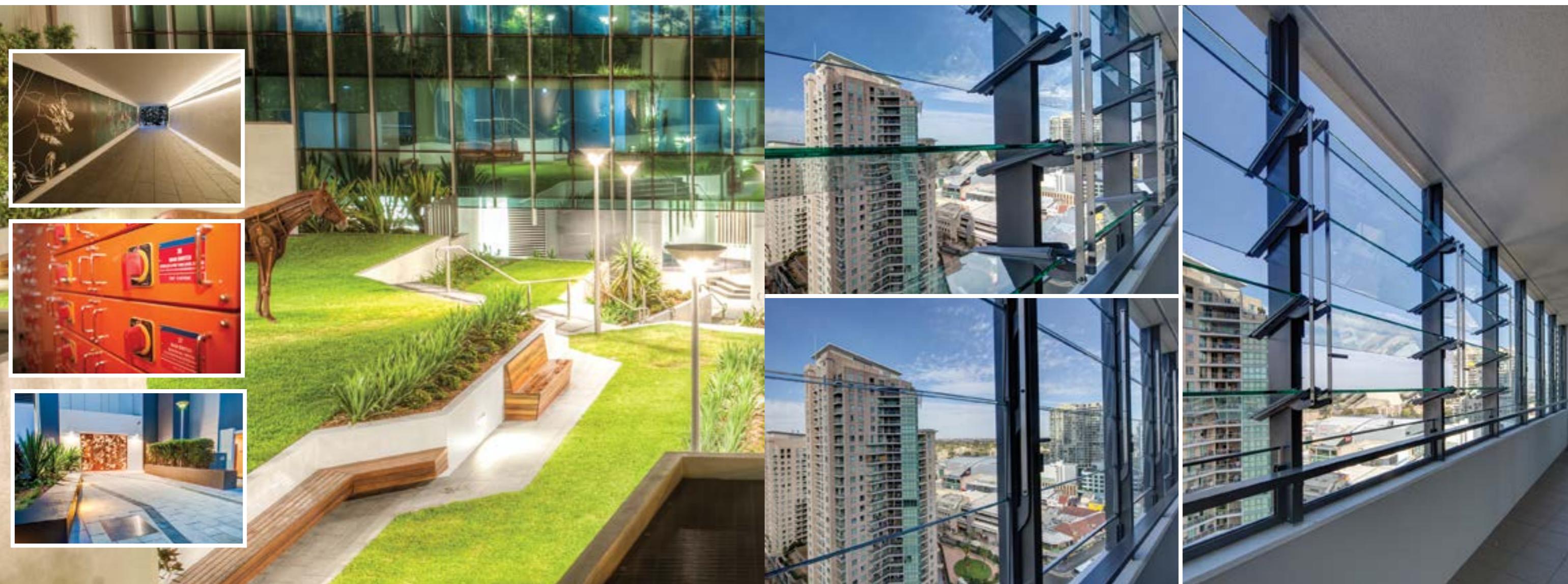
For more information contact Douglas Partners, 96 Hermitage Road, West Ryde, NSW 2114, phone 02 9809 0666, email marketing@douglaspartners.com.au, www.douglaspartners.com.au



- ENGINEERED BALUSTRADES**
3.5km of custom laminate over 42 levels.
- STRUCTURAL STEEL**
L43 Plantroom over 2 days (60°)
- MISCELLANEOUS METALWORK**
Basement carpark over 7 levels.
Public plazas and railway enclosure structures.

Below Webb Australia Group provided electrical consults for the Pacific Place Era.

Below AGP developed a new frameless glass louvre system for the Pacific Place Era.



"We have had great success with design and supervision of many premium apartment and private residence projects" says Director Marc Pirozzi. The company provided electrical consultancy services for the 'Era' Pacific Place project. Webb Australia Group is a multi-discipline engineering consultancy which opened its doors in Sydney over 40 years ago. It now has other offices in Brisbane, Canberra, the Gold Coast, Melbourne, Newcastle and the Sunshine Coast, as well as an overseas office in Doha. From its beginnings as an electrical engineering consultancy, the company has expanded to include specialist lighting, mechanical, security, communications and audio visual consultancy services.

Ivan Pena, Senior Electrical Engineer responsible for the design delivery says "Era" was one of the first buildings in Chatswood to have high speed NBN internet connection". As well as being the electrical consultant, Webb Australia Group was instrumental in the provision of NBN connections for all apartments and office suites. The company also designed the Ausgrid substation for the project. Other residential apartment projects Webb Australia Group has been consultants for include Harold Park Precinct, the upcoming Green Square Precinct,

Top Ryde City Apartments and Rhodes Waterside Precinct. Webb Australia Group has worked on many Sydney commercial projects such as Westpac Place, 200, 388 and 400 George Street and Commonwealth Bank Martin Place. The company has also provided consultancy services for government projects throughout Australia.

Webb Australia Group is one of the few consulting engineering companies that offer a 'design only' Electrical Supply Authority L3ASP service. This allows the company to independently design modifications and/or new incoming power supply arrangements and covers such things as substations, HV/LV network and public domain street lighting.

"We take pride in our ability to deliver infrastructure and building engineering solutions utilising our extensive experience gained from over 40 years in the industry" says Director Marc Pirozzi.

For more information contact Webb Australia Group Consulting Engineers, Level 4, 828 Pacific Highway, Gordon NSW 2072, phone 02 9418 1444, fax 02 9418 1191, email sydney@webbaustralia.com.au, www.webbaustralia.com.au

The AGP Centaline operable glass louvre system is the newest glass louvre product from AGP Pty Limited and was developed in conjunction with Mirvac specifically for Era Apartments.

AGP has an extensive track record of operable façade systems on Mirvac apartment developments, including its motorised metal lift up louvres panels for the Walsh Bay Pier 6/7, Saunders Wharf and Leighton Beach, as well as its Fineline operable glass louvres which have been used at Ephraim Island and Royal Newcastle.

At Era, Zac Hart and his team from Mirvac needed a simple yet elegant frameless glass louvre system which could be manually operated by the apartment owners to provide natural ventilation and striking views in pleasant weather, along with good protection from wind and rain during inclement weather.

The AGP Centaline Series is a centre-pivoted louvre system that uses polycarbonate louvre arms with an external linkage mechanism. This allows the louvres to be manually operated and the system can be installed off any type of mullion framing system. Large glass louvre

spans of up to 1500mm was achieved using 12mm toughened or toughened laminated glass.

At Era, 150x50mm RHS mullions were installed in a powdercoat finish, with glass balustrade panels glazed into aluminium channels in line with the operable louvres above. A custom made aluminium handrail, matching balustrading elsewhere in the building, was fixed to the back of the mullions.

A unique company in the construction industry, AGP provides a number of façade and entrance products to the highest design and construction standards. AGP has built its reputation on a customer service culture reflecting a commitment to excellence, innovation, performance and quality, with two separate divisions: Specialist Glass Façade Projects, comprising frameless glass assemblies, operable louvre systems and motorised structures, and Automatic Door & Security Entrance Systems, for revolving doors, automatic doors and security entrances. AGP offers its clients the unique service of a truly one stop shop construction company.

For more information contact AGP, 9 Liberty Road Huntingwood NSW 2148, phone 02 9671 0000, www.agpgroup.com.au