

COMPANY

Drainage Services Department, HKSAR Government
 AECOM Asia Company Limited
 China State Construction Engineering (Hong Kong) Limited
 MTECH Engineering Company Limited

PROJECT

Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation and Access Tunnel Construction

LOCATION

Nui Po Shan/A Kuk Kok Street/Mui Tsz Lam Road, Sha Tin, New Territories, Hong Kong

TYPE

Civil/Geotechnical/Structural/Infrastructure

SCHEDULED TIME OF COMPLETION

24 Feb 2022 (Contract 1)

Successful BIM Applications and Implementation of Integrated Project Delivery (IPD) in Sha Tin Caverns Project



About Drainage Services Department, HKSAR Government

Since 1989, DSD has been striving to provide world-class wastewater and stormwater drainage services. We have acquired noticeable achievements such as Happy Valley Underground Stormwater Storage Scheme. We implement various projects to uplift the flood protection level and sewage treatment capacity to alleviate the flood risk and improve the hygiene in the areas concerned, such as relocation of Sha Tin Sewage Treatment Works to Caverns. We endeavour to uplift the integrity of the sewer and drainage systems by rehabilitating pipes with high risk.

About AECOM Asia Company Limited

AECOM is the world's premier infrastructure consulting firm, delivering professional services throughout the project lifecycle – from planning, design and engineering to program and construction management. We partner with our clients to solve their most complex challenges and build legacies for generations to come. AECOM is a *Fortune 500* firm and its Professional Services business had revenue of approximately \$13.6 billion in fiscal year 2019.

AUTODESK PRODUCTS USED

Advance Steel

AutoCAD

3ds Max

BIM 360

Civil 3D

Dynamo

InfraWorks

Navisworks Manage

ReCap Pro

ReCap Photo

Revit

Robot Structural Analysis

Vehicle Tracking

Project Description

The objective is to relocate Sha Tin Sewage Treatment Works (STSTW), the largest secondary sewage treatment works in Hong Kong, into caverns to release scarce land resources. STSTW occupies 28 hectares of land and serves a population of about 630,000 in Sha Tin and Ma On Shan Districts, which produce 340,000m³ of sewage per day. Given the complexity of the relocation, the project will be implemented in 5 stages. Currently, site preparation and access tunnel construction are in full swing.

Project Challenges

Being a large-scale public infrastructure project, the total duration was expected to be 13 years. Different construction tasks, including site formation, blasting, steel bridge construction, were required to be implemented concurrently. This required a huge amount of information exchange and collaboration among multiple disciplines, such as civil, structure, geotechnical, blasting, land surveying, quantity surveying, safety, environmental and quality team, across the entire project lifecycle. Public engagement was also vital in this project so as to minimize the construction impacts to Sha Tin and Ma On Shan citizens.

Solutions for challenges

The collaboration between multi-disciplinary project stakeholders was the major challenge of this project. In lights of this, an integrated team entity was assembled by key project stakeholders early in the process. With BIM and digital construction technology, the most updated project information was allowed to be shared to different stakeholders and across various levels. The success of the project always closely linked with the successful coordination of parties. Therefore, multi-lateral open sharing and risk sharing were highly encouraged and fostered.

How does BIM benefit the project?

Integrated Project Delivery (IPD), Virtual Design and Construction (VDC) and Lean Construction were adopted in different areas of the project to resolve project challenges. BIM and Digital Construction technology were used in the construction phase planning to streamline multiple construction programs across various zones. BIM for Virtual Design and Construction was applied to reduce design changes and rework. BIM-enabled latest construction methodologies -Design for Manufacture and Assembly (DfMA) and Modular Integrated Construction (MiC) were adopted to reduce the construction wastage while improving quality and safety.

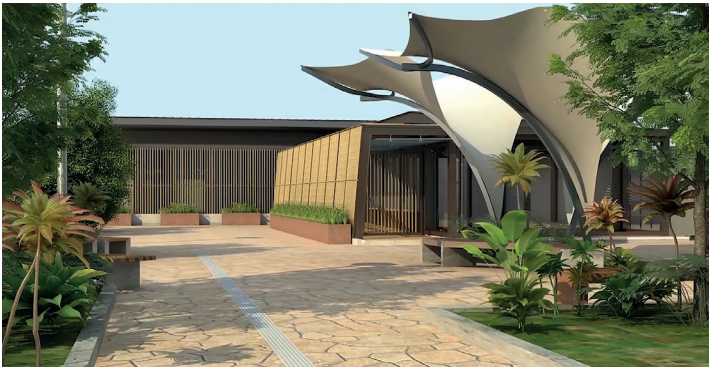
Better with BIM

IPD through BIM with a connected common data environment BIM360 enabled the access of concise and precise information at all phases of the project and by various project stakeholders. This helped to mitigate or avoid the risk of stalling the project.

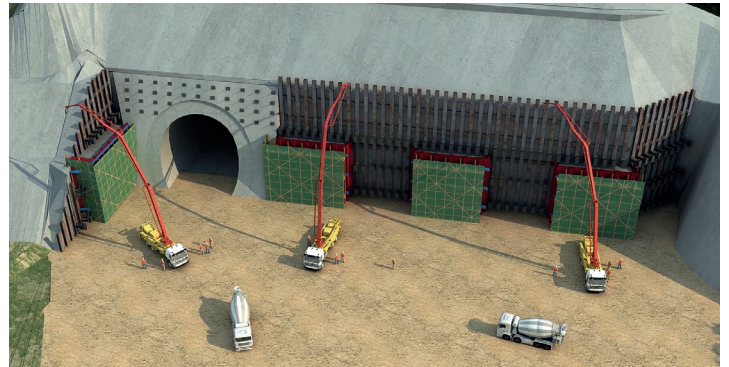
Another important advantage of a complete digital construction process was its ability to be both predictive and reactive. In contrast with paper-based and 2D CAD, digital twinning through BIMs went beyond simply speeding up analogue processes. It drove improvements in core project management practices, and thereby reducing project delays and enhancing public satisfaction.



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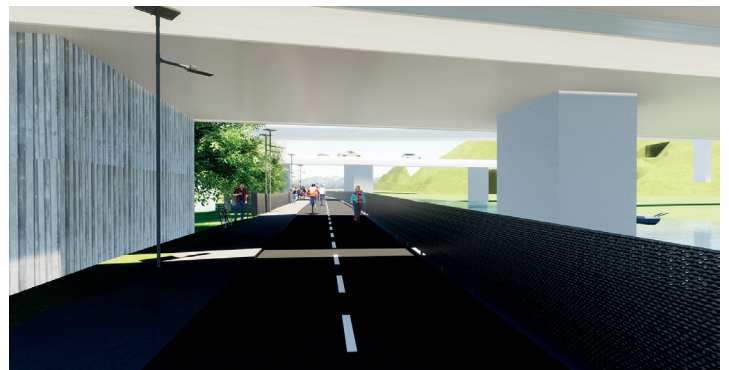
Architectural Design of Community Liaison Centre
 Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited and MTECH Engineering Company Limited



Construction Simulation of Retaining Walls of Tunnel Portal
 Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited and MTECH Engineering Company Limited



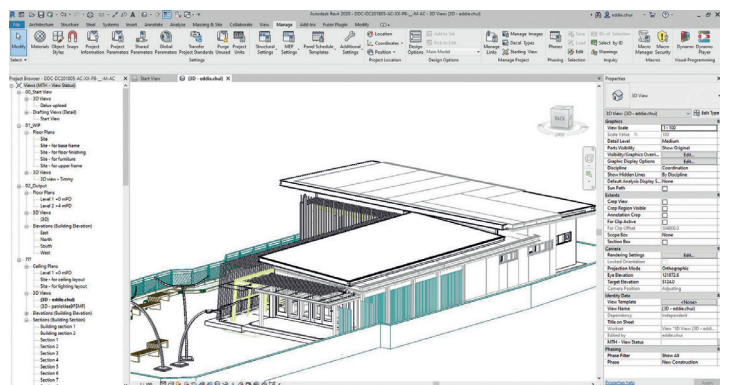
Design for Manufacture and Assembly (DfMA) of Temporary Vehicular Steel Bridge
 Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited and MTECH Engineering Company Limited



As-built Modelling of Cycle Track
 Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited and MTECH Engineering Company Limited



Point Cloud Scanning of Temporary Vehicular Steel Bridge
 Image Courtesy of Drainage Services Department, HKSAR Government and AECOM Asia Company Limited and China State Construction Engineering (Hong Kong) Limited and MTECH Engineering Company Limited



Revit Model of Community Liaison Centre
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