

# PER SPEC TIVE

**2023**

**JEWEL OF THE PACIFIC**  
Gold Coast's rare gem

**THE DIGITAL REVOLUTION**  
Unleashing the potential  
in the built environment

**BUILDING A FOUNDATION**  
for project success

# Contents

06

**GenAI A Cambrian explosion**  
for the digital age

10

**Building a foundation**  
for project success

14

**Mind the gap**  
AI bridges the divide in Southeast  
Asian construction

18

**The digital revolution** Unleashing  
the potential in the built environment

22

**Building defects** The problem can  
be larger than it seems

26

**Drone zones** Building the buzz  
for drones in construction

30

**What shelter-in-place** programs  
taught us about hotel renovations

34

**Moving north** The making of  
Northern Metropolis in Hong Kong

38

**The missing link** How blockchain can  
help construction industry leaders to  
monitor and manage change

42

**Data warehousing** A blueprint for  
quantity surveying's digital frontier

46

**Block by block** Smart contracts  
in South Africa

50

**Healthcare construction**  
Growth reflects changing  
needs of U.S. population

54

**Jewel of the Pacific**

58

**Should funding for public art  
be fixed in every budget?**

Enquiries  
Taryn Harbert  
[taryn.harbert@us.rlb.com](mailto:taryn.harbert@us.rlb.com)

Graphic design  
[Wills Brand Design](#)

# WELCOME

## Each year it feels like the world is getting faster – and we have the data to prove it.

It took 75 years before the telephone had 100 million users, but just 16 years for the mobile phone to reach the same milestone. The internet raced past 100 million users in seven years and Facebook in 4.5 years.

But in 2023 – in what has been hailed the “breakout year” for generative artificial intelligence – ChatGPT hit the 100 million mark in just two months. That record was smashed a few months later by the Instagram Threads app, which attracted 100 million users in just two days.

Technology is undoubtedly transforming the world, and no corner of real estate construction will remain untouched. The World Economic Forum’s Jobs of Tomorrow report, published in September, estimated that 23% of roles will change in the next five years alone.

In this issue of Perspective, RLB’s thought leaders look at technology from many different angles.

We share how RLB is embracing generative AI and machine learning to drive innovation and uncover new value for our clients.

We investigate the potential for data warehousing, smart contracts and drone technology to enhance the outcomes delivered to projects.

And we examine how AI can be a construction ‘co-pilot’ that complements human skills to build better places for people.

Technology may be the common thread throughout this issue of Perspective, but it is complemented with several stories that celebrate human endeavour in art, science and, of course, bringing brilliant new buildings to life.

The role of construction professional is evolving rapidly. But one thing won’t change, and that is our ability to look at projects through a unique lens, and to offer fresh perspectives.

We are proud to share with you RLB’s latest Perspective. We hope you enjoy exploring stories that sit at the intersection of technology and human ingenuity.




**Andrew Reynolds**  
RLB Global  
Chairman

Perspective is the global magazine of Rider Levett Bucknall



# CONTRIBUTORS

Cover photo:  
Sophie Baker  
@sophiebakerphoto

**01**  
**John Corry**  
IT Product  
Manager  
Oceania



**01**

**02**  
**Syidah Arnold**  
Director  
Oceania



**02**

**03**  
**Paul Brussow**  
Executive Vice  
President  
North America



**03**

**04**  
**Tay Wan Ding**  
Research Manager  
Singapore



**04**

**05**  
**Michelle Zompi**  
Head of RLB  
Digital  
Europe



**06**  
**Nick Constantine**  
Head of Asset  
Optimisation  
Middle East



**07**  
**Rami AbuAmmuna**  
Senior Building  
Surveyor  
Middle East

**04**

**08**  
**Leo Zhan**  
Quantity Surveyor  
Oceania



**05**



**06**



**07**



**08**



09

**09**  
**James Casey**  
Associate Principal  
Americas



10

**10**  
**Eric Yu**  
Director,  
North Asia



13

**13**  
**Jordan Miller**  
Associate Principal  
Americas



11

**11**  
**Tom Oulton**  
Digital  
Transformation &  
BIM Lead  
Europe



14

**14**  
**Paul Megram**  
Director  
Oceania



12

**12**  
**Alain Alexander**  
Partner  
South Africa



15

**15**  
**Fiona Doherty**  
Director  
Oceania

# 54

**Jewel of the Pacific** A site of such size and position is hard to come by in Australia, making Jewel a rare gem.



# GenAI

## A Cambrian explosion for the digital age

Perspective Magazine 2023



**John Corry**  
IT Product Manager,  
Oceania

**Syidah Arnold**  
Director,  
Oceania

This month, we learnt that generative AI, or GenAI, can build an entire website from a hand-drawn diagram, troubleshoot for technicians in the field and win ‘Where’s Wally’ in seconds.

**T**he use cases for GenAI are evolving so rapidly that what is fresh today will be yesterday’s news by the time you read this.

We have entered a new epoch – our own Cambrian explosion. But this time the proliferation is not of new species, but of innovative applications that spark new ideas.

McKinsey, which hailed 2023 as GenAI’s ‘breakout year’, estimates that the technology could add US\$4.4 trillion annually to the global economy. IDC forecasts that enterprise spending on GenAI services, software and infrastructure will grow from US\$16 billion in 2023 to \$143 billion in 2027.

A year on from ChatGPT’s launch, there are now thousands of tools available. Many workers are using GenAI for research, to generate or iterate ideas and write emails, and Deloitte estimates that daily users of GenAI are saving around 5.3 hours each week.

Dozens of ‘business-ready’ Gen AI use cases already apply to construction: site plan optimisation, material design review, virtual field assistance, cost analysis and more. And 55% of businesses, globally, are either piloting or producing GenAI solutions, according to Gartner.

Large Language Models (LLMs) like ChatGPT, Luminous and Llama, put the power of GenAI into everyone’s hands. At RLB, we are experimenting in the AI playground with various LLMs, using our treasure trove of data to run queries and extract fresh insights to age-old problems.

### **Deep dive into data**

RLB’s position of strength is our global reach and our deep reserves of data that goes back decades. We developed our digital system, ROSS 5D, well ahead of the curve and have been innovating with data for many years now.

RLB’s team is focused on GenAI initiatives that support innovation and unearth value that has, until now, been hidden or out of reach. We are investigating data warehouse options to aggregate disparate sources of anonymised data – from cost estimates to building information models – into one accessible and digestible repository. This processed data can be fed into an LLM and our quantity surveyors will be able to ask a chatbot questions. This will catalyse our own Cambrian explosion.

“No job role will be untouched by GenAI, and Goldman Sachs analysts have predicted that more than 300 million of today’s jobs will be automated. But technology has traditionally created more jobs than it has displaced.”

We are also using machine learning (ML) – statistical models that can infer patterns or trends to make predictions – that allow us to ask a multitude of ‘what if?’ questions. After the ML model determines the pattern, an LLM provides a human-centric way to query the results. Essentially, the quantity surveyor chats to the LLM that has ingested the ML’s results. The QS can then better monitor and mitigate potential risks, such as cost or time overruns.

It sounds obvious, but when GenAI can tell us exactly how many hinges are required for each of the doors in a 50-storey tower, our skilled quantity surveyors have extra time to spend value-adding.

Importantly, we will still be required to review and verify data, identify inconsistencies and find efficiencies. But ahead of us lies the promise of greater efficiency and the possibility of more time to spend on high value tasks that only thinking, feeling human beings can execute.

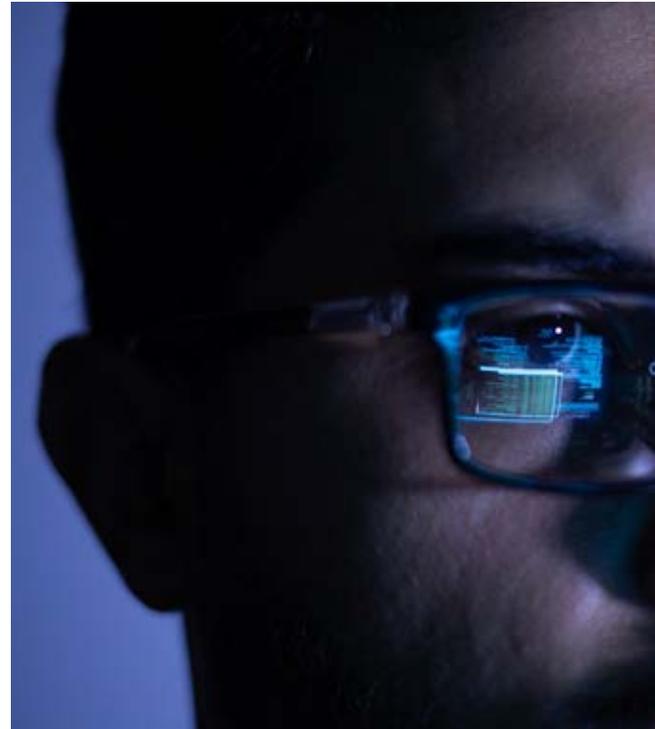
### **Possibilities and pitfalls**

Working with GenAI does come with risks, although eight in 10 business leaders believe that the positives outweigh the pitfalls. Hallucinations – when LLMs generate convincing but inaccurate information – are a new challenge and a type of information error we haven’t encountered before. LLMs are designed to please the person asking the question, even if the answer is wrong, but we are learning that these hallucinations are usually the result of dataset deficiencies.

Another obvious area of concern is data privacy. LLMs are only powerful because they’ve been trained on the creative output of human beings; a recent analysis found 170,000 pirated and copyrighted books were the source of one tech titan’s dataset. Employees are also uploading confidential information into ChatGPT without considering how that data may be used.

RLB is also looking to develop our own proprietary applications using the power of enterprise LLMs so we can protect our data and that of our clients. We have also established a responsible data processing policy that defines principles of fairness, transparency and accountability.

No job role will be untouched by GenAI, and Goldman Sachs analysts have predicted that more than 300 million of today’s jobs will be automated. But technology has traditionally created more jobs than it has displaced. According to the World Economic Forum’s Future of Jobs Report 2023 the impact over the next five years will be net positive.





### Rethinking the way we think

GenAI will also require all of us to rethink the way we think. One illuminating research project undertaken by Boston Consulting Group found a 40% improvement in performance when skilled professionals used GenAI for creative ideation. But when the same skilled professionals were asked to undertake business problem solving – a capability outside GenAI’s current frontier but well within their own remit – it led to a 23% decrease in performance.

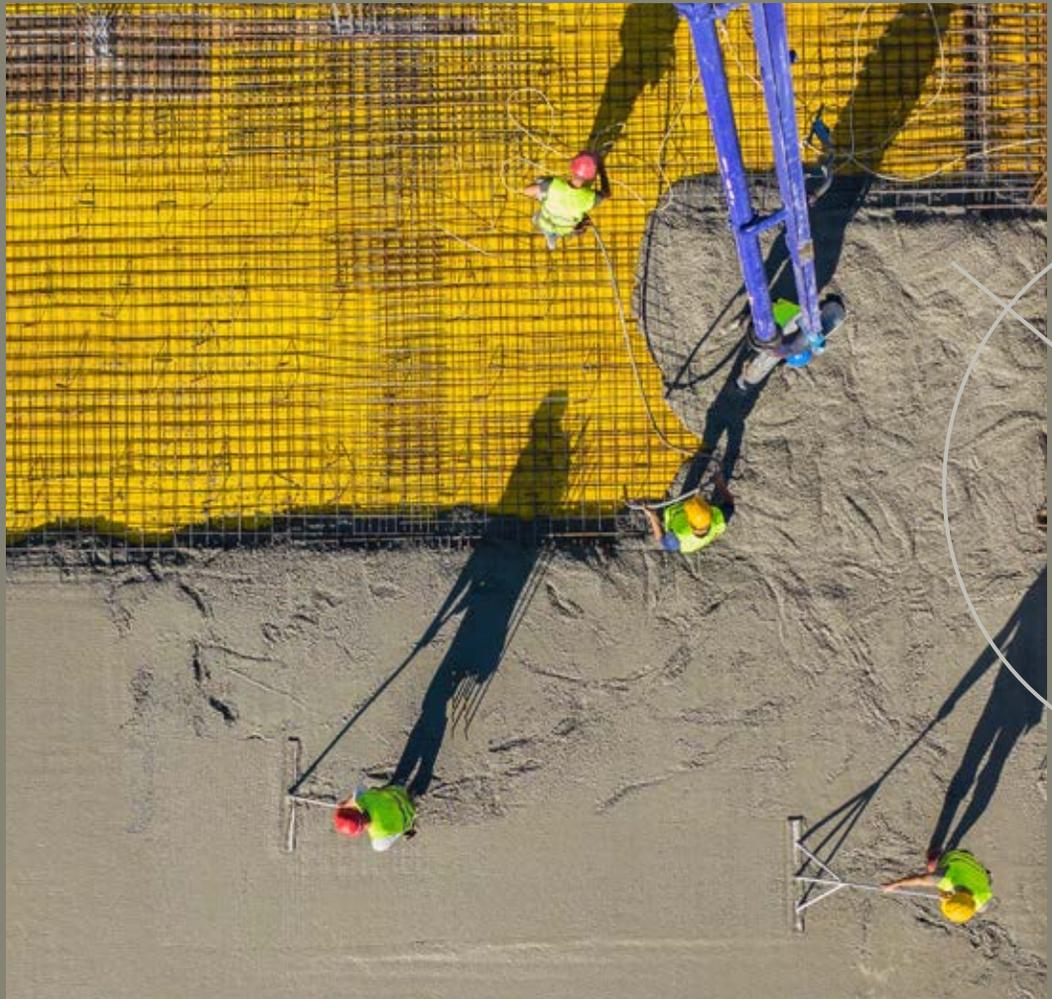
What this tells us is that GenAI can identify unexpected, and sometimes even counterintuitive, patterns and correlations that can spark new ideas. But human intelligence determines how we use these ideas.

Today’s quantity surveyor requires a different set of skills to those we have relied on in the past. Our role is no longer limited to preparing cost estimates, but to harness data and unlock insights that create new value for clients. As we do this, quantity surveyors will move up the value curve.

When ChatGPT launched to the public in November 2022 it was like watching Roger Bannister break the four-minute mile barrier. Now we know it can be done. We understand that GenAI will change everything – we just don’t know how yet. But just as the Cambrian Explosion transformed the Earth’s biodiversity, GenAI is reshaping the digital ecosystem and ushering in a new era of boundless possibilities.

# Building a foundation for project success

**Paul Brussow**  
Executive  
Vice President,  
North America



In the past three years, the entire construction industry has learned a lot about managing projects through adverse situations with the pandemic-related shutdowns, a workforce shortage, supply chain challenges, and inflation, among others.

**M**any owners are now often working on projects they planned pre-pandemic, and those projects are struggling to stay on schedule and budget. With a few strategic building blocks in place, building owners can take control and build a foundation for project success now and in the future.

In ensuring a successful project it's critical to start by outlining an accurate project scope. When setting up a scope for new construction or a renovation, it's important to make sure there is a realistic schedule and a budget that's reflective of the current market. While this sounds rudimentary, it's become increasingly complicated in today's marketplace to get that foundational information in place.

### **Budgeting**

One of the biggest challenges with project budgets is setting them appropriately for the current marketplace. Coming out of such trying times, many building owners are approaching projects somewhat conservatively, focusing more on efficiency, rather than a big change in operations. Owners are paying close attention to supply chains, re-evaluating relationships with all partners and focusing on continuing relationships with trusted partners to navigate the uncertainty that comes with supply chain and workforce challenges.

In general, building an accurate scope for a project is getting more complex with so much disruption in the industry. Often a bid can't be taken at face value and needs further analysis to understanding it. When comparing bids to original budgets, it's important to understand why a bid may be significantly higher or lower than originally anticipated. If a contractor is self-performing many of the scopes, it will have a significant impact on the bid. They get their markup as the general contractor, and then the markup on the work they are self-performing. When a contractor is self-performing, the markup on the work will likely be less than if there was a subcontractor involved, so that lower cost makes sense.

If you see a large discrepancy in bids, it may be related to the thoroughness of a bid. It's important to not just compare the bottom-line cost of a bid, but really look at what went into the scope of that bid. Taking the time to look more closely at these discrepancies across bids can often reveal some insights that are more than just a price difference.

Whether it's labor or material costs, looking at benchmarks from past projects and involving someone independent to confirm those costs can help make a budget as accurate as possible. As part of that planning, it's important to look at the complexity of project as that can cause other a cascading effect of budgeting issues. Hotel renovations can be a good example of this. Let's say a hotel did two similar renovation projects updating finishes like paint, carpet and fixtures seven to ten years apart.

++++++  
 +++  
 ++ **It's important that there's a high level of enthusiasm on the project management side to get contractors interested and excited.**

Although they may be very similar renovations, the most recent renovation will have significantly increased costs resulting from a variety of factors, like maybe the building access had become more complicated and more time is needed to move materials in and out of the building, using more labor significantly increases cost. On the same note, these repetition projects also need to consider the aging parts of a building. For example, putting new finishes in a hotel may not be the most cost-effective projects if the water lines are aging and in poor condition and need to be replaced.

### Scheduling

Outlining realistic schedules is another key component to setting a project up for success. There are a couple of fundamental considerations for building schedules starting with the design phase. We know it's critical to build in ample time not only for the designers, but for the review these designs as well. Don't underestimate the time that building owners need for review, interpretation of what people like and don't like, and rounds of design revisions. It's better to be generous with this time as it serves as the foundation for the remainder of the schedule.

Looking at the permitting phase, it's clear that the post-pandemic permitting process is entirely different than it was three years ago. Permitting offices across the country, like so many other businesses, were shut down and have struggled to get staffing levels back to pre-pandemic numbers, resulting in much longer timeframes for permitting.

In the building phase, there are still a number of delays and uncertainty with certain supply chain which need to be addressed when building a schedule. Companies won't be able to use their old, just-in-time schedules of the past anymore. That way of working was already stressed, and now, its weaknesses have been exposed and can be disastrous for a project. For example, in the first half of 2022, new transformers and similar items which typically take 16 weeks to order, suddenly were taking 52 weeks to get by the third quarter. While the timeline is getting better, things still aren't back to typical timelines. In the case of a transformer, progress on an entire project could be impacted without this critical infrastructure piece so there are serious implications to a schedule if it isn't there on time. Ordering components and materials early and even stockpiling critical materials can help projects stay on schedule. It is becoming more common for projects to have storage space near job sites set up specifically for this purpose.

One final building block when setting up a new project is to focus on building relationships and awareness for a project. It's important that there's a high level of enthusiasm on the project management side to get contractors interested and excited about being part of the project. By working with contractors ahead of time and sharing the upcoming timelines, establishing a clear understanding about the project and ensuring they know when it's coming out to bid so they have the resources in place to work on it. These are all critical things to ensure the success of your project by driving broad interest from multiple contractors. By avoiding a situation where there's only get a single bid, a competitive bidding process will keep the prices down.





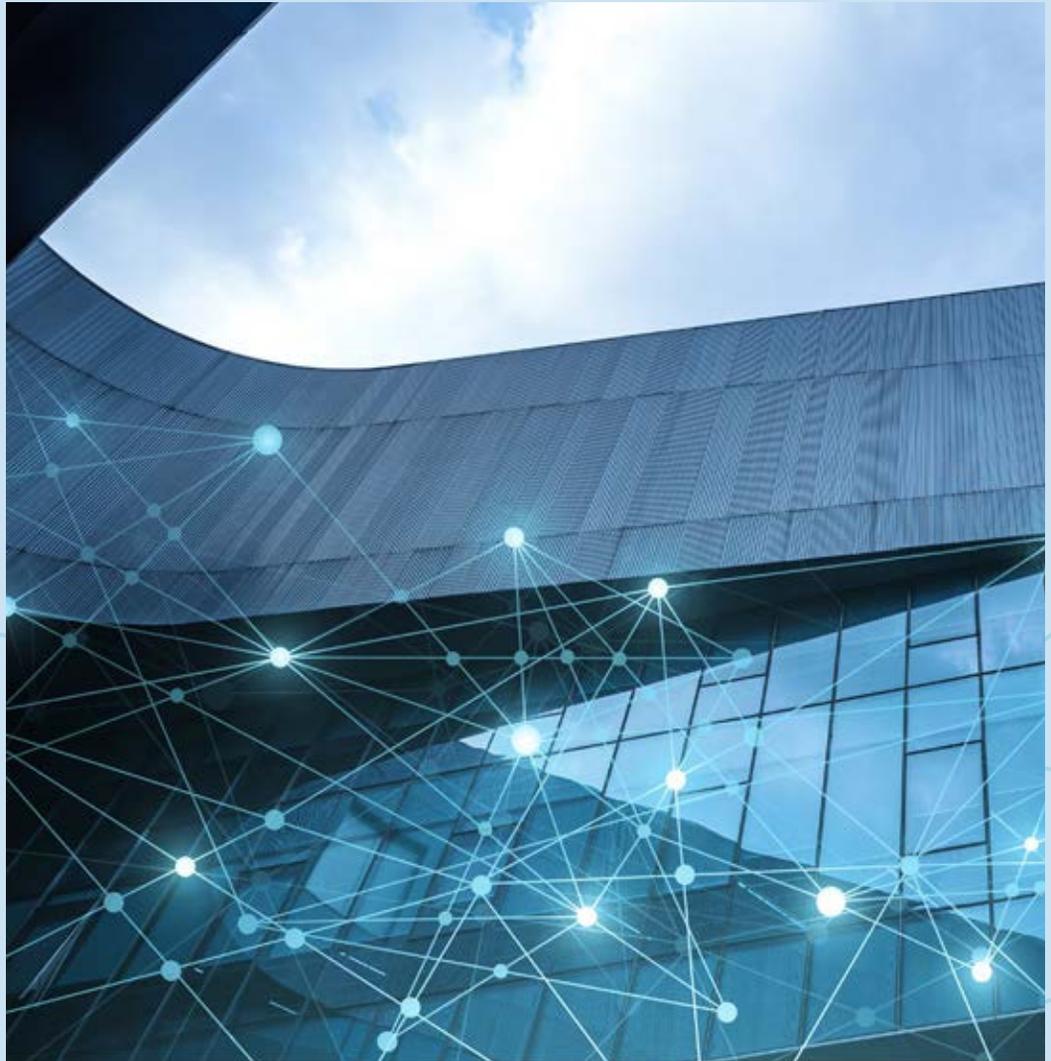
With a little extra time and effort spent upfront developing the scope of work and taking a critical eye to budgets and schedules, a project can be set up to successfully meet its goals and building owners will have built a foundation for project success now and in the future.

# Mind the gap

AI bridges the divide  
in Southeast Asian  
construction

**Tay Wan Ding**

Research  
Manager,  
Singapore



The adoption of artificial intelligence may vary around the Southeast Asian region, but the idea had taken root in construction.

**F**rom robotics to 3D printing, design clash detection to quantity extractions, every part of the construction value chain is investing at speed and scale. But should construction companies establish their own AI ecosystems or set up partnerships? Should the development of AI tools be left to technology companies or developed in-house? These are big questions for everyone with a stake in the future of construction.

Artificial Intelligence, or AI, refers to the ability of machines or computers to perform tasks that typically require human intelligence, such as understanding natural language, making decisions and solving problems. It is a broad field that encompasses several subfields, including machine learning and robotics.

The construction industry has a reputation for being notoriously slow to embrace new technologies. But in recent years we've seen significant advances in AI applications in construction.

One of the main benefits of AI in construction is the increase in efficiency. Construction projects are often complex and involve multiple stakeholders, from owners to architects, engineers, contractors and suppliers. With AI, many of the planning, design, construction and even safety processes can be automated, improving efficiency and reducing time spent on highly repetitive or labour-intensive tasks.

For example, AI can be used to optimise the scheduling of workers and equipment, reducing downtime and delays. It can also automate tasks such as painting and drilling on site, increasing productivity and alleviating labour shortage pressures. At off-site precast concrete yards, the extent of automation can be even higher since selected tasks are standardised, and components can be completed assembly-line style, further increasing productivity.

Another benefit of AI in construction is improved safety. By using AI to identify potential hazards, such as unsafe working conditions or hazardous materials, workers can be alerted to take necessary precautions. Falls from height and being struck by an object are some of the leading causes of construction workplace accidents and fatality. Robotics and automation can also take over lifting and working at heights to help lower the risks, reducing accidents and injuries, thus making construction sites safer for workers.

AI can also address the acute shortage of labour in the construction industry worldwide. Through automation of repetitive and time-consuming processes, available labour can be distributed to tasks that require the human touch. AI-powered robots can be programmed to scan construction sites autonomously and systematically monitor progress, record safety lapses and survey quality of work.

Every construction project is a complex sequence of works, with a massive amount of data created on a daily basis, over an extended period of time. By collecting data on the scope, cost, time and construction progress, quality, risks and more, AI systems gain access to an invaluable data pool from which to learn every day. With the help of AI, in particular machine learning systems, insights generated can improve all aspects of the project, from design to cost management, construction methodology and facilities management. The sky is the limit.

### **AI and construction: Advancing with caution**

Despite these benefits, there are also challenges associated with the adoption of AI in construction – and chief among them is the high upfront costs. There is also a learning curve associated with all technology adoption, which can take time and resources to overcome.

While AI can address labour shortages, it will also impact workforces. One recent investigation from Cornell University has found that large language models like ChatGPT will impact around 80% of the workforce in the United States. Upskilling workers will be a responsibility of all employers across the construction industry.

There are also concerns about the ethical implications of AI in construction. The development of AI is still in its nascent phase but as it takes a bigger role in decision-making, so do ethical concerns such as privacy and surveillance, bias and discrimination and the role of human judgement. There may be questions about who is responsible for decisions made by AI systems. Additionally, where AI is used to collect and analyse data about workers or other stakeholders, there may be concerns about data privacy and learned biasness.

There's another concern for construction in Southeast Asia that is yet to be fully explored. Small and medium size enterprises (SMEs) are the backbone of our industry, and they are usually constrained by both human and monetary resources. This limits their ability to adapt to rapid technological changes and to invest in the knowledge and innovation acquisition. Investments in tool developments can be a bottomless pit and a risk. After all, some analysts estimate that 70 per cent of digital transformations end in failure.

## **There are also concerns about the ethical implications of AI in construction.**

### **Smart solutions in Southeast Asia**

In some markets, the public sector is taking the lead in the promotion of AI and technology adoption. This is particularly the case in Singapore, where the push for productivity through the use of technology begun in the early 2000s. To that effect, the Singapore Government has set aside S\$770 million (US\$580 million) to facilitate transformation plans, with everything from technology scholarships to workforce training, tax incentives to lowered workers levy rates on the table.

In other markets, the private sector is the early adopter of technology, as the example of building information modelling (BIM) illustrates. RLB has been awarded several large contracts based on our track record with BIM – and we can see a similar trajectory with AI tools.

AI is a double-edge sword. It has the potential to transform the construction industry, increasing efficiency, improving safety and enhancing quality control. It also has the potential to alienate players that fail to keep up – with higher costs and job losses the potential consequences.

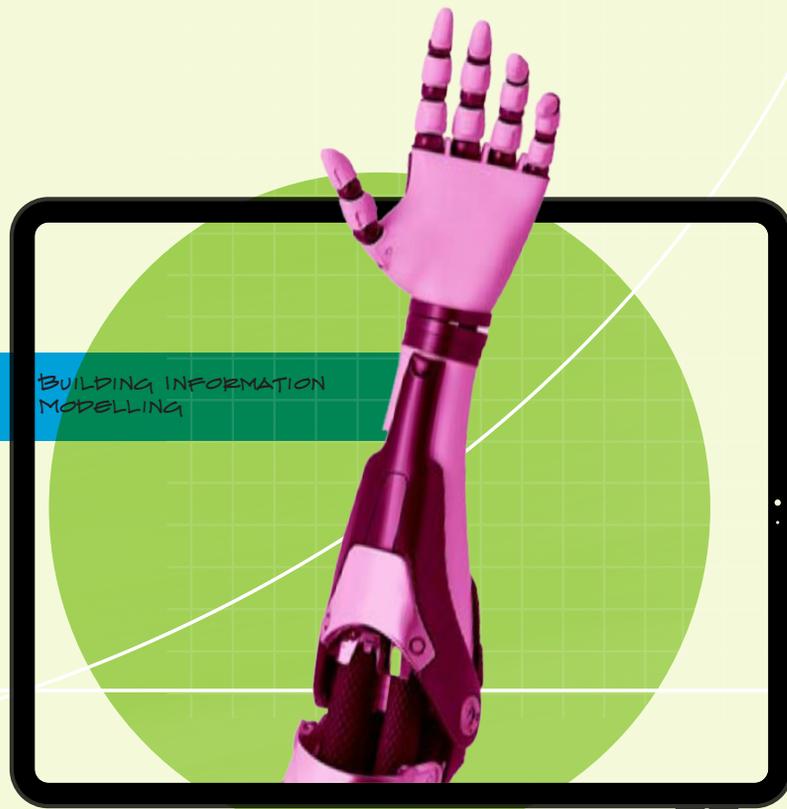




AI will inevitably be embedded and integrated into the construction industry. As with any new technology, it is important to carefully consider the potential benefits and challenges and to work together to ensure that its adoption is responsible, sustainable and spreads the benefits fairly. By doing so, we can unlock the full potential of AI in construction and build a safer, more efficient, and more sustainable future.

# The digital revolution

Unleashing the potential  
in the built environment



**Michelle Zompi**  
Head of RLB Digital,  
Europe



**Europe**

Back in 2020, my colleague Matt Sharp, Chief Digital Officer for RLB UK, wrote an article for this very same publication talking about how digital was transforming the construction industry.

**L**ittle did we know then that we were on the cusp of a digital transformation accelerated by the Covid-19 pandemic, advances in technology, the climate crisis and in the UK, changes in building safety legislation and governance.

As I write this in 2023, the fact that my position exists as Head of Digital, and we have a growing RLB Digital team in the UK reflects the changing pace of digital within our industry. It also reflects how behaviour both at work and at home has been facilitated by technology. Digital is now interwoven into our daily practices. This could be through the auto generated suggestions of other things we might like to buy on Amazon or helping us share best practice with our global colleagues through platforms like Teams. There are three key themes where we have seen digital, and the data produced by digital technologies, beginning to change the built environment as we know it.

### **Digital and Building Safety**

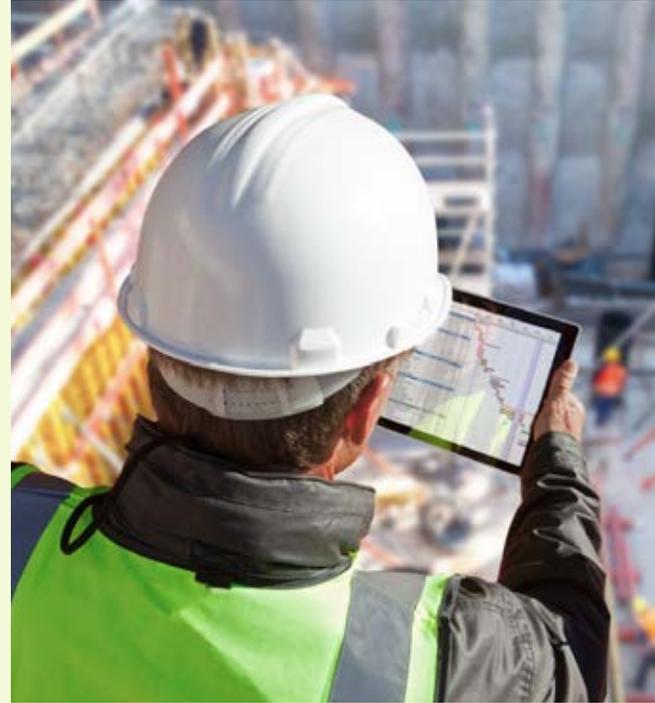
Every built environment project generates huge quantities of data - from initial concept through build to handover, every stage of the construction lifecycle is a flow of critical information, known as the 'golden thread'.

In the UK, following the Grenfell Tower tragedy, in 2017 when a 24-storey residential tower burned for over 60 hours, the UK government began to make law the need for a golden thread of data to ensure responsibility and ownership at all stages of a built asset's lifecycle. This governance, which we are seeing being replicated in other countries outside of the UK, is driving the need to capture, store, manage, transfer and report data, facilitated by the digitalisation of the processes. With teams like RLB Digital in the UK, the insights from this data is now helping clients plan clear health and safety strategies and change the face of building safety for the industry.

### Digital and Sustainability

We all know that we have a climate crisis on our hands and according to estimates the built environment accounts for 36% of worldwide energy usage, and 40% of CO<sup>2</sup> emissions. The advancement of technologies such as Building Information Modelling (BIM) to support both the measurement and monitoring of carbon used in the built environment is instrumental for those managing estates in helping them strategically plan how they can reduce their carbon footprint, both in terms of carbon within new builds and retrofitting, and also their operational embodied carbon. Digital technologies enabling modern methods of construction as well as data to create insights to allow builds to be more efficient in helping to reduce waste, and as a result, work towards net zero and sustainability targets.

**Digital technologies enabling modern methods of construction as well as data to create insights to allow builds to be more efficient in helping to reduce waste.**



We are already using technology as business as usual now within our day-to-day operations, but advanced visualisation methods and the use of Artificial Intelligence and Machine Learning are allowing estate managers and stakeholders to look at how they can prevent future risks and mitigate today for tomorrow. Looking at the impact climate change might have on their built assets including the risk of floods, overheating and fire, we are already seeing digital technology included in advancements like solar control glass that radiates and reflects sun away leaving indoor spaces cooler, being introduced into new buildings and regions where temperatures are soaring. Data analysis is also enabling refurbishment planning adjustments to be made from informed decisions considering whole estate, performance, safety and risk information holistically.



### **Digital and skills – new skill sets and upskilling**

Of course, these changes to the way we work, and implementation of digital practices require upskilling our existing workforces as well as a need to bring in new skill sets. The challenge for many now is attracting talent with digital qualifications, skills and knowledge that can complement and understand traditional core disciplines. We must encourage collaboration between digital innovators and technical experts across disciplines to bring inventive ideas and to reverse mentor our colleagues – ensuring we are continuously aware of the ‘art of the possible’ and delivering the best possible service.

### **Digital driving efficiency**

Digitisation is happening to every industry, in every region. Within the built environment, the digitalisation of our processes is embedding efficiencies, bringing us insights that support solution driven outcomes and acting as the catalyst for us to challenge the way we think and act in our industry.

# Building defects

The problem can be larger than it seems

**Nick Constantine**  
Head of Asset Optimisation,  
United Arab Emirates

**Rami AbuAmmuna**  
Senior Building Surveyor,  
United Arab Emirates



Around the world, building defects are frequently and severely underestimated, and the potential safety risks and costs to asset owners are substantial. In the UAE market, where the building stock is relatively young, there is a lack of appreciation for accurate investigation, identification and analysis of building defects.

**T**his complacency comes at a cost, as assets in the region continue to age with little independent, technical oversight. As 80% of the building stock standing in 2050 is already in existence today, it is crucial to maintain existing assets to ensure we still have high-quality buildings in 30 years' time.

### **Early warnings: Identifying symptoms of defects**

Early warnings are the symptoms that indicate the presence of a defect in a building. These symptoms are comparable to signs a person may experience that point to an underlying disease or condition requiring expert diagnosis.

A flaw in a structure will typically manifest as visible signs that may initially seem insignificant to the untrained eye. However, trained professionals can recognise these signs as indicators of more substantial defects lurking beneath the surface. Ignoring these early warnings often leads to the escalation of the issue, resulting in greater disruption and higher costs for rectification.

For instance, stains or wet marks on a suspended ceiling may appear as isolated issues but can indicate insufficient insulation or a deterioration of insulation around chilled water pipes. A skilled RICS chartered building surveyor would recognise this during their investigations. Chilled water runs through pipes within ceiling voids; because this water is below the ambient temperature it requires adequate insulation to prevent condensation. Ignoring the early warning signs can lead to higher repair costs and negative impacts on the building's air conditioning system. This example highlights the direct correlation between the response to a defect and its impact on the asset.

Early warning signs are not only detected through visual inspections alone. Specialists are trained to use all of their senses during an inspection, such as sense of smell to detect presence of damp in a property or auditory observations such as recognising excessive noise during equipment operation. These initial observations of defects can then be substantiated through further investigation and use of specialist tools.

### **An urgent need for intervention**

It's not enough to deal with defects – they require expert intervention. An urgent and proactive approach is required if we are to address early warnings when they arise.

Based on our extensive experience working with assets in the region, we have often witnessed cases where cheap and insufficient repairs are attempted, or incorrect diagnoses lead to ineffective repairs. These scenarios waste money, resources and lead to redundant work.

Naturally, interventions vary depending on each case. Intervention does not always require immediate rectification; it may involve monitoring and recording. For example, a hairline crack may not be a cause for significant concern initially, but a proactive response could involve monitoring the crack and recording the readings periodically to identify whether the condition is progressively worsening.

We frequently come across cases where early warnings are observed by facilities management representatives or building managers. However, despite drafting a response plan, this valuable information often fails to reach decision-makers at the board level. It is crucial to keep asset owners informed about their building's condition and accurately present them with complete information regarding early warning signs, including defect conditions, symptoms, diagnosis, prognosis and more. This ensures that early intervention can be implemented, reducing the need for costly repairs in the future.

**Interventions vary depending on each case. Intervention does not always require immediate rectification; it may involve monitoring and recording.**



### **The importance of consultations**

Experienced and independent professionals can avoid the pitfalls associated with building defects. For example, lifting and cracking floor tiles on an exterior podium level may initially appear a minor defect that simply requires tile replacement. However, through diligent investigation, including a review of As-Built drawings, site observations, and opening up works, a more complex issue may be discovered. Lifted tiles may serve as an early warning sign of a more significant problem beneath the surface. In this hypothetical case, an incomplete and poorly installed surface drainage system allowed water to accumulate beneath the tiles over time, causing the lifting and cracking.

**Early warnings help us identify building defects, but only expert intervention can address them.**

Without consultation with experienced professionals, a quick fix of merely replacing the tiles would not address the root cause of the issue. This would inevitably result in a recurrence of the problem, leading to additional costs for proper investigations and repairs that should have been conducted initially. Moreover, the underlying issue could further damage the reinforced slab beneath. Investing in consultations with experienced professionals, such as RLB, provides a significant value-add by correctly identifying the root cause of the defect, developing an appropriate response plan, and ensuring comprehensive and cost-efficient rectification.

Early warnings help us identify building defects, but only expert intervention can address them. Most of the buildings standing today will still be around in three decades. By investing in expert maintenance and interventions now, building owners can ensure their assets are safe, liveable and valuable assets for many years to come.



# Drone zones

## Building the buzz for drones in construction

**Leo Zhan**  
Quantity Surveyor,  
Oceania

An abstract graphic consisting of several overlapping, hand-drawn style blue lines on a light blue background. The lines form various shapes, including circles and elongated ovals, some of which are partially cut off by the edges of the page.

Spray painting, site-surveying and drilling drones are already here but the construction industry is yet to fully capitalise on this high-flying technology.

**D**rone technology is revolutionising the way that the construction industry operates and RLB's team is thinking carefully about how drone operations can benefit our work, enhance the services we offer to our clients and help our industry deliver more efficient, sustainable and profitable construction.

The global construction drone market is growing rapidly. Analysts estimate the size of the construction drone market had a value of US\$5.3 billion at the end of 2022, but expect this figure to edge towards \$12 billion by 2028 - a compound annual growth rate of 15.5%. Drone technology's biggest advantage, arguably, is its ability to capture high-quality images and data from hard-to-reach locations. This allows for more accurate and efficient site assessments and measurements, which in turn can support more accurate cost estimates and project timelines. Drones can also be equipped with sensors and cameras to provide real-time data on site conditions - an invaluable tool to identify potential issues before they become costly problems.

Drone technology can also boost safety on construction sites. By allowing for remote inspections and data collection, drones can reduce the need for workers to physically access high-risk areas. This can help prevent accidents and injuries and reduce the risk of liability for construction companies and project owners.

Another benefit of drone technology is the comprehensive view it can provide of construction projects. By capturing aerial images and videos, drones can help clients, project managers and stakeholders gain a better understanding of a project's progress and status. This can support more informed decision-making and better communication among team members.

#### **Drone rangers save cost and time**

Drone technology also has the potential to reduce costs for construction projects. By providing more accurate data and reducing the need for manual inspections, drones can help streamline project workflows and reduce labour costs. By identifying potential issues early on, drones can help prevent costly delays and rework.

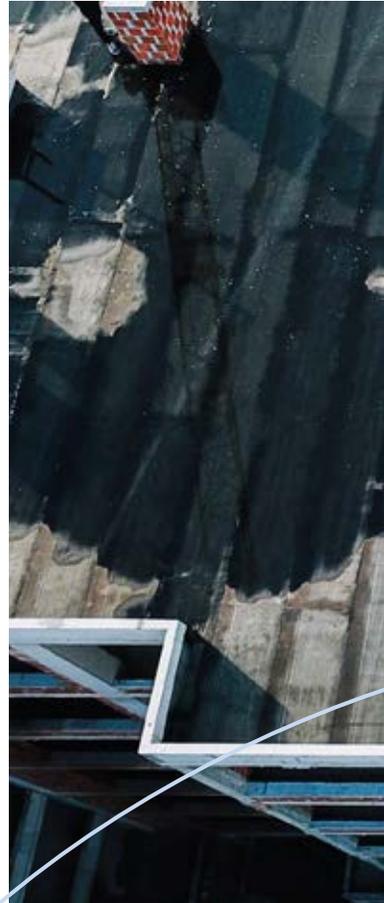
One [2020 study by Deloitte](#) found drones can deliver up to 75% in cost and time savings, and that the savings from the technology investment would exceed the capital cost by 2026.

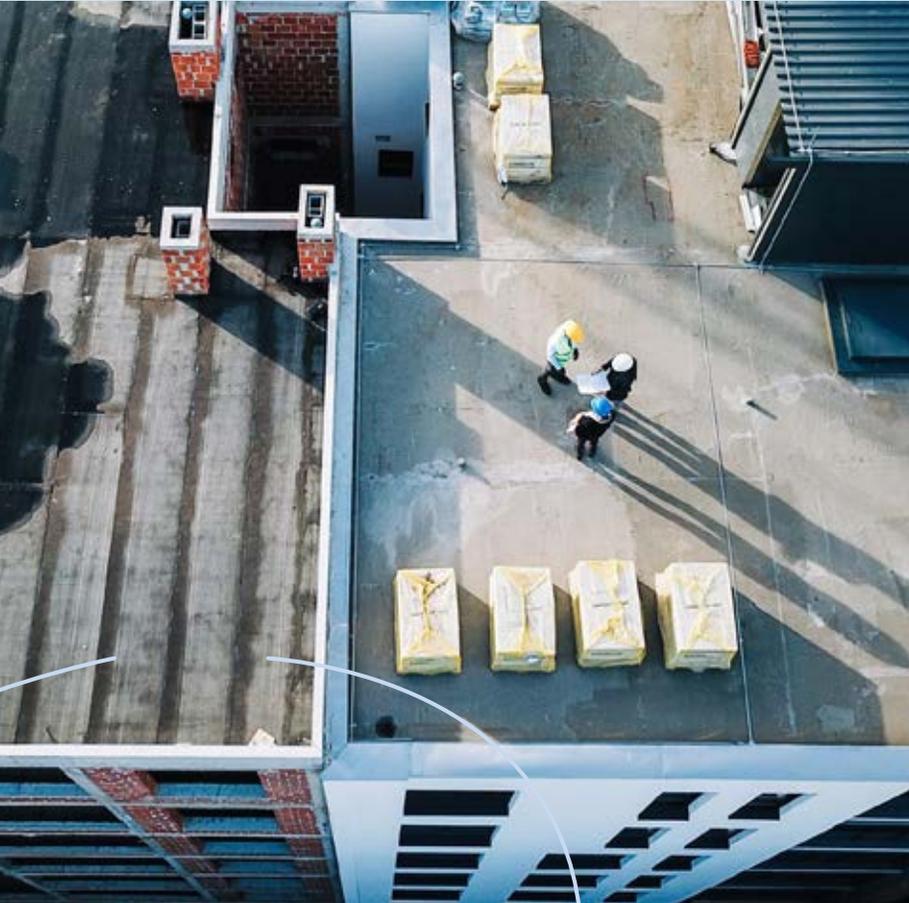
### **By allowing for remote inspections and data collection, drones can reduce the need for workers to physically access high-risk areas.**

Is the sky the limit? Maybe. But as with any emerging technology, there are some challenges ahead. The first is the need for skilled operators who are familiar with both the technology and the regulations governing its use. Concerns around privacy and data security when using drones to capture images and data on construction sites is another challenge.

Despite these challenges, the benefits of drone technology are clear and RLB is upskilling our people to leverage drone technology to improve the accuracy and efficiency of our work, reduce risks and costs, and provide more comprehensive services to our clients.

Recognising the potential of drone technology in the construction industry, RLB is committed to staying at the forefront of this rapidly evolving field. We have invested in the required equipment, licences, training and development of our team members to ensure we can fly high with drone technology. We have also developed protocols and procedures to ensure that our drone operations are conducted in compliance with all relevant regulations and standards.





These magnificent flying machines are set to become essential tools in the quantity surveyor's toolkit - and RLB laying the groundwork to help drones take off.



What shelter-in-place programs taught us about  
**hotel**  
**renovations**

**James Casey**

Associate Principal,  
Americas

The pandemic changed our approach, and the hospitality industry is no exception.



United States

It was three years ago when across the U.S., eight out of ten hotel rooms sat empty due to the pandemic and when stay-in-place orders and travel restrictions resulted in a significant drop in occupancy and revenue. By the end of 2020, annual occupancy averaged just 36%. While occupancy rates continued to rise, the landscape changed with competition from short-term rentals and home-sharing. Some properties have been formally converted into non-traditional uses, including multifamily units and senior or student housing. Still, many properties are entering public/private partnerships to offer space for homeless shelters, juvenile-housing programs, healthcare workers, and emergency shelters, among other uses. With three years of pandemic-related partnerships already experienced, there are some key takeaways for these public/private partnerships to ensure a smooth, positive working experience, particularly when it comes to maintenance and renovation agreements.

### Setting an Example

San Francisco was a leader in private/public partnerships with its alternative shelter program. This program provided temporary shelter for people experiencing homelessness. While the city used some trailers, congregate sites, and other options, hotel rooms were also a big part of the program. The city was able to get this program up and running very quickly in April 2020 and stopped accepting new guests the following June. The city ended the program in December 2022 after helping all guests make stable exits. The program did its job as there were minimal COVID-related deaths among any of the program's guests, and well below San Francisco's already low rate of COVID.

Across the country, government entities were entering into contracts with hotels for use as healthcare worker housing for those exposed to COVID and travel staff, vulnerable populations, and anyone needing to quarantine.

### Lesson One: Maintenance & Agreements

Ongoing maintenance and renovations aren't traditional when a property is used for a non-traditional purpose. Being aware of potential changes in processes, procedures, and budgeting are crucial to ensuring a smooth, profitable relationship with a public entity. And, while these contracts often come together quickly because of a social service emergency, there are a number of items that could and should be addressed upfront in agreements.

When contracts have to be pulled together quickly, the agreements may not be as robust as usual, so it's essential to be comfortable with a "pretty-good contract" and one that's not perfect. Addressing ongoing maintenance and renovations are two big factors that must be part of that contract. But for many of us, understanding how to maintain the hotel while it is being used and managed by a third party is a big question.

Third-party providers are often used to manage the hotels, including food services, ongoing housekeeping, and general management. In many cases, these providers come out of the social service agencies using the property and don't have traditional hospitality experience. While the social service agencies using the property are committed to the safety and well-being of the clients being served, that experience is enhanced by the ongoing cleaning and maintenance of the property. The upfront agreements must address the ongoing maintenance of the property in terms of traditional hospitality expectations to minimize long-term implications to the building's infrastructure.

Having an agreement that requires ongoing maintenance is important. As we all know, too often, significant damage and related repair costs can be avoided if the issue is fixed when first detected. Hoteliers are used to infrastructure that allows full-time maintenance staff to fix things as needed and a housekeeping staff that identifies issues by regularly spending time in each guest room. But when a third party controls the property, they lose that ongoing maintenance process. When a third party is running the rooms, the hotel rooms are often used non-traditionally, likely as long-term housing, and those rooms can go weeks or months without a property manager setting foot into some rooms. If a room develops a simple issue like a leaky faucet, with regular checks and maintenance, that faucet can be a simple fix if identified immediately and managed. Without the right staff in place, a leaky faucet could escalate into a major problem, causing water damage and mold issues across many rooms, not just the origination point.

### Lesson Two: Costs

In addition to ongoing maintenance, a private/public contract should address the costs related to renovation work at the end of the engagement. It's important that there is agreement on what is fair and reasonable reimbursement for necessary renovation resulting from normal wear and tear during the partnership. While a typical renovation is new finishes, like carpet, paint, and fixtures, a contract involving a third-party management team needs attention for underlying damage. Time and costs related to surveying and due diligence must be accounted for. While the general renovation costs will be the same as a typical renovation, there may potentially be more work with this contract.

For example, a window air conditioning unit sometimes drips. Still, without regular maintenance, it can cause more damage than usual and might result in replacing an entire wall because of water damage.

There might be extra work and expenses related to odors as well if pets or smoking took place in the building while under other management. There are just a few examples to be considered in contract negotiations, and it reinforces the need for processes to manage repairs and related costs from damages, as negotiating repairs and other items after the fact will be difficult.

Hotel use for social services and emergency services can have positive results for all parties involved as we work to offer support for issues involving homelessness, public health, and natural disasters





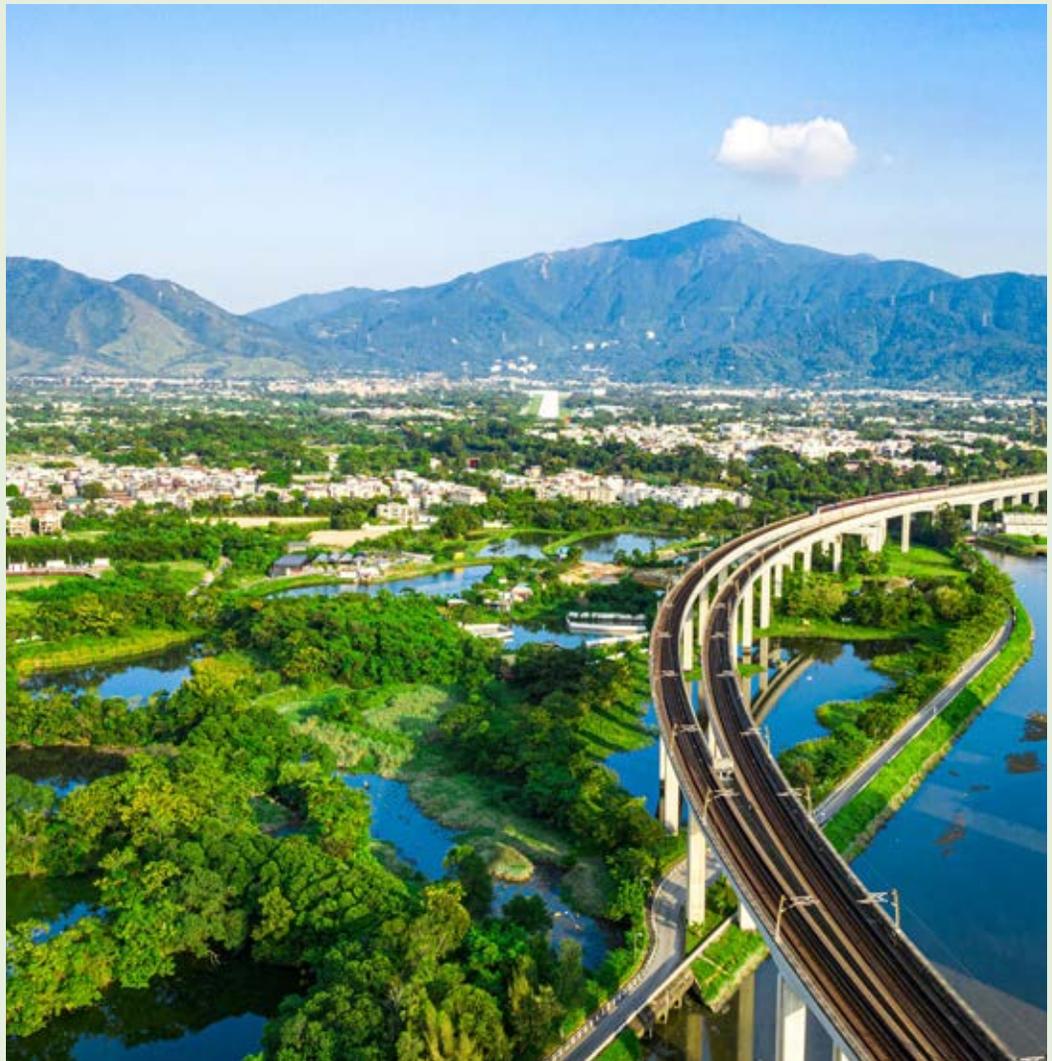
From Los Angeles to New York City and many places in between, there's a growing trend to use existing real estate to help the community. With the right discussions happening at the beginning of these engagements, public/private partnerships can be smooth, positive working experiences, particularly when it comes to maintenance and renovation work.



# Moving north

## The making of Northern Metropolis in Hong Kong

**Eric Yu**  
Director,  
North Asia



Over the past decades, Hong Kong was often referred as one of the world's most important financial centers. Being one of the most densely populated and economically vibrant regions in the world, Hong Kong has highly developed the growth of local population and economic development in the southern part of Hong Kong.

**T**he existing northern part of Hong Kong consists of a significant amount of agricultural farms, villages and rural areas. With just one river away, Shenzhen, has experienced rapid development and urbanization with many prestige high rise buildings. Under the Northern Metropolis Development Strategy launched by the HKSAR government, Hong Kong will collaborate with other Guangdong-Hong Kong-Macao Greater Bay Area cities, Shenzhen in particular, to promote closer, deeper and more thorough co-operation for creating better development potential and opportunities. It can strengthen the synergy effect and paving the way for Hong Kong to better integrate into the country's overall development.



**Hong Kong**



### **A Vivid Metropolis Occupying 30,000 Hectares of Land**

Under this ambitious plan, the government will expand the Northern Economic Belt and encompasses to cover new towns in Yuen Long, Tin Shui Wai and Fanling / Sheung Shui areas, various new development areas and development nodes in different planning and construction stages as well as their neighboring rural areas, making a holistic metropolis with a total area of 30,000 hectares. As an ideal destination for people to live in, work and travel, this metropolis will become Hong Kong's second economic engine alongside the Harbour Metropolis.

Some of the key initiatives in this 10-year programme involves the construction of infrastructure including five railways, the provision of more cross-boundary transport between Hong Kong and Shenzhen and the increase of land supply to boost housing development as the top priority.

### Driving Development to Increase Housing Supply

Hong Kong has also been facing a significant housing supply issue for many years. The housing demand far exceeds the available supply, leading to high property prices and a housing affordability crisis. The new strategy hopes to alleviate the limited land resources by providing more supply of housing units.

At present, the development projects planned or under planning in the Northern Metropolis are estimated to provide about 350,000 more residential units. Upon full development, the entire Northern Metropolis will house 905,000 to 926,000 residential units to accommodate a population of about 2.5 million.

To achieve this target, it is expected to complete a yearly average of 35,000 residential units in the coming ten years. Is this a realistic goal? Let's take the dominant supplier, the public housing production, as an example. The number of public housing units completed in 2021 was only 25,814 and the figure even dropped to 10,587 in 2022 due to COVID. It reflected that the actual number of housing units completed was behind the target in the past few years. As a result, it is doubtful whether the target of 350,000 housing units can be reached under the Development Strategy. Currently, there are some challenges hindering the housing supply.

### Actual Public Housing Production in the past 10 years

Year	Public Rental Housing	Subsidised Sale Flats	Total
2013/14	14,057	0	14,057
2014/15	9,938	0	9,938
2015/16	14,264	0	14,264
2016/17	11,276	3,017	14,293
2017/18	13,413	248	13,661
2018/18	17,658	9,121	26,779
2019/20	10,107	2,998	13,105
2020/21	6,261	5,000	11,261
2021/22	21,764	4,050	25,814
2022/23	857	9,730	10,587

References:

Hong Kong in Figures 2023 Edition from Census and Statistics Department  
Actual Public Housing Production from Housing Department

### Shortage of Labour in Construction

Firstly, the labour shortage is severe in Hong Kong. Contractors are facing challenges in finding skillful construction workers, leading to project delays. As the construction industry is less attractive to young workers, it is believed the shortage will keep growing in coming years. Thus, the construction industry has to look for other ways to overcome this situation. Incorporating some new construction technologies such as adopting Modular Integrated Construction (MiC) would be one of the ways out. The use of pre-fabricated modules helps speed up the construction, reduce labor requirements and improve quality control when comparing to traditional on-site construction methods. Besides, adapting suitable procurement method like 'Design and Build' may also help with this issue. The integration of design and construction expertise will definitely help streamline the project delivery process, improve coordination and probably reduce project timelines. Furthermore, collaborative efforts between the construction industry and the government can help identify labour needs, address regulatory challenges and develop strategies like 'Labour Importation Scheme for the Construction Sector' to attract and retain skilled workers.

Upon full development, the entire Northern Metropolis will house 905,000 to 926,000 residential units to accommodate a population of about 2.5 million.

### Limitations in Land Acquisition

Secondly, acquiring land for developing Northern Metropolis is a tough row to hoe. Unlike artificial islands or near-shore reclamation areas in which all available land resources are government-owned, the Northern Metropolis development is much more complex as its land consists of mountains, rivers, wetlands and built-up areas. Land within the region has also been assigned for different uses under various outline zoning plans or may be restricted to specific uses under the leases governing the sites. However, these land use may be inconsistent with their preferred uses under the Northern Metropolis Development Strategy.

In addition, it is certainly a long struggle to turn the ancestral land into the development area within the region.

Traditional clans have been living there for centuries. There are also many ancestral halls that are used for religious purposes, ancient buildings with historical and cultural value and geographical features with geomantic values. Although the government can resume the land by compensations under the Lands Resumption Ordinance, some key issues such as relocation of residents, conversation of ancient buildings and the amount of compensation should be carefully addressed before doing so.

To resolve the land shortage issue, planning should also focus on the development nodes and corridors connecting various boundary control points in which they should be expanded and improved in terms of planning and design. Moreover, the fragmented development pattern should be improved to achieve greater efficiency in the overall land use.



### Building for the Future

Nevertheless, developing the Northern Metropolis can reshape the land use planning in the northern district and have a positive effect on the development of Hong Kong and Greater Bay Area. The above-mentioned labour and land issues only highlight some of the challenges during the implementation of the Development Strategy. Yet, there are still many challenges to be identified and tackled. By taking a proactive approach to address the problems, we strongly believe the government will turn the northern part of Hong Kong into a metropolitan area for people to live in, work and travel not long after.

# The missing link

How blockchain can help construction industry leaders to monitor and manage change

**Tom Oulten**

Digital Transformation & BIM Lead,  
Europe



**Europe**

**A**s Heraclitus said around 2,500 years ago: “The only constant in life is change.” Unfortunately, what he didn’t tell us was how to monitor and manage that change... But that’s only because Blockchain hadn’t been invented during the era of Pre-Socratic philosophy.

### What is blockchain?

Blockchain is a digital technology that allows multiple parties to access the same information in a digital ledger of transactions. This digital ledger is duplicated and distributed across the entire network of computer systems that form the blockchain.

In a blockchain, information is stored in blocks that are linked together in a chain. Each block contains a unique code, called a hash, that identifies the block and its contents. Once a block is added to the chain, it cannot be altered or deleted. This makes the information stored in a blockchain tamper-proof and provides a high level of security.

This technology can significantly impact the construction industry by improving transparency, accountability and efficiency throughout project execution.

One of the main benefits of blockchain technology in construction is its ability to provide a single source of truth for all parties involved in a construction project. This can help prevent disputes and delays by ensuring everyone can access the same information in real time.

Overall, the future use of blockchain technology in the construction industry is promising. As more companies adopt the technology, we can expect to see increased transparency, efficiency and collaboration throughout the construction process.



### How can blockchain improve efficiency in project delivery?

Blockchain technology has the potential to increase efficiency in the construction industry in several ways.

**Improved transparency:** Delivering a construction project involves multiple parties, including architects, designers, contractors and subcontractors, which can lead to a lack of transparency. Blockchain technology can provide a transparent and secure record of all transactions and activities related to a construction project. This can help reduce disputes and improve accountability – which is becoming increasingly important due to the requirement of the UK’s Building Safety Act and the need to capture the Golden Thread (see below).

**Collaboration and communication:** The use of blockchain can facilitate the sharing of information between project stakeholders. This can improve collaboration and communication, reduce the risk of errors, and increase productivity.

**Secure data sharing:** Project delivery can involve the production of sensitive data such as design plans, contracts and financial information. With managed permissions, blockchain technology can provide a secure and decentralised platform for sharing this data, which can reduce the risk of data breaches and cyberattacks.

**Provenance tracking:** Blockchain can also be used to track the provenance of building materials and ensure their authenticity. This can help prevent the use of counterfeit or substandard materials, which can be a major safety hazard. Additionally, tracking the movement of materials through the supply chain can help optimise logistics and reduce waste.

**Smart contracts:** Smart contracts are self-executing contracts that can automatically enforce the terms and conditions of an agreement. They can be used to automate payments, manage project timelines, and ensure compliance with regulations and safety standards. This can help reduce the time and costs associated with manual contract management.

### How can blockchain support the Building Safety Act?

The Building Safety Act is new UK legislation that has arisen from the Hackitt Review in response to the Grenfell Tower fire in 2017. Blockchain technology can support the implementation of the Building Safety Act by providing a transparent and secure system for tracking and managing building safety data.

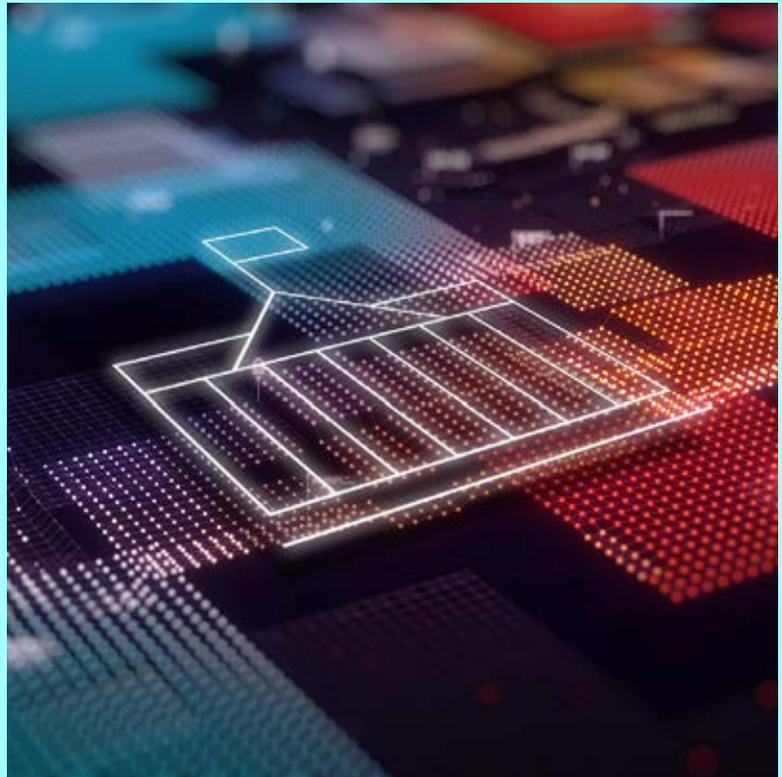
**Tracking building safety data:** The tamper-proof blockchain ledger can be used for tracking building safety data, such as inspection reports, maintenance records, and safety certifications. This can ensure that building owners and managers are held accountable for maintaining the safety of their buildings.

**Streamlining communication:** Blockchain can facilitate communication between different parties involved in building safety, such as building owners, tenants, regulators and inspectors. By using a decentralised system, a single source of truth can be established, communication can be streamlined and made more efficient, reducing the likelihood of miscommunication and errors.

**Facilitating compliance:** Blockchain can help to ensure that building owners and managers comply with building safety regulations by providing a transparent and auditable record of their activities. This can reduce the likelihood of non-compliance and improve overall building safety.

**Improving data security:** Blockchain uses cryptographic techniques to ensure that data is secure and tamper-proof. This can prevent unauthorised access to building safety data and reduce the risk of data breaches.

**Blockchain technology can support the implementation of the Building Safety Act by providing a transparent and secure system for tracking and managing building safety data.**



### What are the challenges in the adoption of blockchain in the construction industry?

Despite the potential benefits of the application of blockchain technology in construction, several challenges must be addressed before widespread adoption can occur.

#### Lack of awareness and understanding:

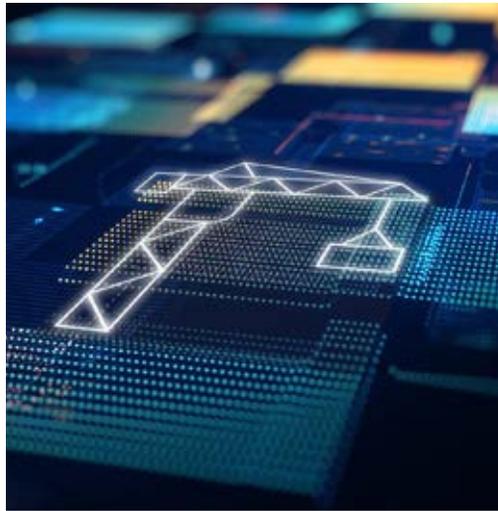
Many construction professionals are still unfamiliar with blockchain technology and its potential applications. There is a need for education and training to increase awareness and understanding of blockchain's benefits and how it can be integrated into construction workflows.

**Fragmented industry:** The construction industry is highly fragmented, with many different stakeholders involved in each project. This can make it difficult to establish a common blockchain platform that all parties can agree on and use.

**Data standardisation:** The construction industry generates a large amount of data, but there is a lack of standardisation in how it is collected, stored and shared. This can make it difficult to integrate blockchain technology into existing workflows.

**Regulatory issues:** The use of blockchain technology in construction may raise regulatory and legal issues, such as data privacy and ownership. This can create uncertainty and hesitation among stakeholders.

**Technical challenges:** The implementation of blockchain technology requires technical expertise and infrastructure, which can be a challenge for smaller companies. Additionally, blockchain technology is still evolving and there may be technical limitations that need to be addressed.



**The construction industry generates a large amount of data, but there is a lack of standardisation in how it is collected, stored and shared.**

#### What's next?

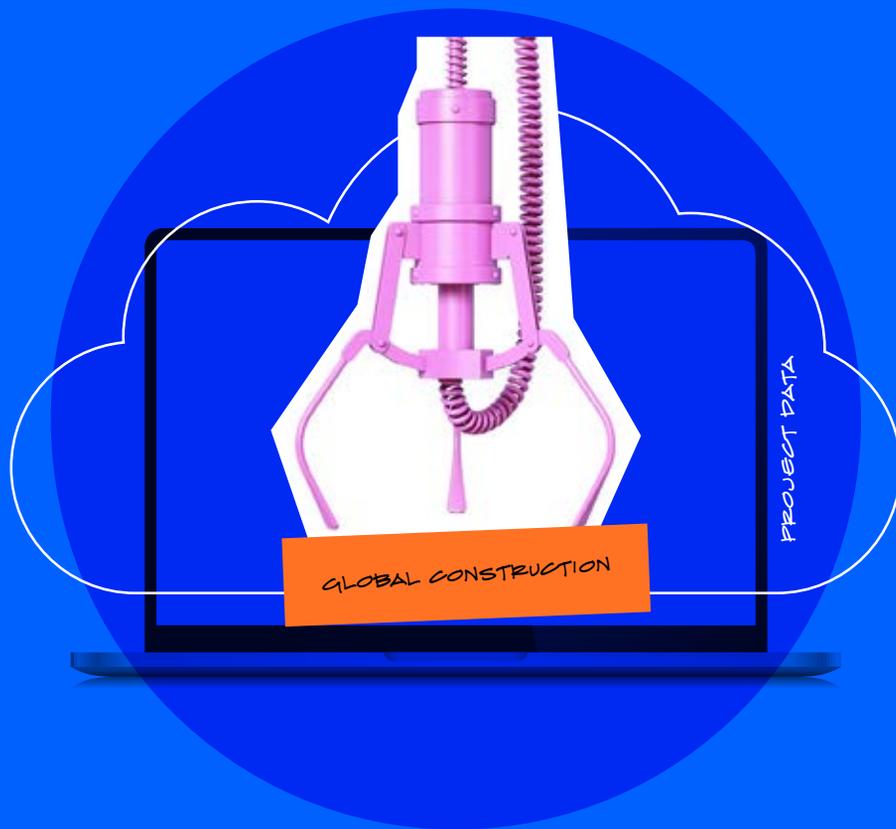
Blockchain has the potential to revolutionise the construction industry. The technology can increase transparency, reduce costs, improve security and enhance the supply chain. While there are challenges to its adoption, such as the need for standardisation, technical expertise and regulatory clarity, the potential benefits are significant.

So back to Heraclitus and a philosophy of change that has been passed down the centuries. In an impermanent world, an immutable digital ledger can offer a solid, singular source of truth. In an industry of fluidity and flux, like construction, blockchain is not a static solution but a dynamic digital framework that can help us move towards a more efficient, competitive and sustainable future.

# Data warehousing

## A blueprint for quantity surveying's digital frontier

Perspective Magazine 2023



**John Corry**  
Product Manager,  
Oceania

Data warehousing in quantity surveying presents the opportunity to revolutionise the construction industry, unlocking unimaginable benefits and services.

Just as the human genome project centralised genetic data to enable new treatments for diseases, data warehousing is teeming with potential to fundamentally redefine how we approach construction.

A data warehouse is an innovative approach to storing, analysing and utilising years of construction project data. It serves as a unifying platform, bringing together many diverse data sources into a single, consolidated view that provides a comprehensive overview of all aspects of construction from numerous real-world projects. From design and cost estimates to project tracking and Building Information Modelling (BIM), a data warehouse aggregates all these disparate sources into one accessible and manageable repository.

BIM and Common Data Environments (CDEs) have emerged as the bedrock of this digital revolution in construction and provide sources for data collection. BIM, a digital representation of a building's physical and functional characteristics, has been a game-changer, improving construction project outcomes by making them cheaper, more sustainable, faster and safer.

CDEs, on the other hand, are a potent tool for managing the deluge of data generated during a given construction project. Serving as a central data storage and management system, CDEs connect seamlessly to the BIM tools used and enhance BIM's features and outcomes. They too manage the information from different sources, including BIM software, company spreadsheets, and other project management tools, providing powerful features for data management, versioning and sharing. However, a CDE does not aggregate data across projects to give a broader view of industry at large hence the need for a data warehouse.

Just as data warehousing serves as the foundation for this transformation, Artificial Intelligence (AI) is the engine that powers it. AI requires vast amounts of data to function effectively, and a well-constructed data warehouse provides the perfect platform to train an AI algorithm. AI can delve into the depths of the data from 1000s of historic projects, extracting insights, identifying patterns, and making predictions that would be virtually impossible for human analysts.

The synergy between data warehousing and AI can lead to significant improvements in various aspects of quantity surveying, including cost estimation, risk management, project scheduling and embodied carbon estimation. These advancements can dramatically enhance efficiency, reduce costs and improve decision-making processes, thereby adding tremendous value to the services provided by quantity surveyors.

Data warehousing in quantity surveying presents the opportunity to revolutionise the construction industry, unlocking unimaginable benefits and services.

### A quantum leap for quantity surveying

As we look towards the future, the potential for data warehousing in quantity surveying is vast and exciting. With RLB's global presence and on-the-ground access to the construction industry, we are uniquely positioned to harness the power of data warehousing, BIM, CDEs and AI to drive innovation and improve our services.

Much like the Human Genome Project – where we are yet to fully understand the possibilities that this data may reveal – we are far from, harnessing the full potential of data warehousing in quantity surveying. We may not fully understand the possibilities, but the prospects are thrilling.

This transformation is not merely about adopting new technologies. It's about changing the way we think about and approach our work. It's about fostering a culture of collaboration, openness and innovation that embraces the power of data and technology. As we undertake this journey, it's essential to create an environment that empowers everyone involved – from quantity surveyors and architects to engineers and contractors – to leverage these tools and make data-driven decisions.

This transformation is not without its challenges. With the rising volume and variety of data, managing and securing it becomes an increasingly complex task. Additionally, navigating the legal and regulatory landscape of data usage, ensuring privacy and maintaining data integrity are significant concerns. However, these challenges also present opportunities for innovation and new service offerings.

For instance, as RLB adopts data warehousing to manage the ever-increasing volumes of global construction project data, we are investing in tools and infrastructure that will better manage and secure data. This is happening through distributed cloud patterns, which enable data and infrastructure to be segregated by design for access management, sovereignty and performance.





### **Building the future, byte by byte**

In conclusion, the revolution of data warehousing in quantity surveying is a transformative shift that holds immense potential for the future of the construction industry. The integration of data warehousing, BIM, CDEs, and AI can drive efficiency, improve decision-making processes, and add tremendous value to the services provided by quantity surveyors.

However, this transformation is a journey that requires patience, commitment and a culture of collaboration and innovation. As we navigate this journey, we must be prepared to face challenges, seize opportunities, and above all, embrace the power of data and technology.

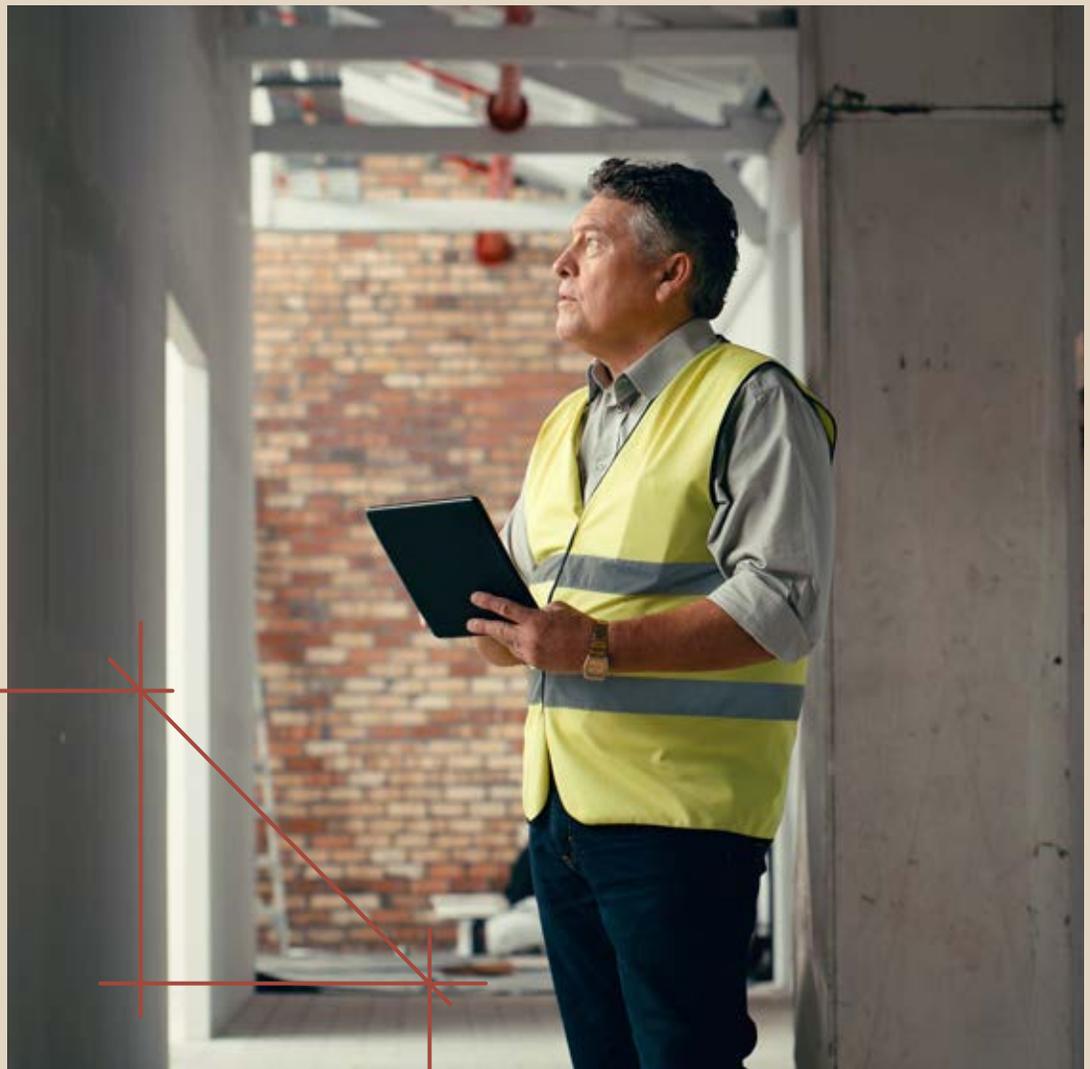
In the end, the future of quantity surveying is a data-driven one. As we continue to explore and harness the power of data warehousing, we are not just building structures; we are building the future.

The blueprint for this future is clear: it's open, it's collaborative, and it's data driven. This is the future we are committed to building, and we invite you to join us on this exciting journey.

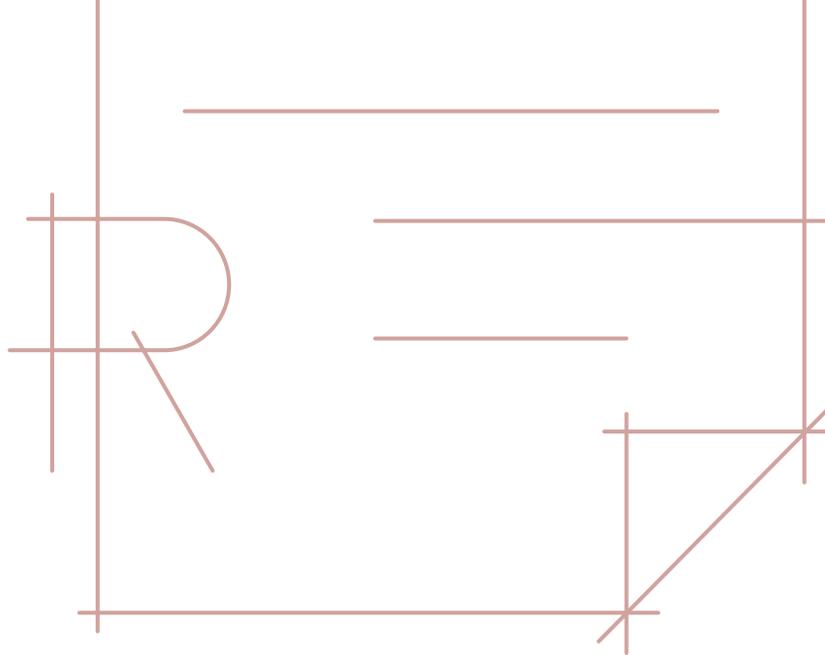


# Block by block

## Smart contracts in South Africa



**Alain Alexander**  
Partner,  
South Africa



In a highly competitive industry like construction, smart contracts can provide a secure and reliable way to conduct transactions when traditional contracting may fall short.



### South Africa

In South Africa, where regulation, limited resources and low profitability cause many headaches, smart contracts could create a new competitive advantage. Picture a contract that executes itself and sustains trust by lines of tamper-proof code. That's what smart contracts do - and these smart contracts are set to transform construction.

Smart contracts are decentralised digital agreements, eliminate the need for intermediaries and ensure secure and transparent transactions. One recent [systematic review of 81 studies](#) on smart contract applications in construction found their biggest benefits included flexibility, security, automation, transparency, reliability and traceability.

In South Africa - where construction employs more than two million people and is a major economic contributor - smart contracts could meet several challenges.

South Africa's construction industry is highly regulated and competitive. Successful operation requires extensive knowledge and skill, and construction firms often vie for limited resources and labour. It is also one beset by structural challenges, ranging from low profitability to lack of access to capital.

### From traditional to high-tech, high trust contracts

A traditional construction contract is an agreement between the parties involved in a construction project. It outlines the scope of work, the terms of payment and other important details. It also serves as the legal basis for any disputes that might arise during the project. While traditional construction contracts are essential for protecting all parties involved in the project, they can also be a source of challenges.

One of the main issues is the lack of flexibility. With a traditional contract, the parties are bound to the specific terms of the agreement, which may not be suitable for dynamic projects. In addition, the contracts can be lengthy and complex, making them difficult to understand and enforce.

One possible solution to these issues is the use of smart contracts. A smart contract is an automated agreement that is executed using computerised protocols. It is designed to ensure that all parties are bound to the terms of the contract, and that any dispute can be resolved quickly and efficiently. Smart contracts can streamline the execution process and reduce the need for manual paperwork.

### Global construction projects are already using smart to automate.

- **Payment escrow:** Hold funds until specific project conditions are satisfied, with the funds then automatically released to the contractor.
- **Progress tracking:** Release payment to the contractor at predetermined milestones.
- **Quality assurance:** Incorporate quality standards or warranty terms into the code.
- **Contract administration:** Eliminate manual tasks, such as distribution, tracking changes and managing approvals.
- **Dispute resolution:** Resolve conflicts based on the terms of the agreement without manual intervention.
- **Supply chain management:** Trigger payment to suppliers once the delivery of materials is confirmed.
- **Insurance:** Incorporate insurance policy terms into the code. If a claim is made, the contract can trigger the payment of benefits to the policyholder.

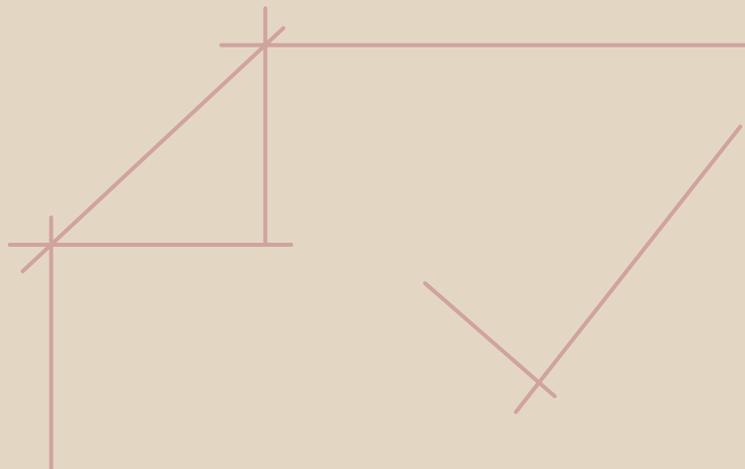
### Cracking the code in South African construction

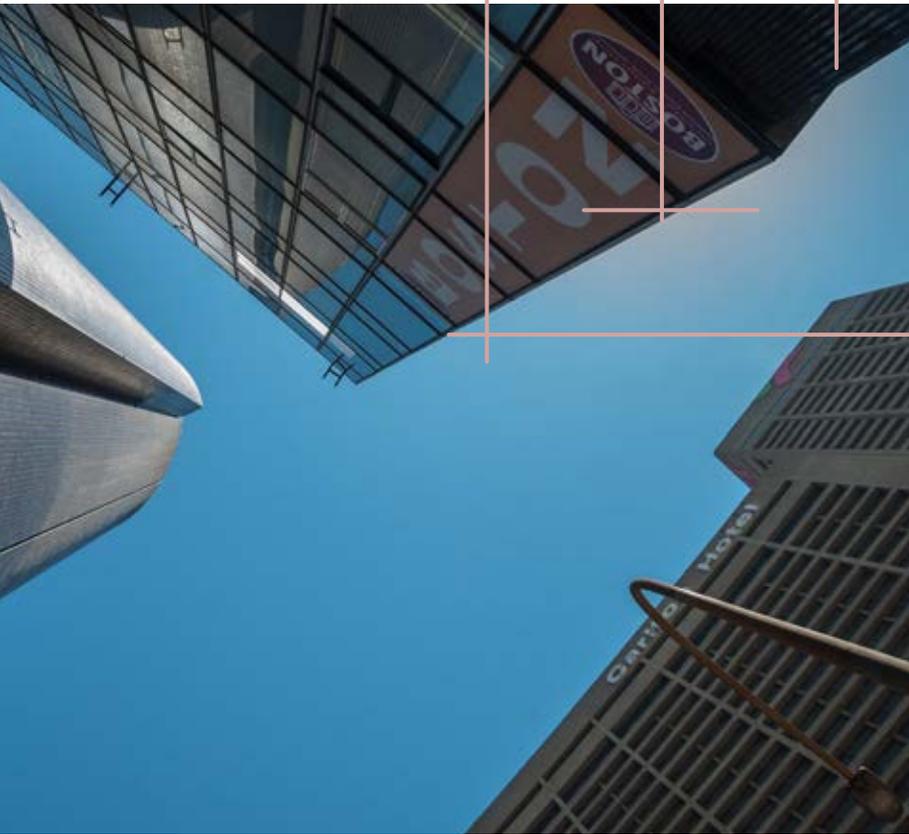
In the South African context, smart contracts offer several potential advantages. Firstly, they can help to reduce contract complexity, resulting in less time wasted on paperwork and more time spent on actual construction.

Secondly, they can improve the transparency of the process, as all parties involved in the contract can view the terms and conditions in real-time. This can help to reduce disputes and ensure that the project is completed on time and on budget. By eliminating the need for manual paperwork, contracts can be monitored more closely, resulting in greater transparency and accountability.

However, there are also some disadvantages to the use of smart contracts that could hamper their adoption in South Africa. For one, they require a certain level of technical expertise and this may make them inaccessible in some pockets of the market. Additionally, smart contracts are still relatively new, and their legal implications are not yet fully understood. This could potentially lead to costly disputes if the terms of the contract are not properly enforced.

As South Africa's construction industry grapples with a host of challenges, smart contracts are emerging as a viable solution to streamline execution, reduce the risk of disputes, and ensure compliance with regulations.





It's early days for smart contracts in construction, and the industry will need to upskill to boost its technical expertise and legal understanding. Despite the challenges on the horizon, smart contracts could be a fundamental building block to better construction.

# Healthcare construction

**Jordan Miller**  
Associate  
Principal,  
Americas



Growth reflects changing  
needs of U.S. population

There are many factors involved in the recent evolution of healthcare, but one thing is for certain: Covid-19 exposed major deficiencies and sped up the need for innovation.



## United States

Many of the critical issues healthcare systems are facing today, however, have been looming since pre-pandemic times such as the aging population of the U.S., staff shortages, technology advancements, and resiliency.

Many of the lessons learned over the past two years can be carried forward into the future of healthcare design. From more efficient patient screening, patient flow, and other operational efficiencies, solutions that have reduced cost and saved time are likely to continue, as the money and time saved through these efficiencies can be put towards enhancing the patient experience.

### The Patient Experience

The healthcare industry has shifted towards a consumer-driven market: today, consumers have many choices when it comes to how, when and where they receive medical care. Virtual care visits are 38 times more frequent than before the pandemic, as consumers are opting for fewer hospital visits. Improving patient outcomes and overall experience is and will remain a high priority for healthcare systems.

From the moment the patient checks in at the reception desk, and enters the exam room, the goal is for all points of engagement to combine and create a comfortable experience, leading to repeat customers, referrals, and maintained revenue.

There's much to consider when planning the design of internal spaces that contribute to the patient experience, such as corridor length or width, room size, and nurse station placement. All of which can have effects on safety, infection control, and patient visibility. In some instances, the patient experience, and most efficient solutions are at odds, as what might be desired by the patient, such as more privacy, might be opposite of the staff's preferred layout.

For example, more privacy for the patient may result in less collaboration for nurses, less opportunity for training, difficulty in monitoring patients, and less chance of preventing falls. More privacy for patients could also result in nurses feeling more isolated and less efficient, potentially causing anxiety and burnout. These are difficult design decisions that need to be evaluated from all angles.

### Improved Technology

Staff communication and training has also evolved since the pandemic. Like other industries, we've all had to adjust to alternative communication and training methods, but how has this affected patient care, and what investments need to be made to ensure proper training and adequate care? Healthcare systems now rely on technology more than ever before. Investments in technology and improving IT infrastructure can be costly, but the long-term benefit of easing workforce challenges and the ability to offer user-friendly solutions to patients may be worth the investment.

Another major disruptor to the healthcare industry that has altered how care is being delivered is telemedicine. Keeping up with digital transformation will be crucial for healthcare systems to remain competitive and meet patient expectations. Virtual care may create both opportunities and threats for healthcare systems as competitors continue to grow. As the patient and doctor interaction continues to evolve, the built environment to support these spaces will change as well.

### Aging Population

Healthcare systems will also have to consider the needs of the aging population, the shift towards prevention-based care, and what technologies are available when designing new spaces.

Involving staff in the planning and design process of healthcare construction projects could provide the perspective needed to address some of these issues.

There are more than 46 million Americans age 65 and over, and that number is projected to double to more than 98 million by 2060. Some hospitals are renovating existing facilities to accommodate older patients, including things like custom lighting and temperature controls, improving wayfinding signage, and adding more family support spaces. Other hospitals are taking the approach of building new specialized geriatric care units dedicated to this specific population.

### Behavioral Health

Hospitals are also continuing to invest in behavioral health care, by adding dedicated space into existing facilities or building entirely new facilities. In fact, 42% of facilities have behavioral healthcare projects under construction or planned over the next three years.

### Staffing Shortage

One of the most critical challenges the healthcare industry is facing is workforce related. Even before the pandemic, burnout had reached crisis levels with 35-54% with nurses and physicians, and 45-60% of medical students reporting symptoms of burnout. This report also projects a shortage of more than 3 million essential support staff in the next five years and a projected shortage of 140,000 physicians by 2033.

The recommendations outlined in the report touch on the critical issues of workplace culture, safety, prioritizing social connection and community, and investment in public health. Involving staff in the planning and design process of healthcare construction projects could provide the perspective needed to address some of these issues.

Design elements that can reduce stress and improve mental health could aid in staff retention. This could include more respite areas, more natural light, and exterior landscaped areas. Some health systems are going beyond cosmetic design features and offering more robust solutions like on-site housing and childcare assistance.

### Safety & Security

Improving safety and security systems may also be necessary to make staff feel safe in the workplace as 44% of nurses have experienced physical violence, and 68% experienced verbal abuse during the heights of the pandemic.

Security strategies can be built into the design of new facilities and renovations. Like the patient points of engagement mentioned above, from the parking lot to the exam room, safety and security should be considered as well. This could affect stairwell placement, exterior lighting, circulation routes, cameras, panic buttons, etc.



### Futureproofing

Covid-19 has brought several design considerations to light, such as future-proofing hospitals for a mass influx of patients. This could include more modular design components to allow flexibility in the future, or upgrades to allow for isolated units. The challenge is balancing the potential need for pandemic-ready facilities with the financial resources available and determining what is most financially responsible.



## Cost Considerations

During the initial planning stages and program development for healthcare projects, cost and schedule typically have a major impact on decision making. The problem we're facing today is that healthcare design is evolving rapidly, coupled with unprecedented inflation, construction cost escalation, lack of materials, and workforce shortages, that historical cost data and prior construction projects don't provide an accurate benchmark.

Developing budgets has become much more complicated at this early stage. Communication with stakeholders is key to fully understanding the design intent and project requirements in order to align the scope with the available funding.

It's clear that planning, designing, and building a healthcare facility is complex. The landscape of healthcare is changing and prioritizing one design element over another seems impossible. Healthcare leaders face a great challenge but can incorporate strategies into the built environment that can create better patient outcomes and safer conditions for all.

Below is a list of design considerations that have been mentioned here, along with the relative construction cost associated with each of them.

Design Considerations	ROM
MEP infrastructure upgrades for future flexibility	\$\$\$
On-site housing for staff	\$\$\$
Modular construction	\$\$
Custom lighting and temperature controls	\$\$
Security upgrades	\$\$
Improve infrastructure for telemedicine	\$\$
Separate entrance/exit to direct patient flow	\$
Improve wayfinding signage	\$
Provide more natural elements / landscaped areas	\$
Add respite areas for staff	\$
Improve acoustic properties / mitigate noise	\$

# Jewel of the Pacific



**Paul Megram**  
Director, Oceania

With absolute beachfront, expansive views of the sparkling Pacific Ocean and an eye-catching façade that emulates shards of smoky quartz, Jewel on the Gold Coast was always planned as a one-in-a-billion project. But as RLB's talented team knows, nothing gets built without a budget.

**R**LB's cost planners began work on Jewel in 2012 and spent a full decade helping an ambitious project team bring this \$1.5 billion beauty to life.

Jewel's design is an architectural treasure. Taking their inspiration from the ancient volcanic crystals that lie along the coastline, Architect DBI Design and Oppenheim Architects created three towers that offer the pinnacle in contemporary luxury and amenity.

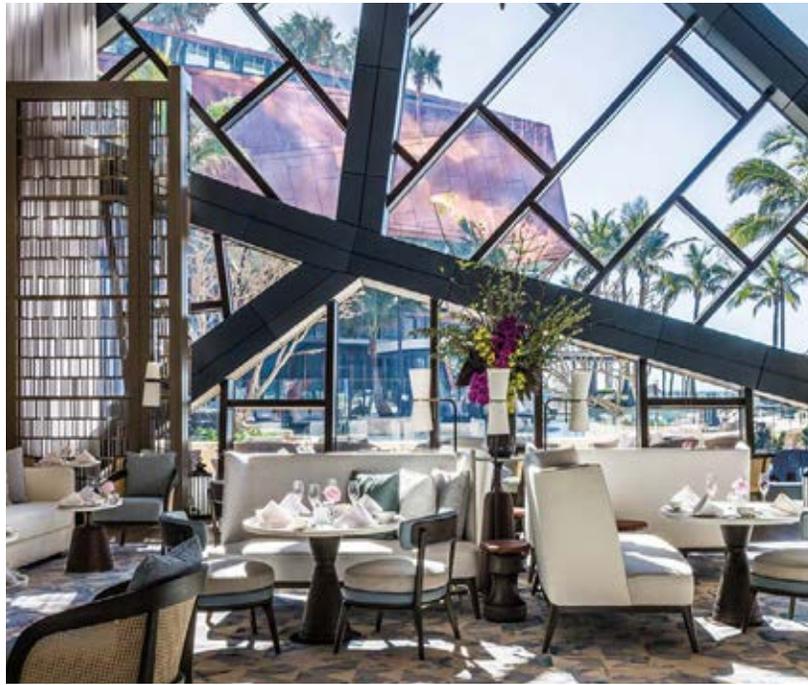
Located in vibrant Broadbeach in Queensland, Jewel's three towers are a people magnet.

Jewel North features 232 luxury apartments across 41 levels. Jewel Central's 47 storeys accommodate 172 serviced apartments and a 169-key, 5 star Langham hotel. The 34-level Jewel South is a premium residential tower with 108 apartments.

Jewel also has three podium levels with hotel facilities and function rooms, retail and restaurants, as well two swimming pools, a spa and gymnasium. Then there's a three-level basement with 765 car park spaces.



**Australia**



“Efficiency comes from repetition and there was no repetition on any of Jewel’s towers or levels. This made the project complex and challenging to cost. With care and collaboration, we came in on budget.”

**Paul Megram**

#### **Crystal clarity**

Jewel’s design has garnered awards and applause. But behind the scenes, a team of skilled quantity surveyors was riding the market ups-and-downs – from pandemic-induced material and labour shortages to customer demand – to balance the budget.

To maintain control of costs required collaborative negotiation with contractors and sub-contractors throughout construction and delivery, and RLB’s team of experts did just that to ensure the project stayed on track.

RLB Director, Paul Megram says there’s one secret to success on complex projects: experience. “RLB’s experienced team can immediately recognise the areas that will be the greatest challenges and to put in the time where they’ll have the biggest impact,” Paul says.





### **More than a pretty façade**

The unusual angles of Jewel's façade meant every floor is unique. Bespoke glazing, steelwork and other structural elements were meticulously mapped and carefully costed.

The sophisticated façade provides shading from sun and shelter from the wind. It also delivers impressive energy efficiency confirmed in the 5 Star Green Star rating from the Green Building Council of Australia.

### **Shine bright like a diamond**

**\$1.5 billion value**  
**11,500 sqm site**  
**47 storeys**

Delivered by Multiplex and Hutchinson Builders, Jewel employed more than 1,000 construction workers onsite during its peak. Now complete, Jewel has created more than 300 local jobs and strengthened the Gold Coast as a dynamic tourist destination.

### **Building brilliance**

A site of such size and position is hard to come by in Australia, making Jewel a rare gem.

Jewel's quality finishes, architectural excellence and sustainable design could only be delivered with the highest standard of professional skills. With rigorous cost planning and diligent attention to detail, RLB's team carefully balanced cost, quality and design to ensure Jewel sparkles.

# Should funding for **public art** be fixed in every budget?



Australia

**Fiona Doherty**  
Director, Oceania



> > > > > >

> My favourite piece  
> of public art is  
> encountered on  
> the approach to  
> Canberra airport.  
> Journeys by Phil  
Price is an organic  
series of silvery  
disks on a sinewy  
base. As the  
kinetic shapes  
dance in the  
wind, it feels like  
the art is waving  
'bon voyage'.

I was thinking about this piece of public art recently, because I had the pleasure of presenting the Rider Levett Bucknall Award for Best Public Art Project at the RLB / Property Council of Australia Innovation & Excellence Awards in August.

The prize was presented to Dexus and Mirvac for commissioning a series of public art installations at the Quay Quarter redevelopment overlooking Sydney Harbour. The public art - which includes Roof for Stray Thoughts by Olafur Eliasson and Remembering Arabanoo by Jonathan Jones - enhances our experience of the city and our understanding of its complex history.

Remembering Arabanoo is a series of five installations that honour the memory of First Nations' man Arabanoo, who succumbed to smallpox following first contact with European settlers and was buried on what is now Quay Quarter. One of the five artworks is Betūnigo, or oysters in the Eora language. Clusters of cast-bronze oysters, which encrust the sandstone wall of the Gallipoli Memorial Club, are carefully positioned at the high tide mark. The artwork reminds us of the countless generations who came before us; people who heaped oyster shells, century after century, to form the middens which were later ground down to create the lime mortar used in colonial buildings. Betūnigo adds physical and metaphorical layers to the public space.

The story behind Remembering Arabanoo serves as a clear reminder of why public art has a value that cannot be measured in money. Public art sparks conversations and creates controversy. It delights, distracts us or elicits disdain. It can be a focal point for a new place or a catalyst for change in an old one. Whether it is a mural, an installation, sculpture or statue, public art challenges, confronts and sometimes cheers us beyond the boundaries of a gallery or museum.

### Cracking the code

Public art is used around the world as a place-making device to accelerate urban regeneration and boost social capital. In recent years, cities have poured eye-watering sums into public art budgets. Sydney's Barangaroo, for instance, has a \$40 million art and cultural plan, and most of that will be spent on permanent artwork.

It is impossible to put a true value on art - although some research teams have tried. The University of Warwick found a correlation between street art and house prices in London after analysing metadata from geotagged photographs. When Banksy painted Achoo - a woman sneezing out her dentures - on the side of a Bristol terrace house during Covid lockdowns, the homeowners found its value had increased tenfold overnight.

The value of public art is hard to pin down. But we can cost it. This is what quantity surveyors do every day. When we break it down into its essential elements, every public artwork is still pieces of granite or glass, brass or bronze.

RLB has been involved with many of the memorials that line Canberra's Anzac Parade, including the Australian Peacekeeping Memorial at the southern end. Each feature of the memorial is symbolic: a cobbled courtyard for quiet reflection, bronze plaques inscribed with personal characteristics of peacekeepers, a monolithic black masonry beam that evokes strength and stability. But the materials are solid matter and can be measured.

Other artworks are harder to cost, like the sculpture overlooking the Australian War Memorial that commemorates the sacrifice of horses. A life-sized bronze horse may not be in my cost book, but I can talk to the artist and the manufacturers, understand their process and the time involved, and then put a price on the output.

### Beyond line items

The job of a quantity surveyor is to assess whether a cost is fair and reasonable. An artist may invest a year, perhaps more, into one piece, pouring all their passion into a project. How do we weigh up a lifetime of skill, imagination and unique perspective? In the same way we determine the worth of an architect's vision.

Just like any other element of a project, public art must be in the budget to be brought to life. But as public art is often the first casualty of cost cutting, its future depends on more than being its own line item. The rest of the budget must be right too.

The best way to embed public art into a project is to make it part of the architecture. I.M. Pei's iconic glass pyramid at the Louvre Museum serves as both an architectural marvel and a work of art. The undulating forms and reflective surfaces of the Guggenheim Museum in Bilbao makes Frank Gehry's masterpiece shows how art and architecture converge. The Sydney Opera House's unfurling sails are an engineering marvel and an artistic expression.

Should funding for public art be fixed in every budget? I think, perhaps, economist John Kenneth Galbraith, said it best. The communities that are "richest in their artistic and cultural traditions" are also those that are "the most progressive in their economic performance and most resilient in their economic structures".

### Finalists in the Rider Levett Bucknall Award for Best Public Art Project 2023

This award recognises the use of public art within Australian developments to "create brilliant spaces and, in turn, enrich and enliven our cities and suburbs".

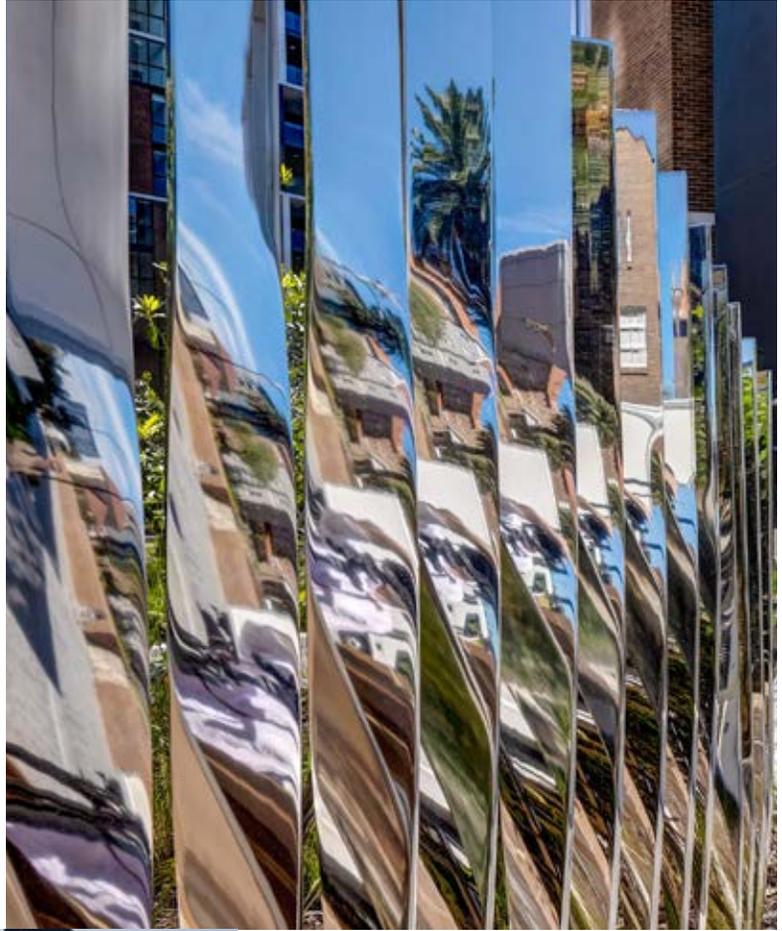
**Quay Quarter Tower:** Roof for Stray Thoughts by Olafur Eliasson is a monumental yellow sculpture on the rooftop podium, while Remembering Arabanoo is five artworks embedded into the architecture of Quay Quarter Lanes by Wiradyuri/Kamilaroi artist Jonathan Jones.

**32 Smith Subtractive Wall Art:** The GPT Group used this carved mural to celebrate the thriving culture of the Darug people, the Traditional Owners, of Parramatta. Darug woman and artist, Leanne Tobin, made the original sketches of people fishing, cooking and canoeing along the Parramatta River, and Di Emme transformed the sketches into a jack hammered bas-relief.

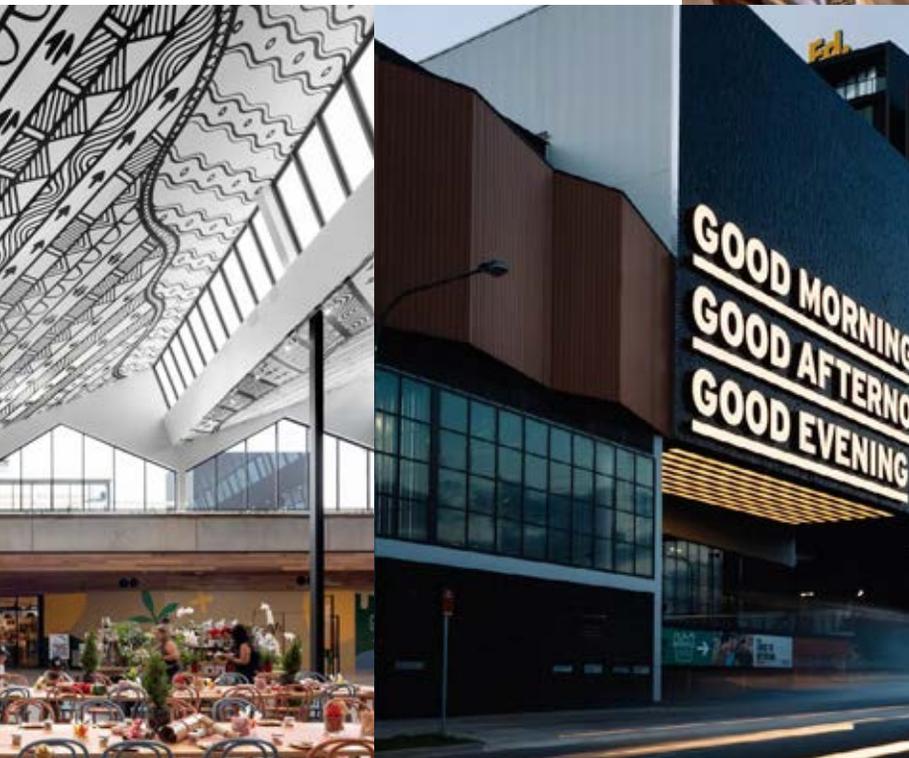


**All Our Boys:** Located at the entrance to the Highline Development in Sydney's Westmead, the former site of St Vincent's Boys' Home, this artwork transforms the traditional, suburban gate with paper-like sheets of mirrored pillars that represent the boys who once lived there. >

**Burwood Brickworks:** Frasers Property commissioned Indigenous artist Mandy Nicholson to create a striking artwork spanning 1,700 sqm across the ceiling and façade of the shopping centre, connecting the site to its traditional heritage and reminding visitors of the depth of Wurundjeri culture. v



Rider Levett Bucknall



< **Greetings, Flowers, Ping Pong 1000:** These three major public art components at Sydney's Ed.Square reinforce identity and belonging. For instance, Ping Pong 1000 is a playful representation of an endless table tennis tournament.



◀ **Resources:** This 8-metre-by-38-metre mural by Casey Coolwell-Fisher, a Quandamooka Nunukul woman of Minjerribah, represents the Albert River, and greets shoppers at their local Woolworths supermarket.

**Interchange Pavilion:** Mirvac and artist Chris Fox celebrate the bustling railway workshops once at the heart of South Eveleigh. Visitors are drawn into the Pavilion by railway switch tracks; inside, timber seats rise around a stage that is perfect for planned events or a quick bite. ▶



▶ **Chandelier Lane:** This immersive kinetic installation by Office Feuerman in the new Eat Street in Stockland Wetherill Park reappropriates the domestic and cultural symbol of the chandelier that lights many meals shared between families and friends.

▶ **Fisherman's Bend:** George Rose's mural depicts a topographical map of Fishermans Bend before the Yarra River's redirection in 1857. Colourful lines represent the natural systems of the land and the rich cultural history of the people who lived there.

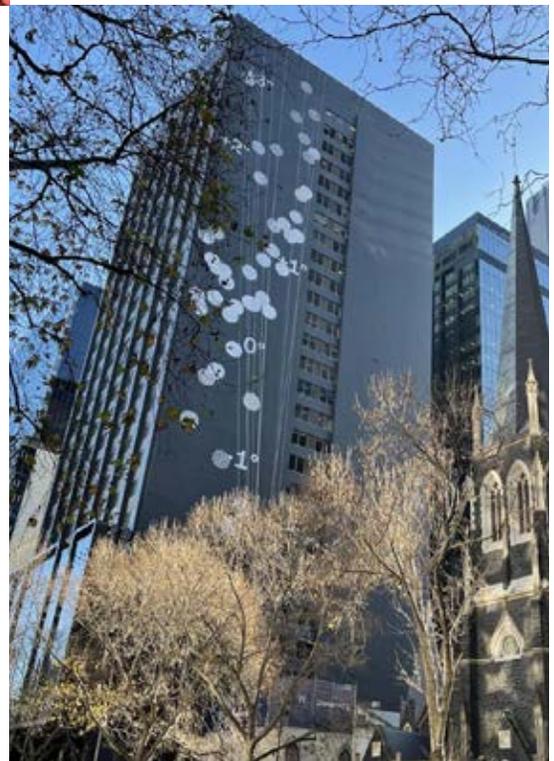


**To Dance - Wakakirra:** TAFE NSW commissions local Indigenous artists from each community to create, share and install their artworks at each connected learning centre around the state.

**Visy Glass Murals:** Uniquely designed murals of magnificent scale from celebrated street artists Kitt Bennett and Georgia Hill pays homage to the history and industrial heritage of the Melbourne suburb of Spotswood, with modern elements a nod to the future.



**Wesley Public Art Project:** Commissioned by Charter Hall, this \$1.5 million investment brings together six leading Australian artists to achieve a thought-provoking and engaging art experience through the 1-hectare precinct.





Bringing  
imagination to life



Rider Levett Bucknall works at the heart of the world's award-winning landmark projects. Our innovative thinking, global reach, and flawless execution push the boundaries. Taking ambitious projects from an idea to reality.

[RLB.com](http://RLB.com)

**RLB** Rider  
Levett  
Bucknall