



2021 PCI  
DESIGN  
AWARDS

## ALL-PRECAST CONCRETE PARKING STRUCTURE

### KEY PROJECT ATTRIBUTES

- Three-dimensional curved spandrels reflect Pennsylvania's rolling hills.
- Designers used Rhino and Tekla tools to meet exact weight requirements.
- The 8-ft overhang cantilever entrance was created in two pours to accommodate its massive depth.

### PROJECT AND PRECAST CONCRETE SCOPE

- Build a 1235-space, four-story, all-precast concrete parking structure with room for expansion.
- The project included 771 total pieces of precast concrete.
- Erection was completed in four months.

*"Precast concrete was our best option among the materials we proposed for the façade of this project. It was the most economical solution that provided flexibility to meet the various design challenges we would face."*

— Dohyoung Kim,  
Lamar Johnson Collaborative

# PENN STATE HERSHEY MEDICAL CENTER PARKING GARAGE

## HERSHEY, PENNSYLVANIA

When owners of the Penn State Hershey Medical Center decided to add a four-story, 1235-space parking structure to their rapidly expanding medical center campus, they wanted it to be eye-catching. "It would be set within the context of an architecturally significant campus, so it had to complement and enhance the materiality already established," says Amy Luchun, principal at Lamar Johnson Collaborative.

But at the same time, it had to fit within the cost, schedule, and technical requirements of the project. The architects used precast concrete to tackle all of these goals.

"Precast concrete was our best option among the materials we proposed for the façade of this project," says Dohyoung Kim, associate at Lamar Johnson Collaborative. "It was the most economical solution that provided flexibility to meet the various design challenges we would face."

Finding inspiration in the landscape, the designers took advantage of the fluidity and versatility of precast concrete to create a three-dimensional (3-D) design that mimics the rolling hills and flowing rivers of Pennsylvania's topography. The total-precast concrete design features a series of 3-D wave spandrels that flow across the sides of the parking structure in four levels. On each level, the panels merge together at central points, then cascade away to create a natural flow in both the design and the way light and air moves throughout the building.

Three 8-ft cantilevered concrete overhangs at the stair tower entrances were incorporated to allow more light to fill the structure, creating a safe and pleasant user experience. The overhangs offer a canopy to protect patrons from rain and snow, while adhering to the flowing design aesthetic.

### NO FINS REQUIRED

To achieve the waved design while staying within budget goals, the design team found ways to maximize forms, while keeping engineering stability in check and minimizing design changes. Significant cost savings were achieved by reducing the number of unique molds from 72 to 8, and by increasing the bay size using larger double tees.

### PROJECT TEAM:

**OWNER:** Penn State Health, Hershey, Pa.

**PCI-CERTIFIED PRECAST CONCRETE PRODUCER:** High Concrete Group, Denver, Pa.

**ARCHITECT:** Lamar Johnson Collaborative, Chicago, Ill.

**ENGINEER OF RECORD:** Hope Furrer Associates, State College, Pa.

**GENERAL CONTRACTOR:** Clayco, St. Louis, Mo.

**PCI-CERTIFIED ERECTOR:** High Structural Erectors, Lancaster, Pa.

**PROJECT COST:** \$32.4 million

**PROJECT SIZE:** 411,000 ft<sup>2</sup>



Photos: High Concrete Group.

However, these changes resulted in concerns about the weight of the massive panels. The precast concrete producer had to stay within a 100,000-lb limit, which they did by using a Grasshopper script in Rhino and Tekla tools to constantly monitor the weight of the panels. In some cases, they hollowed out certain panels to reduce weight and to make space for internal systems.

“The natural features of precast concrete allowed us to control size, weight, and center of gravity to meet challenging requirements for transportation and for lifting and swinging the pieces into place,” Kim says. Within the parking structure, glass-wall stairwells reflect light through the space, casting shadows off the spandrels that complement the landscape seen through the open spaces. The addition

of wood soffits built into the precast concrete canopy entrance further reflects nature in the surroundings.

Luchun notes that the designers initially thought they would have to adhere metal panels and fins to the façade to bring the design to life, but found that precast concrete allowed them to meet all of their design goals while providing the structural purpose of a parking structure. “The eye-catching waving spandrels are now the first element to greet visitors who drive onto the health campus,” she says.

The project was completed in January 2020, and, as an unexpected benefit, the parking structure was used as a drive-through COVID-19 testing site, she adds. “With the larger bays and well-lit area, it was a perfect location that also provided a safe space to tend to their community.” ●