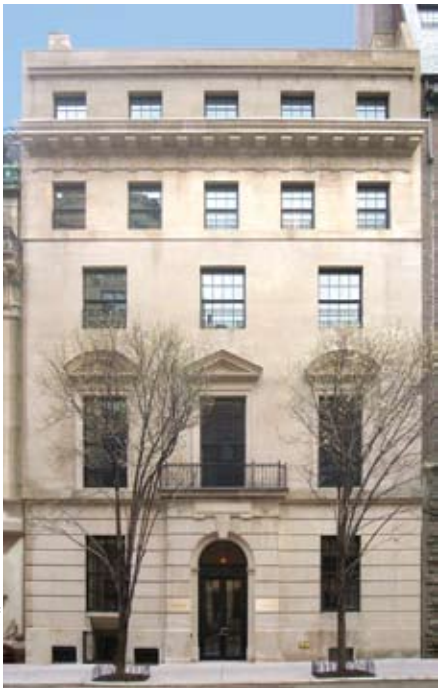
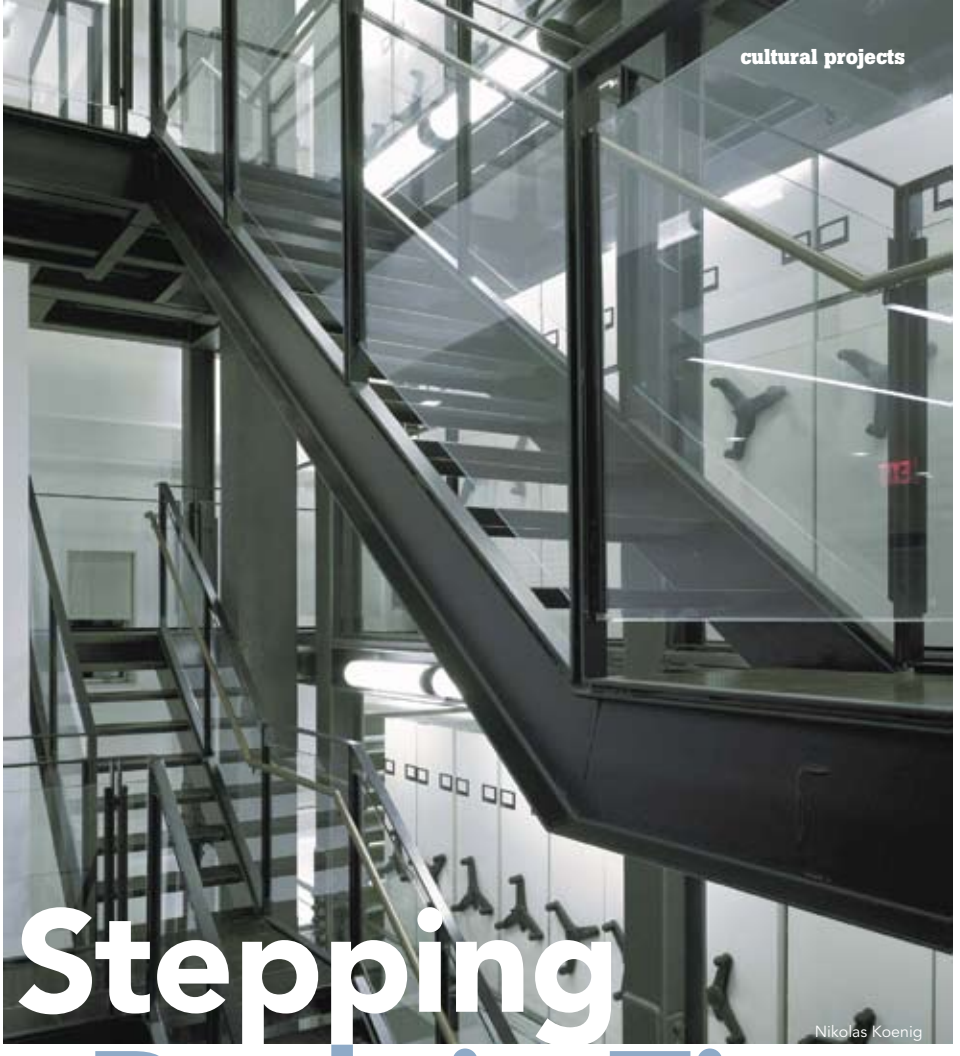
The outside is old, the inside is new, and both revolve around the ancient world in this academic renovation project.



E.W. Howell Co., Inc.



Nikolas Koenig

Stepping Back in Time

BY VICTORIA ARBITRIO, P.E., SECB, RANDALL GOYA, AND JULIE HAUSCH-FEN

THE NEW HOME FOR NEW YORK UNIVERSITY'S Institute for the Study of the Ancient World has come a long way since it was built more than a century ago.

Practically an antiquity itself, the 27,000-sq.-ft townhouse on Manhattan's Upper East Side, originally built as a residence in 1899, underwent extensive alterations to both the exterior and interior in the late 1920s—the majority of which remain today. The building served as a private residence until 1950, when it was sold to the American Jewish Congress for use as the organization's headquarters. In 2004 the site was acquired by the Leon Levy Foundation to house the Institute, which the foundation endows.

A complete renovation of the existing six-story building was necessary in order to meet the needs of an academic facility. The first and second floors were retrofitted and adapted to house various exhibition and study rooms. The remaining floors, which had suffered both poorly conceived and poorly executed alterations, required significant work and creative redesign for adaptive reuse as a library and offices.

On the Shelf

Of critical importance to the facility was the design of a new library to accommodate the Institute's extensive book collection. Removing parts of the fourth and fifth floor slabs at the back of the building allowed for a three-story atrium to house a freestanding stack structure. The structure is composed of three new steel-framed levels that can support high-density shelving and study carrels. These levels are equivalent in weight to the two floor sections that were removed.

To maximize the ceiling height in the second floor exhibit space below the library, a new third floor was built, rather than reinforcing the old one. The new floor is composed of 2½-in. stone-weight concrete over 3-in. composite metal deck, composite W14×30 infill beams, and composite W24×68 or W24×76 girders, which transfer the new library columns above to the original building columns below.

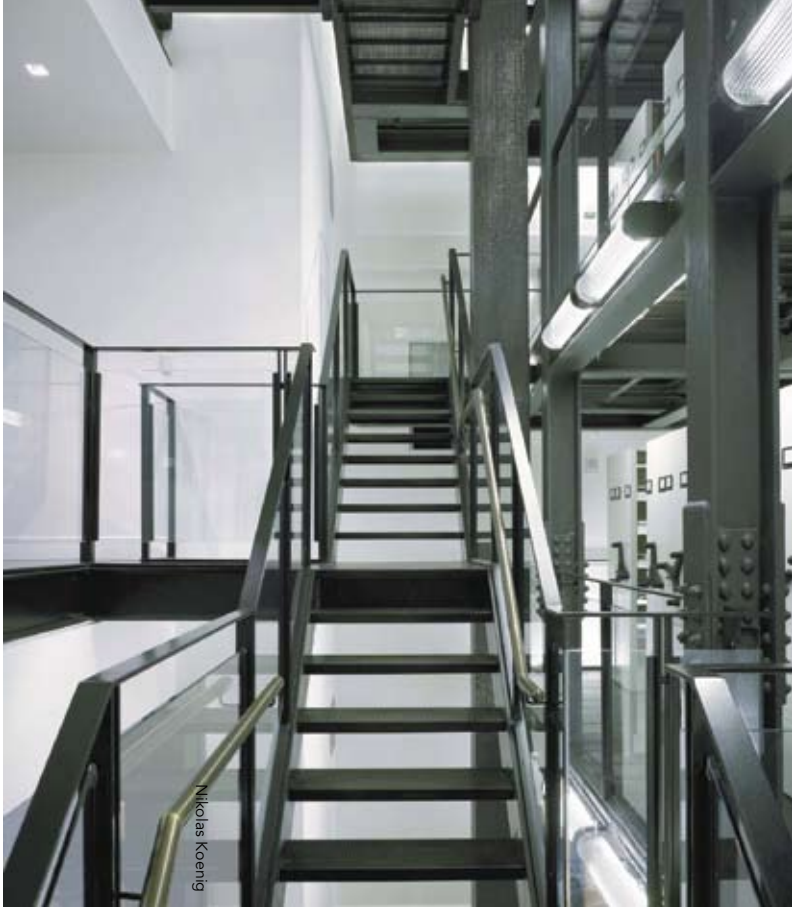
The masonry exterior walls needed additional lateral support after the removal of the fourth and fifth floors and were reinforced with 14×6HSS tubes to transfer the loads to the perpendicular walls. One existing steel column remains in the space; it runs the full height of the atrium, supporting the sixth floor and roof above. In order to extend unbraced for three stories, the column was reinforced with steel plates for its entire height.

The library stack structure is a moment frame with infill beams. The beams and girders are W10×33s and W10×45s and the columns are W8×35s. The rails for the sliding book storage units rest directly on steel girders. The columns are pinned to the underside of the sixth floor in order to brace them against lateral loads, with vertical slotted connections allowing for the floor deflection. The landings of the stair that connects the library floors and the existing floors were cantilevered on W8×40s and W8×58 members.

Thin, perforated steel plates, bent into channels and finished with a gunmetal powder coat, make up the floors, landings, and stair risers. The perforations allow light to pass through the space and in turn lend a feeling of overall lightness to the structure.

The design called for the steel members to remain exposed, so the size of the steel wide-flange shapes was kept consistent, as was the size of the bolts (¾-in.-diameter A325s). Similarly, there were set parameters for routing the building systems, all of which needed to be coordinated with the design of the stack itself prior to the fabrication of the steel. Penetrations through the steel beams to accommodate these systems were predetermined and drilled in the shop. All of the library's steel is ASTM A992 Grade 50. Because the finish of the structure is exposed metal, the beams and columns were coated with intumescent paint.

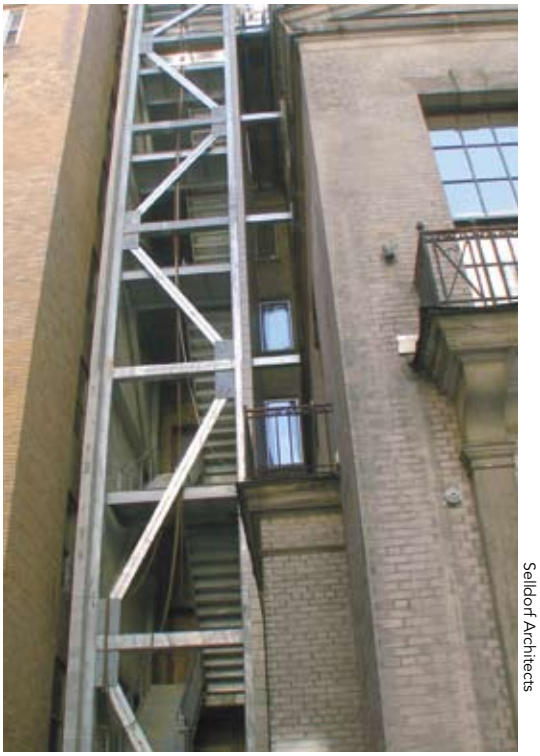
Erecting the library structure within the existing envelope presented considerable challenges. The space was small and largely inaccessible by cranes. The solution involved inserting steel members horizontally through the windows from the street, then distributing and moving them across the flooring, and finally using a chain-fall to pivot and lift each piece into place.



Seel framing is exposed prominently in this structural renovation project.

Adding to the Stories

In addition to the library, another key component in the renovation was refurbishing and extending the grand elliptical staircase an additional flight, to reach the sixth floor. Steel was chosen for the structure of the stairwell extension, as the complex curves of the winding stair stringer could be perfectly formed in steel. The curved tube stringers were supported at a new landing platform at the sixth floor, infilling a former skylight opening. The tubes were sized to limit deflections as well as possible vibration effects. The stringer was then clad in wood and plaster to match the stairs at the existing floors below. The original skylight was salvaged, restored, and reinstalled above the new stair extension.



A new egress stair tower at the rear of the building supports two wooden water tanks.

Steel was also used to reinforce much of the original structure in order to accommodate new loads introduced by the Institute—e.g., a new elevator, a new cornice, upgraded mechanical systems, and a new egress stair tower added at the rear of the building to support two wooden water tanks. (Two tanks were required, as having only one tank would have violated the zoning height restrictions.) The stair tower is open to the elements on one side. This braced frame is constructed with 8×8HSS columns, 10×8HSS beams, and 2L6×4 or 2L6×3½ braces. W14×68s with W6×20 grillage beams at 2 ft on center provide a dunnage platform for the water tanks over the stair roof. In the case of the cornice, the original limestone cornice was found to be severely deteriorated. However, as it did not align with an actual floor, new steel support anchors were installed inside the wall and the new GFRC cornice was through-bolted to these anchors.

The design team's plan for the Institute exemplifies both creative solutions to the project's program requirements as well as innovative structural approaches. The design seamlessly incorporates requisite state-of-the-art technologies and a new academic program while preserving the architectural integrity of a historic New York City townhouse. MSC

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