



Working the Channels

Combinations of techniques to control erosion

By Carol Brzozowski

For erosion control specialists, channel stabilization can bring a host of challenges. Working around water means choosing solutions that will be durable and environmentally friendly at the same time. Approaches may include the combination of hard and soft armor or vegetative techniques.

Yet for those companies with the right crews, equipment, and mitigation approaches, there's plenty of work to be done. Recent severe weather events that have eroded slopes and coastlines have opened the floodgates for such projects.

New Stapleton Waterfront

Case in point: The Homeport, a 35-acre decommissioned US naval base on the north shore of Staten Island, had been slated for a mixed-use residential community project, the New Stapleton Waterfront.

The New Stapleton Waterfront had actually been designed 10 years ago, but budgeting issues prevented it from going forward, says Peter Lauro Jr., vice president of J.R. Cruz Corp. The Aberdeen, NJ, company provides services in micro tunneling, wastewater, water supply, transportation, and general construction.

In 2011, the Ironstate Development Company entered into an agreement with the city to acquire parcels and develop the first phase of a new, sustainable, mixed-use waterfront community at the former Homeport, located within walking distance of the Stapleton Staten Island Railroad station. But in 2012, damage from Hurricane Sandy required coastline mitigation, further delaying the project.

“Hurricane Sandy decimated that area,” says Lauro. The damage required some changes to the originally planned project. “Once we got into the job and started to uncover what was underneath all of the rubble and debris, we got a bunch of change orders, which led to the design you see today.”



Sheet piling was used to create a stilling basin to slow water velocity.



The developer broke ground on the first phase of the project in 2013, turning 7 acres into a sustainable development of retail and residential space—including affordable housing—for Staten Island residents.

“The New Stapleton Waterfront area is in the process of getting a complete makeover,” says Lauro. “The city is pumping a ton of money into that area to rehabilitate it and make it like a little downtown Brooklyn.”

The \$130 million project is financed by New York City and by a state Environmental Protection Fund grant. It was designed by the New York City Department of Design and Construction and is expected to draw more traffic to the waterfront with affordable housing, restaurants, bicycle lanes, a Ferris wheel and other entertainment, retail stores, and newly created tidal wetlands, according to information from New York City Economic Development Corporation (NYCEDC).

The marine work was designed by the McLaren Engineering Group. HDR provided oversight consultation.

J.R. Cruz Corp. was tasked with phase II of the project, which entailed reconstructing the park along the waterfront and intersecting two streets. The company also had to reconstruct the cove area adjacent to the park and rehabilitate five connector streets connecting Bay Street to Front Street with new utilities, new roadway reconstruction, curbs, and sidewalks.

“A lot of the work we did was all a result of what Sandy did,” points out Lauro. “The tides became high again. The designers were trying to mitigate the damage.” Some of that work was done with Reno mattresses.

Richard Prejs, Maccaferri’s northeast area manager, says J.R. Cruz installed 27 Reno mattresses measuring 12 by 6 feet by 9 inches thick with stainless steel Spenax fastening rings.

Maccaferri developed the gabion and Reno mattresses nearly 140 years ago, developing a double-twist wire mesh for hydraulic applications including erosion protection and channel lining, notes spokesperson Craig Foster.

The mattresses are cages engineered from double-twisted, hexagonal, woven steel wire mesh. They are assembled onsite and filled with stones to form flexible and permeable monolithic structures for riverbank protection and channel lining.

Plantings were placed along the waterfront near the Verrazano Narrows upper bay to be the first line of defense against regular scour in an area where cruise ships enter and exit. Reno mattresses were installed behind the plantings.

The mattresses will serve as a slope protection measure to help prevent scouring along the waterline as a second line of higher and stronger defense to help deflect and prevent erosion, says Prejs.

“It also provides a nice buffer between the planting area and above the Reno installation to help deflect and absorb some of the wave action from potential storm surge from a Superstorm Sandy-type event or the more common nor’easter,” he says.

Other mitigation measures were taken, as well, to augment the Reno mattresses, notes Lauro. Underneath the Reno mattresses are Maccaferri Polymeric Marine Mattresses. These mattresses are constructed from HDPE punched and extruded geogrids and fabricated into a mattress container.

“It’s about 18 inches thick, filled with a No. 5 stone, like a riprap stone, and if we do get high tides, that’s to prevent it from washing everything out as the tide recedes” says Lauro. “Those mats are supposed to lock everything we did into place.”

On top of those mattresses, J.R. Cruz constructed a new bulkhead wall of precast concrete along half the area and piles of timber lagging for the other half.

“That wall was built to help absorb some of the energy as the waves and the high tides come in, so they will not destroy some of the planting work that we did there,” notes Lauro, adding that salt-tolerant *Spartina* plants were used in the area.

