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THE FUTURE OF CONSTRUCTION: INNOVATION APPLIED

ENDING THE SILENCE ON TOXICITY IN THE BUILT ENVIRONMENT

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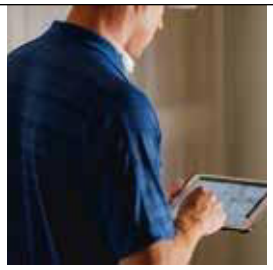

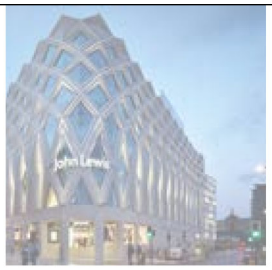

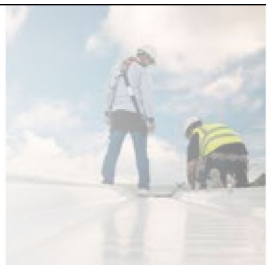

FEATURES

PROJECTS

REGULAR FEATURES

Property prospects post Federal Election

The upcoming Australian Federal Election is currently a topic of great interest among property experts and investors.

One of the most debated subjects in this area is Labor's proposal to limit negative gearing to new housing only, and what impact it would have on the property market. Although some industry specialists have highlighted the negative effects it could have, there are others that believe it could lead to a momentary improvement as a result of further volatility in prices, leading to more opportunities for investors.

However, with a six-year low in property industry confidence levels according to the ANZ Property Council industry confidence index, the industry has been cautioned about the risks to the Australian economy if a further deterioration in the housing sector was to happen.

Furthermore, a recent survey by Turner & Townsend found that although annual GDP growth reached 2.3 per cent in 2018 in Australia, which is above the average for advanced nations, falling prices, tighter credit conditions, curbs on foreign investors, and oversupply could further dampen the energetic apartment building sector.

Nevertheless, although the decrease in house prices could lead to less spending this year and other flow-on effects, it is expected to be offset by publicly funded infrastructure, private developer-led and large resource-based projects. Prospects in 2019 are looking promising according to the survey, with commercial, health, defence, retail and hotel construction rising in parallel with massive multi-year road and rail projects that are underway.

At the same time, construction costs have increased by 3.5 per cent in Sydney and by 4 per cent in Melbourne, which could rise further this year by 5 per cent in Melbourne and by 3.5 per cent in Sydney.

These expected construction cost increases, in combination with the large number of infrastructure projects that are underway or in planning simultaneously – could create pressure on both capacity and resource availability.

Whatever the outcome of the Federal Election may be, the Australian construction sector is expected to continue its robustness off the back of already committed big infrastructure and commercial property development investments across the nation.

Annelie Wressmark
Group Editor

BUILD AUSTRALIA
VOLUME 5, ISSUE 18, APRIL 2019

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EVENTS

DesignBUILD Expo

This event brings Australia's architects, developers and construction professionals together to connect, source quality materials, hear about legislation updates, and get insight into property trends.

14-16 May 2019
International Convention Centre Sydney
www.designbuildexpo.com.au

Workplace Health & Safety Show 2019

This is the must attend event for all safety professionals from a range of industries. Discover interactive, innovative and collaborative solutions to make your workplace safer.

22-23 May 2019
International Convention Centre Sydney
www.whsshow.com.au

BILT ANZ 2019

This event is designed to cater to the needs of those who design, build, operate and maintain the built environment. It is dedicated to improving the way the industry works together.

23-25 May 2019
Crown Conference Centre, Melbourne
www.dbeinstitute.org/event/bilt-anz-2019

Australian Property Expo

This event promises to be the largest and most complex property expo that Victoria has ever seen, focusing on some of the major local, interstate and international developments.

25-26 May 2019
Melbourne Convention and Exhibition Centre
www.aupropertyexpo.com/melbourne

Smart Precincts & Innovation Hubs

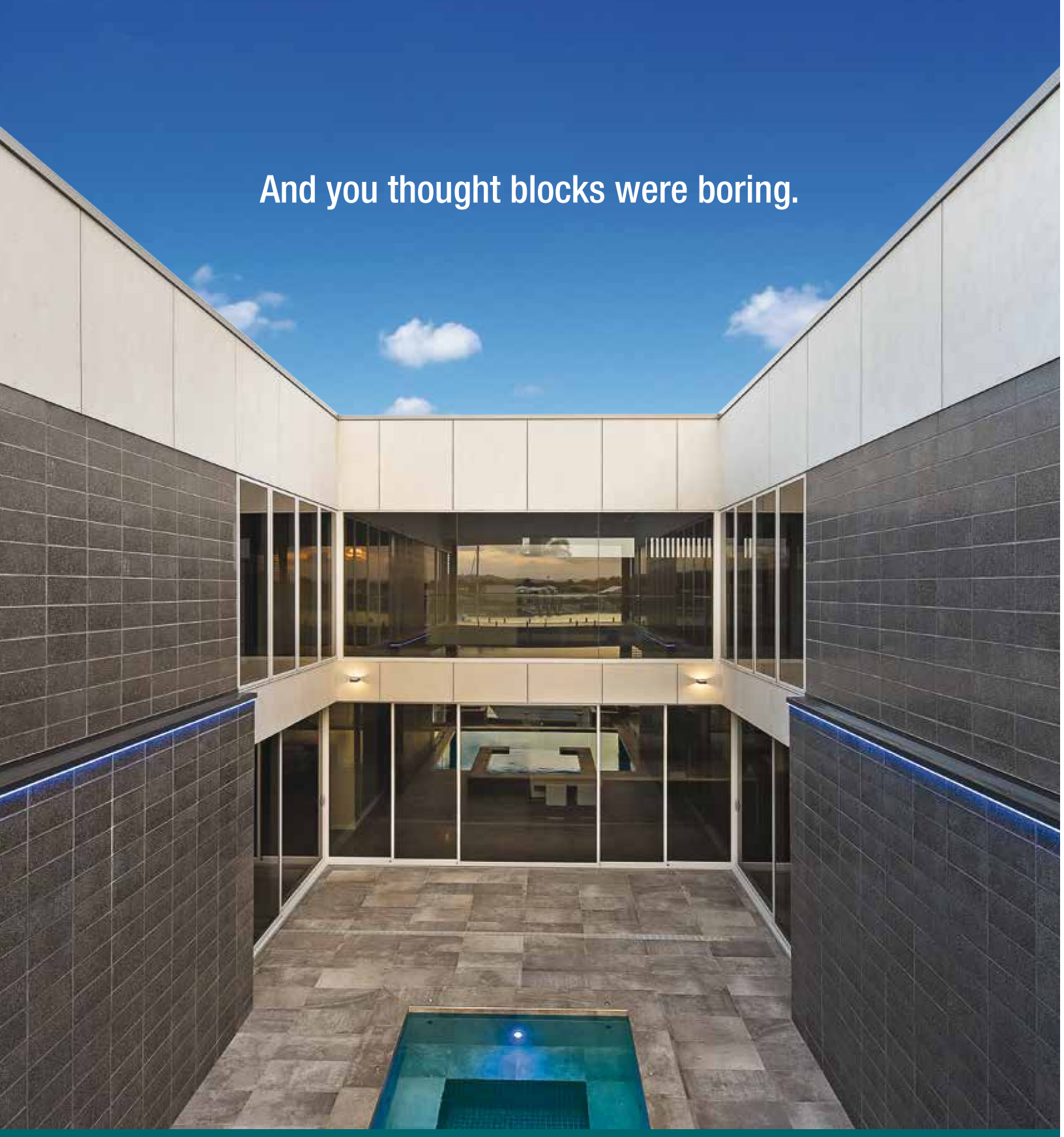
This event will bring together project leaders to discuss innovative strategies to integrate proptech, smart services and innovation into mixed used urban developments.

29-31 May 2019
Novotel Sydney Central
https://smartprecincts.iqpc.com.au

Frame Australia 2019

This is the only national event focussing on the worldwide transformation to timber offsite construction, featuring local and international experts discussing timber and mass wood building systems.

17-18 June 2019
www.frameaustralia.com
Crown Promenade Melbourne



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Sydney construction falls while Melbourne peaks

The Australian construction sector's significant shift in activity from heavy engineering work to medium and high density residential continues, fuelled primarily by the trend in dwelling intensification across the country.

According to the latest Rider Levett Bucknall (RLB) Crane Index, five regions across the country recorded increases in crane numbers and six recorded falls this year.

In the first quarter of 2019, Melbourne's crane numbers surged past the 200 mark for the first time.

According to the index, M City in Clayton, Melbourne's largest building site, recently had four more cranes added to the project, reaching a total of six cranes.

Other projects across the city that also show high crane usage include the $2.8 billion Melbourne Square, led by developer OSK Property, which has four cranes on site and Lendlease's Melbourne Quarter project which has five.

Sydney's dominance has fallen slightly with the city's contribution to the overall crane count falling to 42 per cent, down from the high of 51 per cent in the second quarter of 2017.

According to RLB, despite the small drop in cranes in Sydney, construction work in New South Wales continued to grow, recording an increase of 9 per cent in chain volume terms for the 2018 calendar year.

Residential cranes now account for 72 per cent of total cranes across the nation which is down from the high of 84 per cent in the third quarter of 2016. The rising tide of infrastructure investment at all levels of government, the current cyclical surge in hotel developments over the past two years and the ongoing activity in large commercial developments have resulted in the overall mix of non-residential cranes lifting to 28 per cent.

Building a smart city

The University of New South Wales (UNSW) Sydney is pursuing new partnerships to realise the potential of smart cities and hybrid energy storage systems to power them.

UNSW Sydney will lead Australia's first fully integrated smart city trial, which will be based on Internet of Things (IoT) technologies and will include applications across transport, energy, health, telecommunications and other community services. Previous trials have incorporated only energy systems and are based on older technology on individual user cases instead of an integrated approach.

The trial will be done in partnership with Providence Asset Group (PAG) and Tamworth City Council.

Professor Joe Dong, Director of the UNSW Digital Futures Grid Institute said the aim for the project is to build IT systems that will monitor and control data flowing through 'smart' services, using the wireless network.

Using existing IoT infrastructure will provide seamless integration of IoT devices, from home appliances and utility monitors to council services such as waste management, lighting and parking, and asset security, to health services like remote patient monitoring.

"Imagine having an app on your computer or phone that gives you your electricity usage and cost information in real time, and also tells you how some slight change of usage pattern of appliances such as the washing machine

could most effectively save electricity bills," Professor Dong said.

"You could have other apps on the smart network for a variety of purposes – such as wearable health monitors that alert your medical practitioners should you need to go and see them or live transport and traffic monitoring to give you alternative routes as soon as a hazard occurs.

"If we can prove that our solution works, the potential benefits are endless," Professor Dong said.

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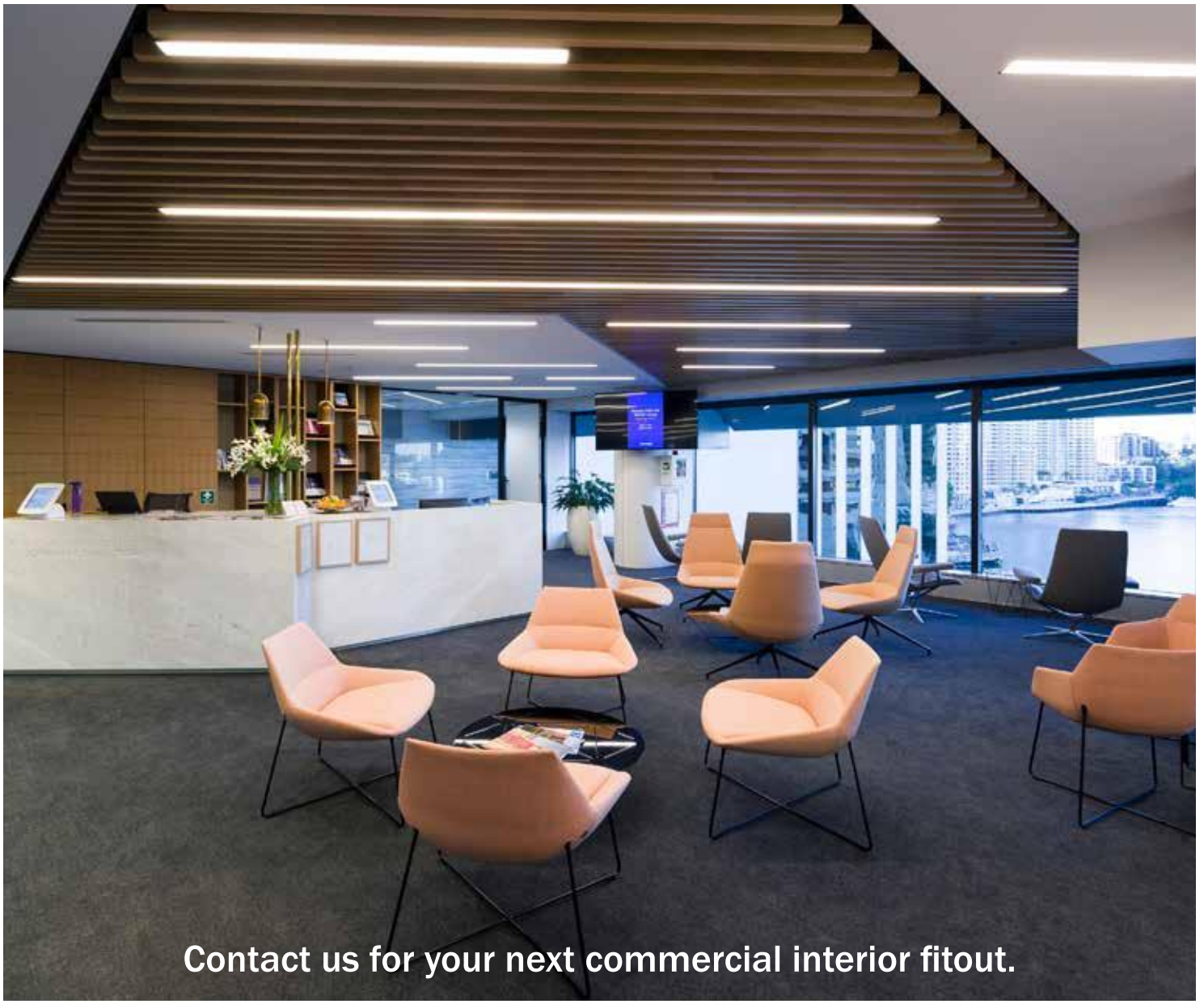

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PRESENTING VALUE IN A FALLING MARKET

In this falling property market, it will become increasingly important for homes to stand out from the crowd, with sale prices and clearance rates dropping and even rental prices affected by oversupply.

With new evidence of an increased number of properties on the market and more spending longer on the market too than in recent years, prices are sure to drop unless there is the perception of increased value.

Increasing perceived value can be expensive, new patios, bathrooms or kitchens can cost a lot with a small return on investment if not done properly, so it is key that any work performed stands out and shows the buyer that the home is of better value than similar properties.

High quality lighting is one of the best tools architects and developers have to increase the perceived value of a home. Speaking of under lit areas, real estate guru Robert Irwin:

"Not only will they keep you from getting a quick sale, but they will also cut down on the amount of money you'll get in offers. On the other hand, if you lighten up these dark spots, you can very quickly improve the value of your property."

We can see that good lighting can improve the sale value, it can also help other more expensive features such as kitchens and bathrooms stand out. In a difficult market, this can result in a shorter time on the market.

Good lighting includes a suitable mix of ambient, accent and task lighting, in other words, a few downlights won't cut it. Using LED profiles under benches, track lights to accent walls and features and pendants for task lighting can be simple ways to create a unique space which resonates with the buyer and gain their emotional attachment.

Bronwyn Poole of Touch Interiors speaking of lighting, "Many designers would go so far as to say it is the most important factor in interior design."

"A home that sparkles
always sells for a higher price"

www.goodsell.com.au/tips-for-sellers

Of course, it can be very easy to spend more than budgets allow, decreasing return on investment or increasing the required sale value - it is essential to get the balance between product quality and price.

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WHY COMPANIES NEED A WHOLISTIC VIEW OF WORKPLACE HEALTH AND SAFETY

The Safe Work Australia 2018 industry report[1] snapshot confirms the high-risk profile of the construction industry, rating it as a national safety priority in the Australian Work Health and Safety Strategy 2012-2022. Data presented in this report reflects the (comparatively) high level of fatalities and serious workers compensation claims (3 fatalities per 100,000 workers and 8.1 serious claims per million hours worked) compared to other industries. Falls from heights were the biggest contributor to fatalities, whilst muscular stress from lifting, carrying or putting down objects accounted for the highest proportion of serious claims. At 9 per cent of the total Australian employment this equates to more than 1.1 million workers in the construction industry[2] at potential safety risk when they arrive at work each day. Known risks include unusual work hours, fatigue management and pushing to meet completion targets.

Since the introduction of the Building Code in 2015 the number of construction and related companies implementing workplace safety drug and alcohol testing programs has increased significantly. Companies recognise the benefit of an additional health and safety tool to minimise risk to their workers and have introduced pre-employment, post incident, reasonable cause as well as random drug and alcohol testing.

WHY IS AN EFFECTIVE WORKPLACE DRUG AND ALCOHOL TESTING PROGRAM IMPORTANT?

A recent study by NCETA[3] which investigated risky alcohol and drug use in young workers (<30 years) has identified a change in the pattern of both drinking and drug use from 2007-2016. Their study found, in general, the incidence of risky drinking has declined, with a concomitant increase in illicit drug use. However, the construction industry bucked this trend in this age group with a decline in alcohol use (69.1% to 55.3%) and a decrease in drug use (42.5% to 33.5%). Further investigation into what has influenced these changes would be welcomed.

Whilst the decline in this demographic (44% of workers aged under 35 years) is to be applauded, the risk of workers attending the workplace whilst affected by drug and alcohol still exists across all age groups. Levels of alcohol use (risky vs. non-risky), and the types of drugs used (including prescription drugs such as benzodiazepines and codeine) often differ between age ranges and geographic locations depending on supply and demand.

Ongoing education and training about the effects of drugs and alcohol to your workers, in addition to regular testing, is crucial in assisting to reduce the risk of occupational injury. AusHealth Work recommends regular delivery of education and

training (online, on-site or at a toolbox/office) to all workers – from senior management down. Training of supervisors and project managers on how to identify and manage workers that may be at risk and are a potential hazard to the site is also recommended.

WHAT NEXT?

Make sure your drug and alcohol policy and procedure is current and compliant with legislative requirements – these documents should be reviewed annually to maintain currency. Implementing worker education and training maintains awareness of the risks of drugs and alcohol and how the misuse of these can impact on the safety of their workmates. Construction is a high-risk business and at the end of the day, we just want to arrive home the same way we left.

[1]https://www.safeworkaustralia.gov.au/doc/construction-priority-industry-snapshots-2018
[2]https://docs.jobs.gov.au/system/files/doc/other/australianjobs2018snapshot_1.pdf
[3]http://www.connections.edu.au/researchfocus/risky-alcohol-vs-drug-use-among-young-workers-2007-2016

AusHealth® Work

How safe is your worksite?

The construction industry accounts for 16% of all Australian workplace deaths (31 per year).

30% of these deaths came from falling from a height.

35 construction workers are seriously injured each day in Australia (12,570 per year)[1].

Drugs & Alcohol:
Is your construction site at risk?

Drugs and alcohol can impede safe behaviours, and impact safe decision-making. AusHealth Work can help you implement a complete drug and alcohol program incorporating:

Policy Development: A clear, comprehensive, and enforceable policy to meet your obligations and the challenges of site safety

Training & Education: Educating your workforce on the impacts and implications of unsafe drug & alcohol use on construction sites

On-site & Laboratory Testing: NATA-accredited, reliable, and quality drug & alcohol testing services, on-site where and when you need

AusHealth Work can help you meet your Drug & Alcohol testing requirements under the Building Code.

AusHealth Work is a Registered Training Organisation (40379) and NATA accredited (Section 2 AS 4760 & AS/NZS 4308 including Appendix A) drug and alcohol testing company using Australian Standard compliant urine and oral fluid drug test devices and assessed and certified Collectors nationally.

1. Safework Australia: Priority Industry Snapshot: Construction.

Deakin engineering researchers have developed a method of monitoring physical comfort levels in an office.

Technology monitors workplace comfort

The Cube Comfort Monitor is a small box, containing a series of small sensors for tracking temperature, humidity, air quality (CO2 and Total Volatile Organic Compound levels), light intensity and light temperature and sound levels.

This data, collected in real time, is available for immediate analysis via a cloud-based web server, giving building managers accurate and timely feedback about comfort levels, such as hot and cold spots in an office, optimum lighting, noise issues and air quality.

Researchers at Deakin's School of Engineering believe the technology has the potential to vastly improve the management of building resources, particularly energy systems, by making it easier to identify areas where comfort levels are less than ideal or even dangerous to people's health.

Scott Adams, a researcher with Deakin's Australian Institute of Management (AIM) team, said the idea came during this year's January heatwave when Deakin's Facilities Services Division sent out a reminder about managing thermal comfort in the work environment.

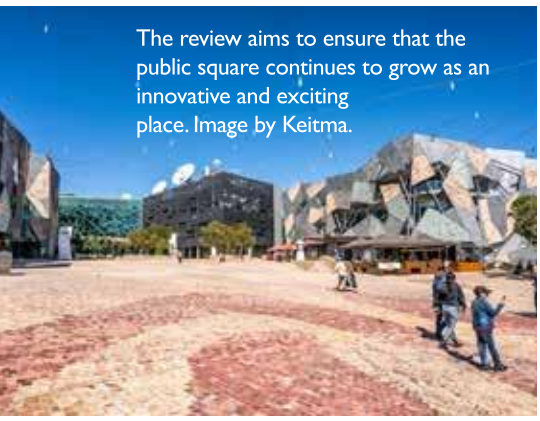
"We wanted to know how temperatures and humidity levels fluctuated during that time to help us manage our cooling systems more efficiently," Mr Adams said.

"Contemporary office buildings generally have in-built monitoring systems but that's less common in older buildings so there is a real need to improve how we monitor workplace comfort in older buildings, ensuring the heating and air conditioning systems are working effectively, that lighting is not too bright or too dull and that the room is not too stuffy or noisy."

Professor Kouzani said the cube was a good example of how the Internet of Things can be used to improve daily lives and how devices can lead to improved health and wellness.

The future of Federation Square under review

Heritage Victoria has rejected the application put forward for the demolition of the Yarra building at Melbourne's Federation Square. Based on this decision, the proposed Apple global flagship store cannot proceed.



The review aims to ensure that the public square continues to grow as an innovative and exciting place. Image by Keitma.

Following this decision, the Victorian Government announced it will launch a review into the precinct, which will examine financial and governance arrangements, ensuring that it continues to grow as an innovative and exciting place.

The review will tap into the vision Victorians and the very best urban design minds have for Melbourne's public square – considering ways to deliver more public space, encourage public gatherings and provide better access to the Yarra River. It will also look at ways to take better advantage of nearby creative and sporting precincts and new transport links.

Australian Institute of Architects (AIA) Victorian Chapter President Amy Muir said the AIA has been advocating consistently against the Victorian Government's plans for the future of Federation Square and lack of due process since they were first announced in 2017.

"Our concerns were broad ranging and we have urged that any change be well-considered, something the original plans were not."

Federation Square Pty Ltd said that whilst they believed the proposal represented a positive step in a pathway to a sustainable future for Federation Square, the Apple project is certainly not the only consideration in planning for the future of this iconic precinct.

"There are a number of interesting projects in the pipeline that we are confident will excite Victorians in the near future."

Tighter right of entry rules to be implemented

The Federal Government has announced changes to Australia's Fair Work Regulations to modernise the Right of Entry (RoE) scheme that allows union officials to enter workplaces.

From 1 July 2019, union officials who hold RoE permits will be required to:

- Present an ID card in an approved format, that includes a photo of the authorised permit holder and clearly states any relevant permit conditions.
- When presenting RoE notice forms, to incorporate specific acknowledgments of the rights and responsibilities an official has when exercising a right under the Fair Work Act 2009.

Minister for Jobs and Industrial Relations, the Hon Kelly O'Dwyer MP said the proposed changes will make the RoE framework clearer and less vulnerable to abuse.

"The building and construction sector is our third largest industry, so it is critical to ensure that it is not held hostage by people abusing RoE laws," Minister O'Dwyer said.

The Minister said the changes will make it easier for permit holders to carry their permits and exercise RoE while those on worksites will be able to appropriately verify the identity of a permit holder on their premises.

Master Builders Australia believes the changes are a positive step towards achieving a stronger and fairer approach to rules about union officials entering workplaces.

"It is important to ensure worker representatives can access work sites, but it is equally important that the RoE system is strong and rigorous," said CEO of Master Builders Australia, Denita Wawn.

The nation's best urban projects announced

Australian urban development projects that excel in innovation, sustainability and affordability, were recently celebrated at the 2019 Urban Development Institute of Australia (UDIA) National Awards For Excellence.

UDIA National President, Darren Cooper said every year the competition gets tougher for the nation's most exclusive awards, and this year's outstanding finalists were no exception.

"All finalists showcased remarkable projects of the highest quality which demonstrated their commitment to meeting the social and environmental challenges currently facing the urban development industry.

The National awards consist of nine categories, and the 2019 National Judges, Alan Zammit AM, Nicola Smith and Tony Marshall, said judging this year was extremely difficult due to the high calibre of the projects.

The 2019 UDIA National Awards for Excellence Winners are:

Masterplanned Development Winner: Parklands by Grocon (QLD)

Residential Development Winner: Brighton Lakes by Mirvac Homes NSW Pty Ltd (NSW)

Medium Density Housing Winner: West by Commercial & General (SA)

High Density Housing Winner: Oxley + Stirling Residences by Aria Property Group (QLD)

The Parklands Project incorporates seven hectares of residential and retail precincts and over seven hectares of green and open spaces. Image courtesy of Grocon.

Urban Renewal Winner: Yagan Square by Metropolitan Redevelopment Authority (WA)

Environmental Excellence Winner: Warralily by Newland Developers Pty Ltd (VIC)

Affordable Development Winner: Jewel Living – Boardwalk at Greentree by City of Salisbury & Rivergum Homes (SA)

Seniors Living Winner: Halcyon Lakeside by Halcyon (QLD)

President's Award Winner: Yagan Square by Metropolitan Redevelopment Authority (WA)

UDIA & Frasers Property Women in Leadership Award Winner: Tamara Rasmussen, Regional Development Manager, Lendlease Communities (NSW)

UDIA Young Leaders Award Winner: Nicholas Grear, Rivergum Homes (SA)

The ultimate challenge for sustainable building

A push to net zero carbon buildings is among the raft of changes proposed in the next evolution of the Green Building Council of Australia's (GBCA) Green Star system.

In line with a 1.5C target in the Paris Agreement, one of GBCA's proposed changes will mean that any building seeking to achieve a 6 Star Green Star rating will be required to achieve net zero.

GBCA's Head of Market Transformation Jorge Chapa said they want to deliver the next generation of aspirational targets to ensure Australia's built environment stays at the forefront of sustainability.

"Green Star for New Buildings aims to promote ambitious action on carbon emissions with a drive towards net zero carbon and carbon positive buildings."

Through Green Star for New Buildings, GBCA are also proposing to maintain their existing entry-level standards for a best practice Green Star building while taking steps to make the process of achieving this outcome less complicated.

"As technologies transform how we build, we believe a Green Star rating will become more important to assure the delivery of what should be even more achievable sustainable outcomes on the ground."

Other changes proposed include additional opportunities to promote exceptional achievement in performance, as well as sector specific credits to recognise issues relevant to particular building types.

"We know our world-leading Australian industry can continue to rise to these challenges."

Industry leader Davina Rooney, General Manager Sustainability at Stockland and incoming GBCA CEO is excited for the future iteration of Green Star.

"Green Star has been rethought from the ground up to deliver a relevant, accessible, and more valuable rating tool," she said.

The consultation period is open until 10 June 2019.

Residential property confidence continues to drop

The latest ANZ Property Council industry confidence index recorded its fourth consecutive quarterly decline and its lowest level since March 2013. Confidence levels were down in all states, except the Australian Capital Territory.

Ken Morrison, Chief Executive of the Property Council of Australia said the downturn in residential markets is driving this confidence slump.

"But we're also seeing a less positive outlook across a number of important indicators, including expectations around national economic growth, construction and capital growth across some property types," he said.

ANZ's Head of Australian Economics, David Plank said the most important aspect of the survey could be the improvement in the availability of finance.

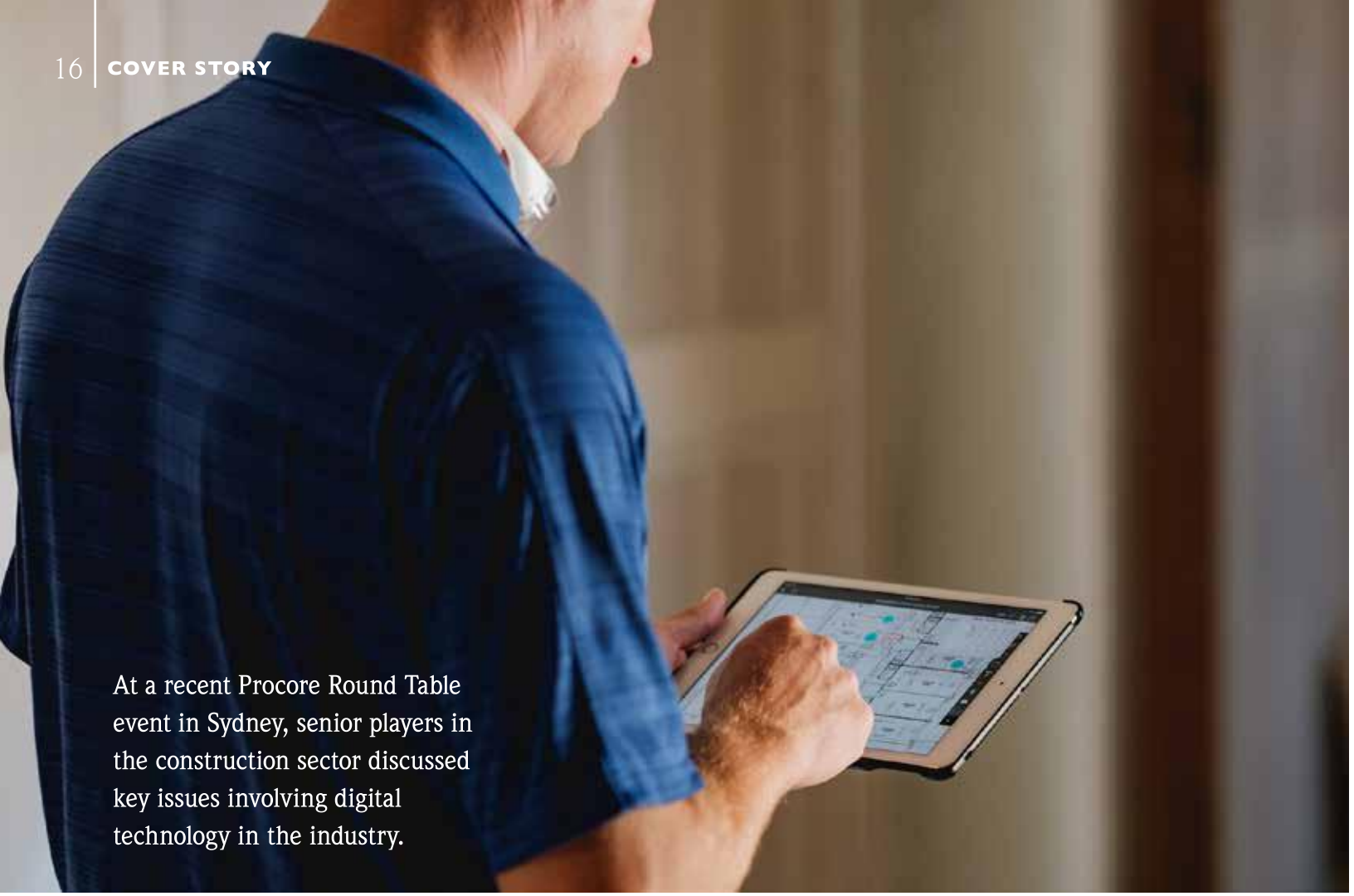
"It was a modest improvement in this part of the survey in mid-2017 that signalled greater stability in the housing market later that year and in early 2018. Finance availability then deteriorated sharply, continuing to fall through the rest of 2018 and into 2019. We think this deterioration was the trigger for the renewed house price weakness in Sydney and Melbourne from that point. The turn in finance availability captured in this survey could signal a turn in the market. Certainly it suggests we may be past the worst of the downturn in building approvals."

Mr Plank encouraged caution about the outlook though, since finance is still difficult to get, and sentiment in the residential property space is very negative.

"This primarily reflects the price outlook, which has fallen further in New South Wales and Victoria. Sentiment does tend to lead rather than follow prices, however, certainly over the past few years. We think the continued downturn in price sentiment reflects recent developments rather than indicating a deterioration in the outlook. The shift in expectations with regard to interest rates may help the outlook. Still, we expect further declines in house prices this year."

However, Mr Plank said outside the residential sector, the sentiment is much better.

"It has, however, declined from its recent peak across most sectors. Sentiment in the retail sector is especially soft, which is not surprising."



At a recent Procore Round Table event in Sydney, senior players in the construction sector discussed key issues involving digital technology in the industry.

THE FUTURE OF CONSTRUCTION: INNOVATION APPLIED

The topics discussed at the event revolved around the use of digital tools, the skills required to implement digital technologies in the construction industry and the future of Building Information Modelling (BIM).

Another subject of interest was the influence of IT consumerisation on the construction industry and its digital platforms. IT consumerisation is coming to the construction industry, but participants spoke of adoption barriers such as the conservative nature of contractors and builders and the effect on the adoption of consumerised enterprise technology.

They also spoke of the need to make construction software as easy to use as a banking app and how large benefits could come from simple consumerised IT use cases such as timecards.

One of the panel's participants said the elephant in the room is that consumer technology moves so quickly, however an enterprise of any size cannot adopt technology at the same rate.

"We've got systems that we've had for 20, 30 years that are right down in the core of our business model and they are impossible to shift out."

But when issues arise that need to be solved quickly and efficiently, it's natural to draw on the skills of the most experienced members of the team, who apply 'old school' methods to fix them.

"When we have a problem, our immediate instinct is to get the person with the most experience in our business to fix that problem. These people have fixed this problem 20 times before and want to forget about the new-fangled stuff you're talking about. They want to be left alone to get it sorted, and not get it wrong. Because at the end of the day the objective is to get the project finished and that's a big thing."

This is the conundrum because contractors and builders are quite linear thinkers and risk averse. Therefore, it's a double whammy of complexities in terms of mindsets as well.

A common theme in the discussion was the difference

between some of the 'over the horizon' debates about technology applications, versus the reality of consistently using digital tools on a day to day basis.

"Futuristic technologies like artificial intelligence (AI) and holograms are exciting. But really, when I talk to so many of our clients, if they could just get every project manager to fill out a daily report, that would be a victory."

"One of our colleagues was giving a presentation on time tracking tools for hours worked and showed some photos from the job site of actual sample timecards. One was on a two by four, one was on a burger wrapper, one was on a crumpled sheet of paper. The problems that they're trying to solve are not always at the level of AI. It's the basic stuff we are still working on."

Other key topics in the discussions were:

ENERGISING CHANGE IN THE CONSTRUCTION INDUSTRY

Participants talked about the challenge of encouraging staff to use the latest digital tools creatively, especially older, more experienced employees. Site safety practices came up as an unexpected area where new technology was making a difference.

WHEN WILL BIM MAKE PRIME TIME?

Participants spoke of the difference between real BIM and 'Hollywood BIM' which was great for adding wow factor to client presentations but of little use on a building site. There was discussion around transitioning BIM into a practical site tool as the next big thing.

DIGITAL TRANSFORMATION IN CONSTRUCTION

The panel investigated the difficulties involved with digital transformation in construction, including a lack of tax incentives in Australia. Participants observed trade teachers could be resistant to new techniques like gamification and that it helps to use experienced, respected personnel as the face of change.

THE STRUGGLE TO ATTRACT DIGITAL ENGINEERS

Attendees spoke of the difficulties in attracting new digital engineers into the traditional construction industry with fresh graduates tending to head towards the likes of Google or the new, disruptive modular building outfits. Participants said traditional construction outfits needed to make their internal development systems interesting for new talent.

SKILLS AND THE ART OF REVERSE MENTORSHIP

Broadly, two kinds of digitally skilled people come together to work on construction projects. There are newly hired graduates from universities who know the latest in technology and digital techniques but lack practical problem solving skills. Then there's more experienced supervisors who are good at nutting out solutions but don't have up-to-the-minute training. The challenge is getting these two tribes to collaborate.

THE ROUND TABLE PANEL CONSISTED OF:

- Steve Zahm, President & COO, Procore
- Tom Karemacher, Vice President, APAC, Procore
- Paul Shetler, Digital Transformation Advisor and Speaker, Former head of the Australia's Digital Transformation Agency
- Ciaran Hennessy, Head of Technology Research & Development, Lendlease
- Kate Hannaford, Head of Business Strategy, Watpac
- Bram Gruwez, National Manager of Australia, BESIX
- David Cahill, CFO, McNab
- Tim Thompson, Managing Director, Prime Build
- Leanne Morgan, Organisational Development Manager, Villa World
- David Cremona, Director of Construction, Meriton
- Professor Chris Pettit, School of the Built Environment, UNSW
- Alex Ferreira, Principal Advisor, NSW Small Business Commissioner
- Dr. Geethani Nair, Head of SkillsPoint, TAFE NSW
- Sharyn Hooper, Industry Lead, TAFE NSW
- The discussion was moderated by Corrie McLeod, Publisher, InnovationAus.com

ENDING THE SILENCE ON TOXICITY IN THE BUILT ENVIRONMENT

By the National Precast Concrete Association Australia

There seems to be no shortage of self-congratulation in this modern age about our technological advancements. However, recent events mirror previous problematic occurrences from pre-historic times, hence needing a pause for thought. Smoke toxicity is a highly significant factor in the event of a fire, but the building regulations currently do not take this into consideration. Why has this ‘elephant in the room’ not been addressed?

Uncontrolled fire – be it from open spaces in bushfires or in the built environment – continues to be a very real threat to health, life and property, easily triggering a visceral response in all of us.

The just passed 10th anniversary of the 2009 Victorian bushfire disaster and recent tragedies including London's Grenfell Tower in 2017, Melbourne's Lacrosse Apartments in 2014 and Neo200 Tower in 2019, all serve as very real wake-up calls of how destructive and detrimental the impact of fire can be. This then poses the question of why combustible materials are still being used in the building industry.

DEMANDING APPROPRIATE RISK MANAGEMENT FROM BUILDINGS

The thought of death and injury as a result of fire is truly horrible and is a thought no one likes to imagine. Accordingly, the argument to demand appropriate risk management for the buildings that we create, should be one that is unnecessary. Safety of those inhabiting a building should hold the utmost priority, as should the safety of the materials used.

But, perhaps contrary to our darkest fears, it is not necessarily the excessive heat and incineration which is the main culprit for building fire-related deaths and injury. Very often, the overwhelming blame belongs with the effects of smoke generated from the combustion of the building and its contents. When placed under extreme heat conditions, will the risk of toxicity of the fumes released cause issues for years to come? Will smoke toxicity be the next asbestos?

WHERE THERE'S FIRE THERE'S SMOKE

Whether a building fire is an accident, deliberate, or as simple as an electrical fault, if a combustible accelerant is involved in the spread, the impact can be rapid and fatal. With the clear potential loss of lives being the main concern of a building fire, the most likely and most dangerous threat to one's safety is from the smoke generated by combustible building elements and building contents. That said, if the smoke produced from the burning of a particular material component emits toxic fumes, the safety measures should have been implemented prior to a fire.

Two important safety consequences of smoke are the toxicity of the smoke and the reduction in visibility. Escaping occupants need to be alive and mobile long enough to egress the building and they need visibility to do so. The clear majority of reported fire fatalities result from smoke inhalation, with the toxicity being the main culprit.

Certainly, active smoke protection systems - such as extraction fans, sensor controlled ventilation and emergency response units - play a role in safety procedures in the event of a fire. If the smoke inhaled is in any way toxic however, regulation of the inclusion and approval to use materials and building components that release toxic fumes cannot be an after-thought.

Ark Richmond Apartments, a 10 storey mixed use development uses precast extensively; precast manufactured by Euro Precast.

TOXIC REGULATION BY ITS SILENCE

While smoke toxicity should be an underpinning consideration by regulation - and subsequently by architects and builders - surprisingly, it is not directly considered in the fire safety aspects of the building regulation. The National Construction Code (NCC), along with many other provisions for personal fire safety in buildings, specifies requirements for Fire Hazard Properties of materials and components of buildings.

The three key properties to be assessed are referenced from AS1530 – Flammability Index, Spread-of-Flame Index, Smoke-Developed Index. Of these, only Smoke-Developed considers the effects of smoke only insofar as its optical obscuring effect is concerned. Toxicity - which is behind the common 'smoke inhalation' cause of death – is a topic that is left silent. It is indeed a problem no one seems to want to address.

NO ABSENCE OF INFORMATION

It is not easy to study toxicity of smoke, but that's hardly a justification for it not to be referenced in fire design codes. Nor is it a reason for a lack of effort to review and investigate how to apply learnings to design and construction. There's plenty of information and knowledge available.

Smoke toxicants fall into two main types – asphyxiants and irritants. Relevant asphyxiants include carbon monoxide (CO), hydrogen cyanide (HCN) and carbon dioxide (CO_2). Relevant irritants include hydrogen chloride (HCl) and hydrogen bromide (HBr). Common relevant sources for these in building materials include the combustion of PVC, polyethylene, fire retardants, wood and adhesives used in wood products (eg. formaldehyde and polyurethane resin) and expanded polystyrene cladding.

RECOGNITION OF HAZARDS AT A HIGH LEVEL

There is a small consolation that perhaps gives the issue added urgency. The safety risks from exposure to toxic chemicals from building materials has recently been given attention via the Commonwealth Senate Economics Committee report into Non-Conforming Building Products. The Committee expressed particular concern about potential material-based safety risks from fire and exposure to toxic chemicals.

TOXIC SMOKE - 'SAFETY IN DESIGN' IMPLICATIONS

There may be an additional perspective - both practically and legally - from the Workplace Health and Safety (WHS) regulation. Indeed, this ought to inform and guide architects and builders about the consequences they may create regarding known smoke-related risk.

While there are some differences in WHS laws across the various Australian jurisdictions, there is a typical principle that underlies the legal obligations imposed on designers, namely:

Designers have a duty to ensure workplace structures and substances are designed to be safe and 'without risks' to the health and safety of anyone who is involved with constructing, demolishing, handling, storing or using them, for the purpose for which they were designed.

This duty can also extend to others who are at, or in the vicinity of, a workplace and who are exposed to the substance or structure, or whose health or safety may be affected by the use of a structure or substance at a workplace.

DUTY TO ELIMINATE RISK

Regardless of what building regulations do (or don't) say, the 'safety in design' process insists that risks must be eliminated or minimised where 'reasonably practicable'.

Precast is frequently specified for public buildings like Bendigo Hospital Carpark and Convention Centre; Precast manufactured by Hollow Core Concrete.

The 'reasonably practicable' test takes several factors into consideration, including the availability of suitable ways to eliminate such risk among others.

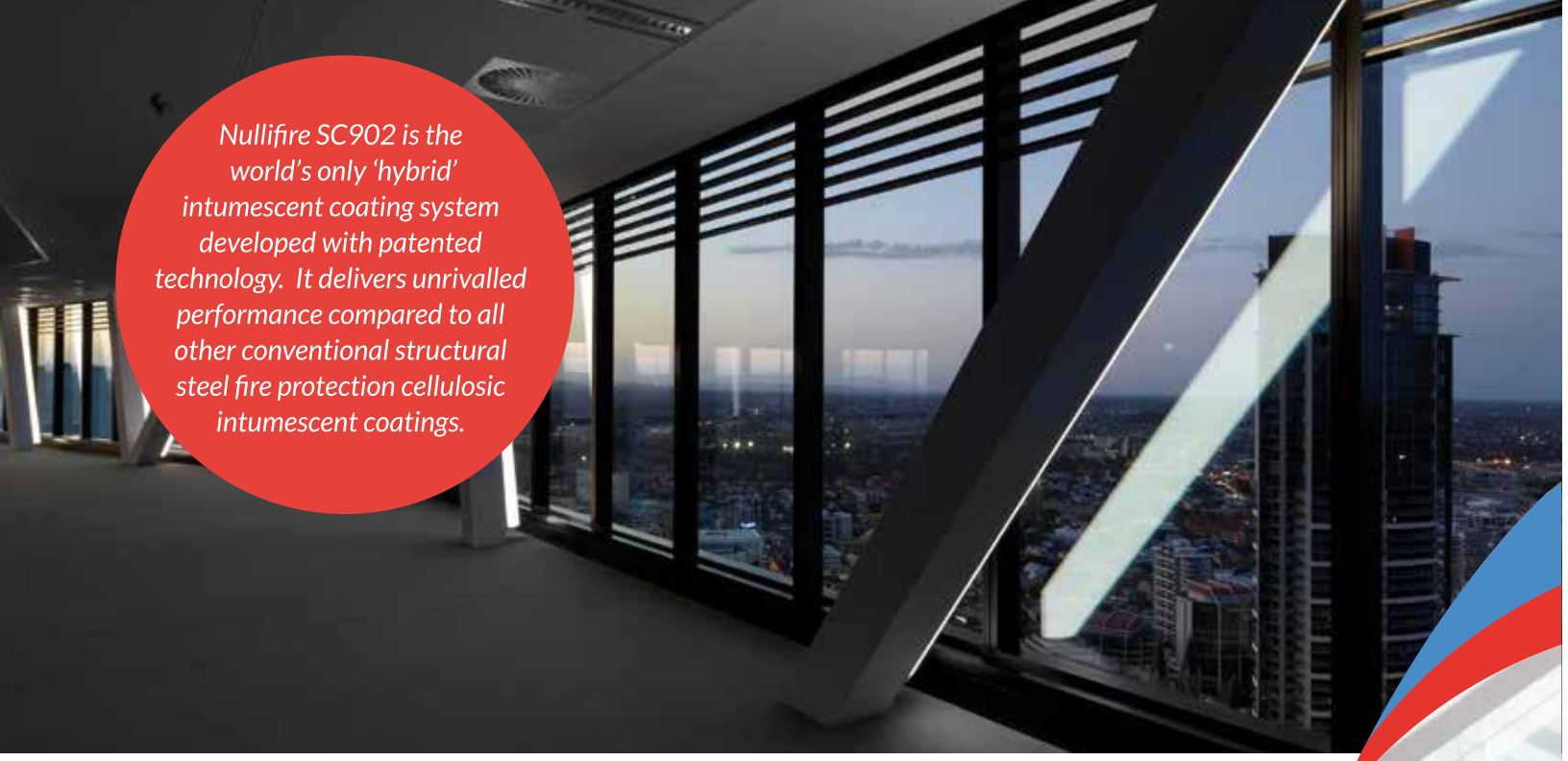
Given the body of knowledge about smoke risk and specifically smoke toxicity – and regardless of whether current building regulation is effective or not in this regard – it would seem prudent for designers to favour building materials which eliminate or positively minimise smoke production.

All this is conjecture of course – all law is merely academic until it is tested, applied and decided upon in a court. In itself, that potential path is another risk that all construction stakeholders may wish to avoid.

THE COMPLETE AND SIMPLE SOLUTION

The necessity to build with highly durable and fire-safe materials is seen in structures across the country. There's a reason why so many public buildings including schools and convention centres, as well as high-rise residential buildings use precast concrete for their construction.

Among its vast benefits, precast is non-combustible, meaning that there is zero flammability, zero spread-of-flame, zero smoke, zero heat production, and most importantly, zero toxicity. Unlike many other structures, precast does not emit toxic fumes and therefore toxicity of the smoke is not even a thought needed.



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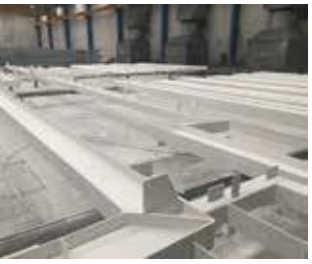

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CALLS FOR A NATIONAL BAN ON COMBUSTIBLE CLADDING

On 4 February 2019, a residential tower in Melbourne was placed under an emergency order by the City of Melbourne after a serious fire broke out. The fire started on the 22nd floor of the NEO 200 Apartments building and eventually spread to the 27th floor. Early investigations indicated that the apartments on these floors were significantly affected by fire and water damage, as well as floors above and below. The Metropolitan Fire Brigade later stated that the building was understood to have had combustible cladding.

The dangers of combustible cladding in multi-storey buildings are well known from recent examples including the fires at the Lacrosse Tower in 2014, the Grenfell Tower in 2017, and the NEO 200 building in 2019. Combustible cladding products can ignite easily and melt at relatively low temperatures which means a fire can spread rapidly through a building's external areas.

However, the NSW Cladding Taskforce stresses that the presence of external combustible cladding on a building does not necessarily mean it is a fire hazard. It depends on where the cladding has been applied and the building's overall fire safety measures.

The NEO 200 fire came only a couple of months after the Senate Inquiry issued its Final Report into non-conforming building products - which included cladding materials. The Inquiry examined a range of issues surrounding the production, sourcing and use of non-conforming and non-compliant building products and presented 13 recommendations as to how the nation could best address these issues.

Among those recommendations was for the Federal Government to consider the merits of requiring manufacturers, importers and suppliers to hold mandatory recall insurance for high-risk building products. Another recommendation was in support to Recommendation 12 of the *Shergold and Weir Report* which stated 'that each jurisdiction establishes a building information database that provides a centralised source of building design and construction documentation', so regulators are better placed to identify where non-compliant building products have been installed.

WHAT HAS CHANGED SINCE THE FINAL REPORT'S DECEMBER 2018 RELEASE?

In February, an 'in principle' agreement was reached by all Ministers at the Building Minister's Forum for a total ban of the use of combustible cladding in new construction – an agreement which is subject to proper investigation and discussions with the industry.

Victoria and New South Wales have already moved to ban the use of cladding on new construction over certain limits. The Victorian Government has also provided a low-cost financing option to help owners remove dangerous combustible cladding from existing properties.

Minister for Industry, Science and Technology, The Hon Karen Andrews MP, said following the Forum the states can now work on how they're going to further implement changes in their own jurisdictions.

"Each state and territory can proceed immediately to implement bans in full

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but I would encourage them to bring industry with them; to talk to industry about what the implications are for existing buildings and also for new constructions," she said.

It was also agreed that each state and territory will make public the status of their compliance implementation plan, including what they have implemented so far and what their plans are in the future.

Minister Andrews said discussions at the Forum had confirmed there is an issue with compliance in accordance with already established legislation across the country, especially when it comes to existing buildings.

"It is an issue of enforcement of some fairly strong regulations that already exist in Australia," Minister Andrews said.

"The NCC makes it very clear that combustible cladding should not be used on high-rise buildings that are greater than about three storeys, about 25 metres. So, where any of that cladding has been installed, it is potentially in breach of the NCC."

Despite recent changes and discussions, the Australian Institute of Architects (AIA) says the outcome from the Forum falls short of community expectations when it comes to ensuring Australians' safety. AIA National President, Clare Cousins, who represented the architectural profession at the meeting, said the slow pace of progress on such a grave issue was of serious concern.

"The blaze at Melbourne's Neo200 was a stark reminder of what's at stake and the immediacy of the danger posed," Ms Cousins said.

"Governments have an opportunity and responsibility, having identified the danger and risk posed by certain types of flammable cladding, to do something about it before any lives are lost," she said, "sadly it is an opportunity they appear to be squandering."

Ms Cousins believes that prohibiting any further installation of such products, without any equivocation, should have been the starting point.

The Victorian Government has reiterated this, saying the most effective way to ensure aluminium composite cladding is not used on anymore Victorian buildings is to remove it from the market altogether.

At the Forum, the Victorian Government pushed for a nation-wide ban on combustible cladding to further protect Australians from being exposed to unnecessary fire risk.

"We've seen how quickly fires spread up buildings fitted with combustible cladding and we have a responsibility to stamp out these sub-standard building materials," said Minister for Planning, Richard Wynne in February.

"Victoria has pushed for a national response to flammable cladding ever since the 2014 Lacrosse fire but has been met with frustrating resistance from the Federal Government."

"Given the fire risk and the cost to apartment owners to fix cladded buildings, the most common-sense approach is to stop this material from coming into the country altogether – and we need Federal Government support to make that happen," Minister Wynne stated.

It is expected that there will be further report-backs at the next Building Ministers Forum meeting, which is currently scheduled for July 2019, but in the meantime it is expected that each jurisdiction will address the issue.

Minister Andrews believes there is a willingness from all of the states to work together.

"I would like to see things progressing as fast as possible, but we need to make sure that we are taking into account the consequences of any action, in terms of the total bans," she said.

The Australian Building Codes Board (ABCB) has amended the requirements for buildings' safety under the 2019 National Construction Code (NCC). A new non-mandatory Fire Safety Verification Method (VM) is expected to be introduced with a delayed adoption date from 1 May 2020. The new VM, which is a voluntary tool under a Performance Solution pathway, provides for a documented process in the design of fire safety Performance Solutions, and is based on the International Fire Engineering Guidelines.

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DAMAGE TO HIGH PERFORMANCE GLAZING A BIG EXPENSE

In recent years, Australian developers and builders have increased uptake of high performance, energy-efficient window and glazing systems that can dramatically cut energy consumption. However, although high performance glazing will cut costs in the long term, they also come with an initial higher cost. Therefore, protecting these valuable assets is becoming increasingly important.

Windows and other glazed surfaces are some of the highest valued items in the construction sector, and with the increased use of high performance glass in today's buildings, replacing them if damaged comes at a big expense.

Glazed surfaces and windows are often delivered and fitted when buildings are still under construction, leaving them exposed to several risks that could potentially lead to damaged products. Therefore, as soon glazing products arrive on site, it is important to ensure they are protected to avoid damage during the construction process.

But if damage does occur, who is responsible to pay for the replacement of the products according to contract works policies?

In the White Industries QLD Pty Ltd v Hennessey Glass & Aluminium Systems Pty Ltd case, the Queensland Court of Appeal considered whether a subcontractor was responsible for scratched glass prior to practical completion.

The trial judge found that the subcontractor was required to provide glass which was not scratched as at the date of completion of the building, regardless of how the scratching occurred. The court additionally noted that the subcontractor had an obligation to protect the property after installation until final handover.

"…the material was either supplied in a damaged condition or the subcontractor failed to protect it adequately. In either case it is liable," the court said.

The case did not consider the issue under a policy of insurance, but confirmed that the subcontractor held the responsibility for the defect.

A common exclusion found in contract works policies in relation to defective workmanship and design was demonstrated in the case of Rickard Constructions v Rickard Hails Moretti, which was before the New South Wales Court of Appeal.

Here, the test applied by the Court of Appeal was that in determining whether something was 'defective workmanship', it was necessary to consider whether or not it was 'good construction practice'. The court held that the failure to appreciate what good construction practice called for would not excuse the party guilty of the defective workmanship.

Another case which specifically considered a defective workmanship exclusion in the context of damage to installed windows, was the Holmes Construction Wellington Limited v Vero Insurance New Zealand Limited.

In this case, the judge considered it significant that there was an obligation put on the subcontractor to protect all finished surfaces.

It was argued against the insurer that the expression 'defective in workmanship' meant that the windows that were to be replaced had to be inherently defective before the insurer could rely on the exclusion.

"The trial judge found that the subcontractor was required to provide glass which was not scratched as at the date of completion of the building, regardless of how the scratching occurred. The court additionally noted that the subcontractor had an obligation to protect the property after installation until final handover."

However, the judge rejected this, finding it was impractical and wrong to separate the subcontractor's plastering of the walls on the one hand from its over-spraying of the plaster onto the windows and its efforts to remove the plaster from the windows on the other.

The judge said that: "…where the subcontract expressly or impliedly includes work on another part of the contract works, even if it is merely of a protective or repairing nature in the event of damage, that must take part, once damaged. For that… the insurance company is not responsible".

It was also said that: "…even if there had been no reference to protection of the windows in surface work's subcontract then its ultimate failure to protect the windows may still have been caught by the exclusion because such protective measures are arguably an equally inseparable part of the work required to be done..."

The judge concluded that once damaged, the windows became 'defective in workmanship' in circumstances where the contract prescribed protection or repair in the event of such damage.

Therefore, provided that the terms of the contract between the builder and owner states that the builder has an obligation to supply a building with glass that is free from scratches and other defects, and is required to protect it after installation until final handover, the damage to the glass may be excluded from cover under a policy of contract works insurance. This is true if the defect occurred either because of a failure of the protective measures or the supply of the material in a damaged condition.

However, it is important to note that this conclusion will depend on the wording of the primary indemnity clause and the exclusions contained within the policy.

Source: A legal guide to contract works and construction liability insurance in Australia, Carter Newell Lawyers

TEMPORARY SURFACE PROTECTION SPECIALISTS

Goop, starting from scratch.

The genesis of Goop came from observations by founders, Shane and Kirstee while trading in their first business, a builders cleaning company. The damage to expensive items like windows, window frames, bath tubs, benchtops and flooring from scratching and impacts during the construction stages was a glaring issue in need of a solution. Conventional methods of protection were mostly deficient and often totally useless in preventing a damage bill that was adding cost to the build and delays in completion and eventual hand over.

Identifying the problem was the easy part. Finding and developing the solution required engaging a team of chemists, painstaking research, testing and trials in the formulation of a peelable coating that met the demanding performance criteria set by Shane and Kirstee. When the product was perfected it more or less named itself and in the relatively short time since launch Goop has grown to a market leadership position.

Goop is a temporary surface protection coating designed specifically for builders. The benefits include cost and time savings but many users also appreciate the relief from the stress associated with repair or replacement of damaged items.
"Our products are very different to other forms of protection in the market place" says Shane. Goop products are genuinely non-hazardous, user friendly, waster-based, non-carcinogenic, environmentally friendly and can be disposed of in general waste.

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Shane and Kirstee are understandably proud that the company is still a family owned and operated business, based in Australia. Goop has grown from a one-man band in 2001 to a national franchise operation 'Gooping' thousands of projects every year. If you have engaged a building company sporting Goop posters on their projects you know you are dealing with a building company that is focused on quality.

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THE FUTURE OF THE INDUSTRY:
NO CHANGE IS NO OPTION

The engineering and construction industry is facing global megatrends such as climate change, increased volatility and turmoil in world politics, amongst industry-specific trends like rapid urbanisation and expanding talent and infrastructure gaps. All of this is occurring while new digital technologies such as building information modelling (BIM), 3D-printing, wireless sensors and autonomous equipment are already disrupting the industry.

In 2018, the World Economic Forum (WEF) worked alongside the Boston Consulting Group and more than 30 leading engineering and construction companies to consider how global trends and new digital technologies could transform the global construction sector.

The report, *Shaping the Future of Construction: Future Scenarios and Implications*, presents three possible extreme scenarios of how the global social and economic context could look like in the future to then determine how decision-makers in the built industry can take preparatory steps for change - sooner rather than later.

The first scenario, 'Building in a virtual world', foresees an era where people are immersed in virtual reality in all aspects of life, meaning intelligent systems and robots could very well run the construction industry. In this scenario, fewer commercial, office and public assets are needed as most of the time will be spent in virtual reality, but demand will rise for more residential and recreational buildings like swimming pools, fitness centres, theatres and large assets such as stadiums and amusement parks when time is not spent online.

In this scenario, not only does the demand for certain assets change, new buildings must live up to new requirements. People will want buildings to be as adaptable as their electronic devices, serving numerous purposes. Buildings will be designed and constructed to be used 24/7 for multiple purposes e.g. suited for offices during the day and residential units at night.

Also, in this scenario digital technologies replace manual work throughout the urban development value chain, and the entire value chain is connected through sophisticated data systems. Highly skilled experts will be increasingly required in areas such as artificial intelligence (AI), robotics engineering and algorithm programming, to manage workflow. AI systems will also be heavily used to optimise building plans by factoring in dimensions such as usability, flexibility, cost and aesthetics, and balance them according to an owner's preferences.

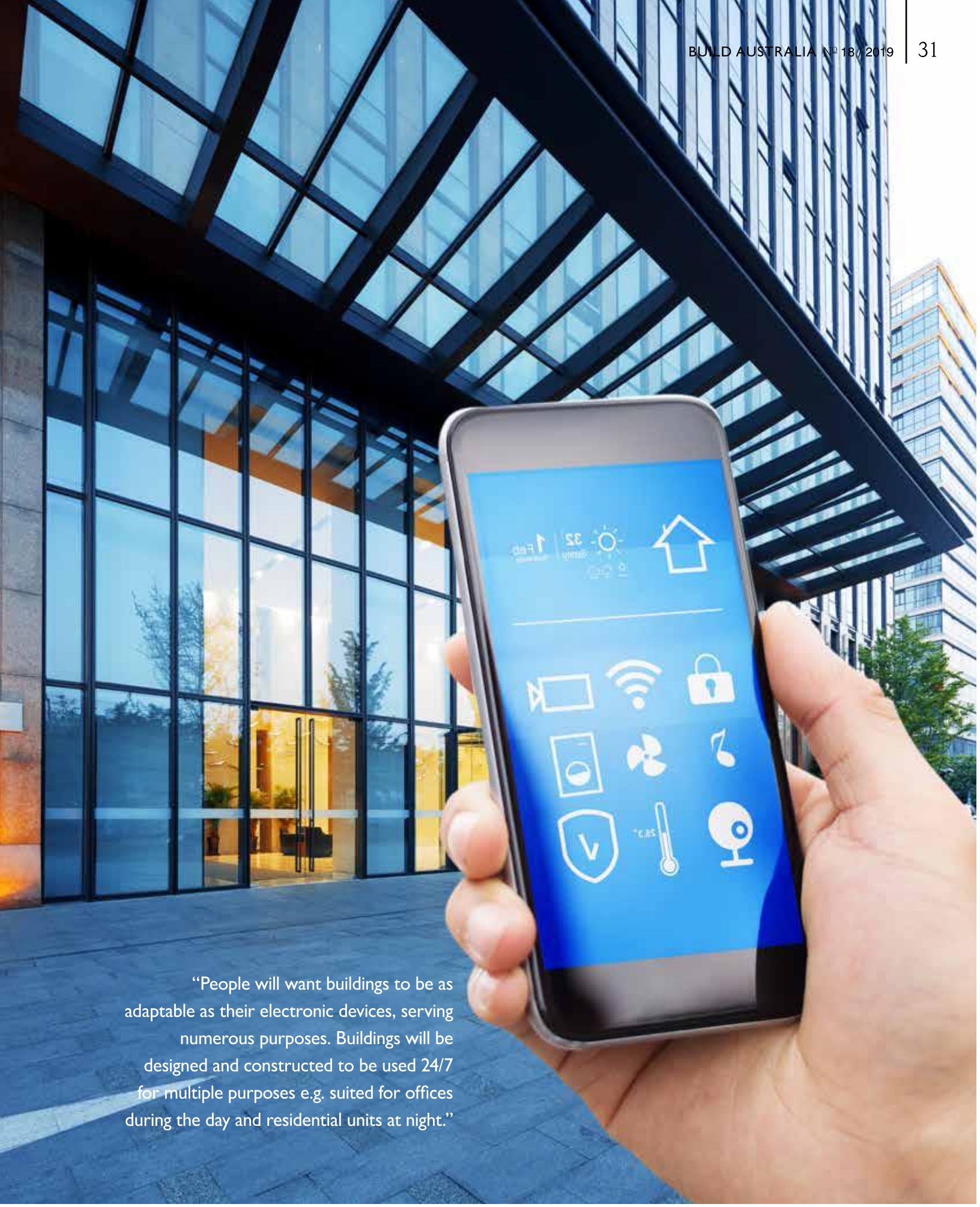
The second scenario, 'Factories run the world', foresees a corporate-dominated society which uses prefabrication and modularisation to create cost-efficient structures. In this scenario, a flourishing economy creates a boom in industrial, office and commercial building construction. Most construction work will occur in prefabrication factories that combine conventional production techniques with 3D printing and mass customisation approaches. Once built in the factory, modules will be shipped to building sites for assembly.

Modularisation is already taking place today to produce cost and time-efficient projects, but in this scenario, the WEF sees the industry leaning heavily on principles and advanced manufacturing processes on a large scale to produce assets from prefabricated, mass-customised modules.

In the third scenario, 'A green reboot', a global push to save the environment leads to innovations in materials and new production methods in construction and other industries. It is envisioned that taxes could be imposed on high CO2 emissions, waste and other industrial by-products that harm the environment, meaning society would adopt more eco-friendly practices and move closer to a circular environment model.

According to the Building Designers Association of Australia, buildings constitute approximately 25 per cent of Australia's emissions. The industry is recognising this impact and thus is shifting in its choice of materials. Aside from aesthetic reasons, traditional materials such as wood is growing in use due to its lightweight and sustainable qualities.

In the WEF's greener scenario, other sustainable materials will also be increasingly used in the construction of buildings such as innovative bioengineered materials created from fast-growing organisms such as bacteria, or materials that copy functions found in nature, such as a plant's ability to heal itself, making them more durable.



"People will want buildings to be as adaptable as their electronic devices, serving numerous purposes. Buildings will be designed and constructed to be used 24/7 for multiple purposes e.g. suited for offices during the day and residential units at night."

"While all three scenarios are quite extreme, they illustrate that the building and construction industry should anticipate a change in the future."

In a greener world, a greater focus will be held on refurbishing, revitalising and upgrading existing assets, to make them more sustainable in the long-term. When new assets are needed, it is envisioned that design and engineering companies will run complex simulations so that the asset will have the lowest possible impact on the environment over its lifetime.

Further to this, construction workers would utilise new technologies to enhance the sustainability of the construction process or the asset being built.

3D-printing robots, for example, could be used to print building elements out of new materials to minimise construction waste. Site crews could wear augmented-reality glasses to see real-time instructions on the most environmentally efficient way to complete tasks, while virtual reality and mobile collaboration applications could assist in minimising travel and the moving of materials and equipment, leading to productivity, cost and environmental gains.

While all three scenarios are quite extreme, they illustrate that the building and construction industry should anticipate a change in the future. While it remains unclear which scenario (or scenarios) will unfold, the WEF believes there is little doubt that the real future will include elements of all three.

Michael Buehler, Head of Infrastructure and Urban Development at the WEF says the scenarios and their implications show that incremental change is not an option any more.

"By redefining the ultimate frontier, leapfrogging innovations in construction will finally help to address major societal challenges, from mass urbanisation to climate change," he said.

"The widespread adoption of game-changing innovations that consider a variety of possible futures is going to make a serious impact, socially, economically and environmentally," Mr Buehler added.

Below are some actions which the WEF believes will be relevant in any possible future:

Attract new talent and build up required skills – as any future scenario requires talent with substantially different skills than today's workforce possesses, and adequate upskilling processes are largely not in place.

Integrate and collaborate across the value chain – as the construction industry is characterised by a disintegrated and highly fragmented value chain, which hampers the seamless data flows and integrated systems that are essential in any future scenario.

Adopt advanced technologies at scale – as the construction industry has been slow to adopt new technologies and still heavily relies on manual labour and mechanical technologies, resulting in poor productivity.

Maximise the use of data and digital models throughout processes – to review existing practices and infrastructure asset portfolios and embrace new business opportunities.

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Madison Technologies was engaged by its partner to design and install a converged fibre backbone supporting integration of building services. The GPON solution, with simple to implement cabling architecture and simple to install network elements, provided the following benefits:

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INNOVATION HELPS FORM CONCRETE DESIGN MARVELS

Recent technological advancements have enabled higher strength concrete to support more weight, which has led to more high rise buildings as well as intricately designed structures being constructed using this method. Previously, the use of concrete in high rise construction was limited, however the emergence of higher strength concrete has made it possible.

Innovations in concrete has given architects more freedom in the design of complex structures, since concrete can now more easily flow into hard to reach areas and around complex support systems. Concrete construction can also be used to achieve modern design features including higher ceilings and exposed architectural concrete.

Concrete construction is highly dependent on formwork which is used for the process of creating a temporary mould into which concrete is poured and formed. Formwork can represent up to 60 per cent of the overall cost of the concrete structure, yet savings can be achieved through the continual re-use of formwork during construction.

There are some great examples where designers across Australia, and around the world, have used this method to create beautiful concrete structures and developments.

M3565 MAIN BEACH APARTMENTS

The M3565 Main Beach Apartments building is a luxury development which comprises seven apartments spread over eight levels. Designed by Sydney-based architect Virginia Kerridge and built by Kane, the elegant and modern building boasts a carefully articulated façade that responds to a streetscape on one side of the building, and a picturesque beachfront on the other.

Concrete is at the heart of the building and is used as the principal structural element for the floor decks and framing. The building's envelope consists of 100 per cent off-form coloured concrete wrapped in pre-patina zinc cladding and 40x40 recycled grey ironbark timber screens. The 'rawness' of the concrete is expressed beautifully on the exterior façade, where form lines and bolt holes are accentuated in a Class 2, off-form finish.

The M3565 Main Beach Apartments building is a luxury development. Images courtesy of Virginia Kerridge Architect.

The exposed concrete façade was meticulously planned to ensure the formwork ties were uniform throughout the finished design. The tie holes were also finished in concrete plugs rather than a grout patch to achieve the architect's industrial intent.

The project received a national commendation at the 2018 Australian Institute of Architects Awards.

BOWEN PLACE CROSSING

The Bowen Place Crossing in Canberra was designed by lahznimmo architects and landscape architect Spackman Mossop Michaels. The aim of the project was to replace a dangerous pedestrian and cyclist crossing on a busy road.

The significant level change from the lakeside to the Kings Avenue Bridge quickly became a challenge for the design team. The team eventually came up with a curving concrete pathway with a 1:33 gradient rise. This minimised the visual impact of the structure within the sensitive Parliamentary Zone, created long sight lines so pedestrian and cyclists could see each other, and eliminated the need for handrails or rest areas that would otherwise be needed for a shorter, steeper pathway.

The 1200mm-wide polished precast concrete panels create a reinforced retaining wall that extends along the length of the pathway. The repetitive panels are fixed to the wall through threaded galvanised rods that allowed for individual adjustment of the angle of each panel. The 45 degree angle of the panels creates a sense of lightness and space on the crossing, particularly where the path passes under the Bowen Place vehicle bridge.

Since the concrete panels vary in height, they were formed using a precast method. To increase efficiency, a mould was used to repeat the process for each panel and a shutter was used at one end of the mould to adjust the length of each panel.

The precast concrete mix included a white cement, together with quartz and a spectrum of dark coloured stones that were exposed through the polishing process. The smooth off-white pre-cast concrete deliberately relates to the existing palette of materials and tones within the Parliamentary Zone.

The project was completed in 2015 and has since been recognised at the 2016 Planning Institute of Australia ACT Great Place Award and the 2016 AILA ACT Award of Excellence for infrastructure design.

VICTORIA GATE

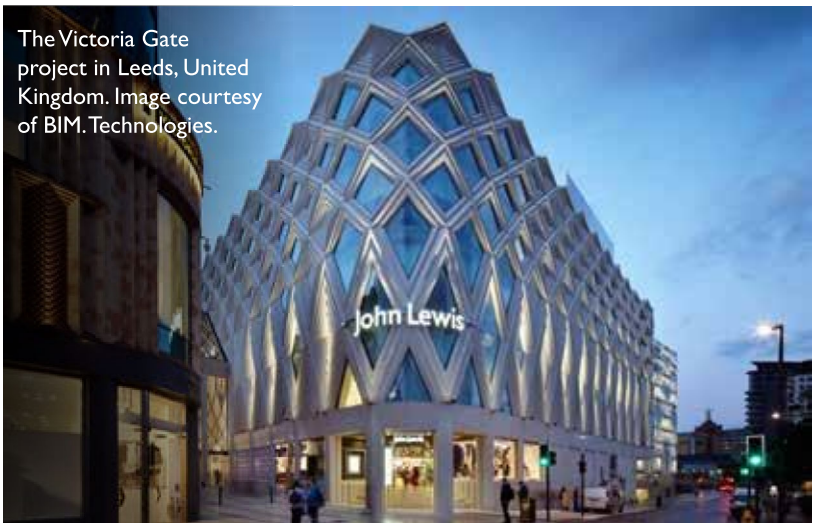
For the Victoria Gate project in Leeds, the United Kingdom, Architectural firm ACME, in collaboration with engineering consultant Waterman Group, used Leeds' architectural heritage as a strong source of inspiration.

The concrete façade concept emerged from a desire to create an articulated frontage with a sense of depth and with repetitive modularity that could accommodate the building's need for transparent and non-glazed areas.

The project used 16 concrete panels which were cast using four different modules. The formwork for each was adapted to give four thicknesses ranging from 150mm to 400mm to create a sense of depth, and an intricate and unique look.

The selection of the aggregate for the concrete held great significance and after testing eight samples of varying stone type, size and cement, a textured appearance was achieved. The white concrete has achieved quality while referencing nearby polished-granite buildings and stone civic architecture.

To emphasise the main diagonals and differentiate it from the rest of the diagrid, different finishes were specified, with a polished finish used for the main diagonals and acid-etched for the infills. To ensure that the joints were unobtrusive, ACME specified 'dusted joints' using crushed concrete bonded onto silicone mastic.



The Victoria Gate project in Leeds, United Kingdom. Image courtesy of BIM.Technologies.

Source: Hurd, M., 2005. Formwork for Concrete, Seventh Edition. Michigan: American Concrete Institute

PROFILE

MARKET LEADERS TURN TO AFS SYSTEMS PERMANENT FORMWORK SOLUTIONS

When a construction company has spent the past 20 years building a reputation for consistently meeting delivery deadlines and budgets while still achieving high standards of quality, it chooses its products very carefully.

For TQM Design & Construct co-founder and managing director Maroun Taouk, that means working with AFS Rediwall® pvc and AFS Logicwall® fibre cement permanent formwork solutions.

"TQM consistently associates itself with the latest innovations in structural systems, materials and methods, which has underpinned our reputation as a market leader," says Maroun. "Since 2002, we have worked with AFS's walling systems because they are versatile, offer easy materials handling and installation, as well as significantly reducing craneage time and ultimately costs."

TQM was appointed to construct Luxcon Group's largest multi-residential development to date – '88 Kensington' in Sydney – an MBA Housing Award Winning project. TQM installed AFS Rediwall® and AFS Logicwall® permanent formwork for internal and external load bearing walls, lift and stair cores.

Both Logicwall® and Rediwall® are versatile, easy-to-handle products. AFS permanent formwork is a time-saving answer to conventional concrete and masonry, offering builders a quick, cost-effective solution.

AFS Rediwall® and AFS Logicwall® enable construction professionals to reduce materials handling, cranage and scaffolding costs, minimise on-site waste and on-site trades, and ultimately improve the bottom line.

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CSR

SMARTER SOLUTIONS FOR ENERGY EFFICIENCY AND FIRE SAFETY PERFORMANCE

Changes to the National Construction Code (NCC) in relation to energy efficiency requirements, an increased focus on fire safety and an intensification in industry regulations is set to have a significant impact on the way commercial buildings are designed in Australia.

Recent updates to the NCC have significantly changed commercial building energy efficiency requirements, with new Verification Methods (VMs) for NABERS and Green Star.

The March 2019 increase of energy efficiency requirements under Section J of the NCC is the first since 2010. These changes are designed to promote significant energy efficiency improvements in commercial buildings.

Due to the number of changes there will be a one year transition period from 1 May, during which time, either the NCC 2016 or NCC 2019 requirements may be used.

Other changes include a new non-mandatory Fire Safety VM with a delayed adoption date from 1 May 2020. The new VM, which is a voluntary tool under a Performance Solution pathway, provides for a documented process in the design of fire safety Performance Solutions, and is based on the International Fire Engineering Guidelines (IFEG).

Mitigating fire risk associated with non-compliant imported products is also a key issue in the Australian building industry at the moment.

Recent incidents involving non-compliant, imported cladding products are highlighting the importance of using materials that have been tested and approved for Australian conditions.

Responding to energy efficiency changes to the NCC and meeting increased stringency in fire performance regulations means that designers, engineers and builders are increasingly in need of standardised solutions to meet their fire safety, thermal performance and energy efficiency requirements.

The requirement for higher performing products, particularly in regard to thermal efficiency and fire protection, has driven demand for better visibility of such products that conform to both the Australian Standards and the NCC.

Responding to these needs, Australian manufacturer and building solutions provider Bondor Australia, offers the widest range of structural insulated walling and roofing systems manufactured across Australia, delivering options with both thermal and fire performance to meet various application requirements.

The company's products have been approved and tested to Australian standards, Codemark accredited to meet a range of the NCC's building requirements and performance criteria.

Bondor has technical and support associations with several international building product suppliers, universities and research facilities in Australia and remains up-to-date with industry trends and regulations through its involvement with the Insulated Panel Council of Australasia and the FM Approvals International Advisory Council.

Bondor also boasts the only National Association of Testing Authorities (NATA) certified structural testing facility in the industry in Australia, which allows the Australian manufacturer to stress test its products for ongoing certification and innovation.

Bondor's Australian Standards conforming and certified, FlameGuard®, offers a non-combustible and fire-rated walling product with a Mineral Wool core, encased in BlueScope® Colorbond® Steel in a range of architectural profiles and finishes.

FlameGuard® has been tested and certified to achieve up to a 3 Hour Fire Rating, also offering a range of cost-effective FlameGuard® wall configurations that can achieve project specific FRL requirements of 60/60/60, 90/90/90 or 120/120/120 in addition to the 180/180/180 (3 hours).

The FlameGuard® wall system not only has high thermal performance and energy efficiency but is a fire-resistant walling panel made from pre-finished Australian-made Bluescope® Colorbond® steel and is well suited to long spanning applications which require Non-Combustibility, FRL or FM Approval for insurance purposes.

If you want to know how Bondor Australia can provide for your next project, please contact them on 1300 300 099, or alternatively visit www.bondor.com.au

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Technical Data

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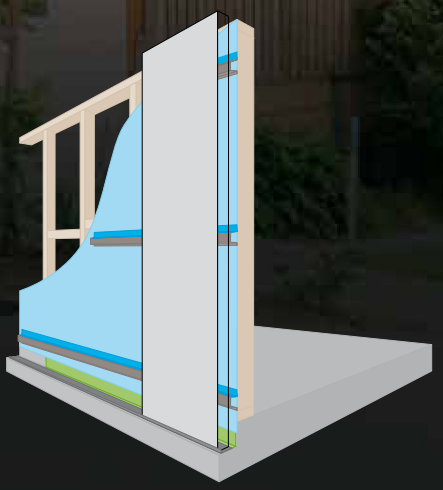
Thermal Performance:	No Batts: R1.8 - 2.4 With Batt: R3.3 - 3.9
Acoustic Performance:	No Batts: Rw40 With Batts: Rw45
Structural Performance	Axial loads up to 11kN/m



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Consumer expectations around convenience, value and choice are driving more and more people to shop online, where they have access to a world of information, products and services at their fingertips.

SMARTER DELIVERIES TO MEET HIGHER CONSUMER EXPECTATIONS

In 2017, one in five online purchases were made from a mobile device, payment services such as Afterpay had attracted over 1.5 million customers, and Australians spent $21.3 billion buying goods online, an increase of 18.7 per cent on the year prior. These numbers are set to further increase thanks to an uptake in online grocery shopping.

According to market research by IBIS World, the online grocery sales industry is yet to achieve the scale of the overall online retail sector, but it has significant potential for growth and has begun to make inroads over the past five years. Industry revenue is expected to rise at an annualised 21.7 per cent over the five years through 2018-19, to total $3.3 billion. Australia Post also predicts that by 2020, 1 in every 10 items in Australia will be bought online.

As a result of this, consumer expectations on parcel delivery are also shifting. In a 2018 survey of more than 1000 Australians, a delivery service company found that when asked which services respondents would like to see in the online shopping industry in the future, weekend parcel delivery topped the list, with 60 per cent of all respondents preferring this, while 52 per cent of respondents wanted after-hours delivery.

Despite the ease of online shopping, many consumers may fail to consider what happens if a package arrives unattended. For example, the parcel could receive unwanted rainwater damage or be removed by troublesome 'porch-pirates'. This could become a major problem as consumers living in commercial, student and residential high-rise buildings are increasingly buying high-value items online, such as electronics and jewellery.

Therefore, building owners, architects and developers are gradually considering the benefits of integrating on-premise parcel management into their developments.

To reduce the risk of package theft, weather exposure and avoiding the 'sorry we missed you' cards, on-premise parcel management usually comes in the form of allocated package centres. However, the increase in volume and size of deliveries means that these centres are being replaced by something 'smarter'.

MORE CONVENIENCE WITH 'SMART' DISTRIBUTION

Now there is a new type of on-principle parcel management for buildings; smart lockers. The principle is simple; the package arrives at the designated location, the locker, and the resident is notified through text or email at the time of the delivery. No key is required as a randomised code is used to gain access to the locker, allowing the consumer to securely collect the package at their own convenient time.

As an on-premise parcel management solution, smart lockers can free up facility management staff from the hassle of managing resident or staff deliveries, instead allowing them to focus on providing better building management.

They come in a range of sizes and designs, so they can be selected to best fit the overall theme of a building. They can be located either indoors or outdoors (in a sheltered location) to minimise space disruption. Also, as they often come in modular form, they can be easily adapted to both new and existing buildings.

Furthermore, each individual locker comes in a variety of sizes, ranging to fit any delivery from the standard letter to bulky groceries and dry cleaning.

With this system, any delivery company has the opportunity to deliver to buildings at any time, while reducing the need for consumers to make their way to different post offices or parcel delivery centres.

Parcel management, delivery and storage may not be the first thing developers usually consider for a building, but it could very well be an addition that makes the lives of residents and staff more convenient, while bringing the premises up to speed with consumer expectations.

Source: Inside Australian Online Shopping - 2018 eCommerce Industry Paper, Australia Post; Online Grocery Sales - Australia Market Research Report, IBIS World

SMART PARCEL MANAGEMENT: AMENITY AND NECESSITY

Managing deliveries is a growing challenge for Australia's high-density developments. Inefficient daily operations, hazardous workspaces and frustrated occupants are the norm.

Australia's dramatic growth in online shopping is producing innovations focussed on better delivery alternatives. Public collection points and multifarious delivery services are valuable choices for recipients, but they neglect the real problem.

"The problem is the last few steps; from the delivery vehicle into the hands of the customer," says Groundfloor™ Director Lauren Melton.

Groundfloor™ addresses these issues by locating systems in the lobby of customers' buildings and providing open access to all couriers.

IT PAYS TO AUTOMATE

When items are placed into Groundfloor™ lockers, recipients automatically receive an access code for 24/7 collection. Automating parcel management provides convenience and modern amenity to Australians living and working in high-density areas. Automating also lowers operating costs, improves building efficiency, and enhances security.

"To large residential and commercial buildings, the benefits of an automated solution are enormous," said Melton.

"Some facility managers have told us they're spending four hours a day managing parcel deliveries. In some residential buildings, more than 50 per cent of deliveries fail and are redirected to post offices and depots."

AUSTRALIA NEEDS TO CATCH UP

Building managers are increasingly adopting IoT solutions to improve building efficiency, sustainability, and livability. With parcel volumes rising up to 12 per cent annually, automated parcel management solutions have become an essential component of every smart building. Developers also want to meet the expectations of those familiar with similar solutions in international markets.

"On-premises solutions are deployed globally but are well overdue in Australia. The property industry is racing to catch up," warns Melton.

"New developments without parcel management systems risk being out-of-date by the time they're operational."

GREEN-BLUE INFRASTRUCTURE: KEY FOR GREENER CITIES IN A DRIER CLIMATE?

Due to Australia's dry climate, there is a direct and important link between green infrastructure and water management. Healthy trees and vegetation rely on the provision of soil moisture to thrive and flourish, while vegetated areas play a key role in absorbing, treating and controlling the excess water in urban areas.

Too often landscape and water planning are considered separately. When planned and designed well though, green-blue infrastructure can help to solve urban and climatic challenges, with plants that enhance the wellbeing and prosperity of local communities, and that do not use precious potable water.

Examples of blue-green infrastructure include:

- Green roofs: Harvested rainwater can be used for irrigation.
- Green walls: Rainwater or greywater from the building can be used to support plant health.
- Raingardens: Capture, detain and treat stormwater runoff as it filters through the underlying filter media before it is discharged at the base of the system either into the surrounding soils or into the local stormwater network.

GREEN-BLUE WALLS

Greywater is increasingly being used as an alternative water source to reduce potable water demand and to alleviate pressure on sewerage systems. New research in urban green infrastructure and green walls has studied how plants can grow in urban areas using only greywater for their irrigation, thus becoming vertical biofilters. This approach is part of green-blue infrastructure.

Green walls are growing around the world, even in one of the world's driest inhabited continent; Australia. But at the same time, urban areas strive to be increasingly water wise. Green walls are being installed mainly for their aesthetics and micro climate benefits. However, new research shows they could also become part of an effective on-site greywater treatment solution.

Professor Ana Deletic, Pro Vice-Chancellor (research) at the University of New South Wales (UNSW) and previously Associate Dean, Research, of the Faculty of Engineering at Monash University, has extensive knowledge in water sensitive urban design (WSUD) involving plants, soils and natural processes to treat water. Her interest in vertical biofilters stems from working extensively with rain gardens in Melbourne which won her a Victoria Science Prize in 2012.

WSUD is an approach to planning and designing urban areas to make use of greywater and stormwater, while reducing the harm it causes to natural waterways. The approach is implemented quite widely across Australian cities, especially in Melbourne.

Although Professor Deletic's research work in the past has been mainly focussed on rain gardens that are proven to treat water runoff, they come with a downside of taking up a lot of valuable space. They also rely solely on water runoff, so seasonal weather variations could mean plants suffer during dry times.

This notion led her to explore options for vertical landscapes and hybrid systems that don't take up unnecessary space in an urban environment. Professor Deletic also wanted to explore if it was possible to use a mix of greywater during dry spells and stormwater during rainy periods that could also promote water treatment.

Creating a self-sufficient green wall that doesn't require fresh tap water, inspired Ms Deletic and her fellow researchers to conduct a study over 12 months on a large-scale pilot green wall located in a laboratory in Melbourne.

The study is the first step in the development of greywater-treating green walls by examining how variation in plant species and operational conditions (hydraulic loading rate, inflow concentrations and intermittent drying) influence nutrient removal from light greywater.

The results showed that ornamental plant species can successfully adapt to a greywater only irrigation regime and can also play an important role in nitrogen and phosphorus uptake from greywater.

The study also found that the overall phosphorus uptake improved over time, suggesting that plant growth plays an important part in removing phosphorus in green walls.

While drying caused a drop in performance, higher performing plant species were less affected by changes in operational conditions. The tested configurations showed good resilience to sudden inflow concentration increases, suggesting green walls could be used as a robust and aesthetically attractive on-site greywater treatment system.

Sources: Designing green walls for greywater treatment: The role of plants and operational factors on nutrient removal, Veljko Prodanovic et al.; Designing living walls for greywater treatment, Harsha Fowdar et al.

WHAT IS GREEN-BLUE INFRASTRUCTURE?

Green-blue infrastructure can be delivered at a range of scales, from building scale initiatives to precinct scale or regional features. Regardless of the size, these systems typically have the following characteristics in common:

- Vegetation, providing amenity and habitat.
- Soil, of adequate volume, nutrient content and drainage characteristics.
- A link to rainwater, stormwater or recycled water supply, with a frequency and quantity sufficient to support vegetation and soil health.

Some systems may provide additional water management functions such as water treatment capacity, utilising natural process to filter local water supplies and reduce pollutants entering local waterways; and water storage capacity, using volumes within soils or above ground space to provide detention of stormwater.

PROFILE

EXPERTS IN COMMERCIAL WASTEWATER TREATMENT

Committed to delivering fully compliant ways to effectively treat, pump and separate wastewater, Kingspan offers the Australian market one of the largest and most technologically advanced wastewater ranges available globally.

With 65 years of global innovation and manufacturing experience, Kingspan has set industry standards for commercial and domestic wastewater treatment solutions, and developed the first ever Rotating Biological Contactor system, which was released to the market in 1974.

Kingspan's Commercial BioDisc® Commercial Treatment Plant is tested and suitable for applications of up to 300 population equivalent in a single tank and up to 2,500 population equivalent in modular form and is perfect for projects with no access to a main wastewater sewer.

CAVES HOUSE HOTEL, YALLINGUP WA

After sharing an outdated and inefficient wastewater system with an adjacent apartment complex for many years, the owners of Caves House Hotel realised the system could not cope with growing demands and usage. Kingspan were able to provide a modern, space-saving and compliant solution with the BioDisc BL Wastewater Treatment Plant.

The contractor for the project, ABCO Water Systems, provided a cost-effective solution to both parties by splitting the wastewater system in two. This allowed the on-going maintenance and servicing to be separate to each entity.

The available land space for installing the new system was relatively limited, due to several factors including topography. The BioDisc is a compact single tank system with a minimal footprint, maximising surrounding space which can be left for recreational use by clientele and guests.

Hospitality sites such as hotels, restaurants, cellar doors and camping parks produce high strength sewage with major peaks and troughs, both seasonally and throughout the day. The unique and patented flow management process in the BioDisc ensures a stable flow pattern through the main treatment zones, thus ensuring a highly efficient treatment process.

Energy efficiency and quiet, odour free service are always major priorities for a business which serves public customers. The BioDisc utilises a highly efficient direct drive motor system with class leading low energy consumption and silent running. The simple treatment process does not employ air compressors and therefore reduces the risk of odour production in the system.

"In many applications, the Kingspan BioDisc gives us the confidence in knowing that we have met and exceeded our client's requirements in providing them with the overall solution to fulfil their Wastewater Treatment project requirement," said Murray Brown, ABCO Water Systems.

Water Management Solutions

Experts in Water Tanks & Wastewater

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HVAC STANDARD TO LOWER BUILDING ENERGY USE

Heating, ventilating, and air conditioning (HVAC) system performance can mean the difference between a healthy, ambient and productive space, and the contrary. The performance of these systems can also play a big role in a building's electricity use and the associated costs.

HVAC systems can be one of the biggest users of energy within a building; a typical system accounts for approximately 40 per cent of a building's total consumption. In particular for office buildings, HVAC is estimated to be responsible for an average 43 per cent of the electricity used according to Sustainability Victoria.

Aside from adding to electricity costs, these systems can also cost the environment if they don't operate optimally. According to the Commonwealth Scientific and Industrial Research Organisation (CSIRO), HVAC systems contribute 34.7 megatonnes of carbon dioxide emissions every year.

However, by improving the efficiency of HVAC systems, the industry can decrease its energy consumption, lower operating costs and reduce greenhouse gas emissions.

The Federal Government is working towards this by increasing Australia's air conditioning standards. Following agreements made at the COAG Energy Council Meeting in December 2018, in late March 2019, Australia's Energy Ministers signed a new Determination for air conditioners under the *Greenhouse and Energy Minimum Standards Act 2012*.

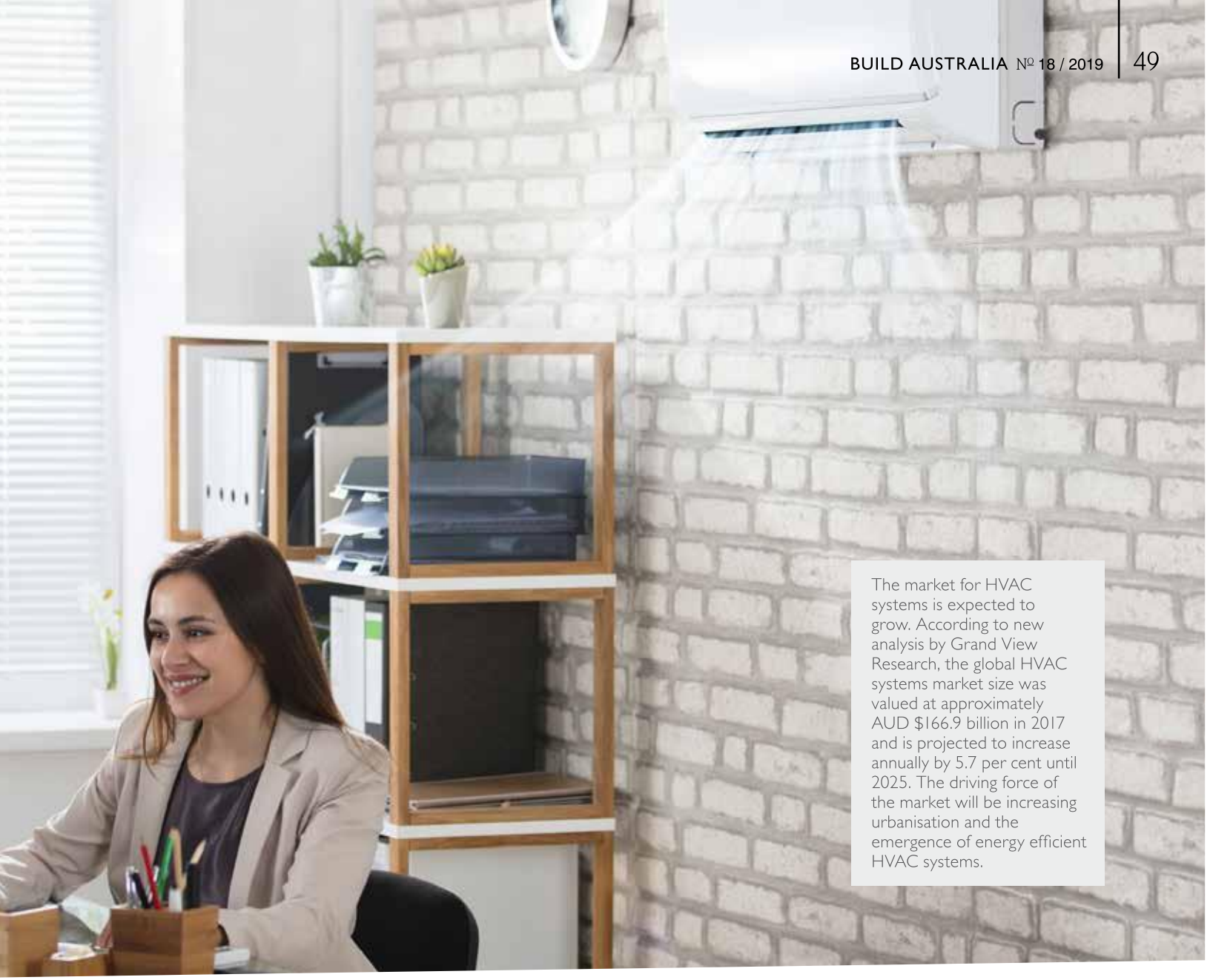
The determination will have a few implications for Australia's HVAC industry and customers when it starts to apply in 2020:

Firstly, higher minimum energy performance standards will prevent the least efficient air conditioners from being supplied into Australia, which is expected to reduce both energy costs and consumption.

Secondly, the determination will see the removal of the existing Energy Rating Label for air conditioners, to instead be replaced by the new Zoned Energy Rating Label (ZERL). The ZERL will inform those buying a new air conditioner to understand the efficiency of a device depending on the climate zone it will be used in, how much cooling and heating it can provide, how much electricity it will use and how loud it will be while operating.

Furthermore, the determination will also see the adoption of the Seasonal Energy Efficiency Ratio (SEER) standard for rating air conditioner energy efficiency. SEER measures the ratio of the total heat removed from the conditioned space during the annual cooling season divided by the total electrical energy consumed by the air conditioner during the same season. SEER also considers a range of outside temperatures to measure how the system will perform under real-time conditions. A higher SEER means greater energy efficiency.

According to Minister for Energy, The Hon. Angus Taylor MP, the net savings to the economy are expected to be nearly $500 million, for products sold between 2020 and 2030, as a result of the phasing out of the least efficient air conditioners in Australia.



The market for HVAC systems is expected to grow. According to new analysis by Grand View Research, the global HVAC systems market size was valued at approximately AUD $166.9 billion in 2017 and is projected to increase annually by 5.7 per cent until 2025. The driving force of the market will be increasing urbanisation and the emergence of energy efficient HVAC systems.

However, for developers with current HVAC systems, there are several steps which can be taken to improve energy efficiency.

PROACTIVE MAINTENANCE

Making sure a HVAC system is periodically checked and serviced by a professional can help building owners to understand which stage in the lifespan components of the HVAC system are in. This assists with operational efficiency and ensuring any problems are quickly rectified to prevent unexpected breakdowns.

RETROFITTING

If an issue with the HVAC system is identified, retrofitting refers to the replacement of obsolete equipment and the installation of new equipment. Retrofitting has been known to achieve significant improvements in the National Australian Built Environment Rating System (NABERS) and Green Star ratings, as well as reducing maintenance costs through extended warranties on new equipment.

INSTALLING PROGRAMMABLE THERMOSTATS

Programmable thermostats are affordable and allow owners to control and pre-determine the temperature in every area of a building. Especially beneficial for office developments, they can also be used to shut off and turn on at certain times, facilitating customisation and allowing the HVAC unit to conserve energy when not required.

INSTALLING AN ECONOMISER

An economiser is a mechanical device that uses the cool

air outside of a building to cool the internal space - in a bid to reduce energy consumption. It usually works in conjunction with the air conditioning system in a building and has been known to cut electricity costs up to 60 per cent or more. However, places that are hot and humid all year-round are rarely good candidates for HVAC economisers as the outdoor climate is rarely cool and dry enough to benefit the indoor space.

REDUCE HVAC LOAD CAPACITY

Minimising load capacity can be a crucial element in increasing the energy efficiency of HVAC systems. Load capacity refers to the amount of heating that a building needs to maintain a desired temperature. Reducing load capacity is ideally achieved through proper insulation of roofs, walls, pipes and ducts, but can also be achieved by installing energy efficient windows or LED lighting to generate savings.

THE FUTURE OF HVAC

The rapid adoption of new technologies such as automated control systems, remote control systems and the Internet of Things (IoT) are transforming the future of HVAC. Automated control systems can be used to detect the surrounding climate and automatically control the temperature and fan speeds of HVAC equipment to offer optimum comfort.

Just as the name suggests, remote control HVAC systems allow building owners to remotely operate devices through mobile applications with ease. Further, IoT-enabled HVAC units can be connected online and provide real-time information about the condition of the system to users and manufacturers, helping them to anticipate defects before they occur.

WHEN WILL THE NEW STANDARD APPLY?

The new format energy labels and SEER ratings will be mandatory for products being registered, imported or manufactured from 1 April 2020.

Sources: COAG Energy Council Meeting Communique Wednesday 19 December 2018; Managing HVAC for better building performance, City of Melbourne; HVAC Systems Market Size, Share & Trends Analysis Report By Product (Ventilation, Cooling, Heating), By End Use (Residential, Commercial, Industrial), By Region, And Segment Forecasts, 2018 – 2025, Grand View Research

PROFILE

THE HEAT IS ON WITH INNOVATIVE SOLUTION

The Shene Estate and Distillery in Tasmania has used local ingredients and traditional methods to produce some of Australia's best gin and single malt whiskeys for several years.

To produce its gin and single malt whiskey, the distillery uses traditional distilling methods which involve hot water to heat the barley mash. Each day 6,000 litres of hot water is required at 90°C. The temperature is then reduced to roughly 64°C (the optimum temperature to dissolve sugars contained within the starch of malted barley). The temperature is subsequently increased to 70°C to dissolve enzymes within the mash.

The water used in this process is conventionally heated using an electric hot water heater, but rising electricity prices have left this method unsustainable for the business.

After considering the distillery's daily water volume and temperature requirements as well as the colder temperatures the distillery would experience in winter, Mitsubishi Heavy Industries' Q-ton, CO2 air-to-water hot water solution was their preferred choice.

The Q-ton is an air to water heat pump that utilises CO2 as a natural refrigerant to deliver a reliable and highly effective hot water solution, even during Tasmania's coldest months.

Achieving an industry leading coefficient of performance (COP) of 4.3 by delivering 30kW of output power from only 7 kW input, the Q-ton is significantly more efficient than the distillery's existing water heater (which achieved a COP of 1, delivering 48 kW output from 48 kW input).

The Q-ton's remote-control scheduling functions also allow it to produce hot water during off-peak electricity periods and store it in tanks for later use.

Because of this, the Q-ton is much cheaper to run, will deliver huge reductions in operating costs and now the distillery is anticipated to save 60 per cent each year on their energy bills compared to an instantaneous heater.

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* Intermediate season Air on at 16°C, Water on at 17°C, Water off at 65°C.
Operation conditions: senior care home, 80 persons, 8000L/day,60°C conversion.

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PROTECTING ALL PARTIES IN THE CONSTRUCTION SECTOR

The liability of principals, contractors and subcontractors is an important issue for Australian businesses providing services or products to the built sector.

The use of subcontractors is common in many industries and it is particularly prevalent in the construction industry. In this sector, a design and construct contract is commonly used, and requires the head contractor to have a single line of responsibility to the principal/developer.

Often the developer or head contractor will have construction or contract works insurance and this is designed to cover many of the contractors working on the site. Despite this, subcontractors in most cases are required to hold their own public liability insurance.

THE CHAIN OF LIABILITY

Principals, head contractors and subcontractors can owe duties of care to each other under contract, at law and to any third party who is injured or has their property damaged.

The extent of the liability depends on which party was responsible for safety issues on the site and whose conduct caused the loss or damage. It is also possible for one or more people to have direct liability for third party loss or damage, but it also depends on the circumstances that led to the damage or injury.

The 'principal and agent' relationship between principals, head contractors and subcontractors may also create a situation where one or more is liable for loss or damage caused by others. This means the principal is liable for the acts of the head contractor, and in turn, the head contractor is liable for the acts of the subcontractor.

If, on the other hand, the parties have engaged with one another as 'independent contractors', the principal may not have liability, but could have other (collateral) legal liability arising from the work performed or the products supplied by the contractor.

The exposure to liability for others is why:

- Head contracts usually contain indemnity clauses requiring the head contractor to indemnify the principal for its liability for any death, injury or damage caused by the head contractor and any subcontractors; and
- Sub-contracts usually have similar clauses requiring the subcontractor to indemnify the head contractor for its liability for death, injury or damage caused by the secondary subcontractors.

The chain of liability can easily be broken if the indemnity clauses in each contract are not properly drafted to give each principal maximum legal protection. This is why contracts should require each party to hold insurance to cover the indemnities they have provided.

FROM THE PRINCIPAL TO THE WORKERS

Most public liability policies only cover the insured's legal liability for third party property damage or personal injury and are not designed to cover another person's legal liability.

However, it can depend on the actual words used in the indemnity and insurance clauses in the contract; and whether a subcontractor has cover for the principal's liability in their public liability policy.

It is important to note that not all liability cover policies are the same. Some provide expansive coverage, while others are very restricted and will only apply when the contractor is acting as an agent of the principal or when the liability arises from the work performed by the subcontractor.

Public and products liability insurance may cover subcontractors and sub-consultants working on a project by an extension or endorsement. But contract works policies are more likely to cover subcontractors and sub-consultants, although sometimes this is limited to the material damage part of the cover and not the public liability section.

A good contract works policy should protect most of the people working on a construction project. However, as a subcontractor working on a project where the principal holds a policy to protect the workers on the project, it is important to check whether this provides appropriate cover, including for worker to worker claims involving the employees on the project.

Rather than relying on the courts to interpret an indemnity clause, it is better to have maximum protection from the insurance by either:

- Having a policy that covers liability assumed under contract (e.g. umbrella liability) or make arrangements to have the policy endorsed and extended to cover liabilities assumed under the particular contract.
- Re-negotiating the indemnity clause so it is consistent with the legal liability. This will involve incorporating elements of proportionate liability and contributory negligence into the wording of the indemnity clause, or confining the indemnity to where the loss or damage is caused by the subcontractor's negligence.
- Subcontract agreements need to have clear requirements for performing the services including appropriate indemnity and insurance clauses. If subcontractors are covered by the head contractor's policy, a reasonable system of control and supervision of subcontractors is required to comply with policy conditions.

Source: The Fold Legal Pty Ltd, Tipsheet 12 – Public liability subcontractors

FALLS FROM HEIGHT SHOULD BE PREVENTED AT ALL COSTS

Falls from height are the major cause of death and injury when working on roofs. Between 2003-2015, 359 workers were killed following a fall from a height, amounting to 11 per cent of all workers killed over this period. Half of the falls recorded involved falling three metres or less, according to Safe Work Australia.

In February this year, a Sunshine Coast company director was sentenced to a year in prison and the company was fined $1 million in Queensland's first Category 1 prosecution under the Work Health and Safety Act 2011.

The charge of reckless conduct related to a 2014 fatality when a 62-year-old worker fell almost six metres to his death while working on an unprotected roof edge.

This was the first charge of reckless conduct to be successfully tested at trial in any Australian state or territory that have similar work health and safety legislation.

The court heard the company director had been motivated by money when he made the decision not to install edge protection on the roof, exposing individuals to the risk of death or serious injury.

Other roofers described discussions with the company director, alleging he had said that it would be too expensive to install edge protection. Instead, as part of the task, one worker would be positioned near the edge of the roof to straighten the roofing sheets. This was the work being carried out on the day by the fatally injured man.

A method was adopted by the roofers where the rails of scissor lifts were used as a barrier alongside the roof edge, and the man working near the edge would wear a safety harness. At the time of his fall, the worker apparently tripped or stumbled, but he was not wearing a harness.

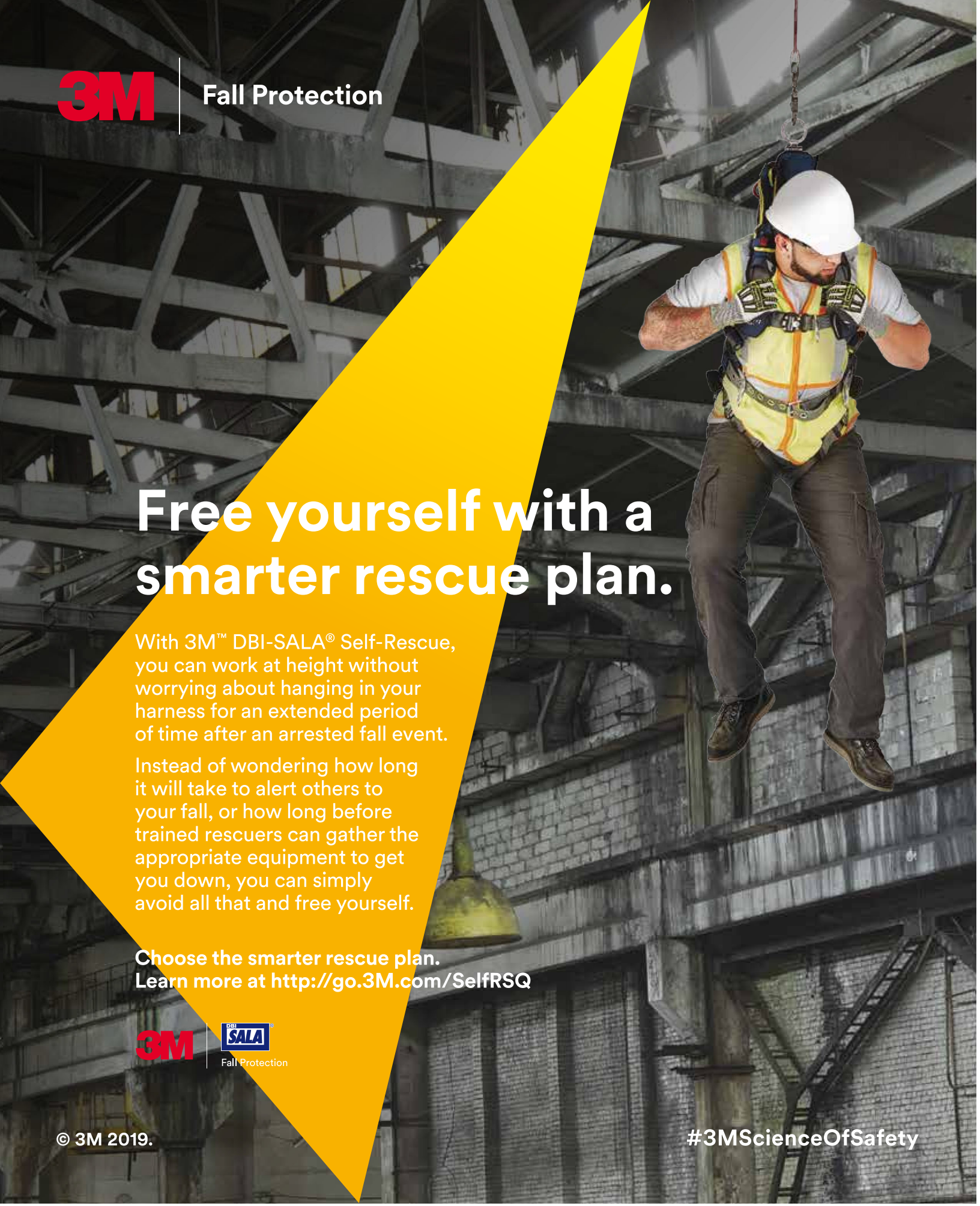
The court found that while the workers involved were competent, the risk was significant, as those working at the 'roof edge were working with a narrow margin for error'. The method adopted also relied on the diligence of the workers, in circumstances where they were engaged in repetitive work.

Importantly, edge protection would have stopped the fall and the lack of it could have been easily addressed, given it was agreed the company would be paid to install it and there was edge protection on site.

Cases like this stand as a reminder for the construction industry to ensure it provides a safe workplace no matter what it costs. Many incidents can be avoided if suitable equipment is used and if those doing the work are consulted about the hazards and risks and given adequate information, instruction, training and supervision.

Safe Work Australia recommends installing a fall prevention device as an important measure to prevent falls from height. This includes any equipment that is designed to prevent a fall when someone is temporarily working at heights, which once in place doesn't need any further adjustment by workers using it, for example guard rails or barriers. Work procedures should be developed on how to correctly install, use and maintain the system.

Even falls from low heights can leave workers with permanent and debilitating injuries, but the risk of serious injury or death from a fall increases significantly as working heights increase.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TAKING A PROBLEM-CENTRIC APPROACH TO SELECTING A TECHNOLOGY SOLUTION

By James Harris, Co-Founder & CTO HammerTech

In today's world of acronyms and hype, we are constantly bombarded by the next 'revolutionary product that will change our lives and industry'.

It's certainly a difficult challenge for today's CIOs, IT departments, business stakeholders and corporate boards. How do we get an edge over the competition? How do we pick a winner from amongst the noise? How do we avoid failures?

It's certainly a challenge that I personally face regularly in our business as we look at tools and technologies that can help improve the efficiency, quality, and productivity of our global team, and potentially providing us an edge over our competitors.

There are technologies and products that can demo very sharply. And yes, some of these products will go on to succeed and provide a lot of value for companies. Often though, when looking at the myriad of solutions available you are likely to find yourself asking the same questions; Do they have any substance? Are they ready for the real world? What are the hidden barriers? How are they going to help us?

WILL THEY (REALLY) WORK?

Let's put one of these shiny revolutionary products onto a real construction site. With men and women who live and breathe construction daily and want to get on with their job, would this technology work? The sad reality is that many will simply fizzle out.

WHY DON'T SOME SOLUTIONS WORK?

There is an age-old saying, "when all you have is a hammer, everything looks like a nail". Too often people stumble upon a tool, call it a hammer, then go in search of a nail. Instead of starting with the hammer (the solution), thought leaders should be starting with the nail (the problem) and asking what the right tool is to hit this nail with, which may, or may not, be a hammer.

MAYBE IT WORKS, BUT HOW WELL?

Maybe there is a technology which is being used on your construction sites today that is causing you to get left behind? It could be cumbersome to use, have limited functionality, not be designed to be used on mobile devices, slow, unreliable or maybe it simply doesn't align with your modern vision for unified management reporting and visibility across the company.

SO WHAT DO YOU NEED?

Consider the diverse range of people on a construction site, for some English isn't their first language, for others they didn't grow up around computers and smartphones, maybe they don't even have a smartphone or an email address. For others at the other end of the spectrum, they grew up with smartphones and spend their weekends coding for fun.

Consider the normal operating rhythm and tasks on a construction site, things like the morning pre-start meetings, reviewing and signing off JHAs/SWMS, safety walks, crane lifts, concrete pours, and hot works.

Finally, consider management. You need to ensure compliance and adherence to your existing standardised processes and systems. You need to monitor site activity. You are likely to have other systems in your business, and you need to combine data to unify your dashboards and key metrics.

Ultimately - you need to ensure that technology is usable across the daily tasks on a construction site, by everyone. You need to ensure compliance with industry standards and company policies, but at the same time not putting barriers in people's way of doing their job.

A TOUGH DECISION

That brings us to the key questions that CIOs and decision makers should be asking: "What are OUR problems?" "What are OUR pain points?"

ARE WE READY?

The construction industry has been traditionally regarded by many as a dinosaur with regards to technology adoption. Many assumed that this was due to a reluctance of people within the construction industry to adopt technology. This is naïve. It overlooks a far simpler and more reasonable explanation, that many technology solutions simply weren't quite right or ready for construction.

> "In an age where innovation is occurring at a breakneck pace I understand that first and foremost - performance, reliability and security are still the core foundations of any successful product."

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— Frank Venezia, Site Foreman, Novati Construction

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ABATING PROPERTY SECURITY RISKS

In 2017, there were 225,900 recorded burglaries in Australia, or one every three minutes. From 2016 to 2017 an estimated 2.5 per cent of Australian households experienced at least one break-in.

Burglary is classified as an offence involving unlawfully entering a building to steal property. In 2015, Australia had the fifth highest rate of burglaries in the world, but despite this, Australia witnessed a reduction in property crime in the last decade. However, relatively little has been known about what caused this decline.

In 2015, the Australian Institute of Criminology released results of a study of property crime detainees. The study found that the biggest perceived reason for the drop in property crime was the improvements in security, the improved level of crime prevention awareness in the community and people being more security conscious. This finding was perhaps not groundbreaking, but it confirmed that improvements in security can actively prevent property crime.

This conclusion was echoed in another study, which found that a lack of security measures around a property is one of the first thing burglars check for when selecting a target. Fake or poorly implemented security systems that could be easily disarmed were not counted as a successful deterrent. Grilled windows and doors, on the other hand were considered to be successful in deterring burglars from entering a property.

Security and access control should be a top priority for all property owners across the nation. Although properties with little to no security and with easy access are often targeted, it has been estimated that more than two million Australians have not implemented basic security measures.

IMPLEMENTING SECURITY MEASURES

An access control program includes the installation of security measures in properties or areas that can be hot spots for burglary. This can include areas that have already been the victim of burglary and where a repeat offence is likely.

Common access control strategies include:

- The installation or improvement of security devices (e.g. window and door locks, security screens), and
- Reducing access by improving perimeter security.

These measures should be hardwearing and make use of appropriate security technology sourced from an appropriate provider and installed by qualified personnel.

Effective strategies have been implemented in high-density residential areas. However, they have also been effective in other residential neighbourhoods, including those with detached dwellings.

Access control strategies work best in:

- Areas with evidence of a burglary problem, a high rate of repeat victimisation, or a high rate of property crime more generally, based on local crime statistics and/or on the basis of concerns raised by the community.
- Areas that have experienced a recent sharp increase in the rate of burglary.
- Where there is an identified lack of security at key entry points.
- When there is a high level of support for preventative measures and concern about burglary among residents.

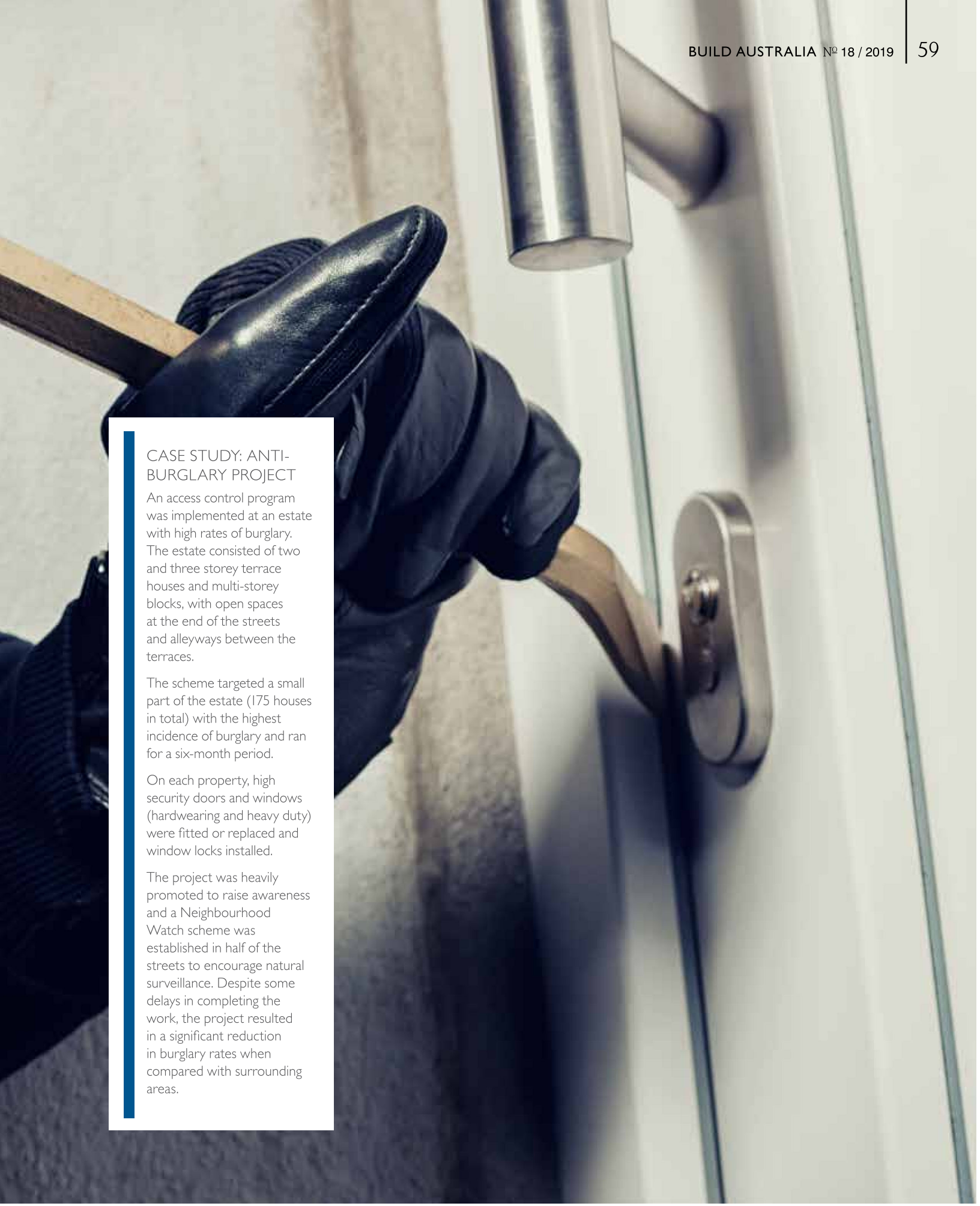
TECHNOLOGY ADVANCEMENTS AND SECURITY

With advancements in technology overall, today's security measures are expected to change dramatically in the future. With improved technology home and business owners already have the ability to remotely access cameras and videos of their properties.

It is expected that property surveillance will become more prominent and even necessary to combat crime and to protect physical property in coming years.

According to Stratistics MRC, the global home security solutions market value is expected to reach $57.73 billion by 2022, growing by 8.9 per cent annually. The factors fuelling the market growth include the increase in remote monitoring mobile devices and growing consumer awareness.

Sources: Explaining the property crime drop: The offender perspective, Australian Institute of Criminology; Home security solutions Market Research Report, Analysis, Trends, Market Size Estimations and Forecast to 2022, Market Research Consulting; Home Burglary in Australia Statistics 2019, Budget Direct; Fact sheet: Access control and awareness campaigns to reduce residential burglary, Australian Institute of Criminology



CASE STUDY: ANTI-BURGLARY PROJECT

An access control program was implemented at an estate with high rates of burglary. The estate consisted of two and three storey terrace houses and multi-storey blocks, with open spaces at the end of the streets and alleyways between the terraces.

The scheme targeted a small part of the estate (175 houses in total) with the highest incidence of burglary and ran for a six-month period.

On each property, high security doors and windows (hardwearing and heavy duty) were fitted or replaced and window locks installed.

The project was heavily promoted to raise awareness and a Neighbourhood Watch scheme was established in half of the streets to encourage natural surveillance. Despite some delays in completing the work, the project resulted in a significant reduction in burglary rates when compared with surrounding areas.

PROFILE

SUPER STADIUM, SUPER STATION, SUPER SECURITY WITH SUPASCREENS

Perth's new Optus Stadium has received national attention, not only for being a world-class stadium, but also for its commitment to transport more than 100,000 fans to and from the stadium through a modern train network.

The East Perth Train Station platform is a key part of the developed stadium precinct area and uses an advanced pedestrian overpass fitted with Amplimesh Security Screens to help cope with masses of sports and event patrons.

Project Architect Peter Rouhliadeff from HASSELL said the station design brief aimed to create a double sided and shaded breezeway with clear sightlines to the platform and station precinct below.

"Substituting the glazed panels with full height mesh security screens was key to achieving this design outcome," he said.

"The screens allowed us to minimise the extent of glazing to the station pedestrian overpass and concourse, reducing damage and maintenance costs as a result of vandalism, whilst providing protection from the working rail corridor below."

The screens are 'anti-throw' which means they prevent damage to passing trains and commuters from a flying object, and are part of the overall station design's aim in reducing opportunistic vandalism.

The security screens were fitted by a National Security Screen Association (NSSA) Member, Louies Flyscreens to ensure project integrity and compliance.

Furthermore, Amplimesh Security Screen's product SupaScreen has undergone recent independent impact testing to ensure it is a suitable product for public commercial projects.

Jack Ryan, Business Manager for Amplimesh Security Screens at Capral Aluminium said being so close (500m) to the Swan River, meant the project needed a product that could not just handle the people traffic, but also stand against all the environmental elements.

"That is where SupaScreen, with its 316 marine grade stainless mesh really stood out," he said.

"We are building an impressive catalogue of commercial projects working closely with architects, developers and our National Amplimesh Dealer Network, and this recent high profile installation showcases this."

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FUTUREPROOFING:

BUILDING ON WHAT SEKISUI HOUSE HAS ACHIEVED IN AUSTRALIA

Toru Abe, CEO and Managing Director, Sekisui House Australia.

CEO and Managing Director of Sekisui House Australia, Toru Abe has led the rise of the Japanese company's local operations since its establishment in 2009. 10 years on, Sekisui House has delivered properties for over 10,000 Australian families, and is poised for growth.

In those 10 years, Sekisui House has made great strides in translating its Japanese service philosophy, design and technology to the unique wants and needs of Australians.

"Australia is a very different market to Japan in many ways. For the Japanese, a home is seen as a lifetime purchase, whereas Australians are much more likely to sell, buy and build several times during their lifetime.

Executive SHAWOOD residences at The Hermitage, Gledswood Hills.

Gledswood Hills Reserve at The Hermitage.

Australian homes are also much larger with more open space," Mr Abe said.

Sekisui House have set out to offer Australians a level of quality to improve the liveability of their homes. It is this focus that has informed the approach of the Sekisui House Australia team, not only in terms of the projects it has invested in and pioneered, but also in the way those projects have been envisaged and delivered.

Many of the company's core beliefs and development principles have been adapted to suit the Australian way of life. For example, concepts such as *satoyama*, which refers to connecting people through 'ribbons of green' and creating mutual benefits between humans and nature, are at the foundation of every Sekisui House development.

As specialists in community masterplanning, Sekisui House has diversified capabilities in medium to high-density and greenfield residential development, as well as the design and construction of detached homes.

"One of our most high-profile projects over the last 10 years has been the Central Park development in Sydney, in partnership with Frasers Property. It's been recognised as a world leading, environmentally conscious development and it makes us proud that we're able to make this kind of impact in Australia," Mr Abe said.

In the area of housing, Sekisui House has introduced the company's patented SHAWOOD technology, a unique timber, pre-engineered house construction system that has challenged the traditional building industry mindset of how homes should be built. Mr Abe believes one of the keys to Sekisui House's growth in Australia will be in the flexibility of the SHAWOOD technology.

"SHAWOOD is the perfect demonstration of our ability to take a proven product from Japan and adapt it for Australian conditions. There is so much more potential for SHAWOOD and we will continue to explore these opportunities for the Australian market," Mr Abe said.

"We've now delivered over 10,000 properties in Australia, with thousands more in the immediate pipeline. This is a proud milestone for us, but a small number compared with that of the 2.4 million we've built worldwide."

SHAWOOD: BUILDING SMART

Housing affordability, sustainability, value appreciation and liveability all have one thing in common, according to Sekisui House General Manager, Craig D'Costa.

"As builders, we are acutely aware of the impact of the construction process – the design, materials and building methods – not only on the affordability of the home, but also on every aspect of the experience of living in and maintaining that home, and seeing that home increase in value.

"Housing affordability is a favourite topic in Australia, and never more so than in and around our major cities. For all the talk around how much it costs to build and buy a home, there is very little attention paid to the significant impact quality of construction plays in that equation."

Mr D'Costa leads the team responsible for the development of Sekisui House's high-end proprietary pre-engineered building

Terrace homes by SHAWOOD.

system, SHAWOOD in Australia. With key building components manufactured off-site in the company's Manufacturing and Quality Control Centre in Sydney, more than 250 SHAWOOD homes have already been built at Sekisui House's masterplanned community, The Hermitage in Gledswood Hills, the majority within the past two years.

A laminated timber post-and-beam structure joined by proprietary metal joints are at the heart of the SHAWOOD system. Integrated with a unique external cavity wall system, a SHAWOOD built home delivers superior precision, durability and reliability.

Sekisui House Manufacturing and Quality Control Centre, Sydney NSW.

"A SHAWOOD home requires less ongoing maintenance and is designed to be more energy efficient and liveable when compared to traditional volume brick veneer methods. They're also very affordable considering the precision and built tolerances both in pre-engineered fabrication and onsite. The construction process is streamlined, with significant reductions of waste and build time over traditional Australian home building systems," Mr D'Costa explained.

"Originally designed and perfected in Japan for over 20 years, we've tailored our SHAWOOD system to Australian conditions and building codes. Since its Australian launch in 2014, we've progressively refined our system handling, pre-engineering process and design and construct capabilities. We are now well placed to consider future diversification and growth within Australia," Mr D'Costa said.

According to Mr D'Costa, The Hermitage was the perfect location to introduce SHAWOOD homes to Australia.

"At The Hermitage, we are in the midst of creating a self-sufficient suburb. At completion, the 320-hectare masterplanned community will be home to more than 6,000 residents, including

SHINKA House - Sekisui House's first net-zero-energy home constructed outside of Japan.

a proposed 75,000 square metre town village with a mix of retail, commercial and community facilities, a new primary school, two golf courses and an abundance of recreational open space, equivalent to more than 80 football fields.

"Our intention is to continue to accommodate demand for both vacant land and complete designer SHAWOOD homes at The Hermitage. We are seeing some clear evidence of growing demand for our unique homes, particularly from people looking for a dream home that is highly liveable and sustainable.

"We see our delivery of SHAWOOD as an opportunity to lead by example when it comes to progressively pushing the

The SHINKA House project is expected to be completed in 2019.

boundaries of affordable and sustainable development.' Mr D'Costa added.

SHINKA HOUSE: THE PATH TO NET ZERO ENERGY HOMES IN AUSTRALIA

Sekisui House has built more than 35,000 net zero energy homes in Japan – and Australia is next.

In 2008, Sekisui House unveiled its prototype zero emission house to delegates at Japan's Hokkaido Toyako G8 Summit. The smart, mass-producible home that saved as much energy and natural resources as it consumed, was a revelation to representatives of the G8 community, attending the Summit to discuss the world's biggest economic and social challenges.

Among those challenges was the question of sustainable living: As global populations in developed countries increased, how could technology, building methods and design reduce reliance on natural resources in the home?

Fast-forward a decade, and Sekisui House has made good on the promise of the prototype. The learnings from having built more than 35,000 net zero energy homes (more than any other company globally) are being applied in other parts of the world, including here in Australia.

Sekisui House will soon unveil SHINKA House, its first prototype net zero energy home designed specifically for Australian climatic conditions and building codes. The house is currently under construction at Sekisui House's masterplanned community, The Hermitage, Gledswood Hills in Sydney's south west.

SHINKA House is expected to achieve a NatHERS thermal comfort rating of more than 8 stars, well above the 6 stars required under the Australian national standard.

"Our goal is to create a home that saves as much energy as it consumes, through renewable energy created on the site and use of more efficient building fabric and design," Mr D'Costa said.

"There's definitely appetite for net zero energy homes here in Australia. The cost of power and other resources is continuing to rise for Australian households, and as a nation, we are becoming more conscious of this impact on our lifestyle choices and the way we live.

"Just as we did in Japan, our objective is to create a home that is not only net zero energy, but also an affordable proposition for Australians to build. The creation of SHINKA House is a massive step in that direction," Mr D'Costa said.

SHINKA House features organic design principles and integrated housing technologies, including Sekisui House's proprietary SHAWOOD construction system. Other key attributes of the home include minimalist PV and battery storage, air and acoustic balancing, and active and passive climate control measures.

Double-glazed thermally-broken aluminium windows and doors, geothermal augmented air-conditioning, energy and wellbeing automation, low maintenance external finishes, low VOC paint and surface coverings, all contribute to the prototype's energy efficiency.

"Beyond the consumption and cost benefits of this approach, SHINKA House will quite simply be a wonderful home to live in. We're creating a healthier ecosystem that can be adapted to the wants and needs of people of any age and can handle the harsh Australian weather conditions.

"Our ambition is that 10 years from now, we'll have achieved the kind of impact Sekisui House has achieved in Japan over the past decade," Mr D'Costa said.

SHAWOOD's light filled interiors.

BUILDING TO LIVE: HOW MASTERPLANNED COMMUNITIES ARE THE WAY FORWARD FOR SYDNEY

With one of the lowest living density rates of any major international city, Sydney represents a significant opportunity to reimagine how to live well as the population grows.

City planners are working on the projection that Sydney's population will reach approximately eight million by 2050, and will be double the current population levels by 2060. With investment in major infrastructure projects booming, Sydney is preparing for more people and an escalation of densification in parts of the city, that until now, have traditionally been dominated by the detached home on a quarter-acre block.

Forward vision: The Orchards, Norwest.

"If you listen to talkback radio in Sydney, you'd be familiar with the main question that dominates the conversation about apartment developments – and that is, do we need it? The population projections alone tell us the real question we should be asking is, how can we create higher-density living environments that improve on what we currently have here in Sydney?," said Sekisui House Project Director, Edward Natour.

"Sydney prides itself on being one of the most liveable major cities in the world. We're at a tipping point now where, as a city, we can make the right choices on how to – at the very least – maintain a high standard of liveability while also accommodating the inevitable growth we're going to see over the next few decades.

The first stage is complete at The Orchards, Norwest.

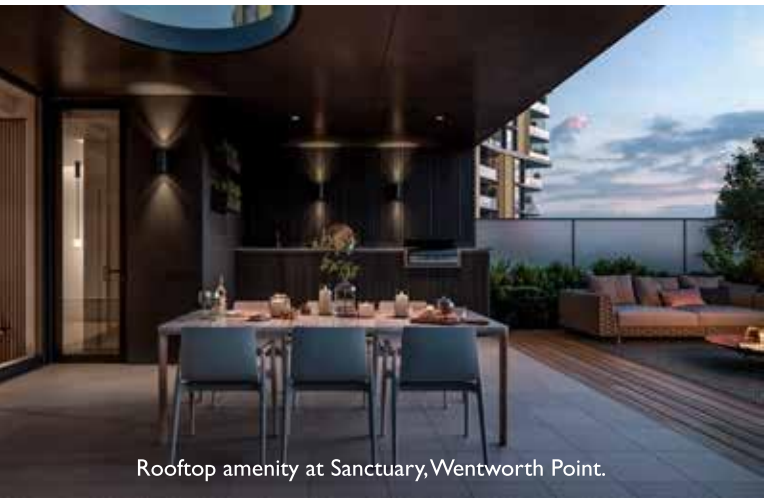
"For Sekisui House, this is about creating communities in close travel proximity to work hubs where home density doesn't mean sacrificing green space, lifestyle facilities, schools and other services that we all want to live close to," Mr Natour said.

Sekisui House is establishing two such Sydney masterplanned apartment communities. More than 1,300 apartments will be built at The Orchards, a $1 billion masterplan project in Norwest, 35 kilometres from the Sydney CBD. Work is also underway at the $1.9 billion Sanctuary project, which will be home to another 2,300 apartments, 16 kilometres from the CBD in Sydney's Wentworth Point on the Parramatta River.

Significant swathes of open green space, dining, shopping, swimming pools, fitness facilities and the variety of services and public and private facilities that would make any Sydney suburb proud, have been planned into both projects, on sites that were selected for their proximity to public transport and major road links.

"I think of The Orchards and Sanctuary as prototypes for what future apartment communities should look like in Sydney. This is about creating an epicentre for the people who live there, with everything they need within minutes of their front door and services like gyms, pools, function and entertainment spaces, even outdoor cinemas that they'd otherwise have to

Sanctuary, Wentworth Point.


Rooftop amenity at Sanctuary, Wentworth Point.

pay separately for and travel across town to use. It's also about making sure that their central facilities are easily accessible by road and rail, so that if a homeowner works in the Sydney CBD for example, their daily commute is short and effortless."

"The feedback we receive from customers is that our apartment communities represent the city they want to live in," Mr Natour said.

"The people buying into these projects are doing so because they want more than four walls and a roof. They're investing in a lifestyle and trying to shape how they live and work as Sydney continues to grow."

BRINGING CITY GROWTH CORRIDORS TO LIFE

Suburban greenfield developments on city fringes are presenting an attractive proposition for first home owners and down sizers, while also offering an attractive purchase option to investors.

The Ripley Valley Priority Development Area (PDA) was declared in 2010 and boasts one of the fastest growing populations in Queensland. Located approximately 40 kilometres west of Brisbane and 10 kilometres east of Ipswich with excellent connectivity via major highways, it is expected that an additional 120,000 people will call the Ripley catchment home over the next 18 years.

The Ecco Ripley masterplanned residential development by Sekisui House is driving a high percentage of that growth.

It is expected that upon completion, Ecco Ripley will become

Ecco Ripley, Queensland

home to more than 10,000 people. While a share of customers have come from neighbouring suburbs looking for newly-built, modern homes, there is a noticeable portion of buyers who are moving from the city in search of a better quality of life.

The adjoining Ripley Town Centre is set to become the bustling core of the region and the only designated sub-regional shopping centre planned to serve the PDA. Stage 1 of the Ripley Town Centre masterplan was delivered by Sekisui House in May 2018 and comprises a full-line Coles, Anytime Fitness, Pharmacy and approximately 20 specialty retailers.

"Masterplanned communities such as Ecco Ripley, that are supported by early implementation of transport infrastructure and the provision for proposed future rail to support convenient CBD commutes, are changing perceptions about suburban lifestyles. Larger, quality homes that are more affordable, and provide room to live, are drawing in people who either never thought they'd escape the rental trap, or just want more for their money," said Sekisui House Queensland State Sales Manager, Scott Blaney.

"A statistic that may surprise some people is that approximately 30 per cent of buyers at Ecco Ripley are mum and dad investors. They've seen the significant capital growth on masterplanned projects built around Brisbane over the past 15 to 20 years, and they're attracted to the affordability of buying into the future vision early.

"One aspect of Ecco Ripley that attracts both investors and owner occupiers is the diversity of affordably sized lots and the abundance of public parklands and amenities that has been integrated within the masterplan design." Mr Blaney added.

At The Hermitage, Gledswood Hills, more than 2,000 homes will be delivered at completion of the masterplanned community.

"More than 50 per cent of buyers at The Hermitage have made their purchasing decision as a result of being referred by friends or family who have previously bought property within the estate. The core appeal of The Hermitage is its sense of lifestyle and community. Upon completion, the masterplan will deliver over 40 hectares of parkland and open space, a 27-hole golfing precinct, 50km of shared pedestrian and cycle pathways, the future Gledswood Hills Primary School and the proposed Gledswood Village," said Sekisui House Sales, Marketing and Customer Relations Manager, Craig Barnes.

Plentiful open space and established natural flora, whilst still being connected to major hubs, is resonating with buyers at The Hermitage. The CBDs of Parramatta and Sydney are a convenient commute via road or rail, and Sydney's second major airport, located within 15km of Gledswood Hills, is set to be operational by 2026. Investment in the region is progressing at a rapid pace, creating abundant opportunities for a broad demographic of home buyers.

"Communities such as The Hermitage in Sydney and Ecco Ripley in Brisbane evoke a sense of healthy and connected living, through visionary masterplanning and a strong focus on the future needs of people, their community and the surrounding environment. At Sekisui House, we strive to create homes and communities that improve with time and last for generations," Mr Barnes added.

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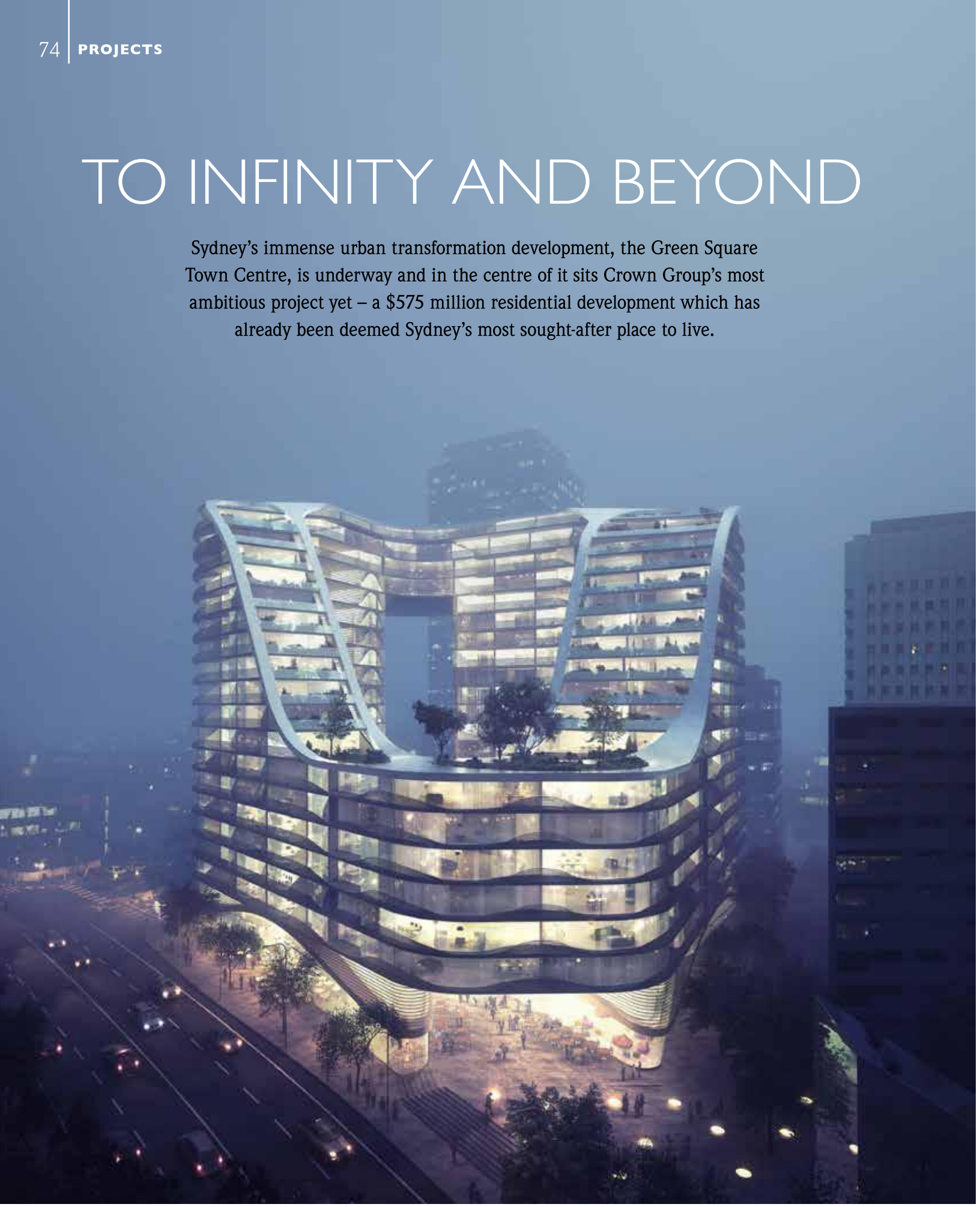
TO INFINITY AND BEYOND

Sydney's immense urban transformation development, the Green Square Town Centre, is underway and in the centre of it sits Crown Group's most ambitious project yet – a $575 million residential development which has already been deemed Sydney's most sought-after place to live.



The vision behind Infinity by Crown was to develop a landmark tower which draws on Crown Group's 18 years of experience developing residential property in Sydney and to showcase the world's best in innovative housing design.

In 2014, the City of Sydney held a design excellence competition during which architecture firms from across Australia had to overcome a series of design and construction challenges to deliver a stand-out piece of architecture. Surry Hills firm Koichi Takada Architects' design proposal captured everyone's attention and was eventually selected.

Located on the corner of Bourke Street and Botany Road, the 20-storey tower was designed with the idea of 'cities within cities'. Reaching a height of 60 metres, the tower will contain a total of 40,000 square metres of mixed-use functions, including 325 apartments, 75 boutique hotel rooms, over 30 retail, food and beverage outlets, a 450-seat conference centre, and a direct connection to the Green Square train station. The tower will also feature state-of-the-art facilities such as a private music room, a sky lounge, an infinity pool and intricately landscaped rooftop gardens.

Koichi Takada Architects intended Infinity to be what they call a 'landscape tower' using terracing and level changes to connect the building from multiple angles. The firm believes that this creates an experience of being within the landscape - resembling Sydney's undulating topography.

Nonetheless, the tower's unique form was designed to be more than just aesthetically intriguing. Once complete, its aerodynamic form will draw air into the courtyard and facilitate natural ventilation through pressure differentials. Furthermore, the sculpted form was carefully planned to add more daylight to the Green Square Library and Plaza (which was designed by Stewart Hollenstein in partnership with Colin Stewart Architects). Since the main library space is hidden underground, it relies mostly on skylights for natural light.

"A lot of people underestimate the shape of Infinity," said Architect Koichi Takada.

"We're not doing it because we think it looks cool, it was something that we developed for a reason. The shape adapted due to the environment, to respond to the sunlight, to create a relationship with the surrounding buildings, and really open the vista for the people who live around it. The loop brings more daylight into the public plaza and in turn makes it a more pleasant place to be. The shape is just a result of this conversation with the environment, the context, and the neighbours."

Each apartment within the development will feature floor-to-ceiling glass to maximise natural light to allow refreshing breezes to flow freely throughout. They will also boast broad spans of living space, energy-efficient lighting and climate control, discreet yet ample storage, and of course, chic and modern interiors.

Each bathroom in Infinity has also been designed to create the atmosphere of a five-star resort, thanks to three different colour schemes and LED strip lighting. They will all be simple yet sophisticated and have luxury finishes that resemble the quality of the rest of the tower.

In July 2015, more than 1500 guests attended a red carpet unveiling event of the building's concept design, eager to see what was in store for the site. In August of the same year, Crown Group's own construction group, Crown Group Constructions, commenced works on the project. Construction began with the excavation of a three-level basement car park.

In the same month, Infinity smashed records when $380 million worth of apartments were sold in just one day. Since then, more than 70 per cent of the apartments at Infinity have been sold.

In March 2016, a ground-breaking event was held, which was attended by Crown Group CEO Iwan Sunito, Sydney Lord Mayor Clover Moore, Architect Koichi Takada and close to 100 VIP guests and media.

At the event, the Lord Mayor said Infinity was emblematic of what the City hoped to achieve at Green Square.

"When completed, Infinity will be home to hundreds of new residents, its eateries and retail outlets will facilitate new jobs,

while a new conference facility in the building will attract new events to Green Square," the Lord Mayor said.

"Throughout history, cities have attracted the best and the brightest and in an era with increasing competition between cities in our region, developments like Infinity and the Green Square renewal will make sure Sydney continues to do just that," she added.

Following this, in June 2018, a major construction milestone was achieved when Crown Group Constructions commenced the installation of the large steel arch at the 18th level of the building. This involved hoisting and assembling 370 items of structural steel 54 metres up in the air. The largest piece weighed 63 tonnes and took approximately 10 hours to bolt into position. To facilitate the construction of the arch, Grown Group used a 500-tonne capacity crane.

The steel fabrication commenced in November 2017 and involved approximately 12,000 man hours to manufacture and deliver to site. 18 truckloads were required to deliver all the steel to the site, 13 of which were oversized loads which needed to travel overnight and arrive onsite at 4 am to be off the roads during peak hour traffic. The journey required two nights for each load.

In 2014, the development took out the Urban Development Institute of Australia (UDIA) NSW Concept Design award. Since then, Infinity has also received an Honourable Mention in the American Architecture Awards for architectural design and mixed-use architecture in 2016 and was chosen as one of the world's best projects at the 2017 Australia Property Congress.

Mr Sunito commented that "the prestigious UDIA NSW Concept design award recognised Crown Group's dedication and hard work to ensure a design concept which goes above and beyond the norm for the important Green Square site".

Infinity by Crown Group is scheduled for completion later in 2019.

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INFINITY BY CROWN GROUP

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LANDSCAPE INSPIRES UNIQUE LUXURY HOTEL DESIGN

Perth's newest luxury hotel, to be opened later in 2019, symbolises the Western Australian landscape when it comes to all aspects of the design, palate and material selection.

In March 2014, The Ritz-Carlton Hotel Company, L.L.C. and Far East Consortium (FEC) signed an agreement for the development of a brand-new Ritz-Carlton hotel in Perth, Western Australia, signalling the much-anticipated return of the luxury hotel operator to Australia.

Positioned on the edge of the picturesque Swan River and adjacent to Perth's iconic Bell Tower, the $500 million development was envisioned to comprise a 204-room Ritz-Carlton hotel and 379 luxury residential apartments. The 30-storey hotel building would also feature several high-quality communal facilities (such as a day spa and vitality pool) and event spaces which would expectedly contribute to the vibrancy of the newly developed Elizabeth Quay precinct.

One could say the design of the project evolved through several visions. The WA Government sought an iconic design on the waterfront which would set the quality benchmark for the Elizabeth Quay development and launch Perth onto the world tourism stage.

FEC sought after a design which would offer equal amounts of marketable design flair and commercial return, while Ritz Carlton wanted a hotel which would operate seamlessly, deliver a guest experience built on its renowned reputation for service, alongside a guest experience which is exclusively Western Australian.

Local design studio, Cottee Parker Architects Pty Ltd, were enlisted to bring all these diverse ideas to life. The result is two uniquely shaped, yet stunning buildings which are set to become distinct additions to the Perth skyline.

According to the architect firm, the design inspiration came from the unique setting at the edge of the Swan River. The imagined effects of erosional forces of water, wind and rain on the cellular structure were in mind when deciding the external form of the development.

Several unique design features were also considered into both buildings. The podium of the hotel would be hewn from sandstone, with the centre carved out like a natural gorge to create a foyer, intended to be 'hidden and mysterious'. The material palate of both towers and podiums would also be deeply rooted in the Western Australian landscape; the Kimberley sandstone is red like iron ore, and the glass façade is faceted and coloured like argyle diamonds.

Cottee Parker Architects explained these choices in form and materiality have ensured the project resonates with its location with poetic effect, and the project will be unlike anything else in civil and commercial architecture in Australia.

Alongside Chicago, Perth is one of the windiest cities in the world and with its riverside location, the buildings had to be designed to face adverse wind conditions. With this in mind, the balconies of each apartment had to be developed with large motorised awning sashes. Ranging between 2,400 and 4,200

wide and 1,600 high, the single plane sashes offer a 'genuine openness' which bi-folding sashes do not.

This innovative design response enables outdoor apartment space to be used all year as a seamless extension of the living room without the slightest threshold transition or track. The structural engineering involved in developing this product for Perth, the procurement of such a vast number of bespoke units and integration into a bespoke façade, and the safety-in-design prudence of the design team have made this a one-of-a-kind innovation.

In early August 2016, Probuild was awarded the construction contract by FEC for the project. Construction on the 5-star Ritz-Carlton hotel and 'The Towers' apartment building commenced in the same month.

Former WA Premier Colin Barnett and FEC Chairman Tan Sri Dato David Chiu, were on-site by the river to turn the first sod. Mr Barnett estimated that the construction of the two towers would bring more than $350 million to the state's economy and create around 1,000 jobs, both during construction and once the new Ritz-Carlton hotel was operational.

The two buildings would be built using a 'top-down' construction method, which would essentially see the structures be built both upwards and downwards simultaneously. According to Project Director, Tony Hodder, this method was chosen to assist in cutting down the build time.

By September 2017, construction of the Ritz-Carlton, Perth was quickly progressing, registering a quarter of the construction process complete. The project had a few design and construction trials, including the excavation of a three-storey deep basement within metres of the Swan River (in reclaimed land), and straddling a heritage jetty, which posed difficult site conditions for the construction team.

Consulting engineering firm, Wood & Grieve Engineers led the development of a custom tool with the Green Building Council of Australia to evaluate the sustainability of the project, which at the time exceeded the limits of what their existing tools allowed for.

The custom tool guided an all-inclusive assessment which addressed the expected impacts of climate change for the site, the carbon footprint of the project over its lifetime and a high-quality internal environment for occupants. Furthermore, a focus on sustainable management practices such as the implementation of energy-efficient LEDs, resource consumption reduction (energy, water and waste) and sustainable transport infrastructure has also improved the sustainability outcomes of the development.

Richard Crawford, Senior Director of Development at Marriott International Australia believes that when the hotel opens later in 2019, it will set a new benchmark for luxury accommodation in Perth and across Australia.

"The city's proximity to many destinations in Asia see it fast becoming an important business-hub and gateway leisure destination. We see Perth becoming a prime location for luxury hotels over the next 10 years," he said.

PROFILE

AIR DIFFUSION CONSIDERATIONS FOR BUILDING PROJECTS

The selection of quality air diffusion is crucial, not only due to the wellbeing and comfort of building occupants, but also because of the integrity and value to the building as a whole.

Faced with the increasing competitive challenges of today's ultra-modern building designs, aging infrastructure and a litany of Building Code of Australia (BCA) requirements, today's architects and specifiers must navigate a myriad of planning and regulatory hurdles.

Whilst the importance of meeting mandated compliance measures must not be discounted, it is crucial for any implemented solution to accord strictly with the unique built and natural features of a project.

Few could doubt that the selection and implementation of quality air diffusion products is key to the successful function, performance and comfort of a development. With a bit of research and the right advise, you can ensure that a reliable and consistent solution that offers not only seamless installation and integration options, but long-term cost benefits and maximum comfort for occupants.

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Shapeair reaches new heights with The Towers and Ritz-Carlton at Elizabeth Quay

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- intricate and integrated plenums
- a successfully delivered solution

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REACHING FOR THE SKY

Towering in the heart of one of Australia's biggest cities and piercing the sky at an impressive 270 metres, a brand-new building in Brisbane is about to make its debut as the largest residential building in the southern hemisphere.

Located at 222 Margaret Street, the $800 million Brisbane Skytower is set to become the region's newest landmark. Developed by Billbergia Pty Ltd and AMP Capital, once complete, the residential tower will soar 90 storeys above ground, making this the single largest residential building in Australia.

The high-rise building will consist of 1,141 one, two and three-bedroom apartments, spacious penthouses at its peak, four recreation levels, a seven-level car park (containing a total of 980 spaces) and 18 elevators - including one goods elevator that will traverse the full height of the building.

Brisbane Skytower will also boast Australia's highest wet edge pool.

Prior to the development of the tower, the site had quite an unusual history. Originally the land was intended for 'Vision Brisbane', a 283-metre-high mixed-used skyscraper. Soon after construction started however, the developer went into liquidation, leaving a seven-storey deep excavation site which sat dormant for seven years. This was until it was purchased by Billbergia in early 2011.

At the height of the Brisbane 2011 floods, Billbergia partnered with Brisbane City Council to use the site as a temporary dam, enabling neighbouring basements and buildings flooded to be drained as quickly as possible, saving the surrounding buildings from excessive water damage. This was one of the first tasks which would need to be addressed once the construction of Skytower commenced.

"According to the NRA Collective, this has enabled the design to devoid itself of any mass dampening devices usually placed at the top tall buildings to reduce sway, which has in effect added two more floors of sellable product."

But before construction could start, multi-award winning architectural and design practice, the NRA Collaborative Pty Ltd, was recruited to design the building.

The Brisbane Skytower has a unique triangular shape with curved corners and a central core. Aside from aesthetics, the building is a perfect shape to handle the wind loading and vortex shedding that occurs on tall buildings. According to the NRA Collective, this has enabled the design to devoid itself of any mass dampening devices usually placed at the top of tall buildings to reduce sway, which has in effect added two more floors of sellable product.

Brisbane Skytower was designed to include separate areas: Uptown and Downtown, Skyrise, Skycity, and Penthouses, each with its own independent lift, lobby and recreational deck which feature a gym, pool, lounge, BBQ area and steam room.

The other pertinent point about Brisbane Skytower is that it will feature a range of sustainable initiatives including bays for charging electric vehicles, shared vehicles (GoGet), high-performance glazing and energy efficient elevators.

Skytower will also feature some exceptional water and waste management systems.

Principal at the NRA Collaborative, Lee Wade explained that building a tower at this height requires systems that can control and slow down roof water and sewerage as they travel down the tower, so that the velocity of the water does not build up speed or pressure downstream of the system. Unlike traditional roof drainage, which is designed to only flow part full, a siphonic system will operate at full capacity.

"The siphonic drainage system is based on the ingenious gravity-induced vacuum principle, which allows and controls the pattern of discharge, while preventing air from entering the pipework drainage of a roof without the requirement of a slope in the pipework, thus saving valuable space," Mr Wade said.

"This versatile drainage system with the engineered design offers an economical and high-performance alternative to conventional drainage systems," he said.

Once the design aspect had been finalised, after a two-year collaboration with Billbergia and AMP, Hutchinson Builders

BRISBANE SKYTOWER QUICK FACTS

THE BUILDING HAS ALREADY REQUIRED:

- 378 square metres of ceilings and partitions.
- 47 cubic metres of concrete.
- 7,695 tonnes of reinforcement.

AND HAS:

- Gross Floor Area of 147 square metres.
- $376 million project value.

were contracted to build the development. Shortly after the contract award, construction commenced in April 2015.

When the company began work on the new nine-level basement car park, a barge was brought in to slowly drain the water left over from the 2011 flooding. The water worked in the group's favour by reinforcing the already built structure and creating pressure that stabilised the expired rock anchors. Rock anchors were then reinforced and renewed level by level as the water was drained.

The tower was built in three components, which provided an opportunity for residents to settle into a completed section in 2017, while construction continued above. Hutchinson Builders stated that this approach delivered maximum economic efficiency, allowing Billbergia to generate income two years before the tower's scheduled completion. This led to Skytower being one of the first ever residential buildings to allow occupancy during construction. Minimal disruption to residents was achieved through careful planning and the builder's previous experience.

Constructing Brisbane's tallest tower has not come without its fair share of challenges, however. Height restrictions by the Civil Aviation Safety Authority (CASA) have required Hutchinson Builders to get creative in building the final levels. Any activity over RL152 is classified as entering airspace and must undergo a rigorous application to proceed.

In order to comply with the strict airspace requirements over Brisbane's CBD, the company installed a custom designed cantilevered tower structure on level 66. The hydraulics were used to lift a flathead crane into operation during the day, which was then lowered into dormancy during the night.

Brisbane Skytower is a vision of elegance. Now in its final stages of construction, the iconic residential tower is sure to become a brand-new centrepiece of the Brisbane skyline.

Brisbane Skytower is due for completion later in 2019.

CUSTOMISED MONITORING FOR PROJECTS LARGE AND SMALL

From vital transport infrastructure to multi-million-dollar mining operations to one of the tallest residential towers in the Southern Hemisphere, UPG is working with the nation's leading businesses to provide unparalleled monitoring solutions.

Using leading-edge technology in hardware and software from Trimble, coupled with the expertise of its Monitoring Solutions Team, UPG creates systems tailor-made for projects of any size and scope.

SKY HIGH SOLUTIONS

For the landmark Skytower project, UPG provided the solution to monitoring the height and movement of Hutchinson Builders' crane, which, due to the 90-level building's height, could interfere with the airport's radar and navigational systems.

The solution was to place the crane on hydraulic jacks that raise and lower the crane as required. GPS monitoring units were installed on top of the A-Frame and end of the boom to then transmit the data to a secure server, fulfilling the project's need for 24/7 monitoring with data available on-demand.

Not a job for those without a head for heights, it was all part of the service UPG offers to solve monitoring problems for any project.

WIDE VARIETY OF PROJECTS

Other recent significant projects the team has worked with professionals from the construction industry include the Toowoomba Second Range Crossing in Queensland, an extensive (and security sensitive) infrastructure project in the Northern Territory, and on several large mine sites across New South Wales and Victoria.

UPG-implemented systems, with Trimble technology at its heart, provide up-to-the-minute data on the condition and behaviour of land or structures, regardless of size.

The information enables project stakeholders to make efficient use of resources to address potential problems, improve safety decisions, ensure structural integrity and future-proof their investment.

With options to combine Trimble instruments and software with external geotechnical sensors, users are enabled to create complete, customised monitoring solutions.

No matter the size, Trimble's scalable monitoring solutions can be customised to meet a range of project requirements from post-processed deformation measurement to real-time automated monitoring.

THE SUN RISES OVER REDEVELOPED PLAZA

Located in Maroochydore on Queensland's stunning Sunshine Coast, Sunshine Plaza has been a leading regional shopping destination since its grand opening in 1994.

The Sunshine Coast is the third most populated place in Queensland, after Brisbane and the Gold Coast. The area is forecast to grow to over 385,000 people by 2026 from just over 300,000 in 2016.

To cater to this expected increase – as well as to give the much-loved shopping centre a fresh new look – Lendlease (who is managing the centre on behalf of joint owners Australian Prime Property Fund Retail and GPT Group) in 2016 gained approval to expand the Sunshine Plaza from 73,000 square metres to over 107,000 square metres.

The $400 million Sunshine Plaza Redevelopment would eventually see the introduction of more than 100 retailers to the centre, in a bid to reduce the need for locals to shop outside the Sunshine Coast.

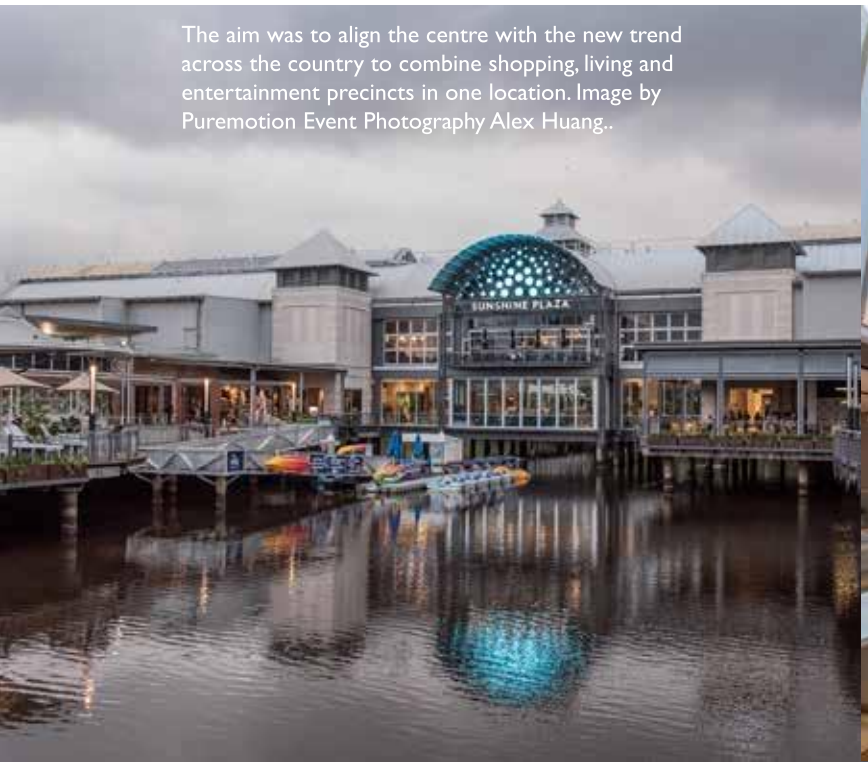
Plans for the redevelopment aimed to make parking at the centre more convenient, thanks to the development of a new multi-level car park and over 1,400 additional new car spaces – taking the total number of spaces to nearly 5,000.

The plans also sought to include new outdoor waterfront dining along Cornmeal Creek, which would also undergo extensive revegetation and regeneration works during the project, to further enhance the indoor/outdoor experience at the centre.

In order to bring more fun and adventure to the centre, a high ropes course was added to the plans, which would include three steel towers with the highest at 22 metres, as well as 150 challenges and 16 ziplines.

To bring these ideas to life, Lendlease engaged global architecture and design firm Callison RTKL, a specialist in the design of world-class shopping and entertainment precincts, to redesign the space.

Inspired by extensive consumer research, Callison RTKL's



The aim was to align the centre with the new trend across the country to combine shopping, living and entertainment precincts in one location. Image by Puremotion Event Photography Alex Huang..

vision for the Sunshine Plaza had the overarching theme of 'home is my holiday'. The intent was to represent the guest experience of locals and tourists alike when they were to visit the centre, an idea which has since been referenced in all aspects of the centre's design and brand refresh.

Callison RTKL Senior Vice President, Katie Sprague said from the onset it was well understood how special Sunshine Plaza was to the community.

"We were committed to designing something that was tailor-made to Maroochydore, creating relevant connections: the new phase to the existing, an urban development to nature, and the wonderful people to a place they have long called home," she said.

The aim was to align the centre with the new trend across the country to combine shopping, living and entertainment precincts in one location. Lendlease General Manager, QLD and NT, Building, Brad Protheroe believes this has emerged alongside the evolution of the new consumer.

"Consumers today are more mindful about what they buy and their impact on the world – they are more globally-minded, and value experiences, personalisation, and convenience. They're increasingly time poor and want to have all their needs met in one location," he says.

"Shopping centres are already evolving to meet consumers' needs. As major shopping centres are often located near transport nodes, government and developers recognise they are prime opportunities for residential, commercial and other development options."

To ensure Sunshine Plaza captured this, the design brief of the centre was customer led and focused, and was the result of extensive research and understanding of the consumer journey.

Mr Protheroe says the design vision has influenced all decisions on the project, from the key hero impact zones and tenancy design, right down to the finer details of wall art and furniture selection.

"The 'bunya nut' public art in the Myer Node is a favourite. Traditionally, the Sunshine Coast is in the heart of the bunya country, and therefore significant."

The construction of the centre commenced in September 2016 with a sod turning ceremony on site.

A new construction methodology for façade pre-cast allowed it to be installed from the outside (in lieu of traditional access from within the building). This saw the major tenancies be handed over on time with a temporary weatherproofed internal wall installed; permitting internal fit out activities to commence prior to the final pre-cast face being installed.

Throughout the project's two year construction period, Lendlease used a 'wholistic' design, build and project management model. Mr Protheroe says the key efficiency outcome with a wholistic team is enhanced communication between design, build and project management teams.

On 28 March 2019, the freshly renovated centre finally opened to the public. Image by Puremotion Event Photography Alex Huang.

"This means the end product can be achieved timely, and within budget," he says.

A dedicated design/construction detail resource was established permanently on site to assist the project team with over 10,000 project documents and support with the coordination of services hot spots.

"[This method] garnered positive feedback on how the finished product was delivered during and after construction from not only stakeholders, but customers as well," Mr Protheroe shares.

Redeveloping a shopping centre can be a complicated task, so naturally there are certain challenges that arise in maintaining and balancing safety, functionality and amenity in a live retail environment.

To mitigate this, Lendlease ensured constant communication with stakeholders and Centre Management to guarantee the smooth process of upcoming works.

As 90 per cent of construction works were undertaken at night, 'builder's brief' sessions were held every day to improve daily trade for tenants and provide a safe and clean shopping experience for the public.

Lendlease also held a SleepFit workshop onsite for construction workers and their families to provide advice and consultation for sleep management and to ensure a safer and more productive work environment.

After 13 months and over 370,000 hours in the making, construction of the car park finally concluded in October 2017. It required a total of 9,200 tonnes of concrete and now stands at approximately 15 metres tall.

On the rooftop, two solar collection farms not only provide weather relief, but generate enough electricity equivalent to supplying 390 homes. The installation of a 1.1 Megawatt (MW), 2,700 panel solar electricity system will reduce the facility's CO2 emissions by over 1,400 tonnes per year.

Despite some construction work being delayed due to severe weather and above average rainfall experienced on the Sunshine Coast in March 2018, work on the project steadily continued.

On 28 March 2019, the freshly renovated centre finally opened to the public. After an opening ceremony was held, some eager shoppers flocked to new stores like H&M, Sephora, lululemon, Kathmandu, JB Hi-fi, MECCA and Seed, while others were treated to giveaways and live entertainment. It is estimated that the project generated up to 2,900 jobs during construction and will create up to 2,300 additional retail positions now that it is complete.

Lendlease Managing Director of Retail, Gary Horwitz says: "Sunshine Plaza now has some of the biggest national brands and most sought-after specialty stores, so locals no longer need to travel to Brisbane for their ideal shopping experience — everything they need, and more, is right here."

SUNSHINE PLAZA FAST FACTS:

NUMBER OF NEW TENANCIES: 114 (44 in first stage of new mall; 70 in stage two opening).

TOTAL AREA: ~107,000sqm

TOTAL NUMBER OF PARKING SPACES: almost 5,000

TOTAL INVESTMENT FOR REDEVELOPMENT WORKS: $440 million

The high ropes adventure course will open mid-2019.

The redevelopment targeted a 5 Star Green Star – As Built rating.

MCCONAGHY PROJECTS HELPS TO DELIVER A CLIENT'S VISION

Fitout is anything but an exact science. Every retail space, like every shop owner, like every brand, is unique, and those that aren't caged by functionality and truly consider how they make their occupants feel, captivate most.

The very best in retail fitouts manifest from contemporary thinking, whereby a space's personality isn't stifled, but heroed. While a space always needs to be innately functional and objectively stylish, it must also subjectively match the people who use it and their purpose for using it. Only by drawing on inspiration from clients' lives can fitout specialists holistically deliver.

If it all sounds like spin, feast your eyes on independent gift boutique and fashion store Mott & Mulberry, nestled amid the $400 million Sunshine Plaza redevelopment. Here you can observe the rollout of something extremely unique; a demonstration of how design and materials can be shaped to influence the way in which we perceive space.

PASSIONATE CLIENTS MAKE THE BEST PARTNERS

Boutique owners, Brett and Ellen Deans, have always been inspired by the richness, textures and diversity of superior quality gifts. Mott & Mulberry's story began with their first store in Indooroopilly with their minds set on creating a backdrop to showcase inspiring local works. Creativity is on their minds, from the products they sell, through to the fine details of the interior space from which they trade.

"We wanted to create a unique space featuring local designers and artists, and we wanted the design to open up and hero the product," said Mr Deans.

McConaghy Projects joined forces with retail fitout designers, The Retail Designers, to take on the challenge of bringing to life what is now the second Mott & Mulberry store; a space that echoes their flagship, connects to the local demographic and all the while represents Mott & Mulberry 2.0. It was to be elegant, refined, cosy and approachable, yet sophisticated. Design elements were to sit together in quiet harmony, providing a subtle frame for the dynamic range of products that adorn the shelves, but also stand independently strong, leaving customers with a lasting Mott & Mulberry experience.

The McConaghy Projects team achieved this by delivering a layered textural design in a restrained colour palette. A selection of light timbers, copper accents and rendered wall linings set the foundations of the modern space. Fibonacci stone and polished concrete floors added thereafter for their textural interest and durability, and a full glazed shop front to showcase the full extent of the design. Completing the design is the Barrisol lighting; a diffused light renowned for enhancing ambience.

Project Managers, Matthew Hirst and Michael Bolin from McConaghy Projects claim that understanding the vision and applying experience, intuition and a good dose of innovation brought the project to life.

"Brett and Ellen's vision was at the forefront of our minds. We set out to create their dream store, which now stands as a true retail destination and provides memorable shopping experiences," said Michael Bolin.

A captivating representation of client vision and the brand to which it is home, Mott & Mulberry provides a glimpse of McConaghy Projects' work - the fitout team to watch in 2019.

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McCONAGHY PROJECTS 50 McCONAGHY PROPERTIES

PROFILE

MANAGING LARGE SCALE HOARDING INSTALLATION

On major development projects such as the $400 Million Sunshine Plaza Redevelopment, every individual component needs to run smoothly to keep the project on track for scheduled completion. Hoardings are a crucial aspect of development works, keeping workers and customers safely separated and able to go about their business.

"Finding an installation contractor capable of managing hoardings through all stages of construction naturally led to the appointment of locally based TITAN trained installer, Infraco."

Both the product and the installer need to meet many requirements including safety, certification, efficiency, flexibility and of course proven capabilities.

Nationally, Lendlease Retail use TITAN Hoarding Systems exclusively for their hoarding requirements. TITAN's modern modular counterweighted hoarding systems provide a structural engineer certified solution with zero fixings to floor or ceilings.

Infraco have been providing services to both Lendlease Retail and Sunshine Plaza for many years across a range of areas including new construction, amenities refurbishments, tenancy defits, general maintenance, project management and hoarding works, so contracting them to manage the hoardings on this project was a safe engagement.

Until the last few years Infraco (like everybody else) used to build their own hoardings but recognised the huge benefits of a modern system and now exclusively install TITAN Hoarding Systems. Once installed to specifications, Infraco as a registered installer, can provide engineer certified hoardings for any client.

Returning regularly to reconfirm certification, plus build new hoardings or modify existing panels to suit the evolution of the project is all part of a night's work for Infraco. By nature of the shopping centre environment, Infraco staff are usually dealing with short notice, quick turnaround and tight scheduling with most work on site performed after hours. The flexibility and versatility of their 20+ staff is crucial to enabling these projects to run smoothly.

Nearing the very successful completion of the Sunshine Plaza Redevelopment, Infraco's contribution cannot be underestimated. Also managing projects for other large scale clients such as Stockland, Myer, Unity Water, Sunshine Coast Airport and many others, Infraco are a prime example that contractors who keep a project on track are always in demand.

TITAN WAS BEHIND EVERY SAFE HOARDING IN THE $400MILLION

LENDLEASE SUNSHINE PLAZA REDEVELOPMENT

ENGINEER CERTIFIED HOARDINGS PROTECTING THE PUBLIC

TITAN ARE THE NATIONAL HOARDING PROVIDER FOR LENDLEASE RETAIL *(plus other major developers),* **WITH STOCK & INSTALLERS AVAILABLE NATIONWIDE**

The official hoarding installation contractor for the Sunshine Plaza Redevelopment was INFRACO

IMAGINE HOW YOUR PROJECT WOULD BENEFIT FROM:

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Sedatech and Sedaservices Management Delivery Team. From left to right; Alex Martin (Branch Manager), Stephen Brown (Construction Manager), Jim Kenny (BDM) and Jaime Castro (Engineering Manager).

SEDATECH & SEDASERVICES SUCCESS AT SUNSHINE PLAZA WITH LENDLEASE

PROFILE

Our installation site team was managed by Rob Grocott (PM) and Erin Murray (site supervisor), Tim Neal (site supervisor), Tom McMahon (site supervisor). The Sedaservices smoke testing team of Mark Henshaw with his apprentice Josh Day.

All would not be complete without "Smokey" the hot smoke machine, for the visual smoke relief visual aid.

The great relationship between Lendlease, the builder of the Sunshine Plaza project, and Sedatech was key to the development's successful delivery. Peter Lindsay (Lendlease) Service Manager was pivotal in ensuring the smooth delivery and coordination between the services trades. Sedatech was responsible for the mechanical services which incorporated mechanical electrical, building management system controls installation, mechanical plumbing, sheetmetal duct work installation, insulation, refrigeration, integrated commissioning, smoke testing and final certification. The project had some significant challenges such as being a live operating shopping mall, tight time frames and many services trades to coordinate with. Sedatech took all of this in its stride and the lead role in services drafting coordination.

As always, the Holy Grail of shopping centres is getting the tenancies completed during the base build installation period which is a huge challenge.

SedaServices is the mechanical service arm of Sedatech. SedaServices has the capability to deliver mechanical services maintenance and minor works installation leveraging from Sedatech's strong internal engineering and drafting support. SedaServices provide maintenance nationally in QLD, NSW and ACT.

Sedatech employed a core team of subcontractors to provide installation for key services on ventilation ductwork (BJSA), chilled water pipework (Jensen Industries Australia), lagging pipe and duct (B&D Insulation) and mechanical electrical (TES) to mention a few.

APE mobile is an established management tool that has now been incorporated into the site management systems for Sedatech. This has been crucial to the successful management of site QA and on-site activities. This system also enabled Sedatech to manage on site labour inefficiencies and were able to work with Lendlease and effectively reduce labour wastage from 29 per cent down to just below 5 per cent. This was a huge result for Sedatech and Lendlease.

Sedatech engaged the services of **Allied Drafting Services** (ADS) www.allieddrafting.com.au of whom we have previously worked together on numerous occasions and is the go to company for this type of project. Allied Drafting Services is a local business owned by Adam Ellis on the Sunshine Coast. He and his team carried out detailed 3D modelling using Revit for the first time, while liaising with our inhouse co-ordination administrator. Adam and his team offered workable solutions in some of the more 'tight fit' areas. Sedatech and Allied Drafting also managed the BIM co-ordination process from start to finish after taking on the initial design from Lendlease.

Sedatech approached another local Sunshine Coast based company in the form of **Building Environment Solutions** (BES). Owned and operated by Daniel Webster, his company has provided all the necessary resources through his NEBB certified company to commission the chilled water and ventilation systems. BES carried out a detailed CIBSE flushing program for the chilled water systems prior to operation. This also included chemical treatment that provided detailed analysis and reports for submission to our client.

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Sedatech and SedaServices QLD have completed a lot of work in northern NSW and other regional areas which was best for the Climatech sister company in NSW and ACT as the QLD branch was much closer. This has occurred on a number of projects:

ARMIDALE HOSPITAL REDEVELOPMENT

The Armidale Hospital Redevelopment includes a new emergency department, inpatient ward, operating theatres, central sterilising unit and a critical care unit. The project includes the planning for a new building to be constructed adjacent to the existing facility with some of the existing services to be decanted into the new building, to make way for refurbishment of some of the existing facilities.

LISMORE BASE HOSPITAL

Major expansion to the existing base hospital, consisting of eight levels of clinical space and operating theatres, plus an expanded emergency

64 Buildings, 112 Pac units, 12 Crac units, over 400 DX ducted split systems, over 600 fans and cowls, over 7,000 grilles, over 1000 dampers, and much more.

CLARENCE CORRECTIONAL CENTRE

The biggest project currently being managed by the Sedatech team is the Clarence Correctional Centre in Grafton. This is a male maximum, male minimum and female maximum prison facility. This is the biggest project that has ever been won by the Climatech Group, and the biggest prison facility in Australia. Letting the QLD team manage and run this project, shows the trust the board has in our teams and what our capabilities are. This is currently a live project that is required to be handed over in approximately March 2020.

OUR EXPERTISE

Office and Commercial

Sedatech have delivered large- and small-scale commercial projects, from 30 storey office towers to small tenancy fit out works. For all projects we aim to deliver a perfect working environment for our clients. We are specialists in coordinating base building and fit out works to ensure a seamless and integrated end product. Our office projects are industry leaders in energy efficient designs, a claim that we can back up with solid operational data.

Shopping Centres

At Sedatech, we understand the unique challenges that face large scale retail operators, which is why Westfield is one of our longstanding repeat clients. Retail facilities require strict program compliance and careful co-ordination with tenancy fit out works. Our project teams know what works for shopping centres and they know how to deliver it on time. Sedatech has developed retail projects for Westfield, Stocklands, Lendlease and QIC.

Data Centre Cooling

The Sedatech team has a depth of experience in designing, constructing and commissioning more efficient data centre cooling systems. We are a frontrunner when it comes to reducing data centre energy costs through enhanced cooling efficiency. By applying innovative measures such as free cooling, co-efficiency analysis and smarter building automation systems, Sedatech achieves energy savings without compromising on quality.

Health and Aged Care Facilities

Health facilities require precise climate control and air filtration specifications. Our design team has an excellent track record in designing and building first class health facilities. Sedatech has completed a number of retirement villages, hospitals and specialised aged care facilities in recent years.

A PLACE OF MATESHIP COMES BACK TO LIFE

With a legacy spanning more than eight decades, the Harbord Diggers Club in Freshwater, New South Wales has witnessed several changes. But what has persevered are the pillars of community and mateship on which it was founded.

With friendships forged during the first World War, a group of Australian Diggers returned to the Northern Beaches yearning for a place to meet and share their stories over a cold beer. Thus, on 5 June 1930, the Harbord Diggers Club was born.

Just like in World War I, the Great Depression of the 1930s helped drive a sense of mateship and community. The club quickly became more than just a place to meet and socialise, but a central platform for supporting the needs of those less fortunate. The club would for example serve billy teas to holidaymakers and raise money towards essentials for members in distress and their families. However, after enduring decades of wear from salt, wind and patronage, almost a decade ago the Harbord Diggers Club recognised that it was no longer sustainable in its current form - recording a $9.2 million loss over six years.

To sustain its operations for the enjoyment of future generations, the operator of Harbord Diggers, Mounties Group, identified that the venue needed to diversify its services and develop fresh and modern facilities to ensure it could become a profitable social enterprise.

In mid-2011, community consultation, urban design and planning process commenced to breath new life into the site. Led by leading architecture firm, Architectus, a masterplan was prepared to guide the future use of the club, the site it was located on and the Freshwater Headland. The outcome of the process was the approval of a site masterplan, which obtained significant community support.

The club's interior architect, Fender Katsalidis has been shortlisted for the 2019 Australian Interior Design Awards. Photo by Grant Leslie.

In September 2013, the Joint Regional Planning Panel approved a Stage One Development Application for the project. The application included the club's building envelope, layout and permitted uses on site. Approval was granted for a new club, members' areas, a senior's living village, a professional childcare facility, community facilities and a state-of-the-art fitness and aquatic centre.

At this point the design of the redevelopment had not yet been determined. To decide this, in 2014, Mounties Group launched a design competition that would challenge selected architecture firms from across the country to design a vibrant, inter-generational social environment without impacting the beauty of the natural headland and to deliver a mixed-use development without disturbing the amenity of residents.

A consortium comprising Architectus, CHROFI and JMD Design won the competition thanks to a captivating proposal in 2014, as one of five design teams selected to prepare initial design concepts for the precinct.

The consortium's 47,655 square metre, $200 million Harbord Diggers Club redevelopment design aimed to celebrate the location of the precinct with a gentle built form that would enable the landscape to dominate, maximise appreciation of the ocean views, capture the sun in winter and the cooling breeze in summer.

Michael Harrison, Architectus Director of Urban Design and Planning, who led the initial masterplan, said the building had been added to over the years resulting in 17 changes of level despite being only two storeys.

"The functional objective was to get all operations of the club on one easily accessible level - resulting in the club being at ground level with the wonderful north facing aspect overlooking Curl Curl Beach," Mr Harrison said.

Tai Ropiha, Partner at CHROFI further explained that the design concealed much of the development within the contour of the land with the retirement village organised around a courtyard above the hospitality precinct and the club positioned below.

"The headland landscape extends across the courtyard to amplify the scenic quality of the precinct while a pair of sandstone buildings rise above as sculptural counterpoints with flowing forms to frame coastal views from the apartments," said Ropiha.

The seniors living residences comprise 96 high-end, architecturally designed apartments priced from $1.5 million. Apartment interiors would eventually feature operable façades

and flexi-rooms intended to accommodate different resident requirements and provide flexibility to engage with the headland environment.

The consortium's winning proposal also featured a dramatic sunken garden at the centre of the site, which would introduce light and air to the various layers of the developments below and include plant species that blend with the colours and textures found on the adjacent headland.

The first stage of the redevelopment included construction of the new club facilities and hospitality venues, the childcare centre and most of the Watermark Freshwater apartments.

Construction commenced in early 2016, with the building works for the project appointed to NSW building and construction company, Ganellen.

"We are excited to be a part of this significant project, which will have such a positive impact on such a wide cross section of the Northern Beaches community for years to come," said Christopher Ahern, Commercial Director at Ganellen at the time.

By April 2016, main building works had fully commenced, and the project was well underway. However, the redevelopment underwent its fair share of challenges. In 2017, 60 construction days were lost because of poor weather

between January and May, which delayed the project timeline considerably.

Despite this, construction progressed and by May 2018, Stage One of the redevelopment was close to completion. Residents were also getting ready to move in in the lead up to the club's grand unveiling. On 10 September 2018, the club's doors officially opened.

Since opening, the Harbord Diggers Club has implemented several sustainability initiatives to ensure the venue and the surrounding community prospers. In an ongoing effort to keep the marine and surrounding environment pollutant free, the club and its members are decreasing their level of plastic waste and increasing recycling by introducing a keep-cup initiative and partnering with Simply Cups – Australia's first coffee cup recycling program. Since launching the venue has also eliminated all single-use plastic by providing reusable bags and removing all plastic straws.

The redevelopment also involved other sustainable solutions, including the relocation of trees during development (which can now be seen in Palm Gully), and the installation of charging bays for electrical cars.

Stage Two of the project has now commenced and involves the construction of the fitness facility and aquatic centre, as well as the final residences of the Watermark Freshwater apartments. This stage is set to open in late 2019.

Although the second stage of the project has not yet been completed, the project has already received an award. The club took out the title of Development of the Year in the mixed-use category at the 2018 Urban Developer Awards.

At the event, Greg Pickering, Chief Executive Officer of Mounties Group said the award recognises the amount of planning, hard work and effort that has gone into the development.

"Our focus was to deliver a thriving, intergenerational precinct that brings together people of all ages, so it's really encouraging that the judges specifically acknowledged the unique 'whole-of-life approach' of the development," he said.

The project has also been shortlisted for the 2019 Australian Interior Design Awards' hospitality category for interior architect Fender Katsalidis' work on the project. The winner will be announced on Friday 31 May at a gala presentation in Melbourne.

Within the first two months of trade, membership of the new Harbord Diggers Club surged by over 20,000, signalling the popularity of the project's award-winning design, combined with the club's breathtaking coastal headland location.

STADIUM DESIGNED WITH PEOPLE IN MIND

Sydney's newest world-class stadium has been unveiled to the public, and the first sporting event at the venue which is located in the city's west, will be held later this month.

Built on the site of the old Parramatta Stadium, the new $360 million Bankwest Stadium was delivered by Infrastructure New South Wales and forms a key part of the NSW Government's Stadia Strategy to improve sporting infrastructure across the state.

The stadium is managed by Venues NSW and caters for national and international major sporting events by providing undercover seating for 30,000 people, high-quality food and beverage offerings, five levels of premium, corporate and function spaces, large LED screens and Wi-Fi capabilities throughout.

In December 2016, Lendlease was awarded the contract to design and build the Bankwest Stadium, with construction commencing in 2017.

Global architecture and design practice, Populous, as part of the Lendlease consortium, designed the rectangular-shaped stadium, spanning 80,000 square metres.

The stadium's exterior design is simple but irregular, with steel pillars fanning out of most of the infrastructure on the ground level to make a big statement at entry.

Another design feature which plays a big role of the function of the venue, is the specially designed roof with fabric mounted on the underside, designed to greatly enhance acoustics. The roof can also be lit up with the home team's colours, helping to heighten game-day intensity and create a great atmosphere.

According to Populous, the design of the stadium aimed to create the best possible venue to watch live games while also making sure it spoke to the wider community.

SPECTACULAR FAN EXPERIENCE

The stadium includes an Australian-first inclusion of convertible safe standing positions in the North Stand. This means that 1,000 seats behind the northern goals provide standing positions for the active home football fan during the season but can also

be converted into seats for rugby fans in winter. The seats, built at the steepest permissible angle, are closer to the field of play than any other stadium in Australia.

The stadium also boasts a 360-degree open concourse with views of the field of play so fans will not miss any of the action while buying food and beverages.

Western Sydney's more egalitarian nature was also catered for in the design of the stadium. This was achieved through the inclusion of Australia's first continuous suite deck, allowing for a social in-bowl balcony experience.

CATERING FOR FAMILIES AND THE PUBLIC

To ensure the stadium catered for families with children of all ages, it was important that the stadium was designed to be family friendly. This has been achieved through the inclusion of a family seating zone with direct connections to a Kids Zone and nearby family activation areas. These outside activation areas were designed by landscape design studio, ASPECT Studios, to integrate the stadium facility within the surrounding city and parklands.

According to ASPECT Studios, the active urban park forms the heart of the public experience and will re-energise the western edge of the CBD.

"The park's terraced design will provide a dynamic setting for multiple uses and activities, including giant slides, sporting facilities and water play," the company explained, "the park will also form a new meeting place to encourage everyday engagement for everyone and has the capacity to transform into an event space during game days at the stadium."

Through sustainability measures such as energy-efficient

"According to ASPECT Studios the active urban park forms the heart of the public experience and will re-energise the western edge of the CBD."

LED sports lighting and water harvesting for irrigation, the stadium project team is targeting a Gold LEED Energy and Environmental design rating.

PROJECT TIMELINE

On 1 December 2016, Planning Approval was granted for Stage One of the stadium project. This included the concept design and the demolition of Parramatta Stadium and the nearby Parramatta Swimming Centre. Only a few days later, the winning design for the stadium was unveiled by the NSW Government, and Lendlease was announced as the preferred contractor.

In response to winning the contract, Lendlease's CEO of Building, Dale Connor said he felt incredibly proud to build the sporting facility for Western Sydney.

"This project is an opportunity for us to continue our legacy in the delivery of important public and sporting infrastructure, including the original Parramatta Stadium in 1986, but also to continue our commitment to enhancing Greater Western Sydney's prosperity," he said.

Prior to demolition works commencing in February 2017, more than 500 fans took home a piece of history from the Parramatta Stadium, including seats and turf from the field.

"This stadium holds some of the strongest memories for Eels,

Wanderers and entertainment fans who have taken the once in a lifetime opportunity take home a piece of history," said Member for Parramatta Geoff Lee at the time.

"Keepsakes ranging from seats to pieces of the ground's hallowed turf are now at home with fans across the country as far as Perth, a significant part of the Parramatta Stadium story," Mr Lee shared.

A range of machines pulled the 31-year-old stadium to the ground including cranes, bobcats and excavators and demolition works concluded in July 2017.

In August 2017, Stage Two Planning Approval was granted, which covered the design, construction and operation of the stadium. By this point, more than $60 million worth of local contracts were in place with other local companies for design, demolition, civil works, remediation, piling and building services.

On 24 September 2017, Lendlease officially commenced construction of the stadium, and in June 2018 a key milestone was achieved when the NSW Government and Lendlease celebrated the topping out of the new stadium – an event to mark the completion of the stadium's concrete structure and reaching the highest point of the stadium. By then, 26,000 cubic metres of concrete had been poured, and 2,500 tonnes of steel had been installed.

By the end of August 2018, more than 70 per cent of the construction was complete and seats were being installed. Construction work continued over the period, and all hands were on deck to get the job done in the lead up to its completion date.

In February 2019, the Western Sydney Stadium was 92 per cent complete and still on track to be finished by the end of March 2019. At this point, over 80 per cent of the 30,000 seats were installed and fit-out works were continuing. Food and beverage outlets were also in the process of being finished.

Following its completion in late March, the Bankwest Stadium was handed over to Venues NSW and operator VenuesLive for vigorous testing and commissioning.

The stadium is estimated to have created approximately 1,200 jobs over its construction period and will continue to support between 600 and 900 jobs once fully operational.

To celebrate the opening of the stadium and to give eager fans their first look at the world-class sporting facility, a free Community Open Day was held on 14 April.

The Community Open Day event also provided a chance to test everything at the venue before the first sporting event; Monday night football, which is to be hosted on 22 April.

The Bankwest Stadium is set to form the centrepiece for the transformation of Parramatta and enhance a sense of place in the revitalised Parramatta CBD within its historic parkland setting. It is a stadium designed with people in mind, aiming to provide an unrivalled game-day experience and result in major economic benefits for the Western Sydney community.

SYDNEY'S NEWEST STADIUM A HOMEGROWN COLLABORATION

Sydney's newest sport and entertainment venue, the $360 million NSW Government funded Western Sydney Stadium (known commercially as Bankwest Stadium), boasts a series of Australian-firsts that revolutionise modern stadium design. Populous embraced the brief from the NSW Government asking for the design to be the best club stadium in Australia by focussing on creating an extraordinary atmosphere for fans and ensuring spectators are closer to the action than any stadium in the country.

Populous understood the need to design a stadium which incorporated the strong tradition of rugby league and football (soccer) within the Western Sydney community. Designed to seat 30,000 football fans at sporting events within the stadium, the precinct focuses on the game day experience, not only for fans within the stadium, but for the wider community as a family-friendly and inclusive venue.

Led by Lendlease, the design and construction team ensured the design, manufacture and build of Bankwest Stadium was a collaborative effort involving local architects, engineers and local fabricators to ensure the project engaged and focussed on the Western Sydney business community.

Al Baxter, Principal Architect at Populous, said "we were excited to collaborate with Lendlease, Aurecon and local steel fabricators to create a stadium that ultimately focused on what makes live sport extraordinary – the atmosphere, proximity to the pitch, and being there to support our local teams in national sporting codes. We wanted to create an experience that draws the Western Sydney community together."

"One of our key inspirations was to incorporate aspects of the manufacturing and industrial heritage of Parramatta and the greater Western Sydney area into the design," Baxter said.

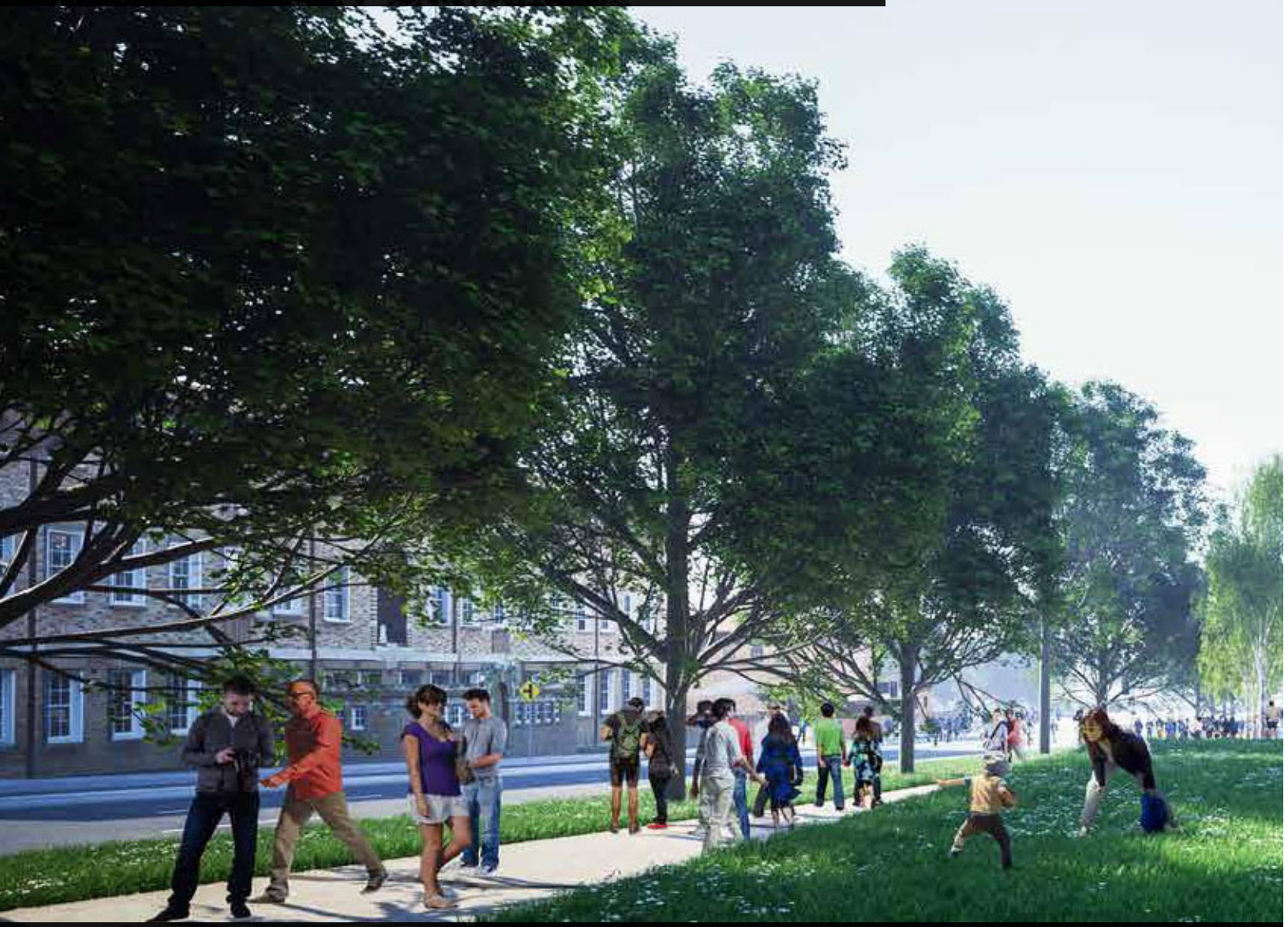
The stadium features over 4,500 tonnes of locally-manufactured Australian steel, with 2,600 tonnes of it in the roof alone. Manufactured by Southern Steel Supplies in Milperra, the steel was fabricated by a number of local Western Sydney businesses. The steel sections were cleverly designed to fit on a standard lorry and assembled on the stadium pitch, preventing the need to disrupt the busy streets in Parramatta with oversized delivery vehicles. Other flow-on effects of using local manufactured steel were to minimise construction time and bring over $60m in locally sourced construction goods and services into the project budget.

Populous' design incorporated the use of exposed steel on the exterior of the stadium: on show in the concourse entries and

precast concrete units, creating a distinctive horizontal pattern facing O'Connor Street. Sourcing local steel complemented the fact that over 90 per cent of materials from the old Parramatta Stadium were recycled to construct the new stadium, allowing the venue to apply for LEED Gold V4 Certification - the world's most widely used green building rating system.

Building on the insights and special features of iconic sports and entertainment venues around the world, the design for Bankwest Stadium delivers a first class stadium, made in the West and set within a sporting and recreational precinct - a stadium in a park, by a river.

Bankwest Stadium



Sydney's newest live sporting and entertainment venue, boasting a series of Australian-firsts that revolutionise modern stadium design

For more information on the innovation behind Bankwest Stadium, visit **populous.com/project/western-sydney-stadium**

Stadium proudly funded by the NSW Government

POPULOUS®

DRAWING PEOPLE TOGETHER®

THE LIVING CENTRE OF THE FUTURE

Conveniently located just 500 metres off the Pacific Motorway (M1) and next to the Coomera train station, Westfield Coomera is Scentre Group's first greenfield development and was delivered in partnership with QIC Global Real Estate (QICGRE).

The vision behind the $470 million Westfield Coomera development was to deliver a one-of-a-kind retail, dining, lifestyle and entertainment experience for locals and visitors on the Northern Gold Coast.

The Gold Coast is expected to have a population of 699,200 by 202 , growing from 581,400 in 2016 according to figures by Urbis. Therefore, in response to the significant growth that has already happened and that is forecast to continue in this part of the Gold Coast, the Westfield Coomera development was built to serve the growing population.

Through Westfield Coomera and Scentre Group's other recent redevelopment projects across the nation (such as the well-received $350 million Westfield Carousel redevelopment which opened last year in Western Australia), the company is aiming to transform shopping centres into 'living centres'; destinations that curate an exceptional retail, services and product mix that reflect the local community.

"Westfield Coomera brings this [idea] to life with 40 per cent of the centre dedicated to dining, entertainment and services. It is a new world of

experience and is a destination you visit not because you have to… but because you want to," explained Scentre Group Chief Executive Officer, Peter Allen.

With more than 59,000 square metres of indoor-outdoor retail and leisure space, Westfield Coomera offers 150 specialty stores and includes a two-level dining and entertainment precinct, market-style fresh food, quick eateries and a never-before-seen purpose-built and curated outdoor space for children and families, 'The Backyard'.

The Backyard is a 2,600 square metre urban oasis, filled with tall trees, native flora and bright and colourful art sculptures. It includes kids' play zones, scooter circuits for all ages, an interactive water play billabong, picnic tables and a built-in BBQ for communal use – together forming the ultimate family-friendly destination.

For added entertainment, Westfield Coomera is home to iPlay Adventure, which boasts a series of fun activities for all ages including a Clip N Climb, a high-ropes course, several arcade games and laser-tag.

For adults young at heart, the creators of iPlay developed The Park Coomera, which features a 'putt-putt meets beer garden' style venue and includes a full bar and pizzeria, full lane bowling, live music and more.

Studio Creative Lead Interiors for Westfield Australia, Sally McBean said Westfield Coomera was designed to be more than just a shopping centre.

"Westfield Coomera is a reflection of the lifestyle of the community – it's fresh, it's family-oriented, it's grounded and it's relaxing. The look and feel is natural, with stone floors; the finishes give ode to the coast. The overall feeling is homely, a place to spend time with friends and family," she said.

Ms McBean added that her favourite part of the centre's design was the seamless integration of indoors with the outdoors.

"The external spaces make it feel leisurely, almost like a holiday. It's eclectic yet simple, humble and coastal," she commented.

"The project faced several challenges during its construction period, including severe weather conditions for large periods in early 2018, design changes from tenants at a late stage and a big crew of riggers that was required to install the steelwork on site at the same time."

SETTING A NEW STANDARD FOR SHOPPING CENTRE CONSTRUCTION

Approximately 860 tonnes of structural steel elements were erected at the project, with nearly a third of that being used to build the Events Cinema complex alone.

The project faced several challenges during its construction period, including severe weather conditions for large periods in early 2018, design changes from tenants at a late stage and a big crew of riggers that was required to install the steelwork on site at the same time.

Approximately 7,500 jobs were created because of the project, both during construction as well as after opening through retail and hospitality positions.

The building officially opened on 11 October 2018 and was greeted by thousands of locals ready to experience the living centre of the future. As Scentre Group's first greenfield development, Mr Allen said Westfield Coomera signifies a pivotal moment not just for their business but sets a new standard for the industry.

"Having a blank canvas allowed us to reimagine the role of Westfield as social infrastructure and its place in the community, which we deliver today with this living centre of the future," he said.

PROCESSED STEEL STREAMLINED SHOPPING CENTRE CONSTRUCTION

Processing of beams prior to fabrication was an important value-add in LIBERTY Metalcentre's supply of structural steel to the Westfield Coomera development.

The Westfield Coomera shopping complex on Queensland's Gold Coast became Westfield's first 'greenfield' development in more than a decade when it opened late in 2018.

The $470 million centre was completed on schedule on the back of a collaborative steel supply chain and comprehensive processing of steel beams prior to fabrication.

Fabricator Steel Fabrications Australia took delivery of approximately 860 tonnes of structural steel from LIBERTY Metalcentre for the Westfield complex, with approximately a third used in the construction of the Events Cinema component of the complex alone.

LIBERTY Metalcentre's Mark Cubby says a variety of steel materials made up the order from Steel Fabrications Australia, the bulk of which were length-based, linear elements. He says processing of steel beams prior to fabrication was an important value-add in LIBERTY Metalcentre's supply of product to its customer.

"All the different materials we deal in – whether plate, structural or tube – are delivered to us from the mill in stock lengths," Mark said.

"We have three beam lines that allow us to cut, drill and fully process the beams. And we have a six-axis coping line that does all the cut-outs for the beams. So, we had the capability to drill and cut all the individual components exactly to the customer's requirements."

Mark explains that the coping line made it possible to do a lot of the cut-outs that a fabricator would previously have had to.

"We aim to provide a fully processed solution for the fabricator so they essentially just have to weld the items together," he said. "It's about getting our service offer better so we become the processor of choice for the Tier One fabricators."

STEEL IN CONSTRUCTION

The Westfield Coomera shopping centre is situated close to the Pacific Highway and features more than 140 specialty stores, including marquee names such as Woolworths, Coles, Target and Event Cinemas.

Owner Scentre Group, together with its development partner QIC Global Real Estate (QICGRE), estimates that approximately 7500 jobs were created as a result of the construction of the centre and through employment at its outlets. Greg Miles, Scentre Group Chief Operating Officer, said the complex "will form part of the longer-term Coomera Town Centre project that will encompass a wide range of amenities for the local region."

The shopping complex is one of three projects that Steel Fabrications Australia has been involved in recently that have required orders of approximately 1200 tonnes of steel each from LIBERTY Metalcentre. Among the other jobs the companies have collaborated on recently have been the Brisbane International Airport northern expansion and construction of three large hangars and ancillary buildings as part of the Battlefield Airlifter Project at RAAF Amberley.

Steel Fabrications Australia Senior Estimator Peter Moolenschot said his company had to rise to a number of challenges during construction of the latest Westfield complex. Up to 20 riggers were needed to install the steelwork on site at one time and the company also had to factor in design changes that came through from tenants at a late stage. He said steel erection subcontractor Wright Way Rigging deserves special credit for having to contend with inclement weather for large periods of the build in the early stages of 2018.

As for his company's dealings with LIBERTY Metalcentre, Peter says the relationship was a strong one throughout the project. "We had a dedicated person to look after our account, so I have to say our interactions with the LIBERTY Metalcentre team were all very positive."

LIBERTY

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We believe in building a future full of possibilities.

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LIBERTY steel was used extensively in the construction of Westfield's latest shopping centre development – Westfield Coomera, Gold Coast (image courtesy Scentre Group).

LIBERTY HRS steel now features LS AS markings.

LIBERTY's extensive range of hot rolled structural steel products now feature LS AS in place of earlier ONE AS markings. LIBERTY'S products are designed to comply with all relevant Australian Standards and carry ACRS certification:

https://www.libertygfg.com/news/non-conforming-building-products-senate-report/

The Ny Horten Videregående Skole is the first public building in Norway to achieve BREEAM Outstanding interim certification.

THE MOST 'INNOVATIVELY SUSTAINABLE' BUILDINGS

BREEAM is the world's leading sustainability assessment method for masterplanning projects, infrastructure and buildings. It recognises and reflects the value in higher performing assets across the built environment lifecycle, from new construction to in-use and refurbishment. Presently, there are over 500,000 buildings certified under the scheme across 81 different countries.

Each year the BREEAM Awards aim to recognise excellence in sustainable building and showcase the most 'innovatively sustainable' BREEAM-rated buildings of the previous 12 months. The 2019 BREEAM Awards, held on 4 March, were no different and featured a range of outstanding eco-friendly buildings and projects from across the globe.

NORWEGIAN SCHOOL PUSHES UNEXPLORED BOUNDARIES

The Ny Horten Videregående Skole, an upper secondary school in Norway, which took out the award for 'Public Sector Project – Design Stage', is the first public building in Norway to achieve BREEAM Outstanding interim certification. Catering for 1,200 students and 200 staff, the school adopts passive design measures, makes extensive use of wood and is intended to be energy positive.

The judges said the project stood out as an accessible and well-rounded exemplar for school buildings in Norway while pushing several relatively unexplored boundaries, including its approach to delivering net positive electrical generation in a northern climate and 'fossil free' construction processes. The upper secondary school is set to open in Autumn 2019 and will span 18,000 square metres over four floors.

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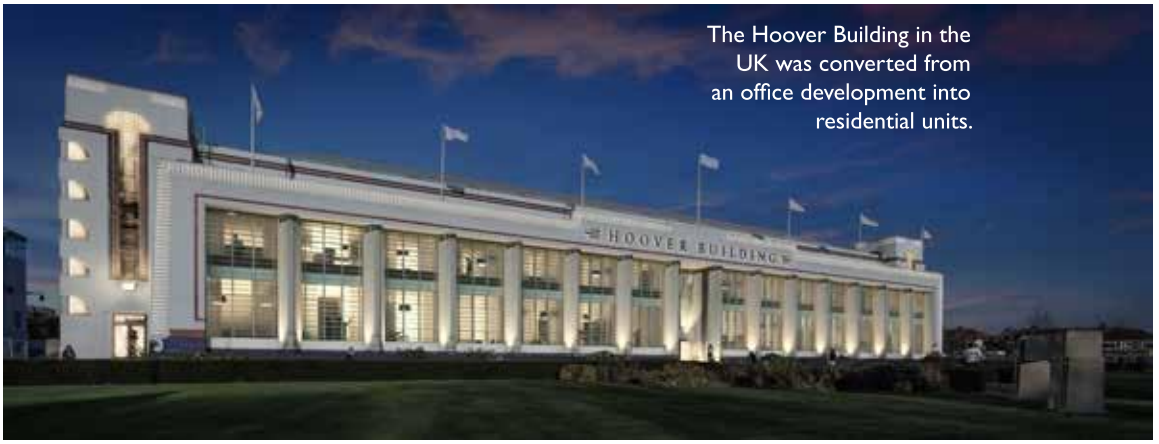
Falconhoven L-Blok Apartments in Belgium sets a new standard in the country's residential market.



The Hoover Building in the UK was converted from an office development into residential units.

A NEW STANDARD FOR BELGIUM'S RESIDENTIAL MARKET

The Falconhoven L-Blok Apartments in Belgium was bestowed with the 'Homes – Design Stage Award'. Designed by Caruso St John Architects for Construction & Investment Partners, and sets a new standard for Belgium's residential market.

The three-storey block of 51 apartments used high-quality, sustainable and maintenance-friendly materials and implemented several occupant wellness measures throughout (such as allowing for optimal daylighting, acoustics and healthy indoor air quality) to not only lower energy costs, but also the building's impact on the environment.

A WORKPLACE THAT BENEFITS PEOPLE AND THE PLANET

Deloitte's new offices in the UK was awarded the 'Commercial Project – Post Construction Award' and provides 2,000 core and 1,500 flexible working positions, as well as spaces for collaboration and refreshment. Deloitte wanted to challenge traditional 'green building' thinking and deliver a workplace that would benefit their people and the planet.

The building is also recognised as the first BREEAM Outstanding/ WELL Gold dual-certified office fit-out in the world. Targeting BREEAM Outstanding provided Deloitte with the framework to improve energy efficiency, reduce water consumption, minimise waste production, and prioritise sourcing materials with a low environmental impact.

ICONIC LONDON BUILDING GOES SUSTAINABLE

The Hoover Building in the UK took out the 'Homes Projects – Post Construction Award'. After sitting dormant for more than a decade, IDM Properties converted this iconic building from an office development into 66 modern and sustainable residential units.

A BREEAM 'Excellent' rating was also achieved through key carbon saving features such as installing a second glazing system to preserve the building's existing original windows (while enhancing thermal performance) and implementing cycle storage facilities to reduce residents' reliance on cars.

BUILDING REFLECTS CORPORATE POLICY

The People's Prize – the Your BREEAM Award - was awarded to the Unilever Food Innovation Centre (UFIC) in Wageningen, in the Netherlands. The UFIC will be a state-of-the-art facility which is designed to strengthen the company's ability to develop cutting edge sustainable food innovations. Built using a range of sustainable materials, the 18,000 square metre building will house a mini-factory, a food and customer experience area, offices and laboratories, and was designed to be inspiring, sustainable and facilitate innovative ways of collaborating.

Deloitte's new offices in the UK challenge traditional 'green building' thinking.

The Unilever Food Innovation Centre will help iin developing cutting edge sustainable food innovations.

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CSR

From 1 May 2019, changes to the 2019 National Construction Code (NCC) will allow the use of fire-protected timber construction systems in all Class 2-9 buildings, up to a height of 25 metres. The changes add schools, retail premises, hospitals and aged care facilities to the previously approved multi-residential, hospitality accommodation and office buildings.

Australia's tallest engineered timber office building, 25 King in Brisbane. Image courtesy of Urbis.

NCC CHANGES EXPECTED TO INCREASE USE OF TIMBER

Following the adoption of the 2019 NCC, mid-rise timber buildings can be constructed from traditional lightweight timber framing as well as mass timber options, including cross laminated timber (CLT), laminated veneer lumber (LVL) and glue laminated timber (glulam). What was once restricted to multi-residential, hospitality accommodation and office buildings in the 2016 NCC, now covers all classes of buildings.

Forest and Wood Products Australia (FWPA) National Codes & Standards Manager, Boris Iskra, who led the submission process for the 2016 and the current 2019 NCC changes, said builders and developers wanting to use timber can now gain building approval with ease, as long as their designs meet the Deemed-to-Satisfy requirements.

As a result, designers can now create mixed use mid-rise timber buildings, with residential upper levels and lower levels used for office space or retail.

The 2016 change has already resulted in a growing number of mid-rise residential projects considering and adopting timber as the primary building material.

In November last year, Australia's tallest engineered timber office building, 25 King in Brisbane was completed by Lendlease.

Inspired by the environmental benefits and versatility of timber, 25 King showcases timber from roof to floor. The nine-storey plus ground superstructure utilises a combination of revolutionary engineered CLT and glulam. The glulam is used for the structural beams and columns, and the CLT for the floors, lift shafts and escape stairs.

The engineered timber has a lower carbon footprint than traditional building materials, and is sourced from certified sustainably-managed forests. It also allows for precise offsite prefabrication and safer onsite construction.

Currently under construction, Daramu House will be Lendlease's sixth engineered timber building in Australia, joining its neighbour, International House Sydney as well as 25 King St in Brisbane, the Forte Apartments and Library at The Dock in Melbourne, and the Jordan Springs Community Hub in Western Sydney.

The new building, which will be completed in late 2019, will have six floors of office space constructed from CLT and glulam in Sydney's Barangaroo South and will also include roof-top planting to capture rain, and solar photo-voltaic cells to enable power to the building and the precinct.

Rob Deck, Managing Director, Barangaroo South said: "Daramu House will provide tenants with health and wellbeing benefits combined with a warm, clean and natural environment."

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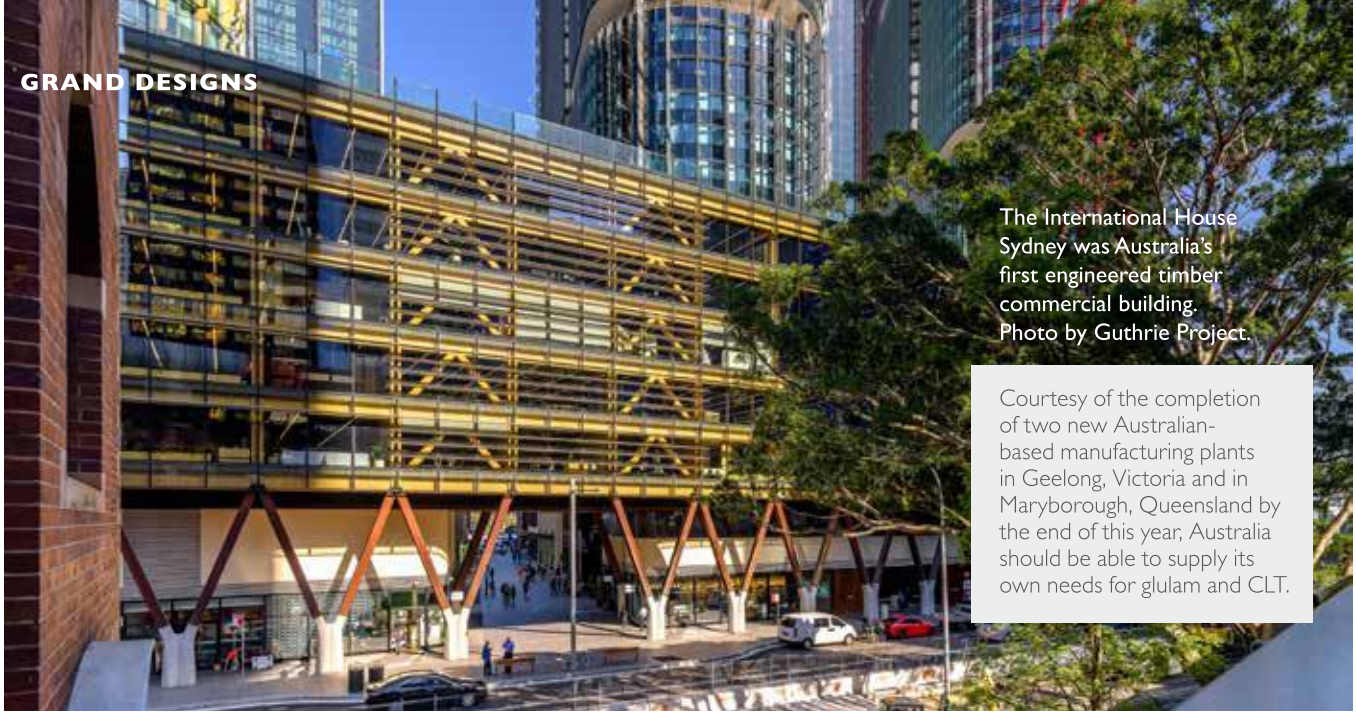


The International House Sydney was Australia's first engineered timber commercial building. Photo by Guthrie Project.

Courtesy of the completion of two new Australian-based manufacturing plants in Geelong, Victoria and in Maryborough, Queensland by the end of this year, Australia should be able to supply its own needs for glulam and CLT.

FWPA's Managing Director, Ric Sinclair said it's been incredibly satisfying to see the market acceptance of timber in these projects and he believes this is just the tip of the iceberg.

"Every week we hear from new designers and developers who are realising the cost and speed benefits of timber systems and are looking for more information," he said.

"The timber used in every one of these new mid-rise projects displaces other materials, so it's effectively creating new market opportunities for timber building system suppliers and added sales volume for our industry."

Mr Sinclair said that one of the major benefits of the NCC change is that timber will now be an option for mixed use mid-rise buildings, the retail, office and apartment complexes, "that are growing in popularity in inner and middle suburbs as part of urban infill policies".

Australia is not the only country pushing to use timber in increasingly taller buildings. In Japan, for example Sumitomo Forestry has released a concept plan for a 70 storey and 350-metre-tall wooden high-rise building. The W350 building will be a hybrid wood and steel structure made from 90 per cent wooden materials. However, the building is not expected to be delivered until 2041, to mark the 350th year since the business was founded in 1691.

PROFILE

CHANGES TO THE NCC IN 2019 TO CREATE NEW TIMBER OPPORTUNITIES FOR MID-RISE DESIGNERS, DEVELOPERS AND BUILDERS

Changes to the 2019 National Construction Code Volume One (NCC) increase the range of buildings, up to an effective height of 25m, in which fire-protected timber construction systems can be used. The new Classes add schools, retail premises, hospitals and aged care facilities to the previously approved multi-residential, hospitality accommodation and office buildings.

In 2016, following extensive work and a successful submission by Forest and Wood Products Australia (FWPA), the company behind the WoodSolutions Program, a Deemed-To-Satisfy (DTS) solution was introduced to the NCC permitting, for the first time, construction in fire-protected timber building systems to an effective height of 25 metres (typically 8 storeys) for Class 2, 3 and 5 buildings.

In the 2019 edition, these concessions will be extended to include all Classes of buildings, enabling the use of timber building systems in aged accommodation, schools, retail and hospitals. Timber building systems include traditional lightweight timber framing and the newer mass timber options, including cross laminated timber (CLT), laminated veneer lumber (LVL) and glue laminated timber (glulam).

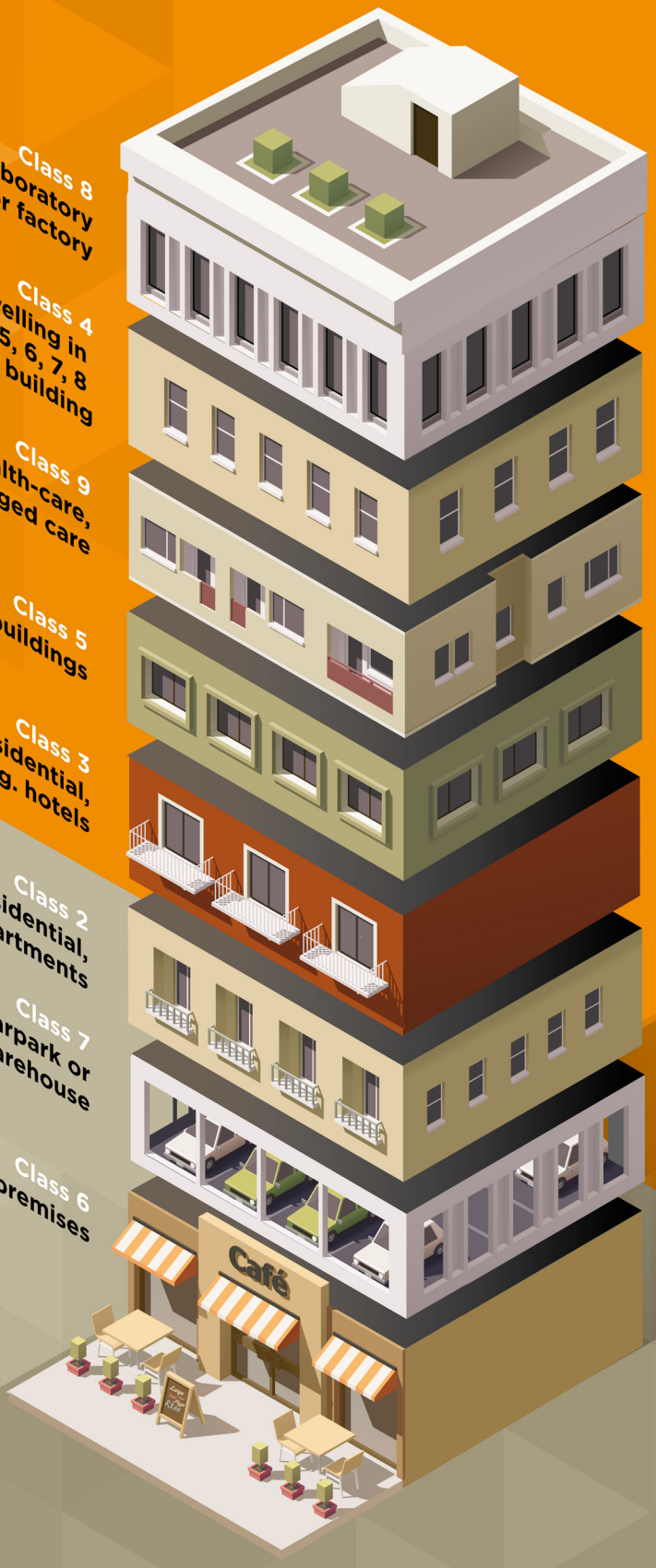
FWPA National Codes & Standards Manager, Boris Iskra, who led the submission process for the 2016 and the current 2019 NCC changes, said that due to the new provisions, builders and developers wanting to use timber will no longer have to undertake time-consuming and expensive 'performance solutions' to gain building approval, as long as their designs meet the DTS requirements. In effect, it opens the door to a wide range of options and combinations, for example, designers can now create mixed use mid-rise timber buildings, with residential upper levels and lower levels used for office space or retail.

Another change to the Code will require all Class 2 and 3 buildings four storeys or above in height, to be sprinkler protected. According to Boris Iskra, sprinkler systems will substantially enhance fire safety and the cost of putting sprinklers in will be significantly offset by greater flexibility provided by new concessions for sprinkler protected Class 2 and 3 buildings.

If you have a mid-rise project in the pipeline, the WoodSolutions Mid-rise Advisory Team pilot program (VIC and Qld) provides free consultancy services to explore the most suitable options in timber and realise the many benefits they can deliver.

A Class Act.

Changes to the National Construction Code mean that more classes of mid-rise buildings can deliver the benefits of wood.



From May 1, 2019 changes to the National Construction Code introduce Deemed-to-Satisfy provisions that allow timber building systems for all Class 2-9 buildings with an effective height of up to 25m - typically 8 storeys.

You can discover more about designing and building with wood – whatever the size or purpose of your project - at woodsolutions.com.au.

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MAKING AN IMPACT WITH TRENDY TILE

Tiles continue to be one of the most popular choices for flooring, mainly because of their low maintenance benefits, but also because of their ability to make a big impact on a space.

Although the market offers many basic and standard tile collections that can last through seasonal trends, if designers want to make a grand statement there are plenty of tile choices and methods of application to choose from that will take any space to the next level.

Here are the tile trends that are already taking 2019 by storm.

TERRAZZO, A WORK OF ART

Terrazzo made a big comeback in 2018, but with the release of more design options this recognisable material is expected to rise rapidly in the design ranks. The use of terrazzo in tile as well as using natural stones and materials consisting of embedded rock and concrete is not only functional, but can also become a work of art.

GET IN SHAPE

For those designers tired of plain white and grey tile, tiles with a mix of abstract or geometric shapes is the answer. Simple, bold, block and more innovative patterns are expected to be released in 2019.

HYPER-MODERN DESIGN

If an interior space needs a hyper-modern look, improved manufacturing processes mean tiles can be produced with high-definition ink technology which can create a realistic and seamless design.

HANDMADE UNIQUENESS

The difference between handmade and machine made is that tiles made by hand have a more unique shape, with jagged edges that aren't completely uniform, which makes each tile unique. Handmade tile is highly decorative and the pattern will result in a textured look without the need for bold colours.

LARGE-SCALE MARBLE

While there is nothing revolutionary about using marble in interiors, there has been an uptick in spaces where the marble is extended from the walls to the counters and all the way down to the floors in a sweeping effect.

MIXING MATERIALS

More traditional stone tiles have been given a modern yet timeless update with the addition of eye-catching metal inserts. Luxurious Carrara marble, for example can be completely transformed with the addition of a brass insert.

VOLCANO

Erupt with **VOLCANO**

Volcano, while contemporary, allows for individual styles and designs to solidify your desired application areas. Defy the beauty of Mother Nature with two dark colour tones to choose from passing through the veins of the tile only to meet the crust of the Earth, giving your space an awe-inspiring atmosphere.

MAT GRT

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JohnsonTILES

Unique wall and ceiling designs can completely change the look of a space and can pay tribute to a specific brand or bring a company's vision to life. Different materials and textures including concrete, exposed brick or wood allow designers to create a striking and memorable decor. Colour also plays a big role in an interior space and can transform the ambience in a room, evoke emotions and highlight corporate branding.

Origin Energy's headquarters in Brisbane. Photo by Nicole England.

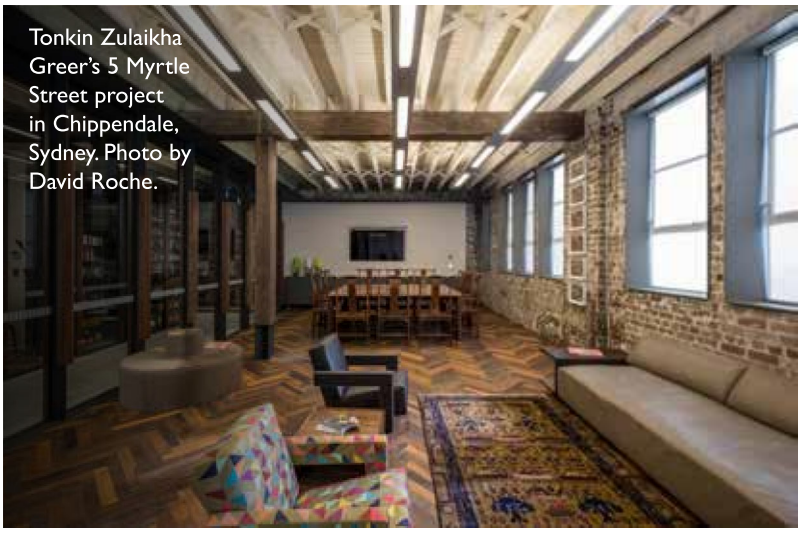
BRINGING BRAND AND VISION TO LIFE BY DESIGN

Recently, the 2019 shortlist for the Australian Interior Design Awards (AIDA) was announced with more than 200 projects nominated in seven categories including hospitality and workplace design.

45 projects were nominated in the 'workplace design' category, including HASSELL's work for Origin Energy's headquarters in Brisbane.

Origin Energy consolidated its footprint from two premises to one across eight floors within the premium commercial tower. The building has a space for 'town hall' functions which includes high-end joinery furniture but also wooden and curved walls.

Another nominated project in the same category was Tonkin Zulaikha Greer's 5 Myrtle Street project in Chippendale, Sydney for client Judith Neilson, an Australian philanthropist. The project involved the repurpose of a two-storey early 20th Century Chippendale glass factory into purpose built offices situated either side of a new central courtyard.



Tonkin Zulaikha Greer's 5 Myrtle Street project in Chippendale, Sydney. Photo by David Roche.

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MAXIWALL

Arup's new offices in Sydney by HASSELL. Photo by Earl Carter.

Architects Pierce Widera were nominated for their work on the Sister of Soul venue in Melbourne. Photo by Derek Swalwell.

The new work to the exterior of the existing building was deliberately played down and repaired in line with its historic façade, which is in stark contrast with the building's contemporary interior. Inside, the architecture is refined with sophisticated materials which offer a new layer to the orginal rustic structure.

The interior design has retained the industrial tone of the factory's past by highlighting the grain and quality of original materials such as brick, steel and large-scale rustic timbers. The new interior adds a touch of glamour, with refined detailing of bronze, steel, glass and bespoke timber furniture.

Another nominee was Arup's new offices in Sydney, where HASSELL was involved to create a space where the client was both the building engineer and the future tenant. This gave the team an opportunity to influence the building's architecture and engineering to align with their vision for the office interior.

"We worked hand-in-hand with Arup through every step of the process to create spaces that stimulate and support the kind of learning and experimentation Arup thrives on – and put the company's culture on show," says HASSELL.

At the heart of the workplace is a four-storey void, connecting all five floors. Horizontal and vertical views across and between levels allow for wide-angle views of Arup's everyday operations. The staircase, connecting areas vertically, is a design and engineering feat – a cast concrete structure floating between floors. The concrete aspect has been repeated on the walls of the void which blends in with wooden accents including timber flooring and handrailing.

HOSPITALITY DESIGNS PLAY WITH NEUTRAL AND STRIKING COLOURS

34 projects were nominated in the 'hospitality design' category, including Australian studio Biasol which paired worn concrete walls with pink marble and rich red accents for the interiors of Pentolina, an Italian restaurant in Melbourne. Set inside a 100-year-old building on Little Collins street, the studio left the patchy concrete walls of the building largely untouched in an attempt to mimic the stone façades in historic Roman laneways. The leather detailing on the seating is perfectly matched with a unique wine red colour on the ceiling.

Overhead lies metal shelving lined with greenery designed to counter the lofty ceilings and create a greater sense of intimacy amongst patrons.

Architects Pierce Widera were also nominated for their work on the Sister of Soul venue in Melbourne which features bright, minimalist interiors. The simplicity of the space does wonders in highlighting the unique design elements, including the wooden beams that have been painted partially white. The textured

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Australian studio Biasol paired worn concrete walls with pink marble and rich red accents for the interiors of Pentolina in Melbourne. Photo by Jack Lovel.

white walls further showcase the few spots of colour that were allowed into the space.

Also shortlisted was Jackson Clements Burrows Architects for the redevelopment of the Monash University Caulfield Campus' Building H Basement floor.

The previously dark and hidden café was completely transformed by opening up and pushing out the building envelope to its full extent. Soaring 3.5 metre high ceilings, full height glazing and open landscaped terrace allows an abundance of natural light and ventilation to filter the space.

A coloured green band encompasses the entry threshold where every material was carefully and harmoniously selected to reflect the adjacent green landscape. The green section of the café offers a certain degree of separation from the rest of the space which has a neutral and light palette, at the same time the two different tones complement each other perfectly.

The winners will be announced at a gala presentation to be held at Forum Melbourne on 31 May.

The Sable cafe at Monash University, by Jackson Clements Burrows Architects. Photo by Peter Clarke.

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New York City's fifth-tallest tower, 3 World Trade Center, was officially opened on 11 June 2018.

PROFILE

THE SMART, SUSTAINABLE SKYSCRAPERS GRACING AUSTRALIA AND BEYOND

While Australia's skyscraper industry might still be developing, a variety of upcoming landmark high-rise projects have the potential to set an international standard for exceptionally-designed tall buildings that stand the test of time.

At this year's Australian Smart Skyscrapers Summit, experts responsible for many of the country's most anticipated high-rise projects will take the stage, alongside the names who brought to fruition some of today's landmark international tall buildings.

Whether significant due to a unique façade, a high sustainability rating or simply due to sheer size, the projects on the agenda encapsulate the theme of this year's summit: *Transforming the Broader Urban Fabric*. Ultimately, each topic provides a useful foundation to draw from when seeking to develop, design and construct high-rises that benefit tenants and their surrounding cities.

Some of the projects set to be discussed at the summit include:

Green Spine - Melbourne, Australia

The unique winning design of the international Southbank by Beulah competition is set to permanently shift Southbank's identity as a 'concrete jungle', while dramatically transforming the Melbourne skyline.

Comprising a cantilevered structure broken up into tall towers, the UNStudio and COX Architecture-designed Green Spine will feature a geometric glass envelope filled with hundreds of green terraces and public podium spaces, topped off with a 'garden in the sky' which is accessible to tenants and visitors.

Jan Schellhoff, Associate Director of UNStudio will present on how the mixed-use concept will be developed into a built-form reality, while Beulah International Executive Director Adelene Teh will reveal what high-rise developers look for when selecting winning designs, and what set Green Spine apart from the rest.

3 World Trade Center (3WTC) - Manhattan, USA

With a construction cost of nearly $1 billion and a gross internal area of 2.8 billion square feet, the development of 3WTC has been an extensive undertaking. This becomes evident even without considering the sensitive nature of the project, conceived as part of a broader redevelopment of the WTC precinct following its collapse in 2001.

John McElgunn, Partner of Rogers Stirk Harbour + Partners (RSHP) will present on how his firm completed a project of such international scope to Gold certified environmental standards. He will also draw from 3WTC to

explore designing and building skyscrapers not in isolation, but as part of broader precinct masterplans.

Melbourne Square – Melbourne, Australia

Upon completion, the multi-building complex will further transform one of Melbourne's most urban neighbourhoods, Southbank. By opening the area up so that it becomes greener and more publicly accessible, Melbourne's status as a 'garden state' will be harnessed to elevate tenant and local wellness, while simultaneously encouraging the linkage and development of communities.

Paul Curry, COX Architecture Director will provide an in-depth analysis of bringing the masterplan to life. He will explore the role that the high-rise residential towers housed within the Square will play in benefiting their quality of life whilst inside, and drawing them to the city, and subsequent communities, present outside.

Vincom Landmark 81 – Ho Chi Minh, Vietnam

Though the 81-storey structure stands as the tallest building in Southeast Asia, its reputation as a global supertall icon is not merely down to its size.

The shopping mall housed at the base of the building, the observation deck at its crown, and the various apartments, hotels, and hospitality venues sitting in between highlight the diverse potential for supertall mixed-use towers in the near future. Visually, the tower's Vietnamese, bamboo-inspired symbolism and UVA-protective glass façade reflects a design that is as culturally contextual as it is environmentally sustainable.

Atkins Hong Kong Senior Director Jason Hutchings will utilise the tower as a case study for diverse supertall designs that fulfil a multitude of needs.

Olderfleet - Melbourne, Australia

Ahead of its 2020 completion, the 40-storey office tower has already earned pre-certification for a WELL platinum core and shell rating. From its building structure and window locations to its ventilation system and water quality, key elements of Olderfleet have been designed for tenant health, meaning that wellness will be significantly elevated for office employees.

Arup Commercial Property Leader Cameron Dymond will draw from this 'workplace of tomorrow' to outline how best to develop office towers for better long-term psychological and environmental outcomes.

The 3rd Annual Australian Smart Skyscrapers Summit is held on the 25-26 June, at the Melbourne Convention & Exhibition Centre.

The Shui Cultural Centre by West-line Studio. Photo: Jingsong Xie, Zheng Jinda, Yin Zhili, Kang Hongsen, Xie Haibo

MODERN FAÇADES
EXPRESS A DEEPER MEANING

Building façades are becoming increasingly important for architects to connect with a structure's location and purpose - beyond its functionality.

The texture of the bronze façade evokes the character for 'rain'. Image by West-line Studio.

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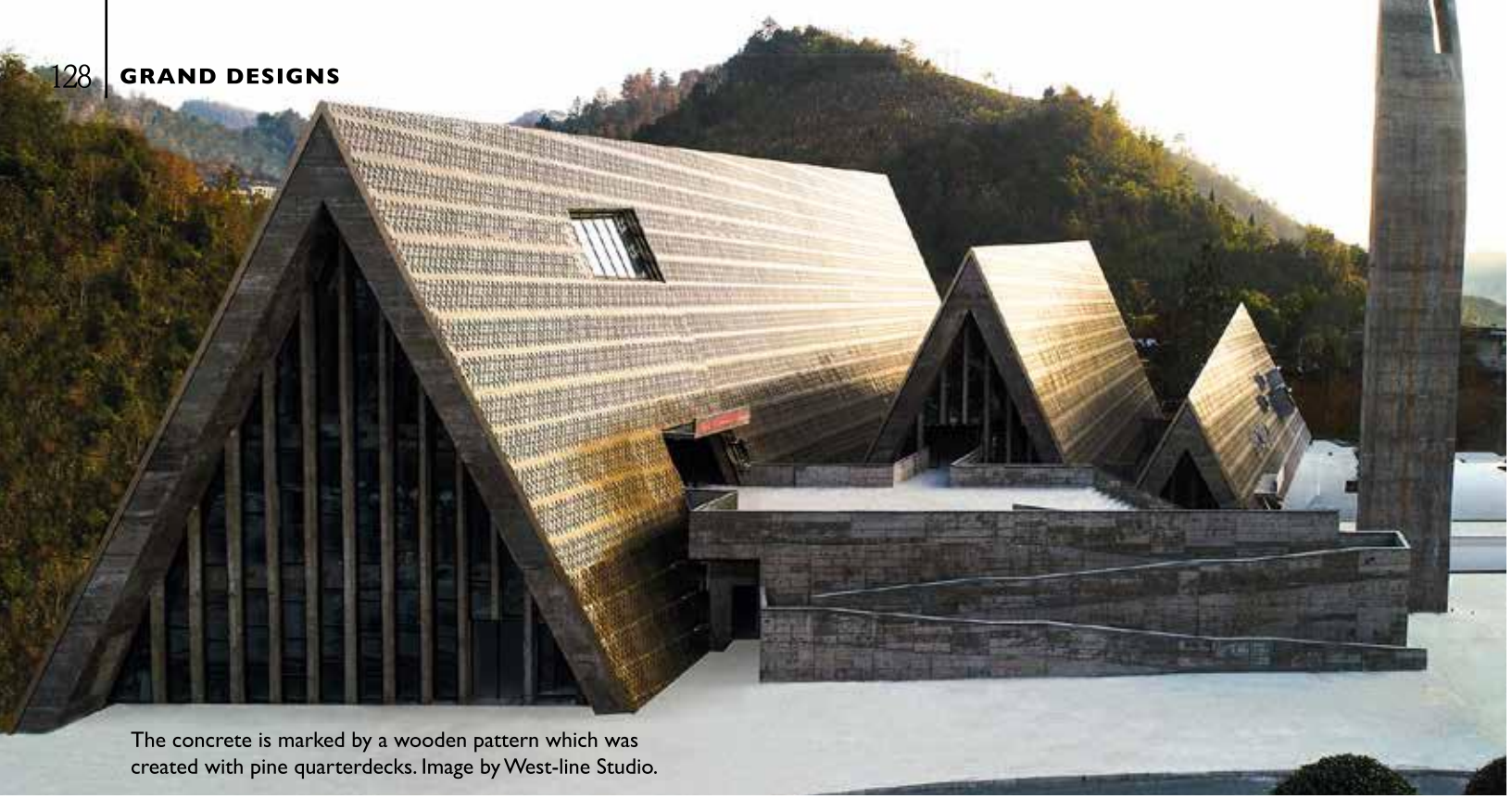

The concrete is marked by a wooden pattern which was created with pine quarterdecks. Image by West-line Studio.

Design and execution are two important aspects of building design and construction. While structural stability, space utilisation and energy consumption are some facets that go into designing a good building, it's the façade design which gives it personality. In recent times, building façades have undergone a revolution with designs that go way beyond conventional ones.

Here are two examples of the modern world's innovative exterior designs:

SHUI CULTURAL CENTRE BY WEST-LINE STUDIO

Located in the Southern Guizhou Province in China, this building pays homage to the local culture and traditional architecture of the Shui (meaning water), one of the ethnic minority groups in China who still retain their own language.

The façade is made out of perforated bronze plates but due to the acidity present in the local air quality, the architects knew they would be subjected to colour changes and corrosion. Since the particular texture of the bronze evokes the character for 'rain', the architects used 12 combined processes to overcome corrosion problems and to make the building shine under the sun for a longer time. The pattern makes the plates lighter - a thin skin which creates a contrast with the heavy concrete structure. It does not only have an aesthetic value but the high perforation rate also helps to prevent technological defects on the overall surface texture.

The concrete is marked by a wooden pattern which was created with pine quarterdecks. Due to the lack of resources and local expertise in concrete architecture, the architects had to establish a whole concrete production process-based matrix.

The project was the winner of the 2018 WAN Awards, in the façade category.

CELINE GINZA G6 BY CASPER MUELLER KNEER ARCHITECTS

The Celine Tokyo Flagship Store is located in Ginza, which is Japan's most celebrated shopping district. The new façade spans five storeys and is based on the Japanese tradition of 'Noren', a decorated curtain or screen that is placed in front of a store. The façade is made from bespoke ceramic pieces that are made from an untreated white clay and are only partially glazed and set in steel frames. The pieces were installed at different angles to create a varied pattern across the façade. The pattern was designed using computer parametrics, which was then translated into carefully controlled fabrication drawings, showing the rotation for each ceramic piece.

The project was highly commended at the 2018 WAN Awards, in the façade category.

The façade of the Celine Ginza building is made from bespoke ceramic pieces. Image courtesy of Casper Mueller Kneer Architects.

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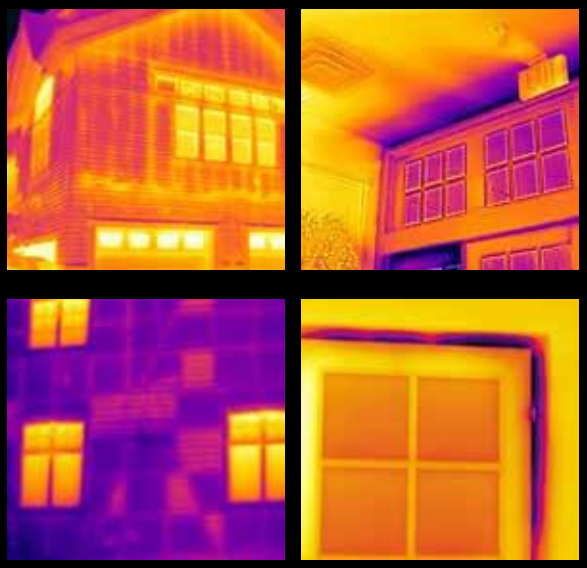

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