



Multiple Mitigation Measures Give Darlington an Elevating Experience

Full Mitigation Best Practice Story

Lafayette County, Wisconsin



Darlington, WI - Located in the southwestern corner of Wisconsin, this rural city (population of 2,398) was founded beside the Pecatonica River and officially given the name of Darlington in 1869. 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 the city with coils of brownish water during floods. 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.

Flooding was deteriorating structures and drastically reducing property values all over town. The losses continued to grow with every clean-up 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.

During the onslaught of floods, the city's mayor, Bev Anderson, with help and advice from State and Federal officials, and other community leaders began developing a come-back strategy by developing a flood mitigation plan. They used a multi-objective approach to understanding their watershed problems: consider all flooding solutions, identify community concerns, obtain 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). The plan called for business property owners to cover the costs of rehabilitation and historic preservation of their buildings; private homeowners encouraged to purchase flood insurance if they did not already have policies; and historic structures brought into conformance with current building codes and the requirements of the Americans with Disabilities Act (ADA). 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.

Among the mitigation plan's projects involved mitigating the city's utilities, constructing flood shields, elevating buildings, and relocating buildings. Darlington's wastewater 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.

In early 1993, city officials had begun discussing an idea to develop a system of "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 atop the concrete entryways. The shields include rubber seals on three sides and are held in place by hand-cranked levers that pulled them tightly against the stanchions at the top of each entryway.

The mitigation plan called for the construction of 150 aluminum shields, enough to protect business-district buildings where floodwaters were deepest, costing the city a total of about \$200,000. The flood shields were developed and created by David Gough of the Darlington Dairy Supply Company, a local business with expertise in working with stainless steel and aluminum materials.

When the flood shields are not in use, three retrofitted, modern, metal hay wagons store the shields. The wagons, each holding 50 shields, are parked in a specially constructed three-door garage at the bottom of Main Street.

Early warning from flood gauges upstream at Calamine, Wisconsin affords Darlington at least eight hours notice before floodwaters reach the town, enough time to distribute and install shields. Applying the shields in the Darlington business district takes approximately six hours from the upstream warning to completion.

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). Steel stanchions were cast into the walls at the top step of the vestibule. The concrete entryways were finished with half-inch thick, 8-inch by 8-inch ceramic tiles, creating a finished entry.

Elevating the old businesses above flood levels was completed by a Madison-based contractor that removed entire first floors and filled existing basements with as much as nine feet of compacted pea gravel to new levels of four feet above the original first-floor elevation. New concrete slabs were then poured over the filled basements, with some slabs placed 13 feet above the original basement elevation.

The downtown district wasn't Darlington's only concern. Adjacent neighborhoods and businesses also were being swamped by floodwaters. As a part of the town's total mitigation plan, other projects included elevating approximately 55 affected homes and their utilities above the base flood elevation (BFE) and filling in their basements with crushed rock. Some homes had concrete walls erected on the exposed sides prone to flooding.

Also included in the mitigation plan was the acquisition and removal of 13 commercial businesses, including an aboveground, diesel and heating fuel storage facility and a large automobile dealership. As a result of the acquisition, the city developed a 33-acre business park away from the floodplain for relocated and new businesses and a new festival ground with sprawling grassy areas and paved walkways along with a new baseball park. The vacated land near the river was turned into a riverside park with a lighted 1.2-mile paved trail, campground 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.

A major benefit from the mitigation projects was a dramatic increase in property values citywide. One city official estimated that property values for the refurbished commercial buildings along the old Main Street have nearly doubled. For example, one structure valued at \$30,000 after the 1993 flood was appraised at \$60,000 after the floodproofing was completed. Nine of the 11 buildings in the first block of the business district were mitigated. In all, 19 commercial buildings were floodproofed 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 floodproofed or elevated were afforded as much flood protection as possible by elevating or floodproofing their mechanical and electrical systems as well as their plumbing. Extreme care was taken to match the existing early 19th Century architecture on the street.

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 city worked to secure grants to supplement their local share of all costs involved in this unique and highly successful mitigation effort. The total funding for the multiple mitigation projects for Darlington amounted to \$2.3 million.

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

The City of Darlington also 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.

Darlington is coming alive and is vibrant again. It is currently enjoying an exciting rebirth as a community that invites new families and businesses. The benefits from implementing the mitigation recommendations include significantly reducing future flood damages, quicker recovery following floods, capital improvements, economic development, and revitalizing the downtown business community.

During the two most recent Wisconsin floods, those of 2007 and 2008, the City of Darlington was "armored and ready." The flood shields stopped virtually all floodwater from entering businesses, elevated buildings and utilities prevented further damage, and the residents and business owners were afforded peace of mind in knowing they were protected this time.

Activity/Project Location

Geographical Area: **Single County in a State**

FEMA Region: **Region V**

State: **Wisconsin**

County: **Lafayette County**

City/Community: **Darlington**

Key Activity/Project Information

Sector: **Public/Private Partnership**

Hazard Type: **Flooding**

Activity/Project Type: **Acquisition/Buyouts; Flood Control; Retrofitting, Structural**

Structure Type: **Masonry, Reinforced; Metal Building**

Activity/Project Start Date: **01/1993**

Activity/Project End Date: **Ongoing**

Funding Source: **Hazard Mitigation Grant Program (HMGP); National Flood Insurance Program (NFIP); State sources**

Funding Recipient: **Local Government**

Application/Project Number: **unknown**

Activity/Project Economic Analysis

Cost: **\$2,300,000.00 (Actual)**

Non FEMA Cost:

Activity/Project Disaster Information

Mitigation Resulted From Federal
Disaster? **Yes**

Federal Disaster #: **964 , 09/30/1992**

Federal Disaster Year: **1992**

Value Tested By Disaster? **Yes**

Tested By Federal Disaster #: **No Federal Disaster specified**

Year First Tested: **1998**

Repetitive Loss Property? **Yes**

Reference URLs

No URLs were submitted

Main Points

No Main Points were entered.



This Main Street restaurant was mitigated with hardened concrete vestibule and flood shields inside.



Former Darlington Mayor Bev Anderson and FEMA Mitigation Specialist Chuck Black inspect stanchions



Black and Anderson start up ramp behind Main Street stores.



A Darlington business with flood shields installed shown during a 1998 flood.



Specially built wagon holds shields while in storage.