Flood Modeller Pro

Case Study

Modelling urban flooding in Dubai, UAE, using Flood Modeller Pro's 2D ADI solver

In 2020, the Emirate of Dubai is hosting EXPO 2020, an international showcase of emerging technology and innovative ideas from around the world.

In addition to the construction of the EXPO facilities, the Emirate will construct an extension to their existing rapid transit rail system to ferry visitors to the EXPO facilities. This project is referred to as EXPOlink 2020, and CH2M is tasked with its delivery and commissioning before the opening of the EXPO.

Dubai is a dry desert country, with mean annual rainfall totals of 10 mm/year. It is also one of the fastest urbanising countries in the world, a trend which is expected to continue well into the future. Due to the dry environment, little attention has been paid to drainage infrastructure master planning in the past.

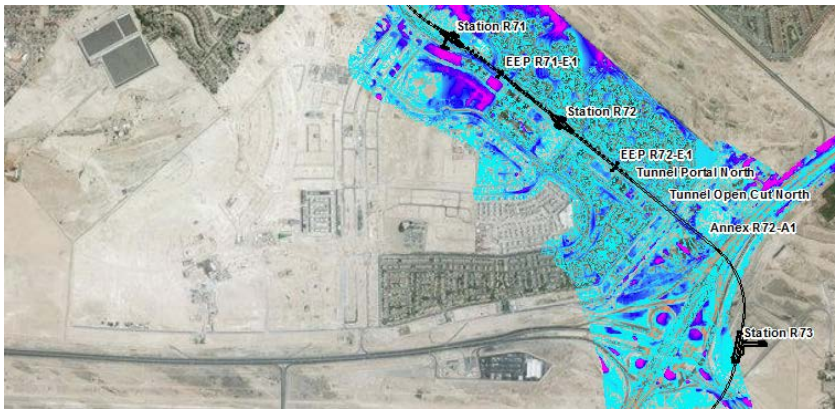
The combination of rapid development and a lack of drainage infrastructure has led to widespread urban flooding during the heavy rainfall in recent years. The Dubai Municipality requested that all design efforts for the EXPO facilities and EXPOlink 2020 incorporate projected flood levels to reduce the risk of damage to infrastructure assets and loss of human life.

A 2D hydraulic model was needed to perform the analysis for this project because of the complex flow patterns in the urban environment. The timeframe to complete the modelling for the project was short, and CH2M selected Flood Modeller Pro to execute a flood study for the EXPOlink 2020 project because the software offered a combination of features that were necessary for successful execution including:

- An advanced 2D solver (ADI) that accelerated the model calculations
- Rapid model development that integrates both hydrologic and hydraulic modelling
- Various graphical output options that allowed for easy presentation and sharing of the results

A topographical 3m grid surface was created from laser scanning survey data to create a detailed topographic surface for the project. The runoff calculations were performed using a combination of direct 2D runoff calculations on the surface, as well as 1D hydrology to calculation runoff from lateral drainage areas onto the surface. This approach compressed the timeframe for modelling while making the best use of the available data. The modelling included four hydrologic events (50- and 100-year events, 6-hour and 24-hour durations) as well as worst case scenarios for flooding resulting from pipe bursting (potable water, irrigation, cooling water, and sanitary forcemain).

Multiple simulations were run simultaneously on a cluster of 11 computers to obtain the final 2D depth and water surface elevation grids for the project. The Municipality were pleased with the results and have instructed that they be incorporated into the design of the stations along the proposed EXPOlink 2020 route.



Contact us

+44 (0)845 094 7990
softwaresales@ch2m.com
www.floodmodeller.com

ch2m.

Flood Modeller Pro is developed by CH2M, a global leader in consulting, design, design-build, operations and program management.