Parsons Brinckerhoff

Customer Success Story

Client:
San Francisco County Transportation Authority

AutoCAD® Civil 3D®
Autodesk® Navisworks®
Autodesk® 3ds Max® Design

Using BIM-based 3D and 4D models to more clearly and accurately present this project has been vital for achieving consensus and obtaining approvals.

—Brady Nadell
Virtual Design and Construction Manager
Parsons Brinckerhoff

Visualizing Future Transportation

Parsons Brinckerhoff uses Autodesk BIM solutions for virtual road design and construction in San Francisco.

Rendering of San Francisco's new Presidio Parkway. Courtesy of Parsons Brinckerhoff.

The Firm
Parsons Brinckerhoff (PB) provides engineering, strategic consulting, planning, and program/construction management services for infrastructure projects around the world. PB has been highly involved in building information modeling (BIM) since its inception and uses many Autodesk BIM solutions to support its civil engineering and visualization services, including AutoCAD® Civil 3D® software, Autodesk® Navisworks® software, and Autodesk® 3ds Max® Design software.

The Challenge
One of PB's current infrastructure projects, funded by the San Francisco County Transportation Authority, is the new $1.045-billion Presidio Parkway in San Francisco, California. The roadway will replace Doyle Drive, a 1.5-mile road that runs from San Francisco's Marina District through the Presidio to the southern access of the Golden Gate Bridge. Built in 1936, the existing Doyle Drive has reached its useful lifespan and is being replaced.

Project construction will cause ramp closures and traffic detours for several years, attracting the scrutiny of public officials and community groups. In addition, since the Presidio is part of the National Park system and a National Historic Landmark, the project is inherently highly sensitive. The California Department of Transportation (Caltrans) is developing the roadway and bridge structures designs, while a joint venture between PB and Arup is developing the tunnel designs and is responsible for architectural design. This joint venture was also responsible for environmental clearance, development of preferred project alternatives, and public outreach.

The Solution
"By using Autodesk BIM solutions, we were able to construct this project virtually, before it was built in the real world," explains PB's Brady Nadell, virtual design and construction (VDC) manager. PB used Civil 3D software to create a virtual model of the infrastructure project and Navisworks software for construction planning. PB also used 3ds Max Design software to create model-based visualizations of the project. This solution enabled the design team to analyze early-stage design alternatives, evaluate construction plans, and more clearly communicate the design proposals to public constituencies—helping to speed the approval process and allay public concerns about the project.

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Parsons Brinckerhoff relies on Autodesk BIM solutions for construction planning and simulation.

Aggregate Design Data
To create a virtual project model, PB imported the Caltrans roadway design data into Civil 3D model-based software. Once PB had aggregated the design data in a Civil 3D model, the team used the 3D DWG format to more seamlessly transfer this infrastructure model to 3ds Max Design, software for design visualization. PB was then able to use the modeling features of 3ds Max Design software to enhance the existing design information, adding surrounding city features and landscape details to create near photorealistic visualizations and animations. "We also transferred the Civil 3D model to Navisworks and developed a 4D project model that integrates the 3D virtual model and the construction schedule," explains Nadell. "And we have started to link cost information to our 4D model, creating a 5D model for cost estimating."

Present and Evaluate Design Options
"Our BIM-based designs, visualizations, and construction simulations helped give the whole design team the ability to view and analyze early design alternatives," says Nadell. For example, PB created visualizations to study architectural elements—such as retaining walls, signage, and landscaping at tunnel portals—and generated 3D drive-through animations to evaluate and compare various lighting alternative designs in both day and night views. In addition, PB used Navisworks software for interactive review sessions with the extended design team.

Increase Public Outreach
With construction underway, the Presidio Parkway project remains sensitive due to its location, cost, and multiyear impact on Bay Area travelers and citizens. "To support public outreach efforts, we have produced almost 40 photo simulations and five animations to help illustrate construction impacts on the surrounding environment," reports Nadell. The photo simulations offer a visual depiction of impacts in key areas along the roadway and the tradeoffs required to implement each design. PB also produced several aerial animations to illustrate the overall project area.

The Result
"Using BIM-based 3D and 4D models to more clearly and accurately present this project has been vital for achieving consensus and obtaining approvals," says Nadell. "And as the project moves forward, we continue to rely on Autodesk BIM solutions for design, collaboration, and visualization—as well as construction planning and simulation." The combination of AutoCAD Civil 3D, Autodesk Navisworks, and Autodesk 3ds Max Design software is helping PB and the Presidio Parkway project stakeholders better understand how the design will perform, assess its impact on the surrounding area, and virtually identify and resolve issues before they become costly mistakes.

Aerial view of Presidio Parkway. Courtesy of Parsons Brinckerhoff.

For more information, visit:
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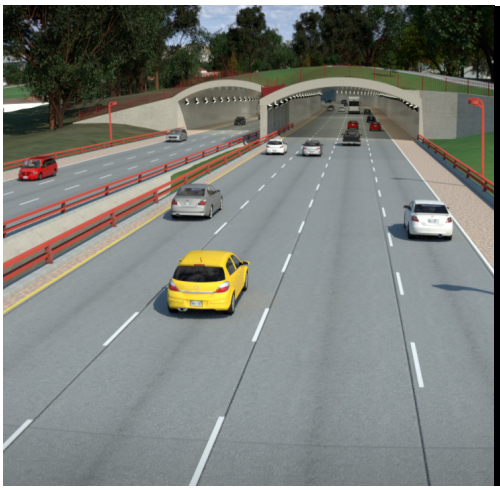

Rendering of tunnel entrance. Courtesy of Parsons Brinckerhoff.

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