

COMPANY

Water Supplies Department,
The Government of the HKSAR
Ming Hing Waterworks Engineering
Company Limited
Shenzhen Yuegang Technology Company Limited

PROJECT

Revolutionizing Large Diameter Water Mains
Management and Pumping System Control with
AI-Driven BIM and GIS Integration

LOCATION

New Territories East

TYPE

Water Works

SCHEDULED TIME OF COMPLETION

Q4 2024

BIM-GIS-AM Integration with AI and IoT for Surface and Linear Assets



About Water Supplies Department, HKSAR Government

The Water Supplies Department is responsible for operating and maintaining fresh water and flushing water supplies and distribution systems to ensure reliable water supplies to the customers. The fresh water supply system covers a total of 99.99% of Hong Kong's population, while the seawater supply network for flushing covers about 85% of the Hong Kong's population.

About Ming Hing Waterworks Engineering Company Limited

Ming Hing Waterworks is the first Company that integrates waterworks, technology, engineering and investment management into an efficient and diversified waterworks holding group. It has established its position as a major waterworks engineering services provider in Hong Kong and is currently accountable for maintaining the water supply system for over 55% of the Hong Kong population.

About Shenzhen Yuegang Technology Company Limited

Shenzhen Yuegang Technology Company Limited has contributed to the Digital Transformation initiative of Water Supplies Department since 2019 by implementing its suite of smart water technologies and systems to support different smart water projects of WSD.

BIM PARTNER

Summit Technology (Hong Kong) Limited

AUTODESK PRODUCTS USED

Autodesk® Civil 3D®
Autodesk® Navisworks®
Autodesk Platform Services
Autodesk® ReCap® Pro
Autodesk® Revit®
Autodesk® Vault
Infowater Pro

Project Description

The Water Supplies Department (WSD) has initiated the first stage of an ambitious program aimed at transforming the control and maintenance of the Dongjiang water trunk transfer network system. We have introduced several new programs, including the Smart Trunk Transfer Support System (STTSS), establishing new Asset Management Information System (AMIS), and AI Leakage Detection by leveraging BIM, GIS, AI, and IoT technologies. The project commenced on 2023 January and the funding is over 18 million.

Project Challenges

The traditional asset management system runs for already 20 years. It is a big challenge to transform an enormous amount of non-organized data to the new AMIS. Besides, as the project adopts BIM, GIS, AI and IoT technologies, interoperability among different software is also a major concern for data transfer. Standard Revit does not come with the function to export data in COBie format which achieve the WSD's BIM Standard.

Solutions for Challenges

The new AMIS system aims as a centralized asset repository for all WSD asset classes, ensuring timely access to accurate information. We have implemented a BIM-AM workflow for surface water treatment facilities, complete with an asset register to ensure an effective maintenance management cycle. To enhance interoperability, we adopted openBIM and openGIS file format, such as IDS, IFC, BSDD, and COBie. A custom-made API program is used to export the relevant asset data into the AMIS under WSD Asset Hierarchy Structure.

How does BIM benefit the project?

The BIM integration of 2D and 3D within AMIS and 3D water mains offers a more comprehensive and systematic view of our water supply assets. When combined with BIM, GIS, and IoT, dynamic data collected on-site can be displayed in both 2D and 3D formats. Asset categories are linked to WSD installation types, enabling informed decision-making and effective management of asset registers. Real-time sensor data also embeds with BIM asset.

Better with BIM

BIM facilitates the integration of data from various sources, enabling WSD to proactively identify potential issues in the system, optimize their asset management practices, and enhance the reliability and lifespan of their assets. This results in several benefits such as improved efficiency, reduced costs, and enhanced safety. BIM-AM in the AMIS enables visualise the assets and show status alerts, thus inspectors can quickly look for that asset for inspection. Inspectors can also make good use of AMIS to do simulations and make action plans for emergency.

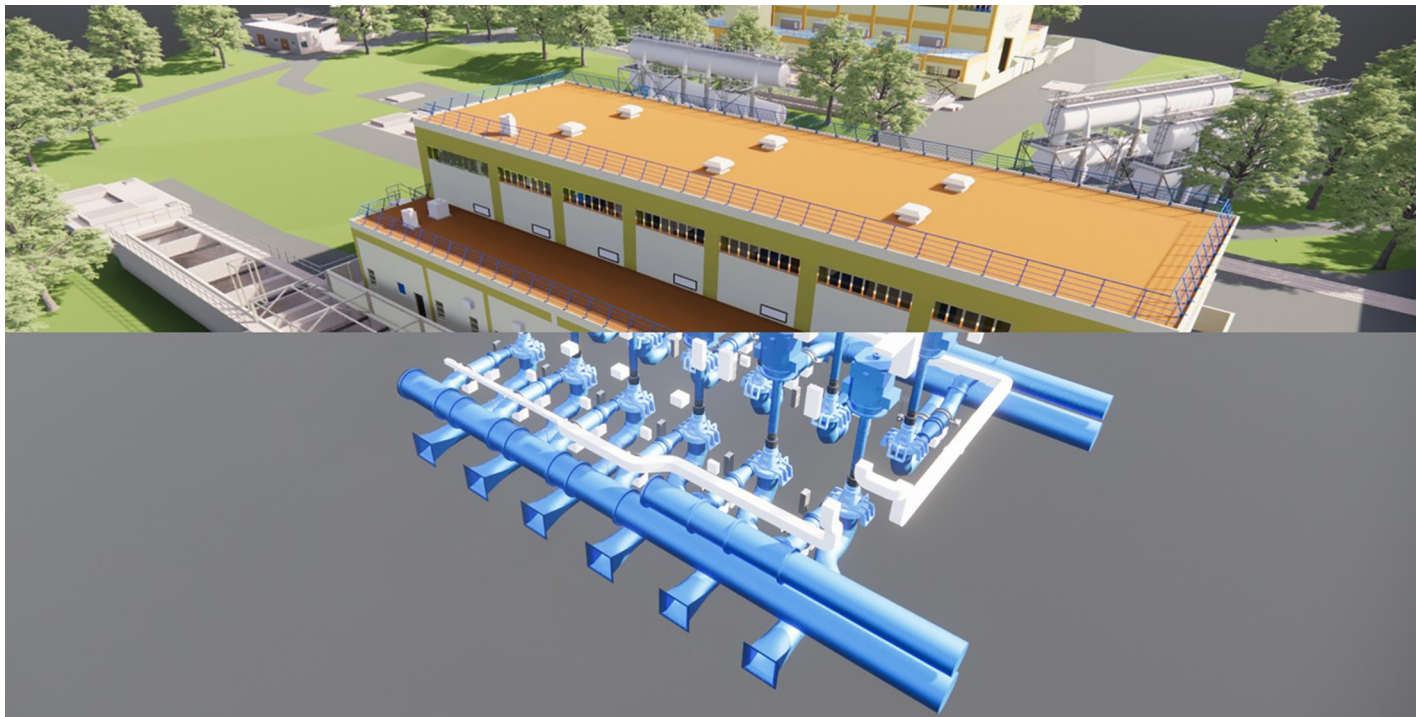
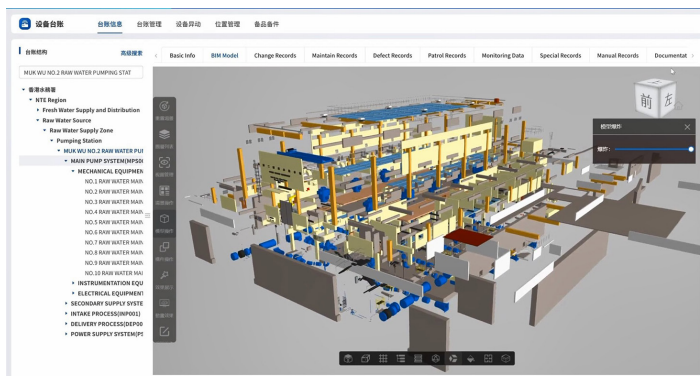


Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Asset Register at Muk Wu Pumping Station

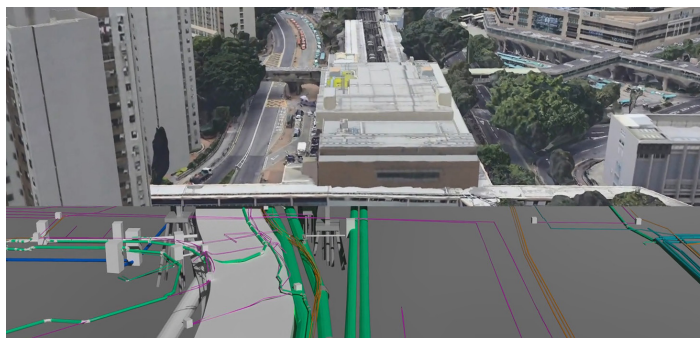


Adoption of BIM in AMIS for Asset Management

Exploded View of BIM Model in AMIS

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

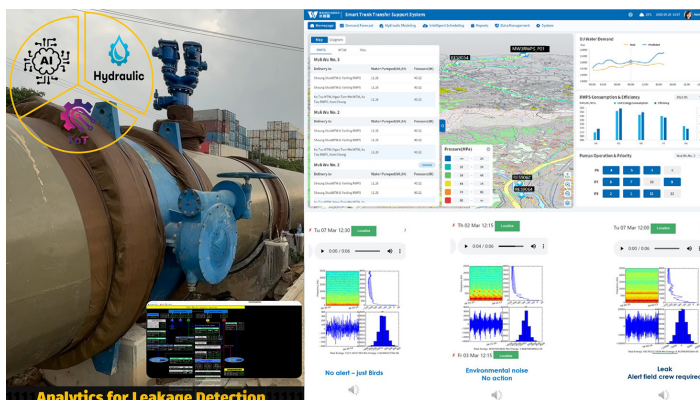
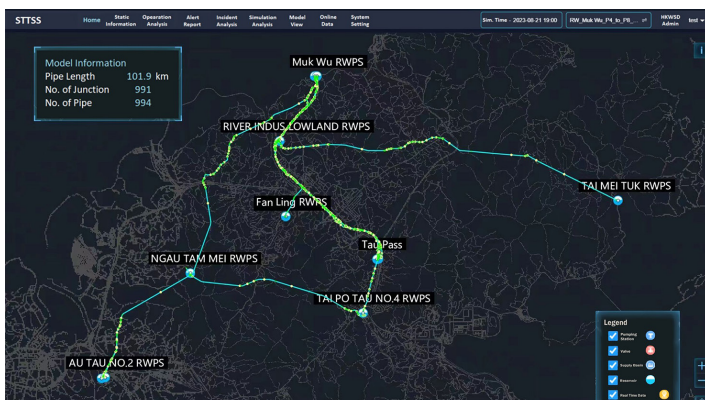


Integration of BIM with IoT for Sensors at Water Treatment Works

BIM Integration of 2D and 3D within AMIS and 3D Underground Utilities

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited



Adoption of GIS and Hydraulic for Dongjiang Water Mains in STSS

Analytics for AI Leakage Detection

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

Image Courtesy of Water Supplies Department, HKSAR Government and Ming Hing Waterworks Engineering Company Limited and Shenzhen Yuegang Technology Company Limited

