



Be Inspired Awards
2012 Finalist

Project Summary

Organization:

Fluor/HDR Global Design Consultants

Solution:

Rail and Transit

Location:

Denver, CO

Project Objective:

- Ease commuter congestion in and out of Denver by creating three new commuter rail lines, a maintenance facility, and 14 new stations
- Complete project in 15 months under a public-private partnership concession agreement
- Manage a core design team of 210 people and 300 auxiliary staff in 34 HDR offices, plus and 43 sub-consultants in offices across the United States, Europe, and Japan

Products used:

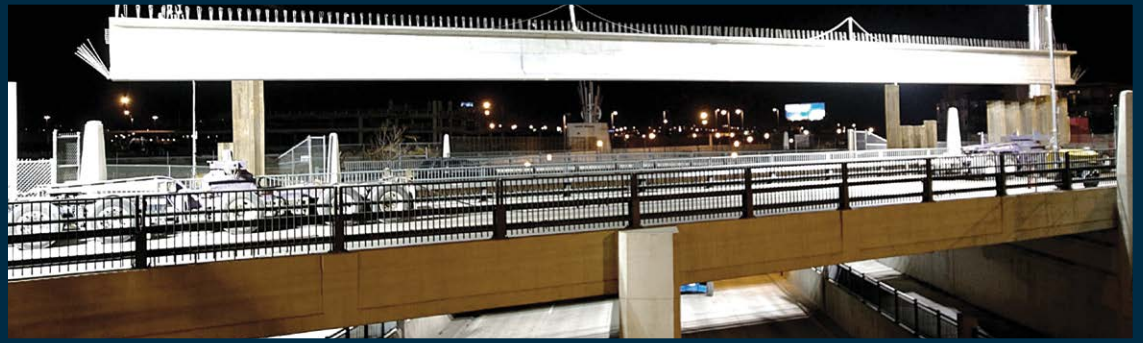
Bentley Descartes
InRoads
MicroStation
LEAP CONSPAN
ProjectWise

Fast Facts

- \$2.1 billion project to ease traffic congestion in the Denver area
- Ease commuter congestion in and out of Denver by creating three new commuter rail lines, a maintenance facility, 13 new stations, and a direct link to Denver International Airport
- Designed the largest P3 mass transit project in the U.S. on an aggressive 15-month schedule
- Leveraged ProjectWise as the document management and collaboration solution to reduce costs and ensure consistent, compliant design files

ROI

- Saved \$3 million in travel and relocation costs by using ProjectWise to enable remote workers
- Increased efficiency by enabling designers to instantly locate files and work on them simultaneously
- Saved hundreds of hours of CAD management and production by using ProjectWise managed workspaces



Fluor/HDR Global Design Consultants Leverage Bentley's ProjectWise to Complete Large-scale Mass Transit Project

ProjectWise Enables Real-time Collaboration Across 43 Teaming Partners, While Saving Hundreds of Hours of CAD Management Time and \$3 Million in Travel Costs

In November 2004, voters within the Denver Regional Transportation District (RTD) approved the FasTracks initiative, which once completed, will expand and improve public transit service to the Denver metropolitan area over a 12-year period. This initiative will ease congestion by adding 122 miles of new commuter and light rail line, 18 miles of bus rapid transit service, 21,000 new parking spaces at rail and bus stations, and enhanced bus and rail connections.

"The RTD selected Denver Transit Partners (DTP), a partnership of Fluor Enterprises, Inc., John Laing plc, and Lloyds Banking Group, to construct and operate the RTD FasTracks Eagle P3 Project – a key component of the FasTracks initiative valued at US \$2.1 billion," explained John Quintero, Professional Associate HDR, Inc. "This project included the design and construction of three new commuter rail lines in and out of Denver Union Station, a maintenance facility, and 13 new stations. Highlighting this project is the 23-mile East Corridor connecting downtown Denver to Denver International Airport, the fifth busiest airport in the United States and the 10th largest in the world.

"To ensure a successful project, Fluor/HDR Global Design Consultants, the subsidiary that headed up the Eagle P3 design team, deployed Bentley software so that we could collaborate globally with each other and with other project partners to meet an aggressive deadline."

Managing a Complex Project Involving Multiple International Firms

The RTD FasTracks Eagle P3 Project had to be delivered and operated under a public-private partnership concession agreement between RTD and DTP. This agreement required DTP to design-build-finance-operate-maintain the Eagle P3 (public-private partnership) project under a single contract. "The P3 approach transfers risk to the private sector, away from taxpayers, and spreads out costs of the project over approximately 30 years," explained Quintero. "It also means that we had to get all of our teaming partners working together in harmony to create the same type of design and presentation – which is no small task. This required a

commitment to tight project integration; innovation; and streamlined project development, engineering, construction, operation and maintenance to reduce lifecycle costs."

DTP faced the challenge of assembling and integrating a core design team of 210 professionals supported by 300 auxiliary team members located in 34 different HDR offices and 43 subconsultants scattered across offices in the United States, Europe, and Japan. "This extended team needed to work efficiently, as we were under contract to take conceptual design documents to completion within an aggressive 15-month project delivery schedule," explained Quintero. "To assemble and operationalize a design team for a project of this scope, we needed a document management system that could support large scale, real-time collaboration across a distributed team."



Eagle P3 project map showing the 23-mile East Corridor

Evaluating and Deploying the Right Solutions

After evaluating various options, Fluor/HDR Global Design Consultants selected ProjectWise as its document management and collaboration solution. "ProjectWise enabled us to create a virtual team by facilitating real-time collaboration among team members and providing a controlled, secure access to project files to help ensure data accuracy," explained Quintero. In addition to using ProjectWise, the entire Eagle P3 project team standardized on other Bentley products including MicroStation and InRoads,

"We consider this project to be a model example of how a large, distributed team can work together in a collaborative environment using Bentley products. We did so – and successfully designed and implemented the largest P3 mass transit project in the United States despite an aggressive 15-month design schedule."

*– John Quintero,
Professional Associate,
HDR Inc.*

Find out about Bentley at: www.bentley.com

Contact Bentley
1-800-BENTLEY (1-800-236-8539)
Outside the US +1 610-458-5000

Global Office Listings
www.bentley.com/contact

which they used to create the final deliverables submitted to RTD. Some designers had never used Bentley software before or weren't familiar with the newest versions of these products. So to encourage adoption, Fluor/HDR CAD managers provided project-specific training and mentoring to all team members, including teaming partners.

The Fluor/HDR design team saved hundreds of CAD management hours by centrally deploying and updating the Eagle P3 MicroStation workspace. Instead of configuring and managing a local MicroStation workspace in 77 remote office locations, the IT department deployed a client/project-specific MicroStation workspace to each team member using a ProjectWise managed workspace. "This workspace included project-specific items such as Level/Dimension/Text/DGNLIBS, plot drivers, line styles, title block integration, and other design tools," Quintero explained. "We were able to push this preconfigured MicroStation workspace to 77 different site locations – and give the Eagle P3 design team all of the tools they needed to increase productivity, improve quality, and collaborate easily." This deployment approach not only enabled people to work remotely, as needed, but it also gave users quicker access to design documents and minimized new user setup time.

Facilitating Efficient Collaboration

To facilitate collaboration between RTD and DTP, HDR established an office in Denver and asked 150 of the 210 core project members to relocate to this location for 15 months. The remaining 65 core team members worked remotely and collaboratively through the virtual workspaces enabled by ProjectWise. "We avoided the cost of airfare, per diems, housing, and extra office space associated with relocating these 65 design team members to the Denver Eagle P3 design office, which saved us over \$3 million," added Quintero. "Plus, remote workers could put in long hours on the project and still return home to their families at night, which they really appreciated."

Managed workspaces also enabled the Eagle P3 design team to control the presentation and format of all design files, minimizing inconsistencies among teaming partners and design disciplines. To enable this, a set of configuration blocks with predefined configuration variables from a central data location, managed in ProjectWise, was downloaded to each teaming partner's workstation. Upon opening a drawing file, these configuration variables and associated files from the central ProjectWise data location were used to create the MicroStation Workspace for the selected drawing file. "This allowed us and our teaming partners to work in unison, as each designer received the same customized Fluor/HDR Eagle P3 workspace that incorporated many basic and advanced features of MicroStation V8i," stated Quintero. "ProjectWise truly allowed the Eagle P3 design team of Fluor/HDR Global Design Consultants and 38 additional teaming partners to work as a single entity."

Realizing the Benefits of Integrated Workflows and a Single Data Source

With all teaming partners connected through ProjectWise, everyone had a trusted, complete, centralized source of live data that could be used to communicate design and construction changes across the design team in real-time.

This helped reduce design errors and omissions due to outdated or missing information. And teaming partners could now reference data in real-time to create the 64,000 CAD files that were necessary to complete the project.

In addition, ProjectWise allowed the Eagle P3 design team to search, locate, and authenticate design information using powerful search tools within ProjectWise. These tools, such as full text search, would prove invaluable for locating any of the over 230,700 documents within the nearly 29,000 project folders. "The search features saved our design team countless hours of searching for documents," explained Quintero. "We also used ProjectWise to coordinate QA/QC reviews of documents and submittals to various permitting agencies located throughout the Eagle P3 Project corridor. Our collaborative ProjectWise environment allowed for quick responses to comments from DTP, RTD, and other governmental agencies."

Improving Design Consistency and Compliance with Streamlined Workflows

Using centrally managed workspaces also enabled the Fluor/HDR design team to achieve a consistent presentation and format of all design files, as well as minimize inconsistencies between teaming partners and expedite the permitting and submittal process. Compliance with standards was very important to both RTD and the different permitting agencies and cities that needed to provide approvals," explained Quintero. "Bentley software helped us achieve this by supporting CAD management with nested reference models."

Fluor/HDR incorporated the use of nested reference files for the creation of all discipline sheet files. This workflow required the creation of one master base file that contains all the required reference backgrounds. This workflow allowed the Eagle P3 design team to control the presentation of design information from a single source document rather than having to open each sheet file of a 36-mile corridor to add a reference background file or adjust the level symbology or display. Countless hours were saved by instituting this type of workflow as opposed to creating sheet files containing non-nested reference files.

Meeting an Aggressive Deadline with a Quality Design

"We consider this project to be a model example of how a large, distributed team can work together in a collaborative environment using Bentley products," stated Quintero. "We did so – and successfully designed and implemented the largest P3 mass transit project in the United States despite an aggressive 15-month design schedule. By providing the right Bentley tools, hands-on training, project-specific workflows, and continual technical support to all teaming partners, we increased productivity, improved quality, and overcame human and technical challenges associated with integrating a seamless design team."