

COMPANY

Water Supplies Department, HKSAR Government
 ATAL – Chun Wo – Ming Hing Joint Venture
 Summit Technology (Hong Kong) Limited

PROJECT

In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works and Ancillary Facilities

LOCATION

Sha Tin, New Territories

TYPE

Water Treatment Works

SCHEDULED TIME OF COMPLETION

2026 Q1

“BIM adoption and development have always been in WSD’s ongoing agenda. The project of In-situ Reprovisioning of Sha Tin Water Treatment Works (South Works) - Water Treatment Works and Ancillary Facilities, is a proven example of success in BIM uses. WSD promotes BIM application and innovative technology driving the engineering industry towards full implementation of BIM uses to maximise the productivity and cost-effectiveness.”

— Horace Ng

Senior Engineer/Project Management,
 Water Supplies Department, HKSAR Government

BIM PARTNERS

AECOM Asia Company Limited
 Binnies Hong Kong Limited

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
 Autodesk® AutoCAD®
 Autodesk® BIM 360® Docs
 Autodesk® Civil 3D®
 Autodesk® Dynamo
 Autodesk® Navisworks®
 Autodesk® ReCap®
 Autodesk® Rendering
 Autodesk® Revit®

BIM Technology Drives Waterworks Project Success



Initial Condition of STWTW
 Image Courtesy of Water Supplies Department, HKSAR Government and ATAL – Chun Wo – Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

The Sha Tin Water Treatment Works (STWTW) (comprising North Works and South Works) is the largest water treatment works in Hong Kong, serving a population of over 2 million. The proposed works comprise the in-situ reprovisioning of the STWTW South Works, which has deteriorated with age and become uneconomical to maintain its operation, with its reliable output reduced significantly after over 50 years of service since its commissioning in 1964. Apart from replacing the aged treatment facilities, the reprovisioning works will also uprate the treatment capacity of the South Works by over 50% from 360 000 cubic metres (m³) to 550 000 cubic metres (m³) per day to meet the increased water demand arising from future developments around the territory. The completed works would be significant to the living of a huge population of citizens, as it is currently the largest water treatment works in Hong Kong in terms of daily output capacity, and is a major source of water supply for the areas of Sha Tin, Central Kowloon and even to as far as part of Hong Kong Island.

The key scope of the works comprises demolition of existing structures and the construction of new plants within the same footprint including Flocculation & Sedimentation Tanks, Ozone Building, Stage 1 (biological) Filters, Stage 2 (granular) Filters, Washwater Equalization Tank, Washwater Recovery System, South Works Pumping Station, Elevated Walkway, and other ancillary facilities. The new treatment works adopt advanced treatment technologies including two-stage ozonation, inclined plate settler



Point Cloud Image of Existing Clarifier
 Image Courtesy of Water Supplies Department, HKSAR Government and ATAL – Chun Wo – Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

for sedimentation, two-stage filters and ultra-violet disinfection, which would enhance the treatment and disinfection capabilities and enhance the reliability of water supply. As a critical challenge of the project, extensive control and monitoring on the impacts of works are crucial to ensure the existing operation and services of the North Works, adjacent to South Works within the same compounded area, undisturbed.

The project is awarded to ATAL - Chun Wo - Ming Hing JV (ACMJV) who engages Summit Technology (Hong Kong) Limited as the BIM consultant, while AECOM Asia Company Limited is delegated as the Project Manager for project supervision. These companies are well-positioned to overcome different challenges with the innovative solution of Building Information Modelling (BIM) throughout the project life-cycle.

BIM Adoption

Under the supervision of AECOM, ACMJV and Summit faithfully execute the BIM requirement under the contract requirements, as well as leveraging on BIM, the innovative cloud-based technology, to create an up-to-date common platform for teams to concurrently exchange information and

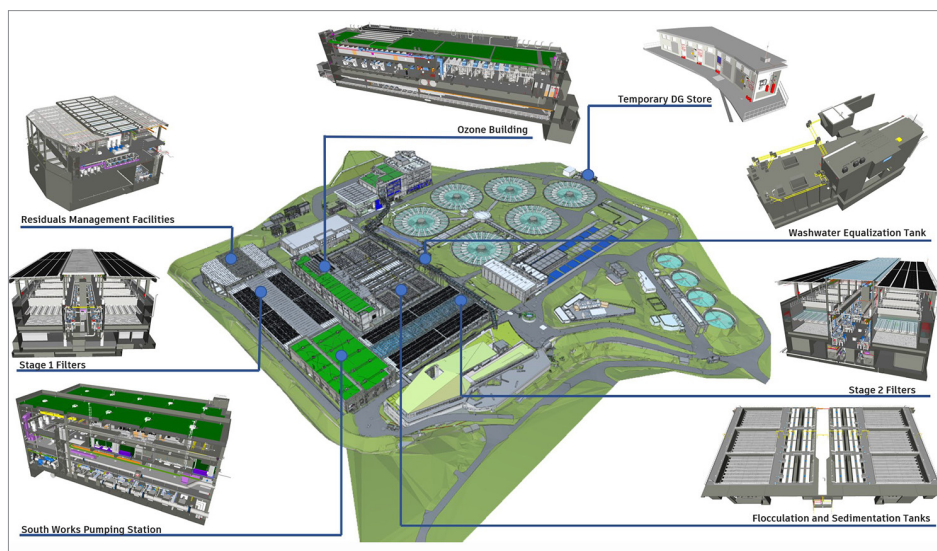


Image Courtesy of Water Supplies Department, HKSAR Government and ATAL - Chun Wo - Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

get a good grasp of the project's latest progress. The project of re-provisioning South Works of Sha Tin Water Treatment Works involves design, demolition and construction, where BIM assists to visualize the integration of existing and new elements, design change, construction sequence, site logistics and the future project deliverables. The platform also enables multi-disciplinary parties to collaborate closely to resolve clashes of design that may cause delay and abortive works, as well as achieving a precise programme for timely completion.

BIM Collaboration in Design, Construction and Asset Management

To develop the design based on existing condition, BIM is adopted to form the existing condition model with information obtained by laser scanning photogrammetry, conventional survey method, record drawings, etc. The existing condition model is verified by point cloud survey to improve the accuracy, which is

used as the initial condition to develop and integrate the new elements.

During the planning cycle, BIM is used to develop the construction programme including the estimation of excavation and fill volume required for the proposed works and the subsequent logistics planning for the excavated soil disposal. BIM also enhances the collaboration and coordination for multi-disciplinary design including structural, architectural, electrical, mechanical and building services, where clashes can be found at early design stage to mitigate the risks of clashes during construction stage. Apart from major buildings design, BIM not only helps the design of alignments for underground utilities such as CLP cables, signaling cables, fresh water mains, drainage, sewage pipes, fire services and existing dosing pipes for water treatment, but also contribute to precise planning of excavation and lateral support (ELS) construction and E&M installations in new buildings.

During the construction cycle, monitoring the current site progress of ELS construction is relied on BIM as well. It enables instant monitoring on the excavation progress, reviewing the construction sequences of ELS installation from time to time and the need for on-site mechanical mobilization. BIM rendering produces images with better visualization to improve communication and coordination between stakeholders (i.e. Client, Consultant, Contractor and Designer), which contributes to collaboration of all parties to resolve issue efficiently and optimize the construction progress.

During asset management cycle, the information such as product brand, model ID, size, properties, etc. of E&M elements including cables, pipes, pumps, ventilation, etc. are incorporated into the as-built BIM and COBie worksheet for ease of operation, maintenance, future repair, replacement and upgrading for end users.

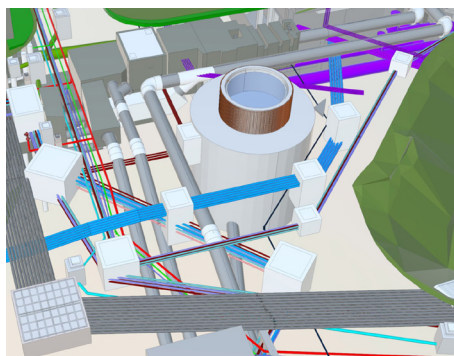


Image Courtesy of Water Supplies Department, HKSAR Government and ATAL - Chun Wo - Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

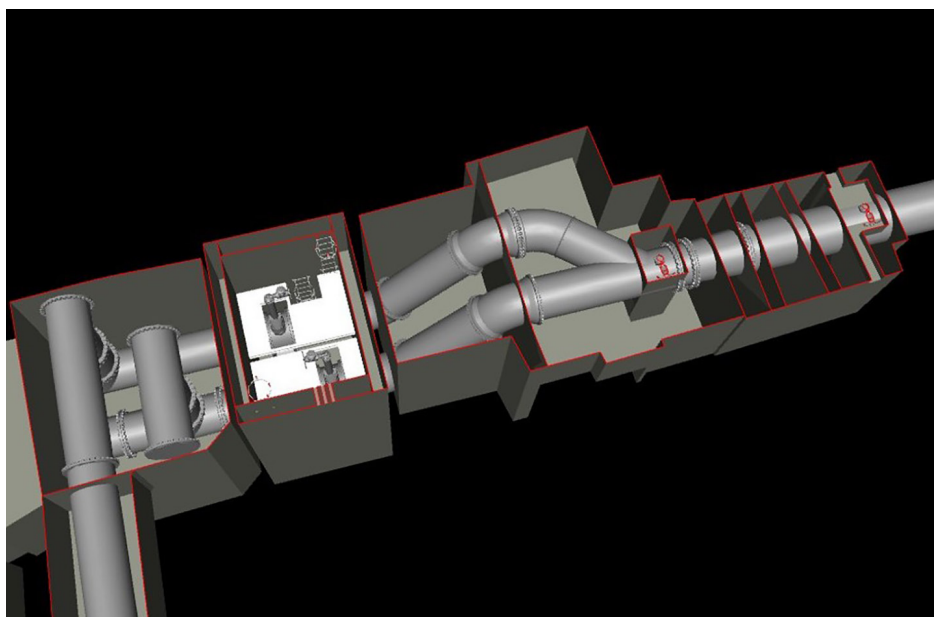
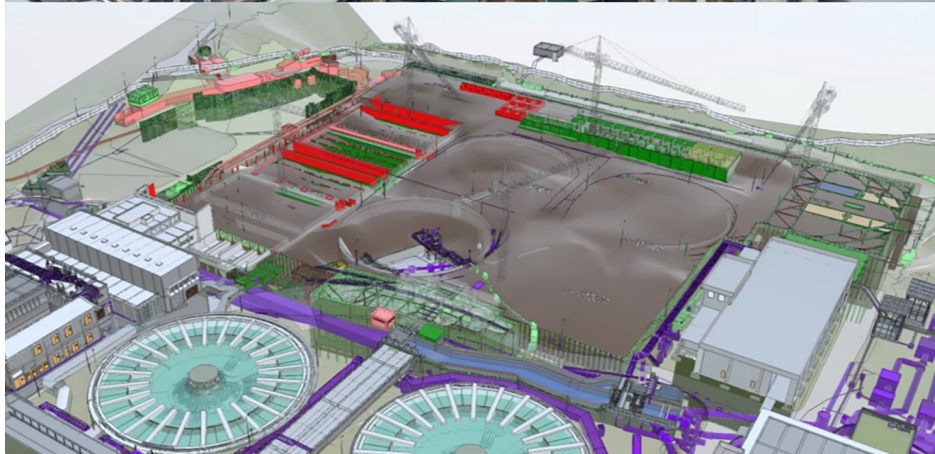
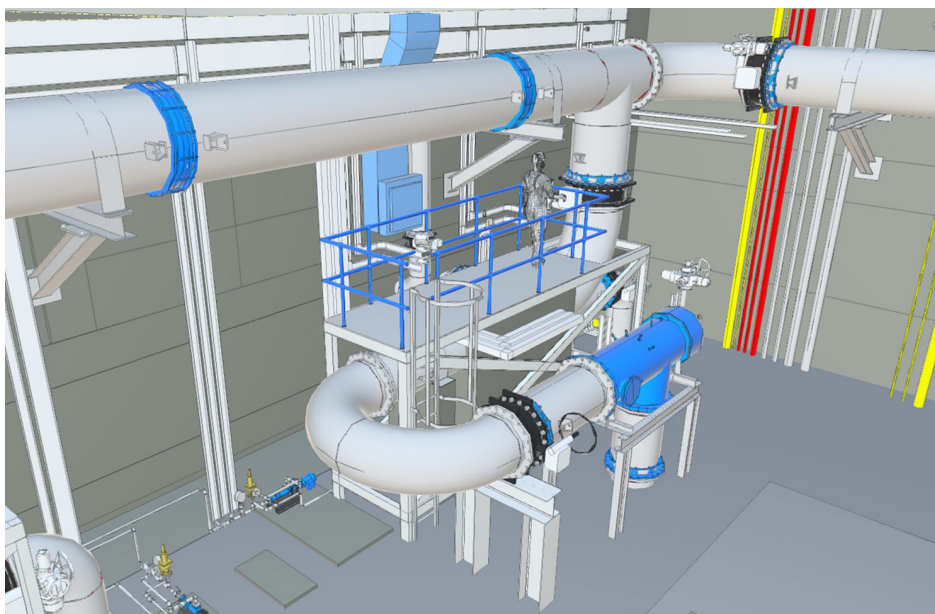


Image Courtesy of Water Supplies Department, HKSAR Government and ATAL - Chun Wo - Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited



Construction Progress Monitoring
Image Courtesy of Water Supplies Department, HKSAR Government and ATAL – Chun Wo – Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited



BIM for Operation and Maintenance
Image Courtesy of Water Supplies Department, HKSAR Government and ATAL – Chun Wo – Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

As a result, the whole design and modification works for the TWET are completed and the permanent WET construction is no longer at the critical path of the programme. The saving of approximately 4-month duration substantially enhances the float time in the contract period and maintains the targeted project completion date.

Apart from the successful TWET idea, BIM is used for the feasibility study of North-South Interconnectivity (NSI) to explore the possibility of connecting the North and South Works together to allow flexibility of future operations. BIM is also employed for the DfMA/MiC study for the major treatment equipment, such as Ozone System and Dissolved Air Flotation System, which improves the efficiency and quality of construction and safety, providing a win-win solution beneficial to all parties.

WSD's Vision in BIM

Although the project has been facing numerous obstacles throughout its various phases, WSD, AECOM and ACMJV have overcome and addressed all issues by working as a united team. With the widely usage of BIM related software especially the CDE collaboration platform, the latest designs and issues can be shared, discussed and resolved promptly. Working together with excellent team spirit and mutual trust, potential risks and delays are mitigated, bringing out the best solutions to the project execution and performance. WSD promotes to build on the BIM successful practice within the project of STWTW reprovisioning works and will remain steadfast in advocating for BIM culture and BIM diversity in upcoming projects.

Innovation by BIM

Referring to the original working programme, a permanent Washwater Equalization Tank (WET) is required to be constructed and commission prior to the demolition of the existing South Works facilities. Due to the unforeseen site constraints, there is risk of delay for critical WET construction, which can potentially cause significant impact to project completion.

With the deploy of BIM collaboration platform, the risks and challenges are eliminated and resolved by an

alternative proposal of modifying and reusing an existing sump tank at the decommissioned South Works pumping station, which is to be demolished at later stage, as a temporary WET (TWET). To explore this innovative idea, the project team immediately reviews the structural modifications and pipework design with the assistance of BIM. The detailed schemes are built and clearly illustrated on the CDE platform (i.e. BIM360) for easy exchange of ideas, swift trial on different scenarios and enhancement of design accuracy.



Image Courtesy of Water Supplies Department, HKSAR Government and ATAL – Chun Wo – Ming Hing Joint Venture and Summit Technology (Hong Kong) Limited

About Water Supplies Department, HKSAR Government

Water supply is an indispensable part of the livelihood of the people and critical to the territory's sustainable developments. WSD has the mission to provide reliable and quality services of water supplies to a population of about 7.5 million. WSD adopts BIM and other cutting-edge technologies in key infrastructure projects to build innovative waterworks assets of the future and achieve transformative performance in collaborative project management.

About ATAL – Chun Wo – Ming Hing Civil Joint Venture

ATAL – Chun Wo – Ming Hing Joint Venture (ACMJV) is formed by ATAL Engineering Limited, Chun Wo Construction & Engineering Company Limited and Ming Hing Civil Contractors Limited, who provides its clients with the best quality of work using BIM technologies.

About Summit Technology (Hong Kong) Limited

Summit Technology (Hong Kong) Limited is dedicated to actively working with the local AEC industry in providing BIM deliverables and project solution, as well as research, development, training and coaching of BIM for achieving better engineering solution.