

New Jersey Reduces Damage From Tropical Storm Floyd



FEMA DR-1295-NJ

These mitigation success stories from Tropical Storm Floyd illustrate some of the ways people, industry and government in New Jersey reduced

potential damage from the storm



**Some solutions are "hard",
such as pumping stations**

**Other remedies are "soft"
environmental approaches**

to control flood damage

Still others rely on common sense



Some projects cost millions. Some cost next to nothing.



Wayne, NJ

NJ Blue Acres Program

Some of Wayne s oldest neighborhoods are squeezed between the Passaic River and high railroad embankments. These areas - Old Wayne, Hoffman Grove, Fayette Avenue and Hobson Avenue - are particularly subject to severe flooding. To reach them, cars drive through a few scattered, narrow tunnels under the railroad embankments. When the Passaic River rises, the long, unbroken embankments confine floodwaters, as though they were levees.

According to local officials in Wayne, NJ, a staggering 700 homes in the municipality are in the Passaic River floodway. Floodways include a river s channel and certain contiguous areas. Any structures in a floodway, in addition to being at great risk from flooding, can increase the height of a 100-year flood.



Under New Jersey's Blue Acres Program, money from bond issues is used to buy homes in floodways and floodplains. Any structures on these properties are demolished or removed. The land may be left to grow wild, or minimally developed for passive recreation.

Seventy homeowners in Wayne Township's floodway said they are interested in participating in the latest round of buyouts. Of these, thirty-five homes are on the State's current list for acquisition. When Tropical Storm Floyd hit, the State had closed on ten of these properties.

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Dunellen, NJ



Newly Elevated Home is Safe From Floyd's Flooding

Over the years, the meandering, picturesque Green Brook flooded streets and homes in Dunellen, NJ. In 1996, it again overflowed its banks and destroyed the Jackson Avenue home of Michael and Maryann Robinson. Fortunately, they had flood insurance. The proceeds and a second mortgage helped the Robinson s rebuild.



The Robinson s elevated their new home four and one-half feet. The foundation was constructed with special openings to allow floodwaters to pass through freely. They purchased flood insurance on both the new house and its contents.

The Green Brook overflowed again in September 1999, during Tropical Storm Floyd. Portions of Jackson Avenue were submerged in over three feet of water, affecting several neighboring residences. The Robinson s elevated home was high and dry, although their air conditioner compressor, located outside, must be replaced.



Rahway, NJ



Wetlands Restored

Officials of the City of Rahway put conditions on their approval of the ultra high-tech Union County

Utilities Authority Resources Recovery Facility. The location was a former landfill. The utility was required to repair the environmental damage done by years of dumping along the bank of the Rahway River at the site. The Utilities Authority agreed to a wetland restoration project that can rise and fall with the level of the river. On a recent visit, an observer watched a great blue heron take flight, a flock of migrating warblers, mallards a public park and nature trail along the river. Phragmites, spartina and other native waterside plants were used to protect and stabilize the riverbank, restoring its natural function. A floating boardwalk, a cormorant and a belted kingfisher occupied the area. A rabbit hopped along in the restored habitat, thoroughly at home.

Tide Gate and Pumping Station Keep Businesses on Route 1 in Rahway Dry



Despite existing levees along the Rahway River, this automobile dealership on Route 1 in Rahway suffered repetitive flooding until recently. A new tide gate was installed and a pumping station to pick up drainage. The Union County Utilities Authority Resource Recovery Facility and the City of Rahway shared the cost.

Floods Prove Value of Union & Allen Street Acquisitions



Flooding from Tropical Storm Floyd exceeded the 100-year flood elevation in Rahway. The Union and Allen Street area flooded again, as it has for many years. This time, there were many empty lots where houses had stood. The City of Rahway put together an acquisition program using FEMA/NJOEM Flood Mitigation Assistance Project grant funds and New Jersey Green Acres funding. The former homeowners had taken advantage of Rahway's acquisition program to sell their homes and move to safer areas.



The owners of the two buildings pictured here have also decided to sell. The white house flooded to the level of the light fixtures on either side of the front door. The shingled house also flooded.



Electric Supply Firm Minimizes Damage to Stock



The Gafney-Kroese Electric Supply Company on Elizabeth Avenue in Rahway is next to the Elizabeth Avenue Bridge. The company does over \$20 million in business annually and has many international accounts.

A few hundred feet north of the Elizabeth Avenue Bridge, the Robinson Branch joins the Rahway River. The peaceful looking confluence of the two streams can generate turbulent, swift

floodwaters.

A few years ago the firm had experienced severe flooding. As a result, they stored most of their stock 18" above floor level. This simple precaution dramatically reduced the firm's flood damage, and enabled them to quickly return to normal operations.

Management decided to send the thirty-six employees home at noon on September 16, 1999, because of the wind and rain predicted from Tropical Storm Floyd. They were concerned that storm conditions would make travel difficult.



The Rahway River flooded during Floyd, sending 13" of water into the firm's distribution facility. Some inventory was lost, carpeting was damaged, and the sturdy steel gate to the parking lot was twisted and warped by the force of the water.



The newly painted floors - certain areas color-coded red, others, grey, - were a uniform brown. A film of mud coated lower edges of shelving.

Most of the estimated \$150,000 in damage to equipment and supplies would be covered by flood insurance. The company minimized down time, but was affected by power outages and a day lost to cleaning up.

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Franklin Township, NJ



Trapped by Floodwaters, Elizabethtown Water Company Workers Rise to the Occasion



The Elizabethtown Water Company has two water treatment facilities. Finished water from both plants is distributed to customers through the same system. The Raritan-Millstone plant increased production to 165 million gallons of treated water a day. Production at the three-year-old, state-of-the-art Canal Road Water Treatment Plant is usually 40 million gallons a day.

The Raritan-Millstone plant on Chimney Rock Road South, Bridgewater, had 18 inches of flooding during Hurricane Doria in 1971, a 50-year event. Afterward, management raised the berms protecting the plant to the 500-year flood frequency flood level. River encroachment permits were being sought to add a security wall this year. The newly constructed Canal Road plant is sited above the 500-year flood level.

By 10:00 pm, September 16, 1999, rains from Tropical Storm Floyd had passed and skies were clearing. Both the Raritan-Millstone and Canal Road water treatment plants were operating normally.



A worker leaving Raritan-Millstone for the night drove toward the railroad grade crossing in front of the plant. As he arrived at the crossing, the gates came down in front of his truck. He waited in the darkness for an approaching train. Instead, he was astonished to see water rushing down the track toward the plant. Using his cellphone, the worker warned other employees of the imminent flood.



Workers at Raritan-Millstone raced to shut down equipment. Two men waded through chest-high water to gas-powered pumps that couldn't be closed down from the control room. Concerned about falling water pressure in the distribution system, Superintendent Oleg Kostin telephoned the staff at the Canal Road Plant and told them to crank the plant up to maximum capacity.



The water rose until 4 am, eventually putting the Raritan-Millstone plant under 12 feet of water. The Backwash Control Chamber at the raw water intake for the Canal Road Plant was submerged. Under twenty feet of water, its top was barely visible. There was water everywhere, but new problems

arose when the raw water intake screens became clogged with debris. The problem was temporarily solved when a huge tree fell and smashed a hatch cover, allowing water to flow freely into the intake pipes.

At the peak of the crisis, the Canal Road plant was running flat out, producing 75 million gallons of treated water a day - double its rated capacity.

Ten workers, including Kostin, remained at Raritan-Millstone through the night. Trapped by floodwaters, Kostin monitored the situation at Canal Road by cellphone. The crew watched the night rescue operations in awe. From a vantagepoint at the top of the plant, they could see a fire burning out of control in nearby Bound Brook while clattering news helicopters illuminated the scene. When morning came, US Coast Guard helicopters evacuated the men.

The plant crew's rapid emergency response mitigated potential health hazards due to the flood. The Canal Road plant helped maintain water pressure, even though it was lower than normal. Concerned that lowered water pressure would cause back-siphoning, Elizabethtown stepped up chlorinating measures and issued precautionary boil water advisories. Fortunately, the water remained safe for consumption. Extensive monitoring and testing in the days following Tropical Storm Floyd showed the crew's efforts succeeded - no contamination occurred.

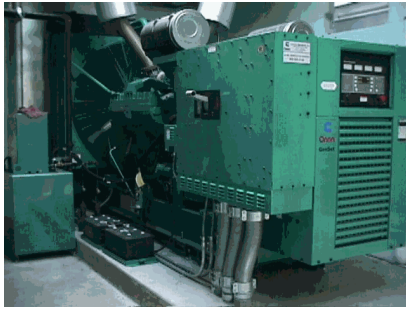
Post-Floyd, Superintendent Kostin is accelerating plans to install a big emergency generator at the Canal Road Water Treatment Plant. The flooded emergency generator at Raritan-Millstone will be replaced as quickly as possible. Twenty-six damaged pumps, all electrical systems, instrumentation systems and power generation equipment are being replaced or factory reconditioned. The company is moving forward with plans for the security wall. The controls for the Backwash Control Chamber will be moved from the Raw Water Intake on the Raritan River to high ground at the Canal Road plant. Elizabethtown plans to be ready if history repeats itself.

Little Ferry, NJ



Pumping Station Tested by Tropical Storm Floyd

The Borough of Little Ferry is tucked away in the New Jersey Meadowlands, bordered by the Losen Slote. The Dutch-named creek empties into the Hackensack River. A 100-year old wooden tide gate was inadequate to control the flow between the Losen Slote and the tides on the Hackensack River. The small, low-lying community flooded repeatedly, even with just a few inches of rain.



Recently, after years of repeated flooding Little Ferry replaced the wooden tide gate with a modern, high capacity pumping station. The \$2 million facility is equipped with an emergency generator that self-tests monthly, to ensure the pumping system will continue to operate even if there is a power failure.



The pumping station went on line in July 1999, just in time to defend the community against the floodwaters unleashed by Tropical Storm Floyd.

Residents were understandably concerned when Tropical Storm Floyd put the new pumping station to the test. The new system performed

beyond expectations and vulnerable residential areas were spared flooding.

Local officials expressed concern that the proposed continued development of the Meadowlands will only increase flooding in nearby communities.

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Fairfield, NJ

Elevated Home in Passaic River Floodway Escapes Undamaged

The Passaic River curls between tree lined banks right in the backyards of the houses on Camp Road. The street s name reveals the origin of the homes there as former summer cottages.

Maria and George Bolton enjoy their elevated home with its views of the river. Mrs. Bolton smiles as she describes the river s beauty even in winter, when ice forms on the stream and snow clings to bare tree limbs. Her sister bought a house across the street. Further down the road, another neighbor mentions that their grown son owns the house next door.





The Bolton's and their neighbors appreciate the secluded beauty of the tiny neighborhood. Home prices and taxes are low, and the Fairfield school district is excellent. There is just one problem: Camp



Road and its homes are in the floodway of the Passaic River.

After an especially severe flood in 1984, many Camp Road residents elevated their houses. Six years ago, the Bolton's bought their home. The former owner had already elevated it. The furnace and the pressure tank for their well were raised on 32" pedestals of concrete blocks.

Flooding from Tropical Storm Floyd sent 29" of water into the Bolton s utility room. As the water quickly rose, the family struggled to move the washing machine, which had not been elevated, upstairs. When floodwaters receded, the furnace and pressure tank were unharmed. There was no structural damage. The Bolton's hosed the mud out of the utility room and washed the walls and floors down with bleach and pine oil. They brought the washing machine back downstairs and created a new 32" platform for the washer and dryer from cinder blocks and plywood.

"It floods here at least once a year, but we are prepared for it," Maria Bolton said. "The house is elevated, and we have a pressure washer to make clean up easier. Now we have the washer and dryer elevated, too. " It is a small price to pay, she feels, to live in the Fairfield School District.

West Creek, NJ



Couple Adapts to Life by the Back Bays

Cathy Blair and Anthony Tortorici carefully chose their Jersey Shore home in 1995. They love living on the water, but know its dangers.



After much searching, the couple found an old waterfront cottage with endless views of the surrounding marshland and picturesque West Creek. It was especially important to them that the cottage had been raised on piles thirteen years earlier. The house was three feet higher than the 100-year flood elevation, so flood insurance to protect their investment would be only \$235 a year.

Cathy and Tony started a complete renovation of the house's interior and began landscaping the bare, sandy lot. The first job was to stabilize the soil, which washed away when storm tides rose higher than their bulkhead.

At first, they planted Japanese Black Pines, which are recommended for seaside locations. But, unsuited to the location's high water table, the pines promptly died. Undeterred, Cathy pulled them out and replaced them with native species. She allowed seaside weeds and tall bulrushes to spring up around the edge of the property so their roots would hold and stabilize the soil. The cedars, bayberry, beach plums and rugosa roses she planted have thrived.

A damp area that resisted her gardening efforts is being transformed into a tiny pond fringed with wetland plants. With the foundation plantings established, Cathy has successfully added ornamental grasses and perennials to her " wild garden". Rock-filled channels that look like dry streambeds drain the inevitable storm tides.

Tony captures the essence of living is such close proximity to the sea. "You have to do what works down here. And when something happens, don t make the same mistake twice." Tropical Storm Floyd produced only 18" of flooding in West Creek, but Cathy and Tony felt prepared for a full-fledged hurricane.

They believe in planning ahead. The home s sewage grinder is elevated and secured. Their new wellhead extends four feet above ground to lessen the chance it will be infiltrated by floodwaters. Tools and equipment stored outside are up on sawhorses. Neatly stacked beneath the house are pre-cut and pre-drilled plywood panels ready to cover their windows when a big blow is expected. Their oil tank is elevated and they keep it filled, so it will not float away.

Their renovation now complete, the couple plans a big new addition. "Its a little crowded in here with Jack, our Parrot, and Nacote, our 100-pound German Shepherd sharing the space with us. And, like most people, we need more closets" Cathy said.

The new addition will be elevated on pilings and comply with all sorts of regulations including the National Flood Insurance Program, the NJ State Building Code, health codes and the Coastal Area Facility Review Act. "I hate paperwork and dreaded the permit process," Cathy said. "But the people at CAFRA were really nice and very helpful. It wasn t bad at all." The couple is confident their elevated home will withstand future storms.

Tony points out that under local practices, propane tanks are not required to be either elevated above the base flood elevation or secured. He feels this could become a problem in a severe storm. "They can break loose and become floating bombs", he says. He is frankly puzzled that people don t do more to safeguard their homes from coastal storms.



This house was recently moved to a new site at the end of Dock Road, close to the open bay. Homes pre-dating the Eagleswood Township Flood Damage Prevention Ordinance were not required to elevate. Today, projects such as this must comply with current elevation requirements.

Lodi, NJ



Tropical Storm Floyd Puts Cleared Land Under 6 Feet of Water



The Saddle River divides the Borough of Lodi; four bridges connect the two halves. In 1977, a severe storm flooded homes and the Borough's sewage pumping plant in the riverfront area west of Main Street. The plant, built above the 100-year base flood elevation, was unaffected by the 1977 flooding. But homes in the area were badly flooded.

After the 1977 event, Lodi became one of the earliest communities to participate in a buyout program using federal funds. In 1982, under Section 1362 of the National Flood Insurance Program, the Federal Emergency Management Agency purchased six flood damaged homes. The Borough of Lodi paid the cost of demolition. Ten additional homes were purchased and demolished using a federal matching grant available under the provisions of the Emergency Flood Control Bond Act of 1978. One homeowner in the target area reportedly refused to

participate in the buyout.

The land cleared in the 1982 buyout was set aside for recreation. The site was improved with a softball/soccer field, and elevated toilet facilities. Chain link fencing and lights were added. The well-used park is dedicated to two Lodi policemen, Voto and Tedesco, who died in the line of duty. The soccer program is so popular, the Borough plans to build another soccer field.



On September 16, 1999, Tropical Storm Floyd caused the Saddle River to overtop its banks with a vengeance. Floodwaters reached from Avenue E to Central Avenue on Main Street. All four bridges were under water and impassable. Voto Tedesco Park lay under six feet of water. Lodi's Sewage Pumping Station, built for a 100-year flood, had four feet of water and was off line for three days. Water and sewage flowed into houses nearest to the pumping station and river. Voto Tedesco Park facilities, although submerged, survived the flooding. The sixteen families who formerly lived

on the site had made the smartest move of their lives.



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