



Savannah Harbor Upgrade Tackles Multiple Tasks

Expansion of port aims to boost Georgia shipping economy without hurting the environment **BY JIM PARSONS**

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Of all the East Coast port upgrade programs aimed at luring cargo traffic from the newly widened Panama Canal, the Savannah Harbor Expansion Project (SHEP) may well be the most ambitious, and complex. Elements of the joint effort by the U.S. Army Corps of Engineers' Savannah District and the state of Georgia—originally estimated to cost \$706 million, but subsequently increased to \$973 million—range from 40 miles of channel dredging and new water quality mitigation facilities to the addition of an upstream fish passage and the recovery of a Civil War-era relic.

The project's intricacies—and approximately half its cost—represent a strategy developed over 17 years to mitigate myriad environmental impacts from dredging nearly 24 million cu yd of material to lower the Savannah River's shipping channel by 5 ft, creating a mean low-water depth of 47 ft suitable for larger, deep-draft

vessels to access Savannah's port facilities year-round.

Not surprisingly, defining and crafting that strategy among multiple agencies demanded the same degree of balancing as the fragile environment it sought to protect, says Corps spokesman Russell Wicke. He cites a 2008 internal review that identified the need to reassess several of SHEP's economic, engineering and environmental aspects, forcing a delay in starting construction.

"If the output of one study component changes, that change alters something in the analyses contained in the other two," explains Wicke. "These revisions were time consuming, but were vital to the report's credibility when it was reviewed by independent panels—both inside and outside of the Corps."

POSITIVE PROGRESS

It wasn't until September 2015, with the permits finally in place, that the Corps could give the go-ahead to Great Lakes Dredge & Dock Co. of Oak Brook,

Ill., to begin deepening SHEP's outer harbor under a \$134.5-million contract. The 18.5-mile-long project includes extending the entrance channel seven miles into the Atlantic Ocean. The contractor is using a mix of cutter suction and hopper dredges.

The project team scheduled dredging to coincide with the beginning of SHEP's most technically complex mitigation project—a \$99.9-million dissolved oxygen (DO) injection system designed to maintain the river's oxygen levels, particularly during seasonal low-flow periods.

Selected from more than 20 potential technologies to cost-effectively maintain the harbor's pre-dredging oxygen levels, the system utilizes Speece Cone technology, which pulls large volumes of water into the cone-shaped device, forcing oxygen into the water. The system will draw approximately 150 million gallons of water from the river each day before returning the oxygen-rich water back into the river flow.

CDM Constructors, Maitland, Fla., began constructing the DO system at two sites in April 2016, following a two-month delay resulting from a protest by an unsuccessful bidder. Robert Gilbert, CDM vice president, says the firm's crews are using a crawler crane with 160 ft of boom to install 12 22-ft-tall, 12-ft-dia stainless steel Speece Cones at two sites, with a coffer system of sheet piling with beam and whaler construction protecting work areas from waves kicked up by the large cargo vessels.

CRITICAL TECHNOLOGY The installation of a dissolved oxygen (DO) injection system will help maintain the river's oxygen levels, avoiding environmental impacts.

"This coffer system was significantly more robust than a typical coffer system," Gilbert says.

CDM Constructors endured a less successful battle against water intrusion in October 2016, when Hurricane Matthew delivered 11 in. of rain that subsequently flooded an intake structure at the downriver Speece Cone site and washed out an upriver site's access road. Crews spent a week pumping out the water and cleaning the intake structure before work could resume.

"There was only a minor delay to the overall construction schedule," Gilbert says, adding that the DO system is scheduled to be operational by the end of 2017.

Another safeguard against Savannah Harbor's low-flow conditions is a 17-acre, 97-million-gallon raw water storage impoundment. The \$40.2-million reservoir, which ties into the 48-in.-dia mains linking Savannah's treatment plant and raw water intake, will also protect the city's drinking water supply from seasonal chloride increases.

Beginning in mid-2016, Thalle Construction, Hillsborough, N.C., started moving approximately 440,000 cu yd of material to create the reservoir's 29-ft-high walls and a 3,400-ft-long dike, both of which topped out in early April.

As at the DO site, Hurricane Matthew's rains re-



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—Russell Wicke, U.S. Army Corps of Engineers

DOWN AND DIRTY Great Lakes Dredge & Dock Co.'s dredging contract includes extending the entrance channel seven miles into the Atlantic Ocean.

ROLL TIDE The Sediment Basin Tide Gate removal project, being led by DeMoya Continental JV, will redirect the flow of saltwater.

PHOTO COURTESY OF U.S. ARMY CORPS OF ENGINEERS

PHOTOS (TOP COURTESY OF U.S. ARMY CORPS OF ENGINEERS; BOTTOM) BY DENOVIA CONTINENTAL JV

SUPPORT FACILITIES

The raw water storage impoundment, a 97-million-gallon mini-reservoir, is a safeguard against the harbor's low-flow conditions.



BIG BUSINESS

The Port of Savannah is banking on increased activity resulting from the harbor expansion and has already made investments in infrastructure.



quired some re-building of previously completed earthwork. But the biggest challenge was a single access point to the 40-acre site, which required routing dozens of dump-truck loads each day through a residential neighborhood, says Thalle project manager Paul DiMeo.

"We repaved a one-mile section of road before we got started to be sure it could handle the traffic, and took other measures to limit any effects on the residents," DiMeo says. Installation of a 16mm thick HDPE liner and construction of pump and treatment facilities should be complete later this summer, allowing the Corps to begin filling the reservoir.

Also scheduled for completion this year is removal of a 1970s-era tidegate structure originally constructed to help reduce shoaling in the Savannah River's main channel. That \$21.3-million project, being performed by the Miami-based DeMoya/Continental Joint Venture, is the first step in a three-part plan to redirect the flow of saltwater to significantly reduce its impact on several hundred acres of freshwater marsh, determined by the Corps as the highest priority wetland natural resource in the Savannah River Basin.

DeMoya/Continental will remove more than 3,200 tons of concrete and more than 650,000 cu

yd of soil and place approximately 130,000 tons of rock along 3,000 ft of shoreline in both Georgia and South Carolina.

Yet even with all the new infrastructure, Wicke considers the recovery of the sunken Civil War ironclad ship CSS Georgia, a designated historic site, to be one of SHEP's most complicated elements. Scuttled as Union troops advanced on Savannah in 1864, the vessel lay for decades at the bottom of the Savannah River adjacent to the existing shipping channel. Recovery of the wreck has required divers to perform complicated rigging work in a dark-water environment during limited periods due to the area's tides.

Although archeologists have recovered more than 1,700 small artifacts from the vessel since 2014, salvage work stalled when two sections of the vessel's side proved too large to remove with the available cranes. Their historic value also precluded breaking them into smaller pieces.

"We plan to return to that work this summer with larger equipment that will allow us to raise those remaining sections onto a barge deck for documentation and collecting imagery," Wicke says. The Corps will then develop a long-term conservation strategy.

AN UNCERTAIN FUTURE

Although SHEP's initial construction has proceeded relatively smoothly in its first two years, a cloud appeared in early April, when the Corps announced that the program's expected cost had increased nearly 40% from the original estimate.

Contributing to the increase, Wicke says, was the need to fund many of the contracts incrementally, a factor further complicated by the project's high number of "one-of-a-kind" features. Demand for industrial dredging services increased significantly as well.

Wicke says the program's original five-year time line, including completing other elements currently in design—such as dredging Savannah's Inner Harbor, adding a \$35-million fish passage at the New Savannah Bluff Lock and Dam and flow rerouting through tidal marshlands—will have to be extended until at least 2020 as funding becomes available.

"This has conditions of course, which include a need

for optimal funding every year, contract awards without delays, avoiding other protests and pending no changes or unforeseen circumstances," he says, adding that the state of Georgia is responsible for funding 25% of SHEP.

While it's currently uncertain how and when SHEP's funding issues will be resolved, the Georgia Port Authority expects to be ready for the program's completion, having made a significant investment in its landside facilities. By this summer, the Port of Savannah will have four new Finnish-built cranes capable of serving the next generation of Panamax container vessels, with another four units scheduled to be commissioned in 2018.

With a total of 30 cranes working over nearly 10,000 contiguous ft of dock, "the port will be able to handle more than 1,000 container moves per hour," says GPA spokesman Edward Fulford.

Construction in Progress



EXPANSIVE PROJECT The map indicates the numerous projects included within the 18.5-mile-long Savannah Harbor Expansion Project.

In addition to new container storage areas, GPA has broken ground on a 42-acre inland terminal in northwest Georgia. Designed to expand GPA's market to other Southeastern states, a 388-mile direct freight rail connection is expected to reduce Atlanta truck traffic by 50,000 moves annually.

"A greater reliance on rail at the GPA as Savannah's container volumes grow will help avoid delays and ease traffic in congested areas," Fulford says. ■



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