## Project Spotlight

## Precast concrete maintains tradition at Churchill Downs

The Churchill Downs colonnade and infield gate project in Louisville, Ky., consists of a colonnade wall encircling the world-famous racetrack. The wall provides added security, better pedestrian flow, and an improved guest entry experience for guests.

Precast concrete from Gate Precast in Monroeville, Ala., was selected as the material of choice for this project for several reasons. One was the ability to seamlessly add new elements with classical architecture details while using products with enhanced durability and security. "In selecting precast, we wanted to create a consistent, unifying architectural element surrounding the historical racetrack grounds that projects a sense of permanence and quality while providing required security," says Kelly Kerns, senior principal with Populous, the Kansas City, Mo., architectural firm for the project. "We turned to precast concrete for its ability to cost-effectively incorporate arches, three-dimensional detailing, and its durable qualities."

Another was the ability to meet very strict schedule requirements. Construction could only take place at the site when the horses were not racing. Therefore, construction had to be completed in the fastest possible time frame. In addition, construction was restricted while the horses were training. The ability to schedule a small crew to provide just-in-time delivery and installation of the pieces was advantageous. The project schedule revolved around the million-dollar horses and the racetrack's racing schedule. Because this racetrack is only open for racing 75 days of the year, all on-site construction had to be completed between the meets. The design and bidding process for each phase happened prior to the Fall Meet at the racetrack. Once the Fall Meet was complete at the end of November, construction fences went up and site work began. During the construction of the project, noise had to be controlled while the horses were training, which meant no loud cranes until after 10 in the morning.

Because of the requirements of the perimeter wall, the precast concrete would be visible on all sides. This required the precast concrete panels to have two-sided finished surfaces. The design utilized four-sided brick inlay columns. In addition, at the main entrances, back-to-back precast concrete spandrels were cast separately and attached in the plant prior to delivery and installation.

The existing buildings are constructed using a white brick with ornate details and in the classic language of historic race facilities. Precast concrete's ability to incorporate matching thin bricks and concrete trim elements mimicking natural stone is a key accomplishment in the design and construction.

Kerns says that key challenges were resolving the varying site grades and conditions in as few precast concrete forms and varying details as possible, along with casting thinset brick within a 360-degree element. "We were able to work closely with Gate Precast to develop solutions that maintained the budget and authenticity of the design," he says.

The Churchill Downs and Populous teams were very pleased with the final visual outcome. "The Colonnade and Entry Gates feel like they have been part of the historic grounds for years," Kerns says, "and the installation was executed in a very short time frame, which minimized operational impacts for the racetrack and its patrons."

—William Atkinson



## Concrete flower bed springs from park along the Hudson

The initial goal of the Little Island at Pier 55 project, which sits like a bed of precast concrete flowers above the Hudson River in New York, N.Y., was to address costly maintenance of decaying steel and timber piles while also creating a new 2.4-acre (1 ha) park space.

The solution had to be durable, and it had to be striking enough to warrant a spot along New York City's famed waterway. As a result, project stakeholders considered precast concrete for providing a resilient structure that could withstand the brackish conditions of the Hudson River but also make the structure special. They selected the Fort Miller Co. Inc. of Greenwich, N.Y., as the precaster.

Originally, the owner envisioned the park as a floating carpet with an undulating platform of precast concrete that hovered over the river; however, the team quickly determined that the initial vision wasn't economically or structurally feasible. The design eventually evolved into a series of blooming tulip shapes that emerge from slender precast concrete stems of varying heights that act as piles in the river. Each stem is topped with a massive precast concrete flower, and together these flowers provide the base and structure of the park.

Initially, the team imagined building each flower as a single unit, but the size and weight of the finished products would have been too unwieldy to create and ship. Therefore, they broke the design into 132 pots of varying sizes and depths, topped by four to six distinct precast concrete petals and four to six precast concrete topping planks. The assembled pots would be clustered together on top of the stems in a pentagon tiling pattern.

Each of the 655 unique petals and column heads was first developed by the architect and engineer using scripts and three-dimensional (3-D) modeling. Fort Miller then used digital scripting to pull data from the models for shop drawings, reinforcing bar fabrication, and form fabrication. These models were uploaded to a five-axis computer numerical controlled milling machine to mill a negative shape of each petal out of a foam material that could support the weight and pressure of the wet concrete. To ensure proper geometry, Fort Miller either dry fitted or 3-D scanned 40 of the 132 completed pots in the manufacturing facility.

There were, of course, some challenges related to the design of the precast concrete pieces. "While the shape, thickness, and reinforcing pattern for each precast element was provided to Fort Miller as a digital model, we were tasked with using that model to generate custom milled foam formwork and a complete detailed set of 2-D shop drawings to our manufacturing facility," says Joshua French, vice president of sales/estimating and marketing for Fort Miller. "Our sister company, Access Anvil Corp., provided the custom-milled foam forming for the column heads and precast concrete petals. One of our other sister companies, Tymetal Corp., supplied and fabricated all of the stainless steel embeds and connection plates."

Production wasn't simple, either. According to French, the most complex element of this project was the fabrication of the individual precast concrete petals. "The petals did not have any straight edges, corners, or consistent dimensions," he says. "They also varied in thickness. Another challenge to this project was the schedule. On average, we poured eight petals each week."

Delivery also posed a challenge. There were a total of 1414 precast concrete elements on the project. The assembled pots were very large and could not be delivered over the road. "As such, each of the 1414 precast concrete elements was delivered via flatbed trailer to the Port of Coeymans, N.Y., about 60 miles south of Fort Miller's Easton, N.Y., manufacturing facility," French says. At the port, the precast concrete was assembled into the final pots and secured on barges. The assembled pots were then floated approximately 120 miles (193 km) south on the Hudson River to the project site on the west side of Manhattan, where they were picked by a crane and threaded over the precast concrete piles.

—William Atkinson 🎵

Little Island at Pier 55 uses precast concrete tulips manufactured by the Fort Miller Co. Inc. to create a new whimsical park in New York, N.Y. Because of their large size, the precast concrete pots were delivered by barge. Courtesy of Joshua French.



