

The New York Times

Flood Barrier in Brooklyn: A 7-Foot Wall, Erected in Hours

In rebuilding the landmark Empire Stores as a commercial complex anchored by West Elm, the developers are relying on a deployable flood barrier.

By DAVID W. DUNLAP MARCH 2, 2017

The next time the floodwaters come to [Empire Stores](#) on the Brooklyn waterfront — and there will almost surely be a next time — the medieval-looking landmark will be defended by a wall.

Two or three days before a really big storm is expected to arrive, 29 crates containing [four- and seven-foot-tall panels](#) will be trucked to the site, overlooking [Brooklyn Bridge Park](#), from a local warehouse.

Should the forecast call for an unrelenting storm, workers will erect the panels a day before anticipated landfall, creating a 1,100-foot-long barricade — one-fifth of a mile — in four to five hours. If all goes as hoped, Empire Stores, which includes [West Elm](#)'s headquarters, will ride out the flood like a tasteful island in a surging sea.

Communities across the country are confronting the mounting evidence of [climate change](#) and fortifying buildings and infrastructure against rising sea levels and ever-more-intense storms. The New York Times is presenting case studies in resilient design in and around New York City. The series and [a glossary](#) are looking at tangible measures being taken to resist floods, surges, high winds and heavy rains.

Deployable flood barriers, which are in use around the world, are far from foolproof. But they are among the most straightforward and economical measures available.

For construction in a floodplain, the general aim is to elevate occupied floors above the expected flood level and to keep lower floors fairly spartan, ensuring they can survive inundation with little or no permanent damage. This makes new buildings intrinsically flood-resistant.

But neither approach seemed practical at Empire Stores, seven abutting storehouses of brick, stone and timber, built from 1869 to 1885. The Brooklyn Bridge Park Corporation is leasing the property to [Midtown Equities](#), and the rental income helps finance the park's operating and maintenance budget.



An example of an AquaFence, a deployable flood barrier. Panels can be from four to seven feet tall. Credit AquaFence

Midtown's renovation and expansion of the structures, now nearing completion, has created 380,000 square feet of commercial space. Public access is threaded through a courtyard that has been opened in the center of the complex. It wends its way past a new satellite of the [Brooklyn Historical Society](#) and up to a landscaped terrace that commands an almost unrivaled panorama between the Brooklyn and Manhattan Bridges.

More than 300 employees work at West Elm's headquarters on the second and third floors. The company also has a [home furnishings store](#) on the ground floor. It will soon be joined by a group of restaurants. "We really wanted to activate the ground floor and the park, with restaurants and seating areas," said Jay Valgora, the founding principal at Studio V, the original architects of the project. That called for a high level of finishes and décor.

Rather than being elevated, the ground floor was actually lowered several inches to better connect the spaces inside with the park outside, said [Navid Maqami](#), the co-founding partner of [S9 Architecture](#), which succeeded Studio V. Both firms are credited with the design.



Left, part of the main floor of Empire Stores. Right, the building's boiler room, situated on the fourth floor. Credit Photographs by Kevin Hagen for The New York Times

Some thought was given to adapting the stores' handsome iron shutters — [memorably recorded in a Berenice Abbott photo](#) — as a flood barrier. But the structural engineers at [Robert Silman Associates](#) determined that the shutters might not resist the force of floodwaters for any length of time.

Instead, for about \$1 million, Midtown bought a deployable barrier made by [AquaFence](#), an 18-year-old Norwegian company that has also equipped the nearby [Jane's Carousel](#), which was flooded during [Hurricane Sandy](#) in 2012. At Empire Stores, seven-foot panels will protect the water side, while four-foot panels will run along the upland side.

The panels are composed of laminated plywood, stainless steel and aluminum. They are hinged. When erected and braced, they form an L shape as deep as it is high. Vinyl webs run between the panels to keep water out.

The horizontal footing of each panel would face the floodwaters, not the building. The weight of water bearing down on the footing, nearly a ton in the case of a single seven-foot-tall panel, is what keeps the wall from overturning.



Jane's Carousel in Brooklyn Bridge Park was inundated by Hurricane Sandy in 2012. Credit Brian Morrissey/Associated Press

“We are definitely protecting it against the next Sandy or a greater storm,” said Adam Goldberg, the director for business development at AquaFence USA. “If the spillover is brief, there are pumps inside the protection barrier that would account for that.” There are also trench drains at the entrances that act as the third line of defense.

Despite the layers of protection, deployable barriers do not always keep floodwaters out.

During Sandy, there were a “large number of failures of these types of protection schemes,” said Andrew Martin, the acting chief of the risk analysis branch in the regional office of the Federal Emergency Management Agency. In some cases, water rose higher than the walls. In others, it leaked through poorly maintained sections of walls.

“Design and standards continue to improve,” Mr. Martin said, “but it is worth noting that these approaches are not fail-safe.”

He said his agency strongly recommended that property owners considering deployable flood barriers consult with local engineers and code-enforcement officials to fully understand the magnitude and nature of risk at a given site, the impact a barrier may have, how to maintain it and what the law requires.

The developers of Empire Stores are not relying entirely on a wall to protect the complex. For instance, the building's Con Ed transformer vaults are on the seventh floor. And there is a 600-kilowatt, gas-powered standby generator.



A view of the Manhattan Bridge from Empire Stores. Credit Kevin Hagen for The New York Times

In the West Elm store, electrical conduits were threaded artfully among the wood ceiling joists by Sean Burns, the job captain for [McGowan](#), the general contractor.

Mark Murashige, a founding principal in [VM Architecture and Design](#), the architects for West Elm, pointed out that the stock room was on the second floor. On the third floor, even farther from harm's way, are workrooms in which furniture and décor prototypes are developed. West Elm's computers are backed up in Rocklin, Calif., along with those of its corporate parent, Williams-Sonoma Inc.

Standing at an arched window on the second floor, recalling how Sandy's floodwaters crested almost four and a half years ago, Mr. Murashige said, "We have a healthy respect for what we see happening."

https://www.nytimes.com/2017/03/02/nyregion/brooklyn-riverfront-flood-protection-empire-stores.html?_r=0