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Army Corps Builds Foundation For Resiliency

By JoAnne Castagna, Ed.D.

Nestled in the Sandy Hook Bay, the community of Port Monmouth, NJ, has experienced flooding, blizzards, and major storms that have swept through the area throughout the years.

It's Atlantic hurricane season once again, and life-long Port Monmouth resident Charles Rogers reminisces about past storms that have battered the area and his experiences.



"My father placed me on his shoulders and walked through four feet of water to take me to my grandmother's house during the hurricane of 1944," said Rogers.

The "1944 Great Atlantic hurricane" was a destructive and powerful tropical cyclone that swept across a large portion of the East Coast in September of that year.

During Hurricane Donna in 1960, the area was evacuated, and Rogers and his entire family were transported by the U.S. Coast Guard via an amphibious vehicle to the firehouse to safety.

"In 2012, Hurricane Sandy placed almost four feet of water in my house and six feet in my cellar and we lost our heating, electric, food, and personal items," said Rogers.

The outlook on future storms is much brighter for Rogers due to the Port Monmouth Flood Risk Management Project being performed by the U.S. Army Corps of Engineers, New York District. "It's an important project to protect Port Monmouth residents," said Rogers.

The Corps in partnership with the New Jersey Department of Environmental Protection Bureau of Coastal Engineering, is working on this project that will make the community more resilient during future storm flooding and surge.

To help with this resiliency, the Corps decided to include an environmentally friendly soil stabilization process that has never been used by the Corps before on a flood risk management project. The process makes the project stronger, improves the community's quality of life, and saves tax dollars.

The project area is made up of low-lying salt and freshwater marsh and there are many residential and commercial structures sitting right on or near this marshland.

Erosion over the years has removed much of the natural beachfront and dune complexes that provided coastal protection to the community from storm surge.

Hurricane Sandy further exacerbated the problem by causing millions of dollars in damages, destroying 750 homes and businesses in Port Monmouth alone.

The project includes two phases of work that together will reduce the risk of flooding throughout the entire community.

The first phase was completed in 2015 and provides storm risk reduction from the Sandy Hook Bay.

This work included building up and widening the shoreline, constructing a 15-foot high protective dune — spanning a mile and half long, and constructing a new stone groin perpendicular to the shoreline. A groin structure extends out from the shore into the water and interrupts water flow and limits the movement of sand, to prevent beach erosion and increase resiliency.

In addition, a fishing pier was extended 195 feet and walking paths were built to provide the public access to the beach area.



The Port Monmouth, NJ, shoreline was built up and widened and a fishing pier extended as part of the Port Monmouth Flood Risk Management Project. (Credit: JoAnne Castagna, Public Affairs)

The second phase is in progress and will provide a line of defense surrounding Port Monmouth.

The work includes constructing a concrete floodwall — the length of almost 22 football fields — to reduce flooding from the Pews Creek to the west and the Compton Creek to the east.

A floodwall is a vertical barrier designed to temporarily contain the waters of a river or other waterway which may rise to unusual levels during seasonal or extreme weather events.



A concrete floodwall is being constructed to help reduce flooding. (Credit: JoAnne Castagna, Public Affairs)

Additionally, pump stations, road closure gates, and a tide gate at Pews Creek will be constructed.

A pump station pumps or drains water from low-lying land and tide gates allow water to flow freely under normal conditions and close automatically to prevent flood waters from flooding a community.

In addition, a system of levees will be constructed. A levee is an embankment designed to prevent flooding.

The levees that are being constructed need a strong foundation. The land is made up of low-lying salt and freshwater marsh that is not strong and very saturated, so this soil needs to be removed and replaced with better soil to construct upon.



*Marshy soil is being mixed with concrete and water to create a strong foundation for a levee.
(Credit: JoAnne Castagna, Public Affairs)*

"Typically, it's cost effective to remove and replace the unsuitable soil, but in the New York and New Jersey region it's a different story," said David Gentile, project manager, New York District, U.S. Army Corps of Engineers.

"In urban areas it's hard to find disposal sites, so the soil would have to be picked up by trucks and transported to a location that can accept it and new more suitable soil trucked in, which is expensive, especially since we are moving a mountain of material," said Gentile.

Gentile decided to move forward with a cost effective solution for the soil that has never been accomplished before by the Corps on a flood risk management project.

This solution is a process called In Situ Soil Stabilization. Instead of removing and replacing the marsh soil, this process allows engineers to leave the soil where it is. A material, such as common Portland cement and water is mixed with the existing soil to strengthen the porous marsh soil, creating an impermeable foundation for a levee.

There are numerous benefits to this process, but the biggest benefactor is the surrounding community that sits just a few hundred feet from the project area.

This process eliminates the need for over 1,750 tri-axle trucks trips, carrying wet, mucky, and odorous material, through residential streets.

Rogers an active member of the Port Monmouth community agrees, "When this process was put on the table it sounded good then. Anytime you can use what is there and not have large truck loads of materials running up and down the roads you save money. It's a big plus for the project, the residents, and the environment."

Ken Johnson, engineer with the Corps' New York District, added, "Less trucks means the local roads and bridges are spared from possible damage, there is less air pollution, noise complaints are greatly reduced, and there is an overall savings of landfill space along with financial savings."

Gentile added, "The public is very supportive of the project and tax-payers will save an estimated \$700 thousand."

This project is expected to be completed by 2020 and designed to provide flood protection that can withstand another Hurricane Sandy.

Rogers added, "I personally believe this project is a big plus for the residents of Port Monmouth. Over the years this area has suffered large dollar losses in property, homes, and vehicles due to floods from hurricanes and storms. This project should cut those losses by at least 95 percent and our residents can sleep better at night."

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