Historic Navy Yard Site Brought Into New Century

The team is charged with updating the 100-year-old structure while leaving most of its original elements in place by Esther D'Amico

Contractors renovating three joined buildings at the historic Brooklyn Navy Yard knew they might find some surprises as they began work on the 220,000-sq-ft structure. The steel-framed buildings, which make up what will become the yard's Green Manufacturing Center (GMC), were built separately between 1893 and 1941 and joined together over time during various building campaigns. The result was a structure with a mix of materials and styles that, in some places, has been a puzzle for the renovation team to figure out. While structural repair drawings helped the team anticipate early on what needed to be done, it was not until roof demolition got under way that long-hidden secrets began to be revealed.

"Nobody knew what we were going to see within the walls," says Everard Martin, project manager at Plaza Construction, the construction manager. His team began work in May 2012 and is charged with turning the Cybul & Cybul Architects-designed renovation into a LEED-Silver-certified light industrial facility. The goal, he adds, is to retain as much of the original structure as possible, salvaging all that the team can and replicating and replacing only where necessary.

That is no small feat for this $55-million project, which sits on the yard's south-central side near Wallabout Bay. The structure, which had once been part of the nation's premier shipbuilding complex, had sustained severe damage over the years. The individual buildings that make up the GMC structure once served as the machine, erecting, power and boiler shops for each battleship at the USS Arizona that were manufactured at the yard in its heyday before and after World War II (see p. 66).

But the yard was decommissioned in 1966 and, though it reopened a few years later to less than full...
capacity, the GMC and many other structures at the 300-acre site were nearly abandoned. The structure fell into disrepair and developed such problems as cracks and spalls in its concrete roof deck; large sections of rusted or missing corrugated metal cladding at the monitor; large portions of missing glazing; and deteriorated pieces of exterior walls.

The team will address those issues and perform a long list of other repairs that include revitalizing existing foundations; re-skinning the structure; adding an insulated roof, wall panels and windows; upgrading the mechanical, electrical and plumbing (MEP) system; and creating an open courtyard.

To add to the complexity, the team must coordinate work at the historical site with approvals from various federal, state and local agencies, including the National Park Service (NPS).

The GMC, which stands 75 ft high from slab to roof at its tallest point, forms a square-shaped “U” that lies near two dry docks. The structure’s three buildings—designated buildings 128, 28 and 123—surround a covered courtyard supported by a steel truss system.

Understanding the history of the site “and ensuring that we have a full understanding as to what we need to do to restore it back to its original state” have been the most challenging aspects of the work, Martin says. Three-dimensional modeling and an extensive amount of surveysing have greatly helped in this, he adds.

Structural engineering firm Wexler Associates made diagrammatical structural repair drawings of the site at the request of the Brooklyn Navy Yard Development Corp. (BNYDC), which manages the site for New York City. These “provided good guidance for the contractor, but they did not cover all that [the team] found,” says Neil Wexler, the firm’s president.

“Roof demolition took place early on and, when completed, we had access to areas that weren’t accessible before and we found distressed areas that we couldn’t see before,” he says. This included concrete-encased rafters that, once the concrete was removed, exposed severe rusting. “Once again, we had to do field work drawings” to determine the next step.

While all the buildings are steel-framed and have gabled roofs, they are not identical. Each building, for example, had a different roofing system when work started. “Some were precast concrete panels and cast-in-place concrete panels with a rubberized membrane, and some were corrugated metal roofing panels,” Martin says. “There was also an area that had a slate roof.” Plans call for the team to install about 181,850 sq ft of 4-in-thick insulated metal panel roofing.

Both Building 128, a long L-shape structure that is the largest and oldest of the three, and 28, another long span, are single-story buildings with gabled monitor roofs, bands of glazing and low brick walls. Martin estimates that his team is restoring about 30,000 sq ft of brick wall around the structure. There has also been extensive lead paint remediation throughout.

“In Building 128 we found something totally unexpected—brick arches below the floor grade in the ground,” Wexler says. He cannot explain why the arches are there. “This was the old foundation for one section of Building 128, and it consisted of pilings, brick arches, fill on top of the arches and concrete on top of that.”

Building 123, a double-height masonry structure, has a 4-ft basement below the slab level. “It’s like a crawl space, and I don’t know what it was used for,” Martin says.

Another undercover surprise was the condition of the structure’s steel column bases, which were encased in concrete at the start of the project. Once the concrete was removed, it was discovered that some of the bases were severely rusted and deteriorated.

That was discovered as foundation work was under way, Martin says. “We had to shore up the structure to release the columns so we could dig up the foundation. While we were doing that, it was then determined that there was deterioration in pretty much all the columns that were previously encased in concrete.”

“The rusted steel was actually supporting the rest of the building,” Wexler says. In keeping with the mandate to retain as much of the existing structure as possible, the team replaced only the portion of the steel that was badly rusted, splicing each column to plate and replacing only the rusted portions.
In some sections, the team found heavy equipment foundations, Wecker says. "The equipment had long been removed. We didn’t remove those foundations, but we will place a new concrete floor over that."

For MEP work, the team will be able to use many of the ducts from the original structure, says Brian Tannenhaus, president of BD Engineering. The structure will include a high-efficiency, gas-fired heating system.

Martin estimates that, after replacement of most of the roof and lower facade, about 60% of the original structure will remain.

Along the way there have been a few delays, albeit short-term ones, due to waiting for certain materials and agency approvals. For example, the original plan was to demolish the courtyard trusses during the initial phase of the project, but "there were some discussions with NPS as to the potential of it remaining as part of the building so we didn’t touch it," Martin says. The team recently received approval to take those trusses down, which will create an open air space for loading docks, he adds.

The delays will likely tack on a few months to project completion, which had been targeted for year-end but will likely be the first quarter of 2014.

BNYDC, which aims to make the yard itself a green manufacturing center, has so far signed up two tenants that will do their own interior build-outs. They are Crye Precision, a body armor manufacturer that also has a line of fabrics made from locally recycled materials, and Macro Sea’s New Lab, an incubator for high-tech green design and prototypes.

Given the age of the structure, "what we haven’t seen is a true structural failure," Martin says. "The failures that we’ve found were the major ones we knew of coming in—the existing grade beams along Morris Avenue were buckling and there were questions over whether the pile caps were sinking." A block of granite for pile caps supports each column, and each pile cap has several piles below it. The team has removed some of the piles and pile caps and replaced them with steel mini-piles and reinforced concrete pile caps as well as reinforced concrete grade beams.

Despite such details, the structure has held up remarkably well, says Richard Wood, Plaza Construction president. "It’s really good basic engineering; it’s nicely done."*