

Fit for man and beast

Full-depth reclamation keeps business, nature moving during power plant road rehabilitation

By Jeff Zagoudis
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Taking a first glance at the Karn Weadock generating complex, a person might think the idea of rehabilitating the entire on-site road network was for the birds.

That is because the 2,400-acre site—located in Essexville, Mich., and operated by Consumers Energy—is abundant with

wildlife, including 285 acres of wetlands with a bird rehabilitation center, butterfly garden and nature trail. According to the plant's website, approximately 140 bird species live at or visit the site, along with deer, foxes and various other woodland animals. The complex is even certified by the Wildlife Habitat Council as part of the Certified Lands for Learning Program.

At 70 years old, though, the road network was in need of a facelift. Consumers

Energy began focusing on infrastructure reconstruction in 2011 but saved the biggest portions—reconstruction of the main access road, the north employee parking lot and the warehouse district road network—for last.

Tight quarters in the warehouse district and an extensive network of underground utilities throughout the complex made traditional construction out of the question. Together, project designer Wade Trim and Soil and Materials Engineers (SME) advocated



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for full-depth reclamation (FDR), a decision that resulted in a 2013 ROADS & BRIDGES/ Asphalt Recycling and Reclaiming Association Recycling Award for the finished project.

Pushing green

While SME and Wade Trim presented several methods for accomplishing Consumers Energy's goals, the FDR process was ideal for the Karn Weadock project for several reasons.

Chief among them was Consumers Energy's commitment to good environmental stewardship. The company was concerned about how much material needed to be brought on-site and how much material would need to be disposed of off-site. A traditional construction process would have been detrimental on both fronts: Fresh paving material would have to be brought in, and existing material would have to be disposed of off-site.

By recycling the existing pavement, the design team was able to limit the number of trips to and from the site, which in turn cut down on the environmental impact (and construction costs).

"The plant takes their wildlife protection very seriously," SME project manager Joe Noykos, P.E., told ROADS & BRIDGES. "And if you do anything out of the ordinary to disturb, injure or anger any of these birds, deer or other animals, you probably won't be back on-site."

Its approach to the abundance of hidden underground utilities was another big point in favor of FDR. "Nobody knew where the utilities were," Noykos said. "You may have sporadic fiber-optic lines, sporadic gas lines, you name it." With so many potential minefields lurking, soft digging to locate them was unavoidable. But since FDR only required going 20 in. or so below ground (as opposed to conventional construction, which could have gone as much as 30 in. down), SME and stabilization contractor Tenmile Creek Excavating were able to significantly reduce the amount of soft digging required.



"If we would have ended up having to relocate a bunch of utilities, the cost savings figure would have been much lower than what we reported," said Tony Thomas, P.E., lead technical manager on the project, told ROADS & BRIDGES. "There's actually no good way to quantify what would have happened had they gone through a traditional construction process."

"I think it was something new for them," Noykos said of Consumers Energy and FDR, "and when we talked to them about the potential cost savings and the potential savings in their schedule, it really put a twinkle in their eye and they wanted to pursue it even further."

Making the mix

SME's initial geotechnical evaluation revealed substantial variation in paving materials and subgrade conditions across the complex, making mix-design creation a bit of a guessing game. "On-site, we had existing asphalt, we had existing aggregates, and then under that we typically had some bottom ash and some other byproduct materials from the history of the plant," said Thomas. "So we had to use all those materials in various compositions and came up with a mix design." For a stabilization agent, SME added dry portland cement, experimenting with different percentages to account for the changing pavement conditions on-site.

With the constantly changing field conditions, Thomas and Noykos both stressed the importance of experienced personnel to the project's success.

"You have to have good guys in the field who can recognize when a change happens and be ready to adjust the application, the water and the other admixtures to make sure you still get what you want," said Thomas.

Hand-to-hand combat

Work began in September 2013 when the top layer of existing asphalt was removed. When it was time to start stabilization, Tenmile Creek brought in a Wirtgen 2500 S soil stabilizer—one of its go-to machines on these types of projects—for the demanding job. As it worked its way through the site, it mixed the cement stabilization product in at a depth of 12 in.

Whenever construction approached one of the discovered utilities, workers resorted to hand-digging around it to expose it. From there, the utility was either relocated or stabilized around it using a stockpile of the stabilization material kept on-site.

"This stabilized material was so easy to work with . . . that they were able to essentially stabilize the entire road network in one long day," Thomas said. "Otherwise we could have been in there a week, possibly two trying to do what we needed to do."

The most difficult work, though, came when construction reached the plant's warehouse district. Situated in the "elbow" of the complex, the profusion of large, closely grouped buildings left little to no room for maneuvering. "You couldn't turn any piece of equipment around," Thomas said. "Everything is one-way because there's just not room between these warehouse buildings."

Making matters even more challenging, crews were required to leave up to two sides of each warehouse accessible at all times for Consumers Energy employees. SME and general contractor Pumford Construction coordinated closely with Consumers Energy to minimize disruptions to the regular, 24/7 operations of the plant. With multiple divisions within Consumers Energy making claims for the same space, juggling access almost became a full-time job.



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"You had road closure negotiations and a lot of weekend work just to work around the plant," Noykos said. That included a required plant refueling midway through the construction process, which "created even more of a nightmare because everybody and their brother had to do everything and the warehouses had to be accessible," added Thomas.

"It was kind of like surgery—you had to pinpoint exactly what you had to do," Noykos added.

After stabilization was complete, a Hamm 3412 PAC Padfoot Roller came through to compact everything down to the required density,

which was checked by personnel with nuclear gauges on-site. Fine-grading was the final step, accomplished with a Caterpillar grader.

Natural conclusion

All told, the entire road network at the Karn Weadock generation plant was completed exactly two months from the start of construction. Overcoming the many challenges was a point of pride for the entire team.

"The actual work environment was probably some of the most difficult work conditions I had seen in a long time," Thomas admitted. "We tried to balance five or six

different organizations' requirements into a very tight work stream."

In the end, Thomas estimated that crews recycled 90% of the material that was on-site. "We're working with this engineering group and we're working on a construction project, but all of these other things—safety, environmental, wildlife habitat—all of that stuff actually had as much influence, if not more, on how projects are built there than anything else." **R&B**

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