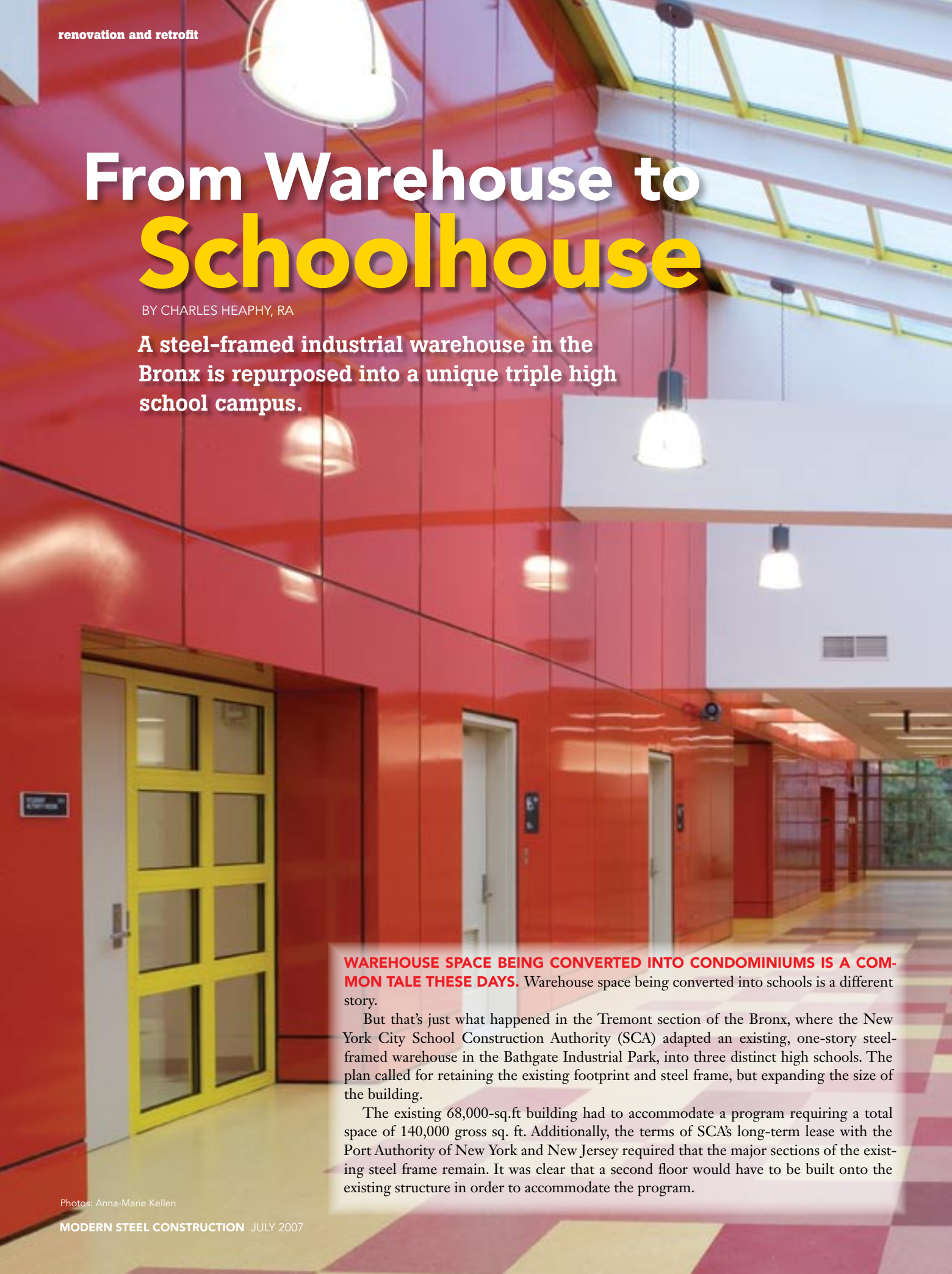
# From Warehouse to Schoolhouse

BY CHARLES HEAPHY, RA

**A steel-framed industrial warehouse in the Bronx is repurposed into a unique triple high school campus.**



**WAREHOUSE SPACE BEING CONVERTED INTO CONDOMINIUMS IS A COMMON TALE THESE DAYS.** Warehouse space being converted into schools is a different story.

But that's just what happened in the Tremont section of the Bronx, where the New York City School Construction Authority (SCA) adapted an existing, one-story steel-framed warehouse in the Bathgate Industrial Park, into three distinct high schools. The plan called for retaining the existing footprint and steel frame, but expanding the size of the building.

The existing 68,000-sq.ft building had to accommodate a program requiring a total space of 140,000 gross sq. ft. Additionally, the terms of SCA's long-term lease with the Port Authority of New York and New Jersey required that the major sections of the existing steel frame remain. It was clear that a second floor would have to be built onto the existing structure in order to accommodate the program.

Photos: Anna-Marie Kellen

The resulting two-story building was designed with all common spaces on the first floor, including the cafeteria, library, music rooms, art studios and recreation room. The three high schools are on the second floor, where each has its own separate areas of classrooms, science labs, administrative offices, lockers, and central atria under enormous skylights.

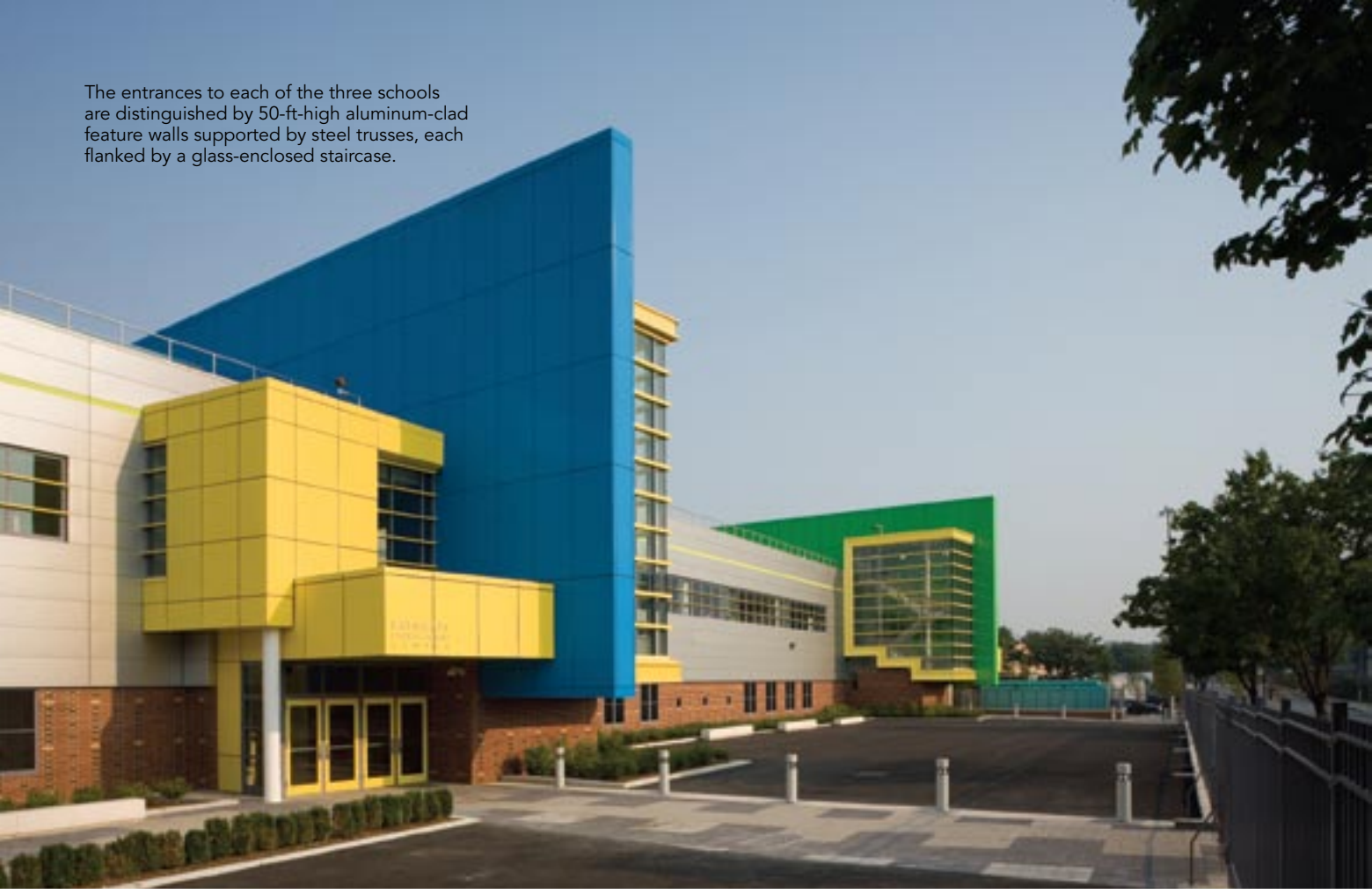
## Foundation

The interior concrete footings of the building were removed and replaced with new 40-ton drilled steel piles at each interior column location, sections of which were reused from the existing structure. The new steel piles were drilled to the depth of suitable soil-bearing capacity. They were required because the existing column footings were designed for 750 psf, which was insufficient to support the additional load of the new second floor. The existing steel columns were modified for connection directly to the steel piles by using steel plates of various thicknesses. This unusual steel-column-to-steel-pile connection replaced the need for traditional concrete pile caps.

The exterior concrete foundation and footings at the perimeter remained without any major modifications, since their existing capacity could support the additional loads of the new second-floor structure.

## Steel Structure

The original steel structure consisted of steel columns and



The entrances to each of the three schools are distinguished by 50-ft-high aluminum-clad feature walls supported by steel trusses, each flanked by a glass-enclosed staircase.

sloped steel roof girders (both W shapes), which created the existing open, double-height industrial space. The existing column bays were approximately 19'-4" wide by 18'-4" deep. The columns (unbraced) were approximately 27'-0" high to the bottom of the sloping roof girders.

The existing steel columns and roof girders were removed from the site by the steel contractor and shipped to their shop for modifications. These included splicing 5'-4"-high W-shape extensions to raise the roof girders. This increased the total column height from 27 ft to 32 ft, which provided sufficient height for the addition of the second floor. This floor also served to provide lateral bracing to reduce the buckling reaction of the increased column height.

The new second-floor assembly consists of a 5½-in. lightweight concrete slab and metal deck and steel wide-flange floor framing. New roof framing, consisting of steel wide-flange sections and metal deck, was installed between the existing roof girders. New connections were provided as required to the existing steel columns and roof girders.

The modified steel structure, combined with the new steel structure, successfully accommodated the 15-ft floor-to-floor heights required by the standards of the NYC School Construction Authority.

## Exterior

The architects realized that the existing exterior masonry wall assembly would need to be removed in order to reduce the total load on the existing perimeter foundation. They chose to replace the masonry wall with a new lightweight metal panel exterior wall system, which reduced the loads considerably, allowing the second-floor loads to be imposed without modifying the existing exterior footings.

The other advantage of replacing the masonry wall assembly was that it allowed the design to develop new elevations with expansive windows, which would be more appropriate for the schools' functions.

## Grand Entrances

The entrance to each of the three schools is distinguished by a 50-ft-high aluminum-plate feature wall, which also provides a dramatic housing for the glass and steel-framed stair tower. The three feature walls, brightly colored in red, blue, and green, continue to the interior atria of each high school, providing a clear circulation path for students—from the entry to the center of the school. The steel frame trusses that support the walls provide an efficient, economical way to create these dominant visual features.

The stairs feature central steel tree columns (12-in.-diam. pipes) from which tapered steel sections are connected to support the steel stair, roof, and glass curtain wall. The steel structure is exposed and coated with intumescent fireproofing to provide a dynamic vertical circulation space.

## Interior

The major public spaces—the student dining, library, exercise, and multipurpose rooms—have an exposed steel ceiling structure (with intumescent fireproofing) and an exposed steel acoustic deck ceiling to provide additional height for open, spacious common rooms.

The two major exposed steel beams in the multipurpose room were increased in depth using W36×280 sections with 30-in.-diam. holes to allow for the spiral ductwork to pass through the steel beams. This exposed structure provides a high open ceiling, as well as reinforces the structural aesthetic of the public school spaces.

The three large skylights are framed using exposed sloping steel sections to cre-

To lighten loads on the existing perimeter footings, which support the new second floor, the original masonry exterior was removed and replaced with a metal panel and glass curtain wall system.

ate dramatic interior courtyards for each of the three schools on the second floor.

## The Future of NYC Schools

At the Bathgate Educational Campus, the design team was able to work with an existing steel frame structure and modify it with new steelwork that allowed both numerous structural modifications and strong design elements. The unusual program—three high schools sharing a single building—was well served by the design, and the materials were a major part of this. The fact that the steel structure is exposed throughout the school, in the public and major circulation areas, reinforces the programmatic and architectural elements.

The Bathgate campus opened in the fall of 2006 to unanimous approval from the community, students, principals, SCA, and the city. MSC

*Charles Heaphy is an associate with John Ciardullo Associates.*

**Architect**
John Ciardullo Associates, New York

**Client/Owner**
New York City School Construction Authority, Long Island City, N.Y.

**General Contractor**
DeMatteis Construction, Elmont, N.Y.