



3D Models Keep I-94 Project on Time

Wisconsin's Interstate 94 (I-94) North-South Freeway Project almost perfectly fits the definition of "stimulus." Initially divided into numerous separate sections, the 56-km (35-mi) infrastructure project had a start date of 2011. The American Recovery and Reinvestment Act (ARRA) changed that. To financially secure the \$60-million reconstruction project with stimulus funds, the Wisconsin Department of Transportation (WisDOT) combined the independent projects and advanced the start date to mid-2009. The project restructuring nearly halved the construction time for some portions; it would also make it difficult to accurately interpret construction plans and have a comprehensive view of the entire project.

However, project managers with the Walsh Group, the lead construction contractor, and Collins Engineers Inc., the engineering firm representing WisDOT on the I-94 project, developed a plan to handle these issues. They commissioned Kapur & Associates to transform the integrated plan sets into two "shovel-accurate" 3D models for earthworks, design and construction, ultimately providing crews with a foresight advantage.

Kapur used Trimble Terramodel™ Software to build digital models of the project before starting construction so that managers could "pre-plan operations and rectify any plan discrepancies to avoid build mistakes in the field," said Survey Manager Daniel Kucza. "That removes any assumptions or misinterpretations in the field regarding the accuracy and quality of the survey data, allowing them to construct more quickly and confidently from day one."

As the two finished grade and sub-grade 3D models were created, a survey team used Trimble R8 GNSS Rovers and Trimble S6 and Trimble 5600 Total Stations to cross-section

the entire project corridor for accuracy of the existing survey data. Once in the field, crews set ground control using Trimble R8 GNSS Rovers and WisDOT's WISCORS RTK network of 35 permanent Trimble NetR5™ GNSS Reference Stations and Trimble VRS™ technology, providing teams with RTK GPS data in real time to within 2-cm accuracy. Using a Trimble DiNi® Digital Level, Kapur's team ran a 13-km (8-mi) circuit to establish a vertical calibration accurate to two hundredths of a foot for the control network and for grade and ground profiles.

With the combination of Trimble's VRS and GPS technology and the 3D models available in Trimble TSC2 Controllers and Trimble GCS900 Grade Control Systems, earthworks teams moved approximately 3,000 m³ (4,000 yd³) of dirt a day to prepare the construction footprint on schedule. The high-precision Trimble S6 and Trimble 5600 helped surveyors stake out more than 45 lane km (28 lane mi) of concrete pavement to within a quarter of an inch vertically for the bottom stone.

Using the Trimble Connected Site™ solution, field data was continually integrated into the portable TSC2 Controllers, connecting the "back office" to the front lines and helping managers to maintain a well-orchestrated assembly line of mini projects; it also helped them monitor work in real time and adapt to needed changes. With the core 3D construction blueprint grounding everyone on the same path, and the advanced survey technology keeping crews on course, field teams successfully completed the first phase of the I-94 project on time, opening the new four-lane southbound corridor to traffic in December 2009.

Construction on the northbound section began in March and is scheduled to be completed by the end of 2010.

See feature article in POB's July issue: www.pobonline.com