

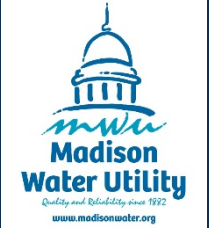
WATER UTILITY BOARD MEETING: 11/23/2021

UNIT WELL 19 TREATMENT PROJECT

Kelly Miess, P.E.
Project Engineer



PROJECT OBJECTIVES



1. **Reduce** iron, manganese, and radium levels at Well 19 through wellhead filtration
2. **Improve** water quality to optimize use of this critically important supply point
3. **Upgrade** the pumps and electronic controls for more energy-efficient operations

MADISON WATER UTILITY – MISSION



Madison Water Utility is entrusted by the people of Madison to supply high quality water for consumption and fire protection, at a reasonable cost, while conserving and protecting our ground water resources for present and future generations.



High Quality
Water



Consumption &
Fire Protection



Reasonable
Cost



Conserve &
Protect

Present & Future Generations

LOCATION & BACKGROUND: WELL 19



Constructed in 1974, it includes a well house and buried 3-million gallon reservoir



The buried reservoir: facing south



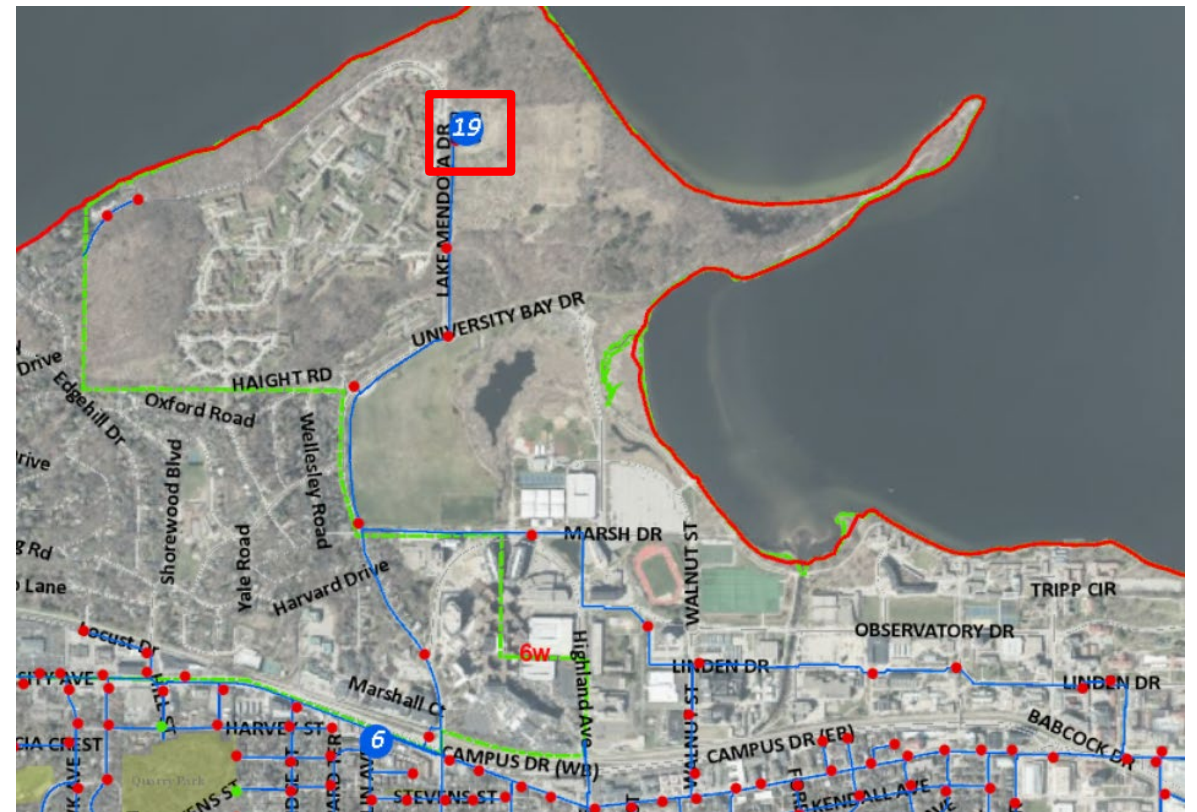
The well house: facing north

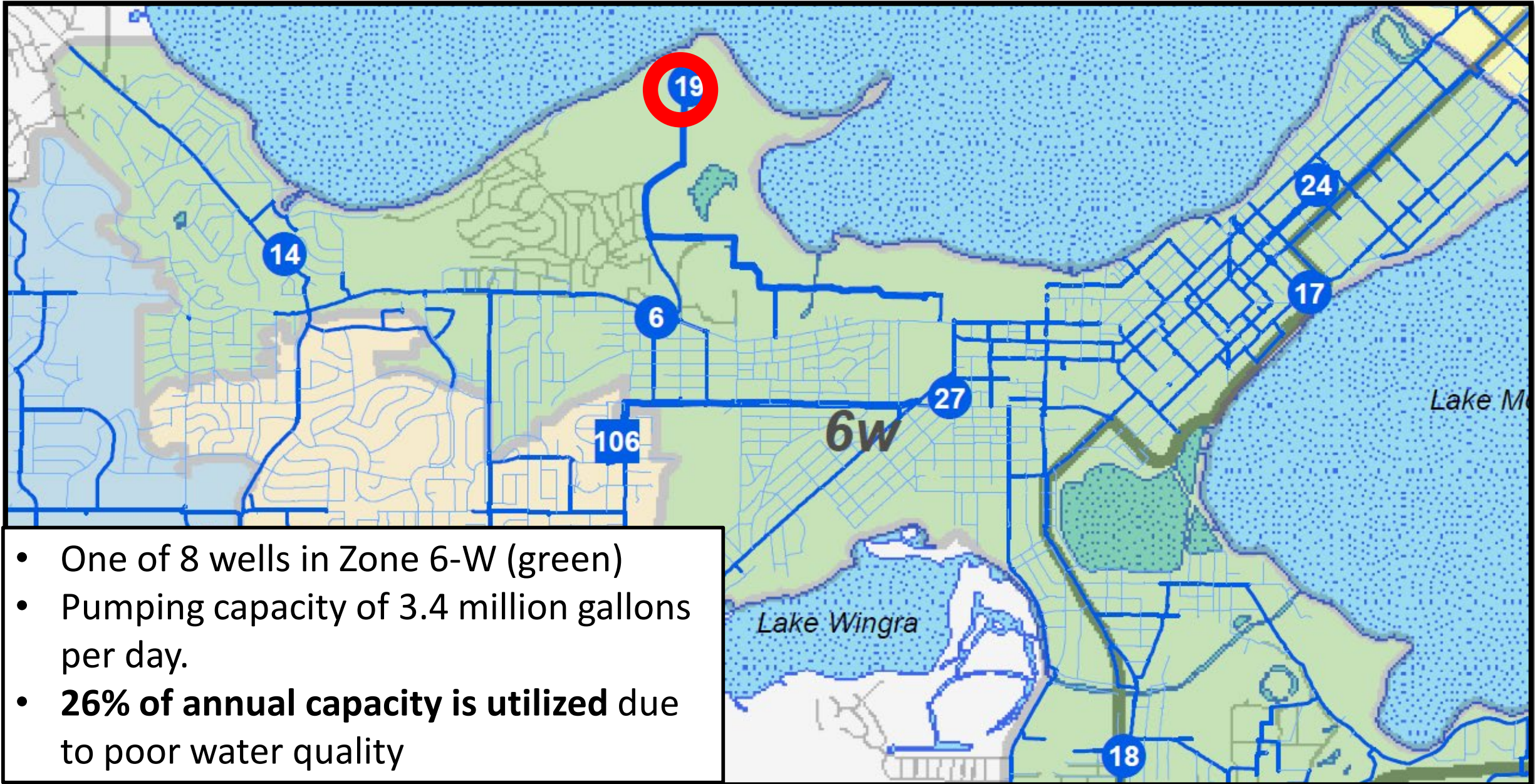


The well house entrance: facing west

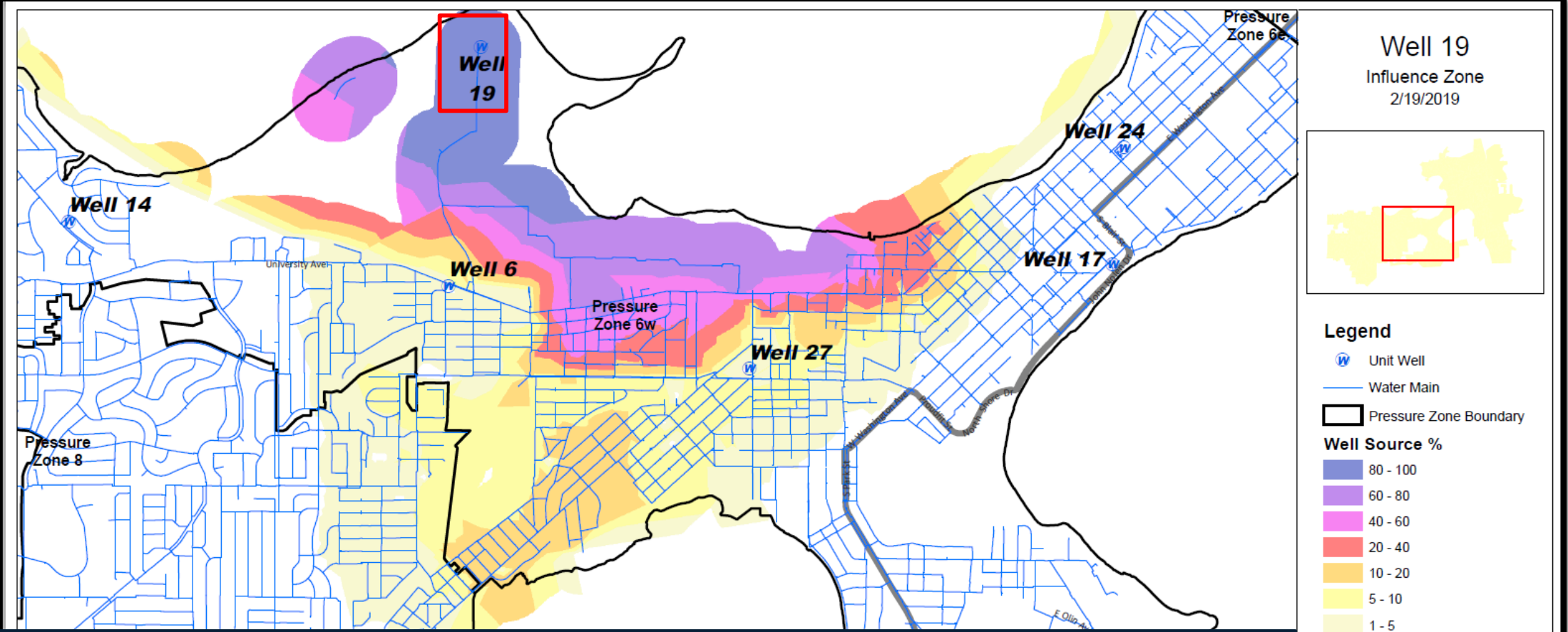
LOCATION & BACKGROUND: WELL 19

The facility is situated on an easement on University of Wisconsin-Madison property

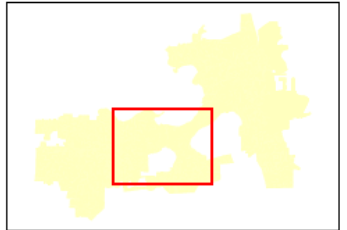




- One of 8 wells in Zone 6-W (green)
- Pumping capacity of 3.4 million gallons per day.
- **26% of annual capacity is utilized** due to poor water quality



Well 19
Influence Zone
2/19/2019



Legend

- Unit Well
- Water Main
- Pressure Zone Boundary

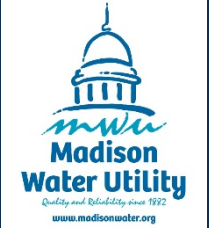
Well Source %

- 80 - 100
- 60 - 80
- 40 - 60
- 20 - 40
- 10 - 20
- 5 - 10
- 1 - 5



Well 19 primarily serves the University of Wisconsin campus area and the Regent neighborhood and is a significant supply point for the entire near west side of Madison

PROJECT NEED / JUSTIFICATION



- Well 19 water quality does not meet MWU Water Utility Board standards
- Radium & manganese periodically exceed primary and secondary MCL, respectively
- Unable to maximize use of facility due to poor water quality, risk of regulatory non-compliance

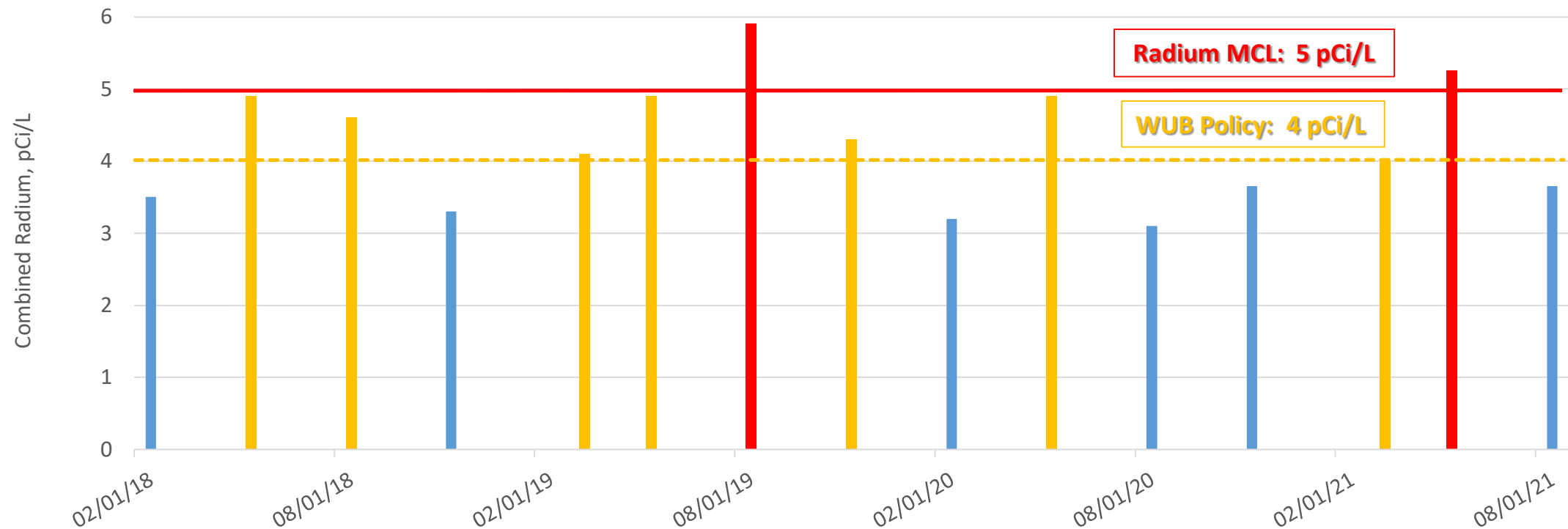
Contaminant	Primary MCL (Enforceable)	Secondary MCL (Non-Enforceable)	Water Utility Board Policy	August 2021 Results
Radium	5 pCi/L	--	4 pCi/L	4.1 pCi/L*
Manganese	--	50 µg/L	20 µg/L	46 µg/L
Iron	--	0.3 mg/L	0.1 mg/L	0.23 mg/L

* Running Annual Average

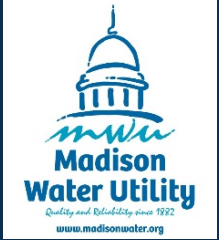
WATER QUALITY CONSIDERATIONS



Radium: Two Maximum Contaminant Level (MCL) Exceedances in Recent Years (red bars);
Three Results Just Below the MCL and Four Others Above the WUB Policy (orange bars)



WATER QUALITY CONSIDERATIONS

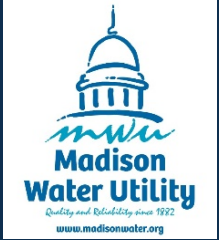


Monthly manganese level ($\mu\text{g/L}$) at Well 19

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	<u>KEY</u>
2018	56	42	47	47	44	45	36	43	45	47	45	47	>SMCL
2019	50	54	46	46	39	37	40	41	37	46	42	47	>WUB
2020	43	51	48	41	45	39	43	38	42	37	50	48	
2021	46	44	47	47	48	44	44	46	48				

- **Five** Secondary MCL exceedances (shaded brown) since 2018
- **100%** of monthly samples since 2018 have exceeded the WUB policy

WATER QUALITY CONSIDERATIONS

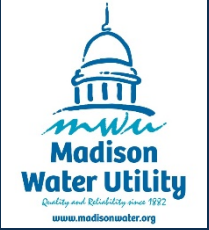


Monthly iron level (mg/L) at Well 19

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	<u>KEY</u>
2018	0.20	0.20	0.21	0.21	0.20	0.21	0.20	0.20	0.21	0.20	0.20	0.20	>SMCL
2019	0.20	0.23	0.20	0.20	0.19	0.20	0.19	0.20	0.18	0.22	0.22	0.21	>WUB
2020	0.19	0.22	0.21	0.21	0.19	0.18	0.20	0.18	0.20	0.20	0.22	0.21	
2021	0.22	0.21	0.23	0.22	0.23	0.22	0.23	0.23	0.23				

- **100%** of monthly samples since 2018 have exceeded the WUB policy

PROJECT BACKGROUND



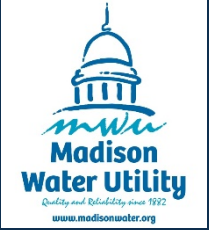
- Original Request for Proposals (RFP) authorized by WUB in **July 2017**
 - MWU envisioned design **(2018)** and construction **(2019)**
 - Lack of funding suspended project after pilot testing and conceptual design completed **(early 2019)**
- Consultant considered **5 alternatives**: - Source water blending, Pyrolusite Filtration, reverse osmosis, ion exchange, and lime softening
- **Recommended Pyrolusite Filtration**
 - Reduces iron and manganese by >90% and radium by 30-50%.
 - Space will be added for **Hydrous Manganese Oxide (HMO)** feed system, if needed in the future, to further reduce radium levels

PROJECT COST AND FUNDING



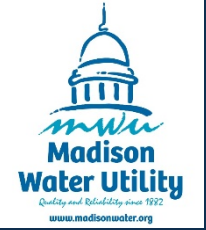
PROJECT ITEMS	2022	2023	TOTAL
Estimated Project Costs	\$ Millions	\$ Millions	\$ Millions
- Design	0.9	0.0	0.9
- Construction	<u>0.0</u>	<u>6.7</u>	<u>6.7</u>
Total	<u>0.9</u>	<u>6.7</u>	<u>7.6</u>
Estimated Funding Source			
- MWU Construction Fund Balance	<u>0.9</u>	<u>6.7</u>	<u>7.6</u>

PROJECT SCHEDULE



- RFP & Consultant Selection: Nov 2021 to Feb 2022
- Preliminary Design Development: Mar 2022 to Jun 2022
- Final Design Development: Jul 2022 to Jan 2023
- Bidding & Construction Contract Award: Feb 2023 to Mar 2023
- Construction: May 2023 to May 2024

REQUESTED ACTION



Authorization to advertise for engineering consulting services for the design and construction of a filtration system, and other facility upgrades, at Well 19



QUESTIONS?

Contact Information:

Kelly Miess (kmiess@cityofmadison.com)

Joe Grande (jgrande@cityofmadison.com)

