FEMA

Multiple Mitigation Measures Give Darlington An Elevating Experience

Darlington, WI - Located in the southwestern corner of Wisconsin, this rural city was founded beside the Pecatonica River and officially given the name of Darlington in 1869. It has a well-run city government headed by a mayor and a population of 2,398. A police and fire department along with a supporting emergency medical treatment (EMT) unit serves the city. Darlington has its own 34-bed hospital complete with a heli-pad (it's an 18 minute flight to Madison). A modern nursing home with capability to care for 120 seniors is just two blocks down the street from the hospital.

Darlington is also the county seat and home to the Lafayette County Fair.

A Darlington business with flood shields installed shown during a 1998 flood.
Photo: Phil Riseeuw, Darlington

Long History of Flooding

Aerial view of Darlington showing flood-prone area between bridge over east-flowing portion of Pecatonica River and horse-shoe bend. *Photo courtesy of USGS*

During the past 172 years, this beautiful community has been at odds with the Pecatonica River, a medium-sized body of water that nearly encircles it with coils of brownish water at flood time. Normally, the river gently flows southward, then bends east until it bends abruptly north, east, south and east again, forming a tight horseshoe. It is at this horseshoe bend where trouble bubbles over and swamps Darlington when the river rises.

A sturdy concrete and steel bridge crossing the river connects Darlington's business district to the south side of town. It is in this low-lying area on the north bank of the river between the bridge and the horseshoe bend that waters from the Pecatonica most frequently invade downtown. Most of the buildings here date back to the mid-1800s and are of considerable historic importance. Across the bridge, the street continues up hill, away from the river, and passes through a residential area on its way to a rapidly-developing industrial park.

Darlington's flooded Festival Grounds: Where buildings used to stand soaking in damaging waters, there is now open space.
Photo: Phil Risseeuw, Darlington

Each time the river unleashed its destructive force, it left a trail of mud, debris, bacteria, and, at times, even hazardous materials such as fuel oil and farm chemicals in its wake. These floods contributed significantly to the financial stress felt by families and businesses. Many homes adjacent to the downtown business district also were repeatedly swamped.

Flooding was deteriorating structures and drastically reducing property values all over town. In addition, the flooding was exacting substantial losses from businesses. The losses continued to mount up with every cleanup and repair. The buildup of mold and mildew in downtown structures was destroying Darlington's business infrastructure. The frequency of flooding in Darlington was approximately once every 20 to 21 years, but since 1950, floods began occurring more often.

The continual flooding is well documented and photographed from 1937 and into the 1950s, its toll clearly imprinted on the faces of the Darlingtonians shown. As townspeople tired of the onslaught of the relentless river, many considered leaving town for good. Others closed long-time businesses and abandoned properties that were quickly becoming unsalable. Property values plummeted. In the early 1990s the historic downtown area began looking forlorn with peeling paint, cracking concrete and brick work, and smudged, fogged-over windows. Deserted buildings on the lower main streets stood as mute testimony to a dying business district.

It had become painfully clear that the multiple floods of the past 50 years had taken a terrible toll on Darlington. Something *had* to be done.

Mayor Bev's Plan

During the onslaught of floods, the city's mayor, Bev Anderson, a former housewife and city council member, tried to think of ways to halt this cycle of destruction. With help and advice from state and federal officials, Mayor Anderson and other community leaders began developing a come-back strategy. "I used to lay awake at night wondering, how in the world are we going to do this?" Anderson said.

The answer, it turned out, was with Anderson's determination, excellent networking skills, and a lot of hard work. The words of a song popular in the late 1940's sums it up best Anderson said, "You got to ac-**cent**-uate the positive and e-**lim**-inate the negative."

So with all emphasis on the positive, the mayor and other Darlington leaders set about developing a flood mitigation plan. To ensure efforts were locally based, they involved civic leaders, business owners and

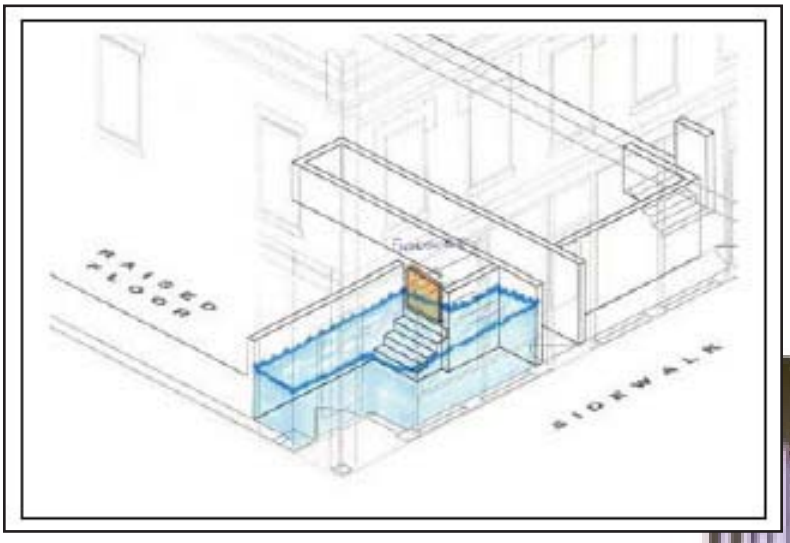
Buildings on a Darlington side street surrounded by flood waters in 1998.
Photo: Phil Risseeuw, Darlington

residents in the planning process. They used a multi-objective approach to understanding their watershed problems: they considered all flooding solutions, identified community concerns, obtained expert advice and built strong partnerships. Mitigation became the one word that could offer hope for everyone involved.

In the end, Darlington's Flood Hazard Mitigation Plan became the first in the state of Wisconsin to be approved by the Federal Emergency Management Agency (FEMA). It was the beginning of a new era for Darlington.

The plan called for the following actions: Business property owners were to cover the costs of rehabilitation and historic preservation of their buildings. Private home owners were encouraged to purchase flood insurance if they did not already have policies. Historic structures were brought into conformance with current building codes and the requirements of the Americans with Disabilities Act (ADA).

Partial barrier protects yellow house (center right). Barrier keeps high water off the property and prevents excessive erosion. Design feature prevents barrier collapse by permitting flood water to enter yard from highest end of barrier (near corner of house). Should flood waters reach this height, they would begin to fill the yard behind the wall, equalizing pressure. Removable plugs at bottom of wall permit water to drain after flood has subsided. Green house on left is elevated to protect it from floodwaters.
Photo: Phil Risseeuw, Darlington



Left: Flood-proof materials and flood shield at top of steps keeps flood water out of businesses while preserving the historical facades on Darlington's Main Street. Below: Vestibule steps lead to newly raised first floor of businesses.
Photo: Phil Risseeuw, Darlington

Meeting the ADA requirements called for constructing a shared, concrete, handicap-access ramp constructed in the rear of the downtown buildings. The ramp not only would serve several buildings, it also would act as a flood barrier.

The community adopted four goals as part of its comprehensive mitigation plan, which was designed to retain the historic and community value

Former Darlington Mayor Bev Anderson and FEMA Mitigation Specialist Chuck Black inspect stanchions and drain cover at top of steps leading into a Main Street business. It is at this point that flood shields are attached when flooding is imminent.

Black and Anderson start up ramp behind Main Street stores. Ramp provides access to businesses during high water when flood shields are in place in front of stores. Walls surrounding ramps provide additional flood protection. Utilities (electrical and gas meters and connections as well as air conditioners) are raised high above potential flood elevations.

Both photos: Barbara Ellis, FEMA.

of down-town Darlington and to mitigate against future flood damage. The four goals were to:

- Preserve the historic downtown business district.
- Restore the economic base of the district.
- Develop an open space park and recreation area next to the river.
- Eliminate or substantially reduce flood damages in the future.

Multiple Projects

Utilities

Among the Mitigation Plan's projects were those that accomplished the following. Darlington's waste water treatment facility was relocated away from the flood zone. All major utilities such as gas and electric in the flood zone were raised as much as eight feet off the ground. Anything that had previously been covered by floods would now be high and dry. As each project to resuscitate the ailing city was completed, the excitement and enthusiasm of Darlingtonians grew.

Flood Shields

In early 1993, city officials had begun discussing an idea with David Gough of the Darlington Dairy Supply Company. Gough had helped to develop a system of what he called "flood shields," to address the downtown flooding problem. The flood shields were designed to prevent flood waters from entering the downtown businesses. Made of a corrosion-proof aluminum, the shields would be clamped to rigid steel stanchions. The stanchions were to be cast into the top concrete entry portals, leading into the proposed raised levels of Main Street's businesses. The shields were to include rubber seals on three sides and were to be held in place by hand-cranked levers that pulled them tightly against the stanchions at the top of each entry way. Next, a major piece of the project would come together with the addition of hardened concrete vestibules. These

would be made of cast-concrete to reinforce each entryway of the affected buildings. Once in place, very little water could enter, although that possibility was handled by the provision of large drains located just behind the flood shields. Whatever water did leak through would quickly be addressed by the floor drains covered by square, metal floor grates.

Gough, being familiar with stainless steel and aluminum materials at the dairy supply company for which he worked, made a prototype shield out of quarter-inch plate aluminum. Then the application was tested in his shop and judged to be just what they were looking for. Darlington officials approved fabrication by the dairy company of all the flood shields at a total cost of about $200,000. The plan called for the construction of 150 aluminum shields, enough to protect business-district buildings where flood waters were deepest.

Each of the 150 shields were numbered and lettered for the specific buildings on which they would be installed. The River Wood Restaurant alone, located nearest to the river, required 30 shields to seal all doors and windows on four sides. Next, three retrofitted, modern, metal hay wagons were acquired to hold the shields when not in use. The wagons, each holding 50 shields, were parked in a specially constructed three-door garage at the bottom of Main Street.

Early warning from flood gauges up-river at Calamine, Wisconsin, affords Darlington at least eight hours notice before flood waters reach the town. This is time enough to distribute and install shields and then hunker-down until the flood waters recede. The application process takes approximately six hours from the up-river warning until the completion of shielding the Darlington business district.

When flooding is imminent, an appointed flood shield distributor driving a pick-up truck with a ball hitch simply backs-up to each of the three garage doors, hooks up the wagons, then drives around the corner to pre-planned locations where individual business owners slide their shields off the wagons and install them on their buildings.

Shields for bank lean against building awaiting deployment to their specific location for flood-proofing doorways and windows.

Specially built wagon holds shields while in storage. Pick-up truck tows wagon short distance to buildings for which shields were custom made.

Both Photos: Phil Risseauw, Darlington

Elevations

A Madison-based contractor was hired to prepare the design for elevating the floors of the old businesses above flood levels. The contractor began by shoring up all affected Main Street structures to withstand future floods. In the process, entire first floors, including old floor joists, were removed. Existing basements were filled with as much as nine feet of compacted pea gravel to new levels of four feet above the original first floor elevation.

Then new concrete slabs were poured over the filled basements, some as many as 13 feet above the original basement elevation. In addition, hardened concrete vestibules, measuring about five to six feet inward, were poured inside the entrances of each business building. Concrete steps leading up to the newly raised floor levels then were constructed as were 8-inch thick reinforced concrete walls on either side of the steps (see diagram on page 3). Steel stanchions were cast into the walls at the top step of the vestibule.

The concrete entry ways were finished with half-inch-thick, 8- x 8-inch ceramic tiles creating a neat-looking finished entry. During the refitting of these businesses, done two at a time, businesses were transferred to what were called “incubator sites,” so that the merchants could continue with day-to-day commerce. As each business was completed, furnishings and merchandise were transferred back to their original site. When the project was completed, the contractor received a special award in 1997 for this highly successful flood mitigation project.

The downtown district wasn’t Darlington’s only concern though. Adjacent neighborhoods and businesses also were being swamped by flood waters. As a part of the town’s total mitigation plan there were several items to be taken care of. They consisted of elevating many affected homes and their utilities above the base flood elevation (BFE). Participating homes in the flood zone elevated all utilities and furnaces. Those with basements had them filled-in with crushed rock. Some homes had concrete walls erected on the exposed sides prone to flooding. Approximately 55 homes were involved.

Relocations

Also included in the mitigation plan was the acquisition and removal of several businesses including an above-ground diesel- and heating-fuel storage facility and a large automobile dealership. The Economic Development Administration of the U.S. Department of Commerce provided funds for the infrastructure in the business park (streets, sewer and water).

As a result, a brand new festival ground has sprung up with sprawling grassy areas and paved walkways. Also, a new baseball park now exists for little leagues and teams from T-ball to adult.

Darlington received a Petroleum Environmental Cleanup Fund Award (PECFA) for relocation and cleanup of the petroleum-products storage facility in the southeastern part of the city adjacent to the river. The PECFA program reimburses owners for a portion of the cleanup costs of discharges from storage systems. Awards vary up to 100 percent of eligible cleanup costs.

This Main Street restaurant was mitigated with hardened concrete vestibule and flood shields inside. The entrance to the apartment above the business is shielded from the outside.

Photo: Phil Risseeuw, Darlington

The vacated land near the river was turned into a riverside park with a lighted 1.2-mile paved trail, camp-ground and open green space. A portion of a 39-mile tri-county multiuse trail also runs through the park on what had been an old railroad bed. Adjacent to this new park, the Lafayette County Fairground with buildings, stands and exhibit halls was included in the city's elevation project.

The city's completed project has acquired and demolished 13 commercial properties and developed a 33-acre business park up and away from the floodplain for relocated and new businesses.

House at the end of a block of several elevated homes across street from Darlington's new ball fields. Lots and homes all are raised above the Base Flood Elevation for this neighborhood and were not flooded during the June 2008 flood.
Photo: Barbara Ellis, FEMA

Multiple Benefits

A major benefit of the entire project was a dramatic increase in property values city-wide. One city official estimates that property values for the refurbished commercial buildings along the old main street have nearly doubled. One structure valued at $30,000 after the 1993 flood and then appraised again after the flood proofing was appraised at $60,000. Nine of the 11 buildings in the first block of the business district were mitigated.

In all, 19 commercial buildings were flood-proofed while preserving their historic storefronts. For this, Darlington was honored with an Achievement award from the Wisconsin State Historical Preservation Society. Six downtown businesses that could not be flood proofed or elevated were afforded as much flood protection as possible by raising or flood proofing their mechanical and electrical systems as well as their plumbing. In addition, upper Main Street was given a facelift with new construction of a combination business block containing a new dental clinic and 17 condominium units. These serve as a draw for seniors to remain and abide in the city. Extreme care was taken to match the existing early 19th Century architecture on the street.

In the growing business park across the river the latest additions to Darlington's business community include a Mexican cheese plant, a Case farm implement store, a bank, a 41-unit motel, the Illinois Tool Works and a gas station.

Darlington is coming alive and is vibrant again. It is currently enjoying an exciting rebirth as a community that invites new families and businesses to come and settle down there. Benefits resulting from implementation of the mitigation recommendations are the significant reduction of future flood damages, quicker recovery following floods, capital improvements, economic development and revitalization of the downtown business community. The city, once on the losing end of a battle with a river is becoming a classic upper-Midwestern Phoenix; arising with a new heartbeat, ready to spread its wings and fly again.

Multiple Funding Sources

Darlington needed to obtain funding and expert knowledge to implement the plan. Success in reaching the city's goals depended on forming an interagency coalition and promoting cooperation among local, state, and federal governments – and the city's business participants. The total funding for the multiple mitigation projects for Darlington amounted to $2.3 million. The city worked to secure grants to supplement their local share of all costs involved in this unique and highly successful mitigation effort.

During the two most recent Wisconsin floods, those of 2007 and 2008, the city of Darlington was "armored and ready" for whatever Mother Nature decided to throw at it. The flood shields stopped virtually all flood water from entering businesses, elevations of buildings and utilities prevented further damage and the residents and business owners were afforded peace of mind in knowing they were protected this time.

The following agencies contributed grants and/or expertise to the project.

- FEMA's Hazard Mitigation Grant Program
- FEMA's Pre-Disaster Mitigation Program
- National Flood Insurance Program
- Flood Mitigation Assistance
- Economic Development Administration, U.S. Department of Commerce
- Wisconsin Emergency Management
- Wisconsin Department of Natural Resources
- Wisconsin Department of Commerce
- Wisconsin Department of Administration
- Wisconsin Historical Society
- Southwest Wisconsin Regional Planning Commission

Historic buildings that grace Darlington's Main Street are protected from flood damage and their historical character is preserved.
Photo: Barbara Ellis, FEMA