

## COMPANY

Water Supplies Department, HKSAR Government

## PROJECT

Uprating of Chai Wan Salt Water Supply System

## LOCATION

Chai Wan and Siu Sai Wan areas

## TYPE

Water Supply

## SCHEDULED TIME OF COMPLETION

2021Q2

# Our BIM Journey in WSD



## About Water Supplies Department, HKSAR Government

The Water Supplies Department (WSD) is responsible for providing reliable and adequate supplies of fresh water and seawater (for flushing) to a population of over 7.5 million in Hong Kong for the territory's sustainable and long-term developments. In 2019/20, WSD supplied 998 million cubic metres (Mm<sup>3</sup>) of fresh water and 310 Mm<sup>3</sup> of seawater with about 3.08 million customer accounts (as at 31 March 2020).

## BIM PARTNERS

Summit Technology (HK) Limited  
CW – CMGC Joint Venture

## AUTODESK PRODUCTS USED

AEC Collection  
AutoCAD  
BIM 360 Design  
Civil 3D  
InfraWorks  
Navisworks Manage  
Revit

## Project Description

To cope with the rising demand and enhance the reliability of salt water supply system in Chai Wan and Siu Sai Wan areas, this Project aims to uprate the output capacity of the existing Siu Sai Wan Salt Water Pumping Station (SSWSWPS) from 30 million litres per day (MLD) to 41.7MLD, and laying of about 3.8 km salt water mains ranging from 150 mm to 600 mm in diameter together with associated works. BIM is adopted throughout the design, construction and operation stages.

## Project Challenges

The Project involved laying salt water mains at the existing SSWSWPS and in urban areas with congested underground utilities which involved liaison and engagement with different stakeholders including utilities companies during design and construction. There was a need to establish a systematic and effective communicating platform, which should include BIM, to ensure close coordination and collaboration.

This Project aimed at visualization of real-time flow rate and pressure in salt water mains during on-site inspection in order to understand the network operating condition. It was challenging to develop a dynamic and synchronized approach in data monitoring and the state-of-the-art Asset Management (AM) system to visualize the network condition.

## Solutions for challenges

A 4-dimensional BIM model was developed to allow for better illustration of interfacing works and enhance collaboration among multiple parties working at the congested site. The construction programme and sequence could also be incorporated into the model so that variations of the 3-dimensional model against time could be visualized through Construction Method Simulation (CMS).

This Project incorporated the use of BIM, HoloLens, Supervisory Control and Data Acquisition system and Global Positioning System to facilitate remote collaboration between inspector on site and engineer at office. The visualization of real-time asset data during on-site inspection allows for quick decision and follow-up actions.

## How does BIM benefit the project?

BIM allows for adoption of 4-dimensional modelling and CMS, which enable effective information exchange and collaboration between multi-disciplinary project teams. Such features allow for visualization of interface works within a tight timeframe. In particular, to minimize nuisance to the public, duration of water supply suspension can be shortened to minimum through an advance simulation of interface works.

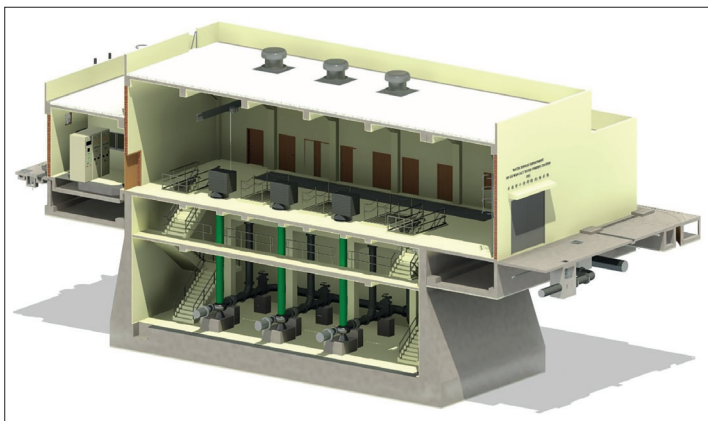
The BIM model integrated with Construction Operations Building Information Exchange (COBie), Virtual Reality (VR) & Augmented Reality (AR) technologies enable operators to interact with the as-built 3-dimensional BIM model to facilitate asset management, thus safeguarding quality and reliability of the water supply system.

## Better with BIM

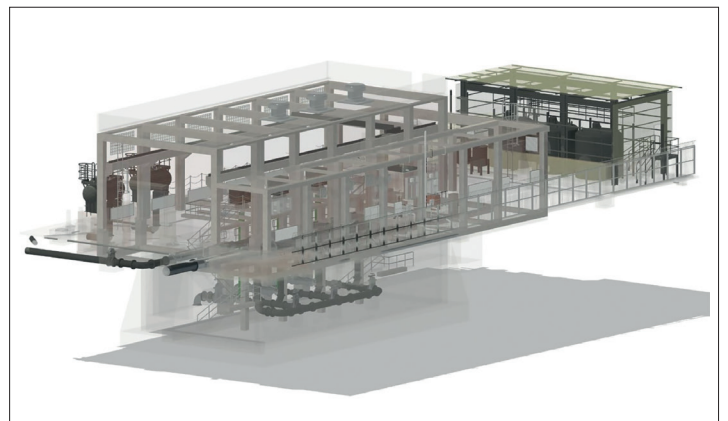
With the adoption of BIM model throughout the asset life cycle from design, construction, operation and maintenance, a complete asset management data set can be developed to facilitate future information exchange. To allow successful phase transition, the Project comprises the application of BIM Specifications for AM and interface solution between BIM and WSD's AM system using COBie for a systemised exchange of information. The Project also adopts the concept of BIM-AM with deployment of AR and VR. We aim at exploring a wider application of BIM to further promote the benefits of BIM application and usage in future waterworks projects.



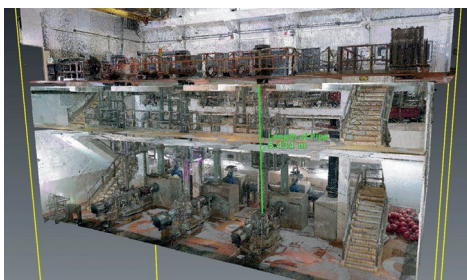
Overview of the Siu Sai Wan Salt Water Pumping Station  
Image Courtesy of Water Supplies Department, HKSAR Government



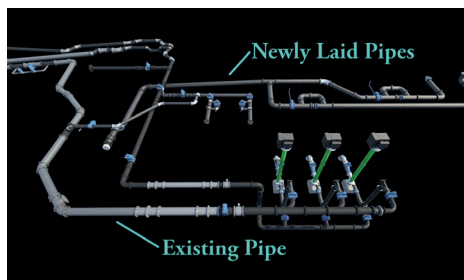
Cross section of the Pumping Station  
Image Courtesy of Water Supplies Department, HKSAR Government



Transparent view of the Pumping Station  
Image Courtesy of Water Supplies Department, HKSAR Government



Point Cloud using Photogrammetry  
Image Courtesy of Water Supplies Department, HKSAR Government



4-D simulation on the water mains construction sequence  
Image Courtesy of Water Supplies Department, HKSAR Government



Digital Interface with HoloLens  
Image Courtesy of Water Supplies Department, HKSAR Government



Walkthrough with simulation  
Image Courtesy of Water Supplies Department, HKSAR Government