Heritage Park Flood Control Facility
Compensatory Storage for Levee 37

“Make no little plans; they have no magic to stir men's blood.” —Daniel Burnham

Joseph Kratzer, P.E., CFM
Presentation Agenda

• Background
  – Des Plaines River Flooding
  – U.S. Army Corps of Engineer’s Levee 37

• Heritage Park Flood Control Facility
  – Site Plan
  – Challenges/Solutions

• Keys to Successful Collaboration
Des Plaines River Watershed

Wisconsin/Illinois: 120 mi²

Lake/Cook County: 320 mi²

Will/Cook County: 680 mi²
Des Plaines River Flooding

- 1986 Flood
  - $35 Million Estimated Damages
  - 10,000 Homes Flooded
  - 263 Businesses Flooded

- 1987 Flood
  - $78 Million Estimated Damages
  - O’Hare Airport Closure
Des Plaines River Flooding

UPPER DES PLAINES RIVER FEASIBILITY REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT

CHICAGO DISTRICT
LAKES AND RIVERS DIVISION
U. S. ARMY CORPS OF ENGINEERS

REVISED DRAFT
MAY 1998
Levee 37 Benefits

**Without** Levee 37

**With** Levee 37
"Regulatory Floodway" The channel and that portion of the floodplain adjacent to a stream or watercourse as designated by the Department, which is needed to store and convey the anticipated future 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to the loss of flood conveyance or storage.

Levee 37 Permitting

State of Illinois Floodway Construction Permitting Authority
Levee 37 Permitting

- Analysis of the Des Plaines River system indicated that the induced flood stage increase for the 100-year flood caused by Levee 37 is greater than the State's permitting guidelines allow.

- Permit for levee construction will not be issued without other upstream flood storage measures in place to reduce this increase.
The 100-Year Flood

• The 100 year flood has a one percent (or 1/100) chance of being equaled or exceeded during any given year.

• When FEMA was setting its standards for mapping flood hazard areas and for issuing regulations, the 100 year flood standard was established as a compromise. It fell between what the Corps of Engineers had used as the protection level when they built dams and levees and what most communities used when they designed their stormwater systems. It was thought to be a fair balance between protecting the public and overly stringent regulation.

• 1% Annual Exceedance Probability flood

• The 1% AEP flood has a 1% chance of occurring in any given year; however, during the span of a 30-year mortgage, a home in the 1% AEP (100-year) floodplain has a 26% chance of being flooded at least once during those 30 years, based on probability theory that accounts for each of the 30 years having a 1% chance of flooding.

<table>
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<th>Period of Time</th>
<th>10-yr Flood</th>
<th>25-yr Flood</th>
<th>50-yr Flood</th>
<th>100-yr Flood</th>
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<td>2%</td>
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<td>50 years</td>
<td>99%</td>
<td>87%</td>
<td>64%</td>
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</tbody>
</table>
Levee 37 Permitting

• Levee 37 Floodway Construction Permit

State of Illinois
Department of Natural Resources, Office of Water Resources

THIS PERMIT IS SUBJECT TO THE FOLLOWING SPECIAL CONDITION:

a) Prior to completion of construction of the levee herein authorized, flood stage increases on the Des Plaines River due to the levee must be effectively mitigated by the construction of additional floodwater storage at Buffalo Creek Reservoir or an alternate site. Otherwise, flood easements must be acquired on all properties affected by the stage increases.
Alternate Sites for Levee 37 Compensatory Storage

• 30 sites analyzed by USACE on mainstem Des Plaines River and upstream tributaries

• Buffalo Creek Reservoir Expansion
  – USACE recommended expansion of the Buffalo Creek Reservoir as part of Upper Des Plaines River Phase I report.
  – Project would provide Comp storage for Levee 37 and reduce flooding along Buffalo Creek
  – Unable to negotiate with landowner for expanding Buffalo Creek Reservoir.
Levee 37

- Combination Levee / Floodwall
- Approx. 8,500 Feet Long
- Construction started in 2009
- Essentially Complete in 2011

- 600 Foot Long Gap in Place until Compensatory Storage is Provided
MWRDGC | Stormwater Management

• District conveyed authority in November 2004 to plan, manage, implement, and finance activities relating to stormwater management in Cook County

• Engineering Department’s primary activities:
  • Capital Improvement Program to address existing stormwater problems
  • Comprehensive stormwater regulations to ensure future development and redevelopment does not exacerbate flooding
MWRDGC | Stormwater Management

• Regional Flooding or Streambank Stabilization Projects recommended in Detailed Watershed Plans

• Projects previously approved by Federal or State Agencies
Levee 37 and Heritage Park
Wheeling Park District Master Plan for Heritage Park
Negotiations

• Conceptual plans and negotiations began late 2008

• Defined terms for design/construction

• Responsibility for maintenance to Park District

• IGA signed April 2010
Heritage Park Partners
Site Constraints
H&H Modeling

- Des Plaines River
  - 630 Square Miles
  - 10 Day Critical Duration
  - HEC-1 / HEC-2

- Buffalo Creek
  - 27.2 Square Miles
  - 24 Hour Critical Duration
  - HEC-HMS / HEC-RAS

- Basin Volume / Spillway Elevation Optimization
Preliminary Site Planning
Site Plan

- Spoil Pile
- Band Shell
- Lake Heritage
- Pavillion
- Buffalo Creek
- Baseball Complex and Concession Building
Flood Control Operations

• Basin F spillway crest elev. 640.15
• Basin D spillway crest elev. 641.20
• Basin F will be served by (3) main 75 HP submersible pumps for heavy rainfall events, as well as (2) 7 HP submersible sump pumps to handle final wet well dewatering and light rainfall events.
• Pump out when Buffalo Creek below elev. 638
Stakeholders

- IDNR
- IEPA
- IDOT
- FAA
- USFWS
- HERITAGE PARK
- North Cook County Soil & Water Conservation District
- Wheeling Park District
- Village of Wheeling
- Illinois Historic Preservation Agency
- AECOM
Recreational Features
Ballfields w/ Concession Bldg
Pavilion & Bandshell
Landscaping
Parking Lot w/ Bioswale
Project Challenges

- Coordination with Stakeholders
- Geotechnical Issues
- Design Modifications
- Constructability
Geotechnical Challenges

Poor Soils
Geotechnical Solutions

• Avoid Poor Soils to Maximum Extent
• Flatten Side Slopes in areas of weak soils
• Basin D
  – Bottom Elevation Above Groundwater Level

• Basin F
  – Cement Bentonite Groundwater Cutoff Wall
  – Leave Central Portion (weak soils) at Grade
  – 8:1 Slopes in some areas
Cement Bentonite Barrier Walls
Cement Bentonite Barrier Walls
MWRD Tinley Park Project - 1985
Design Modifications

• Added above ground structure to house Basin F Pump Station controls
• Replaced Ped. bridge over Basin F with Boardwalk
• Minor changes to site features based on feedback from stakeholders/permitting agencies
• Relocated Bandshell and Pavilion
Design Modifications

• Added above ground structure to house Basin F Pump Station controls
Design Modifications

- Replaced Pedestrian bridge over Basin F with Boardwalk
Constructability

• Construction hour waivers
  – 24-hour construction for:
    • Cement-Bentonite Wall Installation
    • Lining of the existing Storm and Sanitary Sewers
    • Bypass pumping for work in Buffalo Creek
  – Extended work hours for Basin F Excavation
Keys to Success

- Understanding Stakeholder Goals
- Frequent Communications
- Adapting to Constraints
- Recognizing Opportunities for Cost Savings
Current Status

- **Contract Advertised:** November 9, 2011
- **Bids Received:** February 7, 2012
- **Construction Estimate:** ~$33 million
- **Lowest Apparent Bid:** ~$29 million
- **Construction Period:** ~2 years
Closing

“If you build it, he will come.”

Joseph Kratzer, P.E., CFM
Questions?

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