IAFSM
2010 Annual Conference

THE CITY OF ROCKFORD ILLINOIS, USA

City of Rockford
Keith Creek Greenway
Flood Mitigation Project

March 10, 2010

MWH
BUILDING A BETTER WORLD

Introduction – Problem Overview

- 1890’s Building of homes along Keith Creek
- 1920’s Home construction nears completion
- 1926 Flood devastates new homes
- 1938 Flood again causes damage to homes
- 1939 WPA program assist with channel project
- 1941 Flood Control Dam built on North Branch
- 1941 Flood Control Dam not built on South Branch
- 1952 Flood of Record causes damages to homes
- 2006 & 2007 Floods continue to harm homes

Introduction – City Buyout Program

- 2008 Acquisition of flood damaged homes begins
- Goal established to remove the highest damaged and most at risk homes (approx 128 homes)
- Homeowners offered pre-flood fair market value
- Acquisition program follows the Uniform Relocation Act guidelines and uses certified appraisal firms

Introduction – Solution Options

- Recognize there is not one measure will solve this long-term flooding problem
- Home buy-out first phase toward a long term solution
- Channel work needed to help flooding, water quality, and sustainable neighborhood design
- Construct a small flood control dam on the south branch of the creek
- Community buy-in to the vision of the approach

Rockford - Background

65 square mile area

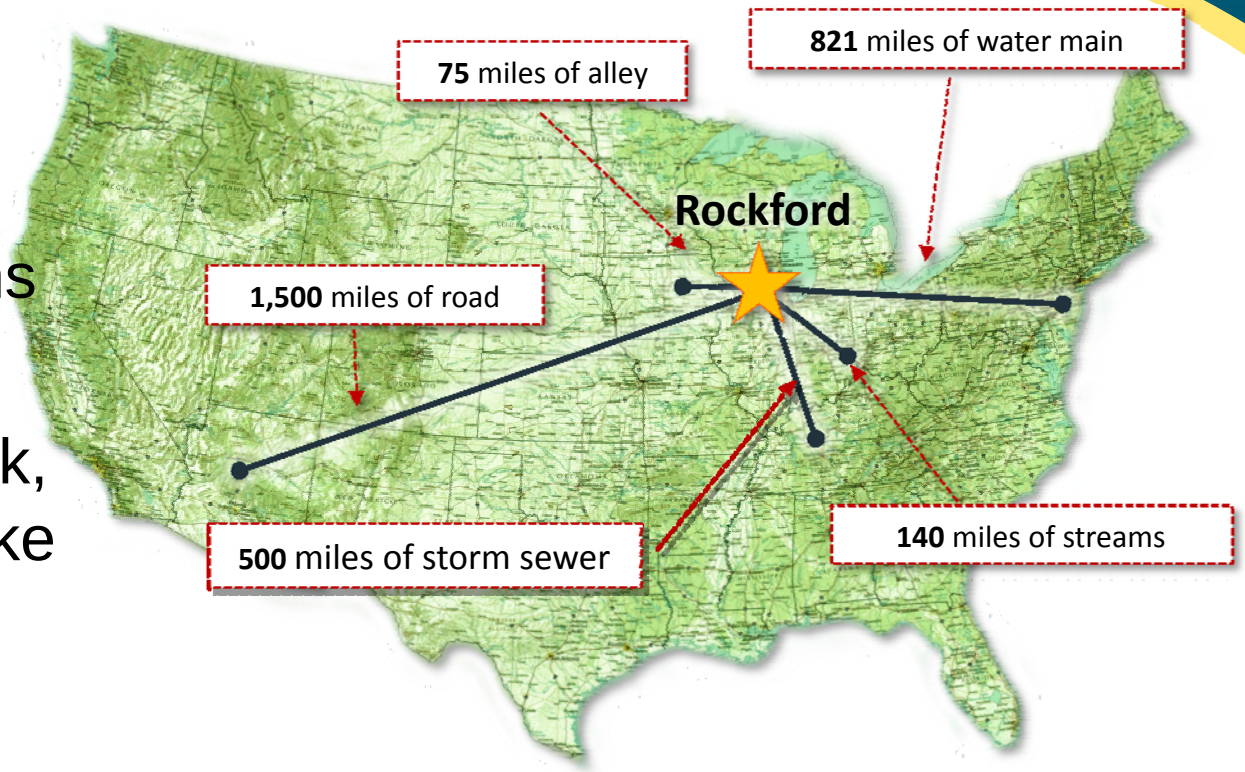
80,000 parkway trees

14 watersheds

365 detention basins

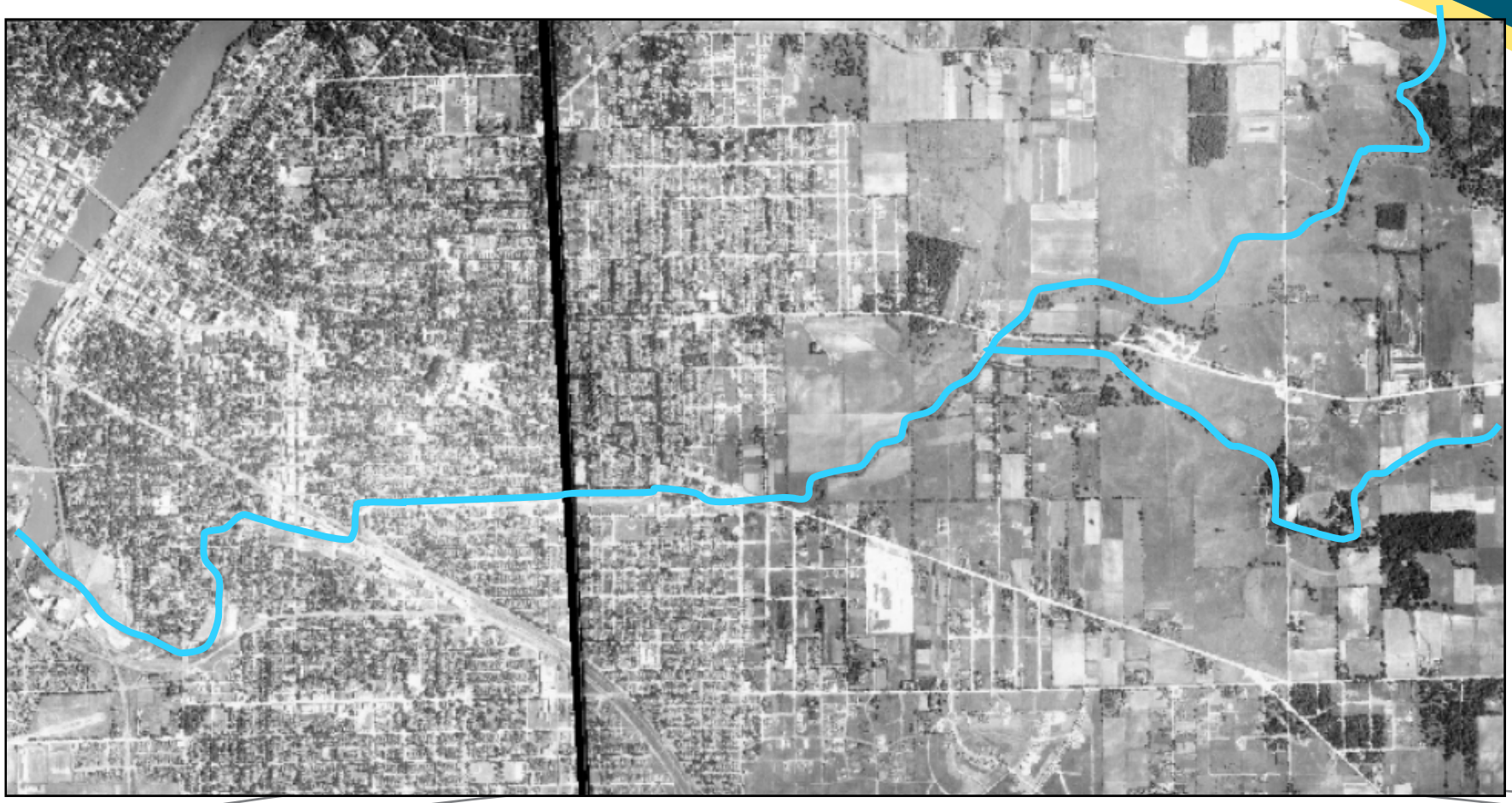
3 dams: Alpine, Page Park, Levings Lake

123 bridges



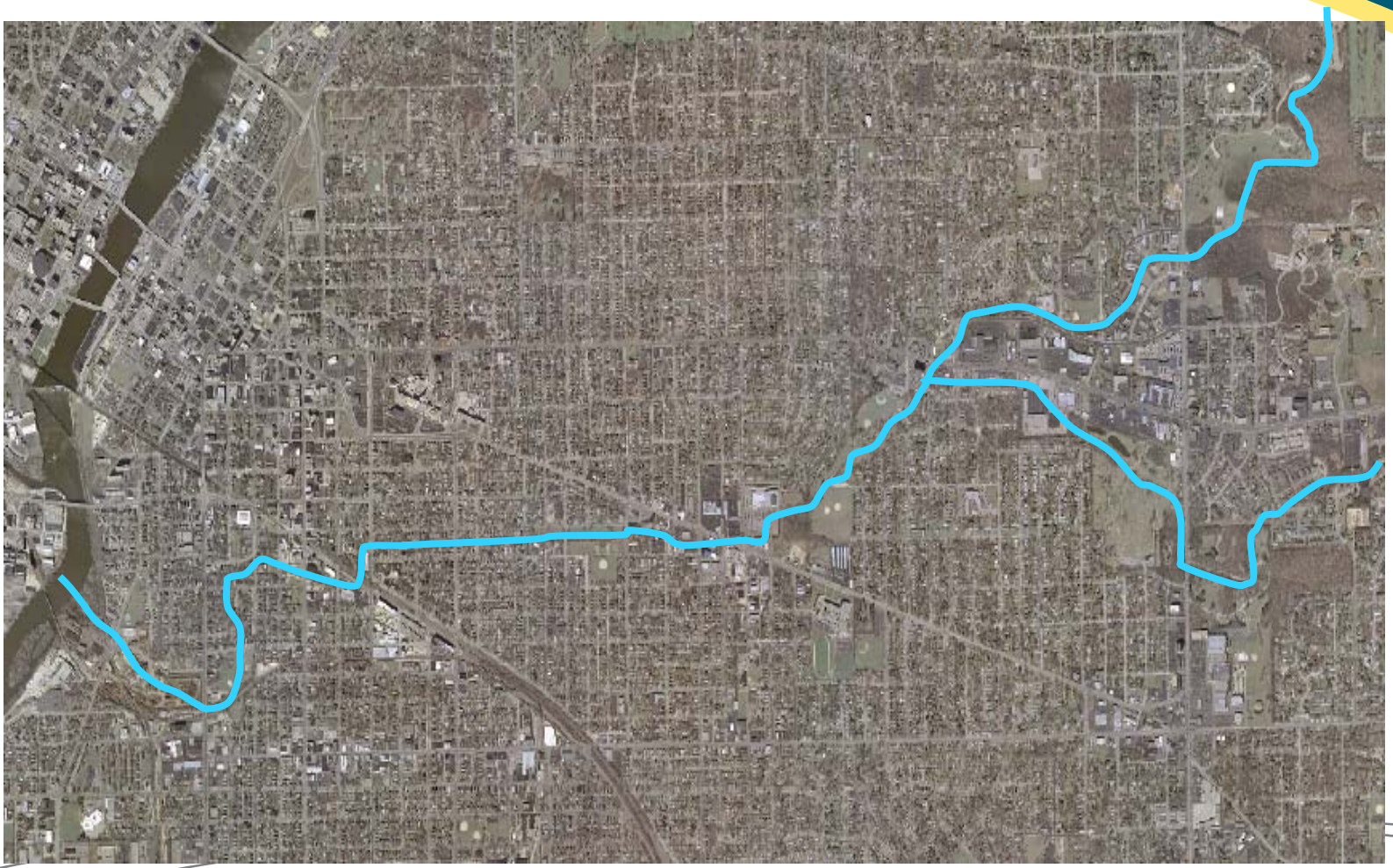
Keith Creek – Background Cont…

Keith Creek - In the 1930's….



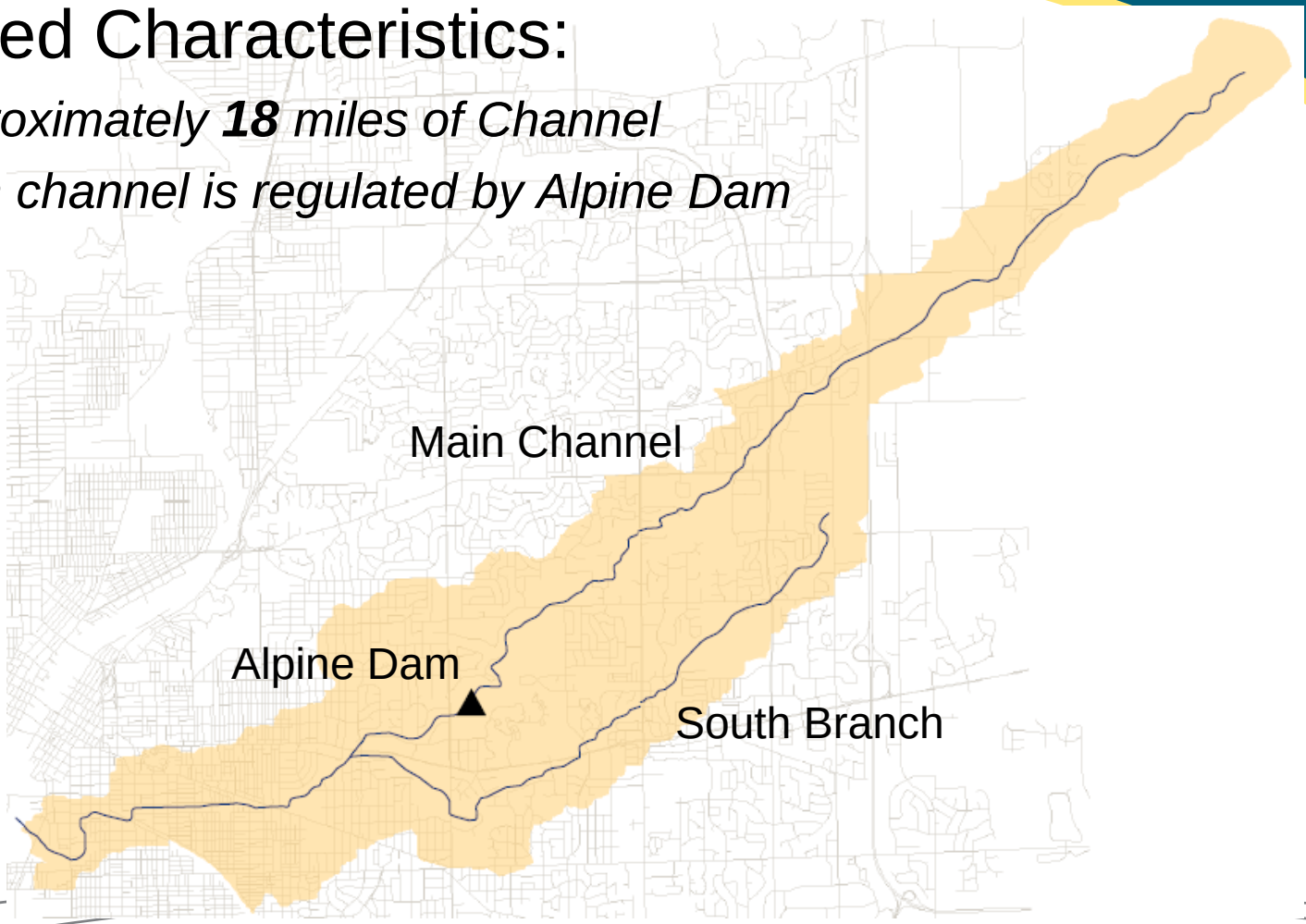
Keith Creek – Background Cont…

Keith Creek - Now….



Keith Creek – Background Cont…

- Watershed Characteristics:
  - *Approximately **18** miles of Channel*
  - *Main channel is regulated by Alpine Dam*



Keith Creek – H&H Model Development

- FEMA Effective Hydraulic Model
  - *HEC-2 Hydraulic Model*
  - *Developed in the late 1970's*

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HEC2 VERSION UPDATED JAN 1976
ERROR CORRECTIONS 01,02,03,04,05,06,07,08,09
MODIFICATIONS 52,53,54,55,56,57,58
**********
T1      HUD-FIA FLOOD STUDIES 877T  HARZA ENGINEERIN
T2      KEITH CREEK     ALPINE DAM TO SECTION 11 T44
T3      100 YEAR FLOOD          DISCHARGE AT ALPINE DAM
J1  ICHECK     INQ        NINV       IDIR       STRT
          =1.        2.         =0.        =0.    =.000000
J2  NPROF      IPLOT      PRFVS      XSECV      XSECH
         1.000      =.000      =1.000     =.000      =.000
J3       1.000     34.000      2.000      4.000
NC        .075       .040       .080       =.000
QT       2.000   1144.000   1144.000       =.000
ET       =.000      =.000      1.400       =.000
X1       1.000     12.000     87.000     115.000
GR     805.000       .000     794.000      33.000
GR     777.300     92.000     777.100      98.000
GR     780.500    200.000     806.700     250.000
X1       2.500     20.000     283.000     322.000
GR     809.000       .000     803.000      70.000
GR     785.800    283.000     783.200     283.000
GR     781.000    315.000     784.000     322.000
GR     796.000    520.000     800.000     558.000
X1       3.500     22.000     572.000     599.000
GR     807.000     90.000     803.000     130.000
GR     786.300    350.000     786.000     500.000   787.800   572.000   785.000   572.000   784.000   577.000
GR     782.000    582.000     781.800     587.000   782.000   593.000   785.500   599.000   788.600   599.000
GR     791.600    650.000     794.000     700.000   795.000   751.000   797.000   810.000   799.000   840.000
GR     803.000    860.000     807.000     920.000      =.000      =.000      =.000      =.000      =.000      =.000
X1       4.500     15.000     470.000     488.000   760.000   510.000   630.000      =.000      =.000      =.000
GR     811.000       .000     805.000     100.000   799.200   200.000   794.700   300.000   791.300   400.000
GR     789.200    470.000     785.200     473.000   785.000   484.000   786.200   486.000   789.600   488.000
GR     789.200    500.000     789.700     556.000   793.000   570.000   803.000   580.000   813.000   600.000
X1       5.500     20.000     410.000     427.000   360.000   490.000   600.000      =.000      =.000      =.000
GR     816.000       .000     811.000      90.000   807.000   130.000   802.000   200.000   798.200   250.000
GR     796.200    300.000     795.500     334.000   792.400   354.000   793.800   410.000   789.600   410.000
GR     789.000    427.000     793.700     427.000   793.600   500.000   795.600   600.000   798.400   700.000
GR     798.800    716.000     802.000     728.000   805.000   740.000   813.000   810.000   815.000   820.000
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Looking D/S at top Alpine Dam

Keith Creek – H&H Model Development

- USACE and City of Rockford Coordination

- ***Performed Detailed Survey***
  - *55 Bridge and Culverts*
  - *Over 240 Cross-Sections*
- ***Developed HEC-HMS model***
- ***Created Steady-State HEC- RAS Model***
  - *Modeled 8 miles of Channel*

Keith Creek – H&H Model Development

- Conversion from Steady State to Unsteady
  - Increase level of detail in hydrologic model
  - Combine Main Channel with South Branch
  - Added more cross sections in project area
  - Included Alpine Dam in hydraulic model

- Allowed investigation of…
  - Effects of projects on overbank storage
  - Timing of flows from South Branch

Keith Creek – H&H Model Development

- Modeling Results – 100 Year Flowrates

Location	FIS Flows (cfs)	MWH Flows (cfs)
To Alpine Dam	900	1,447
Rock River Confluence	1,144	2,746

Keith Creek – H&H Model Development

- Modeling Results – Flood Elevations

Location	FIS WSEL (ft)	MWH WSEL (ft)
South Branch Confluence	745.0	745.9
Churchill Park	730.9	731.7
8th Street	726.0	725.9
Rock River Confluence	703.2	703.4

Keith Creek – Proposed Flood Control Solutions

- Charles Street Overflow
  - *800 feet of Diversion Channel*
  - *1,000 feet of Stream Channel Widening and Restoration*
    - *Extending from 18th to Charles Street*
  - *Flood Level Reduction = **3** feet*

Keith Creek – Proposed Flood Control Solutions

- Churchill Park Restoration Plan
  - *Restoration and Stabilization of Eroding Banks*
    - *Removal of existing concrete-line channel*
    - *Lowering and re-meandering of channel*
    - *Establishment of native vegetation*

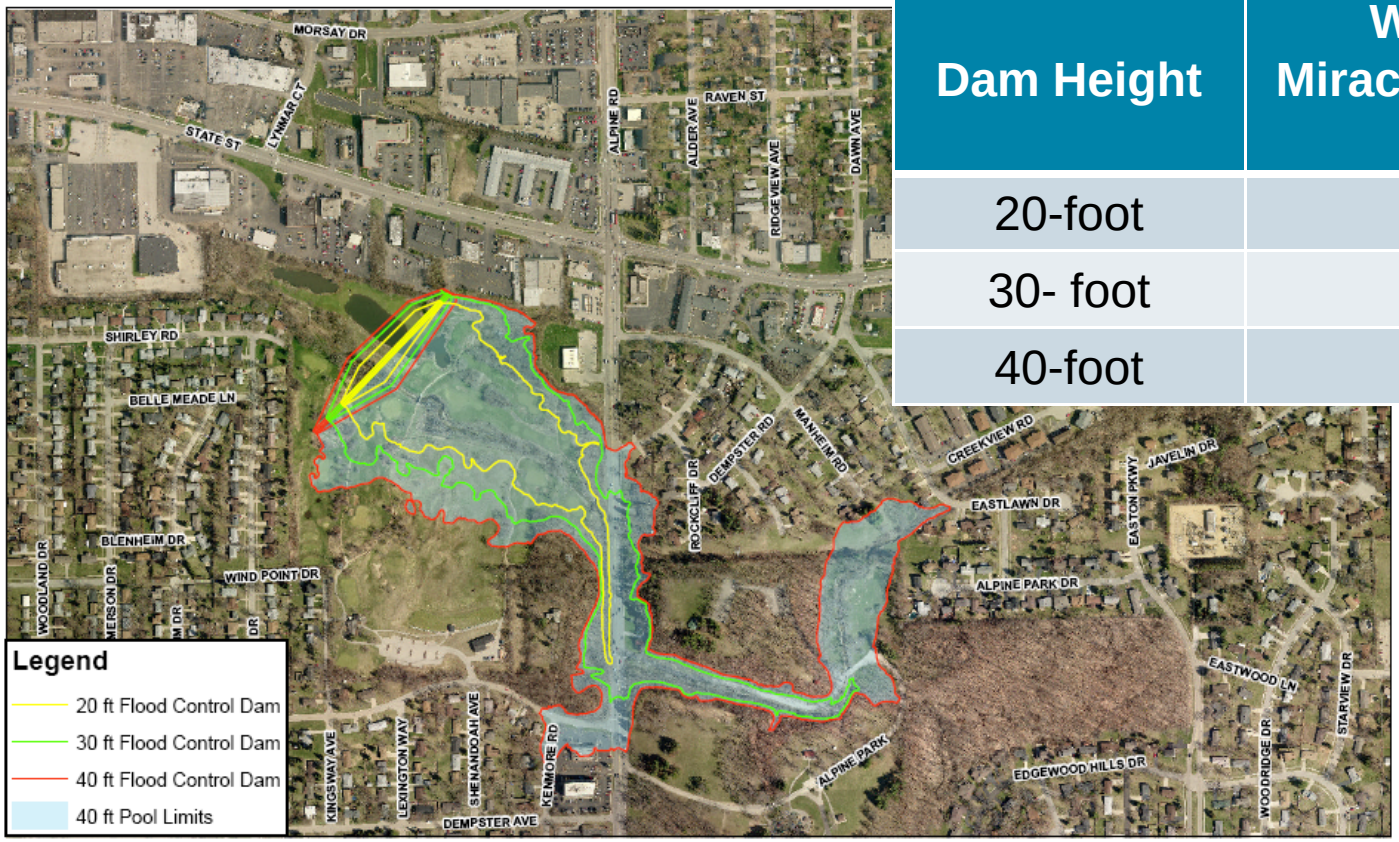
Keith Creek – Proposed Flood Control Solutions

- Churchill Park Restoration Plan Cont…
  - *Increase Conveyance*
    - *-Modifications to several restrictive bridge crossings*
  - *Increase Flood Storage*
    - *- Excavation in Overbank Areas*

- *Maximum Flood Reduction = **3** Feet*

Keith Creek – Proposed Flood Control Solutions

- South Branch Flood Control Project
  - *Eliminate Street Flooding*
  - *Earthen Embankment Dam*



Dam Height	WSEL Drop Miracle Mile Culvert (ft)
20-foot	1.0
30- foot	4.0
40-foot	8.0

Funding - Opportunities

- Traditional Disaster Grant Programs
- Non-Traditional Federal/State Programs
- Sales Tax for Infrastructure
- Public-Private Partnerships
- Long-Term Bonding
- New Utility Tax

Funding – Road Blocks

- Traditional Grant funding timeline challenges
- Community Buy-in challenges
- Size of Project Needs ($30 Mil)
- Federal Interest Process
- State of Illinois funding challenges

Funding – Lessons Learned

- Recognize that everyone's priorities change very quickly
- Don’t be bashful about developing your project, but recognize that you need to build flexibility into the financial strategy very soon
- NIMBY can be an obstacle and a benefit
- Projects that change a Neighborhood dynamic are political, financial, and culturally challenging. In our case the challenge dates back to the 1930’s

Where are we now?

- 112 homes have been acquired and are awaiting funding for their deconstruction
- Buy-in by our citizens help to make this project sustainable throughout all phases
- Development of a multi-phase approach to mitigate future flood loss
- Continue to meet with stakeholders to complete the different phases of this project

Moving Forward

- Remove physical and non-physical obstructions to this project
- Create a safe walkable neighborhood
- Establish an environmentally enhanced riparian stream corridor near the confluence with our river
- Improve connectivity with existing neighborhood destinations through pathway and roadway improvements
- Promote the efforts of this project throughout the state and region