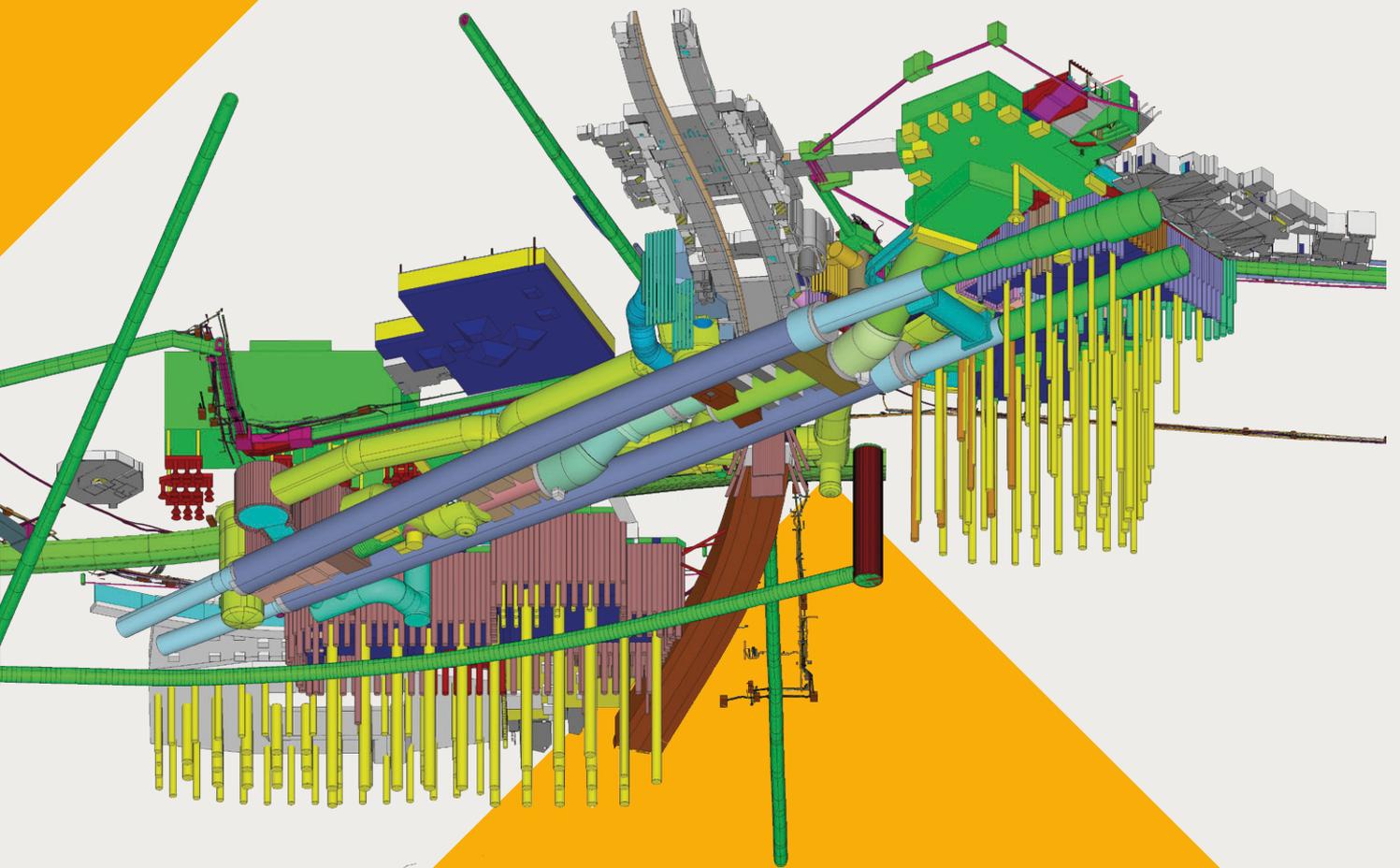


# Welcome to 2018, the year of the dog, and of mandated BIM

What the government's Technical Circular 7/2017,  
making BIM mandatory, means for clients,  
consultants, contractors and their partners



# A step change for BIM in Hong Kong



Technical Circular 7/2017 came into force on 1 January, mandating the use of building information modelling (BIM) for all government projects over HK\$30M.

This document considers what this means for Hong Kong’s construction professionals, clients, and our many partners.



## What does Technical Circular 7/2017 mean for you?

### Architects and engineers

- Collaborate with delivery partners and clients
- Collect data from diverse sources and integrate it with models in a common data environment
- Advise on hardware, software and organisational structures that enable effective, efficient and secure data management
- Lead BIM delivery and host and manage the common data environment on behalf of the client and the wider team

### Contractors

- Use contracts that support, enable and manage a collaborative work environment
- Embrace offsite prefabrication, using design for manufacture and assembly (DfMA) to add value
- Combine cost management, quantities take-off and carbon modelling with BIM models, to gain accuracy in cost estimates and manage risk better

### Developers

- Understand how to use contracts to enable and manage collaborative working
- Use BIM to optimise design and construction, making better decisions faster and cheaper to add real value to projects
- Use BIM to bridge the gap between construction, commissioning, and operation

### Government

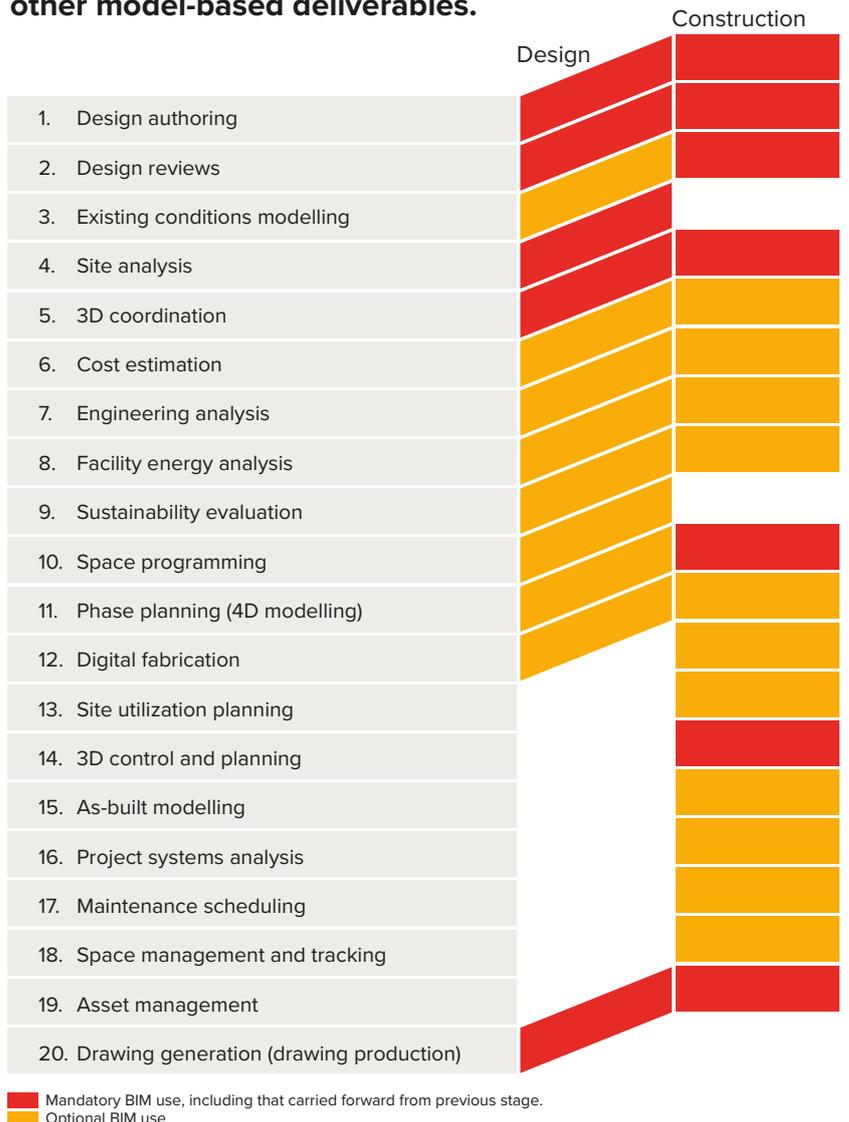
- Promote Hong Kong as a global leader for BIM-enabled project delivery
- Promote and adopt BIM technology in capital works projects with a view to enhancing design, construction, project management and overall construction productivity
- Promote the use of BIM for asset management
- Establish a pool of colleagues capable of building up and administrating BIM models

# Technical Circular (Works) No. 7/2017

The Hong Kong Development Bureau has issued Technical Circular (Works) No. 7/2017 that makes building information modelling (BIM) delivery mandatory for all public capital works projects from 1 January 2018 with the aim of “enhancing design, construction, project management, asset management and improving the overall productivity of the construction industry.”

Technical Circular (Works) No. 7/2017 identifies 20 specific uses of BIM. From 1 January 2018, eight of these uses became mandated for the design or construction stage, with others expected to be mandated in the future.

Design authoring is the key BIM activity for creating model-based 2D documentation, 3D detailing and other model-based deliverables.



# Seize the moment

Through the new Technical Circular, Hong Kong Development Bureau is aiming for “enhanced design, construction, project management, asset management and improved overall productivity.” Paul Lengthorn, a chartered engineer and Mott MacDonald’s development director for North East Asia, explores how.

Hong Kong has lagged behind some others in promoting and mandating the use of BIM, but the benefit of its slightly later start is the ability to leapfrog forwards using learning from those countries that started earlier.

In the UK, BIM adoption has coincided with other construction industry advances, enabling the country to rise as one of the global champions, backed by a clear national strategy and government support. Since 2016, all centrally-procured construction projects in the UK are required to achieve BIM Level 2, as part of the government’s construction industry strategy that aims to achieve 20% savings in procurement costs.

The US General Services Administration established a policy mandating BIM adoption for all public buildings projects in 2003. In 2010 Wisconsin became the first US state to require all public projects with a budget of US\$5M or more to incorporate BIM.

In 2015, Singapore mandated e-submission for building approvals. BIM adoption has been greatly encouraged by grants for training, consultancy, hardware, and collaboration software through a BIM fund.

South Korea has also been an early adopter, with BIM now mandated for most public projects. China’s story is less impressive with uptake remaining inconsistent. The Ministry of Housing and Urban-Rural Development (MOHURD) took on a role to lead BIM adoption in the 12th Five-Year Plan.

**As we enter a new year in Hong Kong, it’s time to wholeheartedly embrace BIM technology and its potential to lift our industry to world leader status. It requires bravery – we must all recognise the funding, time and upskilling needed to succeed.**

But let’s be in no doubt – as far as Hong Kong is concerned, this is the year of BIM. Let’s make the most of it.

Happy new year!

# Why Hong Kong's registered engineers need to get and stay ahead

The Buildings Department has provided guidance for registered structural and geotechnical engineers on BIM submissions for building proposals (Practice Note ADV-34). Henry Kwok, a registered structural engineer and technical director at Mott MacDonald Hong Kong, considers how registered engineers should respond to Technical Circular 7/2017.



If your building involves an innovative structural system or facade, irregular or twisted forms, unusual means of escape and compartmentation, complex drainage systems, or challenging construction sequencing, then ADV-34 encourages the submission of BIM models.

But the guidance is clear that BIM models are considered 'supplementary information' only, with 2D plans remaining the primary submission material that take precedence. It remains the case that any 3D BIM model must be converted to 2D drawings to gain Buildings Department approval.

Accordingly, there is still a need for the registered engineer (RE) to give signed approval of 2D plans and supporting calculations, taking statutory responsibility for their content.

That statutory responsibility weighs heavily on all REs, who are personally liable for any failure to assure the integrity and competence of a design. Penalties include potential jail terms or heavy fines. With the mandating of BIM, some changes in the way that REs lead, influence and review the design are called for.

### **Powerful engineering design software is now compatible with the main BIM drawing packages.**

This means that designers can innovate and test designs, enabling them to easily optimise, standardise or optioneer to reduce costs, improve buildability or enable prefabrication. However, us REs need to have confidence in the software being used, those who use them, and specifically their suitability and compatibility with other digital tools.

A technology plan is now an important starting point for all projects, large or small. They address the impacts of proposed technologies on cost, risk, resources, and schedule. Defining and reviewing the technology to be used for project delivery provides the perfect opportunity to drive consistency and adopt the recommended ways of working, driven by experience and best practice. Technology planning ensures that design and data management platforms, and associated working methods, are considered early and give the entire team an opportunity to make sure that our design delivery is both compelling and aligned with the client's vision.

The technology plan enables REs to 'buy-in' to the design development process.

Although the Buildings Department sees BIM models as supplementary, REs should submit BIM models voluntarily. Voluntary submission of more BIM models will help build a stronger relationship between the REs and the department. We'll have to wait and see, but it may be that effective use of BIM will enable the Buildings Department to evaluate designs, grasp complex 3D design ideas, save time in checking design submission, and grant permission much more rapidly.

Without doubt, Hong Kong's REs – like all construction professionals – must work to stay ahead of technology advances, including BIM adoption, if we are to continue to fulfil our important responsibilities.

# Digital delivery calls for new skills.

## The best consultants will be those committed to learning and development.

In the past, design tools developed slowly and it was easy to learn them on the job. But now, the lifecycle of a software tool can be shorter than that of an engineering project. Companies that aren't set up to learn fast will struggle in the new age of digital delivery, while those that take learning and development seriously will lead the market, says David Hooper, chartered civil and structural engineer, and Mott MacDonald's global knowledge and innovation manager for the built environment.

It's not just design tools that are evolving fast, it is the way we manage projects and models using collaboration platforms such as ProjectWise and SharePoint, that enable critical collaboration and workflows around a single source of shared data. This means not just getting up to speed with the technology, but also finding new ways to automate processes – as this is where the real efficiencies are gained.

It's our senior people, project principals and technical directors that have the toughest challenge. Their leadership role naturally means they are a step away from design production, but it is essential they retain a working knowledge of how design is now produced and have hands-on experience of the main design authoring and review tools and how data is managed in a common data environment. How can these key people remain relevant when their appreciation of the tools that underpin their teams' work becomes diminished? To lead the doing, you must know how it is done. Firms will start to lose the benefits from their most gifted engineers if they cannot keep up with the delivery tools – the very people who make professional services not just good but great.

With advances in how knowledge is managed within an organisation, the days when senior staff could rely solely on their experience are gone.

A new balance needs to be struck between humans and machines and that calls for greater digital know-how. Human experience, intuition and interaction are still invaluable. For example, while advancing technology is a strong catalyst for innovation, innovation needs to be managed. It requires insight into customers' needs, a bright idea, resources and leadership, and a process that manages the development of that idea into something that adds value.

And while machine learning has given rise to computers that can beat grand masters at chess, we are a long way from the day when a computer comes up with a good idea and can appreciate the overall impact of that idea. We still need people to evaluate the right balance between the needs of programme, cost, quality, sustainability, and risk.

However, data correctly gathered, managed, manipulated, and shared can profoundly change perceptions and enable much more powerful, value-adding decisions. The pairing of experience and digital intelligence will be one of the key attributes of the best advisors within a matter of years, if not months.

**We'll now see in Hong Kong that those who invest in technology, the management of knowledge and innovation, and in learning and development will differentiate themselves and lead the market of the future.**

At Mott MacDonald, we have been through that learning curve, having made significant investment in global enterprise license agreements with software vendors. We offer all of our staff access to the latest and best tools they need, supported by global training and technical support. BIM feels like a train leaving the station. Those that are fully on-board have a huge advantage. As it gathers pace others will have to run ever faster to catch up – and there will be some who won't be able to.

A practical approach must bring technology into the heart of planning for bidding, budgeting and project delivery.

At Mott MacDonald, over the past few years, we have seen our project technology groups move from providing project support to standing front and centre of our client-facing delivery teams. This has happened naturally in response to market demands as we've driven innovation and new delivery models.

The days of learning on the job really are over. As we welcome Technical Circular 7/2017, let's use it as an opportunity to build the skills among Hong Kong's construction professionals to lead the way internationally.



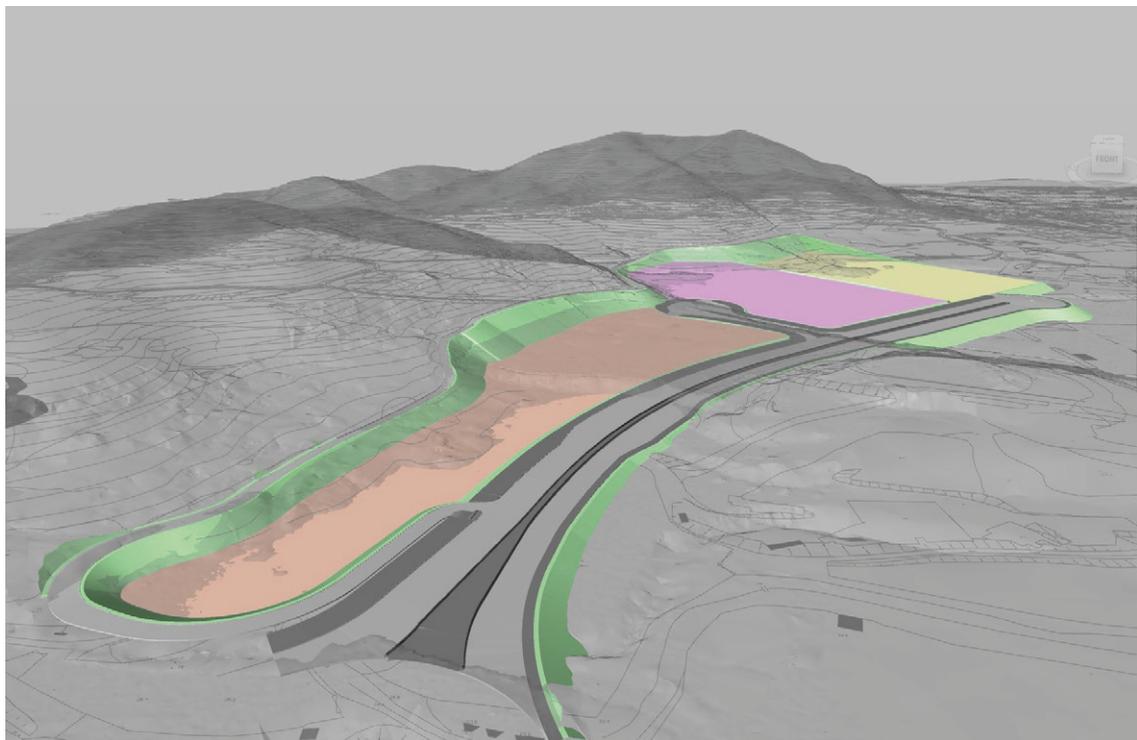
# The power of BIM for Hong Kong's civil works

Don't think that BIM is just for buildings. It's also essential for infrastructure, groundwork and civils design, including major linear projects. Sean Kearney, a chartered civil engineer and Mott MacDonald BIM manager for North East Asia, provides thoughts on the use of BIM for site analysis, phase planning, and 3D co-ordination.

As part of Hong Kong's long-term housing strategy, the government is targeting an additional 460,000 units by 2026. The built-up areas will be expanded from 24% to 28% of total land, considering the planned development areas and areas under planning studies. We need efficient civil project delivery to unlock land quickly, to prepare it for new housing developments and to provide the transport connections and utility networks that integrate this new housing with the existing infrastructure.



Delivering this and meeting Technical Circular 7/2017 requires the whole project team to participate in digital design workflows. Digital design is about engineers using technology to develop options and analysis. For example, on a road project, preliminary road alignments can be quickly designed based on site and terrain data, and simulated in a BIM model. Then, when preferred options are identified, the model is evolved to produce the detailed design. The BIM model is then developed further, with the road build-up, utilities, and street furniture added to provide sufficient detail for construction drawing production. The model will be used to check the design and co-ordinate differing elements and surrounding assets.



Ground grading model for Hung Shui Kiu new development area and the existing site

**Using this digital workflow, we can combine BIM and engineering analysis software tools, so options and scenarios can be tested fast to inform and link back to the original design.**

At the heart of Technical Circular 7/2017 is a drive to avoid using old methods of working, where the BIM model is produced at the end of the design process, rather than as a valuable tool at the heart of it.

Checking models as opposed to drawings is a change in mindset, but 3D models improve understanding of complex interfaces, and this clearer view enables better choices.

Training and access to the correct tools is essential to ensure that models are reviewed, checked, and approved by competent staff. Mott MacDonald has found that encouraging clients to review models in design meetings helps to embed BIM as the standard on their projects – clients that embrace BIM delivery properly are the clients that deliver the best project outcomes.

2D drawing creation from the civil BIM model is simple if a standardised protocol is adopted across the project team. In Hong Kong, the Works Department prefers the use of MicroStation CADD so there is usually an additional step required to move to the industry dominant Autodesk BIM packages. We expect that in time, the Works Department will review its standards and reconsider this issue, as the Airport Authority has recently done.

It is interesting that Technical Circular 7/2017 specifically identifies the use of BIM for phase planning (4D modelling) as part of the Annex 1 list of BIM uses. This is identified as optional now with design phase, but BIM does offer a very powerful tool to plan, test, and consider scenarios for phased implementation of projects, with many of the new urban developments needing careful planning of complex, phased and time critical roll-outs. Astute clients, keen on avoiding programme delays and driving down costs will be demanding this in the design phase now.

# Contracts to manage BIM collaboration

Delivery of projects using BIM necessitates unprecedented collaboration across the project team. Complex alliances are already a feature of Hong Kong's engineering and construction industry. But a new breed of contract is needed to facilitate collaborative working, without losing the ability to manage performance and risk. Hayman Choi, chartered quantity surveyor and Mott MacDonald's head of contracts and cost management in Hong Kong considers the contractual implications of Technical Circular 7/2017.

Hong Kong's Development Bureau (DEVB) has been promoting and encouraging the use of the New Engineering Contract (NEC) for many years in public projects. NEC is now also being used for professional services. With Technical Circular 7/2017 now mandating BIM, there is a need for BIM and NEC to work hand in hand. But NEC is not the only contract used – and BIM is mandated for non-NEC projects too.



When all designers are working on a single BIM model, one person has to be given the responsibility of looking after the model for the good of the team, but who is brave enough to take on this role? The fourth (and latest) version of NEC (NEC4) was launched in June 2017. This includes a standard secondary option provision for managing these new and potentially complex collaboration relationships that BIM's common data environment brings us.

The new secondary option clause X10 entitled "Information Modelling" incorporated in NEC4 requires the client to include the 'information model requirements'. This should include details of the 'common data environment (CDE)' to be used for BIM. Some client organisations will look to external parties such as their consultants or contractors to provide the CDE. Consultants or contractors will in some cases subcontract that requirement to a specialist provider, and it may be more appropriate for the client to form a contract directly with the supplier for the CDE.

We now see a global industry trend towards alliances and the creation of consortia to deliver major projects. This helps to share and manage risk and gives the client a single appointment with a stronger team. Hong Kong has followed this trend and with more players and more interfaces, efficient BIM can enable better collaboration – but the contracts also need to be developed to support that collaboration.

The question is how to collaborate in a common data environment with a common BIM model while capturing the obligations of each team member? What protocols should be adopted and who is responsible as the owner of the common model? These are the issues that must now be expressed in contracts, providing clear definitions of responsibilities and liabilities between clients, consortium partners and subcontractors.

NEC4 can provide the framework and contractual structure within which BIM collaboration can take place. But it is the bespoke information model requirements that must define common standards for how information within the BIM models is captured, presented, and distributed. In BIM, the model elements are attributed with data, such as materials, performance, catalogue numbers, supplier types. The data that is included in the model must be uniformly collected, expressed, and shared in accordance with a 'common protocol'.

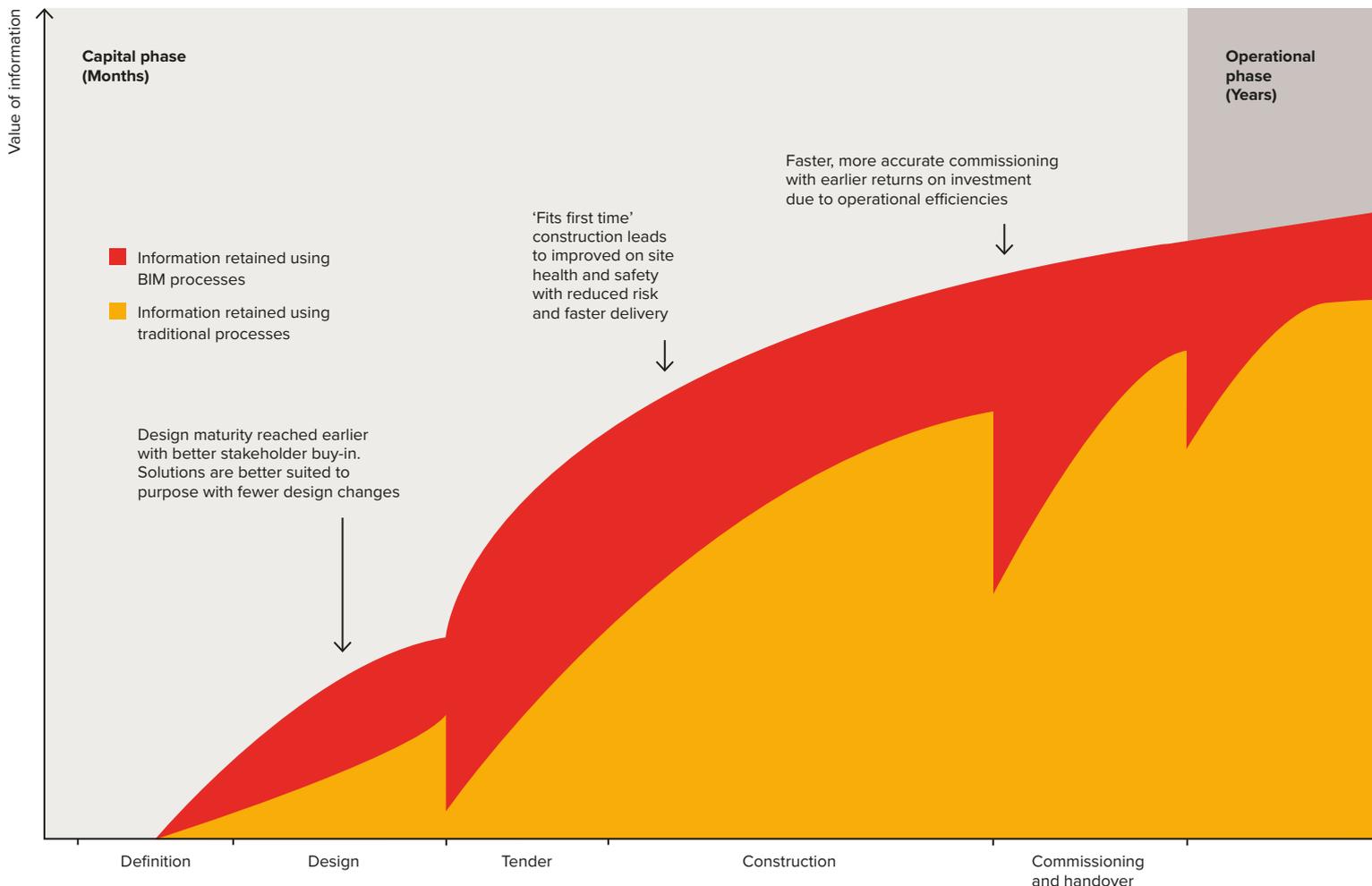
Close collaboration between designers, contractors and clients is powerful in driving innovation, quality, and speed, but there remains a need to manage information flows. During the early BIM adoption phase in Hong Kong, as elsewhere in the world, it's to be expected that there will be some teething problems. It's necessary to know who did what, why and when. It's possible that some team members won't be able to perform because they are inexperienced in BIM delivery, or begin to fail for reasons, such as lack of adequate BIM resources, or training. We need to be ready to manage these realities of construction in the BIM world.

Advanced BIM support packages do provide facilities and functions that enable the management of complex workflows including stage gates and approvals effectively. But someone must set it up as the project standard, implement it and manage it in use.

Now is the time for Hong Kong's clients to be reaching out to their consultants and procurement experts so that they are ready to properly manage the new obligations that Technical Circular 7/2017 brings. The forms of contract that enable collaboration are already there. Now it's time to start using them.

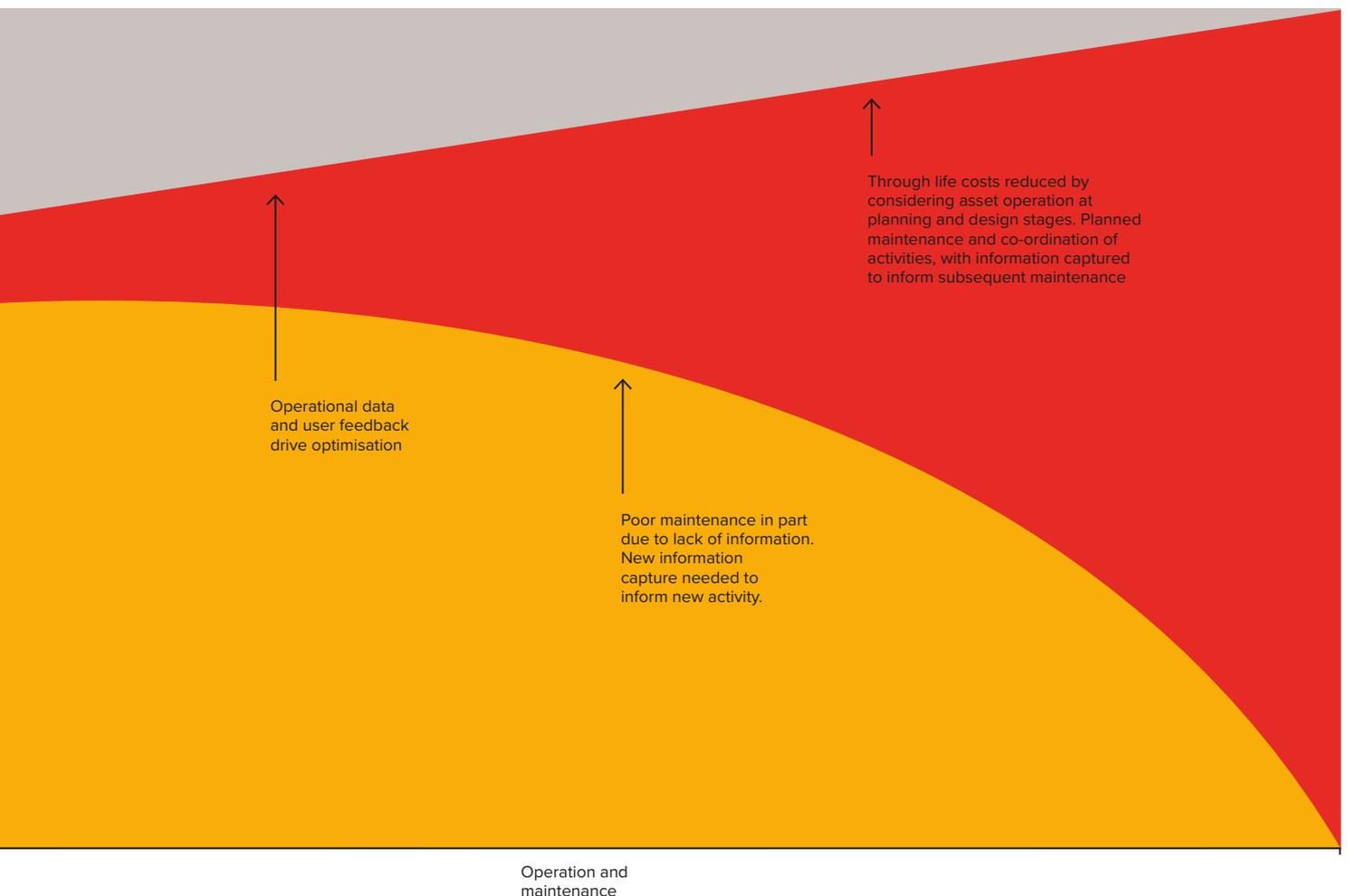
# What's in it for Hong Kong's asset owners?

BIM can offer significant benefits to asset owners in developing and managing their assets. It starts with collaboration and design optioneering, leading to streamlined delivery and optimised performance, maintenance, renewal and eventual decommissioning, reducing whole-life asset costs. Ole Wong, a chartered civil engineer and Mott MacDonald's director of highways and infrastructure in Hong Kong, explains more.



Conventional asset delivery results in loss of information at the end of each milestone stage, as one team hands over to another. This leads to wasted time and increased risk.

Instead of losing information at each interface, the value of information in the model environment increases as it is passed on. This 'virtual asset' accompanies your physical asset for the duration of its life, continuously increasing in value and enabling new teams to hit the ground running for all subsequent downstream works.



To benefit from BIM throughout the asset lifecycle, behaviours developed earlier in the process need to become embedded as 'business-as-usual'. Assets can be continually optimised using performance data, and maintenance is streamlined and reduced. However, the datasets being used at this stage can be vast. Many of Hong Kong's asset owners organisations will need to establish guidance and access training in order to realise the potential benefits.

Information provided by consultants and contractors in the design and construction phases can be organised and structured according to the asset owners operational needs. Consistency, rigour, and standardisation are crucial, as are information exchange processes and interoperability between applications. In addition, different departments in client organisations, typically procurement, operation and facility management, should be engaged from the outset of each project. This way they can enhance project design and delivery and ensure that the asset is truly fit for purpose, delivering whole-life efficiency.

Protocols provide the framework which allows the data management strategy at the heart of BIM to be implemented and governed. When properly laid out, they give the asset owner control over the process, providing the foundations for creation of a model that adds value throughout the asset lifecycle. International best practice is centred around BS 1192 and the emerging ISO 19650.

Clients need to regularly assess progress and maturity, both within their organisation and across their supply chains. Hong Kong's consultants provide support to clients by acting as information managers and BIM co-ordinators, either in support of design commissions or as a separate service.

We provide controls and guidance so that the information you and your supply chain produce is well organised and structured, so that it can be transferred in a logical and easily accessible format across the delivery process, improving performance and eliminating repetition.

## Common protocol

**Hong Kong's Construction Industry Council (CIC) produced BIM standards in 2015, which cross-refers to BS 1192 as a potential framework for managing BIM models in addition to providing extensive guidance.**

A 'common protocol' for Hong Kong has still not been established across the industry. Hence for each project using BIM we need to work with the technical teams to define how this will work. There is clearly a requirement for the industry to come together, logically led by the Hong Kong government, to develop standards and guidance for the information model requirements and, for NEC contracts, how the NEC is to be used on BIM enabled projects. In the UK, Mott MacDonald is at the forefront of efforts to standardise the use of BIM across various industries.

## Digital technology can boost safety

**In the delivery of the Thames Tideway Tunnel, a major sewer expansion project in London, Mott MacDonald developed immersive virtual reality safety scenarios to identify hazards in construction.**

We worked with the contractor to record and communicate these hazards to the whole delivery team via a SharePoint site. We also trialled a process to populate these safety risks into the BIM models, ensuring that they are considered for all future upgrade and maintenance work.

# Linking GIS and BIM

**Utilising available GIS information and connecting design models to GIS databases can provide considerable benefits on current and future design projects. BIM models can now incorporate GIS spatial data, bolstering the information used for decision making.**

GIS data such as land boundaries, environmentally sensitive areas, or drainage networks can be overlaid within the BIM model to quickly assess design options and can help demonstrate ingenious solutions that may not previously have been easy to prove.

GIS-based geotechnical information and borehole data can be used directly in the 3D BIM model to provide an understanding of the geotechnical conditions in a way that enables engineers to quickly consider options and search for cost efficient designs. GIS data can also be updated during the design process, for example to record site visits and public consultation activity, as was done on the High Speed 2 railway project in the UK, providing a transparency in public engagement not seen before.

On project completion, GIS data can be extracted from the civil BIM model and incorporated into the Hong Kong GIS database. Differing GIS systems require differently structured data and BIM models output various data formats. But these can be aligned with foresight and planning. The recent partnering agreement between Autodesk and ESRI is likely to make this connection easier in the future. The information input into the BIM model can then be retained after construction. As Hong Kong evolves as a 21st century smart city, the harnessing of GIS data will inform better decisions, with BIM as the foundation.

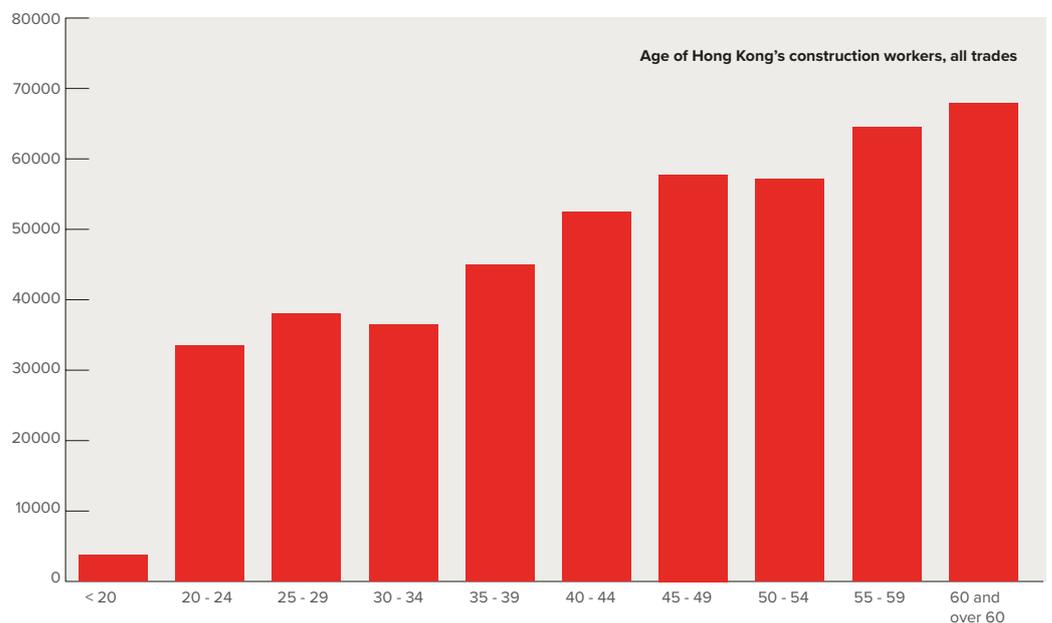
# BIM's role in enabling DfMA and prefabrication

**BIM can play a part in helping to battle one of Hong Kong's critical challenges – its increasingly ageing workforce. At present, over 40% of all trade workers are over 50. It is essential that we encourage young people to join the industry and to train them and that, where we can, we retain older skilled workers and make their working day more efficient. A real part of the answer is more offsite prefabrication, implementing BIM as a driver for DfMA (design for manufacture and assembly).**

DfMA is becoming far more common in Hong Kong's construction industry, with prefabricated service risers, plant rooms and bathroom units being used in several public housing projects. DfMA is an approach that avoids many of the piecemeal tasks involved in traditional construction with much of the process carried out in a controlled environment offsite, so quality improves, with less material waste.

The production line efficiencies of factory production cut the time it takes to produce individual units, speeding up overall construction programmes. Reduced work on site means fewer workers and less exposure to bad weather and the hazards and distractions of the construction site, increasing safety.

BIM is an essential tool for enabling offsite prefabrication, enabling exchange of design data between consultants and the manufacturer. This gives clients the opportunity to reduce cost, time, and to realise safety benefits within Hong Kong's construction industry.



Source: Construction Industry Council (CIC) of Hong Kong

# Eric's day...

Eric stood in the middle of his site office and ran through the sequence one final time. He was wearing a VR headset, and was joined in the virtual representation of his construction site by the consulting engineer, the client, and his architect.

Together with the three avatars, he replayed the sequence of construction he was proposing for the day.



Using the models provided by the consultants, and assisted by his small team back at the contractor's office, Eric had re-sequenced a portion of the weekly work plan based on an updated master schedule, which itself was the result of a series of client change requests. Although it was not possible to accommodate late changes to prefabricated components, he had made use of his company's 'agile construction' principles and delayed the delivery of some components so that client changes could be incorporated. He had used the models, along with input from the structural engineer, to check the eccentric loadings caused by the re-sequencing and then changed the order of the build, keeping it safe but leaving out the parts to be amended and delivered later.

Eric's role as construction manager meant that he was responsible for site safety, which required supervising the delivery and lifting into place of the large precast units. Once he had received client approval to proceed he quickly saved the recording of the meeting into the project common data environment (CDE) and made his way outside. He knew that another delivery was due very soon.

Eric strolled out of the site hut and into the dazzling sunlight. Registering the temperature change, the cooling fan built into his safety helmet kicked in, the contrast adjusted on the built-in augmented reality visor to compensate for the brightness, and the overlay showed him the safe path to take across the site. Overhead, a site drone registered his emergence from the hut and automatically alerted the driver of an approaching dump truck to reduce speed.

After a stroll across an unmade road, aided by his helmet mounted visor display, Eric skirted around the fatal zone of a mobile crane counterweight, and into the ground floor entrance of the partially constructed office building. His tablet chimed as he stepped over the threshold and he expanded the updated progress report. A new prefabricated section had just arrived, having been flagged by the RFID masts at the site entrance, and not a moment too soon.

This was the second lift of the morning, and space had already been prepared for the premanufactured floor cassette on the otherwise congested site. Luckily, the number of operatives required on the site was extremely low due to the amount of prefabrication being used, which made such large lifts easier to manage and much safer.

He could tell from his headset display that he was the only human near the lift, although there were two welding robots still working, but these could be allowed to continue safely enough.

He looked out into the yard to see the truck delivering the floor cassette nosing into the space set aside for the delivery. He swiped the progress report and tapped the 'received' command, immediately updating the blockchain and confirming release of payment to the supplier. Eric leaned out of the nearest empty window frame and caught the driver's attention with a wave. The wave was returned and the driver acknowledged receipt of payment with the usual thumbs up. This had been the pattern for the past week, since construction of the superstructure had begun, and they were making steady progress towards topping out the 20-storey structure by the end of the following week.

This is a work of fiction, yes, but science fiction? No, says Simon Gallagher, a chartered architectural technologist, and Mott MacDonald digital delivery leader for North East Asia.



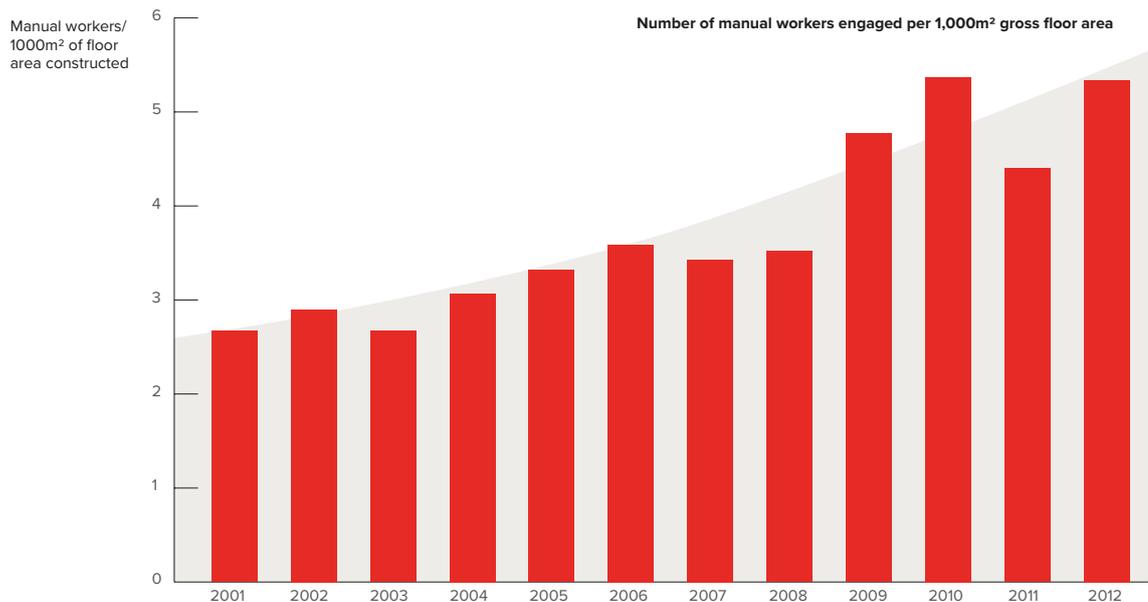
The use of all the technologies described has already been proven in one form or another, from university trials to onsite projects.

Is it such a leap of imagination to picture a construction procurement chain that has more in common with automotive manufacture and robotic assembly lines? A design process which is more akin to software development, where Lean, Agile, Scrum and Six Sigma are commonplace?

This is the direction the construction industry has been moving since the publication of documents such as the Latham Report in 1994 and the Egan Report in 1998. These UK government publications were hugely influential in pointing out systemic failings throughout the industry. Traditional methods of construction were labelled as 'inefficient', contracts as 'adversarial' and supply chains demonstrated to be 'fragmented' and of diminishing value. What was needed, it was argued, was more joined-up thinking. More collaboration. More trust.

In Hong Kong, these concerns are now being considered by the work of the Project Cost Management Office (PCMO), with its remit to 'devise, promote, co-ordinate and oversee the implementation of cost control and cost reduction measures for capital works projects'. It's an area where BIM can help lead the way.

BIM is not a new idea, although the acronym is relatively recent. Prior to the coining of the term, it was variously referred to as 'virtual design and construction' and 'plant design management system' – a software system developed in 1967, in Cambridge, UK. Advanced CAD/CAM systems have been in use in the automotive industry for decades. Productivity in most industries has increased many times over since the 1960s, while in real terms construction has flat-lined or even become less efficient.



Source: Hong Kong Construction Industry Performance Report for 2013, prepared by the Construction Industry Council (CIC) of Hong Kong and in collaboration with Rider Levett Bucknall Limited (RLB)

**The number of manual workers involved per square metre of floor area built has risen. Yet fewer young people are entering the construction industry. We're approaching the edge of a demographic precipice, with the largest single group of workers aged over 60 years.**

The construction industry needs to become more efficient to reduce its reliance on what will soon become scarce labour. It must also become safer and more attractive to young talent. BIM offers the potential to solve both these challenges.

We don't need a huge leap of imagination, just to use technology that is already available, and work in ways which are enabled by that technology.

The Hong Kong Government has seen fit to enforce the use of BIM via Technical Circular 7/2017, but this should not be seen as anything more than confirmation that full BIM implementation, and the many efficiencies it enables, is the correct approach for the industry and long overdue.

Opening opportunities with connected thinking.

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