

# The State of Our Water

March 9, 2021





**WE HAVE A RESPONSIBILITY TO ENSURE THE  
DRINKING WATER IN MOUND IS:**

**RELIABLE  
AFFORDABLE  
SAFE**





## Water System at a glance:

- 2 (active) Wells
- 2 Water Towers 750,000 gal storage
- 48.5 miles of distribution network
  - sizes 4" to 16"
- Originally installed 50's – 60's
  - Cast iron; brittle & corroded
  - Replacing with ductile iron and PVC: flexible & stable
  - Programmed with street projects; only dig once



# To Ensure Our Water is Reliable

- Capitol Improvement Projects have focused on system RELIABILITY
- Investments guided by 2007 Water System Improvement Study & CIP
- The age, condition, and material of pipes can contribute to the water quality, but are not the primary factors
- The same topography that makes Mound a livable lake community also contributes to the need for more infrastructure per capita and per acre than other communities



**REPORT**  
On the  
**HYDRAULIC MODEL OF THE  
WATER SUPPLY SYSTEM**

Prepared for:  
**CITY OF MOUND**

January 2007



# To Ensure Our Water is Reliable

~\$30 Million Dollars invested in water system from 2005-Present

- Pipe Network Redundancy and Efficiency
  - Eliminating dead ends
  - Replacing High-failure/Critical Link Cast Iron Water Mains
  - Improved system performance and management practices
- NONE of these improvements remove Iron or Manganese, which causes the discoloration



# To Ensure Our Water is Reliable

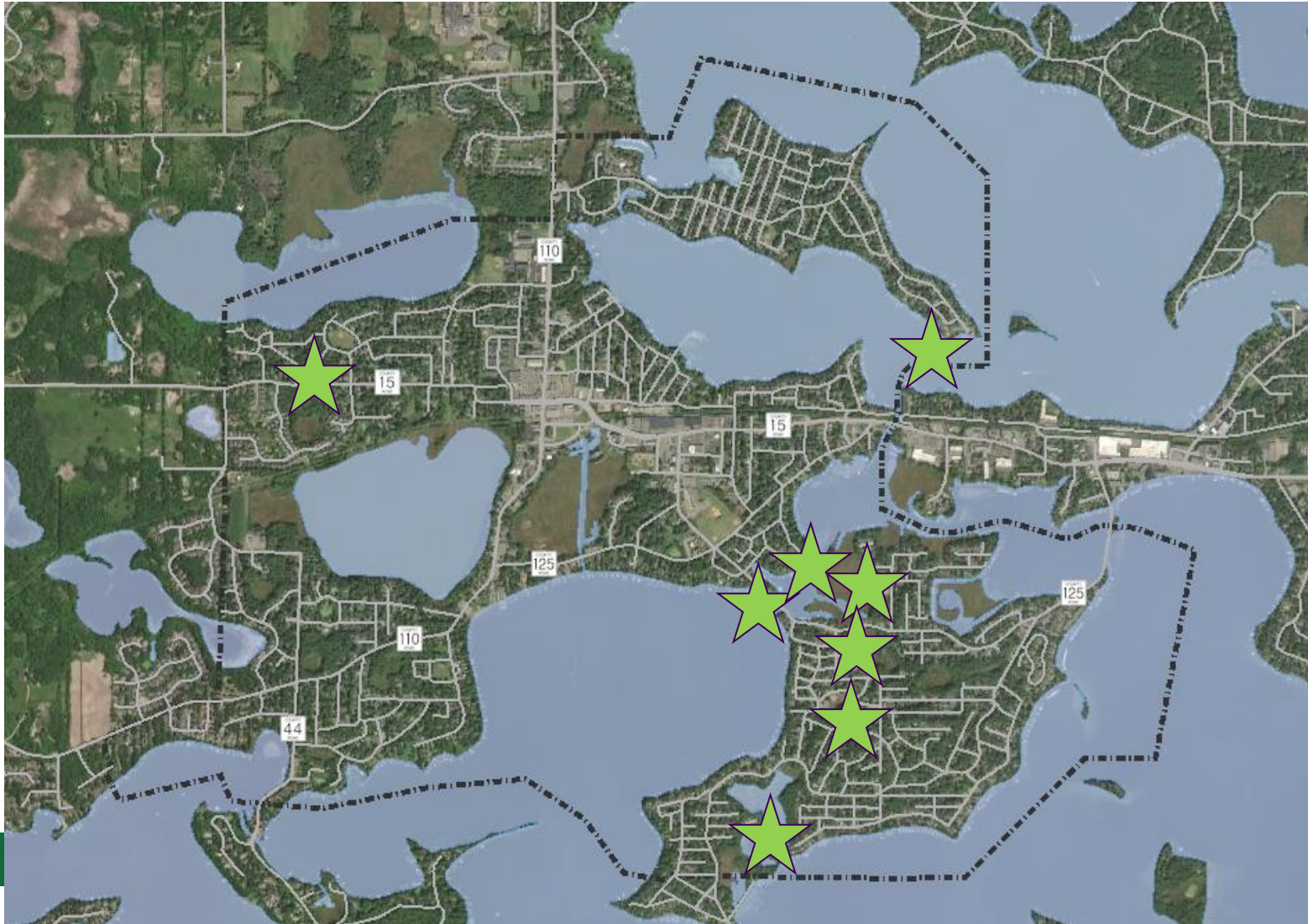
~\$30 Million Dollars invested in water system from 2005-Present cont'd

- Sources and Storage Capacity:
  - Developed Well 8 to replace Wells 4 & 7 due to aquifer arsenic level
  - Replaced “Silver Bullet” tower at Chateau
  - Island Park transmission mains to decommission Devon tank
- Fire Protection Flow Rates (1000 Gal/Min Hydrant Flow)
  - Looping transmission into peninsular areas (under lake)
  - Pipe size upgrades





# To Ensure Our Water is Reliable Fire Flows

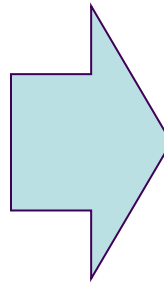
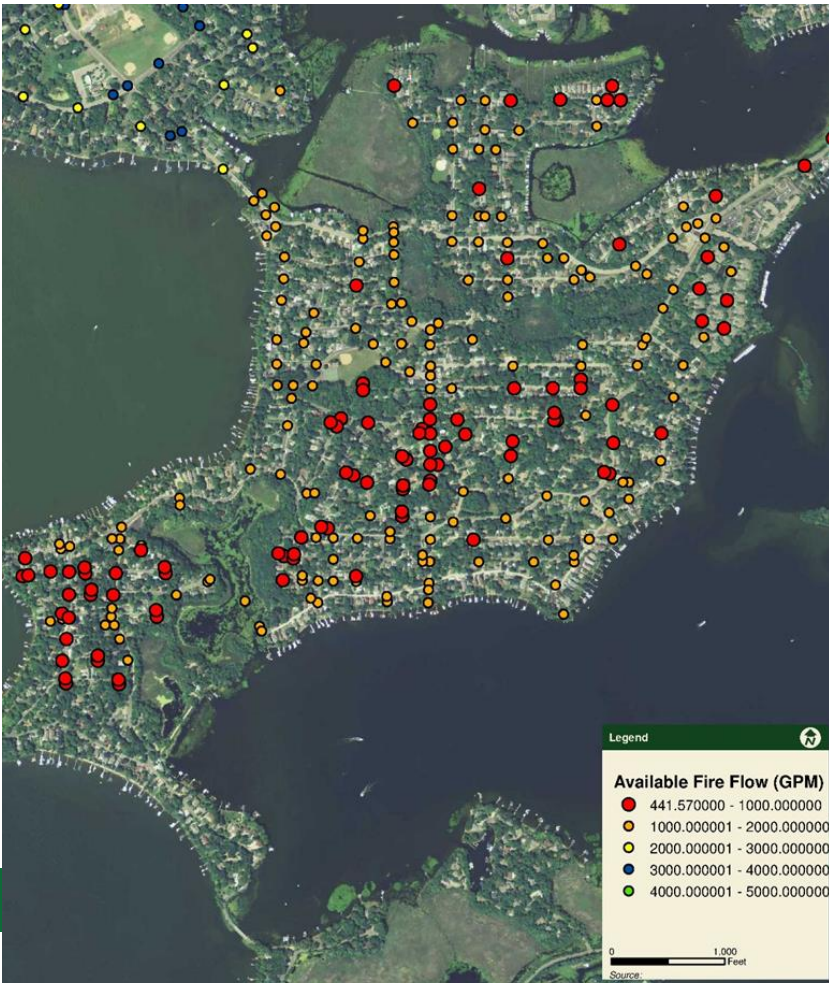




# To Ensure Our Water is Reliable

## Fire Flows

Available fire flow volumes in the Island Park area





# To Ensure Our Water is Affordable

- Past capitol projects to improve the distribution system have been financed by bonds (city debt)
- The City makes debt payments solely through water rate revenue
- The current rates are a reflection of work that has been completed
- Capital investments for continued RELIABILITY are reflected in long range planning, rate planning, and forecasting
  - Bartlett WMN (county road, not city street)
  - Lynwood WMN (country road, not city street)
  - 4" on Three Points
  - Water Tower Coatings



# To Ensure Our Water is Safe

- The metrics for Safe begin with source (well) water chemistry, and ends at the point of use (the faucet)
- The Safe Drinking Water Act & the Groundwater Protection Act define safe in terms of compounds and contaminants
  - Environmental Protection Agency (EPA)
  - Minnesota Pollution Control Authority (MPCA)
  - MN Department of health (MDH)
- We test the water, and report:
  - City Well Composition – Annual
  - Lead/Copper sampling – Annual
  - Chlorine – Monthly
  - Fluoride – Daily

**2021 Monitoring Schedule**  
Mound, PWSID 1270038

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
<b>BACT/TOTAL CHLORINE RESIDUAL*</b>	Sample Date												
	Required # of Samples	10	10	10	10	10	10	10	10	10	10	10	10
	Send Monthly Report to MDH By the 10th Day	X	X	X	X	X	X	X	X	X	X	X	X
<b>NITRATE**</b>	Sample Date				04/12								
	Required # of Samples				2								
<b>LEAD/COPPER</b>	Sample Month												
	NONE REQUIRED IN 2021												
<b>WQP***</b>	Sample Month												
	NONE REQUIRED IN 2021												
<b>FLUORIDE</b>	Sample Date		02/01		04/12				08/30		10/25		
	Required # of Samples		1		1				1		1		
	Send Monthly Report to MDH By the 10th Day	X	X	X	X	X	X	X	X	X	X	X	X
<b>CCR****</b>	Print CCR				X								
	Distribute CCR to Consumers								07/01				
	Copy of CCR & Certification Form to MDH BY JULY 1								07/01				

X - Due within the month indicated  
 \*Total Chlorine Residual - Only required for systems that add chlorine  
 \*\*Nitrate - Systems will be notified by MDH if monitoring is increased  
 \*\*\*WQP - Water Quality Parameters  
 \*\*\*\*CCR - Consumer Confidence Report

Print your CCR from MDH website  
(SEE REVERSE SIDE FOR MORE INFORMATION)

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# To Ensure Our Water is Safe

Compounds that can be unsafe (*TESTING & REGULATED LIMITS*):

Arsenic

Lead

Copper

Petroleum Products

Volatile Organic Compounds



Test results reported in  
Consumer Confidence  
Report

Compounds that may be present (*TESTING BUT NOT REGULATED*):

Calcium

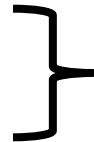
Magnesium

Manganese

Iron



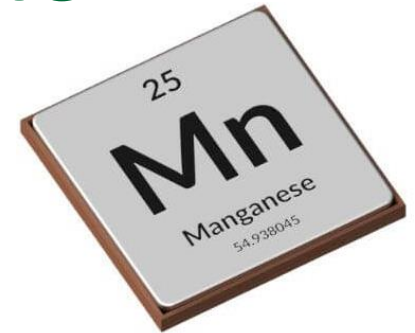
Hardness



Discoloration



# To Ensure Our Water is Safe



- We need discuss Manganese
  - We are aware that manganese exists in our source water: both Well No 3 and No 8. based on testing
  - We previously did not test for manganese levels
- The MDH first tested for Manganese in Dec 2020
  - levels detected above standards
  - Performed by an independent lab
- Resampling was performed in January 2021
- Resampling was performed in February 2021
  - Performed by an independent lab
  - Reported to Department of Health
  - Test results confirmed by Department of Health
  - Samples were taken directly at the wells and at homes

Mound Sample Results

Sample Location	Mn (µg/L) 12/7/20	Mn (µg/L) 12/14/20	Average Mn (µg/L)
Well #3 Entry Point	672	724	698
Well #8 Entry Point	451	496	473.5

µg/L = micrograms per liter





# To Ensure Our Water is Safe



## Manganese Continued

- Because the MDH Health Advisory Limit was exceeded, this presentation is accompanied by a resolution to inform and advise customers of Mound Water
- The levels of manganese detected to not constitute an immediate health risk or any measures such as a boil order
- Consuming large amounts of manganese for long periods of time, can have health risks
  - Infants from 0-12 months are more susceptible
- Other municipalities in the metro are experiencing similar levels
- The proposed notification answers questions about Manganese and who is at risk as some potential short-term solutions (bottled water)
  - Long term solutions are discussed later in this presentation



# To Ensure Our Water is Safe

## Source Water Composition

- Source water contains manganese: range of 0.47-0.70 mg/L
- Health advisory limits
  - 0.10 mg/L infants - Health-Based Value
  - 0.30 mg/L adults - Health Advisory Level
  - Public notification Recommended by MDH
- Source Water contains iron: 0.92 mg/L
  - Secondary standard 0.30 mg/L (exceeded)
    - No contamination limit, health advisory, or health-based value
    - Can cause staining to laundry and fixtures



# To Ensure Our Water is Safe

## Source Water Composition - Continued

- Source water has high hardness 21-24 grains
  - Classified as very hard
  - No standard for hardness
- Previous issues with high arsenic
  - The well containing high arsenic is currently offline
  - Plan to decommission



PWSID: 1270038

## Final Report

Minnesota Department of Health  
Public Health  
Environmental Laboratory  
601 Robert St. N., 10th Floor  
St. Paul, MN 55101

Results were produced by Minnesota Department of Health, except where noted.

Batch B0L0457 - EPA 200 Series Prep

Blank (B0L0457-BLK1)

Prepared: 12/10/20 11:29 Analyzed: 12/16/20 15:18

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Init.
Manganese	<	10.0	ug/L							RCC

LCS (B0L0457-BS1)

Prepared: 12/10/20 11:29 Analyzed: 12/16/20 15:21

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Init.
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# To Ensure Our Water is Safe

- How do we handle Manganese?
  - Consider a municipal treatment solution
    - Iron removal is accomplished at the same time
  - Filtration
    - You may already be removing it with your refrigerator, home or water softener filter if you have any of these in place
  - Bottled water for certain uses
    - Infants that are formula fed





# Residential Treatment

Resident Side Removal options



Filtration



Ion Exchange Softening  
(softener salt or iodine)



Reverse Osmosis

Average systems cost from \$250 - \$2000+ per home



# Future Treatment Considerations

- Finishing treatment processes come after ensuring:  
RELIABLE, AFFORDABLE, SAFE
- Finishing targets hardness, discoloration, red/black sediment/fines
- Clear connection to customer perception of value... and safety
  - Affect on laundry, fixtures/appliances, skin/haircare
- We have OPTED OUT of finishing to focus on the above priorities
- It remains appropriate to check our work periodically



# Treatment Scenarios

1. Centralized Treatment Plant
2. 2 filtration plants
3. 2 lime softening plants
4. Iron and manganese sequestering
5. Continue to monitor



# Scenario 1

## Centralized treatment plant

- One plant, on a central site
- Requires new piping from each well to the plant
- Would require a dedicated site
- Cost to construct is prohibitive
  
- Capital Cost \$50 million+
- Not considered viable at this time

This is what we would build if we were building Mound from scratch, today





# Scenario 2

## Construct 2 filtration plants, one at each well site

- Remove manganese and iron
- Challenges
  - Sites are limited, but this is much smaller footprint than Scenario 1
  - *Residents still responsible for finishing (hardness)*
- Benefits
  - Manganese and iron issues eliminated
- Capitol Cost
  - \$12-\$18 million
  - \$250-275 per year in water rate increases



# Scenario 3

## Construct 2 lime softening plants, one at each well site

- Remove manganese and iron
- Remove hardness
- Removes other contaminants found in lower levels
- Challenges
  - Larger treatment plan footprints
- Benefits
  - *Residents no longer responsible for finishing (hardness removed)*
- Capitol Cost
  - \$26-\$36 million
  - \$550-\$600 per year in water rate increases



# Scenario 4

## Iron and manganese sequestering

- Controls how these compounds **appear** and **oxidize** in the water
- Does **NOT** remove iron or manganese
- Effectiveness of this method declines with water age “half-life”
- Benefits
  - Least costly treatment option, works within existing equipment
- Challenges
  - Manganese and Iron levels are not reduced
  - May still see “rusty water” if there is detention in the system
- Capital cost
  - \$150k 250k



# Scenario 5

## Continue Testing and monitor Manganese Levels

- We can do nothing to the water if we choose, and comply with the MDH advisory requirement
- This is not the recommended course of action
- Benefits
  - No cost
- Challenges
  - Manganese not reduced
  - Water chemistry could continue to change
- Capital cost
  - \$0.00





# Treatment Funding Options

## Possible Funding Options:

- Pay for treatment using water rates
- Apply to existing State Funding Sources
  - Minnesota Public Funding Authority (PFA)
  - Clean Water Revolving Fund
  - Drinking Water Revolving Fund
  - Legislative/future Funding
- A water treatment study is necessary to apply for the state funding sources
  - Accompanying Resolution to direct an engineering study



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