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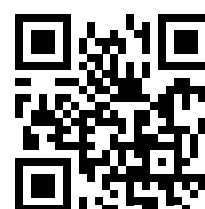
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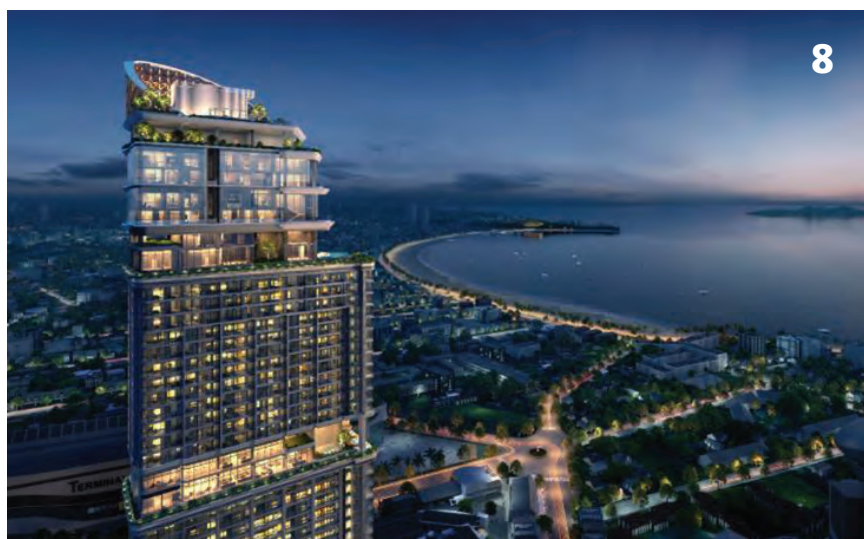
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Bouygues Construction to build 56-storey luxury residential tower in Thailand

Bouygues Construction, through its Thai subsidiary Bouygues-Thai, has been appointed by developer Honour Thailand to design and build 'Once Wongamat'. At 239 m in height, this 56-storey tower in Pattaya is poised to become one of Thailand's tallest buildings when completed.

The Once Wongamat tower is located on Pattaya-Na Kluea Road in North Pattaya, with a total floor area of more than 60,000 sq m. Designed by Thai architectural firm D103i (Design 103 International), the building will consist of 548 luxury apartments featuring high-end finishes. It will prioritise living spaces and resident amenities, including five retail areas.

The foundation work began in February 2026 and was scheduled for completion in August 2026. Bouygues-Thai and Siam Tone Co were commissioned to carry out the work, which involves rock coring to lay the tower's foundations.

Following this, work on the superstructure will begin and is expected to take around 30 months. According to Bouygues Construction, the low-carbon concrete structure presents technical challenges, one of which is constructing a



Image: Honour Thailand

Work on the superstructure is expected to take around 30 months. When completed, Once Wongamat is set to become one of Thailand's tallest buildings.

cantilevered swimming pool that extends beyond the building. The construction of high-rise towers in seismic zones requires proven technical expertise, an area in which the contractor has a strong track record.

The project site also faces several logistical challenges, including a restriction on any activity after 6 pm and the complex task of managing traffic and material supplies in central Pattaya, added Bouygues Construction. The teams are using digital logistics tools to manage the site effectively: streamlining deliveries within operational windows and minimising congestion to keep the project on schedule. The

contractor said up to 700 people will be working on site during peak periods.

"Bouygues Construction brings its expertise in high-rise projects to Once Wongamat, a flagship development in the luxury residential sector. With more than 80 high-rise towers delivered worldwide, including Mahanakhon Tower in Bangkok, our teams combine technical excellence with architectural ambition to deliver buildings that leave a lasting mark on their environment," said Philippe Jouy, deputy CEO of Bouygues Construction with responsibility for Bouygues Bâtiment International. ■

OC Global wins contracts for Gia Binh International Airport Project in Vietnam

Oriental Consultants Global Co Ltd (OC Global), in consortium with Transport Engineering Design Incorporated (TEDI) and CPG Vietnam Co Ltd (CPG), has signed a contract with Masterise Aviation Infrastructure Joint Stock Company to provide airport infrastructure design services for the Gia Binh International Airport Project in Bac Ninh Province, Vietnam.

As the consortium leader, OC Global will be engaged in designing core airport infrastructure, including runways, taxiways, aprons, aeronautical ground lighting (AGL) systems, air navigation systems such as ILS/DME, intra-airport roads, bridges and tunnels, water supply and drainage, power supply, and telecommunications. Furthermore, through design integration and interface management using building information modelling (BIM), the company will promote high-quality, efficient design across multiple facilities and engineering disciplines.

Considered a nationally important project, the Gia Binh International Airport aims to establish a new aviation and

logistics hub for northern Vietnam and the surrounding region, while becoming the country's first large-scale privately developed international airport.

Located approximately 40 km northeast of central Hanoi, the airport is planned to comply with the International Civil Aviation Organization (ICAO) Code 4F standard. The development plan outlines a handling capacity of 30 million passengers and 1.6 million tons of cargo annually by 2030, increasing to 50 million passengers and 2.5 million tons of cargo annually by 2050. Over the long term, the facility is envisioned to accommodate up to 100 million passengers annually.

Moreover, the airport is positioned as the centrepiece of a comprehensive regional development concept that includes a multimodal transport hub, a free trade zone, an industrial park and urban development. It is expected to significantly contribute to the economic growth and improved international connectivity of northern Vietnam. ■



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RINA and PT LRT Jakarta sign MOU to explore potential collaboration

RINA, an Italy-based global inspection, certification and consulting engineering company, and PT LRT Jakarta, the transport operator managing Jakarta light rail transit (LRT) system, have signed a memorandum of understanding (MOU) to explore potential cooperation in consultancy services and business development related to Jakarta's light rail system.

The agreement establishes a framework for cooperation between the two parties, aimed at assessing opportunities across several areas. These include planning, construction supervision, testing and commissioning, technical assistance, operational training, railway infrastructure maintenance, as well as identifying opportunities to enhance commercial operations within the LRT Jakarta network.

PT LRT Jakarta is the operator of the LRT system serving Indonesia's capital region, where it plays a role in improving urban mobility and supporting the development of integrated public transport. Jakarta is regarded as the world's most populous city, with nearly 42 million residents, and faces growing demand for efficient and sustainable mobility solutions.

As public transport use continues to expand in the city, rail-based systems are expected to play an increasingly important role in easing congestion and strengthening connectivity between key urban centres. RINA provides engineering consultancy services, drawing on expertise in infrastructure and mobility developed through major projects worldwide.

"This agreement creates a framework to assess how our technical expertise can support the development and operation of urban rail systems in Jakarta. We look forward to working with PT LRT Jakarta to explore solutions across the lifecycle of



RINA and PT LRT Jakarta will explore opportunities for cooperation in consultancy services and business development related to Jakarta's light rail system.

infrastructure, from design and construction through to operation and maintenance," said Enrico Beccaceci, Asia engineering executive commercial management director at RINA.

"The collaboration with RINA provides an opportunity to evaluate potential improvements to our infrastructure and operations, as well as to support the ongoing development of Jakarta's public transport network. We see this as a step towards strengthening the role of LRT Jakarta within the city's integrated mobility system," said Aditia Kesuma Negara, president director of PT LRT Jakarta. ■

OKP awarded S\$90.6 mil contract for Dawson Road network enhancements in Singapore

Singapore's contractor OKP Holdings Limited has secured a contract worth approximately S\$90.6 million from the Land Transport Authority (LTA) for enhancements to the Dawson Road network, comprising the design and construction of a new road extension along Kay Siang Road, as well as the widening of Tanglin Road, Kay Siang Road and associated connecting roads.

Under the contract, OKP's wholly-owned subsidiary, Or Kim Peow Contractors (Private) Limited, will undertake the design and construction of the new Kay Siang Road extension and the widening of existing roads, including recambering, raising, milling and overlaying works. The project will also involve associated ancillary and interfacing works required to complete the road infrastructure.

The 42-month contract commenced in August 2026. As part of the project, OKP will undertake works relating to existing and new bus stop facilities on Kay Siang Road, Tanglin Road,

Queensway and Margaret Drive. This includes the relocation or replacement of affected bus stop shelters, as well as the design and construction of new bus stop shelters along the new Kay Siang Road extension. The scope of works also includes the construction of covered linkways and a new cycling path network, together with footpaths and shared path elements.

"Against the backdrop of Singapore's continued investment in infrastructure and the built environment, we remain confident in the opportunities ahead and our ability to leverage our established track record and execution capabilities to secure quality projects," said OKP group managing director Or Toh Wat.

"We will remain disciplined in pursuing new opportunities while delivering our projects safely, efficiently and to high standards of quality, with a continued focus on sustainable growth and long-term value creation for our shareholders." ■



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Work starts on SCTEX Hacienda Luisita Interchange expansion in the Philippines

The Philippines' Bases Conversion and Development Authority (BCDA) is investing Php172.1 million to expand the Subic-Clark-Tarlac Expressway (SCTEX) Hacienda Luisita Interchange, further strengthening Tarlac's connection to major economic centres in Central Luzon.

This expansion project includes the construction of a 624-m two-lane access entry ramp bound for Baguio City or the Tarlac-Pangasinan-La Union Expressway (TPLEX), and a 242-m one-lane additional exit ramp bound for Tarlac City and adjacent municipalities.

Another ramp will be a 681-m two-lane access exit ramp with supporting structures, bound for Tarlac City and other municipalities. The project also covers the construction of a toll plaza, drainage facilities, slope protection, utilities, streetlights, and other structures.

"The Hacienda Luisita Interchange will serve not only BCDA properties, but also residents, workers, businesses and communities across Tarlac and the wider Central Luzon region," said Joshua M. Bingcang, president and CEO of BCDA. "When we improve connectivity, we make it easier for people to get to work, businesses to move goods, and investments to reach communities. This is the kind of infrastructure that helps the broader region grow."



Image: BCDA

An artist's impression of the SCTEX Hacienda Luisita Interchange Expansion Project, which is scheduled for completion in 2027. It aims to improve access between Tarlac and major economic centres in Central Luzon.

Scheduled for completion within 240 calendar days, or around the second quarter of 2027, the expansion project forms part of BCDA's continuing efforts to improve strategic SCTEX interchanges and strengthen connectivity across Central Luzon, facilitating the movement of people, goods and investments throughout the region. ■

Team Group secures construction supervision contract for Bangkok's SRT Light Red Line

Thailand's Team Group, in partnership with its consortium members, has secured the construction supervision contract for the Light Red Line suburban railway project, covering the Siriraj-Taling Chan-Salaya section and three additional stations, with a total contract value of THB 392 million. The project is expected to commence operations in 2029.

The contract was signed with the State Railway of Thailand (SRT) on 22 July 2026. As the lead firm in the consortium, Team Group said it holds a 66% share of the contract, equivalent to THB 258 million.

Under the project, Team Group will manage the project, supervise construction, oversee quality control, coordinate with stakeholders, and support SRT in meeting contract requirements to ensure the delivery of high-quality work on schedule. The three additional stations are Saphan Rama 6 Station, Bang Kruai-EGAT Station and Ban Chim Phli Station.

Chawalit Chantararat, CEO of Team Consulting Engineering and Management Public Company Limited, highlighted that the project is one of the government's urgent rail infrastructure initiatives, aimed at extending the Light Red Line network from the existing Bang Sue-Taling Chan section, which is already

in service, to Siriraj and Salaya. This expansion is expected to enhance connectivity across public transport networks and support future urban growth.

The Siriraj-Taling Chan-Salaya section and the three additional stations form part of a total construction budget of THB 15,176 million, covering approximately 20.49 km, added Team Group. The project includes at-grade rail lines, elevated tracks, improvements to existing lines, and new rail alignments, with a total of nine stations: Siriraj, Bang Khun Non, Talat Nam Taling Chan, Saphan Rama 6, Bang Kruai-EGAT, Ban Chim Phli, Kanchanaphisek, Sala Thammasop, and Salaya.

Furthermore, the project involves the construction of six U-turn bridges, as well as the design, installation, testing and integration of electrical, signalling, telecommunications and train support systems.

"The Red Line railway project is a key component in enhancing the western Bangkok mass transit network, connecting major economic, educational and medical hubs across the country through an integrated railway system," said Mr Chawalit. ■



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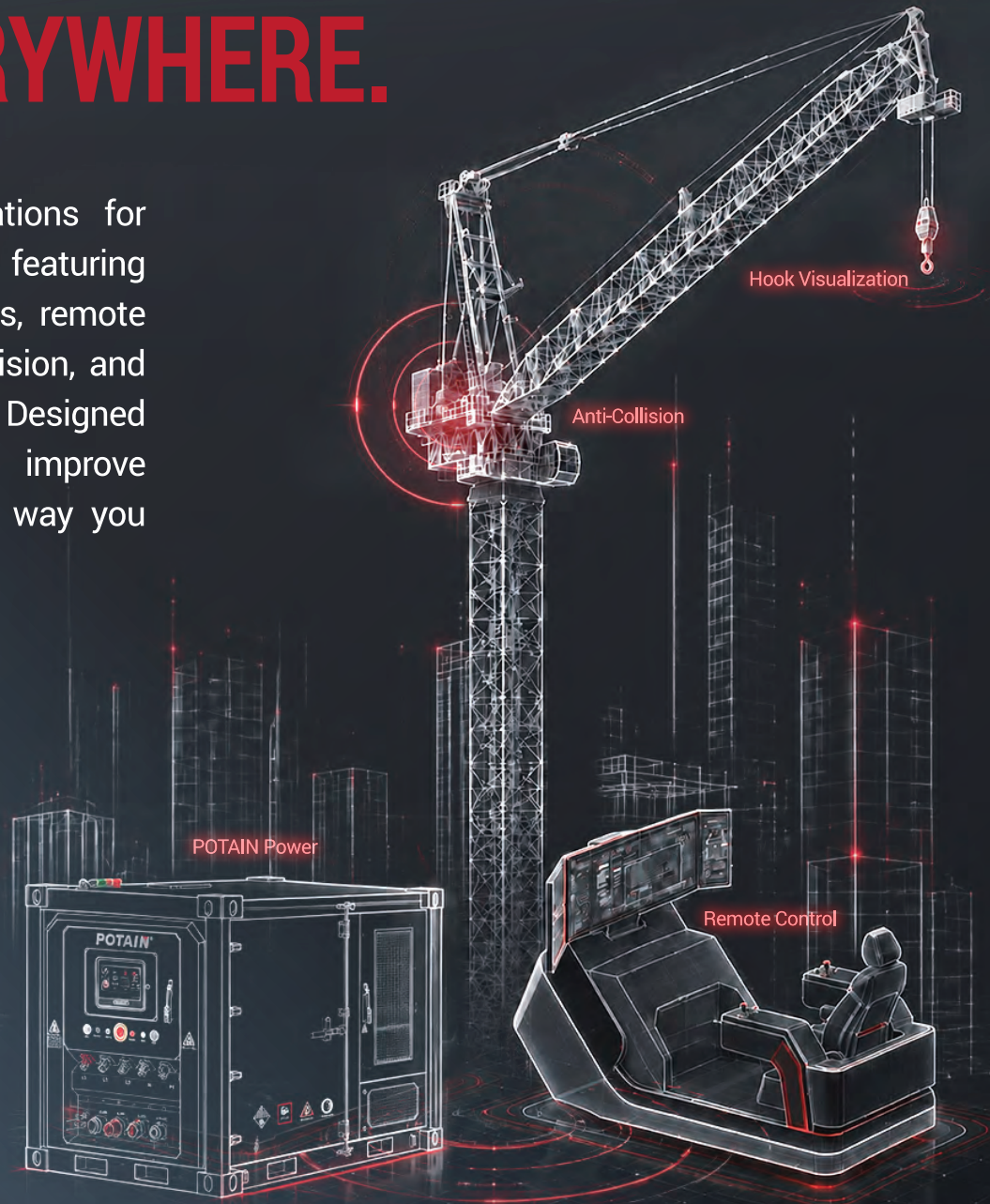
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Singapore's Hiap Heng Group enters mobile construction crane market with Liebherr MK 88-4.1E

Singapore-based Hiap Heng Group has taken delivery of a Liebherr MK 88-4.1E, marking the company's entry into the mobile construction crane market.

"The construction industry is constantly evolving. Limited space in urban areas is presenting project managers with increasingly complex challenges. Our clients expect safe and cost-effective solutions. The MK 88-4.1E is a targeted addition to our service portfolio," said Joyce Foo, CEO of Hiap Heng Group.

The vertical tower of the MK 88-4.1E allows work to be carried out directly on the structure, even over obstructions. This enables wide working radii with high performance while requiring minimal space. Thanks to their asymmetrical outrigger configuration and small footprint, Liebherr mobile construction cranes are ideal for use in densely built-up city centres.

Founded in 1983, Hiap Heng has more than 40 years' experience in the construction, infrastructure, marine, industrial and energy sectors. Its fleet comprises more than 100 large-scale machines, including mobile cranes, crawler cranes and aerial work platforms. The MK 88-4.1E expands the company's portfolio into the mobile construction crane segment.

Ms Foo added, "Thanks to its versatility, we will in future be able to support projects that would previously have required more complex solutions. These include, for example, lifting tasks during the construction or maintenance of office buildings, schools, hospitals and shopping centres, as well as infrastructure projects and a wide variety of installation works."

In Singapore, construction projects are increasingly being carried out in densely built-up urban areas. The MK 88-4.1E offers ideal conditions for inner-city construction sites, where conventional cranes often reach their limits.

'More cost-effective and sustainable'

Transport, erection and operation of the MK 88-4.1E can be handled by just one person. The taxi crane is ready for use in almost no time, without the need for additional transport units. Meanwhile, the high lifting capacity, long reach and precise control ensure efficient workflows during demanding lifting operations. This means that, in some cases, several construction sites can even be served within a single day.

"With the MK 88-4.1E, we can support projects more cost-effectively and significantly reduce set-up times. The electric crane operation is particularly valuable to us, as it drastically reduces noise and emissions. More sustainable construction methods are becoming increasingly important in Singapore. At the same time, Liebherr's advanced safety systems and intelligent control technologies inspire a high level of confidence among both operators and clients," explained Ms Foo.

Thanks to its powerful electric engine, the Liebherr crane can be operated at optimum efficiency and is highly flexible, running either on an integrated generator or on site power – optionally even at 32 amps.

"This decision underlines our long-term commitment to innovation, safety and productivity," continued Ms Foo. "We are investing not only in modern machinery, but also in the future of our employees and business partners. Together with Liebherr,



Crane handover in Singapore (from left): Lee Ah Tong, Joyce Foo and Kenny Lim of Hiap Heng; Marcel Beck of Liebherr-Werk Ehingen; Tek Siong Cheam and Daniel Wonschak of Liebherr-Singapore.



ABOVE: Hiap Heng enters the mobile construction crane segment with the acquisition of its first Liebherr MK 88-4.1E. The crane can be erected quickly and set up by a single person.

LEFT: Liebherr mobile construction cranes offer flexibility as 'taxi cranes', making them particularly well suited to densely built-up city centres such as those found in Singapore.

we aim to explore new opportunities and actively support the further development of intelligent lifting solutions."

For Hiap Heng, reliable after-sales service, technical expertise, user training and a long-term partnership are also crucial factors. Ms Foo stressed, "We have valued Liebherr's engineering expertise and innovative strength for many years. The quality and reliability of its cranes are recognised worldwide. Through this collaboration, we are laying the foundations to continue supporting our customers with modern and high-performance lifting solutions in the future." ■

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Penang Mutiara Line achieves key delivery milestones

Construction of the Penang Mutiara Line continues to gather momentum as Malaysia Rapid Transit Corporation Sdn Bhd (MRT Corp) achieves a series of key delivery milestones, marking steady progress in the development of Penang's first metro rail system.

As the asset owner and project manager, MRT Corp leads and drives the coordination of engineering design, construction planning, land readiness and railway systems implementation to ensure the project progresses on schedule.

A major focus of the project at this stage is the completion of detailed construction drawings for Civil Main Contract 1 (CMC1), covering critical infrastructure elements including pile caps, piers, viaducts and stations from Silicon Island to Komtar. To enable construction activities to commence progressively, MRT Corp has been issuing construction reference drawings to the contractor while detailed designs continue to be finalised.

According to MRT Corp, this parallel design-and-build approach has allowed construction works to proceed without waiting for the completion of the entire design package. As a result, works have already progressed with the construction of 45 pile caps and 32 pier columns, while construction activities are now taking place across 14 of the planned 19 construction sections under the CMC1 package.

Land acquisition for the project also continues to progress well through close collaboration between the federal government, the Penang state government and the relevant agencies, added MRT Corp. As of early August 2026, 93% of the total land acreage required for the CMC1 package has been made available for construction activities.

Another significant milestone has been achieved at the reclaimed Silicon Island, where soil investigation works have

commenced, paving the way for future depot construction activities in this key section of the alignment.

Following the handover of the Tapak Pesta site by the Penang state government in April 2026, MRT Corp has completed the removal of old structures and the necessary site preparation works, enabling construction activities to commence soon.

As civil works continue to advance across multiple fronts, MRT Corp is also actively managing the interface between the civil construction works and railway systems to ensure both workstreams progress in an integrated and coordinated manner. Through the continuous stewardship of MRT Corp, the project is being delivered as a single, integrated railway programme, ensuring that civil infrastructure and railway systems are developed in tandem towards a fully operational metro rail network.

With these key civil works and enabling activities well underway, the project is ready to enter its next major phase with the appointment of the system turnkey contractor.

MRT Corp has awarded a RM3.028 billion system turnkey contract (STC) to Malaysian Resources Corporation Berhad (MRCB) and Theta Edge Berhad Joint Venture (MRCB-Theta Edge JV). This appointment will enable the detailed design of the railway systems to proceed in parallel with the ongoing civil construction programme, ensuring both components remain aligned towards overall project delivery.

Meanwhile, the tender for the Civil Main Contract 2 (CMC2) package encompassing the extension of the alignment from Komtar to Penang Sentral is also progressing as planned, with tender evaluations currently underway. MRT Corp is targeting the award of the contract in November 2026. ■

Potain appoints PT Potaindo Machinery as dealer for Indonesia

Potain has appointed PT Potaindo Machinery as its official dealer in Indonesia, providing sales, service and parts support to customers nationwide. This appointment expands Potain's presence in the country, giving customers access to local expertise and on-the-ground assistance throughout the lifecycle of their cranes.

PT Potaindo Machinery has extensive experience with Potain tower cranes and a well-established team of sales, technical and service personnel. The company operates across Indonesia and is involved in a wide range of construction projects and lifting applications.

Central to this partnership is PT Potaindo Machinery's commitment to its '3S' values: safety, service and satisfaction. By prioritising these pillars, the company delivers reliable, high-quality services. To support this commitment, PT Potaindo Machinery maintains a comprehensive stock of genuine Potain spare parts. The company also offers crane rentals with experienced operators, providing customers with complete lifting solutions backed by local technical expertise.

"PT Potaindo Machinery brings strong technical expertise and a deep understanding of the local market, enabling us to deliver the reliable service our customers expect. This partnership ensures customers across Indonesia have access to responsive service, parts availability and experienced teams," said Johnny Kuah, regional sales manager for Potain.



The PT Potaindo Machinery team, now representing Potain as the official dealer in Indonesia, is ready to provide comprehensive support for tower crane sales and service nationwide.

"Our team has extensive experience with Potain cranes, and we are committed to delivering dependable service to keep customer operations running efficiently. We know the cranes well, and expect models such as the Potain MCT 325 L16, which offers an impressive 75 m jib, to be a key focus for Indonesia. We look forward to working closely with customers to meet their lifting requirements," said Greg Sunardi Rifay, director of Potaindo. ■



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Singapore unveils new initiatives to advance innovation and collaboration in the built environment

NEW S\$112 MILLION BOOST FOR RESEARCH AND INNOVATION

Singapore's Cities of Tomorrow (CoT) R&D Programme and Built Environment Technology Alliance (BETA) Catalyst Programme have secured an additional S\$112 million in funding initiatives (FIs) for the next five years under the Research, Innovation & Enterprise 2030 (RIE2030) tranche, to drive the next phase of research and innovation (R&I) and accelerate the transformation of the built environment (BE) sector.

"This reflects the government's continued commitment to investing in innovation and to partnering the industry to translate good ideas into practical solutions that can be commercialised and deployed in Singapore, and over time, taken to overseas markets," said Minister for National Development Chee Hong Tat, speaking at the International Built Environment Week (IBEW) 2026 on 2 September.

Four priority areas

Mr Chee highlighted the four key areas of R&I that align with Singapore's latest priorities. The first is to advance productive and safe demolition techniques to support urban rejuvenation needs, while improving productivity and minimising disamenities in built-up areas.

"As we rejuvenate more parts of the city, we need better ways to carry out demolition works more efficiently and safely, while minimising risks, disruptions, noise and other disamenities in our dense built-up areas," he said.

The second area is to expand capabilities in modelling building lifespan, improving building maintenance reliability and timeliness of repairs. "As our buildings age and their uses become more diverse, we need better tools, such as anticipatory models, to assess structural health, lifecycle costs and remaining operational lifespan," explained Mr Chee.

The third area is to strengthen the focus on embodied carbon



Singapore's Minister for National Development Chee Hong Tat delivers his opening address at the International Built Environment Week (IBEW) 2026.

Image: International Built Environment Week

reduction and energy efficiency towards achieving net-zero carbon emissions in the BE sector by 2050. The fourth is to catalyse the translation of R&I outcomes into industry adoption through the BETA Catalyst Programme.

"We will place greater emphasis on helping promising innovations move beyond the research and pilot stages towards wider industry adoption," stressed Mr Chee. "Ultimately, our investments in R&D must translate into tangible improvements in the way we design, build and manage our built environment."

The CoT R&D Programme is a multi-agency effort led by the Ministry of National Development (MND) that seeks to sustain Singapore's success in the decades ahead by leveraging R&I. It is supported under the National Research Foundation's (NRF) RIE efforts. Meanwhile, the BETA Catalyst Programme is an ongoing initiative to transform Singapore's BE sector and build industry capabilities by encouraging stakeholders to share their strengths and resources.

Fostering collaboration

More private sector players are investing in R&I across successive RIE tranches, such as by co-developing innovations, participating in pilot trials, or adopting promising solutions in their projects. The four FIs aim to deepen this collaboration further by bringing together BE firms, researchers and Institutes of Higher Learning (IHLs) to translate promising research into practical solutions that address real-world challenges and can be adopted by industry.

One example is the Construction Technology Innovation Laboratory (CTIL), a partnership between the Singapore Institute of Technology and Woh Hup that is supported by the BETA Catalyst Programme, shared Mr Chee.

"CTIL has developed high-performance steel king posts, which are central support columns, that are 57% lighter than conventional



Mr Chee has reaffirmed the government's commitment to partnering with the industry to translate good ideas into practical, deployable solutions. He is seen here touring BEX Asia 2026, the exhibition component of IBEW.

Image: International Built Environment Week

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ones and can be installed faster and more precisely with a smart positioning system. This helps to improve productivity and reduce costly installation errors,” he said, adding that the solutions have been deployed in several projects across Singapore, including Newport Plaza and the redevelopment of Alexandra Hospital.

“We want to see more of such partnerships and a greater willingness to try new ideas, to take calculated risks and to make targeted investments. This is how we turn promising innovations into practical solutions, and how we can continue to improve the way we build.”

The first grant call for the CoT R&D Programme is expected to be launched in October 2026.

Mr Chee further mentioned that moving forward, the government is exploring ways to expand underground uses to optimise Singapore’s limited land resources and meet the country’s diverse needs. “We will work with the [NRF] for additional funding to support more research and innovation to achieve Singapore’s long-term underground development goals and deepen our local capabilities within our ecosystem.”

However, government funding and research efforts alone will not be sufficient, Mr Chee pointed out, emphasising that the true measure of a strong research programme is whether its solutions can be implemented and deliver tangible impact in practice. “This is why we need more companies to join us and come on



The BuildSG booth at BEX Asia highlights initiatives supporting transformation across Singapore’s built environment sector.

board RIE2030, so that we co-develop new solutions together, participate in pilot trials, and adopt promising innovations in your projects.” ■

SITE SUPERVISION FIRM ACCREDITATION SCHEME & BCA GREEN MARK VERSION 7

As Singapore’s built environment (BE) sector advances with increasingly complex projects, firms must develop a broad range of technical competencies to meet supervision demands. To address this, from 2028, large-scale structural works projects valued at more than S\$75 million will be required to appoint Building and Construction Authority (BCA)-licensed firms to carry out site supervision services.

Additionally, there is increasing adoption of remote site supervision across the sector. This approach enables firms to supervise multiple project sites virtually by leveraging digital tools and technologies such as data platforms, smart glasses and live streaming devices, while maintaining rigorous governance and standardised operating procedures.

Engaging BCA-licensed firms for supervision will allow projects to benefit from the necessary firm-level resources and expertise, as well as access to the latest technological developments, to meet evolving demands and deliver safer, higher-quality infrastructure.

Mr Chee highlighted that “licensed site supervision firms will play an important role in helping to keep pace with the demands of increasingly complex projects and new technological developments, while ensuring quality and safety.”

New SSF Accreditation Scheme

To give developers and builders greater confidence in the firms they appoint, the Singapore Accreditation Council (SAC) has launched the Site Supervision Firm (SSF) Accreditation Scheme. Under this scheme, firms must first be accredited before they can be licensed by BCA to provide mandatory site supervision services for large-scale structural works projects.

To be accredited, firms must meet stringent requirements for competence, impartiality and consistent operations as inspection bodies, in accordance with ISO/IEC 17020. They must



At this year’s IBEW, Mr Chee also introduced Singapore’s new accreditation scheme for site supervision firms and refreshed BCA Green Mark certification (GM v7).

also demonstrate the necessary technical expertise, staffing and professional experience, and have structured training programmes in place.

“The accreditation scheme will assess whether firms have the necessary governance structure, systems and processes in place to ensure efficiency and quality control in site supervision, and at the same time effectively harness technology,” said Mr Chee.

In terms of technical expertise, firms are expected to show proficiency in six key areas: concreting works, including precast concreting; structural steelworks; reinforcement in reinforced concrete (RC) members; foundation works; earth retaining and stabilising structures (ERSS) works; and safety barriers.

There are also seven specialist competencies for which firms can be validated in: pre-stressing and post-tensioning works; post-

installed anchors/rebars; PPVC systems; demolition works; curtain wall and cladding systems; tunnelling; and land reclamation.

Applications for the SSF Accreditation Scheme open in September 2026. BCA encourages developers and builders to engage accredited site supervision firms before the new requirements take effect in 2028.

BCA Green Mark Version 7

The BCA Green Mark Version 7 (GM v7) is the latest update to Singapore's green building certification scheme. It aims to accelerate decarbonisation efforts in the BE sector, in support of broader national climate commitments under the Singapore Green Plan 2030.

The updated scheme is anchored by three key objectives:

- Advance the greening of Singapore's building stock
- Mainstream Super Low Energy buildings
- Respond to industry feedback to make sustainability more practical and achievable

New Energy Rating

The new Energy Rating is part of the GM v7 certification scheme and focuses solely on a building's energy performance. It provides an alternative certification pathway for building owners to invest in energy efficiency improvements with a clear return on investment – an approach that has been successfully adopted by other international green building frameworks. This Energy Rating will enable more buildings to enter the green building ecosystem and further drive decarbonisation.

"This is done by focusing first on energy performance, because I think that is a big contributor to the overall carbon emissions of the building. So this will enable more building owners to start their sustainability journey through energy

improvement retrofits, and then hopefully progressively do more over time," said Mr Chee.

Under the Energy Rating, BCA will introduce the SLE70 – a new Super Low Energy tier that is achieved by delivering more than 70% energy savings against its building typology's 2005 baseline. This challenges Singapore's most progressive developers to demonstrate leadership and strive towards the national target of an 80% energy efficiency improvement.

Alternative cooling technologies (ACTs), including hybrid cooling, active chilled beams and passive displacement cooling, can achieve up to 50% energy savings compared with conventional air-conditioning systems. To further support the industry in mainstreaming such technologies, ACTs will now be recognised under GM v7.

"This is especially useful in Singapore and other tropical countries, or countries with a hotter climate," noted Mr Chee, "because cooling is the one that takes up the largest amount of energy and contributes the largest amount of carbon emissions overall for buildings."

After achieving an Energy Rating, industry frontrunners seeking to demonstrate more comprehensive sustainability performance can pursue holistic BCA Green Mark certification. This scheme combines the Energy Rating with points scored for five additional sustainability sections covering Intelligence, Health & Wellbeing, Whole Life Carbon, Resilience, and Maintainability. Together, these criteria enable a fuller assessment of a building's sustainability performance in all aspects of green building.

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The GM v7 pilot phase was completed across 26 projects spanning all building typologies. These included the new Comcentre (above), which has achieved BCA Green Mark Platinum with a Zero Energy Rating, and the SMU Administration Building (below), which has achieved an SLE60 Energy Rating.

Image courtesy of BCA



Buildings pursuing holistic BCA Green Mark certification will receive two separate certificates: one reflecting their BCA Energy Rating performance tier and another reflecting their holistic rating. This provides building owners with flexibility to display either certificate, or both, depending on their objectives and target audience.

Collaborative development

GM v7 was developed in close collaboration with industry stakeholders, incorporating feedback from consultation sessions with over 150 organisations and 280 professionals throughout the BE value chain. The result is a certification that balances sustainability ambition with practical, cost-effective implementation.

Other enhancements in GM v7 include:

- More efficient recertification processes. Building owners with large portfolios of similar properties can recertify multiple buildings concurrently, reducing the time and administrative effort required. Buildings that demonstrate sustained energy performance will also benefit from an extended certification validity period of up to five

years, up from the current three years.

- Increased competitiveness and access to green financing. GM v7 is further aligned with globally recognised environmental, social and governance (ESG) reporting frameworks and international sustainability standards, enabling building owners to unlock green financing opportunities and strengthen their competitiveness in a sustainability-conscious global economy.

The GM v7 pilot phase was successfully completed across 26 projects spanning all building typologies, with strong participation from major developers and environmental sustainability consultancies. Among these projects were the new Comcentre, SMU Administration Building, Gardens by the Bay (Bay East and Bay South), Tuas Water Reclamation Plant – Administration and Operations Buildings, Raffles Hotel, and UOB Tower 80, to name a few.

Projects can apply for GM v7 from 2 September 2026. BCA Green Mark 2021 will continue to run in parallel, allowing the industry time to transition, with applications closing on 1 April 2027 and all active Green Mark 2021 assessments to be concluded by the end of 2027. ■

ROBOT LEASING SCHEME, WOG VIRTUAL INSPECTION & BEAMP INITIATIVE

As part of Singapore's efforts to enhance construction productivity, the Building and Construction Authority (BCA) has been supporting the adoption of robotics & automation (R&A) technologies through measures such as the Built Environment Technology and Capability (BETC) Grant and the Productivity Solutions Grant (PSG).

In response to growing demand, BCA will launch the Robot Leasing Support Scheme (RLSS), which co-funds R&A providers to lease their solutions to construction firms.

Funded through the BETC, this initiative will provide up to 50% co-funding for each robot, thereby defraying the costs of scaling up leasing and enabling more firms to benefit from R&A solutions while achieving greater time, cost and manpower savings.

"We are creating strong, sustained demand so our industry can readily deploy robotics on the ground. But we know the challenges: how do you make buying advanced robotic hardware affordable? We know that doing so can be capital-intensive for builders," said



At the ConTech Summit 2026, Minister of State for Foreign Affairs and National Development Alvin Tan announced further initiatives to accelerate innovation and technology adoption in the built environment sector.

Minister of State for Foreign Affairs and National Development Alvin Tan, speaking at the closing ceremony of the Construction Technology (ConTech) Summit 2026 on 2 September.

"Under RLSS, we will provide co-funding to robotics and automation solution providers so they can lease proven machines, like concrete-levelling and tile-grouting robots, directly to construction firms."

There is a growing pipeline of market-ready R&A solutions that have been proven to deliver significant productivity gains and manpower savings, including robots for autoclaved lightweight concrete (ALC) panel installation, drilling, painting, concrete levelling and tile grouting. However, barriers such as high upfront costs continue to deter some firms – particularly small and medium-sized enterprises (SMEs) – from adopting these technologies, explained BCA.

Leasing can help lower the cost barrier, making it more affordable for firms to access R&A solutions. The authority said that many have expressed interest in leasing options during industry engagements.



Various robotics & automation (R&A) solutions were on display at this year's BEX Asia exhibition, as Singapore's construction industry embraces these technologies more widely to improve productivity.

Who qualifies for RLSS?

To qualify, applicants must meet the existing BETC grant eligibility criteria. This means they must be built environment (BE) sector-related business entities operating in Singapore and be financially capable of undertaking and completing the proposed capability transformation initiative. SMEs will receive co-funding of up to 50% of qualifying costs, while non-SMEs will receive up to 30%.

Applicants must also be able to sustain a viable leasing model. They should establish a fleet of at least five robots, have a local maintenance team to provide adopters with adequate technical support during the lease period, and commit to offering fixed leasing rates for up to two years.

"The RLSS is a good initiative to encourage more contractors to adopt robotics," said Toh Chee Boon, deputy managing director of Hi-Tek Construction Pte Ltd. "It reduces the high upfront investment and allows more contractors to access proven robotic solutions. This will help improve productivity, reduce manpower reliance and enhance site safety. It is a practical way to accelerate robotics adoption across the construction industry."

"The RLSS helps construction companies trial robots without large upfront costs, while providing robotics companies with cash flow at the same time," added Keefe Wayne Teo, CEO of Fabrica AI, a Singapore-based R&A solution provider. "It also addresses the problem of utilisation – many main contractors do not have a continuous stream of a given task, such as tile grouting, at any given time. Renting a robot allows them to incur the cost of using robotics only when they need it." More details on the RLSS scheme will be shared later.

BEAMP initiative

The Singapore government is also exploring another run of the Built Environment Accelerate to Market Programme (BEAMP), a multi-agency initiative by BCA, JTC Corporation and Enterprise Singapore (EnterpriseSG) that supports innovators from solution co-creation and pilot testing to market trials and commercialisation.

Established in 2019, the BEAMP programme has issued more than 100 challenge statements that have catalysed corporate-startup collaboration between about 80 firms and innovators. One example is the collaboration between Fabrica AI and Woh Hup to co-develop a robot that automates floor tile grouting, a traditionally labour-intensive task.

Through this partnership, Fabrica AI developed Version 5 of its robot with up to two times the productivity gains, as well as greater reliability and user-friendliness, compared with its Version 4. On the other hand, Woh Hup, an investor in Fabrica AI, had a first look at the technology, which helped it stay ahead in an operating environment with a tighter labour supply. The technology has already been deployed in projects such as One Holland Village.

"BEAMP has built a strong track record over six cycles, with applicant numbers more than doubling over the last three cycles alone. BCA is exploring another run of BEAMP, so I encourage interested firms to keep a close lookout," said Mr Tan.

He reaffirmed Singapore's commitment to supporting start-ups in moving their innovations from prototypes to real-world deployment. "Our vision is for Singapore to be the testing ground where all promising prototypes prove their worth and then scale across the region."

WOG virtual inspection

In another development, Singapore's regulatory agencies have introduced the whole-of-government virtual inspection

(WOG VI) process for Temporary Occupation Permit (TOP) and Certificate of Statutory Completion (CSC) inspections. Under this process, project teams have the option to submit 360-degree virtual scans of their project sites to participating regulatory agencies for virtual compliance checks required for TOP/CSC approvals.

"Instead of coordinating multiple physical site walks, project teams can now capture 360-degree virtual scans of the building. Agencies can then pull up that digital twin and carry out inspections remotely and concurrently," said Mr Tan.

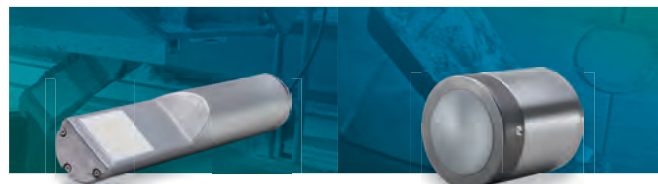
Preliminary findings from pilot projects – such as the Grand Dunman residential development – indicate that the WOG VI process can deliver manpower savings of up to 30% for project parties. The phased submission approach also enables project teams to save time, as they can now obtain TOP approval up to two months earlier than with the conventional physical inspection process.

In addition to BCA, the other participating agencies are the Infocomm Media Development Authority (IMDA), Land Transport Authority (LTA), National Environment Agency (NEA), National Parks Board (NParks), Public Utilities Board (PUB), Singapore Civil Defence Force (SCDF) and the Urban Redevelopment Authority (URA).

Firms can start using WOG VI for their TOP/CSC inspections with immediate effect. To support industry adoption, participating agencies have published a WOG VI Guidebook that sets out the inspection requirements, processes and key considerations for project teams seeking to adopt the new approach. ■



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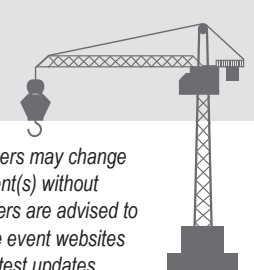
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'Beyond Limits': ICW & BuildXpo Malaysia 2026 to feature new platforms, ideas and innovations

The 28th edition of International Construction Week (ICW) and the fourth edition of International Building and Construction Exhibition (BuildXpo Malaysia) will take place from 10 to 12 November 2026 at the Malaysia International Trade and Exhibition Centre (MITEC), Kuala Lumpur.

This year's event is anchored by the theme 'Beyond Limits' and the positioning tagline 'The Industry Platform for Knowledge, Innovation and Growth'. For the first time, it will be held in conjunction with Glasstech Asia & Fenestration Asia (GAFA) 2026.

Building on last year's success with more than 15,000 trade visitors, 210 exhibitors from 11 countries and RM1.41 billion in projected business transactions, the 2026 edition is targeting 250 exhibitors from 15 countries and regions, 17,000 trade visitors and RM1.5 billion in projected trade value.

"When we launched ICW & BuildXpo Malaysia 2026 earlier this year, we set out an ambition for the industry to go 'Beyond Limits' – to move beyond conventional approaches, embrace innovation and strengthen collaboration," said Sr Ahmad Farrin Mokhtar, chief executive of the Construction Industry Development Board (CIDB) Malaysia, the host of ICW.

"But transformation cannot happen through policy or technology alone. It requires people who are willing to learn, organisations that are prepared to adapt, and an industry that is willing to share knowledge and collaborate across traditional boundaries. This is where ICW & BuildXpo Malaysia has an important role to play. It provides a platform where the industry's aspirations, ideas, technologies and capabilities can come together, and where we can move beyond discussing transformation to explore how it can be implemented in practice."

Expanded programme

ICW & BuildXpo Malaysia 2026 will place a stronger emphasis on knowledge sharing, technical excellence and industry collaboration through an expanded programme of conferences, seminars and new visitor experiences.

The programme will feature the AsiaConstruct Conference, BAMBUILDS'26 Talk & Dialogue, Global Opportunities Seminar, and Impact Change Through Construction (ICTC) Conference, alongside The Build Series, a curated platform for technical insights, innovation showcases and thought leadership discussions. New features, including Build ProPass and Build360, will further connect conferences, exhibitions, business opportunities and professional development into a more integrated visitor experience.

"This year, we are putting even greater emphasis on the experience of learning, discovering and engaging, to make every visit to ICW & BuildXpo Malaysia more purposeful and valuable," said Richard Teo, executive chairman of Qube Integrated Malaysia, which organises BuildXpo Malaysia, the official trade show of ICW.

"We are [also] bringing together a strong mix of conferences and seminars covering different dimensions of the construction industry, [demonstrating how] ICW is no longer simply about what is being built today; it is increasingly about how we will build tomorrow – the technologies we adopt, the skills we develop, the ideas we exchange, and the partnerships we create."



Preparations are underway for the upcoming ICW & BuildXpo Malaysia. This year, the event will place a stronger emphasis on knowledge sharing, technical excellence and industry collaboration.



Sr Ahmad Farrin Mokhtar, chief executive of CIDB Malaysia, provides a preview of what to expect at ICW & BuildXpo Malaysia 2026.

"Ultimately, the success of ICW & BuildXpo Malaysia should not be measured only in numbers. It should be measured by the connections made, the technologies discovered, the knowledge exchanged, the partnerships formed and, most importantly, the progress that follows after everyone leaves MITEC," added Mr Teo.

The co-located GAFA 2026, organised by MMI Asia Pte Ltd, will bring specialised expertise in glass, facades and building envelope technologies into the wider construction ecosystem, with more than 250 exhibitors, 5,000 visitors, participation from 50 countries and regions, 300 international hosted buyers and 50 speakers expected.

What's more, ICW & BuildXpo Malaysia 2026 will also feature Quest Day 2026, technical visits to Carcosa Seri Negara, Bangunan Sultan Abdul Samad, and Pos Malaysia Headquarters Kuala Lumpur, the CIDB-CLPM-ISOSB 2nd ASEAN Crane Lifting Planning Competition, and the MSSA Open Ideas Competition.

The event builds on the momentum of ICW Borneo 2026 in Kota Kinabalu, Sabah, which attracted more than 1,000 visitors, further strengthening ICW's role in connecting construction innovation, business opportunities and industry collaboration across Malaysia. ■

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MBAM OneBuild 2026 concludes on strong note

MBAM OneBuild 2026, held alongside OneWare, the fifth Malaysia International Hardware Technology Exhibition, took place from 5 to 7 August 2026 at the Kuala Lumpur Convention Centre (KLCC), marking its 12th edition.

Jointly organised with the Master Builders Association Malaysia (MBAM), the event brought together industry professionals from the construction, infrastructure, hardware, machinery, engineering technology and smart urban development sectors.

“Platforms such as MBAM OneBuild and OneWare are invaluable to us precisely because they bring industry voices directly into the same room as policymakers, and I encourage MBAM to continue using this exhibition as a channel for constructive dialogue with the Ministry in the years ahead,” said YBhg. Dato’ Seri Azman bin Ibrahim, secretary-general of the Ministry of Works, who attended the event.

Themed ‘Smart Cities Building Tomorrow’, MBAM OneBuild 2026 highlighted the growing importance of digitalisation, sustainability, industrialisation and smart infrastructure in shaping the future of construction. The event covered six key areas: construction, infrastructure, construction machinery & equipment, smart city, digitalisation, and sustainable construction, providing industry professionals with access to a wide range of technologies, products and solutions

Digital construction

One of the key highlights was Digital Construction Day, organised in partnership with CIDB Digital Sdn Bhd. The programme saw the participation of 12 technology providers showcasing solutions in building information modelling (BIM), industrialised building systems (IBS), Internet of Things (IoT), smart cities, artificial intelligence (AI), digital twins, construction robotics, drones and virtual reality (VR).

The event also featured a range of on-floor activities and knowledge-sharing programmes throughout the three days. The ESG Conference, organised by MBAM, focused on sustainability strategies, governance frameworks, environmental responsibility and long-term resilience within the construction and infrastructure sectors.

The special forum ‘Machinery Decisions: Own or Rent – Prepare Before You Choose’, featured four speakers from major industry players who shared their perspectives on whether owning or renting construction machinery is the better option. The discussion looked at cost, utilisation, maintenance and project requirements, offering practical considerations for contractors and industry professionals when making machinery investment decisions.

BuildTalk, a three-day seminar series, brought together industry experts and professionals to share practical insights on current developments in construction. Across 16 sessions, the programme covered topics including smart cities and smart warehouses, digital transformation, BIM, AI, digital construction, construction materials, concrete quality, digital handover and construction machinery.

The IPAF Seminar also provided industry professionals with an opportunity to gain knowledge and exchange views on mobile elevating work platform (MEWP) safety and compliance.

Live demonstrations

Led by the ACI-Malaysia Chapter in collaboration with TAR UMT,



ALL IMAGES: With the theme ‘Smart Cities Building Tomorrow’, MBAM OneBuild 2026 highlighted the growing importance of digitalisation, sustainability, industrialisation and smart infrastructure in shaping the future of construction.



the Concrete Clinic served as an avenue for visitors to seek practical advice and solutions on concrete-related issues.

Another new addition to this year’s event was the EVBuild Demonstration, which comprised 15 live demonstration sessions showcasing electric-powered equipment and smart mobility solutions. These included electric forklifts, intelligent EV logistics tricycles and electric-powered machinery mover skates.

MBAM OneBuild 2026 also hosted two days of business networking, attracting close to 500 contractors and suppliers from the construction and construction hardware sectors.

“MBAM remains steadfast in its commitment to fostering a construction industry that is strong, sustainable and competitive. Events like MBAM OneBuild are central to that mission; they are where ideas are exchanged, partnerships are forged, and the future of our built environment is imagined and inspired,” said Kenneth Liew, president of MBAM. ■

Website: www.mbamonebuild.com.my



Singapore Goes AUTONOMOUS



JTC CORPORATION AND JAPANESE CONSTRUCTION COMPANY KAJIMA CORPORATION HAVE OFFICIALLY LAUNCHED THE FIRST PILOT PROJECT TO EXPLORE THE USE OF AUTONOMOUS HEAVY CONSTRUCTION EQUIPMENT IN SINGAPORE.

In the first phase, four autonomous machines – two excavators and two compactors – will be tested at the Bulim Autonomous Yard (BAY), JTC's sandbox in the Jurong Innovation District for validating autonomous construction technologies under real-world site conditions.

Together with the Public Sector Science & Technology Policy & Plans Office (S&TPPO) and the Housing & Development Board (HDB), this pilot will test how these autonomous machines can ease

Singapore's construction manpower constraints and improve safety.

"For JTC, our upcoming projects include more than 800 ha of major earthworks in the next five years alone. And with this scale of work, we need to change the way we build and leverage emerging technologies to improve productivity, strengthen safety and make construction more resilient," said Jacqueline Poh, CEO of JTC Corporation, speaking at the launch event on 16 September 2026. "Autonomous construction has the potential to help Singapore build faster, safer and better."

As the government agency in charge of Singapore's industrial development, JTC has been mandating the use of robotics in its construction tenders since 2025 to achieve higher productivity in the sector.



ABOVE BELOW: In the first phase of the project, four autonomous machines – two excavators and two compactors – will be tested at the Bulim Autonomous Yard (BAY), JTC’s sandbox in the Jurong Innovation District. The pilot is targeting a 50% reduction in manpower, with one operator overseeing two machines.





Jacqueline Poh, CEO of JTC Corporation (left), and Yoshihiko Riho, senior executive officer at Kajima Corporation (right), speaking at the launch of Singapore's first autonomous heavy construction equipment pilot project on 16 September 2026.

Raising productivity with less manpower

Under the trial, an operator assigns tasks and sets virtual geographic boundaries (geofencing) for each machine. Equipped with sensors and artificial intelligence (AI), the machines then carry out these tasks autonomously. The activities are monitored remotely by staff, who will intervene whenever an issue arises. JTC is currently targeting a 50% reduction in manpower, with one operator overseeing two machines.

Luke Wu, managing director of The GEAR by Kajima, highlighted the significance of the trial. "While the technology exists, the real challenge is adapting it for use in the Singapore context," he said at the launch event. "That's why sandboxes like the BAY are so important, as they give us a site-realistic environment to validate the equipment."

This pilot involves multiple technology partners. To automate digging, the excavator uses a retrofit kit from Gravis Robotics, a Zurich-based startup that develops autonomous software and hardware for earthmoving equipment. Similarly, the compactor runs on Kajima's A*CSEL system, marking its first deployment outside Japan. Retrofitting is an important design feature that lowers the barrier to adoption, as contractors can upgrade machines they already own rather than replace entire fleets.

"Singapore offers an innovation-driven environment where new technologies can be tested, refined and put into practical use. At the same time, the government has established a clear direction for construction automation and set out long-term plans for major infrastructure works, including land reclamation and projects to raise land levels to strengthen resilience against rising sea levels. Together, these policy-driven and long-term plans create a strong foundation for developing and applying technologies such as A*CSEL in Singapore," said Yoshihiko Riho, senior executive officer at Kajima Corporation, who was also present at the launch event.

"Through close collaboration with JTC and our local partners, we will advance the development of automated construction technologies that enhance productivity, safety and quality while addressing the challenges facing Singapore's construction industry. We believe the combination of Kajima's technologies and Singapore's innovation-driven environment will help realise the next generation of construction."

RIGHT: Under the trial, an operator assigns tasks and sets virtual geographic boundaries (geofencing) for each machine. Using sensors and AI, the machines then carry out these tasks autonomously. Staff monitor the activities remotely and intervene when issues arise.



Guests watching the autonomous machines in action during the launch event.



Image: SEAC



Keeping workers safe

Autonomous construction equipment has the added advantage of reducing workers' exposure to some onsite safety hazards by minimising the need for personnel to operate machinery or work in close proximity to moving equipment.

Arising from the BAY trials, JTC is working with the Ministry of Manpower (MOM) to develop operating guidelines and safeguards to support industry-wide deployment while prioritising human safety. These include geofencing to keep machines within designated areas, LiDAR sensors to detect humans and obstacles, and emergency-stop controls on site and in the control room.



Image: SEAC

ALL IMAGES: Autonomous construction equipment can also enhance jobsite safety by reducing the need for personnel to operate machinery or work near moving equipment.





Upgrading machines and skills

Scaling autonomous construction will require new skills in data interpretation, digital task planning, system integration and maintenance. As these capabilities are still nascent in Singapore, Kajima is working with local contractor Kok Tong Construction (KTC Group) and equipment provider Tractors Singapore Limited (TSL) to retrofit conventional equipment with autonomous capabilities, train Singapore-based operators and engineers, and document lessons from the pilot for wider industry adoption.

Mr Wu outlined the three main objectives of the pilot. The first, he said, is to retrofit existing machines. “The aim is not to reinvent the supply chain or get our contractors to restock their inventories.” The second objective is verification – determining whether autonomous technology can work under local conditions – while the third focuses on building the capabilities of local operating partners.

The project kicked off in January 2026, with a soft launch in May, shared Mr Wu. Phase 1 is scheduled to run until the end of the year.

Next phase

JTC and Kajima will also explore extending the trial to autonomous bulldozers and dump trucks in 2027 (Phase 2), creating a coordinated fleet of machines.

“The real value of autonomous systems happens when we go beyond just individual machines. We have to consider how they can work together across actual construction processes,” explained Mr Wu.

“Earthworks is a particularly suitable example because it involves a series of connected and repetitive activities. The material needs to be loaded, hauled, spread and compacted. Each of these activities that follow one after the other needs to be coordinated. And that’s where I believe Phase 2 can take us further.”

“The objective of Phase 2, put simply, is to identify a use case for Singapore’s context, because we need to build a technical foundation before we deploy [the technology] on an actual project,” Mr Wu pointed out. “So, Phase 2 has to be about proving that autonomous construction is possible.”



ABOVE: Luke Wu, managing director of The GEAR by Kajima, sharing details of the pilot at the launch event.

TOP AND BELOW: JTC’s BAY sandbox provides a platform for companies to test and validate autonomous construction technologies under real-world site conditions.





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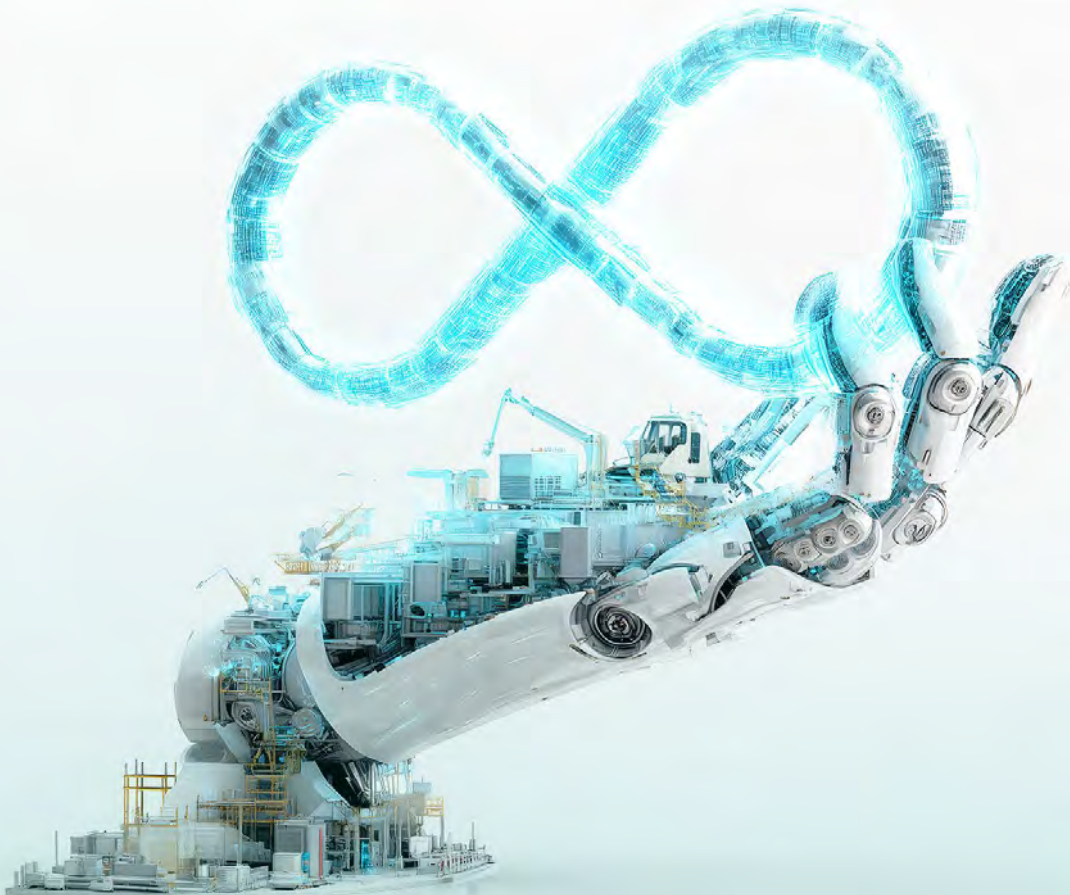
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“Our ambition goes beyond these initial few machines,” added Ms Poh. “Over time, we want to expand the range of heavy construction equipment that can operate autonomously and ultimately [move] towards multiple autonomous machines working together as an orchestrated fleet.”

“With more than 800 ha of major earthworks in the pipeline, we do think we have a real opportunity to translate what we learn here into deployment at scale, particularly at large sites, such as our reclamation projects.”

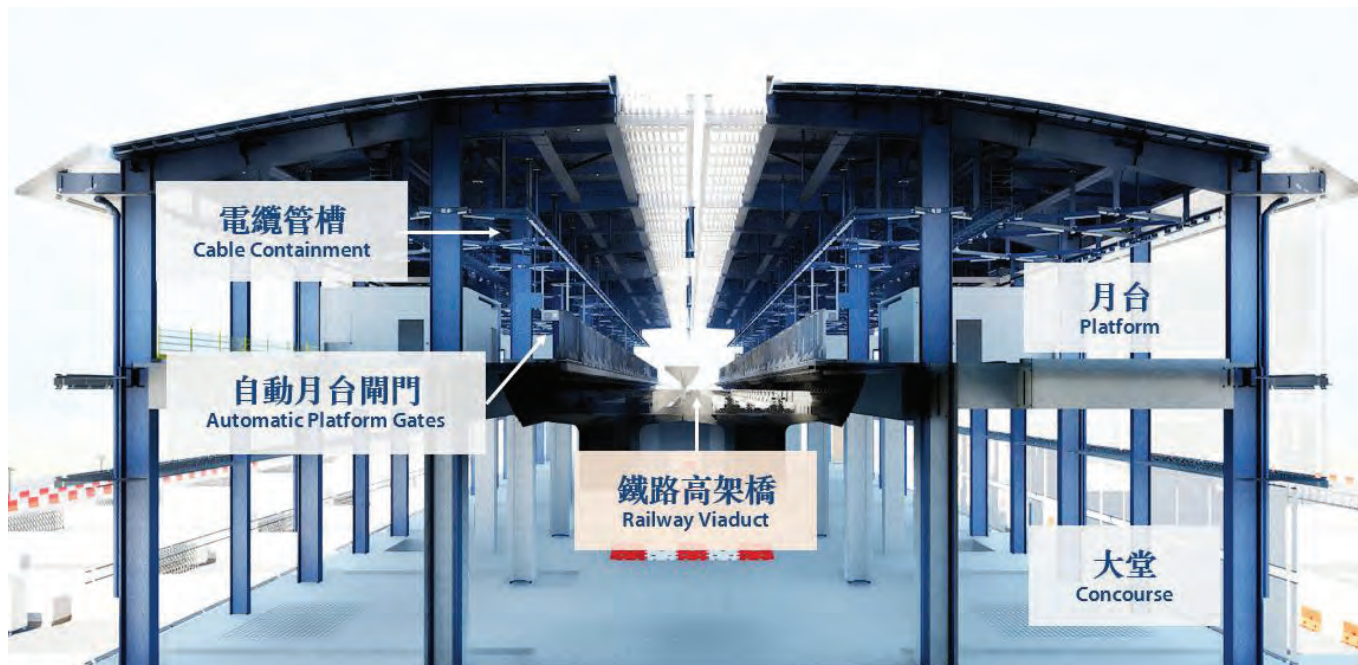
Beyond the pilot, JTC will be collaborating with public agencies, contractors, equipment providers, research institutions and technology companies to conduct more autonomous construction trials at the BAY sandbox. ■

All images: JTC and Kajima (unless stated otherwise)

TOP RIGHT, RIGHT AND BELOW: Since 2025, JTC has been mandating the use of robotics in its construction tenders to improve productivity in the sector. With more than 800 ha of JTC’s major earthworks planned over the next few years, there is a real opportunity to translate the lessons from this pilot into deployment at scale, particularly at large sites.

Note: JTC’s sandbox is open to firms looking to test innovative technologies under real-world site conditions and support the advancement of Singapore’s construction sector. Interested firms may contact JTC directly: askjtc@jtc.gov.sg





Hung Shui Kiu station on the Tuen Ma Line is transforming traditional in-situ construction methods for railway projects. Major station structures, including the ground-level concourse, upper-level platforms and rooftop structure, are being assembled off-site together with major electrical and mechanical (E&M) and building services equipment, thereby achieving a high level of completion before being skidded into their final position at a later stage.

MTR Hung Shui Kiu Station

Skidding method takes construction to new ground

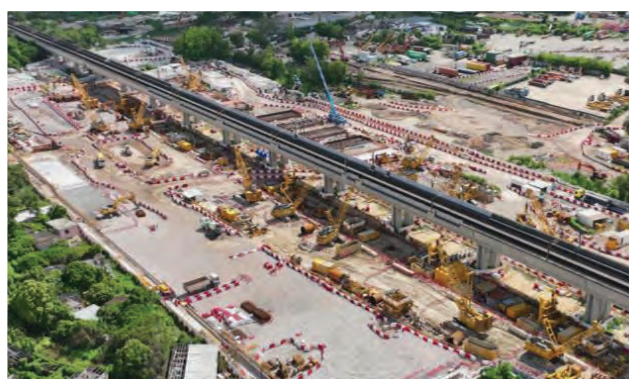
MTR Corporation is advancing multiple new railway projects at full speed in support of Hong Kong's future development blueprint. In particular, Hung Shui Kiu station on the Tuen Ma Line is set to reach a major milestone.

Prefabricated components of the station structures will be assembled at the jobsite and then precisely skidded into their designated positions and inserted into the operating Tuen Ma Line viaduct. According to MTR, this method is being used for the first time in the world to insert station structures into an operating railway viaduct.

'Build first, skid later'

Located between Tin Shui Wai and Siu Hong stations on the Tuen Ma Line, Hung Shui Kiu station will primarily serve the future Hung Shui Kiu/Ha Tsuen New Development Area. Since construction commenced in 2024, MTR has undertaken meticulous planning for the works to be carried out on the operating railway. The corporation has adopted a 'build first, skid later' approach for the construction of station structures. This approach overcomes the constraints of conducting works on the railway viaduct only during the 'golden two hours' of non-traffic hours.

The station's main structures, which will be inserted into position using the skidding construction method, will be divided into two sections located on either side of the operational Tuen Ma Line viaduct, serving the uptrack towards Tuen Mun and the



Foundation works on the station are progressing rapidly, while components for the main structures are being delivered to the site in phases for assembly. These two main structures are expected to be skidded into their final positions on both sides of the Tuen Ma Line viaduct in 2027, forming the future station.

downtrack towards Wu Kai Sha, respectively. Each of the main structures will be 210 m long, 15 m wide and weigh approximately 10,000 t.

Upon completion of assembly at the jobsite next to the Tuen Ma Line viaduct, MTR plans to commence skidding works

in phases using a large-scale hydraulic jacking system. The two sections will be precisely skidded, inserted alongside the operating viaduct, and secured to form the complete station structures.

MTR said this will be the world's first and largest heavy rail station constructed on an operating railway viaduct using the skidding construction method. In addition to the major station civil structures – including the ground-level concourse, upper-level platforms and rooftop structure – the assembled station structures will also incorporate major electrical and mechanical (E&M) and building services installations, including cable containment systems and automatic platform gates (APGs).

Following completion of the skidding works, a series of subsequent works will commence, with the overall Hung Shui Kiu station project scheduled for completion in 2030.

The construction of Hung Shui Kiu station is massive in scale and highly complex. MTR plans to undertake the skidding of the station structures alongside the downtrack of the Tuen Ma Line in the first quarter of next year, while skidding along the uptrack, which is on the opposite side, is scheduled for the third quarter of next year.

Carl Devlin, capital works director of MTR Corporation, shared that a series of advance works, including the removal of parapet walls and the modification of overlapping sections of the overhead line along the viaduct, had been completed over the past two years. The station construction has now entered a critical stage.

“Our project team breaks through the traditional mindset of railway construction to overcome the constraints of building a new station on the operating line, and decides to adopt a skidding method for the construction of Hung Shui Kiu station. It requires comprehensive and meticulous planning to ensure precise movement of the massive structures and insertion into the viaduct and seamless connection to various railway systems,” explained Mr Devlin.

“The station components are now being progressively delivered to the site for assembly. The team is working extensively on the construction details and arrangements, as well as to carry out testing and trials, and making every effort to ensure readiness for this mega skidding.”

Based on current progress, as the skidding works get underway, the station structures on one side will be gradually skidded from a position approximately 30 m away towards the viaduct. The final



Carl Devlin, capital works director of MTR Corporation, provides an overview of the construction works for Hung Shui Kiu station and updates on the progress of other railway projects.

and most critical stage will be the insertion of the station structures into the Tuen Ma Line.

After the new station structures are inserted into the operating Tuen Ma Line, the project team will immediately perform critical works, including the installation of overhead lines and modifications to related railway facilities, to ensure seamless integration and enable continued train operations.

MTR pointed out that these final connection works for both station structures will be highly complex and time-consuming, requiring continuous execution that extends into daytime operating hours. At this stage, services at a few stations on the Tuen Ma Line are expected to be affected when the skidding-related procedures on the two sides of the viaduct are carried out in the first and third quarters of next year, respectively.

Mr Devlin added, “This innovative construction method significantly reduces the need for works during non-traffic hours, greatly reduces construction risks and secures project progress. However, service adjustments are required and inevitable for adopting this method. Drawing on our experience from previous railway projects, we will undertake careful planning and do our utmost to minimise the impact on passengers.” ■

All images: MTR Corporation



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Luding Dadu River Bridge

The Luding Dadu River Bridge in China is being built under challenging high-wind, canyon conditions. This 1,060 m bridge, part of the Sichuan–Tibet Railway, will improve connectivity across the local mountainous terrain.

Three Potain MC 480 tower cranes helped construct the bridge's pylons. The main contractor, China Railway Major Bridge

Engineering Group, selected the cranes for their stability and lifting performance under the project's challenging conditions.

Purchased by dealer Xiamen Vigors Mechanical Equipment in 2016, the cranes started work on the project in November 2022 and wrapped up construction in May this year after completing a key stage of the bridge development.



TOP AND ABOVE: The new 1,060 m bridge, part of the Sichuan–Tibet Railway, is being built to improve connectivity across the local mountainous terrain.



ABOVE AND LEFT: Three Potain MC 480 tower cranes helped construct the bridge's pylons, working under extreme conditions that included a deep V-shaped canyon and strong winds.

BELOW: The cranes were configured with jib lengths ranging from 40 m to 60 m and operated at their full 25 t lifting capacity.



China Railway Major Bridge Engineering Group received parts, service and technical support during the project from the Potain factory in Zhangjiagang, together with local expertise from Xiamen Vigors. This combined aftermarket service ensured consistent uptime, efficient maintenance, and long-term operational reliability across the demanding schedule.

Facing extreme conditions, including a deep V-shaped canyon and strong winds, the three Potain MC 480 tower cranes worked in perfect harmony, with jib lengths ranging from 40 m to 60 m and operating at their full 25 t lifting capacity.

The working configuration of the pylon construction also added to the complexity, with a 21 m steel formwork section

providing no tie-offs for the cranes, meaning they had to work around it as the project progressed upwards. Moreover, the staggered multi-crane operations offered only 10 m between jibs. Despite these issues, the Potain MC 480 cranes delivered robust performance, completing the 262.8 m and 255.8 m main pylons right on schedule.

"This project highlights the reliability and performance that customers expect from Potain cranes. The MC 480 continues to deliver the lifting capability and durability required for demanding infrastructure applications," said Wang Zhiwei, head of engineering at Manitowoc China. ■

Website: www.manitowoc.com

VÖGELE PRESENTS 'DASH 5' SPRAY PAVER

The new Super 1800-5 X SprayJet from Joseph Vögele AG features a spray width of up to 8.25 m, precise metering of low spray rates and a spray module with optional heating for residual emulsion. New Dash 5 technologies ensure ease of use, shorter setup times and automated processes.

More applications

Spray pavers apply bitumen emulsion and asphalt surface courses in a single pass. This results in an optimal bond between layers, saving time, material and costs. With the new Super 1800-5 X SprayJet, Vögele is now introducing a model that offers more applications, a high level of user-friendliness and new automation solutions. Like its predecessor, the new machine can be used either as a conventional road paver or as a spray paver.

As a standard paver, it provides a paving width of up to 9.25 m; as a spray paver, it provides a spraying width of up to 8.25 m. This is 2.25 m more than before, enabling construction companies to use

the machine both in the local authority sector and for motorway refurbishment projects. The spray module's insulated emulsion tank has a capacity of 2,100 l, and an optional additional emulsion tank increases the capacity to 7,100 l.

With a motor power of 129 kW and a laydown rate of 700 t/hr, the Super 1800-5 X SprayJet is also highly efficient. A wide

range of new technologies make users' day-to-day work easier – including the ErgoPlus 5 operating concept, which allows the machine to be put into service at the



touch of a button using Paver Access Control (PAC), the optional Lighting Package Plus, and automation solutions such as the Smart Pave digital paver control system and digital site documentation with WPT Paving.

The Super 1800-5 X SprayJet is fitted with five spray bars, which are positioned between, behind and to the sides of the crawler tracks. The arrangement enables seamless application of emulsion, even when the paving width varies. With two additional bolt-on extensions, the maximum spray width of 8.25 m can be achieved. The spray nozzles operate in pulse mode at a maximum pressure of 3 bar and are available in 07, 10 and 16 sizes, with flow rates of 70%, 100% and 160%, respectively.

Optimised calibration delivers extremely precise application across the entire spray width – including with small quantities. To maintain the temperature of small quantities of emulsion (less than 300 l) until the end of the operation, the new model is now available in a version with an additional heater. This allows residual emulsion to be used up completely, even with a low spray rate and at low outside temperatures.

New operating concept

With the new ErgoPlus 5 operating concept, the Super 1800-5 X SprayJet is consistently tailored to users' needs. Vögele has optimised the paver operator's console, simplifying the operation of SprayJet functions, improving the design, reducing the overall height to provide more legroom, and integrating extra storage options, for example for a smartphone. The new SmartWheel allows for particularly precise fine-tuning of the spray paver. The optional touch screen also facilitates convenient monitoring and operation of existing and future digital solutions.

The tank is fitted with a new, high-contrast, high-resolution display, enabling operators to view the readings clearly. Key functions and information relating to the SprayJet module can also be accessed via the displays on the screed control consoles. In addition, with Paver Access Control (PAC), users can start up the spray paver at the touch of a button. A separate control unit lets users manage all the initial steps safely and conveniently. On night-time construction sites, the Light Package Plus option ensures shorter setup times: two LED spotlights, permanently integrated into the hardtop and canopy, illuminate the paver and screed area across the entire paving width. The new model is equipped with a windscreen.

Furthermore, the Super 1800-5 X SprayJet helps users with steering and levelling: the Grade Assist, AutoTrac and Smart Pave automation solutions control profile paving, as well as the direction and width, of the Dash 5 paver. Cloud-based jobsite intelligence solutions such as Wirtgen Group Performance Tracker (WPT) Paving and the new RoadScan help paving teams collect and analyse relevant paving, temperature and machine data in real time, and optimise the entire process. ■

Website: www.wirtgen.com



Joseph Vögele AG has upgraded the Super 1800-5 X SprayJet spray finisher to Dash 5 level. This machine can be used either as a conventional road paver or as a spray paver.

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CATERPILLAR INTRODUCES REMOTE-CONTROL SYSTEM FOR HEAVY EQUIPMENT IN SINGAPORE

As Singapore's construction industry increasingly embraces robotics and automation, Caterpillar has introduced its Cat Command remote-control technology to the local market. The system is compatible with wheel loaders, dozers and excavators, enabling operators to remotely perform loading, dozing and excavating operations.

At Construction Technology @ Punggol Digital District (ConTech@PDD) in July 2026, Caterpillar partnered with its local dealer, Tractors Singapore Limited (TSL), to showcase Cat Command and highlight its applications. The event brought together government representatives and stakeholders from the infrastructure and construction industries.

According to TSL, Cat Command has been deployed on projects around the world. While the technology is already operational in the Southeast Asian mining sector, Singapore aims to be the first country in the region to adopt it for construction.

Higher safety, efficiency and control

The use of Cat Command will enhance safety and productivity in various applications. Its remote-control capability provides full machine manoeuvrability from a safe distance when working in potentially hazardous environments.

By removing the operator from the cab, the system eliminates exposure to machine vibrations, reducing fatigue and allowing for longer working periods. To help address current and future labour shortages, its 'virtual cab' expands access to machine operation, opening up opportunities for a larger pool of potential operators, including those with physical limitations.

A single operator can remotely control multiple machines, one at a time, whether they are at the same jobsite or at different



Cat Command remote-control technology is compatible with wheel loaders, dozers and excavators, enabling operators to remotely perform loading, dozing and excavating operations. One of the options, the non-line-of-sight (NLOS) Command Station, includes a modular, customised 'virtual cab' where the user is comfortably seated in front of machine controls and displays similar to those inside the operator's cab.

locations, improving work efficiency while reducing travel time and costs. In addition, remote control enables continuous production immediately following disruptive processes, like blasting, thus increasing machine productivity.

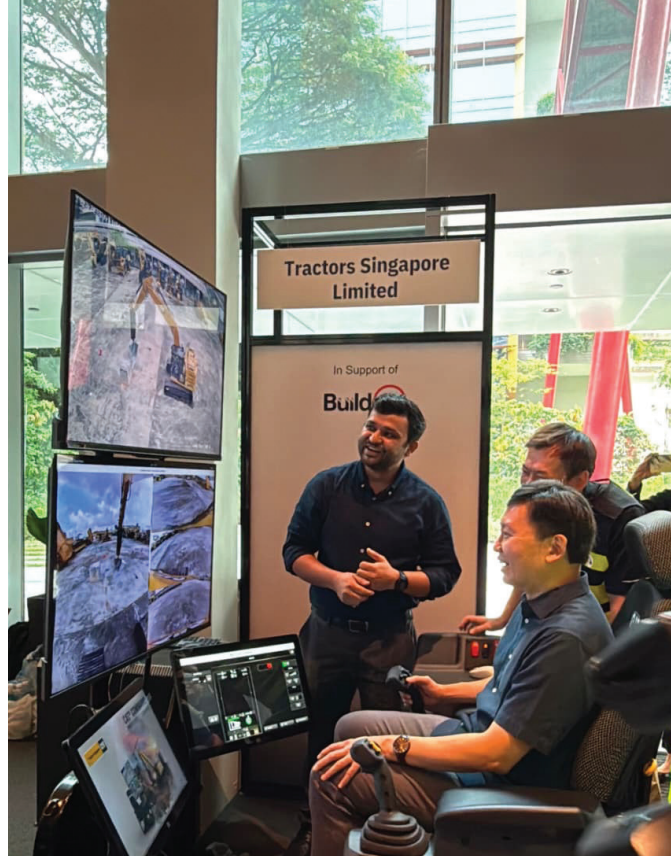
At the ConTech@PDD event, TSL demonstrated the remote operation of an excavator located 40 km away from the venue. The setup leveraged a robust 5G network and was paired with a standard Cat machine.

Flexible options

The system offers two solutions: the line-of-sight (LOS) Command Console and the non-line-of-sight (NLOS) Command Station. Both are aftermarket installations that integrate fully with the machines' hardware and software, enabling quick response and smooth control. Operating commands are sent directly to the machines' electronics through a dedicated radio transmitter/receiver, resulting in real-time control.

These two solutions feature integrated safety protocols that allow the machines to return to a fail-safe state in situations such as network disruptions or console/operator tip-overs, ensuring safe remote operations.

The LOS Command Console comes complete with a lightweight, compact control console supported by a comfortable shoulder harness. Controlling all machine



LEFT: During the recent Construction Technology @ Punggol Digital District (ConTech@PDD), Caterpillar partnered with its local dealer, Tractors Singapore Limited (TSL), to showcase Cat Command and highlight its applications. Minister for National Development Chee Hong Tat is seen here seated in the 'virtual cab', exploring the technology.

BELOW: At the event, TSL demonstrated the remote operation of an excavator located 40 km away from the venue. The setup leveraged a robust 5G network and was paired with a standard Cat machine.



ABOVE AND RIGHT: With Cat Command, a single operator can remotely control multiple machines, one at a time, whether they are at the same jobsite or at different locations. This improves work efficiency while reducing travel time and costs.



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functions, the console allows the user to work safely and comfortably away from the machine while remaining onsite and maintaining direct visual contact with the equipment. This solution requires no onsite communications infrastructure and is ideal for short-term and emergency use when encountering potentially hazardous work areas.

Meanwhile, the NLOS Command Station offers the flexibility to be located onsite or positioned miles away from the machine. The station includes a modular, customised 'virtual cab,' where the user is comfortably seated in front of machine controls and displays similar to those inside the operator's cab.

Similar to normal cabs

Operating from the Command Station is similar to running a machine from the cab. Multiple monitor views show everything the operator needs to see, including additional views that are not available from the cab.

The control layout of the station mirrors what operators will find in most Cat equipment. The controls are familiar and precise, reflecting what is happening on the machine in the field.

TSL pointed out that, although operators require some training, the Command Station works much like a conventional machine cab, making it easier for them to learn and use.

Along with exterior camera views, the station monitor provides essential machine status information in real time, such as fuel usage, engine speed, travel mode and more, as well as information from other Cat technologies, such as Cat Grade. ■

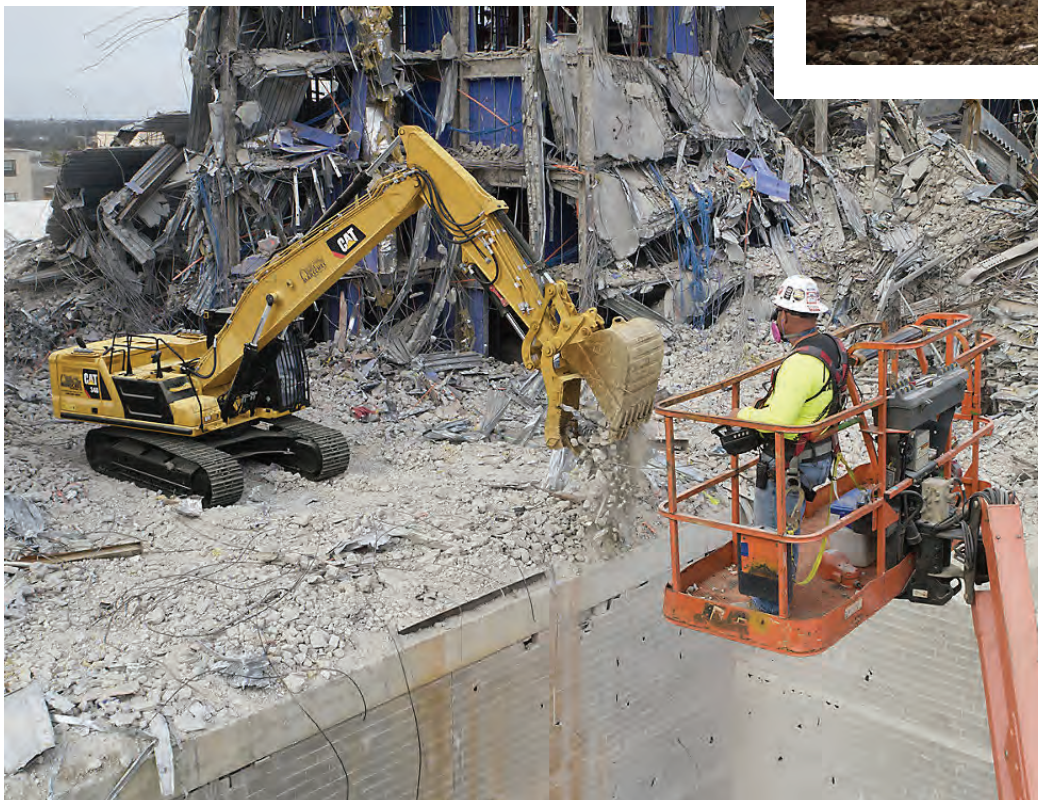
Website: www.cat.com/commandforconstruction / www.tractors.com.sg



The Caterpillar and TSL teams at ConTech@PDD. Held in July 2026, the event brought together government representatives and stakeholders from the infrastructure and construction industries.



ABOVE AND BELOW: The line-of-sight (LOS) Command Console allows the user to work safely and comfortably away from the machine while remaining onsite and maintaining direct visual contact with the equipment. This option is ideal for short-term and emergency use when encountering potentially hazardous work areas.



LEFT: Remote-control operation not only enhances safety and productivity but also eliminates exposure to machine vibrations, thus reducing fatigue and allowing operators to work for longer periods.

THREE ENGINEERING FIRSTS IN SINGAPORE SHOW A SAFER WAY TO BUILD BIG

The Building and Construction Authority (BCA) has recognised four Professional Engineers, along with their firms and project teams, with the Design and Engineering Safety Award (DESA) 2026 for three landmark projects that set engineering firsts in Singapore: **New Central Manpower Base (CMPB)**, **IOI Central Boulevard Towers** and **Geneo at Singapore Science Park**.

These developments showcase technical excellence in urban engineering. At CMPB, Singapore's first suspended auditorium safely supports 468 seats from above, freeing up space below for a large, column-free public hall, while IOI Central Boulevard Towers saw Singapore's first application of the observational method for an earth retaining and stabilising structure (ERSS) within a dense, infrastructure-heavy site. Geneo at Science Park features the country's tallest mass engineered timber (MET) canopy at 27 m. Together, the three projects demonstrate how engineering enables land-scarce Singapore to optimise space, elevate public environments and build safely for the future.

Engineer (Er.) Tan Chun Yong, group director (building engineering) at BCA, said, "As Singapore continues to develop within a highly urbanised environment, engineers must work around existing infrastructure and buildings innovatively while meeting stringent safety requirements. This year's Design and Engineering Safety Award (DESA) winners are a testament to how sound engineering can turn complex site and design constraints into ambitious developments that will serve the community for decades."

New CMPB

The new CMPB marks the start of the National Service journey. The vision behind the development is to bring together registration, medical screening, fitness assessment and visitor services within a single, welcoming campus. To realise this vision, engineers had to reimagine traditional structural design and construction to optimise space for each activity.

The 468-seat auditorium is Singapore's first suspended auditorium, which does not sit on a grounded floor. Er. Clement Chen, executive director at Meinhardt (Singapore) Pte Ltd, minimised the need for multiple supporting columns by transferring the auditorium's loads upwards through mega steel trusses at roof level, freeing the space below for a large, column-free public hall.

The 208-m multi-span pedestrian bridge links CMPB and Cashew MRT station. It was constructed directly above operating MRT infrastructure. With strict limits on the additional load that

could be imposed on the MRT structure, Er. Chen designed a calibrated raft foundation with carefully positioned voids, reducing its weight by about 40% while maintaining the structural strength and stability needed to support the bridge.

The building's 68 tapered reinforced-concrete (RC) fins rise approximately 32 m (about 10 storeys high) along CMPB's frontage. Each fin is set at a unique angle to provide structural support and solar shading. Due to their height, the fins were each divided into five segments and secured on-site. A proprietary bracket system enabled installation without full-height temporary supports, allowing for a faster installation process. Building information modelling (BIM) was also utilised to coordinate the precise geometry, angles and connections before fabrication and installation, improving accuracy, safety and productivity.

IOI Central Boulevard Towers

IOI Central Boulevard Towers is a mixed-use development at Marina Bay, where nearly one-third of the site was occupied by a common services tunnel (CST), a major monsoon drain, MRT protection zones and conserved heritage trees. During construction, engineers had to overcome severe site constraints to execute deep foundation works safely while ensuring all surrounding facilities remained fully operational and protected.

Er. Aaron Foong, senior executive director at KTP Consultants Pte Ltd, a member company of Surbana Jurong (SJ Group), designed long-span transfer trusses that carry the load of the 12-storey East Tower across the restricted zones to columns and foundations outside them. Integrated into the inter-storey car park, the approximately 7-m-high trusses preserved usable space and created a large column-free public area at ground level, with improved pedestrian movement through the development without increasing the building height.

Below ground, the team adopted an innovative dual-function secant bored pile (SBP) system in challenging marine clay geology. The piles that initially retained earth during excavation were retained as the West Tower's permanent deep foundations. The project is also the first in Singapore to apply the

observational method to an ERSS structure, using live sensor data and pre-agreed thresholds to verify how the ground and retaining structure were performing and safely optimise the temporary support required during excavation. Together, these approaches maintained safety requirements while improving material efficiency and reducing embodied carbon. They saved approximately 10,000 cu m of concrete and 1,000 t of steel reinforcement.

Geno at Singapore Science Park

Geno was designed as a life sciences and innovation hub with purpose-built R&D workspaces that adapt to changing research needs while providing welcoming public spaces for the wider community. Delivering this vision required engineers to balance structural performance, flexibility and sustainability on a sloping site bordered by transport infrastructure and utilities.

The showpiece is Singapore's tallest MET canopy – rising 27 m and spanning a 3,000-sq-m public plaza. Its cathedral-inspired, unconventional columns and arches serve as both the canopy's main structural supports and defining architectural features. Er. Ponnampalam Thusiyanthan, technical director (mass engineered timber) at Ronnie & Koh



FROM LEFT: Er. Teoh Eng Sin, Mott MacDonald Singapore Pte Ltd; Er. Aaron Foong, KTP Consultants Pte Ltd; Er. Ponnampalam Thusiyanthan, Ronnie & Koh Consultants Pte Ltd; and Er. Clement Chen, Meinhardt (Singapore) Pte Ltd.

Consultants Pte Ltd, was behind the complex geometry of the design, which required specially engineered connections, extensive off-site prefabrication and digitally planned assembly sequences to ensure precise alignment and safe load transfer.

Er. Teoh Eng Sin, structural technical director at Mott MacDonald Singapore Pte

Ltd, also developed a hybrid post-tensioned and RC structural system to achieve column-free spans of up to 19.2 m while meeting stringent vibration performance requirements. This gives future occupants greater flexibility to reconfigure laboratory layouts, equipment and building services without major changes to the primary structure. ■

This year's Design and Engineering Safety Award (DESA) winners are a testament to how sound engineering can turn complex site and design constraints into ambitious developments that will serve the community for decades.

NEW CENTRAL MANPOWER BASE (CMPB)

Er. Clement Chen, Executive Director, Meinhardt (Singapore) Pte Ltd



FAR LEFT: The pedestrian bridge linking CMPB and Cashew Station was constructed directly above operating MRT infrastructure.

LEFT: Er. Chen designed a calibrated raft foundation with carefully positioned voids, reducing the foundation's weight while maintaining the structural strength and stability needed to support the bridge.

A. Suspending an auditorium above hall

Conventionally, an auditorium is supported by beams and columns positioned beneath it. At the new CMPB, this would have introduced multiple columns into the Level 3 Service Connect space, which would restrict visitor movement, visibility and flexibility in using the hall for services, ceremonies, training and other events. The engineers therefore devised a solution to support the auditorium without any columns below.

The engineering solution:

- The auditorium is suspended from large steel roof trusses, with its weight channelled upwards and outwards to composite columns at the sides, and down into the building's foundation.
- The steel truss system was chosen for its ability to incorporate building services within the structural depth, enable quicker assembly by about 30% compared to girder beams, and reduce the need for extensive temporary staging above an active public space.
- The main roof trusses span approximately 30 m and are supported by six 1-m-diameter steel-concrete composite columns on each side of the auditorium.
- High-strength S460 structural steel was used in selected built-up sections to reduce member sizes and overall structural weight compared to conventional concrete.
- Steel beams and steel decking were used to form the floor slabs. This approach reduced the need for extensive temporary staging and minimised work-at-height activities.
- Design for manufacturing and assembly (DfMA) was adopted for precast columns, beams and slabs to achieve a 10% time saving.
- The design was verified through three-dimensional structural analysis and staged construction simulations, covering dead and imposed loads, wind, seismic loads, load redistribution, structural robustness, temperature, and movement and vibration. It also included performance-based checks for both seated and walking areas.

B. Connecting CMPB to Cashew Station

- A sheltered pedestrian bridge was required to provide direct access between CMPB and Cashew MRT station. The bridge is approximately 208 m long and 5 m wide. Its four principal spans range from approximately 35 to 63 m and cross Upper Bukit Timah Road and a drainage reserve.
- At the Cashew Station end, a lift structure carrying the POB had to be supported directly above the underground station box. Strict limits therefore applied to the additional permanent load and movement that could be imposed on the existing MRT infrastructure.
- A conventional solid raft foundation would have added substantial weight. Strengthening or modifying the existing station structure would also have resulted in greater complexity and disruption.

The engineering solution:

- Designed a calibrated raft foundation incorporating engineered voids in carefully selected areas, reducing the foundation's weight while maintaining the strength and stability needed to support the bridge and lift structure.
- Utilised automated safety controls set to stringent tolerances to monitor the movement of the ground, station structure and MRT station tunnel.



Both images: Memhardt (Singapore) Pte Ltd

FAR LEFT AND LEFT: The CMPB facade features 68 tapered, 32-m-high, aerofoil-shaped reinforced-concrete (RC) fins. Each fin is set at a unique angle to provide structural support and solar shading. Due to their height, weight, slender geometry and orientation, an alternative installation method was required.

- Prefabricated DfMA long steel spans off-site for assembly on-site, reducing the number of people working on site. Given that the spans had to be lifted into position above live roads overnight, the operation required careful coordination across multiple agencies, advance notification to residents, nearby schools and management corporations, and staged traffic diversions.

C. Constructing 68 RC fin columns, each 32 m tall

The CMPB facade features 68 tapered, 32-m-high, aerofoil-shaped reinforced-concrete (RC) fins. Besides contributing to the development's identity, the columns play an important role in providing passive solar shading while preserving views between the fins. Due to their height, weight, slender geometry and orientation, an alternative installation method was required.

The engineering solution:

- Each fin was divided into five precast segments to remain within transportation and crane-lifting limits.
- The segments were joined using grouted splice sleeves to ensure structural continuity between the reinforcement bars.
- A proprietary bracket-fastening system was used to temporarily hold and align the segments during erection, eliminating the need for full-height props or scaffolding, reducing work-at-height risks and shortening installation cycles.
- BIM was used to coordinate the geometry and orientation of each fin prior to fabrication and erection.

Other highlights:

- **Higher-strength reinforcement, lower carbon footprint:** Grade 600 steel rebars have a higher yield strength than conventional Grade 500 steel rebars, meaning less steel is needed to achieve the same structural performance. This reduction in material use translated into sustainability gains, including the building attaining Green Mark Platinum Super Low Energy certification with approximately 10% lower reinforcement tonnage compared with Grade 500 steel rebars, and a 10.13% reduction in embodied carbon associated with reinforcement, supported by the use of recycled steel from a local mill.
- **Prefabrication and DfMA:** Approximately 80% of the superstructure's columns, beams and slabs were precast. This contributed to an overall precast content of approximately 69% by concrete volume, leading to reduced on-site labour.
- **10 m retaining wall within a tight footprint:** A counterfort retaining wall system of approximately 10 m in height was required within a constrained footprint. Compression piles at the toe and tension piles at the heel resisted overturning and uplift, allowing a shorter base slab and reducing the wall's required footprint. A hybrid soil-nail and green-bag earth-retaining system stabilised an approximately 11.6-m-high slope inclined at about 75 degrees. The system combined slope stabilisation with a vegetated finish.
- Dynamic pile load testing (StatRapid method) was adopted in place of conventional kentledge testing, reducing the duration of each test from approximately 12 days to three days. ■

"This project shows that what appears effortless architecturally is often the result of considerable engineering complexity behind the scenes. Through meticulous planning, close collaboration and a clear understanding of users' needs, we transformed ambitious ideas – from the 'floating' auditorium to the direct MRT connection – into safe, practical solutions. That is the value of civil engineering: creating lasting infrastructure that improves connectivity, amenities and quality of life for generations," said Er. Chen.

IOI CENTRAL BOULEVARD TOWERS

Er. Aaron Foong, Senior Executive Director, KTP Consultants, a member of Surbana Jurong (SJ Group)



Image: IOI Properties Singapore

An artist's impression of the large, column-free public area at IOI Central Boulevard Towers. During construction of this mixed-use development, engineers had to overcome severe site constraints to safely execute deep foundation works while ensuring that all surrounding facilities remained fully operational and protected.

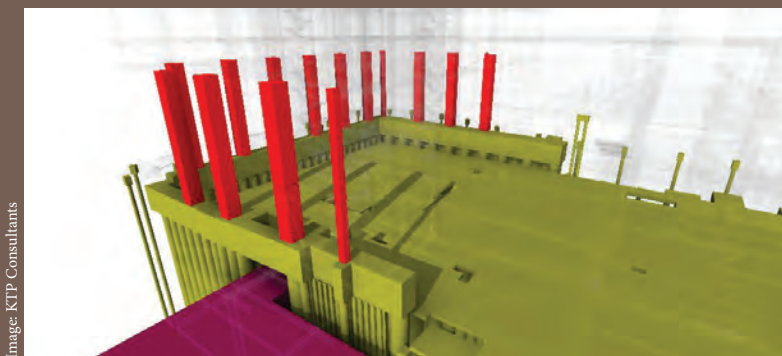


Image: KTP Consultants

Below ground, a dual-function secant bored pile (SBP) system was adopted in challenging marine clay geology. The piles that initially retained earth during excavation were retained as the West Tower's permanent deep foundations. The project is also the first in Singapore to apply the observational method to an earth retaining and stabilising structure (ERSS).

A. Constructing a high-rise development across live infrastructure

In a conventional high-rise building, columns and core walls transfer structural loads vertically into foundations located directly beneath them. At IOI Central Boulevard Towers, this was not possible within the strict no-pile zones occupied by the common services tunnel (CST), monsoon drain and other protected infrastructure.

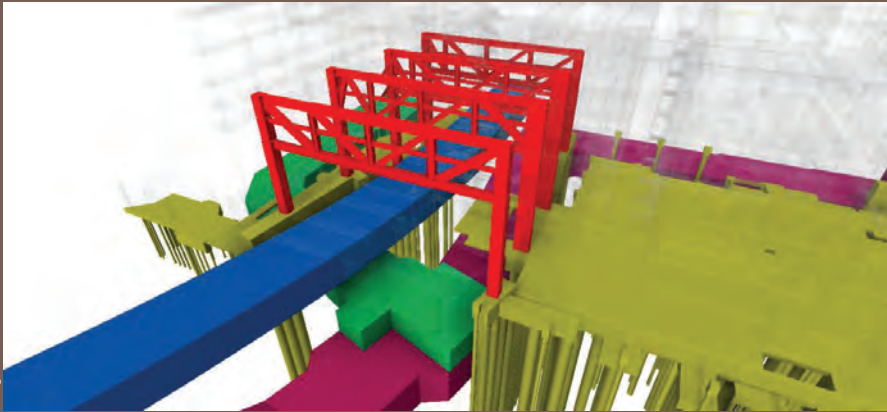
The engineering solution:

- **Interstitial long-span transfer trusses:** The engineers developed interstitial long-span transfer trusses that extend across the restricted zones. These trusses collect structural loads from the building above and redirect them to columns and foundations positioned outside the no-pile zones. This allows the development to coexist with the existing public infrastructure. Similar to the role of bridges, the transfer trusses, with a structural depth of 7 m, were integrated within functional building zones rather than added as a separate transfer floor. By integrating the transfer trusses as part of the building, they do not impact floor space or height. This reduced the need for additional building height and allowed the transfer structure to coexist with car park, circulation or service requirements.
- **Precambering:** The transfer trusses did not receive their full load at once. As each new floor was constructed, additional weight was progressively transferred into them. Engineers therefore had to calculate how much the trusses would deflect at different stages of construction. An intentional upward curvature (precamber) was introduced during fabrication. As the permanent building loads were added, the trusses gradually settled towards their intended final position. This was important because movement could affect areas such as finished floor levels, facades and internal finishes. This required both structural calculations and engineering judgement throughout design and construction.

B. Combining excavation support and permanent foundations

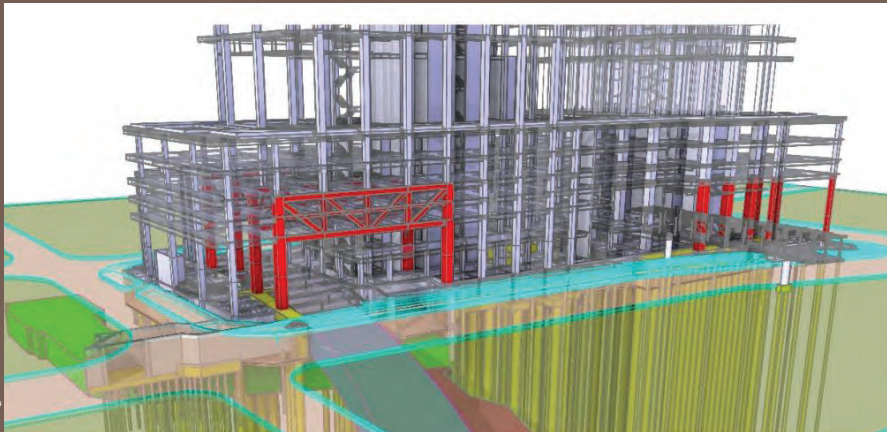
The project required a deep basement to be constructed in ground underlain by up to 40 m of soft marine clay, while maintaining strict movement limits to protect the operational Downtown MRT and nearby public infrastructure. The high-rise tower's commercial floor plate is formed by perimeter columns close to the site boundary, leaving very limited space below ground. Conventional

Image: KTP Consultants



LEFT (ABOVE AND BELOW): The engineers developed interstitial long-span transfer trusses that extend across the restricted zones. These trusses collect structural loads from the building above and redirect them to columns and foundations positioned outside the no-pile zones. This allows the development to coexist with the existing public infrastructure.

Image: KTP Consultants



construction would have required separate temporary earth-retaining walls for excavation and permanent foundations to support the completed building. Accommodating both systems within the constrained site would have been highly challenging, consuming valuable underground space and increasing construction complexity.

The engineering solution:

- **Dual-function secant bored pile system:** A secant bored pile wall was formed by constructing overlapping bored piles so that adjacent piles intersected and created a continuous wall. Piles were designed to retain soil and groundwater during excavation and become part of the permanent foundation system supporting the completed development. This simplified construction sequencing, improved spatial efficiency, and saved approximately 10,000 cu m of concrete and 1,000 t of steel reinforcement, significantly reducing the project's embodied carbon.

- **Observational method:** This is the first project in Singapore to apply the observational method to an earth retaining and stabilising structure (ERSS). Engineers developed both a conventional code-based excavation design and a performance-based design before construction began. As excavation progressed, a network of sensors continuously measured how the ground and retaining walls were actually performing.

The real-world data was compared against the design predictions and pre-agreed safety limits. When readings confirmed that the excavation was performing better than the code-based assumptions and remained within pre-agreed safety limits, the team adopted the two-strut scheme. Omitting the third strut cleared space for a major pile cap, improved access and headroom at the lowest basement level. This saved approximately three months on the basement programme. Both schemes, together with their safety limits and contingency measures, had been fully assessed before excavation began. ■

“This project reminded us that good engineering is rarely about finding a single technically feasible answer. It requires us to challenge conventional assumptions, understand competing priorities and work closely with all stakeholders to arrive at the solution that best serves the project and the city. Much of that work may remain unseen, but its impact is felt in the safety, resilience and functionality of the places people use every day,” said Er. Foong.

GENEO AT SINGAPORE SCIENCE PARK

Er. Teoh Eng Sin, Technical Director (Structural), Mott MacDonald Singapore Pte Ltd

Er. Ponnampalam Thusiyanthan, Technical Director, Ronnie & Koh Consultants Pte Ltd



An artist's impression of Singapore's tallest mass engineered timber (MET) canopy. Its cathedral-inspired, unconventional columns and arches serve as both the canopy's main structural supports and defining architectural features.

A. Creating Singapore's first 27-m mass engineered timber (MET) arched canopy structure

The development required a large sheltered public plaza that would serve as a welcoming gathering space at the centre of the innovation hub. This approximately 3,000-sq-m plaza is covered by a timber canopy rising 27 m – the tallest in Singapore. Its columns and arched beams function as both the canopy's primary structural supports and its defining architectural elements. Compared with a more regular straight-beam structure, the canopy's long spans, complex geometry and limited number of supporting columns created additional challenges involving structural behaviour, complex connection design and integration with surrounding buildings.

The engineering solution:

- **Prefabricated off-site:** The principal timber elements were manufactured under factory-controlled conditions. The long-span arches could not be transported as complete elements, so each arch was delivered in two sections and assembled on-site for installation. Off-site prefabrication provided tighter dimensional control, reduced on-site cutting and adjustment, improved fabrication quality, and reduced work at height.
- **Concealing structural connections:** Bespoke steel connectors were designed to join the timber elements while remaining concealed. The connections had to transfer structural forces safely while accommodating manufacturing and installation tolerances. The steel brackets were designed to allow movement in the directions for which they were designed. These connections allowed the timber structure to be safely braced to the adjacent building structure while allowing a certain degree of movement.
- **Precision and stability during construction via BIM:** The arch reaches full structural stability once all its sections are assembled and working together. Engineers therefore analysed each major stage of the assembly sequence, including lifting, temporary support, connection of arch sections, and transfer of loads to permanent supports. BIM was utilised to create four-dimensional construction simulations and virtual construction. Through early coordination and careful planning of the assembly sequence, the installation was successfully carried out using only localised shoring. Compared with the conventional approach of erecting full shoring beneath the structure, this resulted in labour savings of approximately 780 man-days.

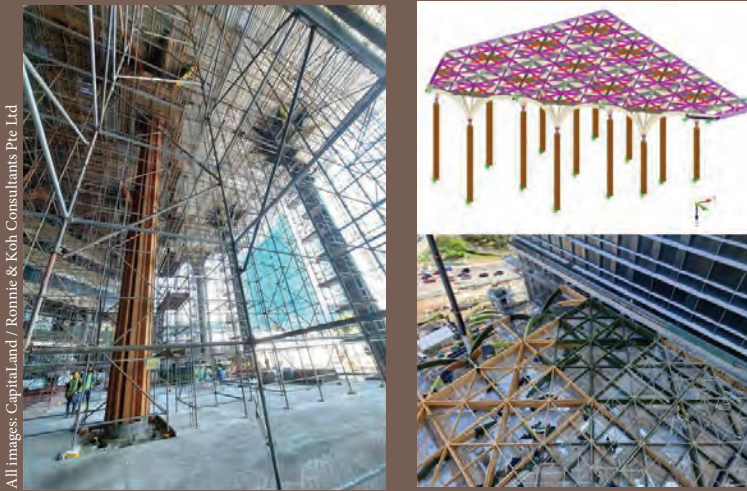
B. Designing adaptable, vibration-controlled laboratories

Research and laboratory tenants may have substantially different requirements. The space may need to accommodate changes in laboratory planning, different equipment layouts, sensitive instruments, and heavier floorboards. A conventional floor structure with a dense column grid would restrict how laboratories could be arranged or reconfigured as research requirements change. At the same time, highly sensitive scientific equipment may be affected by floor movement that building occupants may not perceive. The structural system therefore had to provide both flexibility and stringent vibration performance.

The engineering solution:

- **Post-tensioned reinforced-concrete (RC) system:** The engineers developed a hybrid post-tensioned and RC structural system. Post-tensioning uses tensioned steel tendons to place the concrete floor into compression. In suitable applications, it allows longer spans with fewer columns while controlling structural deflection and cracking. The system enabled long spans of up to 19.2 m, allowing column-free, highly flexible floor plates, as well as a zoned structural design that achieves stringent laboratory vibration criteria (4,000 MIPS), providing both high vibration performance and greater flexibility for future use.

The structural strategy created large, flexible floor plates while maintaining the environmental stability required for sensitive laboratory operations. Future occupants can reconfigure laboratory layouts, equipment positions, internal partitions, tenant spaces, etc.



FAR LEFT AND LEFT: Analysis model and construction of Singapore's tallest MET canopy structure. The principal timber elements were manufactured under factory-controlled conditions. The long-span arches could not be transported as complete elements, so each arch was delivered in two sections and assembled on-site for installation.

C. Designing the basement around the natural terrain

The site has a substantial change in elevation between Science Park Drive and the Ayer Rajah Expressway. A conventional approach would establish a relatively uniform development platform by excavating the higher ground and constructing extensive retaining structures. This would have required greater excavation and soil removal, more permanent earth-retaining structures, and greater embodied carbon.

The engineering solution:

- **Basement levels to follow natural terrain:** Instead of extensively reshaping the site, engineers profiled the basement levels to follow the natural terrain. This included retaining the higher ground near Science Park Drive without introducing unnecessary basement construction beneath it.
- **Managing groundwater without pumping:** The basement was positioned largely above the existing groundwater table. A drainage blanket beneath the base slab was designed to allow groundwater to continue flowing from the higher to the lower parts of the site, channel water in a controlled manner towards external drains, and discharge the water by gravity rather than relying on permanent pumping.

Other highlights:

- **Digital design and construction:** The project used full-lifecycle BIM and integrated digital delivery (IDD) to coordinate design, construction sequencing, building services and cost information. Applications included weekly clash-detection and coordination reviews, virtual construction, four-dimensional installation simulations, digital mock-ups and BIM walkthroughs, as well as a common data environment for project records and collaboration.
- **Off-site manufacturing and lean construction:** DfMA was adopted for prefabricated timber components, precast staircases and modular precast linkway beams. These approaches reduced on-site work and improved installation consistency.
- **Construction robotics:** Rebar-tying robots were used for selected reinforcement works. An automated overhead-drilling robot was also deployed to reduce manual work at height, which translated to a 30% improvement in drilling productivity.
- **Sustainability outcomes:** The project has been certified under BCA Green Mark Platinum Super Low Energy and WELL Core Gold. The use of MET as a lower-carbon structural material, distributed district cooling and photovoltaic integration, and construction materials certified under the Singapore Green Building Product scheme are some of the areas where the project has demonstrated its commitment to sustainability. ■

"This project reinforced that the best engineering solutions often emerge when we are prepared to rethink conventional approaches. By working closely with the architect, client and project team, we reshaped the basement to follow the natural terrain, reducing excavation and protecting nearby MRT infrastructure. Good engineering is about understanding the site holistically, balancing competing priorities and creating safe, sustainable solutions that will serve society for generations," said Er. Teoh.

"Many visitors will admire the timber canopy without realising the engineering precision behind it. Every prefabricated component had to fit within extremely tight tolerances, accommodate structural movement and connect seamlessly with the surrounding buildings. Delivering the canopy required close collaboration across design, fabrication and construction to transform an ambitious vision into a safe, buildable and enduring structure," said Er. Ponnampalam.

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Residential**TEMBUSU GRAND**

Image: City Developments Limited & Sunway MCL



Tembusu Grand is a 638-unit residential development that achieved Temporary Occupation Permit (TOP) within the contractual period despite challenging soil conditions. The project showcases excellence in project delivery through early contractor involvement, advanced construction methods, digital innovation and strong stakeholder partnerships, enhancing productivity, quality, safety and delivery certainty.

Project Highlights**Sustainability**

- The development has achieved the BCA Green Mark Platinum Super Low Energy certification with Health & Wellbeing, Whole Life Carbon and Maintainability badges for demonstrating strong energy efficiency and environmental performance.
- The building's facade design and optimised unit layouts reduce the amount of heat entering homes, thereby maintaining lower temperatures for residential units.
- Homes and clubhouses feature highly energy-efficient air-conditioning and LED lighting, contributing to 62% energy savings compared with the baseline.
- Renewable electricity from solar panels offsets 33% of energy usage from shared facilities such as the clubhouse, function rooms and swimming pool pumps.

Digitalisation

- The project team used FulcrumHQ as a centralised common data environment – a shared digital platform where the project team could access the latest project information in real time.
- This helped the team resolve issues faster and minimise downtime throughout the programme.

Workforce transformation

- A digital work-permit system reduced paperwork and administrative work, allowing safety coordinators to spend more time on-site identifying potential safety risks.
- Structured training and capability development programmes were conducted for value chain partners, including contractors, suppliers and consultants. ■

Project Team

Developer: **City Developments Limited (CDL) and Sunway MCL Ltd (Tembusu Residential Pte Ltd)**

Builder: **United Tec Construction Pte Ltd**

Architect: **ADDP Architects LLP**

Civil & Structural: **TW-Asia Consultants Pte Ltd**

Mechanical & Electrical: **Rankine & Hill (S) Pte Ltd**

Quantity Surveyor: **AECOM Cost Consulting and Project Management (Singapore) Pte Ltd**

Environmentally Sustainable Design (ESD) Firm: **Building System and Diagnostics Pte Ltd**

Infrastructure

SUBSEA WATER PIPELINE TUNNEL CONNECTING TUAS AND JURONG ISLAND – CONTRACT 1

Image: PUB, Singapore's National Water Agency



Project Team

Developer: **PUB**

Builder: **Shanghai Tunnel Engineering Co (Singapore) Pte Ltd**

Consultant: **CH2M Hill Singapore Private Limited**

Civil & Structural: **Arup Singapore Pte Ltd**

The project involved the construction of a 1.6-km subsea tunnel with a 6-m diameter, enclosing two pipelines, one 2.2 m in diameter and the other 1.2 m in diameter. These will convey NEWater from the future Tuas Water Reclamation Plant to Jurong Island to serve the growing demand from industries located on the island.

Project Highlights

Sustainability

- The project used a type of concrete—steel fibre reinforced concrete (SFRC) — that requires much less steel reinforcement than conventional concrete while still maintaining material strength.
- This significantly reduced the amount of steel required, from 180 kg to 38 kg per cubic metre of concrete.
- Across the entire project, this is estimated to have avoided approximately 2,980 t of carbon emissions (comparable to the electricity used by roughly 550 average Singaporean households over a

year) — a 76% reduction compared with conventional reinforced concrete tunnel segments.

Advanced manufacturing and assembly

- Automated welding robots were successfully deployed inside the confined tunnel environment.
- They welded 60% faster, while achieving almost no rejected welds.
- The robots were powered using the tunnel boring machine's electricity supply instead of diesel, eliminating the need for diesel in the welding process.
- The new SFRC system also reduced the need to manually assemble conventional steel reinforcement cages, cutting the manpower hours required for reinforcement work by 75%.
- Instead of using water, steam was used to help the concrete harden faster, allowing tunnel sections to be produced and moved to storage more quickly. This also reduced the potential environmental risks

associated with conventional water-curing of concrete.

Digitalisation

- Critical approval and permit processes were moved onto a digital platform, cutting approval times by 20% and eliminating paper permits entirely.
- AI-enabled cameras were used to monitor safety conditions deep underground.

Value chain transformation

- During tunnelling, large pieces of excavated rock repeatedly blocked the system used to transport excavated material, causing delays.
- The team tested several improvements before redesigning part of the rock-crushing equipment to prevent oversized pieces from entering the system.
- The final solution completely eliminated the blockage problem and significantly reduced downtime caused by this issue. ■

Institutional

OUTRAM SECONDARY SCHOOL (SENGKANG CAMPUS)



Image: Bai Jiwen, courtesy of Kwan Yong Construction Pte Ltd

Project Highlights

Sustainability

- The school is the first BCA Green Mark Platinum Zero Energy Ministry of Education (MOE) School, meaning it generates enough renewable energy on-site to offset the energy it uses. In addition, it has three badges: Whole Life Carbon, Health & Wellbeing, and Maintainability.
- Its solar panels generate about 1,034 MWh of electricity a year — enough to power around 250 four-room HDB flats.
- Energy-efficient air-conditioning, LED lighting and smart sensors help ensure that lights and other systems operate only when needed.
- Courtyards, gardens and landscaped areas provide outdoor learning and social spaces for students while supporting biodiversity.
- The greenery also helps cool the school environment, manage rainwater naturally and make the campus more resilient to climate change.

Advanced manufacturing and assembly

- Large parts of the building structure were

manufactured off-site and assembled on-site, reducing the amount of work that had to be carried out manually.

- This approach saved about three days of construction time per floor and reduced manpower needs by 30% for the precast works.

Digitalisation

- Project information and digital building models were brought together on a common data environment, allowing teams to identify potential conflicts before they became construction problems.
- Weekly clash detection resolved 57% of issues identified each week and reduced rework by 30%.
- IoT sensors also provided real-time information about environmental conditions on the construction site.

Workforce transformation

- The implementation of the BECARE Charter resulted in strong safety performance and positive workforce outcomes across the project.

- The project recorded no Stop Work Orders, no demerit points, and zero fatal, major or minor injury cases per 100,000 workers. ■

Project Team

Developer: **Ministry of Education**

Builder: **Kwan Yong Construction Pte Ltd**

Project Manager: **PM Link Pte Ltd**

Architect: **DP Architects**

Civil & Structural: **CPG Consultants Pte Ltd**

Mechanical & Electrical: **Meinhardt Singapore Pte Ltd**

Quantity Surveyor: **CPG Consultants Pte Ltd**

Specialist: **DP Sustainable Design**

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SCAN TO REGISTER

Industrial**BULIM SQUARE**

Image: JTC

Project Team*Developer:* **JTC Corporation***Builder:* **Rich Construction Company Pte Ltd***Architect:* **SAA Architects Pte Ltd***Civil & Structural:* **TY Lin International Pte Ltd***Mechanical & Electrical:* **Beca Carter Hollings & Ferner (SE Asia) Pte Ltd***Quantity Surveyor:* **Asia Infrastructure Solutions Singapore Pte Ltd***Environmentally Sustainable Design (ESD) Firm:* **Building System and Diagnostics Pte Ltd**

Bulim Square is connected to Jurong Innovation District (JID)'s underground District Logistics Network (DLN), enabling more efficient goods deliveries through dedicated underground routes. Designed to support future electric Automated Guided Vehicles, the network advances the vision of a cleaner and more car-lite district.

Project Highlights**Sustainability**

- The development has achieved the BCA Green Mark Platinum certification.
- *Real-time energy monitoring and optimisation:* Bulim Square's open digital platform draws real-time data from building systems and sensors into its digital twin, giving operators a virtual view of building performance, allowing them to monitor energy use and identify opportunities to optimise consumption. A common data environment also provides the project team with a shared digital platform to access and coordinate project information.
- *Energy-efficient district cooling:* An on-site district cooling system serves Bulim Square's four towers and is designed with excess capacity to support future neighbouring developments. The system enables greater energy efficiency and helps reduce carbon emissions.
- *Integrated stormwater management:* Bulim pond, a stormwater detention and

cleansing pond at Bulim Park collects rainwater from the surrounding area and cleanses it through a rain garden. By centralising stormwater detention for multiple land plots, the pond eliminates the need for individual developments to build their own detention facilities, freeing up space traditionally used for stormwater detention tanks and transforming Bulim Park into a recreational space for the community.

- *Connected to JID's car-free Sky Corridor:* Bulim Square's Sky Corridor Plaza connects to JID's 11-km car-free Sky Corridor, set to be Singapore's longest when completed. The corridor will connect the district through walking, cycling and autonomous shuttles, creating a sustainable transportation hub that reduces dependence on carbon-intensive transport while promoting active mobility and urban heat mitigation.

Advanced manufacturing and assembly

- *Prefabricated mechanical, electrical and plumbing (MEP) modules:* More than 12,000 sq m of MEP components were pre-assembled off-site into modules before being installed at Bulim Square, reducing the amount of work required on site. Together with the use of drilling and anchoring robots, this achieved 40% higher productivity compared with manual methods and reduced installation time by 50%.

Digitalisation

- *Digital modelling to enhance design and construction processes:* 3D/4D/5D/6D building information modelling (BIM) brought architectural, civil and structural, and mechanical and electrical designs together in a shared digital model. This allowed the project team to coordinate designs and identify potential clashes before construction, contributing to 50% faster progress claims as well as an average of 40% fewer clashes and 80% fewer disputes.
- *Faster and more accurate quality inspections:* Digital quality management tools were used to track and manage inspections, enabling an average of 40% faster inspections and 20% fewer defects.
- *Digital tracking of prefabricated components:* RFID tags and barcodes were used to track components that were manufactured or assembled off-site (DfMA components), contributing to an average of 30% fewer installation errors and 15% faster assembly.
- *Digital monitoring of construction progress:* Drones and 360-degree cameras were used to capture the construction site's progress, giving the project team a more comprehensive and up-to-date view of works on the ground. This supported progress reporting and helped the team identify potential schedule overruns early. ■

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Mixed-use**PASIR RIS MIXED USE DEVELOPMENT**

Image: Woh Hup (Private) Limited

Pasir Ris Mixed Use Development is a landmark integrated development and the first of its kind in Pasir Ris, bringing together homes, retail, essential services, transport and community spaces in one connected destination.

The project exemplifies sustainable, technology-driven construction through low-embodied-carbon design, high-performance energy management and industry-leading design for manufacturing and assembly (DfMA) outcomes — reflecting how collaboration and innovation can deliver a vibrant, future-ready development.

Project Highlights**Value chain transformation*****Developer's initiatives***

- Early contractor involvement (ECI) – the builder was brought into the project during the design stage to give suggestions on site planning, share utilisation plans, and suggest practical or cost-effective solutions before work began.
- Throughout construction, the different project partners continued to jointly assess proposed changes, including their cost and schedule implications.
- The team leveraged data to decide

whether potential design improvements were worth the impact on the construction schedule.

Builder's initiatives

- Internal training programmes were extended to subcontractors.
- The company recognised suppliers and subcontractors for good performance across all projects.
- Annual safety campaigns also recognised individuals and teams that demonstrated good safety practices.

Workforce transformation

- The project adopted the BE CARE Charter. DCA is also one of the early adopters of the BE CARE Charter and INSPIRE Internship Programme.
- Woh Hup worked with BCA to support students through the MOE-Singapore-Industry Scholarship. ■

Project Team

Developer: Allgreen Properties Limited & Kerry Properties Limited (Phoenix Commercial Pte Ltd & Phoenix Residential Pte Ltd)

Builder: Woh Hup (Private) Limited

Architect: DCA Architects Pte Ltd

Civil & Structural: Mott MacDonald Singapore Pte Ltd

Mechanical & Electrical: J Roger Preston (S) Pte Ltd

Quantity Surveyor: Threesixty Cost Management Pte Ltd

Environmentally Sustainable Design (ESD) Firm: Building System and Diagnostics Pte Ltd

Landscape Architect: Shma Company Limited

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