

Welcome!

We will begin shortly...

Virtual Meeting Schedule	
6:00 – 6:10	Welcome
6:10 – 6:55	Presentation
6:55 – 7:15	Presentation Q & A (General)
7:15 – 7:30	Wrap-Up



Wingra Proper Watershed Study Public Information Meeting No. 1

by City of Madison Engineering Division
December 8, 2022

Please Note: This meeting is being recorded. It is a public record subject to disclosure. By continuing to be in the meeting, you are consenting to being recorded and consenting to this record being released to public record requestors.

- ✓ This meeting will be **recorded** and posted to the City's project page.
- ✓ All attendees should stay be **muted** to keep background noise to a minimum.
- ✓ You may use the **“raise hand”** option at the bottom if you have something that required immediate clarification.
- ✓ Use **“chat”** option if you are having technical issues and a staff person can try to assist.
- ✓ Please use the **“Q&A”** option at the bottom of the screen to type your question. Questions will be answered at the end of the presentation. Inappropriate questions may be dismissed.
- ✓ If you cannot ask via typing your question, use the “raise hand” option and you will be unmuted when it is your turn.



This meeting is being recorded.

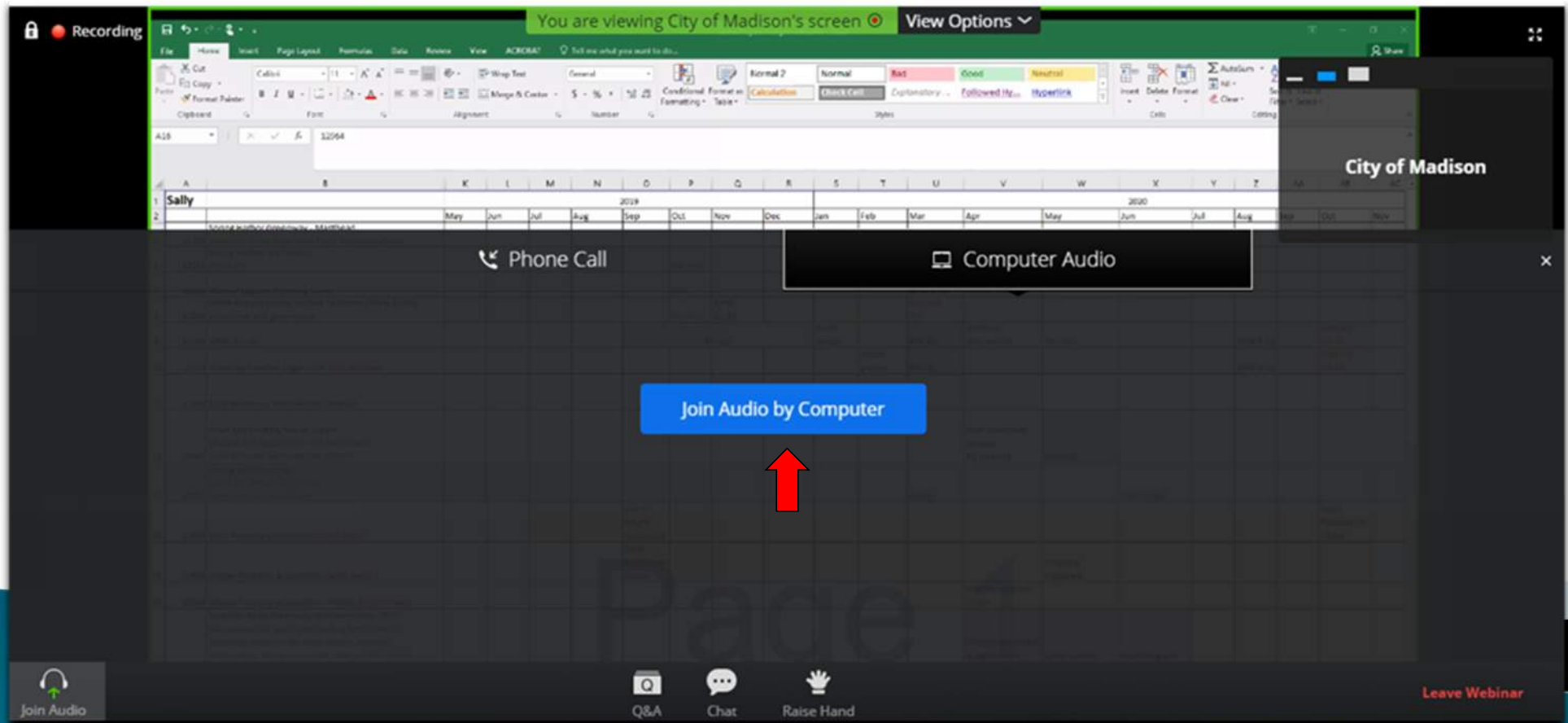
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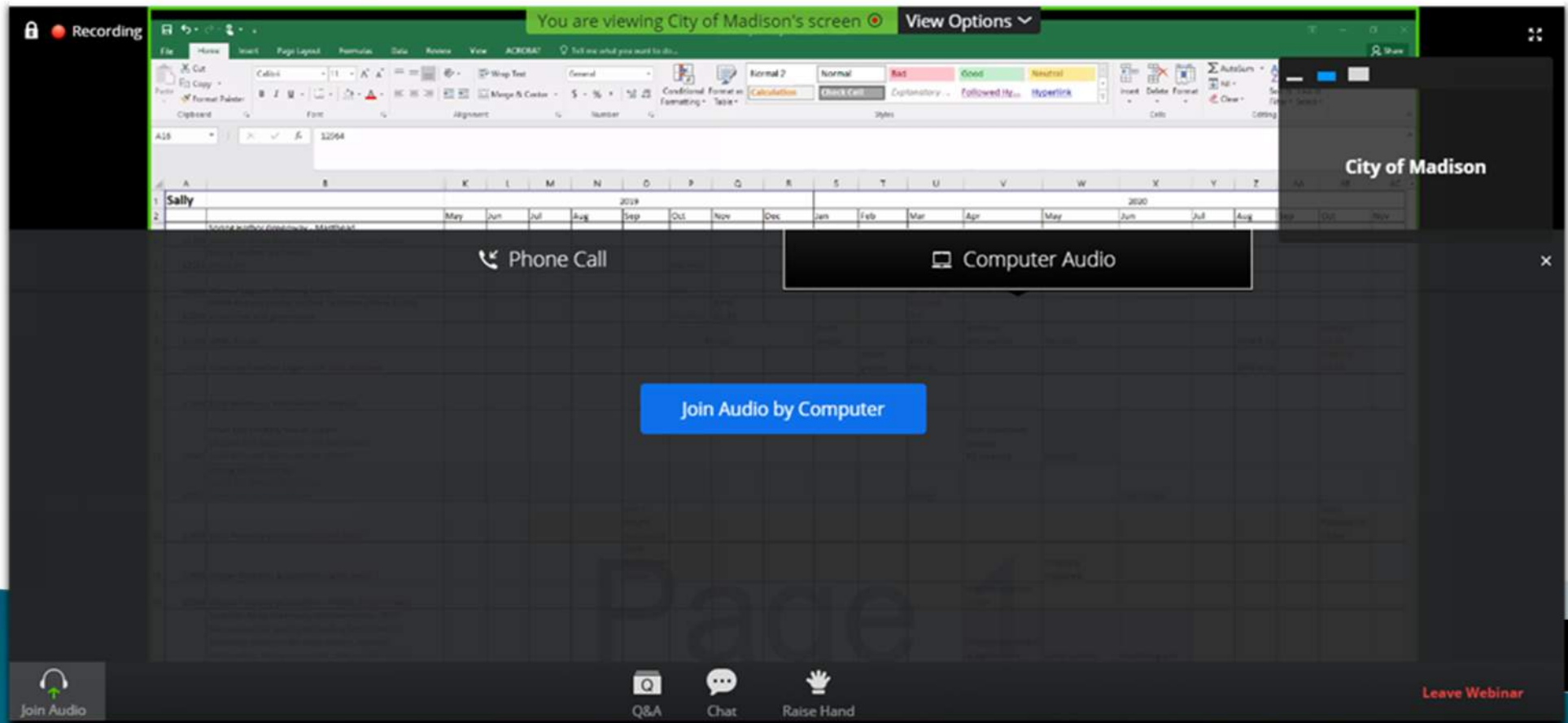


How to Participate



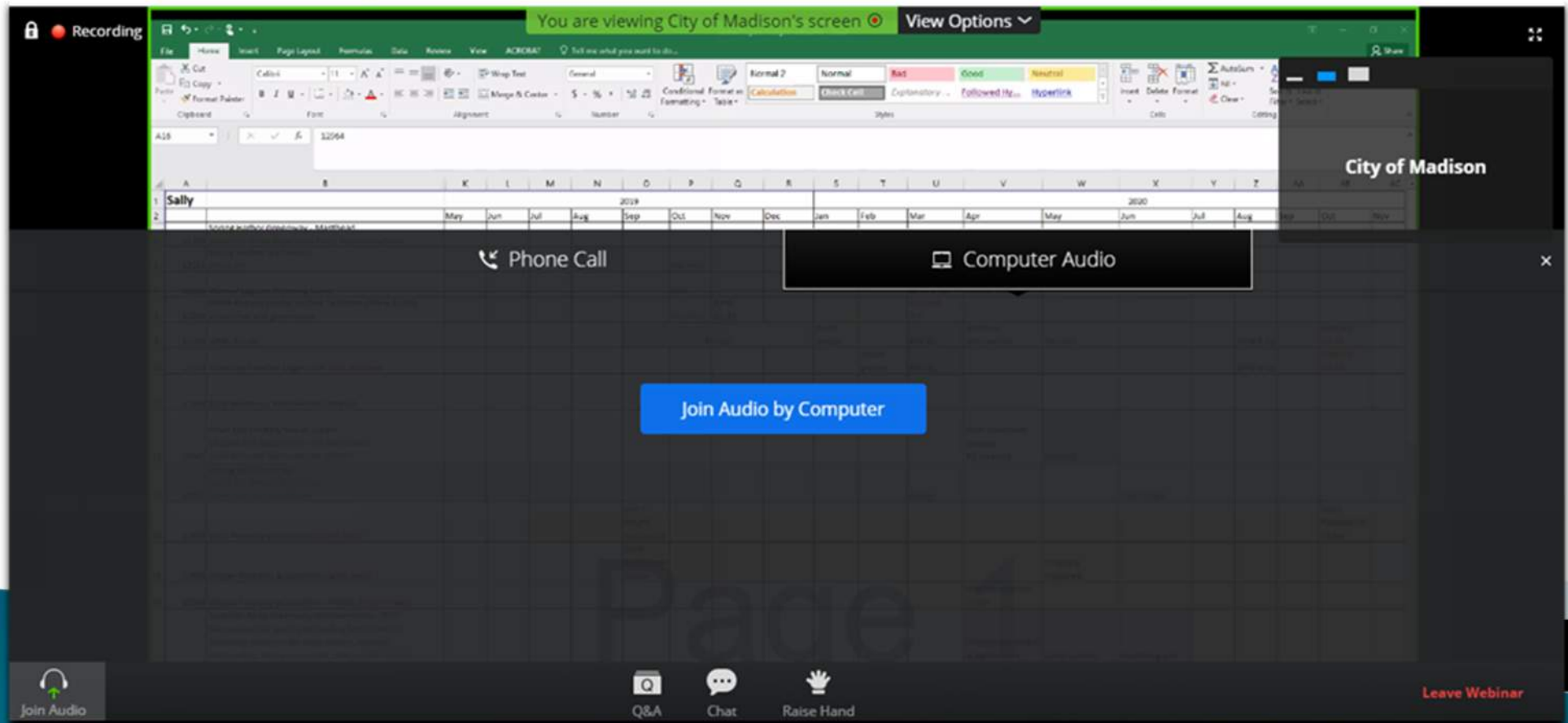
Make sure to join audio

How to Participate



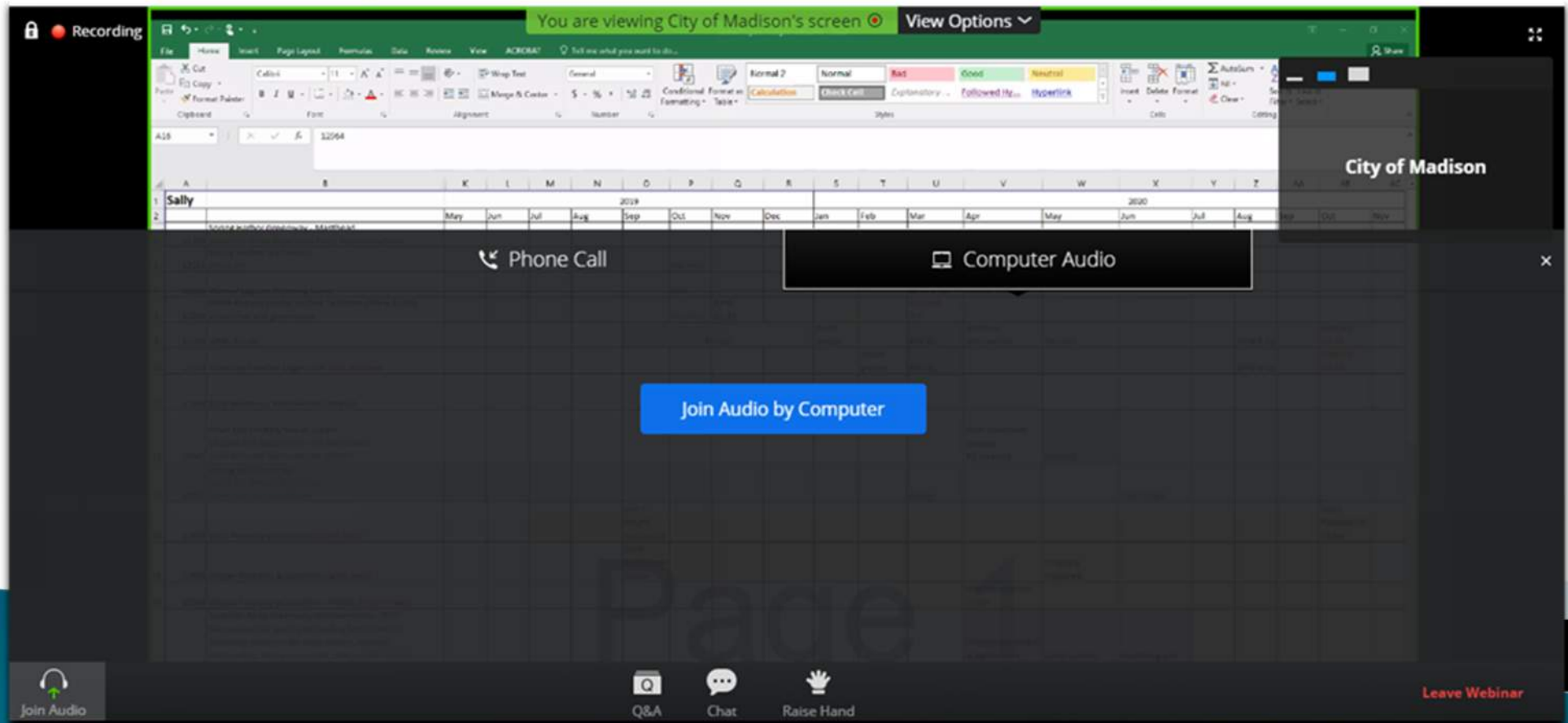
Raise your hand to be unmuted
For comments or ask additional questions.

How to Participate



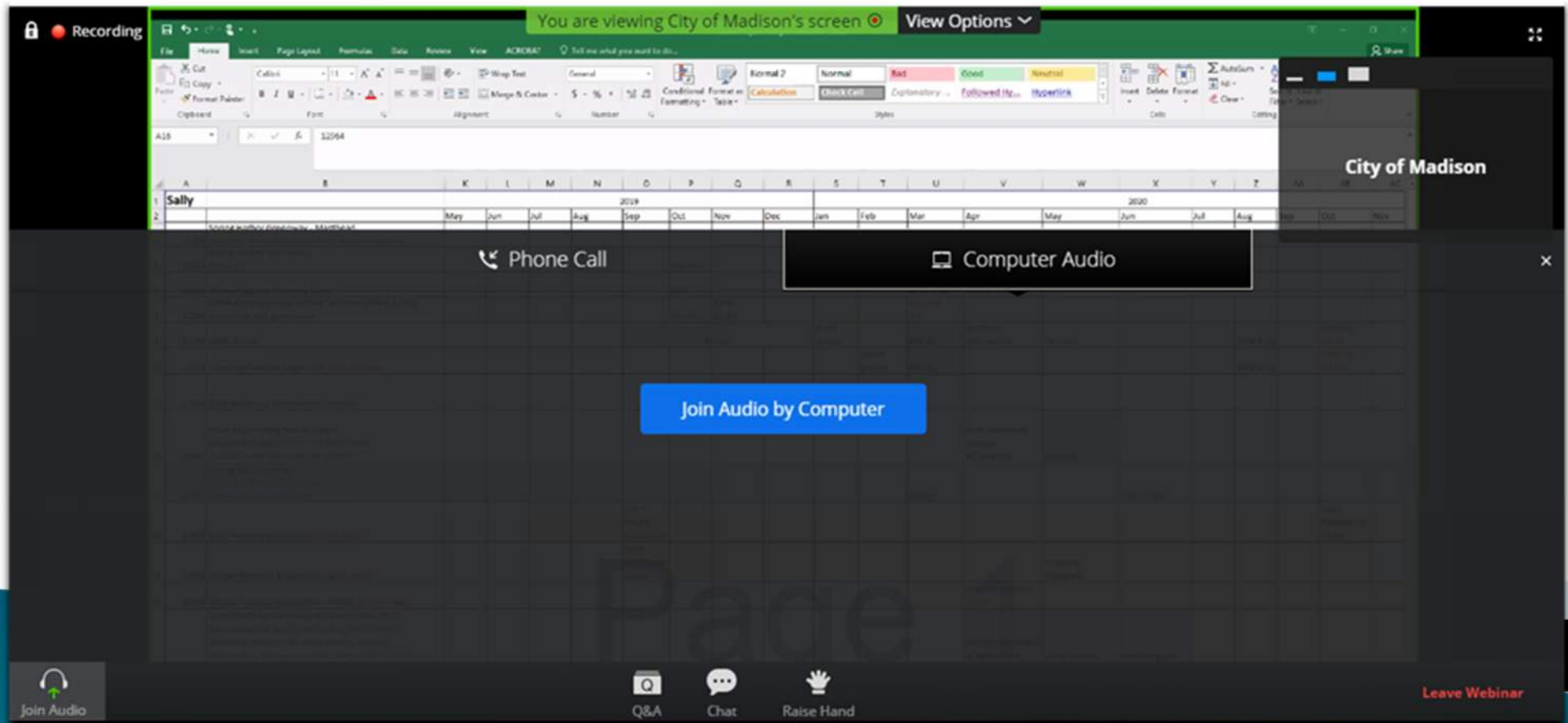
Use chat if you have technical issues or a question for the panelists

How to Participate



Use Q/A if you have questions.
We will answer after the presentation

How to Participate



To leave the meeting click here



Evening Overview

- ▶ Welcome (Hannah Mohelnitzky, City of Madison)
- ▶ Presentation (Mike Wegner, Brown and Caldwell)
- ▶ Q&A (facilitated by Hannah Mohelnitzky, City of Madison)
 - Submit questions through Zoom Q&A
 - *To find the Zoom Q&A Box, hover over the edge of your screen. A toolbar will appear and you can click on “Q&A”*
 - Questions answered at the end of the Presentation
- ▶ Wrap Up (Hannah Mohelnitzky, City of Madison)

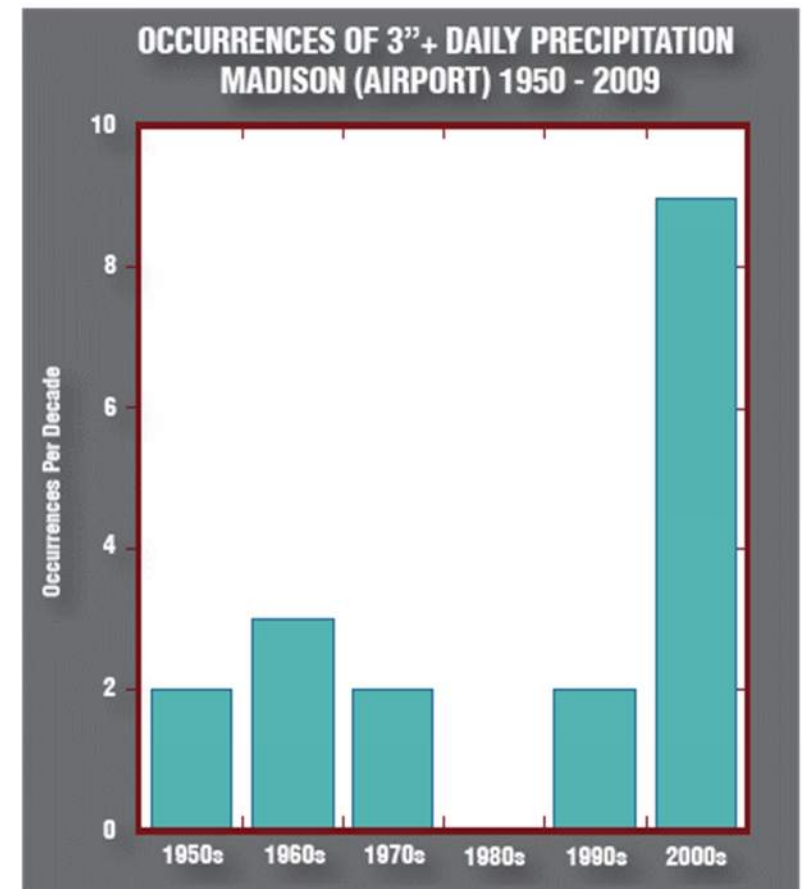
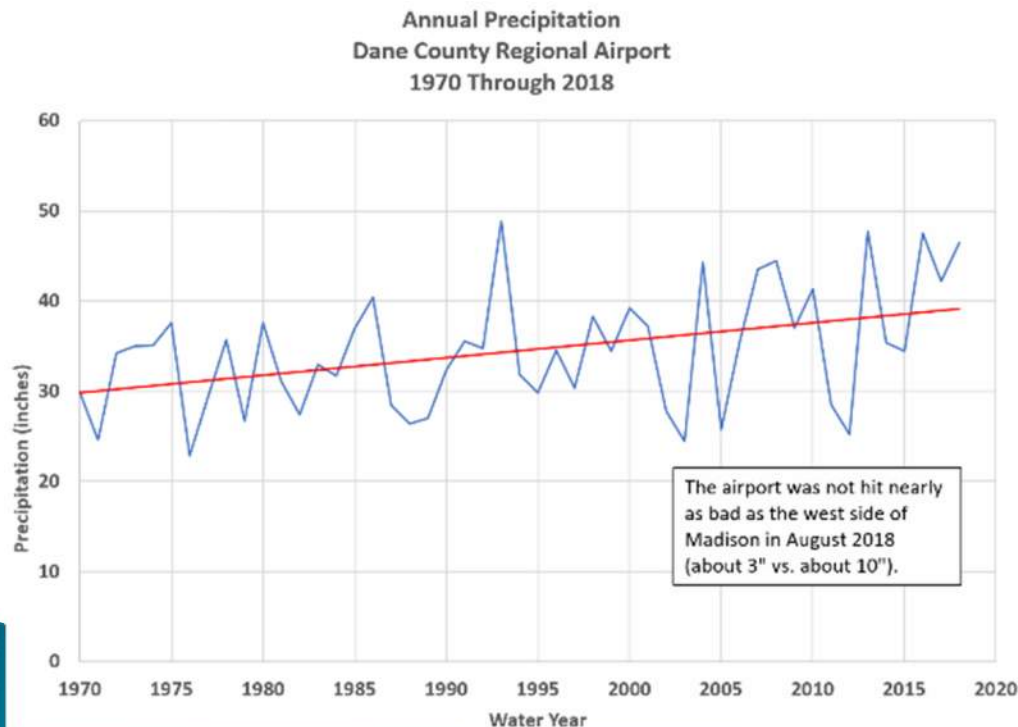
Presentation Overview

1. Why We Are Here
2. Where the Water Goes
3. Reasons for Flooding Issues
4. Watershed Study Goals
5. Next Steps
6. Property Owner Responsibilities
7. How to Stay Involved



Why We Are Here: Historic Events

- ▶ More rain
- ▶ More rain events greater than 3"

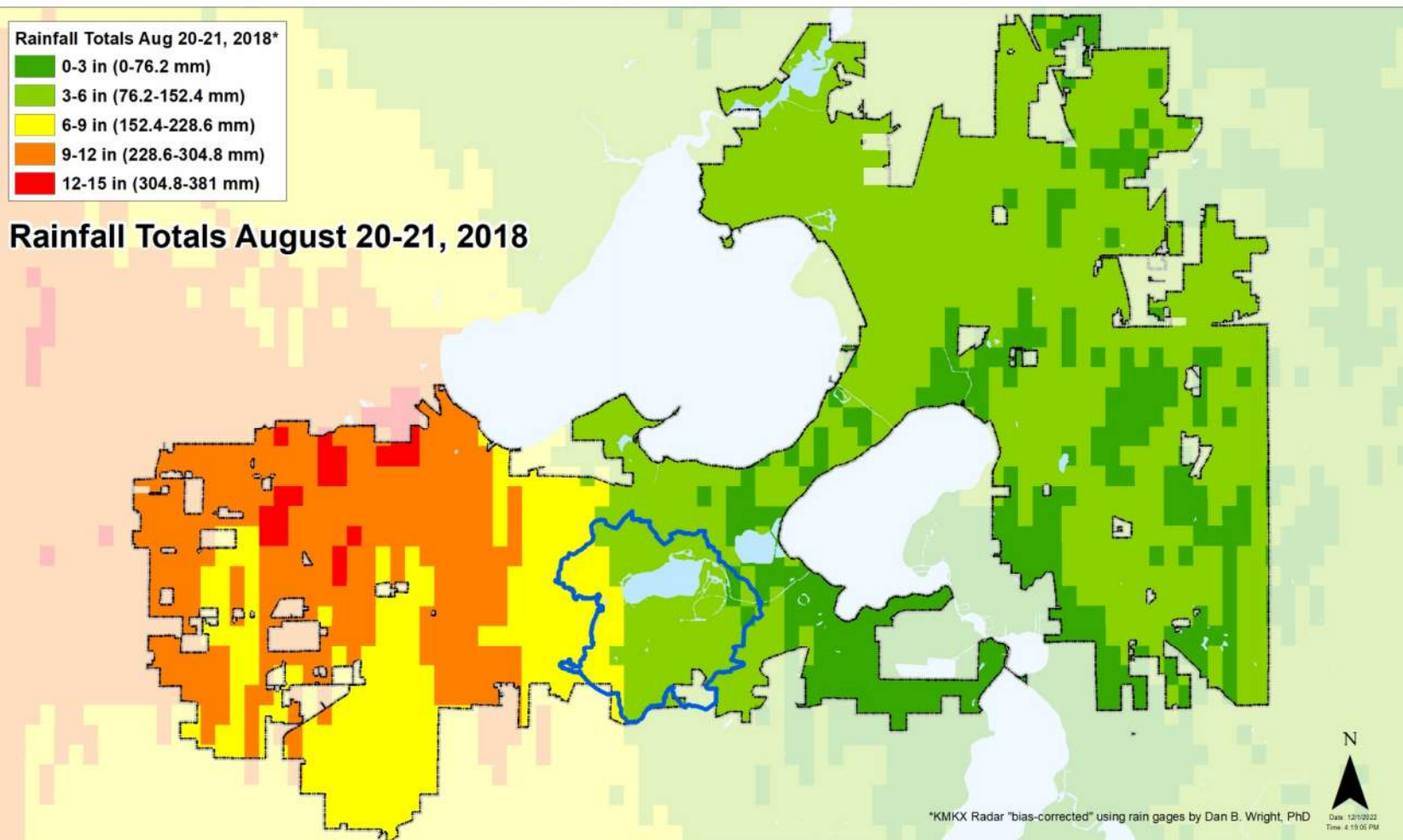


Wisconsin's Changing Climate: Impacts and Adaptation. 2011. Wisconsin Initiative on Climate Change Impacts. Nelson Institute for Environmental Studies, University of Wisconsin-Madison and the Wisconsin Department of Natural Resources, Madison, Wisconsin.



August 20-21, 2018 Event

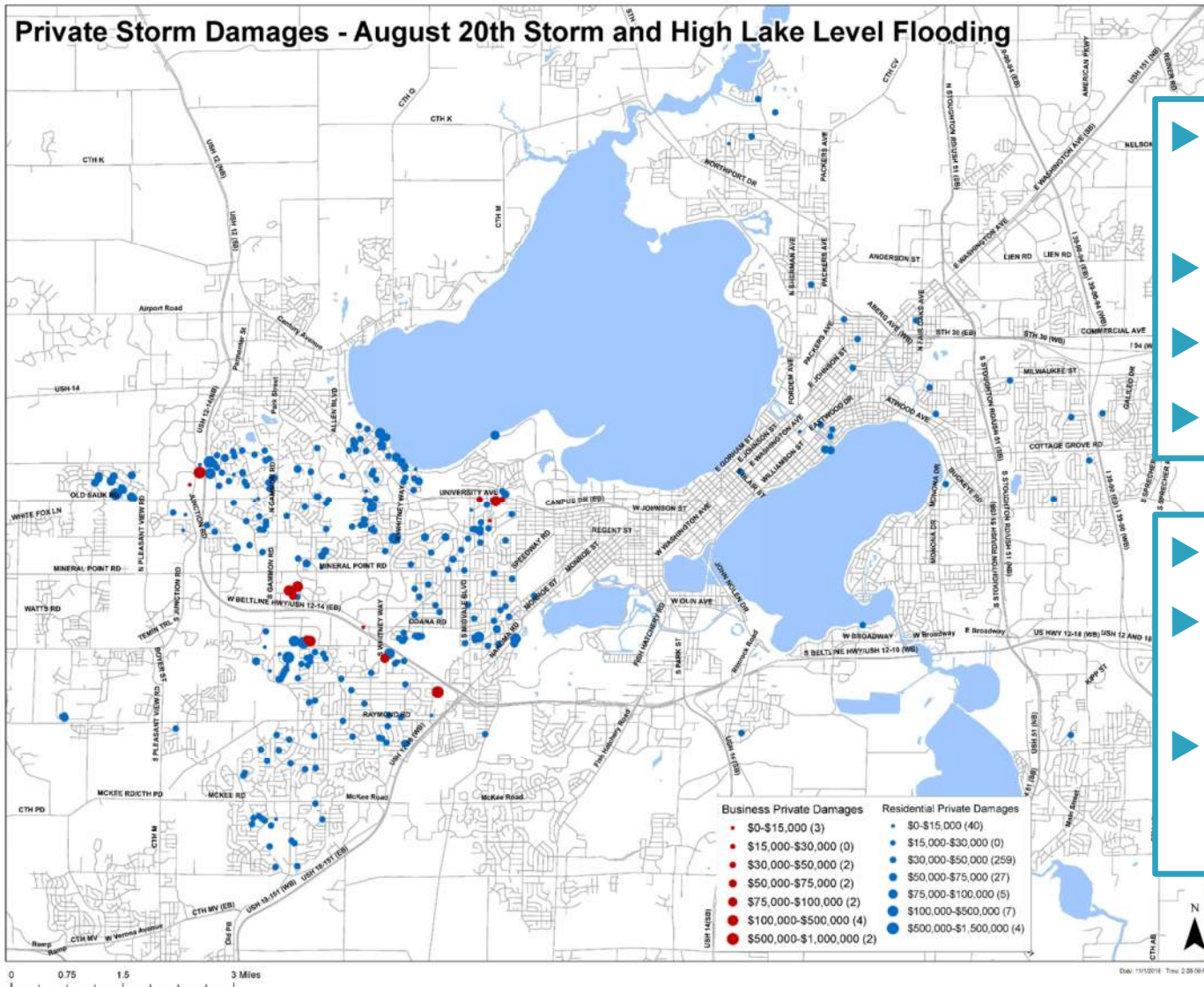
KMKX Radar that was
"bias corrected" using
rain gauges by UW
Professor Dan Wright



IADISON



Private Storm Damages - August 20th Storm and High Lake Level Flooding



- ▶ Most damage on the West Side
- ▶ Mostly residential damage
- ▶ Some commercial damages
- ▶ Big losses!

- ▶ You can still report flooding
- ▶ www.cityofmadison.com/flooding/report/
- ▶ Can report information from 2018 or other events

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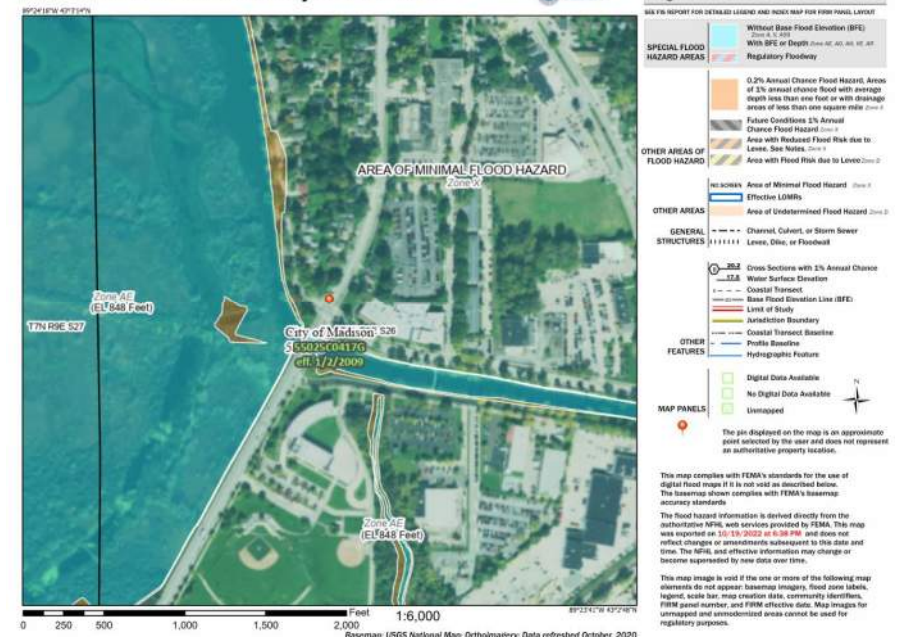
2018 Flooding: Distribution and Impacts, Insights for Future

- ▶ West side experienced more flooding and damage, because of rainfall patterns
- ▶ The Wingra Proper watershed was spared from the worst of the storm
- ▶ One of primary purposes of project is to predict where and how much flooding will occur if the Wingra Proper watershed, has a similar storm
- ▶ Opportunity to be proactive rather than reactive
- ▶ We welcome your historical observations from Wingra Proper watershed, in case there are flooding problems which have been underreported

Floodplains mapped by state (DNR) and federal (FEMA) government

- ▶ Historically, floodplains have been mapped for flood risks associated with midsize and large rivers, lakes and creeks
- ▶ Flooding in 2018 and other recent years showed there are areas of high flood risk outside of officially mapped floodplains

National Flood Hazard Layer FIRMette

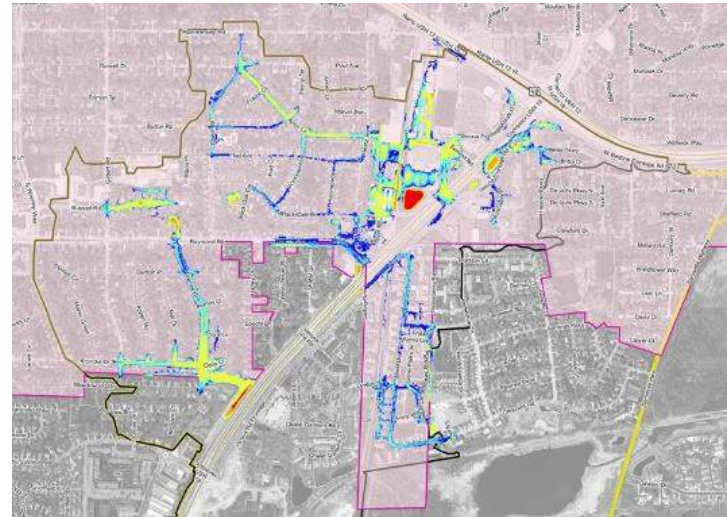


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Flooding occurs outside of mapped floodplains

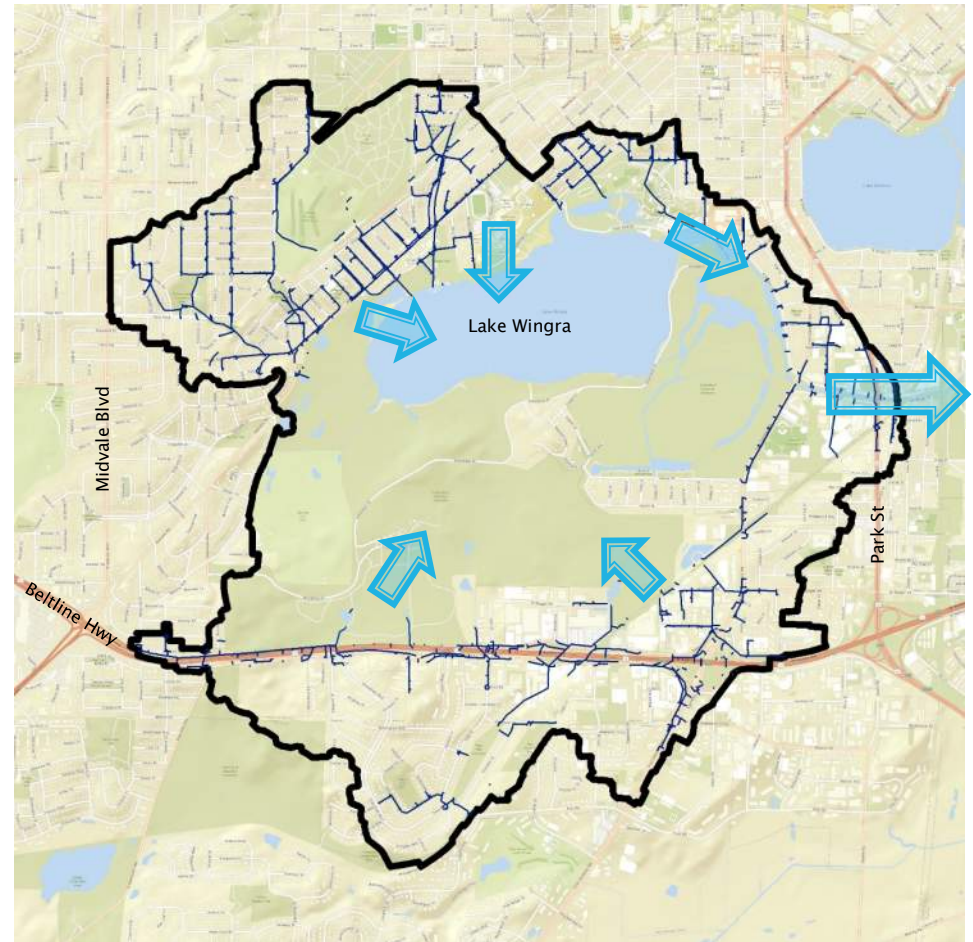
- ▶ Recent flooding and analysis shows there are areas of high flood risk outside of officially mapped floodplains
- ▶ Flood risk because of undersized stormwater drainage systems is typically not mapped by FEMA



Where the Water Goes

What's a watershed?

- ▶ A watershed is the area of land that drains precipitation (rain, snow, etc.) to a common low point, such as an inlet, stream, or lake.
- ▶ Determined by surface terrain and underground pipe system.



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Where the Water Goes: Sewer Systems

- ▶ Madison has separate storm and sanitary sewers
- ▶ Storm sewer system is NOT the same as the sanitary sewer system



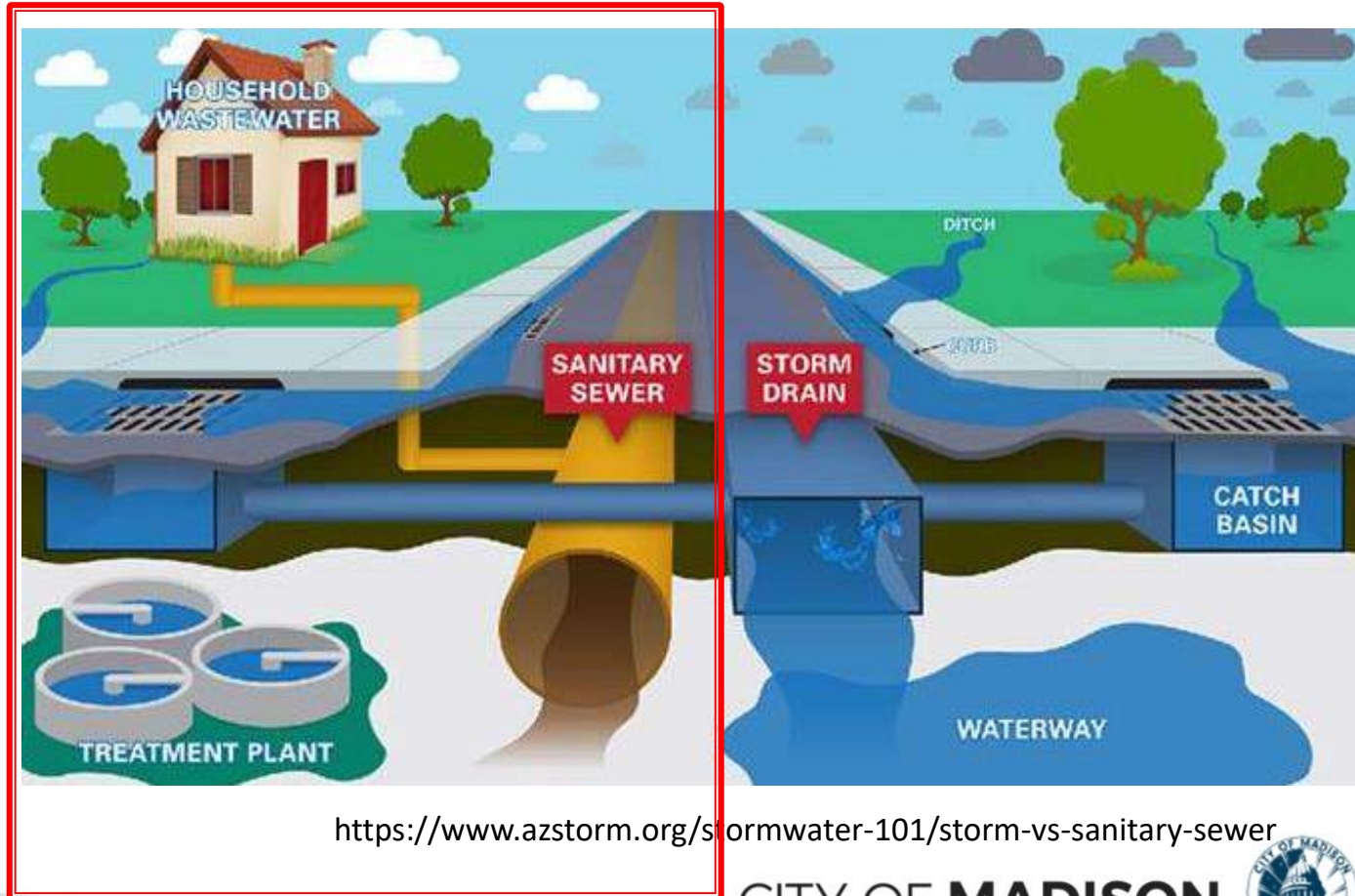
<https://www.azstorm.org/stormwater-101/storm-vs-sanitary-sewer>

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Where the Water Goes: Sanitary Sewer

- ▶ Sanitary sewer drains residential (toilets, showers, kitchen sinks, etc.), commercial and industrial wastewater streams
- ▶ Sanitary sewer transports wastewater to Madison Metropolitan Sewerage District (MMSD) treatment plant
- ▶ Sanitary infrastructure includes:
 - ▶ Manholes
 - ▶ Household lateral pipes
 - ▶ Main collector pipes

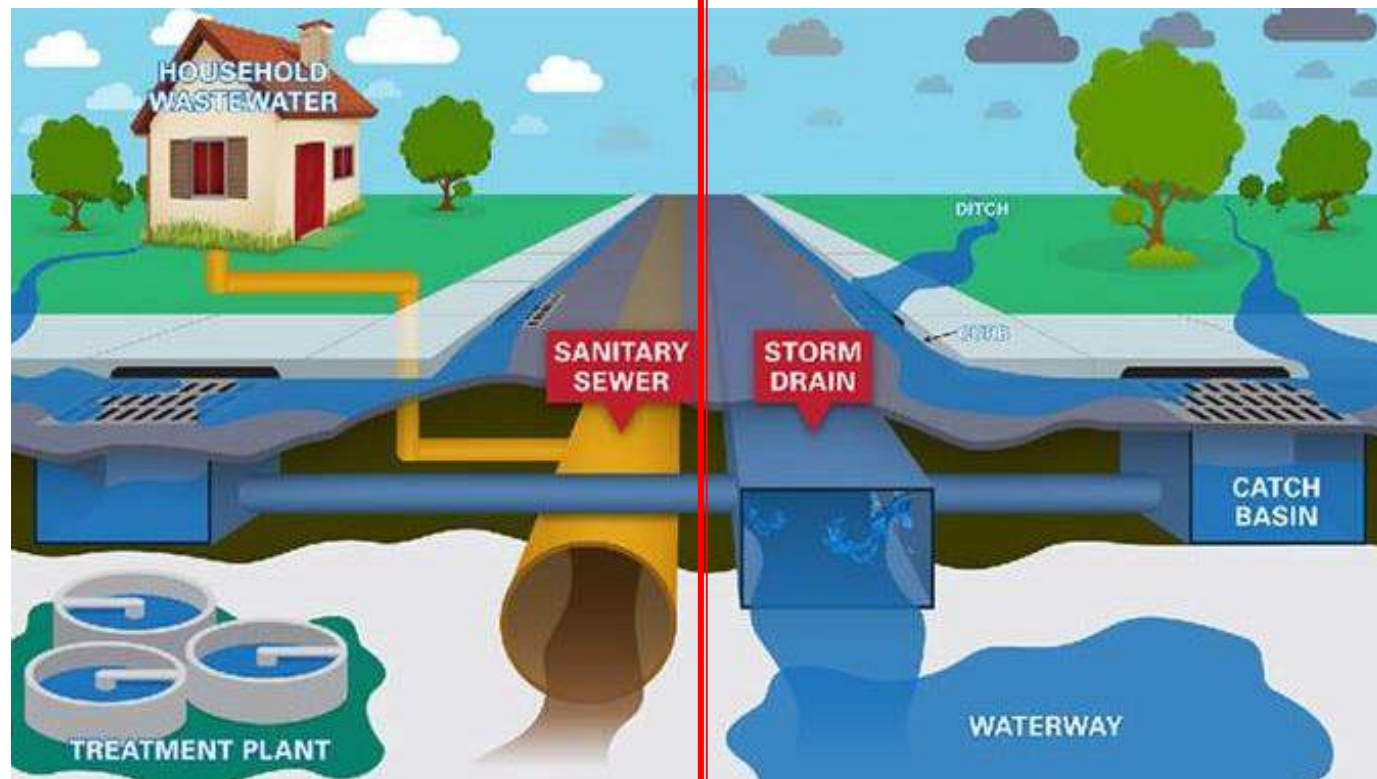


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Where the Water Goes: Storm System

- ▶ Our stormwater drains to local surface waters
- ▶ We try to treat for nutrients and sediment
- ▶ Storm infrastructure includes:
 - ▶ Curbs and gutters
 - ▶ Inlets
 - ▶ Pipes
 - ▶ Channels (greenways)
 - ▶ Ponds



<https://www.azstorm.org/stormwater-101/storm-vs-sanitary-sewer>

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Where the Water Goes: Storm System in Madison



Greenway at Owen Conservation Park



Above: 96" pipe on University Ave (2013)

Below: storm sewer inlet on W Doty St



Reasons for Flooding Issues

- ▶ In many watersheds, flooding is not caused by lake levels
- ▶ This study will incorporate Lake Wingra and Wingra Creek water levels
- ▶ Yahara Lakes function as a system
 - Solution to problems is increased conveyance through lake chain
- ▶ Website:
<https://lwr.d.countyofdane.com/Yahara-Chain-of-Lakes-Lake-Levels-Task-Force>



<https://www.wiscontext.org/yahara-watershed>

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Reasons for Flooding Issues

- ▶ Flash flooding: when storm sewer system cannot handle high amounts of rain
- ▶ Comparative example: a traffic jam
 - Too many cars on the Beltline during rush hour → backups happen
- ▶ During a storm, more water tries to move through the storm sewer system → backups happen



Beltline, looking west from Park Street, WisDOT

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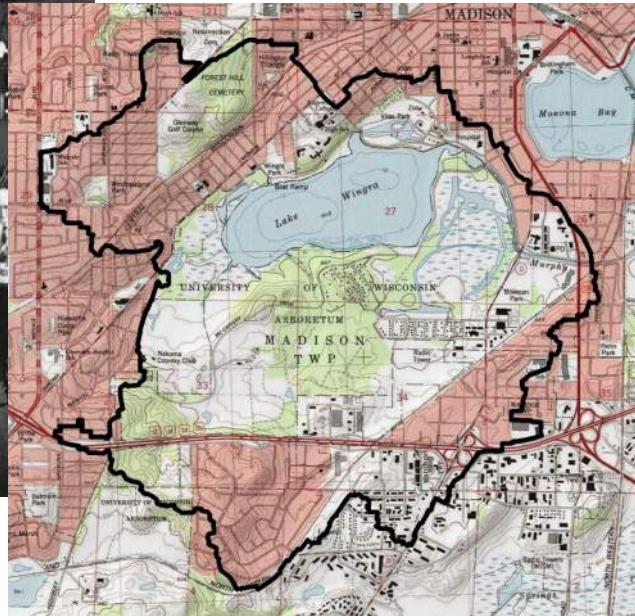


Reasons for Flooding Issues

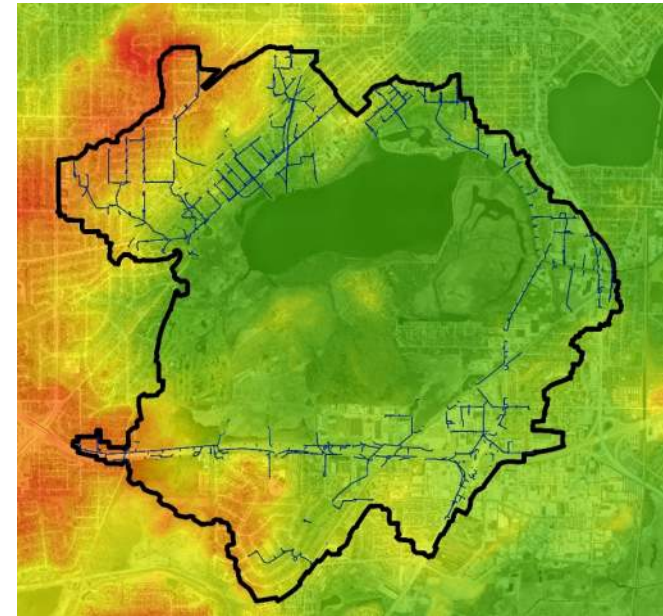
- ▶ Tools have changed in the last five decades.
- ▶ Old tools made data gathering and stormwater modeling difficult.



Photo above:
<https://www.vintag.es/2018/08/life-before-autocad.html>



VS.



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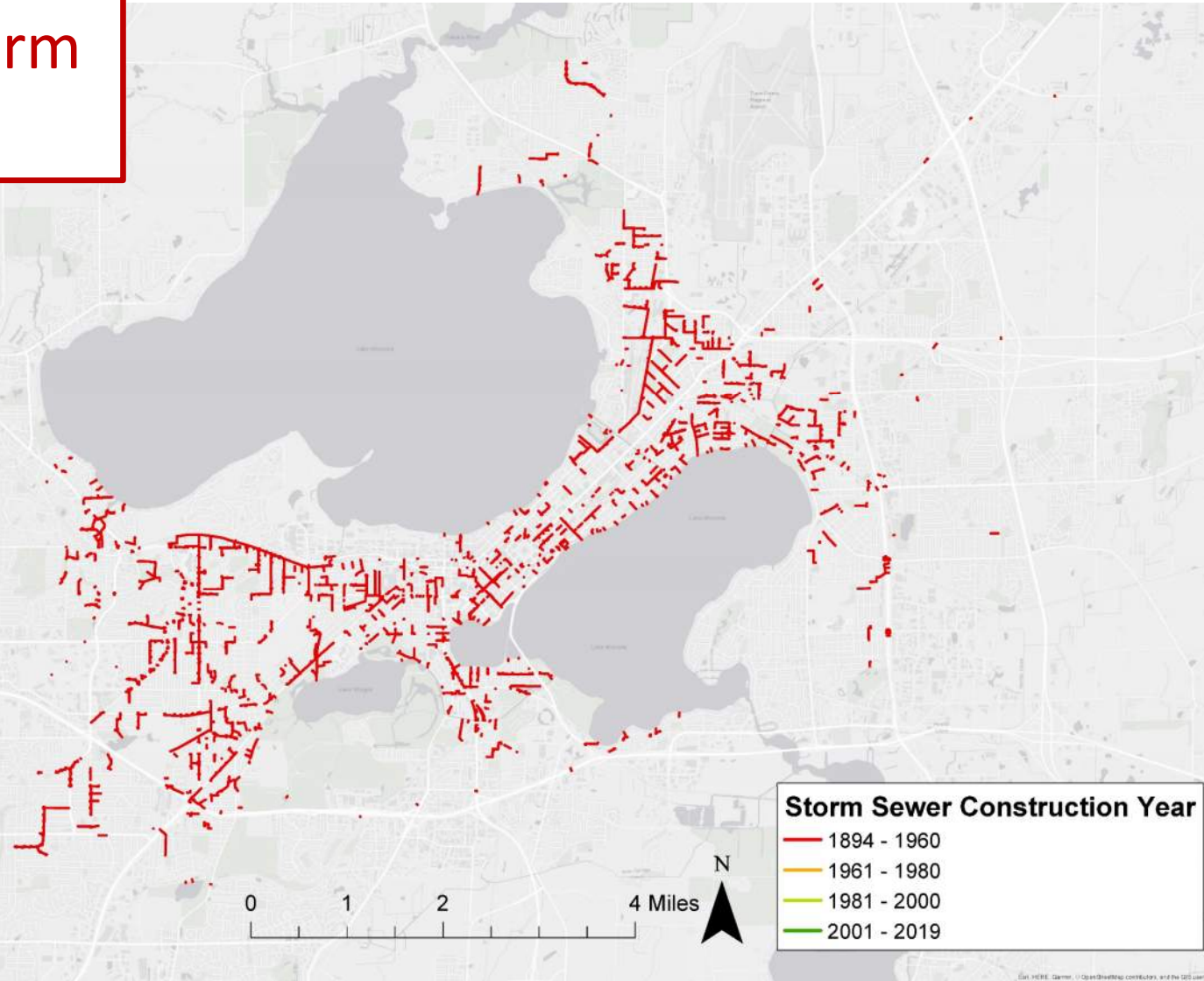


Reasons for Flooding Issues: Changing Design Standards

- ▶ Changing public design standards and past limited private design standards have led to flash flooding.
- ▶ Lax historical building requirements created hard-to-solve flooding problems on private property which cannot be easily corrected.

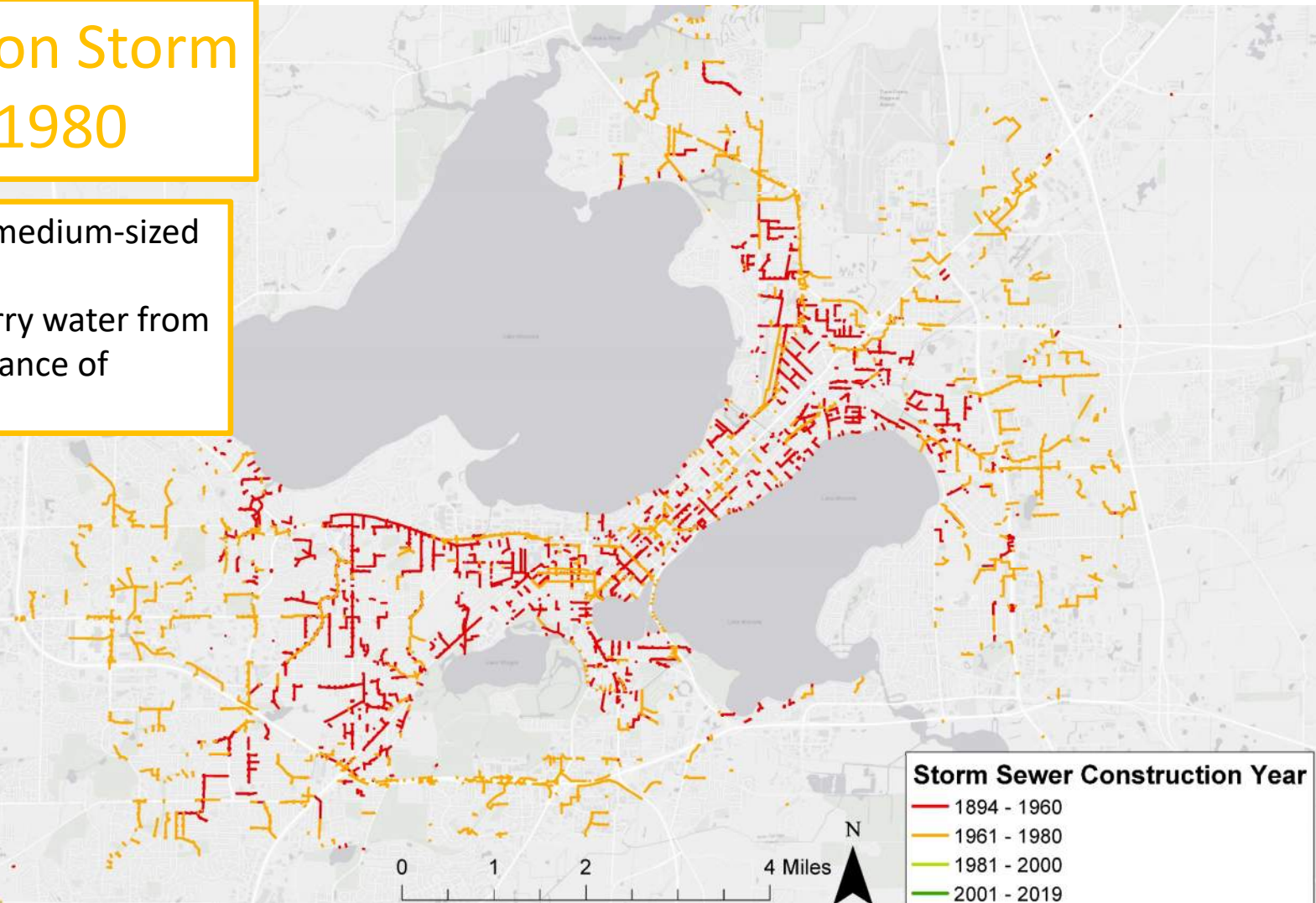
City of Madison Storm Sewer: 1894-1960

- Rule of thumb design
- No flood control



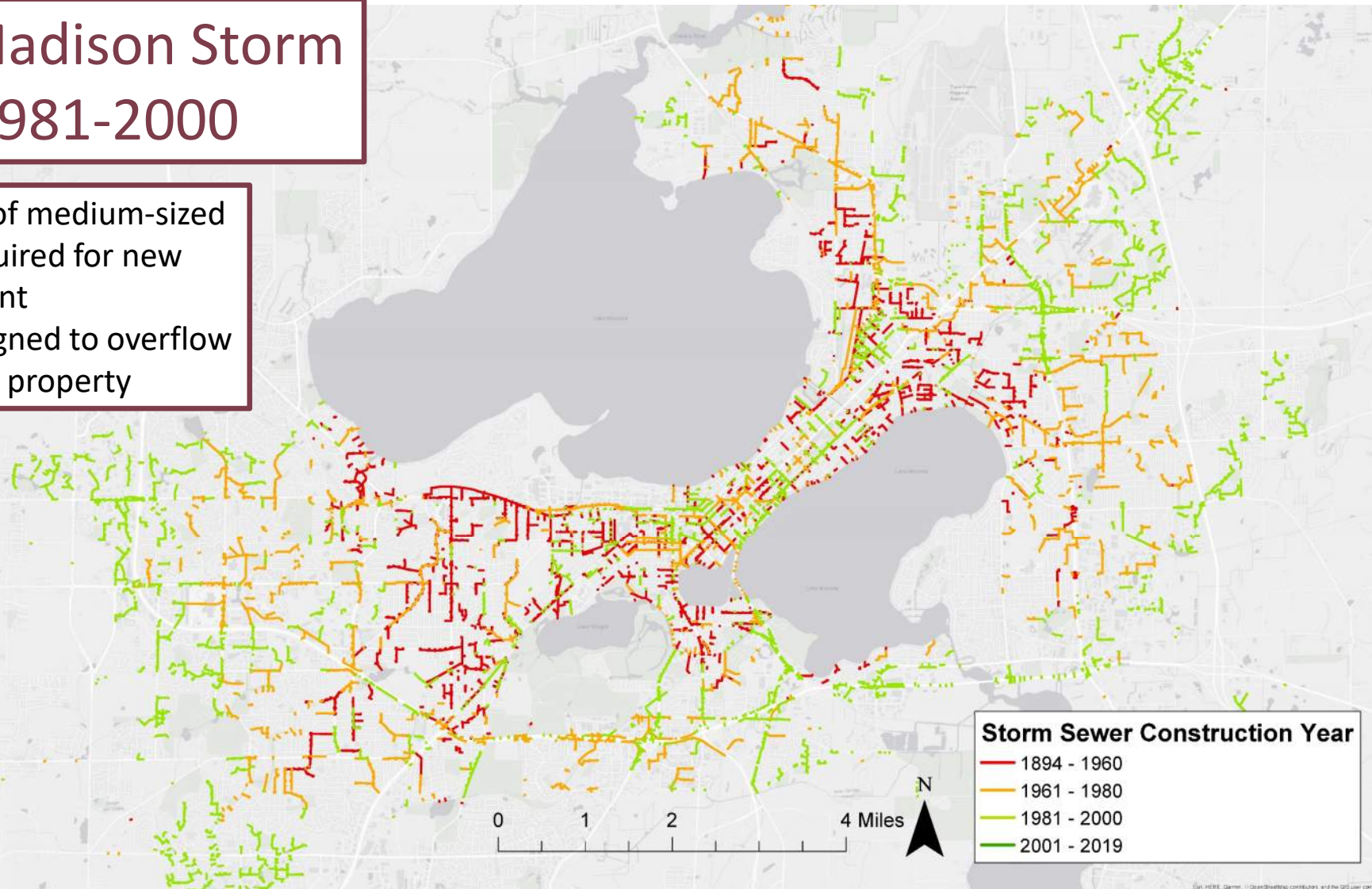
City of Madison Storm Sewer: 1961-1980

- Pipes designed for medium-sized storms
- Culverts sized to carry water from storms with 10% chance of occurring each year



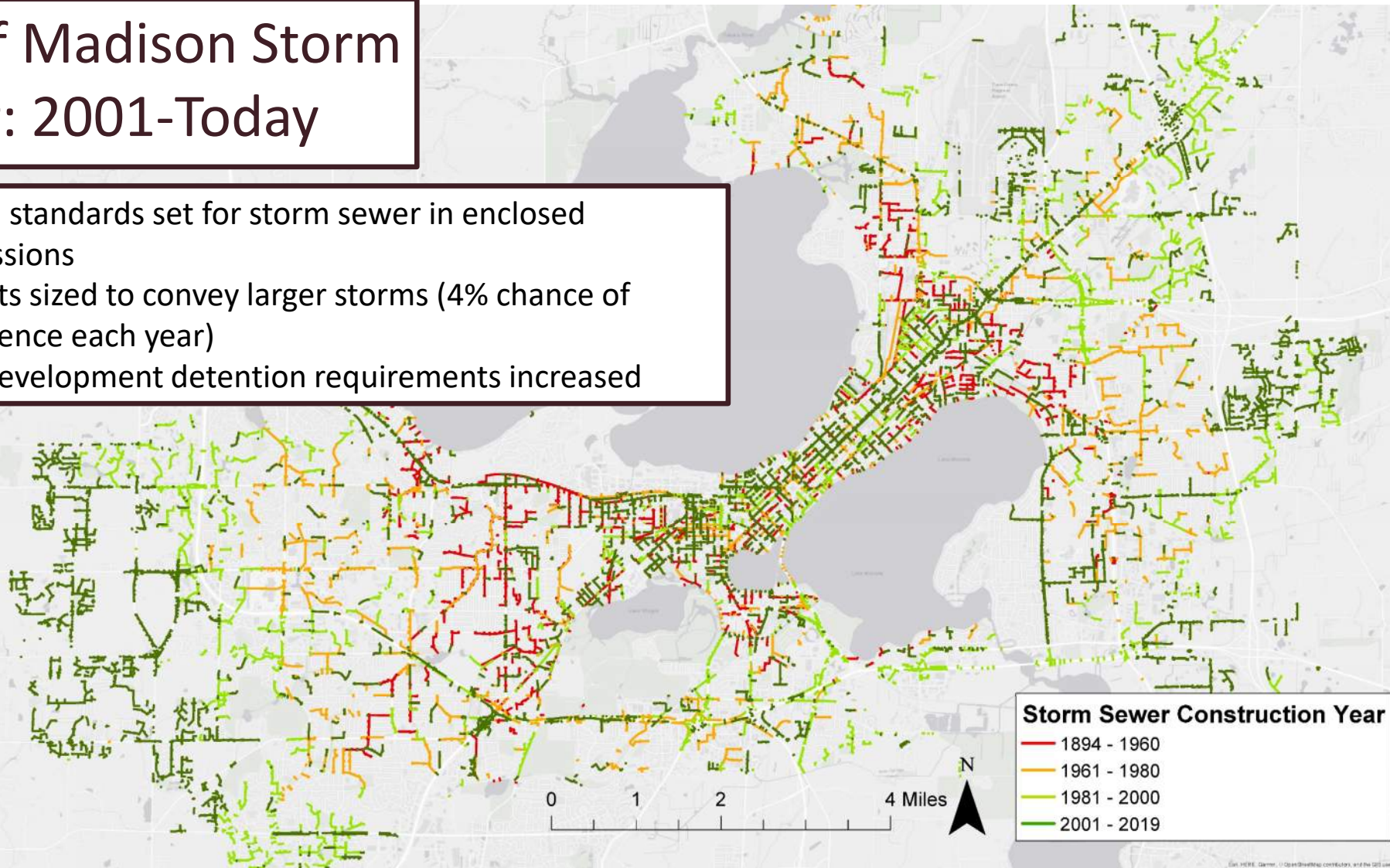
City of Madison Storm Sewer: 1981-2000

- Detention of medium-sized storms required for new development
- Ponds designed to overflow onto public property



City of Madison Storm Sewer: 2001-Today

- Design standards set for storm sewer in enclosed depressions
- Culverts sized to convey larger storms (4% chance of occurrence each year)
- New development detention requirements increased



Why Replacement Takes Time

- ▶ Road reconstruction, storm sewer is expensive but long-lasting
 - Road reconstruction cost = approximately \$500-\$2,000/ft
 - 2% City infrastructure is upgraded annually
 - Average life:
 - Street=30-50 years
 - Pipes=50-100 years
- ▶ Storm Water Utility bill
 - 2018 increased 2.3% (avg. residential increase of \$2.15/year)
 - 2019 increased 10.1% (avg. residential increase of \$9.60/year)



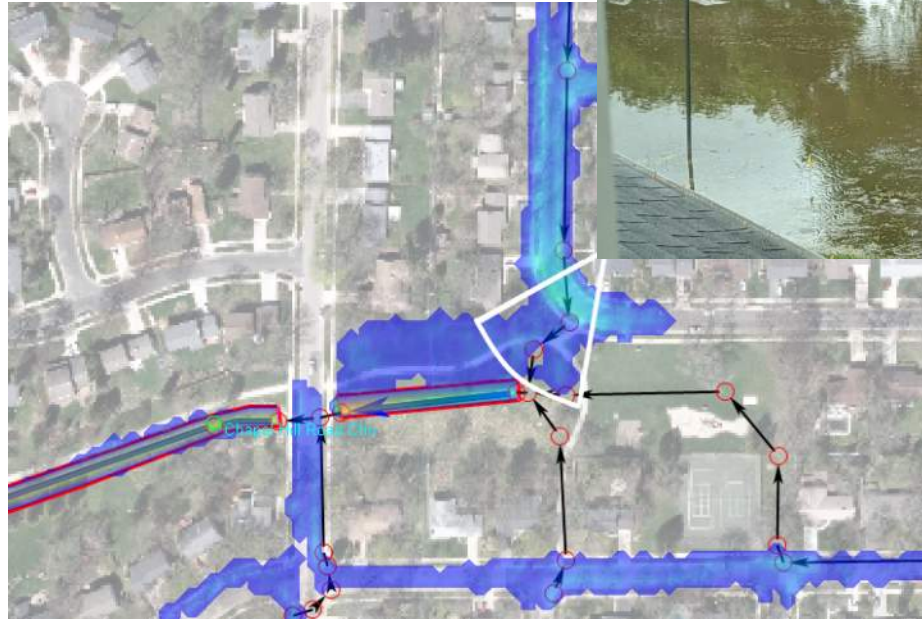
96" pipe tunneling on University Ave, Madison, WI
(2013)

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Watershed Study Targets

- ▶ Find out why flooding happens in certain locations



Above – Photograph of Actual Flooding Witnessed (June 9, 2020)

Left – Example Watershed Model Output Map (June 9, 2020)

Watershed Study Targets

- ▶ Find out why flooding happens in certain locations
- ▶ System goals
 - Eliminate flooding from storm sewer during storms with a 10% chance of occurring each year (4" of rain in a day)



N. High Point Road at Old Sauk Road, Madison, WI

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Watershed Study Targets

- ▶ Find out why flooding happens in certain locations
- ▶ System goals
 - Eliminate flooding from storm sewer during storms with a 10% chance of occurring each year (4" of rain in a day)
 - Cars can pass down the middle (highest) part of the street during a storm with a 4% chance of occurring each year (~5" of rain in a day)



Winding Way, Madison, WI

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Watershed Study Targets

- ▶ Find out why flooding happens in certain locations
- ▶ System goals
 - Eliminate flooding from storm sewer during storms with a 10% chance of occurring each year (4" of rain in a day)
 - Cars can pass down the middle (highest) part of the street during a storm with a 4% chance of occurring each year (~5" of rain in a day)
 - Structure and major roadway damage is eliminated for storms with a 1% chance of occurring each year (6.5" of rain in a day)



Regent St at Kenosha Ave, Madison, WI

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Watershed Study Targets

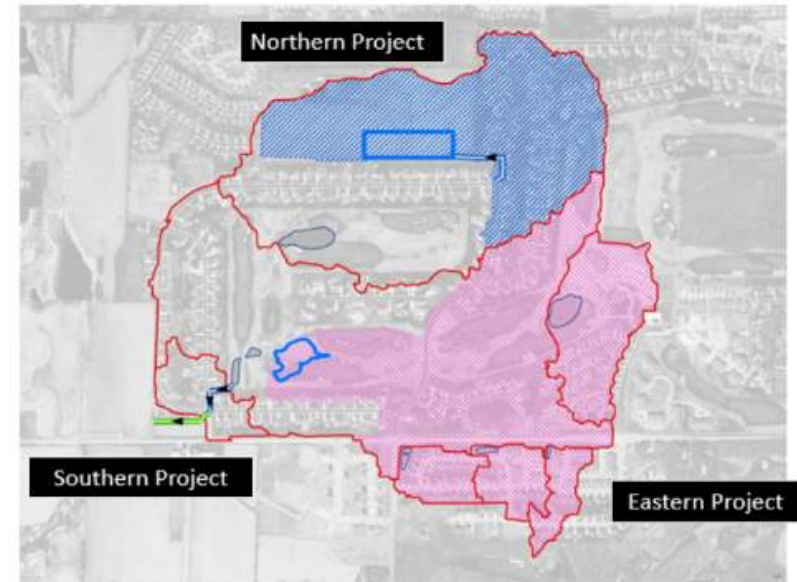
- ▶ Find out why flooding happens in certain locations
- ▶ System goals
 - Eliminate flooding from storm sewer during storms with a 10% chance of occurring each year (4" of rain in a day)
 - Cars can pass down the middle (highest) part of the street during a storm with a 4% chance of occurring each year (~5" of rain in a day)
 - Structure and major roadway damage is eliminated for storms with a 1% chance of occurring each year (6.5" of rain in a day)
 - Flooding extents known during storms with a 0.2% chance of occurring each year (8.96" of rain in a day)



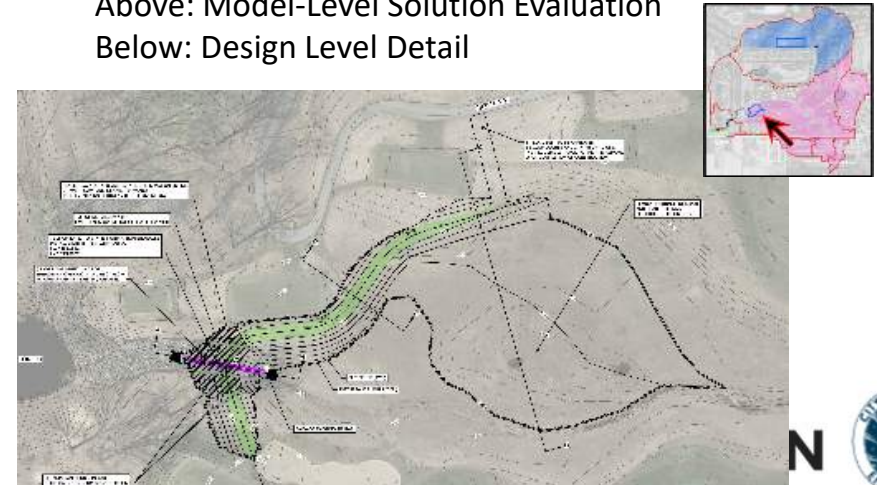
Tenney Park, Madison, WI

Watershed Study Targets

- ▶ Find out why flooding happens in certain locations
- ▶ System goals
- ▶ Test Solutions
 - Lots more detail gets added in final design
 - Will help prioritize and budget future projects

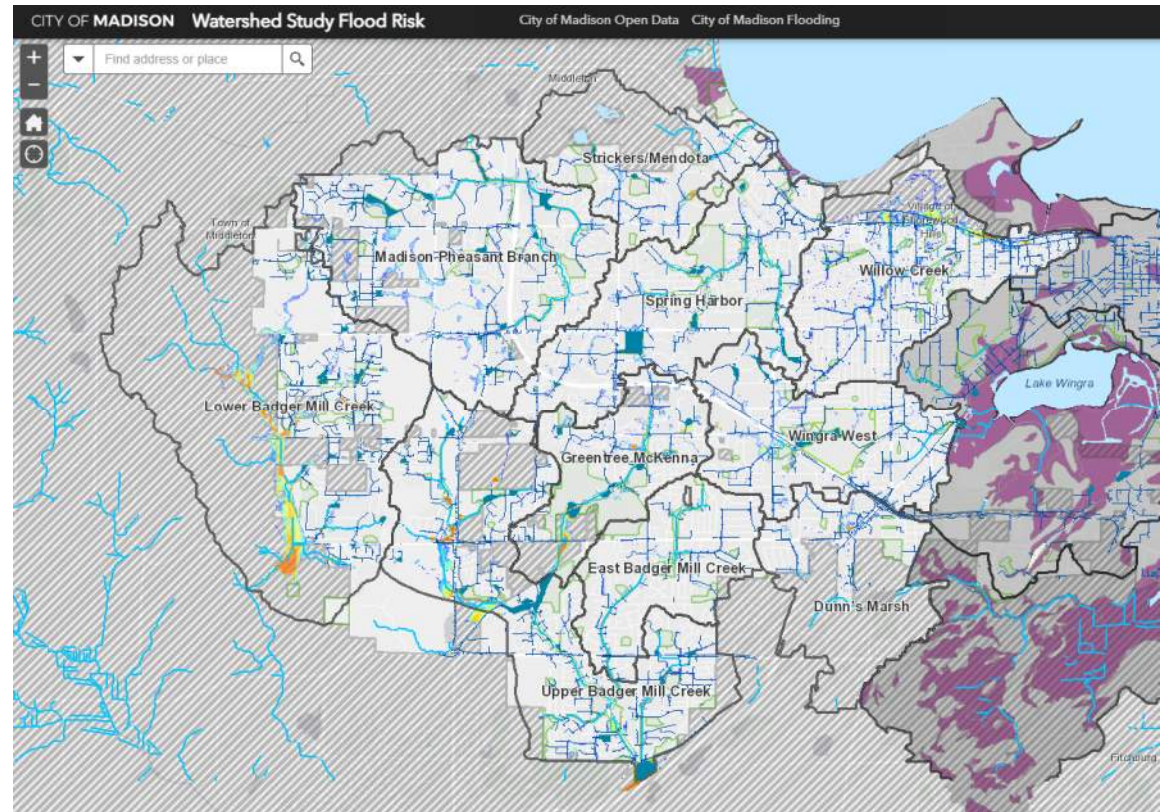


Above: Model-Level Solution Evaluation
Below: Design Level Detail



Watershed Study Targets

- ▶ Find out why flooding happens in certain locations
- ▶ System goals
- ▶ Test Solutions
- ▶ Education
 - Understand potential flood risk
 - Educate public on what they can do to reduce their flood risk



Watershed Study Limitations

- ▶ Retrofitting infrastructure takes time and money
- ▶ Repairs are not always easy, popular, or cheap
- ▶ Not always a good solution
- ▶ Property owners will need to create solutions too
- ▶ Solutions will need broad community cooperation
- ▶ Groundwater problems not easily addressed by watershed modeling and surface infrastructure
- ▶ Not a water quality study

Next Steps

Model Existing Conditions & Predict Future Flood Risk

Analyze Solutions on Watershed Scale, Rank & Budget

**Create
Drainage
Model**

**Identify
Flooding
Impacts**

**Develop
Engineering
Solutions**

**Prioritize
& Budget**

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Next Steps



**Create
Drainage
Model**

**Identify
Flooding
Impacts**

**Develop
Engineering
Solutions**

**Prioritize
& Budget**

- ▶ Gather model input data
- ▶ Install equipment and measure rainfall and channel flow
- ▶ Build computer models to represent rainfall-runoff-routing
- ▶ Compare model to data
- ▶ Determine extent of past flooding

Next Steps

Create Drainage Model

- ▶ What does modeling the Wingra Proper watershed involve?
 - ▶ Watershed area: 3,480 acres (about 5.5 square miles)
 - ▶ 30 miles of City-owned storm sewer
 - ▶ 896 acres of open water and wetlands
 - ▶ About 4,300 City parcels, primarily residential

Next Steps

Create Drainage Model

- ▶ What you might see in the watershed



Above: Storm Sewer Flow Meters



Above: surveyor in the field.
Photo courtesy of Amber Lefers (AE2S).

Next Steps

**Create
Drainage
Model**

**Identify
Flooding
Impacts**

**Develop
Engineering
Solutions**

**Prioritize
& Budget**

- ▶ See how well existing storm sewer system meets goals



Commerce Drive near
Plaza Drive, Madison, WI

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Next Steps



Create
Drainage
Model

Identify
Flooding
Impacts

Develop
Engineering
Solutions

Prioritize
& Budget

- ▶ Must be holistic
- ▶ Not “move the problem elsewhere”
- ▶ Account for climate change
 - ▶ Look at **trending increases** in storm frequency and intensity
- ▶ Consider long term maintenance needs
- ▶ Provide benefits relative to cost

Next Steps



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Prioritize
& Budget

What are some general options?

- ▶ Improve pipe and/or inlet capacity
- ▶ Safe overflow paths
- ▶ Reroute flow
- ▶ Increase storage / detention
- ▶ Flood-proof buildings
- ▶ Local landscaping / grading
- ▶ Solutions on private property to structures or land



Above: Bioretention
Top Right: Stormwater Pond
Bottom Right: Box Culverts

Next Steps



**Create
Drainage
Model**

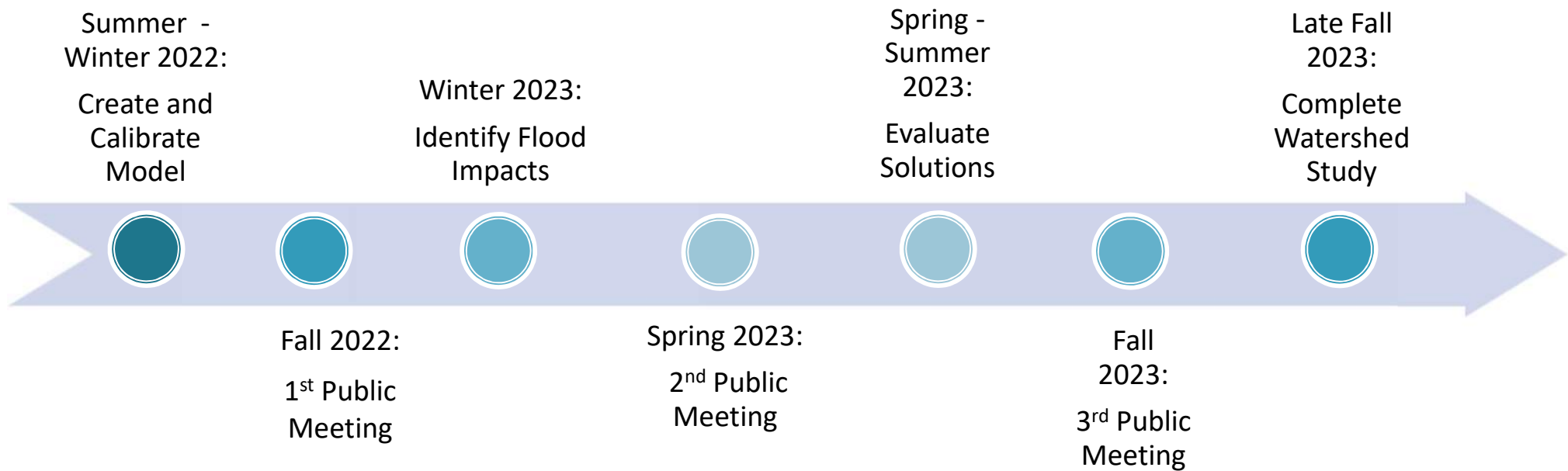
**Identify
Flooding
Impacts**

**Develop
Engineering
Solutions**

**Prioritize
& Budget**

- ▶ Improvements require time and money
 - ▶ Some solutions are long-term, sustained community efforts (green infrastructure)
 - ▶ Some solutions are discrete, high capital-cost projects (box culverts, pond, etc.)
- ▶ Solutions prioritized based on:
 - ▶ Frequency, severity and damage (cost-benefit)
 - ▶ Emergency response routes
 - ▶ Areas with other projects scheduled (road repair, etc.)
 - ▶ Within a Neighborhood Resource Team area

Next Steps

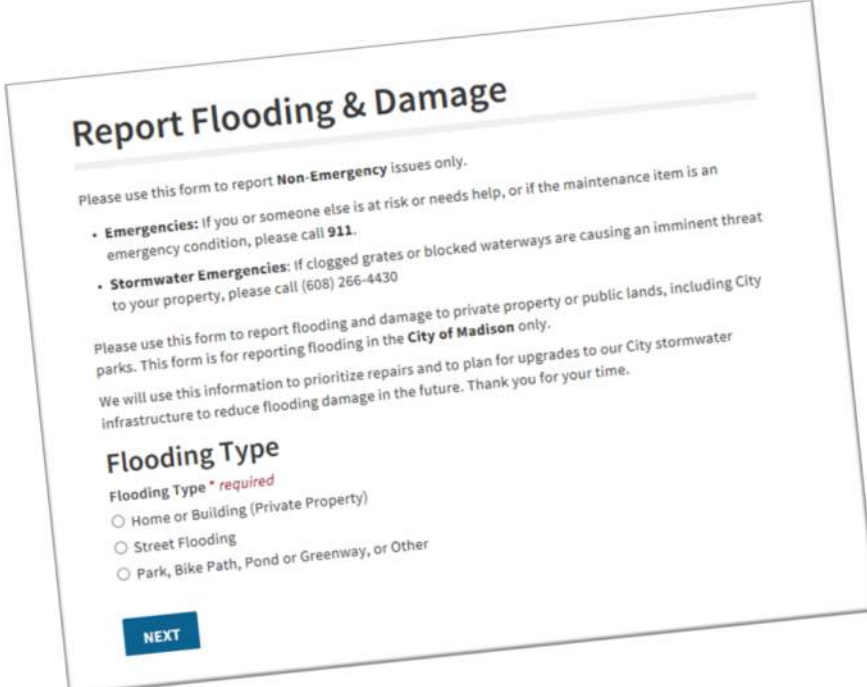


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Property Owner Responsibilities

- Self-report Online Survey: document and share data during rain events
 - www.cityofmadison.com/flooding
WE NEED YOU TO REPORT ON-LINE TO INFORM OUR STUDY!
- Understand local drainage and how to protect your property
- Install backflow preventers and sump pumps
- Consider supplemental insurance
- Focus group/stakeholder meeting participation

A tilted image of a 'Report Flooding & Damage' form. The form includes instructions for reporting non-emergency issues, emergency procedures (calling 911 for emergencies or (608) 266-4430 for stormwater emergencies), and a section for 'Flooding Type' with radio button options: 'Home or Building (Private Property)', 'Street Flooding', and 'Park, Bike Path, Pond or Greenway, or Other'. A blue 'NEXT' button is at the bottom.

Report Flooding & Damage

Please use this form to report **Non-Emergency** issues only.

- **Emergencies:** If you or someone else is at risk or needs help, or if the maintenance item is an emergency condition, please call **911**.
- **Stormwater Emergencies:** If clogged grates or blocked waterways are causing an imminent threat to your property, please call (608) 266-4430

Please use this form to report flooding and damage to private property or public lands, including City parks. This form is for reporting flooding in the **City of Madison** only.

We will use this information to prioritize repairs and to plan for upgrades to our City stormwater infrastructure to reduce flooding damage in the future. Thank you for your time.

Flooding Type

Flooding Type * *required*

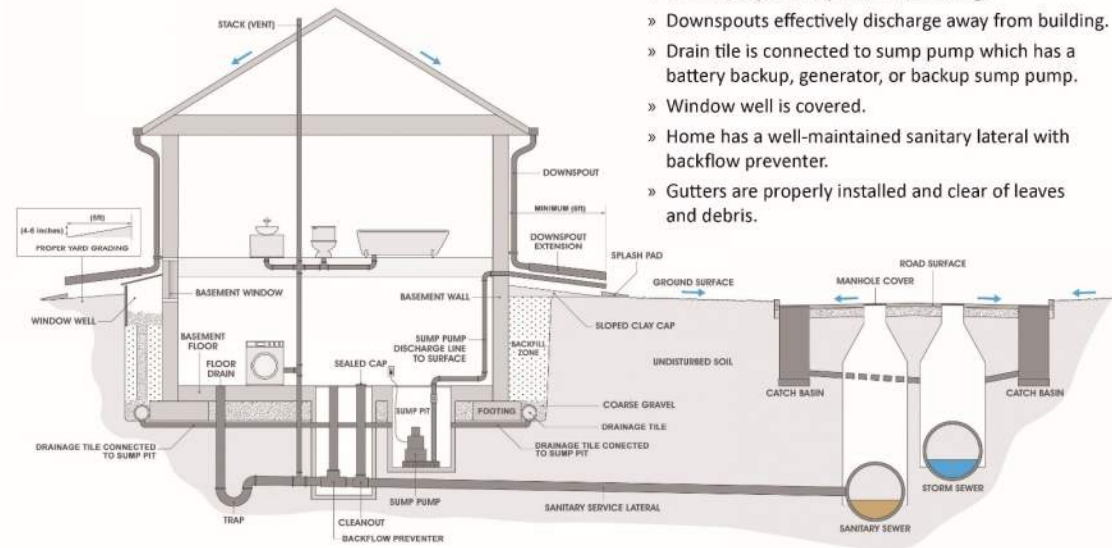
- ☐ Home or Building (Private Property)
- ☐ Street Flooding
- ☐ Park, Bike Path, Pond or Greenway, or Other

NEXT

Property Owner Responsibilities

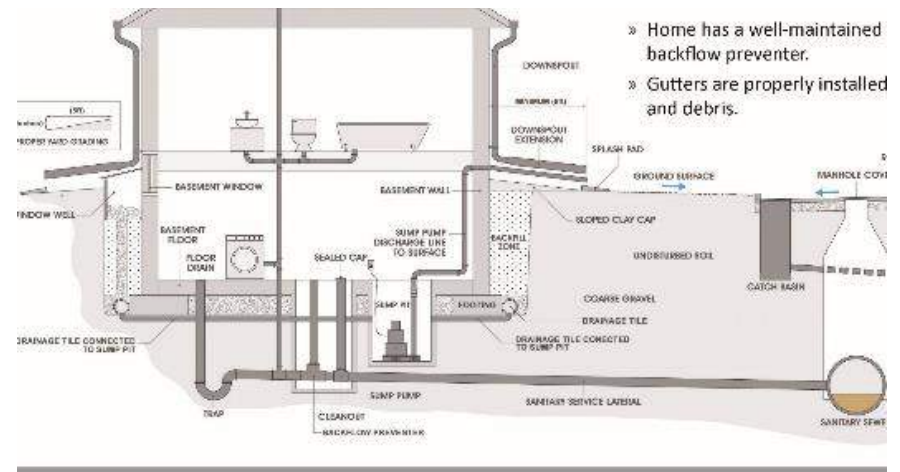
- Self-report Online Survey
- Understand local drainage and how to protect your property
www.cityofmadison.com/floodprotection
- Install backflow preventers and sump pumps
- Consider supplemental insurance
- Focus group/stakeholder meeting participation

Good Flood Prevention



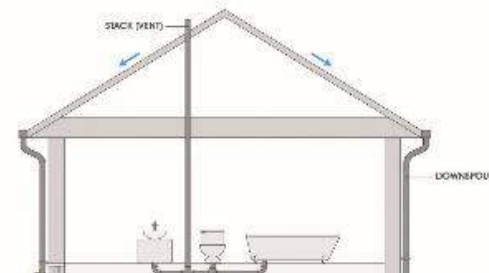
Property Owner Responsibilities

- Self-report Online Survey
- Understand local drainage and how to protect your property
- Install backflow preventers and sump pumps**
- Consider supplemental insurance
- Focus group/stakeholder meeting participation



- » Home has a well-maintained backflow preventer.
- » Gutters are properly installed and debris.

Basement Flood Prevention



- » Foundation, wall, and sewer lateral are not properly sealed.
- » Ground is sloped towards the house.
- » Downspouts discharge near the foundation.
- » Drain tile is illegally connected to the sewer lateral.
- » Window well is not covered and is open to the ground.
- » No sump pump.
- » No backflow prevention installed on the sewer lateral.
- » Gutters are cracked/loose/sagging and filled with debris.

GROUND SURFACE (POOR LOT GRADING)
BY
MANHOLE COVER

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Property Owner Responsibilities

- Self-report Online Survey
- Understand local drainage and how to protect your property
- Install backflow preventers and sump pumps
- Consider supplemental insurance – **contact your private insurance agent for more information**
- Focus group/stakeholder meeting participation

Property Owner Responsibilities

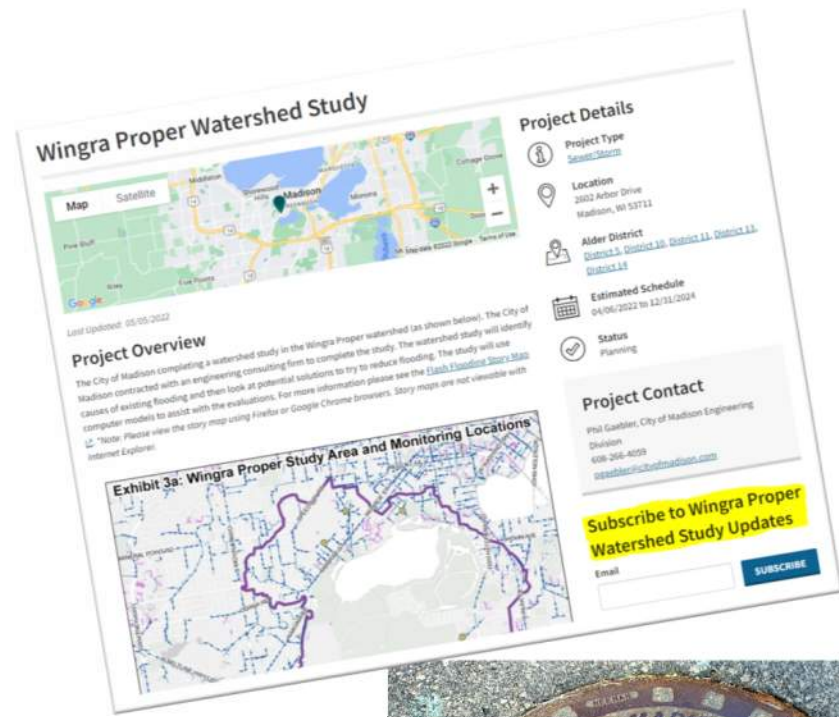
- Self-report Online Survey
- Understand local drainage and how to protect your property
- Install backflow preventers and sump pumps
- Consider supplemental insurance
- Focus group/stakeholder meeting participation: for regional issues that affect more than one person

Property Owner Responsibilities

- **Be a good neighbor!** Understand how your water could have negative impacts on your neighbor's property.
- Install rain gardens and/or rain barrels etc.
- **Have a plan** to protect yourself during a flash flood warning.
- Become a better steward of your watershed.
 - Adopt an Inlet
 - Remove leaves from the street
 - <http://www.ripple-effects.com/>

How to Stay Involved

- ▶ www.cityofmadison.com/flooding
 - Report Flooding Survey
- ▶ Individual Watershed Studies Pages
 - Sign up for updates!
- ▶ How you can prevent flooding at your home
- ▶ Everyday Engineering Podcast
 - Historic Flooding and Basement Drainage episodes



How to Stay Involved

- ▶ Attend the Public Information Meetings
- ▶ Focus Group/Stakeholder Meetings

- Coming in the future
- Contact us to let us know you are interested
- Follow on the Project Webpage

<https://www.cityofmadison.com/engineering/projects/wingra-proper-watershed-study>



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Next Public Information Meeting

- ▶ Spring 2023
 - Present stormwater and flood model findings
 - Specific to the watershed
 - Refine data and model
 - Use as a 'fact check' with residents

Contact Information & Resources

- Project Manager: Phil Gaebler, PGaebler@cityofmadison.com
- Public Information Officer: Hannah Mohelnitzky, hmohelnitzky@cityofmadison.com
- Project Webpage: <https://www.cityofmadison.com/engineering/projects/wingra-proper-watershed-study>
 - Engagement Survey
 - Sign-up for project email updates on the website
 - Report flooding, past or current on the Report Flooding form
 - Learn ways to protect your property from flooding with on-site fixes
- New Flooding Website: www.cityofmadison.com/flooding
- Everyday Engineering Podcast
- Facebook – City of Madison Engineering
- Twitter – @MadisonEngr



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Question and Answer Session

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