A River Runs Through It

A Look at the Flood Protection System for Cedar Rapids, Iowa
A History of Flooding

• Major floods in Cedar Rapids
  1. 31.12 ft on 06/13/2008
  2. 21.95 ft on 09/27/2016
  3. 20.00 ft on 06/01/1851
  4. 20.00 ft on 03/18/1929
  5. 19.66 ft on 03/31/1961
  6. 19.27 ft on 04/04/1993
  7. 18.60 ft on 04/04/1933
  8. 18.51 ft on 04/10/1965
  9. 18.31 ft on 07/25/1999
 10. 18.30 ft on 05/27/2004
 11. 18.23 ft on 06/02/2013
 12. 18.23 ft on 06/16/1947
 13. 18.05 ft on 07/12/1993
 14. 17.85 ft on 07/18/1993
 15. 17.60 ft on 03/30/1906

17.94 on 09/26/2018
2016 Flood
Flash Flooding
City Response

- Interim flood control plan and concept for permanent protection (2008)
- Voluntary Property Acquisition Program (1300+) 2009-2014
- Adoption of New Flood Insurance Rate Maps (2010)
- Updated Floodplain Management Ordinance (2010)
- Retrofitted buildings flooded in 2008 and Raised Building Equipment
- Raised two bridges over Prairie Creek (2009 and 2011)
- McGrath Amphitheatre / Levee protection (2012)
- Water System Improvements / Wells Raised (2012)
- Waste Pollution Control Facility Upgrades / Levee System (2013)
- Interim Levee Repairs
- Sanitary Sewer Improvements and Watershed Management (ongoing)
- Secure Iowa Flood Hazard Mitigation Grant (2014)
- NewBo/Czech Village projects ‘16 – ‘18
- FCS 5 – 20 years
- Remaining Risk

Flood Control System Master Plan
Public Engagement

Neighborhood Workshops, Open Houses, City Events, Website

City Council approves flood control logo

By Rick Smith, The Gazette

CEDAR RAPIDS — The City Council this week approved a green-and-white logo that will appear on signs and correspondence as the city’s $575 million flood control system is implemented.

In addition, the council agreed to repaint a city water tower near C Street SW and Highway 20 and, as with no other water tower in the city, “CEDAR RAPIDS” will be added on the tower’s east and west sides so the name is visible in both directions from Highway 20.

The flood control logo

Flood Protection

Residents get fresh chance to weigh in

Emily McElrath, communications coordinator for the city’s Development Services Department, said the zone’s west side flood control system, came up with the logo design and businesses were asked to help identify those areas and using the branding to help communicate the long-term vision to the community.

Megan Murphy, communications coordinator for the city’s Utilities Department, said the C Street SW water tower will be repainted with a similar logo.

More than 6 years of talk about flood control nears end with first signage unveiled

By Rick Smith, The Gazette

CEDAR RAPIDS — City officials and residents weighing options have been watching the floodplain and taking a step to help prepare for another flood.

The new first step, for flood control residents to find out what the flood control project means to them.

City officials and community members in their months on Friday in the community.

The 60-foot sign to be placed near the flood control site in the southwest is designed to help communicate to the public how the flood control site will look post-flood.

The sign will show what the flood control site will look like post-flood, what the future of the flood control site will look like post-flood.

Flood Control System - East Side rendering as of March 2015

Flood plans impact You

Thanks to @EconomicAlliance for letting us bring #floodcontrolsystem info to the Farmer’s Market!
Overall System

Quick Facts
- 7.5 miles (walls, levees, gates, pumps)
- 20% removable walls
- Protection Level: 2008 Flood Volume
- Includes East and West sides
- Approximately 15 feet in height
- Includes 8th Ave bridge raising
Master Plan Updates

FCS Master Plan Updates
2018
Budget Overview

- East Side ($236M)
- West Side ($231M)
- Bridges ($63M)
Funding

• No authority or multi-jurisdictional entity to fund, design, construct, or manage the system
• Estimated cost = $550 million
• 3.5% inflationary factor applied to design and construction
• Over 30 funding options investigated and vetted
Funding

• Major funding sources include
  • Flood Mitigation Grant: $267 million
    ▪ Iowa legislature authorized a program for communities to capture up to $15 million for each of 20 years for flood control
  • USACE funding: $117 million
  • Debt Service levy increase: $200 million
    ▪ $0.20/year for each of 10 years will generate $200 million

• Efforts underway to offset project costs through
  • Value Engineering
  • Competitive Grants ($15 million secured to date)
Partnering and Collaboration

- **Flood Control System MP**
  - Decrease 5-year peak flow rate = smaller stormwater pump station
  - Reduce pump station capital costs

- **Stormwater MP**
  - Reduce flood risk throughout the watershed
  - Utilize existing floodplain conveyance system
  - Increase value and utility of upstream capital investments

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City of Cedar Rapids
Maximize flood-resiliency for every dollar spent on capital improvements
Partnering and Collaboration

Sub-Catchment
Detention Basin
Surcharge
- Less than half full
- More than half full
- Full - bottleneck downstream
- Full - bottleneck pipe
Max Ponding Depth (ft)
- 0.1 - 1.0
- 1.1 - 2.0
- 2.1 - 3.0
- 3.1 - 4.0
- 4.1+

Cedar River Outfall Hydrograph

Existing vs Proposed 5-Year Model Results

0 Avenue Watershed

2019 IAFSM Annual Conference | A River Runs Through It: A Look at the Flood Protection System for Cedar Rapids, Iowa
<table>
<thead>
<tr>
<th>Exceedance Probability</th>
<th>FIS Report</th>
<th>Discharges (cfs)</th>
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<tbody>
<tr>
<td>10% (10-year)</td>
<td>53,000</td>
<td>54,500</td>
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<tr>
<td>1% (100-year)</td>
<td>87,000</td>
<td>94,100</td>
</tr>
<tr>
<td>0.5% (200-year)</td>
<td>N/A</td>
<td>106,000</td>
</tr>
<tr>
<td>0.2% (500-year Design Flow)</td>
<td>112,000</td>
<td>122,000</td>
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</tbody>
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## Discharge Comparison for Cedar River at the Cedar Rapids Gage

<table>
<thead>
<tr>
<th>Exceedance Probability</th>
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<th>Feasibility Study (Approved by IDNR 11/30/08)</th>
<th>FEMA Remapping (March 2019)</th>
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<tbody>
<tr>
<td>10% (10-year)</td>
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From 16th to 12th and from 8th to 3rd, for sections with a floodwall on the west side, the elevation will be constant (not sloped) for constructability purposes. This may cause slight elevation differences in the design elevation between the west and east sides.
Lessons Learned

• Coordinate Early, Coordinate Often
  • Workflow and schedules
  • Technical aspects (models, methods, criteria…)

• Identify and support multi-benefit projects
  • Prioritize
  • Partnering/Collaboration
  • Transparency
  • Flexibility

• Focus on the shared goal: 
  A flood-resilient Cedar Rapids