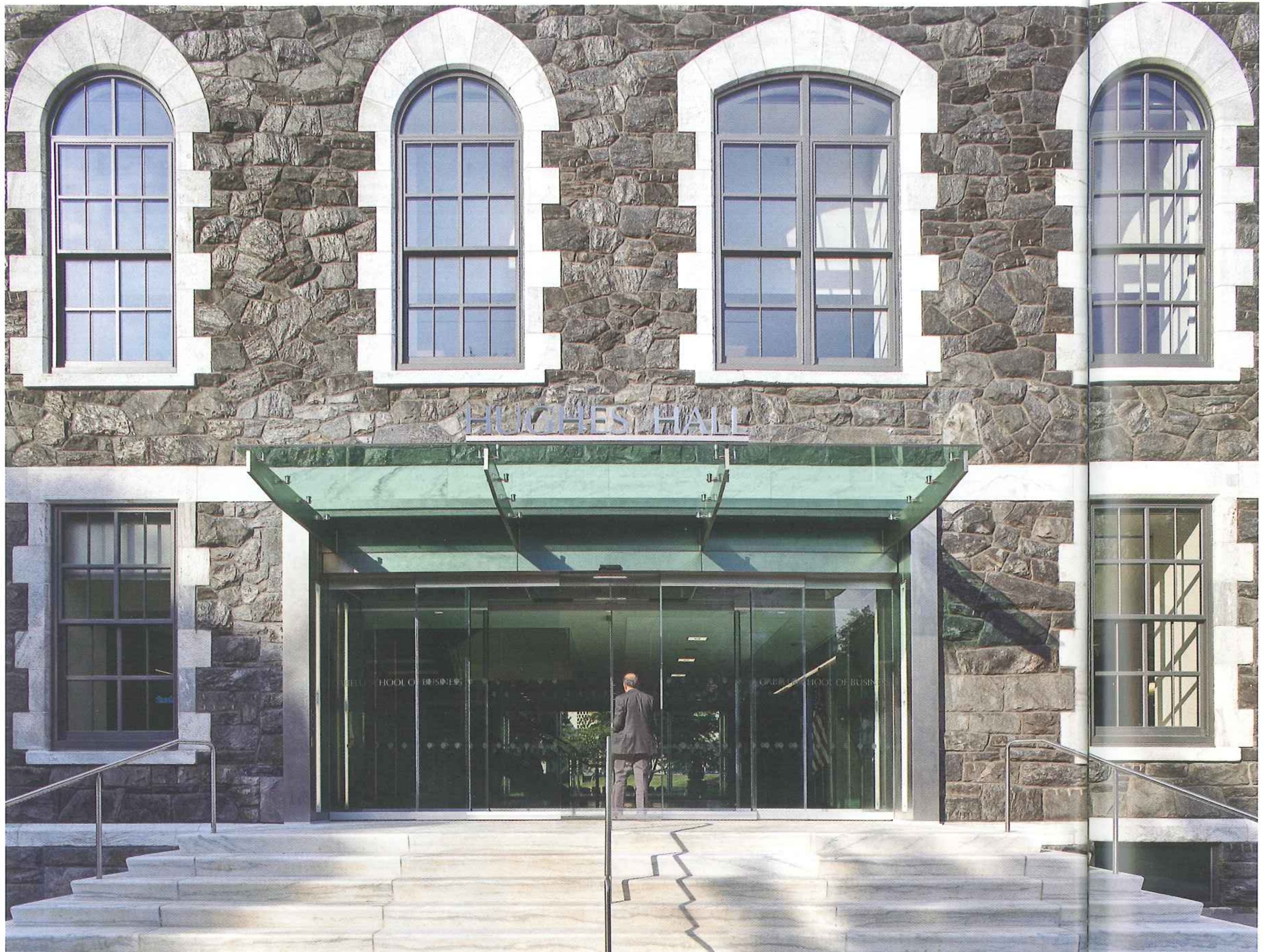


Fordham University Gabelli School of Business

Temporary and permanent steel structures make a 21st century program possible while preserving the heritage of the university's past.

THE GREEN MANSARD ROOFS OF Fordham University's Rose Hill campus buildings are integral to the university's heritage, which dates back to 1840. They symbolize stability and longevity, cornerstones to the culture of the school. When it came time to transform a 120-year-old, 40,000-square-foot dormitory with a prime campus location into a new state-of-the art facility for the Gabelli School of Business, the mansard roofs became integral for another reason: they served to connect the building's conservative, revivalist-style granite facade, its stone quarried from the campus grounds, with the business school's new high-tech program inside.

Project architect HLW's proposal to use a two-story glazed structure instead of a traditional copper mansard roof was responsible for making the connection, says John Gering, managing partner. "We knew the president wanted a mansard roof," Gering adds. "But we were certain that the solution would bridge the gap between the past and the future."

The team had a full-scale model of the structure built on top of the building. When university President Joseph M. McShane, who made all decisions impacting the exterior architecture of the school, returned from the 2011 Saint Patrick's Day Parade, where he had been "seeing green all day long," the team showed him the 20-foot-high glass mock up. "Within two minutes, he said 'do it,'" Gering says.

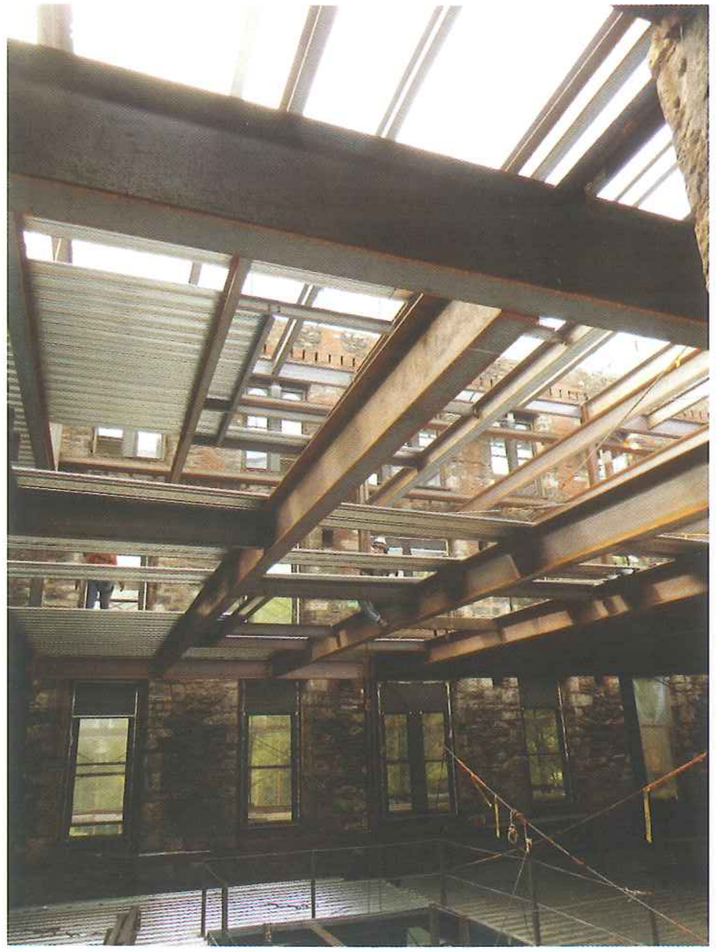
But the real challenge the design team faced was how to fit the school's extensive program within the confines of a five-story building with a 125-by-50-foot footprint. The original structure—cast iron columns in a central corridor with steel girders and wood joists spanning to the granite exterior bearing walls—took up too much floor area.

"We went against conventional wisdom and got rid of all the interior columns to create an open span of space, " says Jennifer Brayer, HLW's partner in charge. The decision allowed for a very effective interior plan that accommodated classrooms, offices, a trading floor, common areas, and more. "There was a lot to cram in," she says.

This meant removing the original structure while keeping the exterior walls intact. Everything inside the four walls of Hughes Hall—the mechanical systems, the roof, the wood-joist framing, cast iron columns, structural steel beams, and footings—had to be removed. "We called it melon-balling," Gering says. "We took a melon-baller and scooped everything on the inside and took it out."

The university did not allow external temporary bracing for aesthetic reasons, so the team had to develop a creative interior plan for bracing the building's perimeter walls while the demolition of the interior took place. HLW's structural engineers developed a sequencing plan that would transfer the lateral support from the original timber framing, which was pocketed into the bearing walls, to twelve perimeter columns just inside the walls.

First, the team had to dig down 3 feet so that the basement space was usable for classrooms and to ensure the floor-to-floor heights were properly aligned. This entailed underpinning the basement. "The profile of the borings under our building showed



that the bedrock ranged from 5 feet down to 20 feet down," says Frank Polemeni, project executive and vice president for construction manager Tishman Construction.

The exterior bearing walls at the base are 3 feet wide. "The underpins had to go to firm soil, and span the depth of the walls," Polemeni says.

When the underpinning was in, new footings for the twelve perimeter columns were formed. The footings would bear the entire weight of the new interior structure, explains Tom Gasbarro, HLW partner and director of structural engineering. "It was like building a new building inside an old one," he adds.

The original timber framing was pocketed into the bearing walls and provided the lateral support for the walls. "One of the first things we thought about was, if we take the framing out, will the walls be stable?" Gasbarro says. "We didn't want to take any chances. We designed a sequence of installation so that we would maintain lateral support through all phases of construction."

The construction teams opened up each floor in 5-foot sections from top to bottom and threaded the W10x100 steel columns from the roof down through the entire building; W18x76 beams were installed below the original floor slab and attached to a temporary whaler system (W18x45) installed around each floor.

"At that point, we had a stable structure that was bracing the walls and it was independent of the original floor framing, so only then were we able to demolish the floor framing," Gasbarro says.

The steel columns were detailed with two double-angle bolted connections—one for temporary bracing during demolition, and the second for the final location. Once the temporary structure was in place and the building stabilized, the original floor framing was removed, and the beams were raised to their final positions.

"Even for that, there was a sequence," says HLW's Brayer. "Every time we disengaged the diagonal to move the beam, for a short period of time the walls were not braced. We went floor to floor all the way up."

Once the metal deck and slab were in place and doweled into the original granite walls for stability, "it was a conventional job," Polemeni says. "But the challenge was getting to that point."

Polemeni jokes that the temporary bracing plan seemed like "overkill" at first. "I swear, we had this conversation, and the next week, I was in my office and I heard this rumbling sound. I thought 'No, way,' and I ran all the way to the building. An earthquake had hit farther south and we felt it all the way up here. The building was fine. Then the conversation was, 'Thank goodness we had it.'"

Above Architects replaced the building's original structure—consisting of cast iron columns, steel girders, and wood joists—with steel columns and beams to create room for the business school's many functions. **Facing** A circulating staircase encourages interaction between students and lends to the school's collaborative atmosphere.

This spread and opening spread: HLW

The project team also faced the challenge of widening the north and south entryways to 20 feet. "At those large openings, we had to have new lintels for the stone and those members were 27x129 and 21x93 side by side. Each opening had both because the opening was 3 feet thick," Gasbarro says. Because of the size of the opening, the load from the stone above the doorway had to be supported temporarily until the load could be transferred to the steel members.

"We used the new footings to support the shoring as we put the new beams in," Polemeni adds.

At the entrances and for the temporary and permanent structural needs of the building, "there wasn't any thought to using any other material other than steel," Gasbarro says. While the design team explored different sequencing schemes and temporary bracing alternatives, he says that steel was always the choice for bringing the building from the 19th century into the 21st century.

When the lights glow from Hughes Hall at night, the bright future of Fordham's business school clearly shines from the windows, roof, and entryway. In Brayer's words: "The building is the connector bridge between the old and the new and now provides a sense of community on campus."

FORDHAM UNIVERSITY GABELLI SCHOOL OF BUSINESS

Location: **441 East Fordham Road, Bronx, NY**
Owner: **Fordham University**, *Bronx, NY*
Architect: **HLW**, *New York, NY*
Structural Engineer: **HLW**, *New York, NY*
Mechanical Engineer: **Jaros Baum & Bolles**, *New York, NY*
Construction Manager: **Tishman Construction Corporation**, *New York, NY*
Structural Steel Erector: **Burgess Steel**, *Englewood, NJ*
Miscellaneous Iron Erector: **GC Ironworks**, *Elmsford, NY*
Architectural and Ornamental Metal Fabricator and Erector: **Coordinated Metals, Inc.**, *Carlstadt, NJ*
Metal Deck Erector: **Burgess Steel**, *Englewood, NJ*