



Photo courtesy of Garden State Precast

Going with the Flow

Precast concrete replaces cast-in-place to save time and labor on a new solid/floatable screening facility along the Hudson River.

By Shari Held



Weehawken, N.J., was dealing with a sewage problem, and precast concrete is helping protect the city and its residents.

Weehawken, N.J., has enjoyed its fair share of memorable moments in history. Henry Hudson dropped anchor in Weehawken Cove in 1609 during his third voyage to the New World. It served as the site of the famous duel between Alexander Hamilton and Aaron Burr, and it became a favorite retreat for the rich and famous in the late 19th century. But in recent times, Weehawken had a problem common to areas with combined sanitary and stormwater systems – how to stop raw sewage from polluting the Hudson River.

At low flow, discharge from Weehawken’s two outfall pipes was directed to a sewage treatment plant. But during times of heavy rainfall, the combined sanitary and sewer system would overflow and head straight into the Hudson Rivler. Continued combine sewer overflow (CSO) would put Weehawken in violation of Environmental Protection Agency mandates and would not be healthy for the community.

Weehawken chose to install a twin-chamber screening station and connect it to the existing six-foot and eight-foot diameter outfall pipes. Nets, mounted in the two chambers, would collect the debris. The ambitious project also

included a sophisticated bypass system that could divert water flow to one chamber while workers performed maintenance on the other chamber.

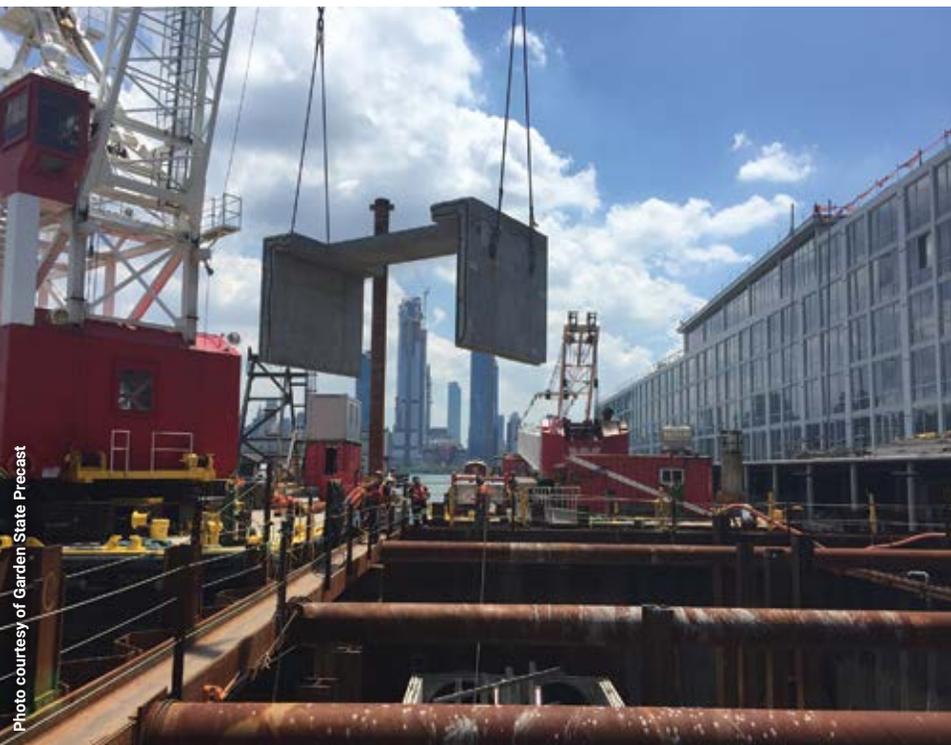
The original plan called for cast-in-place concrete. But Cranford, N.J.-based Weeks Marine, general contractor for the project, thought precast might be a better solution. The contractor invited Garden State Precast, which had successfully performed similar projects of this size and scope in New York City, to quote the job with precast. It was a pivotal decision.

PRECAST PREVAILS

“We took a cast-in-place project of a very large scope and made it precast,” said Paul Heidt, vice president of specialty precast sales for Garden State Precast, based in Wall Township, N.J. “This allowed the project plan to be changed for the benefit of all parties.”

Replacing cast-in-place with precast concrete saved money, reduced construction time and impact to the community, and created better on-site working conditions.

Weehawken didn’t have to close a nearby road for 30 days and also didn’t experience the inconvenience of concrete delivery trucks and



Crews assembled precast concrete elements on a barge and shipped them up the Hudson River to the jobsite.

Photo courtesy of Garden State Precast

concrete pumps during the pouring process. Plus, the precast elements could be shipped and staged on a barge, reducing the project's footprint.

In addition, using precast eliminated the need to keep the job site watertight during the on-site pouring and curing phases required by the cast-in-place process.

"That's a hard thing to do, and it's expensive," Heidt said. "Once the precast went in, the area could flood and then just be pumped out so the crew could go back to work."

It's a good thing, too, since the summer produced plenty of rain storms, some of which could flood the area within a mere five minutes.

"One of the main reasons we chose precast was for the time savings," said Sofia O'Brien, staff engineer for Weeks Marine. "While Garden State was casting the elements at their facility, we were able to continue other work on-site and have them deliver when we were ready for the installation. It really sped up the process."

FABRICATING FOR PRECISION

It was no small undertaking to fabricate the precast elements. Each chamber measures 16-feet-by-48-feet-by-16-feet tall and weighs 300,000 pounds. Garden State Precast

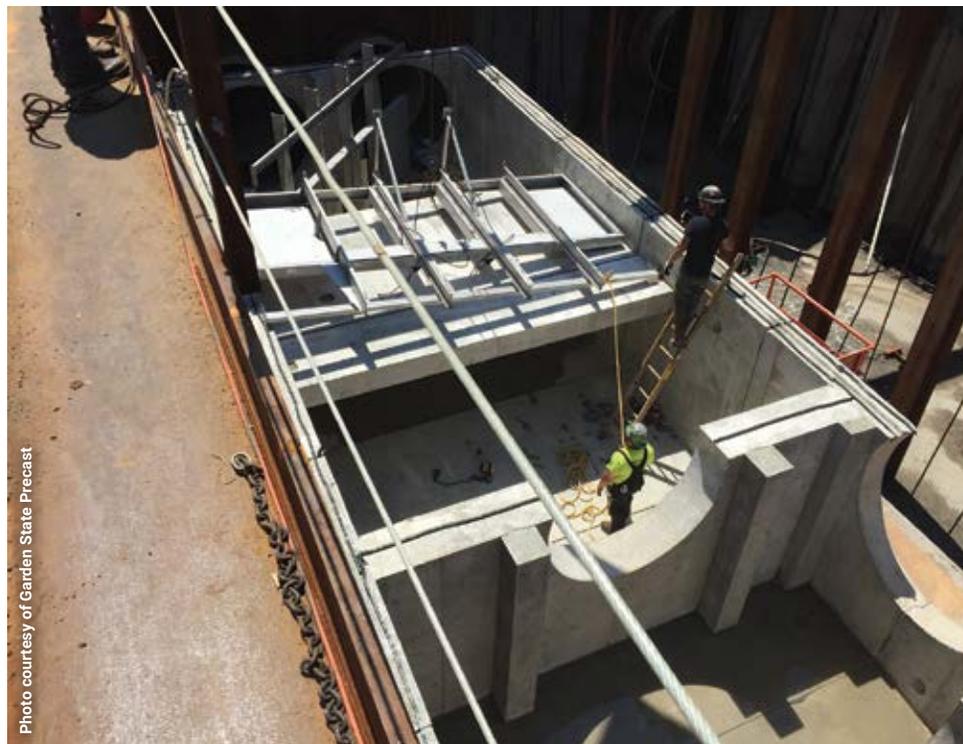


Photo courtesy of Garden State Precast

fabricated 11 elements for each chamber – 22 elements altogether. They ranged in weight from 33,000 pounds to 83,500 pounds. In terms of size, the smallest piece measured 5 feet long, 18 feet wide and 9 feet high, with the largest one coming in at 11 feet, 8 inches long, 18 feet wide and 9 feet high.

"Each piece was individual," Heidt said. "Each piece is unique to the setup."

Garden State Precast used the local preapproved Department

of Transportation concrete mix (5,500 psi) that everyone was familiar with and reinforced it with epoxy-coated steel rebar.

Precision was imperative for the success of the project. To ensure the 11 pieces of each chamber would fit flush after fabrication, Garden State Precast cast the elements one against each other.

It took about six weeks to fabricate each chamber. Production on the North chamber began in April and production on the South chamber was complete in August.

The biggest challenge during the fabrication process was the amount of space required to accommodate a chamber. The Weehawken project took up to 50% of Garden State Precast's production area for six weeks at a time. It made fabricating other projects difficult. To maximize floorspace, workers extended the crane reel, putting more production area under the crane.

DELIVERY AND STAGING BY BARGE

Garden State Precast delivered the first 11 elements to Weeks Marine's Jersey City shipyard via truck. From there, they traveled up the Hudson River by barge to the job site. The logistics of barge loading was another challenge. Elements needed to be loaded in a sequence that balanced their total weight on the barge.

A 100-ton revolving crane on a second barge set each of the 11 pieces on the materials barge. Then both barges made the hour-long trip up the Hudson River past the Statue of Liberty to Weehawken. It was slow going to ensure the barge wouldn't capsize with its 300,000-pound load.

The job site was in a congested, urban residential area with minimal road access and lots of pedestrian activity along the sidewalk. To further complicate work on the project, construction of a new condominium community was in progress a scant five feet from the edge of the Weeks Marine job site. Working conditions were tight even with using the barges as a staging area.

"Making sure the picks were good was very important for the safety of the public,"



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Photo courtesy of Garden State Precast

Crews were able to assemble the pieces on barges and quickly install them on the job site.



Photo courtesy of Garden State Precast

The first chamber was installed in a mere four days, with Garden State's team providing assistance and training to the installation crew.

O'Brien said. "It was so tight we had to confirm that the equipment we were using had the right capacity to pick and set. One of our biggest concerns was whether it would reach 90 feet with a 45-ton piece."

GOING UNDERGROUND

No land was available near the two outfall pipes, which meant the twin-chamber facility had to be built in a pier slip along the coast. Conditions were challenging 25 feet below sidewalk level where workers would install the two chambers. As if the job site constraints weren't enough, Mother Nature played a part in the installation process challenge as well.

"They based the design for a capacity of 480 million gallons of water per day," O'Brien said. "But this past summer we had that 10-year storm event that you don't plan for pretty much every single week."

The rains didn't let up during the installation process either.

"Anything we did had to be able to be completed or left as is until the next day in anticipation that the site would flood overnight," Heidt said.

Despite the difficulties involved with cofferdam construction, the installation went without a hitch, taking only four days to install the North Chamber.

Garden State Precast oversaw the first installation, providing advice and training to Weeks Marine. Garden State Precast's crew needed to ensure there were no issues with the sealants or the cables used to post-tension the elements. Weeks Marine backfilled the excavation area, and the North Chamber was ready to go.

"It was a learning experience and a teachable moment for us," Heidt said. "Anytime you can be an ambassador for your company and for precast concrete while performing a valuable function of aiding the install, it's a good thing."

It took only two days for workers to install the South Chamber. Weeks Marine installed it while the Garden State Precast crew attended the National Precast Concrete Association's Annual Convention.

"My phone didn't ring once," Heidt said. "That was the best news I had all day."

The quick installation considerably reduced on-site labor costs. By installing the units in only



Photo courtesy of Garden State Precast

The new screening facility is up and running with trash and debris being collected in the massive chambers rather than flowing freely into the Hudson River.

six days instead of 10, crews were able to save up to \$3,000 per day.

The original project plan also called for the creation of a park, situated atop a cast-in-place slab covering the two chambers, but that was changed to precast too. The park will also serve as the access point for the service truck that will collect the trapped debris. To meet H-20 traffic loading criteria, the roof of each chamber includes inserts that accommodate heavy-duty reinforcement rebar. Workers threaded the rebar through the inserts to tie the chambers to the top deck slab.

Weeks Marine also asked Garden State Precast to fabricate the park's 15-foot overhang deck. It was originally designated as cast-in-place.

“There’s only so much work you can do when it’s high tide, unless you have divers,” O’Brien said. “That gets a little difficult, so we decided to go with precast for the overhang deck, too.”

The park is slated to be finished this summer.

SUSTAINABLE FROM START TO FINISH

The Weehawken W 1234 Solids/Floatables Screening Facility was a sustainable project in many ways. Construction occurred with minimal disruption to residents and the surrounding area. And once the project is complete, they can enjoy the new green space.

More importantly, Weehawken’s new trash removal system is in place and doing its job. No longer do waste solids and floatables flow unimpeded into the Hudson River when large storms pummel the area. Instead, the netting traps the majority of the debris, which is collected and disposed. Water flow is improved,



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and the negative impact to the environment will be substantially reduced.

“This will provide Weehawken with a watertight, long-term solution that’s rated to last 75 years,” Heidt said. **PS**

Shari Held is an Indianapolis, Ind.-based freelance writer who has covered the construction industry for more than 10 years.