



BANKING ON IT

CRA Services is willing to bet on its hard-working crew, next-level technology, and solid communication strategy for building a flood diversion channel and embankment.

When contractors start a job, they have to be ready to face its challenges. That has been the case with one the latest projects for Conestoga-Rovers & Associates (CRA) Services, which provides comprehensive engineering, environmental consulting, construction, and information technology (IT) services.

Currently, the company is working on a New Mexico project that involves constructing a 1,000-year flood diversion channel and embankment. The channel varies in depth from 3 to 10 feet below the existing terrain and maintains a constant width of 250 feet, along with the embankment, which varies in height from 12 to 15 feet above the channel. The channel will protect an existing tailings pile that is on-site. The CRA crew placed D50 = 1 inch of filter stone over the embankment, then installed riprap (varying in size from D50 = 3.2 to 12 inches) over the filter stone on the channel side or “wet” slope of the embankment. Both the channel and embankment are over 1.5 miles long.

With up to 20 people working on the project, CRA plans the use of its equipment carefully. CRA has utilized exclusively Caterpillar equipment, including D9 and D6 dozers, 627 push-pull scrapers, 730 articulated dump trucks, 330 excavators, and a motor grader. The project began the first week in May 2008 and is due to be complete in mid-September 2008, approximately 3 to 4 weeks ahead of schedule.

EXCAVATION CHALLENGE

Six days a week, the CRA crew meets at 7 a.m. to discuss the day’s work and be led through a safety meeting. Once the meeting is complete, they head off to the field to work. It is important that

everyone start the day on the same page because the crew has run into several challenging situations on this job, not the least of which is a 16-inch water main that crosses perpendicular to the channel and berm. As the crew excavates underneath the water main, they have to support it, making sure it is stable throughout the operation. This is especially crucial when considering the repercussions of rupturing the line that runs 5 miles uphill to the source.

To accomplish this, the crew uses a process called cribbing. Cribbing is when they take large timbers—similar to railroad ties—that are approximately 4 feet long, and stack them underneath the pipe in a crisscross pattern to stabilize it. Excavation beneath the pipe progresses slowly. A short section is opened and supported before the next section of material is removed. In fact, the crew excavates up to 12 feet below the pipe to facilitate bedding stone and riprap placement for the buried scour slope.

The CRA crew double-contains the water main, so to speak, when lifting it. For example, if they are using a piece of equipment to lift it, they have a secondary piece of equipment strapped to it so that if the first one breaks, there is a backup to protect it from falling.



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INFORMATION



Conestoga-Rovers & Associates (CRA) is a family of companies that has been providing comprehensive engineering, environmental consulting, construction, and information technology (IT) services for over 30 years. CRA has grown to over 90 offices and more than 2,700 people working on projects around the world. For more information, please visit www.craworld.com.

Recognized as one of the premier vendors in the industry, Dirt Pro, LLC, continues to lead and innovate in the growing field of 3-D Site Models for 3-D/GPS machine control. For more information, please call 480.840.1570 or visit www.dirtprollc.com.

TAKING TECHNOLOGY TO THE NEXT LEVEL

CRA has taken advantage of 3-D technology on the New Mexico job. They use Topcon global positioning systems (GPS) to add speed to the project and increase productivity. The systems allow them to quickly gather and manipulate survey data in the field, set and reset grade stakes quickly as required, and grade to within five-hundredths of a foot.

CRA outfitted two dozers with GPS systems for this project: one with a monitor system to show the operator where finish grade is located and the other with a similar system that also allows the operator to run in automatic mode, where the GPS unit automatically controls the position of the blade.

The project would have taken considerably longer without the use of the GPS. In fact, with the increased productivity CRA has seen, CRA anticipates completing the project several weeks ahead of schedule.

CRA contracted with Dirt Pro, LLC, of Higley, Arizona, to produce the 3-D site models for the GPS to work from on the site. Dirt Pro's expertise came in handy. With this job, there were some specific design elements for which no design drawings or details were generated. In fact, the design drawings consisted mainly of contour maps of the berm and channel, so the 3-D model was practically built from scratch. Dirt Pro was able to work with the CRA team to come up with exactly what the design documents intended, so they were able to hit the ground running once on the site. Dirt Pro has also assisted CRA with earthwork take-offs and 3-D site model changes that have been required as a result of necessary field changes.

WORKING BETWEEN THE LINES

Another challenge is the power lines that the crew has worked beneath on the site. They follow Occupational Safety and Health Administration (OSHA) guidelines, which call for 10 feet of

clearance for every 50,000 volts, plus an additional 0.4 inches for each additional 1,000 volts over 50,000 volts. The CRA crew has had some lines across the site that carry upwards of 230,000 volts, which requires about 16 feet of clearance. They've had to use spotters and radio communication with operators so that they are constantly aware of their position relative to the lines.

They also had a gas line that had to be relocated and deepened on the project. Because it was taken down to a different elevation within the channel, they had to make sure they took it to a deep enough elevation so that they could put at least 3 feet of cover over the top of it. That way, any heavy equipment working over the pipe would not damage it.

CAREFUL COMMUNICATION

Another challenge for the CRA crew is the 1,500 feet of berm on the northwest side of the site, where they had stone trucks bringing in 1-inch bedding stone. The trucks were belly-dump trucks, and they ran right over the top of the berm and were about 15 to 16 feet above grade.

To address the issue, all drivers have to read and sign off on task-specific JSAs, as well as retain a copy in their truck. CRA has also installed CB radios in the equipment working near the dumping trucks.

CHANNELING SUCCESS

This project was not without its challenges—from a water main, overhead power lines, and a gas line that were in the way to the necessity of working at heights. But with the right technology, the right crew, and the right plan, CRA is coming through to complete a highly successful job. It also doesn't hurt that they've built quality partnerships throughout the process, and worked to communicate well at all times. ♦



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