

Waverly Flood Mitigation Improvements

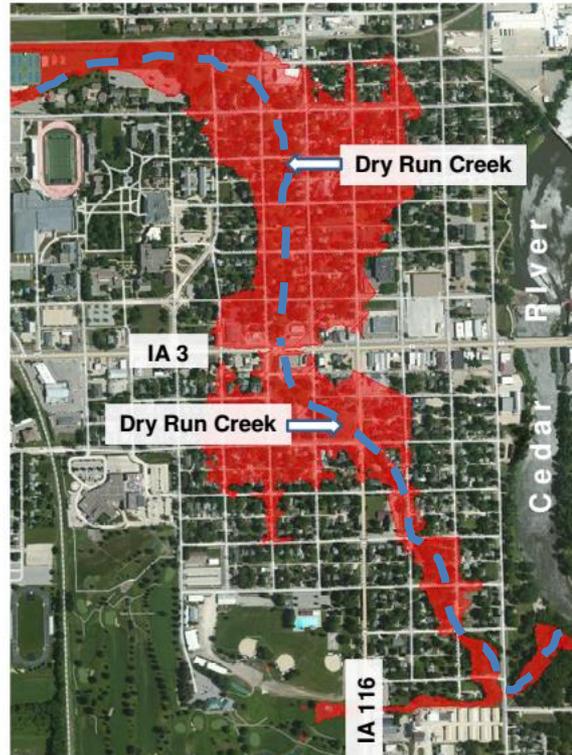
(Over 450 homes and businesses permanently removed from the 100-year FEMA floodplain.)

Past
2010 Flood Map



100-year floodplain mapping before the Cedar River and Dry Run Creek flood mitigation improvements.

Present
2013 Flood Map



100-year floodplain mapping after the Cedar River Inflatable Dam project and before the Dry Run Creek flood mitigation improvements.

Proposed
2016 Flood Map



100-year floodplain mapping after the Cedar River Inflatable Dam project and after the Dry Run Creek flood mitigation improvements.



Waverly June 2008



Cedar River Dam Improvements

Protecting and Preserving Waverly's Heritage

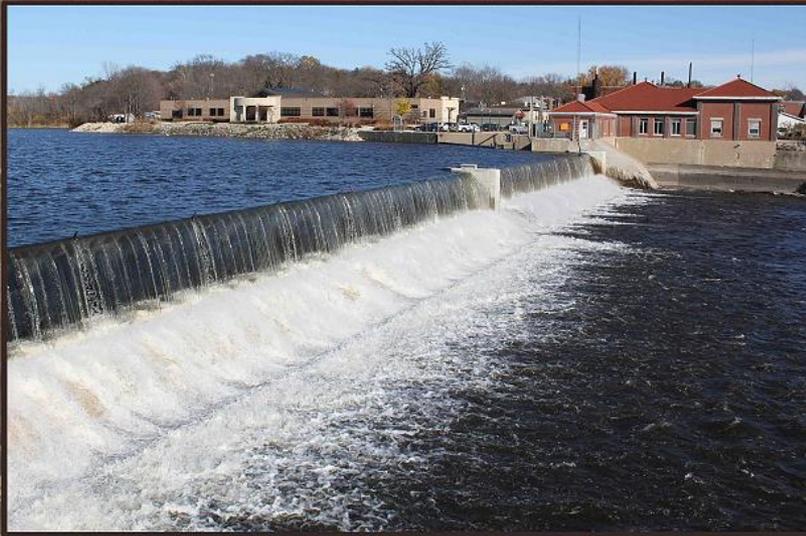


Photo: Waverly's Inflatable Dam - Completed - 2011

For over 150 years, the Waverly Dam has been integral to the city. Over the years the value of the Cedar River to industrial and economic development has led to extended development on the adjacent floodplain.

The risk of flooding in Waverly increased significantly with the 1915 construction of the new concrete dam and elevated spillway. Flooding occurred in 1917, 1933, 1945, 1948, 1961, 1965 (twice), and 1993 (twice). A 100-year flood hit in 1999 and a 500-year flood struck in 2008.

A flood protection study provided by Stanley Consultants in 2000 recommended an inflatable dam to protect the city from future flooding. Unfortunately, funding was not secured until the catastrophic 500-year flood of 2008 brought unimaginable destruction to the town of 10,000.

Waverly's new inflatable dam is fully-automatic with a gated spillway that maintains a set water level elevation and automatically adjusts to flow rates. Hinged crest gates that control discharge and pool level run the length of the former uncontrolled spillway.

The project incorporates a novel approach to managing development in floodplains. Rather than alter the floodplain to contain the river, the river was altered to fit the floodplain. The project lowered the flood profile of the river, thus reducing the extent of the floodplain and removing the floodplain from properties (rather than vice versa).

With the new dam, Waverly is now successfully protecting 450 homes and businesses from a 100-year flood, preserving hydroelectric generation at the oldest operating facility in Iowa, and enhancing recreational opportunities by maintaining the upstream pool elevation.

FW Mueller
No 129



A migrating sandbar provided material for the cofferdam.



Workers installing hinged crest gates.



The gated spillway maintains a set water level elevation and adjusts as needed to changing flow rates.

The DAM

WAVERLY IA.

Waverly's Inflatable Dam



Normal Operations

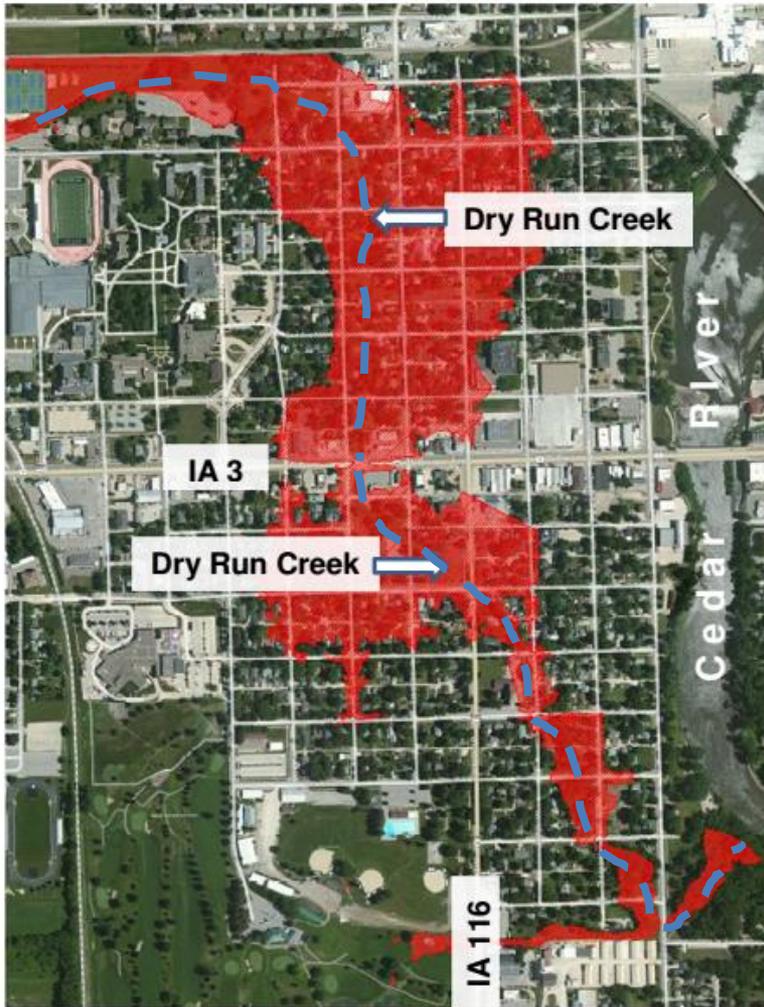
May 22, 2013 Flood



- Waverly's new dam was totally deflated.
- 9th largest recorded flood in past century.
- Waverly incurred only minor damages.
- Bremer County was the only county along the Cedar River that did NOT warrant a Governor's Disaster Declaration!

Dry Run Creek Improvements

Present
2013 Flood Map



100-year floodplain mapping after the Cedar River Inflatable Dam project and before the Dry Run Creek flood mitigation improvements.

Proposed
2016 Flood Map



100-year floodplain mapping after the Cedar River Inflatable Dam project and after the Dry Run Creek flood mitigation improvements.

Existing Dry Run Creek Channel



Rapid snow melt and moderate rains can quickly fill the banks of the Dry Run Creek.

In the early years development was allowed to encroach upon the Dry Run Creek channel.



DRY RUN CREEK IMPROVEMENTS - SECTION CONCEPTS



interpretive signs



trailheads/bike parking

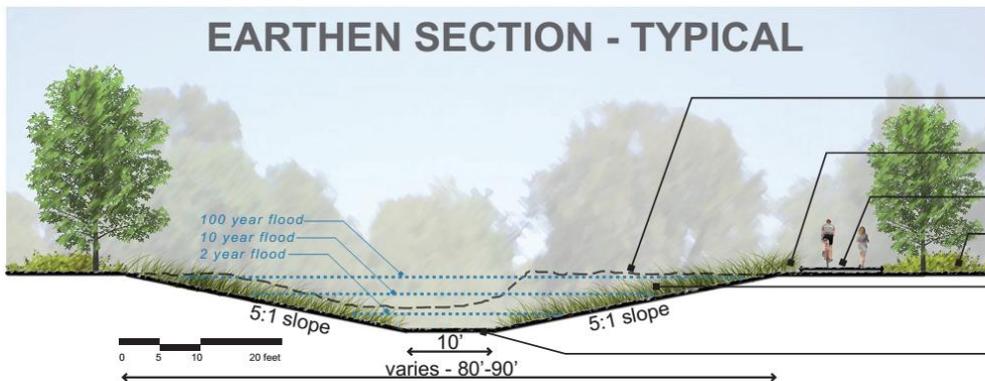


rest stops/waysides

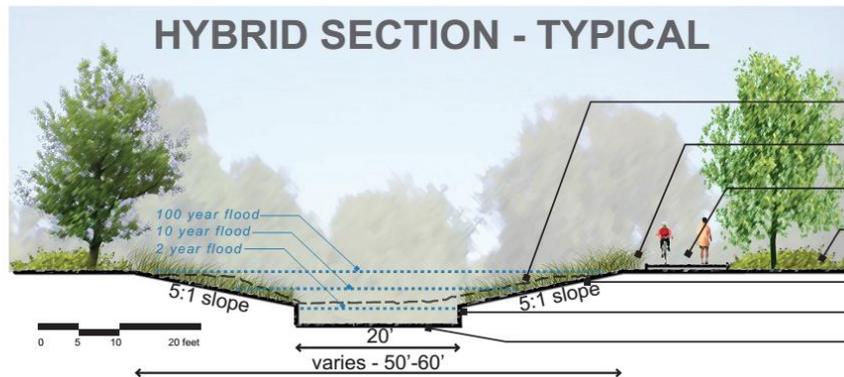


trail directional signs

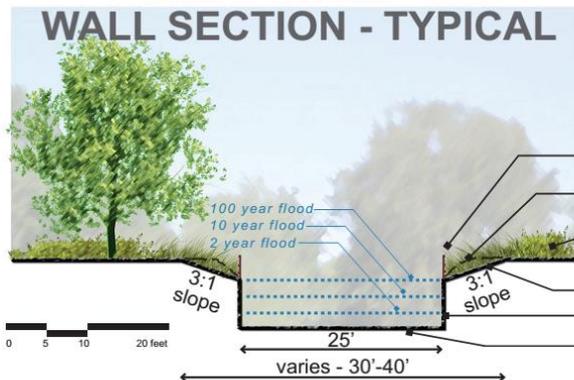
POTENTIAL TRAIL AMENITIES



- approximate existing grade
- 3' clear zone
- 10' wide trail
- screen plantings (if appropriate)
- grass side slope
- concrete channel bottom



- approximate existing grade
- 3' clear zone
- 10' wide trail
- screen plantings (if appropriate)
- grass side slope
- vertical concrete wall - approx. 30" height
- concrete channel bottom



- railing - 3' height
- approximate existing grade
- screen plantings (if appropriate)
- grass side slope
- vertical concrete wall - approx. 6' height
- concrete channel bottom

Flood Insurance Avoidance



The estimated value of property in the SFHA is:

450 homes and business x \$125,000 each = **\$56 million**

Negative Impact from the Biggert-Waters Flood Insurance Reform Act of 2012:

450 properties at \$5,650 annually = \$2.5 Million Annually

Insurance Impact on Local Economy x3 = \$7.5 Million Annually

Project Costs & Financing



Waverly Inflatable Dam Improvements.....\$ 4,223,898

Dry Run Creek Improvements.....\$ 7,077,000

Total Costs.....**\$11,300,898**

Federal.....\$ 4,223,898

State.....**\$ 5,647,000**

Local.....\$ 1,430,000

Total Financing.....**\$11,300,898**

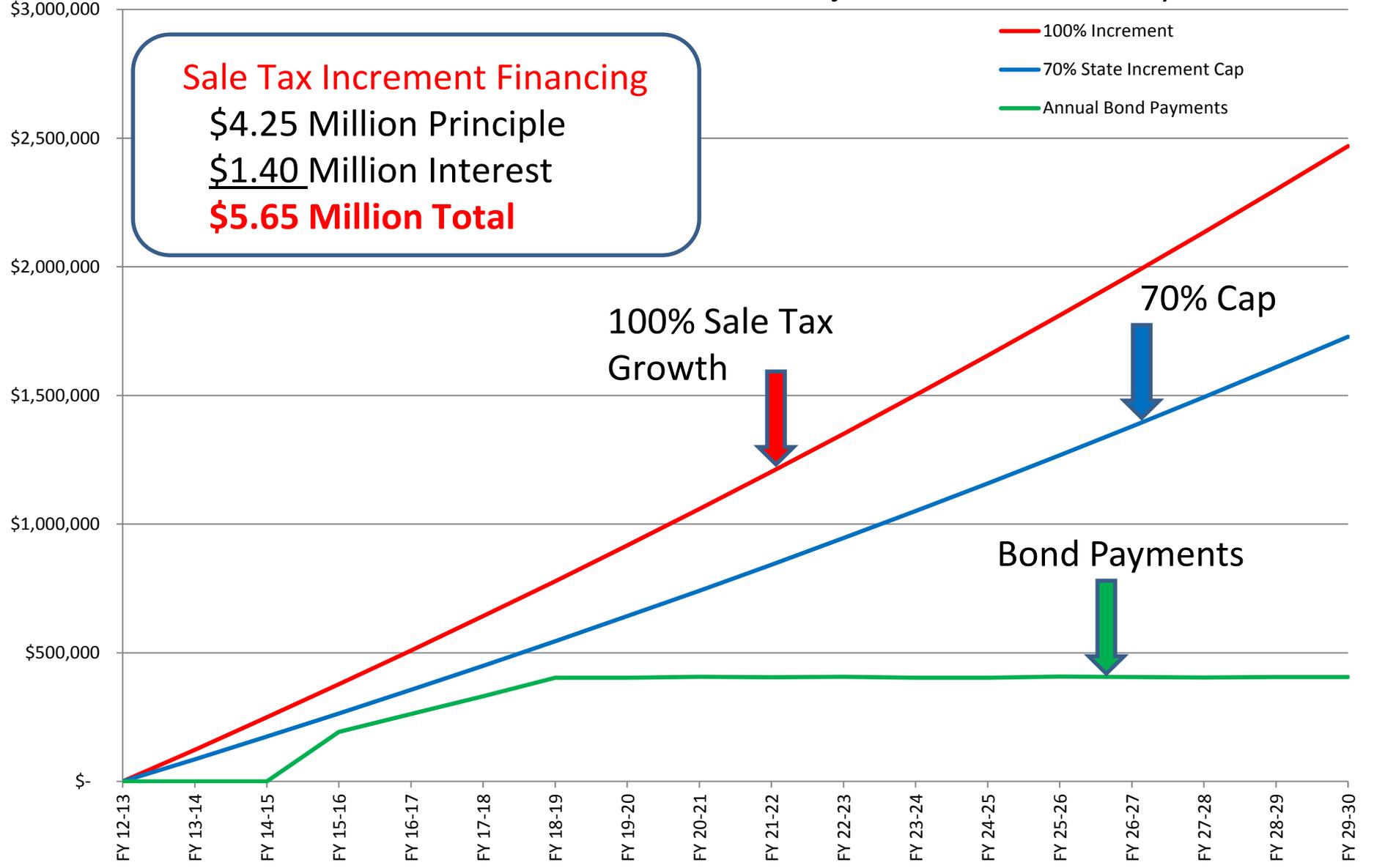


City of Waverly Iowa Flood Mitigation Program

Annual Sales Tax Increment Forecast & Projected Annual Bond Payments

Sale Tax Increment Financing
\$4.25 Million Principle
\$1.40 Million Interest
\$5.65 Million Total

- 100% Increment
- 70% State Increment Cap
- Annual Bond Payments



Waverly Flood Mitigation Improvements Schedule

Flood Mitigation Studies and Planning - **DONE**

Phase 1 - Waverly Inflatable Dam Improvements – **DONE**

Phase 2 - Dry Run Creek Improvements

- 2014 Final Design & Property Acquisition
- 2015-16 Construction
- 2017 Finalize FEMA Map Revisions

