



## Project Summary

### Organization:

Mott MacDonald and the Costain, VINCI Construction Grands Projets, Bachy Soletanche Joint Venture

### Solution:

Project Delivery

### Location:

London, England, United Kingdom

### Project Objective:

- Accelerate project delivery by applying new technologies and practices.
- Improve collaboration, create a connected data environment, and leverage model-based delivery to complete the project two years early.

### Products used:

ProjectWise, AECOSim Building Designer, LumenRT, Pointtools, ContextCapture, Navigator, MicroStation®, STAAD®

## Fast Facts

- Automated iModel production saved 22.5 hours per week on design production.
- The client accepted 76 percent of packages the first time due to improved collaboration and program assurance.
- ProjectWise CONNECT Edition saved 80 percent on information delivery time, reducing it from five days to one.

## ROI

- Model-based delivery reduced design delivery time by six months.
- Mott MacDonald saved 32 percent in design production time savings through Bentley's BIM advancements.
- By digitally accelerating project delivery practice, Thames Tideway East project benefits can be repeated on other major projects.

# Mott MacDonald Accelerates Project Delivery on East Tideway Tunnel Project

Bentley's ProjectWise® CONNECT Edition Helps Reduce Design Time By 32 Percent for the Complex Design

## Accelerating Project Delivery

Seeking to accelerate the delivery of projects in the digital environment, the GBP 4 million Thames Tideway East (Tideway) project successfully applied new technologies and practices to complete the largest infrastructure project ever undertaken by the UK water industry.

The Tideway project faced many challenges, including dispersed teams throughout Europe, different disciplines utilizing a wide array of software, the management of vast amounts of data, and the need for fast information delivery and real-time updates. Collaboration was a vital component for this design and build project because 12 design disciplines were participating, as well as many supply chain companies and stakeholders. Also, Tideway Chief Executive Andy Mitchell challenged the project contracting teams to deliver the project two years ahead of schedule.

The Mott MacDonald project team met these challenges by implementing a connected data environment with ProjectWise CONNECT Edition, thereby reducing the deliverables, managing large collections of information, improving design workflows, and limiting rework. By creating a connected data environment, improving collaboration, and adopting model-based delivery, the project team advanced industry practice so that future projects could achieve similar outcomes.

## Cleaning Up the Thames

London's antiquated Victorian sewers are overflowing into the River Thames, causing pollution and water contamination. The city determined that it needed a newly designed and constructed sewerage tunnel system to reduce sewage overflows and boost the river's water quality.

As the lead designer for the project, Mott MacDonald was contracted to design and build a new, modernized sewerage system for the east portion of the project, involving approximately 10 kilometers of tunnel works located 70 meters beneath central London and six shaft sites. The joint venture project between Costain, Vinci Construction Grands Projets, and Bachy Soletanche is expected to be completed in seven years.

## Creating a Connected Data Environment

The project team created a connected data environment (CDE) enabled by ProjectWise, linking it to other enterprise systems, including the cost reporting mechanism, design program, and task information delivery plan. This connection produced digital workflows and automatic reporting, allowing all team members to look forward to predicted deliveries and backward at past ones. It also eliminated separate conversations about project status. By training a few people in different locations, called information champions, team members could get answers without ringing an office in another country. Finally, it allowed for automated earned value analyses and an intelligent risk management dashboard powered by Microsoft Power BI, so team members could focus on resolving issues rather than finding them.

ProjectWise accelerated collaboration across the 12 design disciplines during the development phase of the tunnel by facilitating information sharing. ProjectWise was used to store all project information, not just drawings and models, but also reports, specifications, calculations, and meeting minutes. The controlled structured environment enabled information to be found quickly and easily. The software allowed users to create, modify, and store thousands of deliverables in one location, creating a single source of truth accessible to dispersed users from organizations across Europe. It gave control to package managers and design teams by providing clarity of the project's status in the workflow. It also provided assurance for the clients, who know that the project was checked and approved by the appropriate people. All these capabilities significantly reduced design time.

## Providing Consistent Collaboration

With team members in various locations and diverse design principals, Mott MacDonald needed to control the information accessed by the team. The most recently approved information from all disciplines was formulated into a single, coordinated 3D model and shared through the CDE. It provided control and the ability to easily clarify project information statuses. The project team also used the CDE to set up

*“ProjectWise enabled the project to achieve control and clarity in our design delivery, and ultimately deliver a better-quality product to our client.”*

*– Michael Gaunt,  
BIM Manager,  
Mott MacDonald*

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weekly BIM Wednesdays meetings, where members of the project teams participated and reviewed work throughout the design phase. The project team used Bentley’s Navigator to create markups with full audit trail, identifying and resolving issues through collaboration. A total of 170 meetings were held with over 1,500 attendees from across the continent, including the client. The meetings provided Mott MacDonald with progressive assurance and, with the client’s direct involvement, workflows became more streamlined with 76 percent of packages accepted the first time. The constant communication and flexibility of collaborating via ProjectWise reduced rework, cost, and travel time, while also providing control and clarity of all information.

### **Streamlining the Design Process with Model-based Delivery**

Traditional project deliverables are 2D drawings, meaning 3D design models must be converted through a costly and time-consuming process, only to become out of date almost immediately. Mott MacDonald removed this entire production process by adopting a model-based delivery, saving significant time and improving productivity. Instead, AECOsim Building Designer and MicroStation were used to create federated iModels. As a result, the client could receive top quality design models earlier than expected. The models included dynamic views that provided a traditional 2D view and contained an easily navigable, data-rich 3D model—providing all the information to the client in one iModel. This modeling process improved the quality of the deliverables and bolstered efficiency by 32 percent across all sites, which is equivalent to removing 350 2D drawings from the first two design gates. Also, digital approvals of all documents, reports, and drawings throughout the workflow saved CAD time and a large amount of money throughout the project.

### **Controlling and Expediting Critical Document Workflows**

To control the flow of information, the project team leveraged ProjectWise Deliverables Management. ProjectWise CONNECT Edition includes an integrated set of cloud services for digital collaboration across the project ecosystem. As one of these services, ProjectWise Deliverables Management helps save time and mitigate risk by automating, integrating, and codifying the processes for transmittals, submittals, and RFIs. Deliverables Management replaced email and spreadsheet tracking systems, reducing the time for sending the CAT III checkers packages from a morning to an hour. The service also managed exchange histories in one place, providing greater transparency.

### **Achieving Significant Outcomes**

The achieved outcomes can be divided into two categories: technology savings and improved collaboration. For the technology savings outcomes, Mott MacDonald delivered documents 80 percent faster with ProjectWise than on similar past projects. Engineers could quickly sift through information in ProjectWise. What used to take days to deliver to the client would now happen instantly. This fast-paced environment and model-based delivery reduced the design time by 22.5 hours per week, reducing it by a total of six months. These outcomes have saved the team GBP 20,000 so far.

The most important outcome from improved collaboration is the improved communication between the project team and the client. About 960 documents were shared informally with the client, allowing the team to resolve any issues earlier and faster, saving time and money. Also, there was a high level of engagement between the client and design team, with an average of 5.2 clients attending the weekly meetings. This engagement directly correlates with the time for client approval, which was less than five days, and shows how collaboration can streamline digital workflows. Finally, the project team stored 40 revisions of composite models created from the meetings in ProjectWise. These models were easily accessible to all parties and included audit trails, which allows viewers to see how the design is progressing and understand where changes occurred.

### **Advancing Future Projects**

With a digital project delivery approach, enabled by ProjectWise, Mott MacDonald delivered a better-quality product to the client ahead of schedule by way of digital collaboration, model-based delivery, and a connected data environment. Now, the company has adopted a fully digital platform and uses a connected data environment on all major projects to attain similar benefits, such as projects for HS2 and Crossrail, and the Heathrow expansion project.



*Mott Macdonald used ProjectWise’s connected data environment to share a single, coordinated 3D model to improve efficiency.*