



# Using MicroStation to Enhance Infrastructure Projects

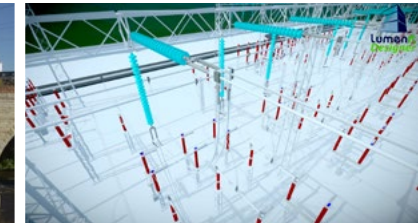
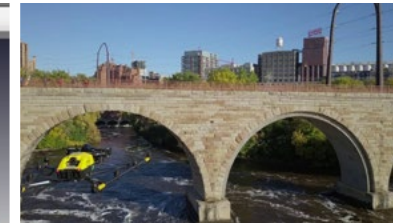
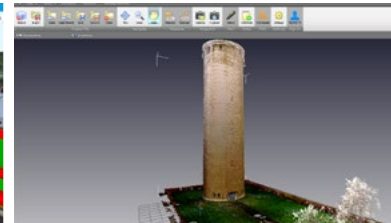
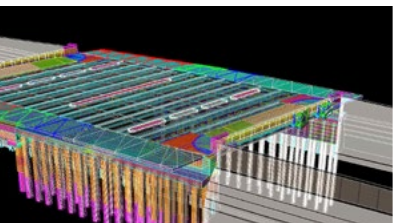
Selected User Projects from the 2021 YII Awards



**Thousands of designers, engineers, and drafters worldwide trust MicroStation** to produce high-quality deliverables on time and on budget, making it the CAD leader for infrastructure design projects.

**This showcase spotlights selected user projects that are using MicroStation, along with other Bentley products, to design, improve, and build better infrastructure across the globe.**

- East 138th Street over the Major Deegan Expressway – New York State Department of Transportation.....4
- Application of BIM in the Design of the Renovation Project of Century Avenue in Xixian New Area – CSCEC AECOM Consultants Co., Ltd.....6
- Transpennine Route Upgrade (TRU) – Network Rail + Jacobs .....8
- Using 3D Reality Mesh for Water Crack Detection – La Société Wallonne des Eaux ..... 10
- Stone Arch Bridge Rehabilitation - Collins Engineers, Inc.....12
- Digitization of Koh Kong 230/22kV Substation – PESTECH International Berhad..... 14





# BRIDGES





# East 138th Street over the Major Deegan Expressway

## New York State Department of Transportation

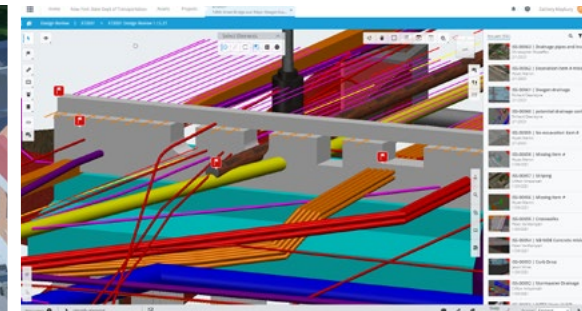
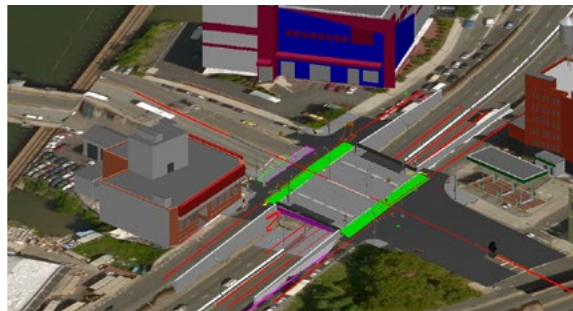
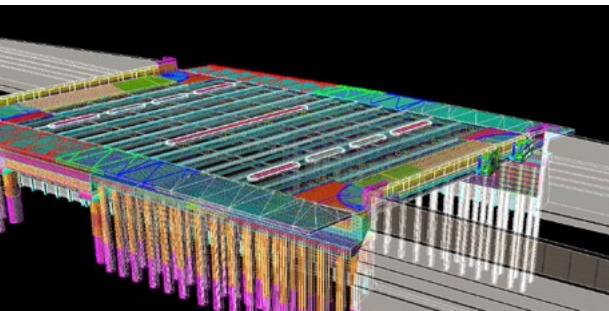
New York City, New York, United States

Originally built in 1938, the existing East 138th Street Bridge is being replaced to eliminate vertical clearance issues and optimize vehicle and pedestrian traffic demands. NYSDOT wanted to use a digital twin as the primary construction document. Located in a heavily congested area, the team needed to create the construction sequencing plan and accommodate existing utilities. They needed a hybrid modeling approach to generate a digital twin of the complex superstructure and pedestrian components.

Already familiar with Bentley applications, they used OpenBridge Modeler, OpenRoads Designer, and ProSteel to generate an accurate 3D model. iTwin Design Review provided a central platform for over 180 reviewers. Bentley's integrated technology helped identify and resolve costly issues prior to construction. SYNCHRO 4D facilitated visual, dynamic construction sequencing and traffic control planning for better project coordination. The digital twin is a tool for asset management and bridge inspection.

**Project Playbook:** MicroStation, OpenBridge Designer, OpenBridge Modeler, OpenRoads Designer, ProjectWise, ProSteel, ProStructures, SYNCHRO 4D

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# DIGITAL CITIES





# Application of BIM in the Design of the Renovation Project of Century Avenue in Xixian New Area

**CSCEC AECOM Consultants Co., Ltd.**

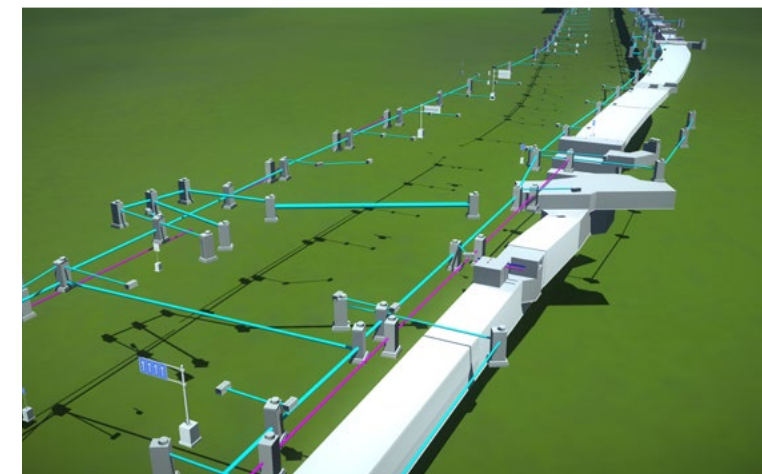
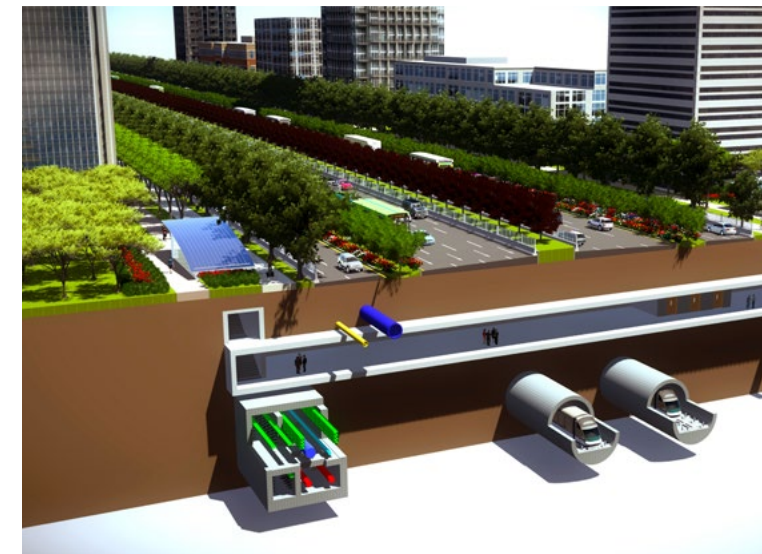
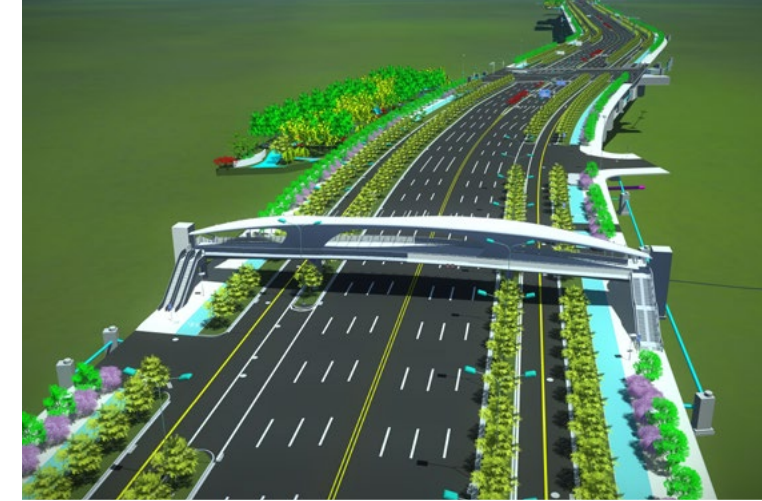
Xi'an, Shaanxi Province, China

The Century Avenue renovation project will improve the district's road network structure and traffic situation, while minimizing the disruption to citizens and businesses. Featuring underground space with subways, cross-street passages, and complex pipe corridors, the large-scale municipal project presented planning and coordination challenges that traditional 2D design could not accommodate. Faced with a short project schedule and multiple design disciplines, the team needed an integrated digital platform to implement collaborative BIM workflows for precise coordination of design and construction.

They selected ContextCapture to generate a reality model of the existing conditions, reducing on-site visits and shortening the design period by 28 days. OpenRoads Designer and OpenBuildings fully refined modeling of the pipeline and landscape, resolving clearance conflicts and reducing design changes by over 60%. Overall design efficiency improved by 15% to 20%, saving over CNY 10 million. The 3D model will be further updated to incorporate construction, operation, and maintenance data, forming a digital twin.

**Project Playbook:** ContextCapture, MicroStation, OpenBridge Designer, OpenBuildings, OpenRoads Designer

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# RAIL & TRANSIT

A high-speed train, likely a Shinkansen, is shown in motion, traveling through a tunnel or a station. The train is white and sleek, with a rounded nose. The background is heavily blurred, creating a sense of speed and movement. The overall color scheme is a deep blue, with the train's white body providing a strong contrast. The text "RAIL & TRANSIT" is overlaid in the top left corner in a bold, white, sans-serif font.



# Transpennine Route Upgrade (TRU)

## Network Rail + Jacobs

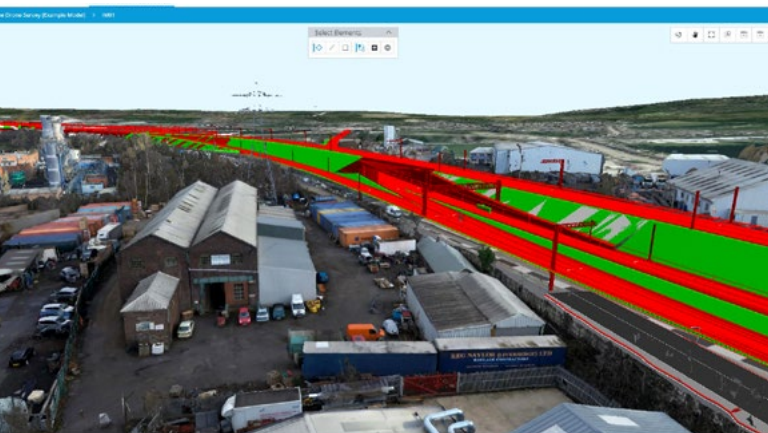
Manchester/ Leeds/ York, United Kingdom

The Transpennine Route Upgrade (TRU) is a GBP multibillion railway enhancement program to double capacity, reduce carbon emissions, and cut journey times on commuter routes between Manchester, Leeds, and York. When completed, the 100-kilometer route upgrade will improve connectivity and provide economic benefits to the North of England. To bring together the large volume of data and disciplines involved, Network Rail tasked Jacobs with implementing a route-wide digital twin.

Realizing paper-based processes and Excel spreadsheets introduced unnecessary risk and inefficiency across the team, Jacobs used the Bentley iTwin platform with ProjectWise, ContextCapture, and other integrated applications. Using the digital twin meant over 1,300 staff could track, contribute, and analyze design data and asset information in real time. Improved access saved the team 20,000 hours in the first six months, worth an estimated GBP 1 million. Overall, the digital twin will save approximately GBP 15 million.

**Project Playbook:** ContextCapture, iTwin.js, iTwin Design Insights, iTwin Design Review, iTwin Design Validation, iTwin Platform, MicroStation, OpenBuildings Designer, OpenRail Designer, ProjectWise

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# REALITY MODELING





# Using 3D Reality Mesh for Water Crack Detection

## La Société Wallonne des Eaux

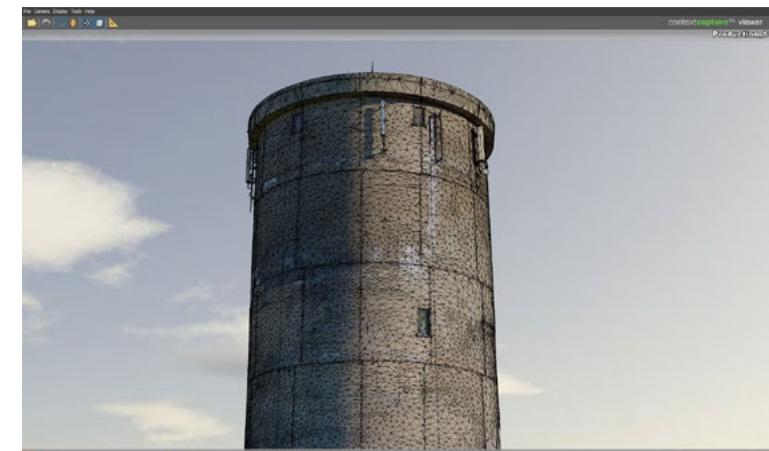
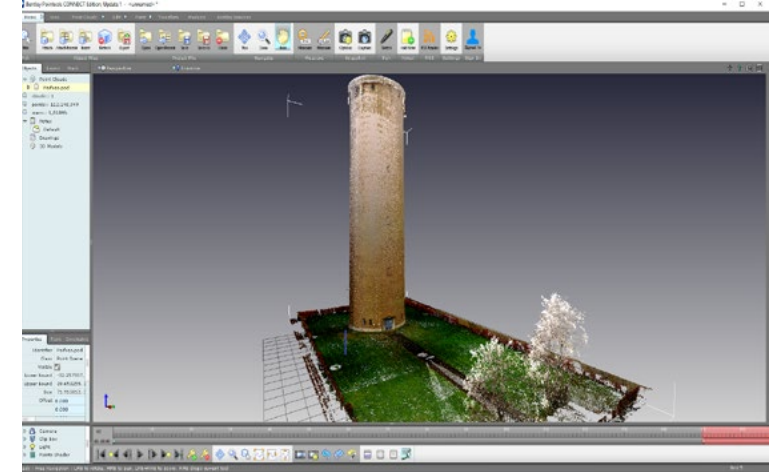
Juprelle, Liège, Belgium

Regional water corporation Société Wallonne des Eaux owns and operates a 50-meter-high water tower in Juprelle, Belgium, with a storage capacity of 500 cubic meters. Previous surveys revealed damage, so they took ground photos to define the renovation works but missed the most significant damage. To refine their methods and obtain a more insightful assessment of the water tower's condition they needed to apply photogrammetry, machine learning, and 3D modeling technology.

They selected ContextCapture Insights to process over 3,000 images and generate a digital twin of the tower to visualize the entire structure and assess the damage. Using machine learning on the digital twin, they automated the accurate identification and quantification of the size of the cracks and determined the optimal corrective actions. The digital process reduced survey and modeling time and reduced costs. The digital twin could be completed in one day, enabling a quick assessment and remediation plan to ensure a reliable water supply.

**Project Playbook:** ContextCapture, ContextCapture Insights, MicroStation, Pointools

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# ROAD AND RAIL ASSET PERFORMANCE





# Stone Arch Bridge Rehabilitation

## Collins Engineers, Inc.

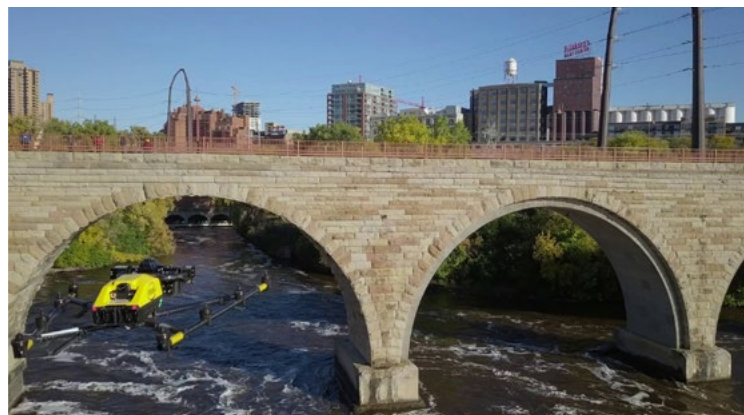
Minneapolis, Minnesota, United States

Collins Engineers was tasked with inspecting and designing the rehabilitation of the iconic Stone Arch Bridge in Minneapolis, ensuring that it remains a valuable asset. With its age and size, they faced challenges when developing repair plans that traditional data collection could not accommodate. They used reality modeling previously, but it lacked the quality required for inspecting and modeling complex structures. To collect sufficient data and accurately model the bridge, they needed an integrated survey, modeling, and inspection solution.

Collins Engineers selected ContextCapture to generate a high-fidelity 3D model from over 13,000 images, improving quantity and quality of data. Using iTwin applications facilitated real-time model access, saving 20% of field time. The solution is expected to save 10% to 15% in construction costs due to improved project and bid data. They will use digital twins throughout the bridge's lifecycle for future planning and maintenance decisions.

**Project Playbook:** AssetWise Inspections, AssetWise Digital Twin Services, ContextCapture, ContextCapture Insights, iTwin Immersive Asset Service, MicroStation, ProjectWise

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# UTILITIES & COMMUNICATIONS





# Digitization of Koh Kong 230/22kV Substation

## PESTECH International Berhad

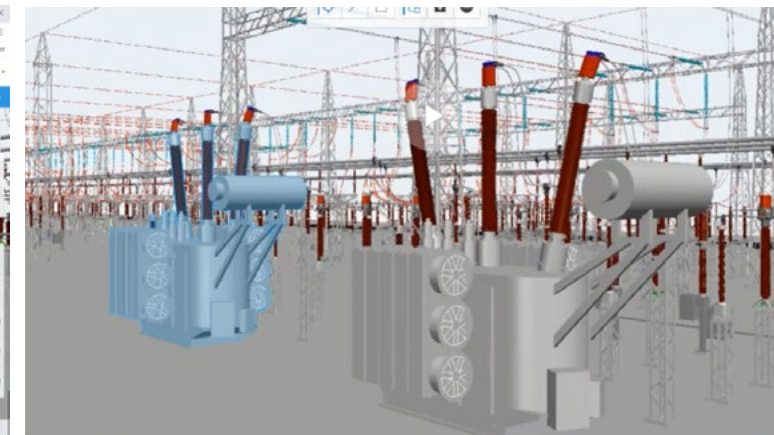
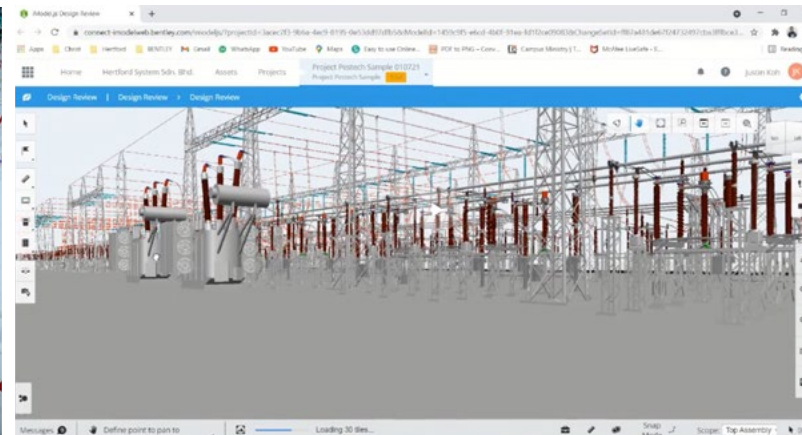
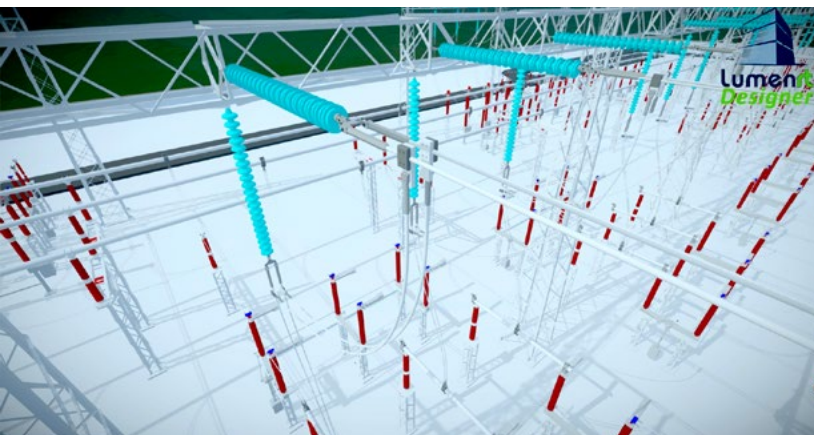
Koh Kong, Cambodia

Located along the border of Thailand and Cambodia, the 230-kilovolt Koh Kong substation will provide essential power to 11 rural villages, strengthening the reliability of Cambodia's grid. PESTECH was awarded the construction and installation contract and faced site constraints along with a tight timeline and budget. Manual substation design methods were time-consuming and error-prone, so they needed integrated intelligent modeling technology in a connected data environment.

They selected OpenUtilities and OpenBuildings to model the entire substation, including equipment and buildings, addressing its entire lifecycle. ProjectWise provided the collaborative design platform. They could automatically extract materials and construction deliverables, eliminating manual errors and increasing design quality. Maximizing design automation through digital modeling accelerated design time by 50%, while coordinated design and clash detection reduced design changes by 60%. Bentley's integrated smart technology solution allows utilities to keep pace with refurbishment requirements and reduce regulatory compliance risks.

**Project Playbook:** Bentley Raceway and Cable Management, iTwin, iTwin.js, LumenRT, MicroStation, Navigator, OpenBuildings, OpenRoads, OpenUtilities, SYNCHRO 4D

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