

COMPANY

Drainage Services Department,
HKSAR Government
Kwan Lee - Chun Wo Joint Venture
Blue BIM Limited

PROJECT

Sau Nga Road Stormwater Storage Scheme

LOCATION

Sau Nga Road Playground, Kwun Tong

TYPE

Urban Stormwater Storage Scheme / NEC3
Engineering and Construction Contract Option C, BIM

SCHEDULED TIME OF COMPLETION

2028

“DSD is always exploring new opportunities to expand our BIM applications. For this project, we’ve worked with Kwan Lee-Chun Wo Joint Venture and Blue BIM Limited to pioneer new BIM applications in streamlining interactive public outreach and engagement, and further promoting the mutual trust and collaborative spirit of New Engineering Contract. BIM has so far, allowed the project to proceed as scheduled with a friendly atmosphere between our project stakeholders.”

— Ben YT Ho

Engineer, Drainage Services Department,
HKSAR Government

AUTODESK PRODUCTS USED

Autodesk® 3ds Max®
Autodesk® AutoCAD®
Autodesk® Civil 3D®
Autodesk Construction Cloud®
Autodesk® Dynamo
Autodesk® Navisworks®
Autodesk® ReCap®
Autodesk® Revit®
Autodesk® Vault
COBie Extension for Revit
Model Checker for Revit

Spearheading Innovative BIM Applications in Urban Stormwater Storage Scheme

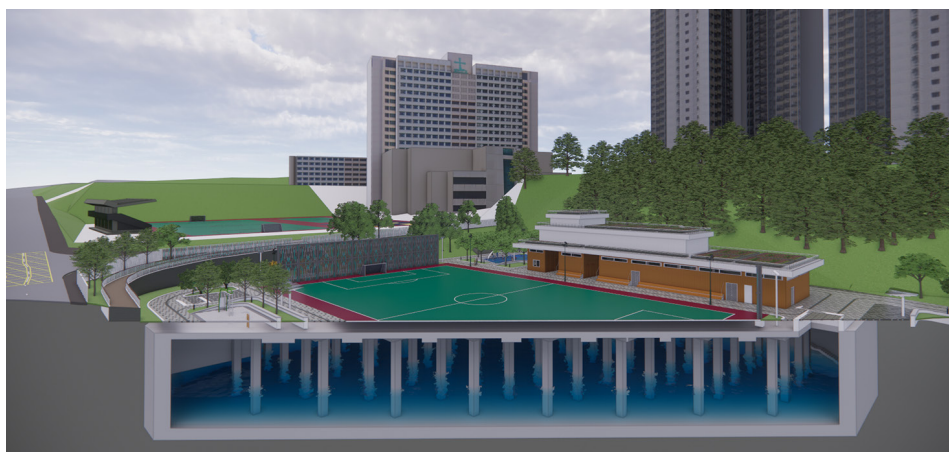


Overall View of the Sau Nga Road Stormwater Storage Scheme with Re-provisioned Sau Nga Road Playground
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

The Drainage Services Department (DSD) is responsible for providing world-class wastewater and stormwater drainage services, while enabling the sustainable development of Hong Kong. DSD continuously strived to upgrade Hong Kong’s climate resilience with acquired noticeable achievement. As part of DSD’s ongoing effort to combat climate change, DSD has commissioned the Kwun Tong Drainage Improvement Works, which include the design and construction of Sau Nga Road Stormwater Storage Scheme (SNRSSS). The SNRSSS is envisioned as an urban guardian angel, which will protect

downstream areas in Kwun Tong from 200-years rainfall event. It will be constructed underneath the existing Sau Nga Road Playground, which will be re-provisioned above the underground stormwater storage tank with renewed playground facilities for public co-use.

Once completed, the underground stormwater storage tank will have a storage capacity of 64,000 m³, equivalent to 25 standard swimming pools. Children playground, fitness area, soccer field, lavatory and changing room will be re-provisioned above the underground stormwater storage tank for public



Sau Nga Road Stormwater Storage Scheme will mitigate impact of 200 years rainfall event
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

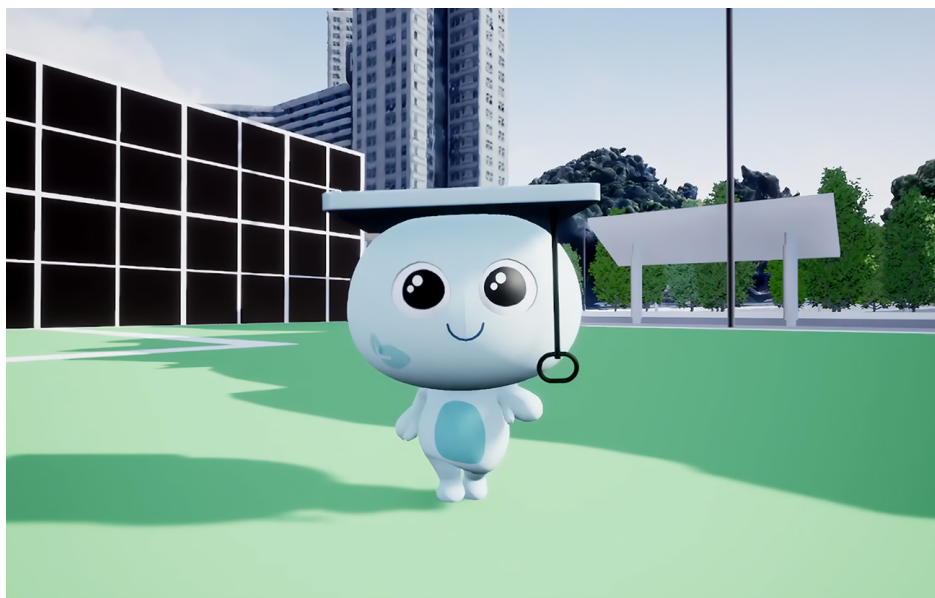


Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

entertainment.

DSD is fully aware that the project will be developed in a highly congested area with developed community; thus, DSD has deployed its in-house project team with Engineer and Technical Officers for BIM-based detailed design during the project's design stage, and subsequently employed Kwan Lee - Chun Wo Joint Venture and its BIM Consultant, Blue BIM Limited for BIM implementation during construction stage.

During design stage of the project, DSD's in-house project team utilized Autodesk Vault as the in-house Common Data Environment for its functionality in tracking design process and maintaining version control. Besides modelling the facilities, DSD has pioneered the implementation of BIM-based interactive virtual reality public engagement. DSD used Autodesk Revit for the base model of the facility, and Autodesk 3Ds Max for recreation of DSD's key opinion leader, Drainy; both of which are then exported for further processing in Unity. Coding in Unity allows users to immerse themselves in a virtual environment with Drainy as the users' avatar and navigate the proposed playground facilities through Android / Mobile and Windows / Desktop devices. This application was immensely useful for DSD's engagement with younger and elderly audience, and provided our designers with valuable feedback from the community.

Furthermore, DSD applied the wheelchair simulation function of Fuzor to evaluate accessibility of the proposed re-provisioning of Sau Nga Road Playground, so that the need of our disabled users will be properly addressed. DSD's design for inclusiveness and accessibility has consistently been met warmly from community users.

As part of the risk mitigation efforts, DSD has also presented the project to other government departments and the academic regarding the project's design and BIM applications to obtain their feedbacks. Their constructive suggestions have enabled development of Key Performance Indicators for this project's BIM applications.

During construction stage of the project with Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited, the project's BIM applications have been elevated to the next level. First and foremost, the construction team has fully embraced the project's New Engineering Contract's (NEC) spirit of mutual trust and cooperation, and elected to utilize BIM in preparation of its early warning matters and compensation events. The BIM models and simulations are regularly reviewed during early warning meetings to decide on actions to address early warnings; they are also utilized to evaluate the time and cost implications of compensation events and to substantiate quotations. A

revised 4D master programme model is submitted with any major revision to the programme.

Besides 4D master programme, our construction team has strengthened the project's safety and logistic aspects through method statement simulation and maintenance works simulation. They first included more disruptive site works, including demolition of existing spectator stand of football pitch. The works was not only visually intrusive; the transportation of and occupation by construction plants may also negatively impact the neighborhood, and thus our construction team meticulously simulated every step of the method statement for coordination with nearby residents and schools to facilitate a construction process with minimal impact to daily lives of nearby residents.

Additionally, our construction team has proactively consulted DSD's O&M team for brainstorming future maintenance procedure, including the required access, equipment and vehicles, to ensure that sufficient provisions have been incorporated for ease and safety of maintenance after completion and commissioning of the facilities.

Furthermore, our construction team has applied BIM for the design and

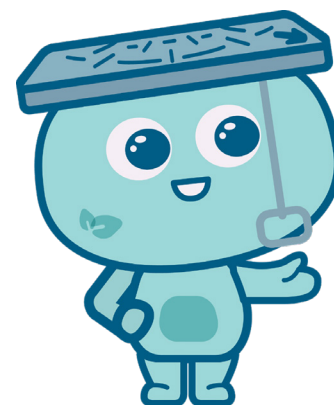


Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



Maintenance Simulation with Fuzor
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

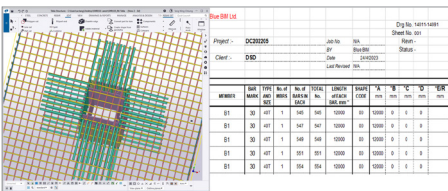


Early Warning Meeting with BIM
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

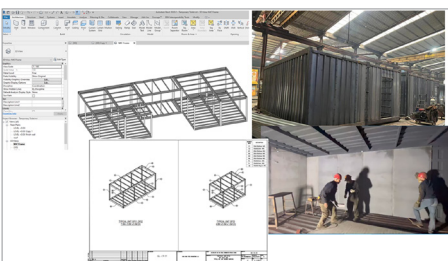
coordination of pre-fabrication modules. The modules are developed and validated through BIM to safeguard against on-site clashes, and then the design was issued to our off-site fabrication partner for module fabrication. The Modular-in-Construction module was then transported to site for installation, and greatly reduced amount of on-site works and enhanced construction productivity.

implementation has provided us with considerable return of investment in monetary and time consumption. DSD will continue to explore and develop other BIM applications in this project with our Contractor and BIM consultant, and the results will be documented in DSD's future BIM standards and shared with other works department and the academia.

Overall, the project's blossomy BIM



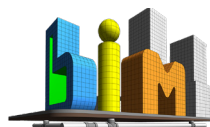
Rebar Design and Quantity Take-Off
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



BIM-developed MiC Module
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



CAVE Coordination Meeting
Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited



The public will be able to participate in soccer matches upon project completion
 Image Courtesy of Drainage Services Department, HKSAR Government and Kwan Lee - Chun Wo Joint Venture and Blue BIM Limited

About Drainage Services Department, HKSAR Government

The Drainage Services Department (DSD) is a department of the Hong Kong Special Administrative Region Government responsible for drainage and sewerage works. DSD's vision is to provide world-class wastewater and stormwater drainage services enabling the sustainable development of Hong Kong.

To enhance its service quality, DSD fully supports development of BIM in Hong Kong. DSD has so far published its own DSD BIM Modelling Manual (2nd edition) with a 3rd edition in the works, and has participated in the sharing of DSD BIM objects through CIC BIM portal. DSD has also established its own BIM team, office and CAVE meeting room at DSD headquarter.

About Kwan Lee - Chun Wo Joint Venture

Kwan Lee - Chun Wo Joint Venture (KL-CWJV) is principally engaged in the core construction and property development businesses with the professional capability to undertake large integrated construction projects. To facilitate the construction effectiveness and productivity and encourage the innovation application in construction industry, KL-CWJV deploys enormous resources in BIM development and has attained outstanding performance (e.g. Autodesk HK BIM Award) in various government projects.

About Blue BIM Limited

Blue BIM Limited is a local BIM consultancy firm that focus on providing BIM support to statutory bodies on infrastructure projects, and has closely worked with DSD, WSD, Housing Authority, MTR Corporation and others.

Blue BIM's services include but not limited to model development, 3D survey, BIM training, asset management software retail, product support and plug-in / add-on development.