

Gateway Center at Bronx Terminal Market



This spread Structural steel supports outdoor balconies while providing clear span floor space for the north and south volumes.



Structural steel allows the newest mixed-use development in the Bronx to accommodate a range of tenants and architectural expressions.

SITUATED ON 17 ACRES WEDGED BETWEEN River Avenue and the Major Deegan Expressway, the new Gateway Center at Bronx Terminal Market has more of a history than most big-box store developments. The market dates to the 1920s, when Mayor John Hylan proposed building it to reduce crowded conditions among the fruit and vegetable vendors in Tribeca's Washington Market. In 2004, Related Companies acquired the Bronx Terminal Market lease and entered into an agreement with the City of New York and the New York City Economic Development Corporation to redevelop the long-neglected site, as well as the adjacent Bronx Mens House of Detention (BMHD), as a major shopping center. To create a linkage between the site's old and new structures, architects GreenbergFarrow and BBG-BBGM conceived a design in structural steel that would yield the long spans and design flexibility that tenants desire, while supporting balconies and other elements that create a welcoming pedestrian environment for the new buildings and their historic neighbors, including the BMHD and pieces of the original market buildings.

The design called for a pair of three-story big-box structures flanking a six-level parking garage for 2,600 cars, each occupied by a range of big-name retailers. While so called big-box structures may seem simple enough, creating a structural steel design that could satisfy the different requirements of tenants like Home Depot versus Target was key to realizing the project, particularly one of this scale. Totalling approximately 1 million square feet, the \$500 million project needed to be constructed in phases. Related first retained GreenbergFarrow as retail planners, who divided the bulk of the retail program into north and south volumes serviced by centralized parking. The architects also conceived of staggering the buildings so that each store could have a dedicated parking field (each garage floor is 12 feet high). BBG-BBGM then shouldered the job of design architect, and acted as overall architect for the project.

Complicating the planning was each retailer's floor loading requirements. In the north retail building, occupied by Home Depot, Staples, and Target,

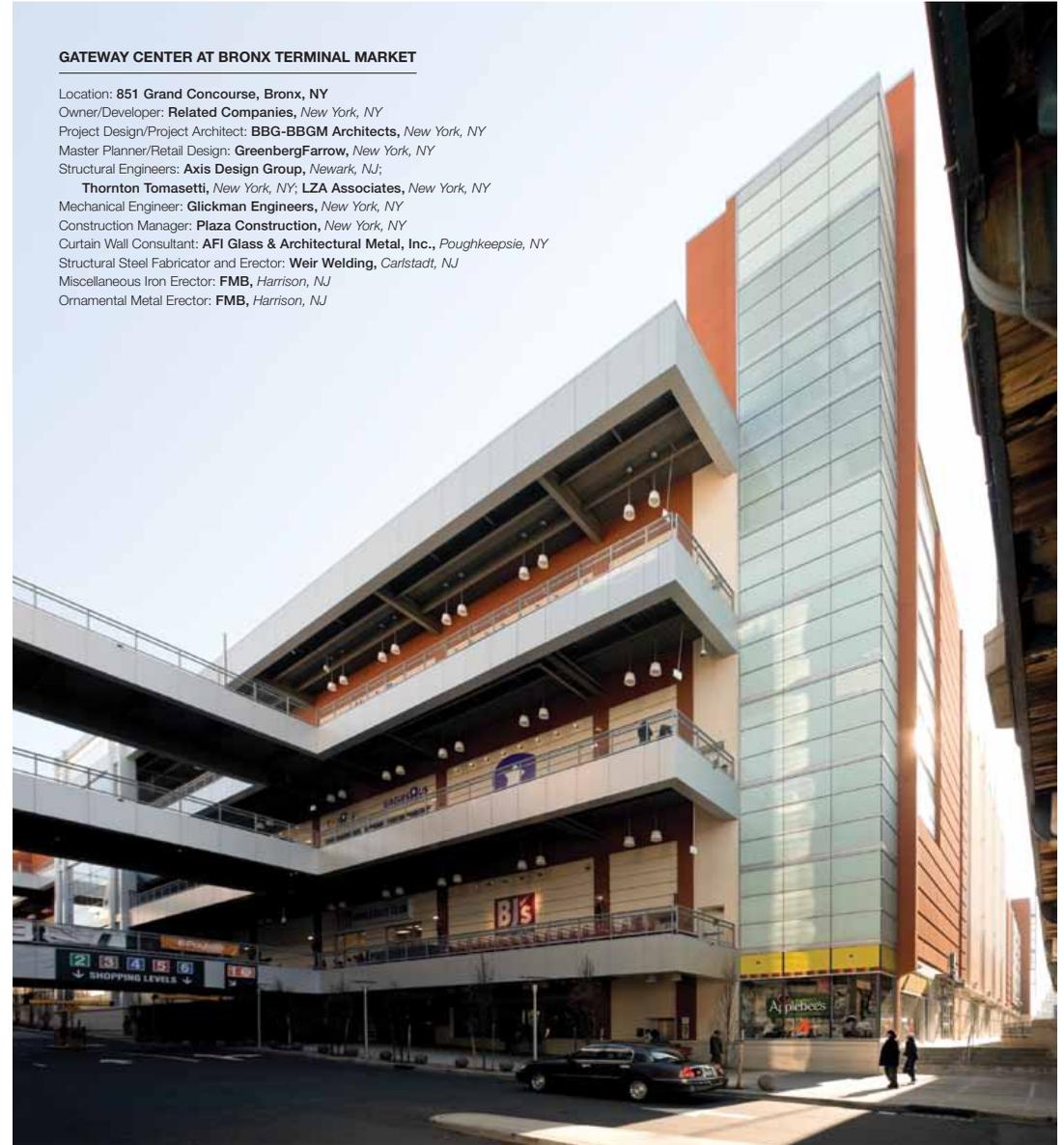
Home Depot is located at grade where the slab is able to handle its 650-pounds-*psf* live load requirement. In the south retail building, whose tenants include Babies and Toys "R" Us, Bed Bath & Beyond, Best Buy, BJ's, Marshalls, and Raymour & Flanagan, BJ's required a 250-pounds-*psf* live load capacity, while the floor load required by other retailers is 150 pounds *psf* and floor-to-ceiling heights are 24 to 26 feet. Only structural steel could stand up to the demands of suspended slabs without sacrificing clear span floor space. Structural steel also made certain architectural expression possible—in particular the series of expansive balconies that cantilever from the parking-facing sides of the two main retail volumes. Smaller stores line the garage, which is constructed of precast concrete, and occupy the Prow Building, a 20,500-square-foot, two-story holdover from the original Bronx Terminal Market.

"We explored a number of different ways to express this building," says BBG-BBGM principal Gregory Cranford. "Ultimately, we opted for a less industrial look in order to make a linkage between the neighborhood and the riverfront. There are a lot of scaling elements that create a pedestrian environment." Those include the two sets of balconies, which also contain vertical circulation cores, the restored Prow Building, and bas-reliefs that were reclaimed from the Bronx House of Detention and mounted at pedestrian level along River Avenue.

Gateway Center's structure was made possible partly by salvage, too. According to Narendra Shah, principal of one of the project's structural engineers, Axis Design Group International, the foundation of the old six-story wholesale market was designed for a heavy load, so it was reused for a majority of the north retail building's footprint. "We utilized those pile caps, putting a new concrete pier and base plate on top of each pile cap and then erecting the steel columns for the new building," Shah explains, adding that those piles have a capacity of between 15 tons and 20 tons. To provide retail tenants with more unfettered interior spaces, the project team eliminated many of those columns and drove 100-ton-capacity piles for the new building's expanded footprint to achieve an average 30-by-50-foot column grid. "It was not far off from the grid originally established by the retail planners," says BBG-BBGM partner Marc Gross. The average column grid in the south retail building, where there were no preexisting constraints, is 36 by 40 feet.

The south building's tighter column grid is just one indication that it is heavier, comprising 4,000 tons of steel compared to its sister's 3,000 tons. Charlie Weir, owner of structural-steel fabricator Weir Welding, cites the BJ's live load for that difference. In another example, floor construction is concrete fill on composite 18-gauge metal deck; where most decking is 6 1/4 inches deep, the BJ's decking is 8 inches deep.

In the north building, retail bays are framed mostly with W24x68 or W27x84 beams spaced at 10 feet and W30x99 girders. Its heftier counterpart to the south has W24x76 and W24x55 beams spaced at 9 feet and W33x118 girders, with W36x210 and W30x211 girders at the BJ's level. Columns are W14, and all the material is ASTM A992. The Grade 36 steel connection clips were attached at the shop, and the steel was field-bolted using A325 bolts



GATEWAY CENTER AT BRONX TERMINAL MARKET

Location: **851 Grand Concourse, Bronx, NY**
 Owner/Developer: **Related Companies, New York, NY**
 Project Design/Project Architect: **BBG-BBGM Architects, New York, NY**
 Master Planner/Retail Design: **GreenbergFarrow, New York, NY**
 Structural Engineers: **Axis Design Group, Newark, NJ;**
Thornton Tomasetti, New York, NY; LZA Associates, New York, NY
 Mechanical Engineer: **Glickman Engineers, New York, NY**
 Construction Manager: **Plaza Construction, New York, NY**
 Curtain Wall Consultant: **AFI Glass & Architectural Metal, Inc., Poughkeepsie, NY**
 Structural Steel Fabricator and Erector: **Weir Welding, Carlstadt, NJ**
 Miscellaneous Iron Erector: **FMB, Harrison, NJ**
 Ornamental Metal Erector: **FMB, Harrison, NJ**

typically measuring 7/8 inches in diameter. Separate crawler cranes were deployed to erect the buildings, with the north building beginning first and erected in two vertical runs working from south to north. The south building was erected in a U sequence, starting in its southwest corner and proceeding northward.

Although pedestrian bridges link the cantilevered faces of the retail buildings to the parking structure, the precast concrete building remains independent of its steel-framed bookends. The bridges—the northern and southern spans comprising W40x199 and W40x297 beams, respectively—frame into the retail buildings and rest on independent columns at the garage side, with expansion joints and seismic gaps.

“Ultimately cost advantage led us to a lightweight exterior material,” Cranford says of the precast concrete and Dryvit panels that are mounted to galvanized steel studs. That skin, like Gateway Center’s open-web joist roof, bears the only resemblance between Gateway Center and a run-of-the-mill big box. The project’s pedestrian-friendly articulation and its mighty structure, however, couldn’t be farther from the ‘burbs. ■

Above left United Iron fabricated and installed new canopies and railings on the restored Prow Building, unifying the center’s pedestrian space.
Above and facing Steel bridges link the cantilevered face of the retail buildings to the parking structure. The bridges frame into the retail building and remain independent of the precast concrete garage.

Previous spread: left: Dbox; right: GreenbergFarrow. Left column: United Iron Inc.; right: Dbox

Dbox