A Brief History of the City of Madison's Watershed Study Program

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February 11, 2021

Note: This presentation contains preliminary solutions that may be modified as the studies progress. See the final study report for the final proposed solutions.

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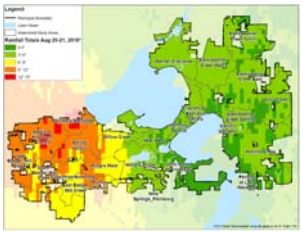
Fundamental Questions

- **Why** did the City of Madison develop watershed study program?
- **How** was the watershed study program set up?
- **What** does a watershed study look like?
- What challenges did Madison encounter?



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Past Approaches to Flood Management

- Projects often selected based on one or more of a variety of factors
  - Staff knowledge of site/problem
  - Resident complaints
  - Convenience
- Problems with approach
  - Not evaluated for equity
  - Not holistic

Photo courtesy John Greening

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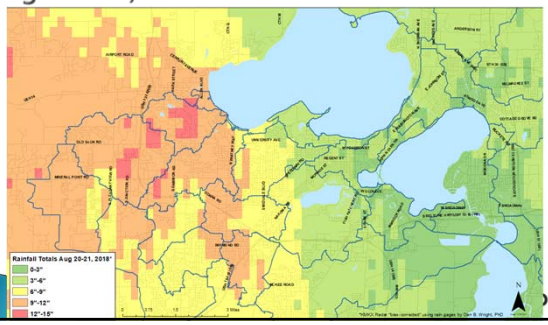
August 20, 2018



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Aug 20, 2018 – Damages

- August 20th event: substantial damage
  - Public infrastructure: $4 million
  - Private property: reported $17.5 million, estimated $30 million

Odana Road (above), Glenwood Children's Park (right), Madison, WI

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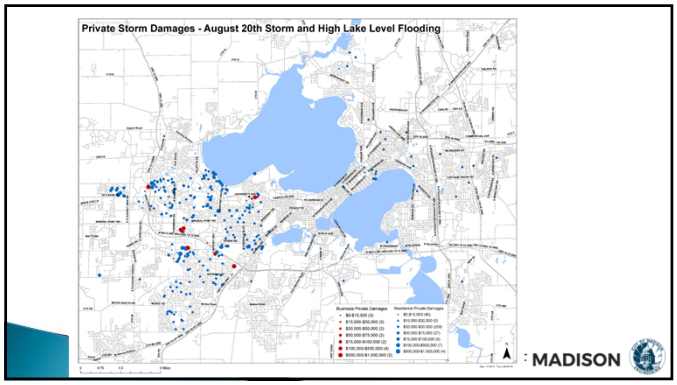

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City Response to Aug 20, 2018

- Goal: improvement to flood mitigation planning approach
  - Systematic
  - Standardized
  - Equitable
- Result: Watershed Study Program
  - Evaluate existing flooding potential throughout City on a watershed scale
  - Develop solutions that work together
  - Engage traditionally-quieter stakeholders through new engagement process

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Watershed Study Setup

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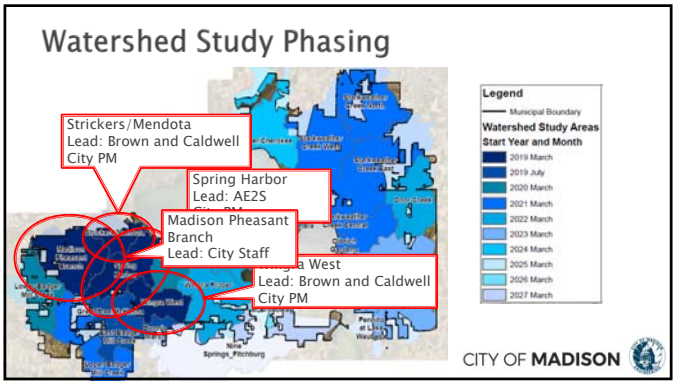

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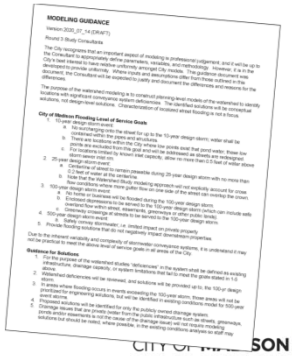
Technical Standards

- City modeling guidance document
- Sets standards for:
  - Study scope
  - Flooding goals
  - Modeling software
  - Starting modeling parameters
- Living document



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Outreach Standards

- 4-Step Public Information
  - Public Input Meeting #1 – Introduction to studies
  - Focus Groups – In-person, on-site discussion in "problem" areas or where requested
  - Public Input Meeting #2 – Existing conditions model
  - Public Input Meeting #3 – Proposed solutions model
- Project website creation and updates (maintained by City)

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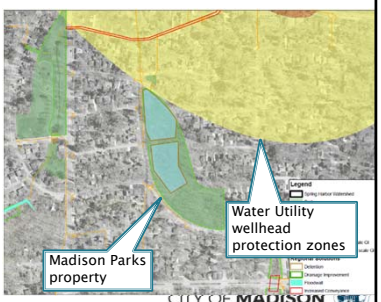
Stakeholder Input

- Active outreach to/engagement with stakeholders
  - Internal
    - City of Madison Parks, Streets/Forestry, Planning, Fire, Engineering Ops, Transportation Departments; Mayor's Office
    - Madison Water Utility
    - Madison Metro
  - External
    - Neighborhood groups
    - Friends groups



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Watershed Study Process and Deliverables (Phase 1)

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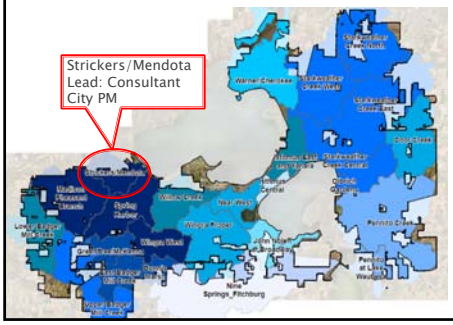
Example Watershed: Strickers/Mendota



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What Goes In/Comes Out of a Watershed Study?

- In
  - Model setup
  - Data collection
- Out
  - Calibrated existing conditions model
  - Proposed "gray" infrastructure solutions (w/ modeling)
  - Proposed "green" infrastructure solutions (w/ modeling)

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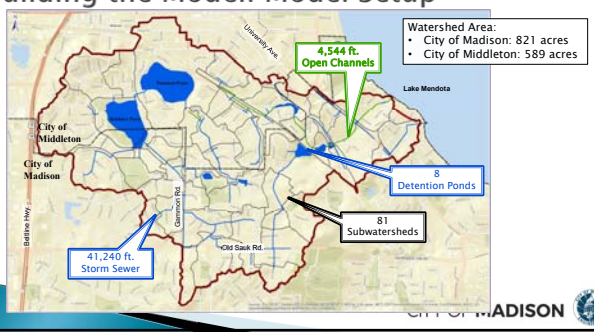
Building the Model: Model Setup



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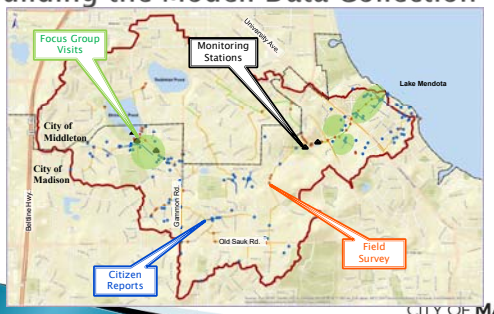
Building the Model: Data Collection



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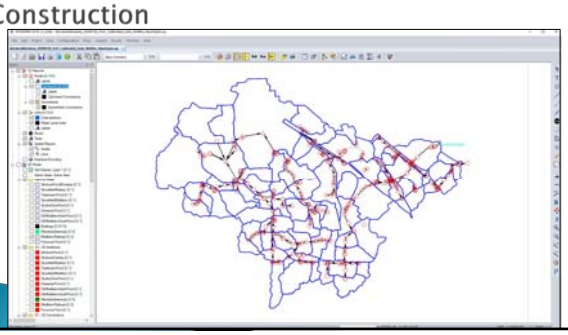
Building the Model: Existing Conditions Model Construction



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Model Results: Proposed "Gray" Infrastructure/Regional Solutions

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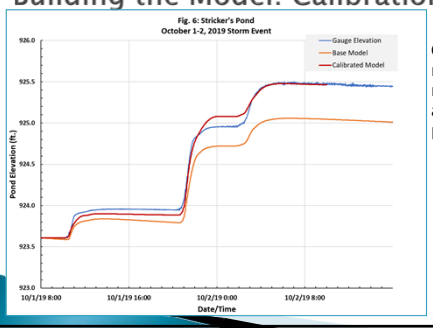
Building the Model: Calibration



Calibration compares model results to monitored results and adjusting model parameters

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Longmeadow Relief Storm Sewer

Stricker's/Mendota Watershed

- Target: Prevent roadway flooding in 10% event
- Install parallel 60" relief sewer from existing Harvest Hill connection along Gammon Road and Longmeadow Drive to Stricker's Forebay
- Includes outlet improvements to Strickers, Tiedemans Ponds

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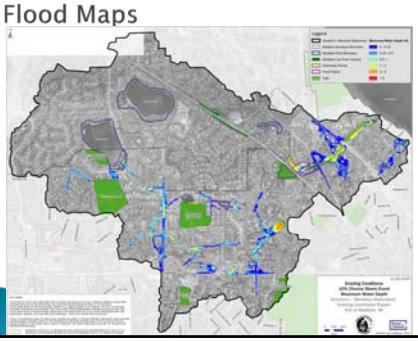
Model Results: Calibrated Existing Conditions Flood Maps



Flood Inundation Mapping

10% Chance Storm (4.1" over 24 hrs.)

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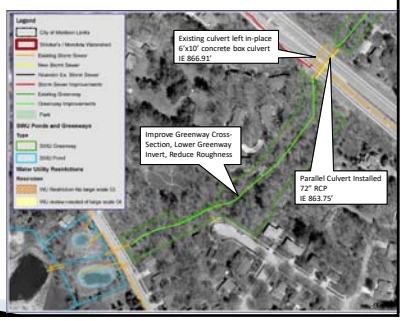
Mendota/Grassman Greenway

- Target: Prevent structure flooding in 1% event
- Improve greenway flow conditions from Old Middleton Road to Lake Mendota Drive



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Mendota/Grassman Greenway (Continued)

- Target: Prevent structure flooding in 1% event
- Improve greenway flow conditions from Old Middleton Road to Lake Mendota Drive

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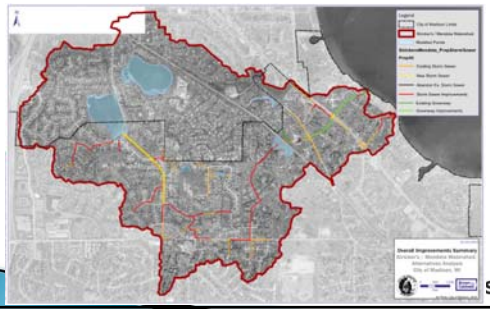
Stricker's/Mendota Watershed Proposed Mitigation Measures – Pipe Size Increases



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Green Infrastructure Analysis

- Piloted with Madison Pheasant Branch Watershed
- Evaluate impact of traditional Green Infrastructure sizing on the large events
  - Route 25% Directly Connected Impervious Area to Green Infrastructure
    - Treat ½" of runoff from all impervious surfaces
    - Resulted in ~5% reduction of peak flow for 1% chance (100-year) storm event
    - Estimated cost ~ $78 million to construct
- Next steps: evaluate Green Infrastructure in other watersheds
  - Add non-stormwater benefits to analysis

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Proposed and Actual Schedule

Round 1 Watershed Studies

Create and Calibrate Model
Projected: Spring-Summer 2019 **Actual**: Spring-Winter 2019

Identify Flood Impacts
Projected: Summer-Fall 2019 **Actual**: Fall-Winter 2019

2nd Public Meeting
Projected: Fall-Winter 2019 **Actual**: Summer 2020

Evaluate Solutions
Projected: Winter-Spring 2020 **Actual**: Spring 2020-Winter 2021

3rd Public Meeting
Projected: Spring-Summer 2020 **Actual**: Spring-Summer 2021

Finalize Study
Projected: Summer-Fall 2020 **Actual**: Summer-Fall 2021

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Challenges/Lessons Learned

- Modeling software selection
  - Local consultant experience with software
  - Software suitability to desired results
- Outreach limitations
  - In-person evening meetings – challenging for many
  - Zoom meetings – more accessible for some, require equipment
  - Focus groups – most popular option

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Comments/Questions/Open Discussion

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