

COMPANY

Civil Engineering and Development Department,
The Government of the Hong Kong Special
Administrative Region
Ove Arup & Partners Hong Kong Limited
China Railway Group Limited and TYFRON
Consultancy Limited

PROJECT

Tung Chung New Town Extension – Site Formation
and Infrastructure Works at Tung Chung Valley,
Phase 1 (Contract No. NL/2020/06)

LOCATION

Tung Chung, Lantau, Hong Kong

TYPE

Infrastructure / Civil

SCHEDULED TIME OF COMPLETION

2026

From BIM to Digitalization in Building Sustainable Environment



About Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region

CEDD of HKSAR Government is a leading organisation for development of Hong Kong who is committed to provide high quality high civil engineering services to meet its development needs. Its missions include striving for engineering excellence, creating a safe, green and sustainable environment, partnering with the community in infrastructure development and building a caring and motivating working environment for staff.

About Ove Arup & Partners Hong Kong Limited

Ove Arup & Partners Hong Kong Limited (Arup) is a global collective of designers, engineers, and consultants dedicated to sustainable development. Since 1976, Arup's Hong Kong office has spearheaded urban innovation, shaping the city's infrastructure and skyline with cutting-edge projects and a commitment to environmental sustainability for the future.

About China Railway Group Limited and TYFRON Consultancy Limited

China Railway Group Limited (CRGL) is a leading Chinese construction conglomerate, renowned for its extensive infrastructure projects worldwide.

TYFRON Consultancy Limited is a Hong Kong based BIM and Digitalization Consultant specializes in infrastructural and building works BIM Execution for design and construction stage. Services also include BIM Auditing, 3D Survey and Digital Strategies for construction projects.

AUTODESK PRODUCTS USED

- Autodesk® Civil 3D®
- Autodesk Construction Cloud®
- Autodesk® Navisworks®
- Autodesk® ReCap®
- Autodesk® Revit®

Project Description

The project mainly comprises site formation works for Tung Chung Areas 42 and 46 for public housing development, revitalization of Tung Chung Stream and construction of the first phase of the River Park with a visitor centre, construction of new roads (i.e. Road L29 and L30), road improvement works at Chung Mun Road and Shek Mun Kap Road, construction of a series of public facilities, such as pedestrian and vehicular bridges across the Tung Chung Stream, sewage pumping stations, drainage, watermain and sewage works along Yu Tung Road, common utility tunnel and sustainable urban drainage system and compensatory woodland planting.

Project Challenges

This project faces several challenges, including the need to complete the site formation works in a short period of time for subsequent public housing development and carry out temporary Tung Chung Stream diversion to facilitate the revitalization works. Besides, the construction of the Visitor Centre requires close coordination amongst civil, structural and E&M teams, making real-time updates and effective communication essential. In addition, the site is in close proximity to the existing Tung Chung Stream, which may have flooding risk to workers nearby. The extensive site coverage also increases the challenges in site supervision and monitoring.

Solutions for Challenges

Given the extensive site coverage and diverse engineering works, the project team has implemented innovative technologies to enhance safety, efficiency, and productivity. In congested areas, all the excavators are equipped with a “360-degree Intelligent Monitoring System” to maintain safe clearance between equipment and workers nearby. The 360-degree Project Management Platform with BIM aids in managing site safety and progress. Proximity to Tung Chung Stream necessitated a comprehensive flood warning system with real-time monitoring to predict flooding and alert workers via smartwatches. AI cameras monitor unauthorized entry into danger zones and ensure vehicle wheels are cleaned before leaving the site.

How does BIM benefit the project?

This project involves extensive works with non-gridline and uniform level control elements. Utilizing BIM for design and construction coordination significantly enhances communication efficiency and provided accurate resolutions. BIM also serve as a framework for developing digital construction technologies to resolve fabrication wastage, spatial optimization and most importantly, BIM enables the team to evaluate construction methodologies through dynamic risk assessments. All output are shared with the entire project team, including frontline supervisors and workers, ensuring everyone is aligned and informed. This comprehensive approach facilitates better collaboration and efficiency across all stages of the project.

Better with BIM

Through the good practices and lesson learning from this project, we have systematically integrated BIM at different stages, including design, manufacturing, construction and risk assessment. We will continue with the practice and apply to upcoming civil projects with similar nature. Given the high spatial constraints in the construction industry in Hong Kong, geometrical accuracy is essential to project success. Therefore, BIM accuracy is crucial in this digital construction era, providing a solid foundation for all workflow collaboration. This ensures that all team members, from designers to frontline workers, are aligned and can work efficiently together.



Image Courtesy of Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region and Ove Arup & Partners Hong Kong Limited and China Railway Group Limited and TYFRON Consultancy Limited
Photomontage of Tung Chung River Park and Visitor Centre



Image Courtesy of Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region and Ove Arup & Partners Hong Kong Limited and China Railway Group Limited and TYFRON Consultancy Limited
Photomontage of Revitalization of Tung Chung Stream

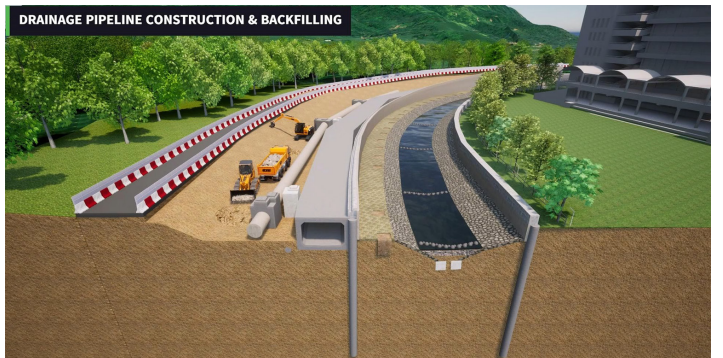


Image Courtesy of Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region and Ove Arup & Partners Hong Kong Limited and China Railway Group Limited and TYFRON Consultancy Limited
Construction Sequence Simulation for Road and River Works



Image Courtesy of Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region and Ove Arup & Partners Hong Kong Limited and China Railway Group Limited and TYFRON Consultancy Limited
BIM Development from Design Stage to Construction Stage



Image Courtesy of Civil Engineering and Development Department, The Government of the Hong Kong Special Administrative Region and Ove Arup & Partners Hong Kong Limited and China Railway Group Limited and TYFRON Consultancy Limited
Adoption of ACC for Design Coordination

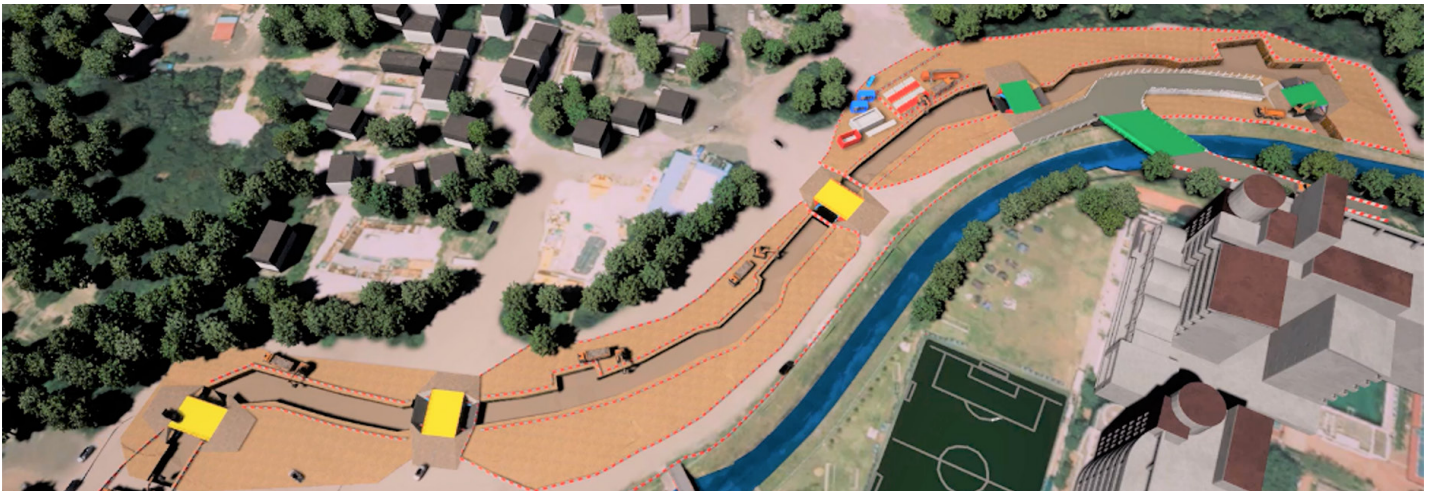


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4D Phase Planning for Concurrent Works Simulation