



AMI Data Collector System

AB6422 | March 5, 2024





Presentation Overview

- Project Overview & Background
- Data Collector Stations
- Propagation Studies
- Data Collector System Options
- Next Steps

Project Overview

Upgrade the water meter system to an Advanced Metering Infrastructure (AMI) system

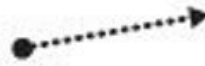


Main components:

- Water meter replacements – meter and radio transmitter
- Customer portal
- **Data collection network**

How AMI Works

Data is encrypted and sent via radio signal to a data collector



The City receives the secure data at regular intervals. Using the data, staff can identify suspected leaks, irregular water use, and trends that can help users & the City improve efficiency.

Water use data is available for the customer to view through a portal



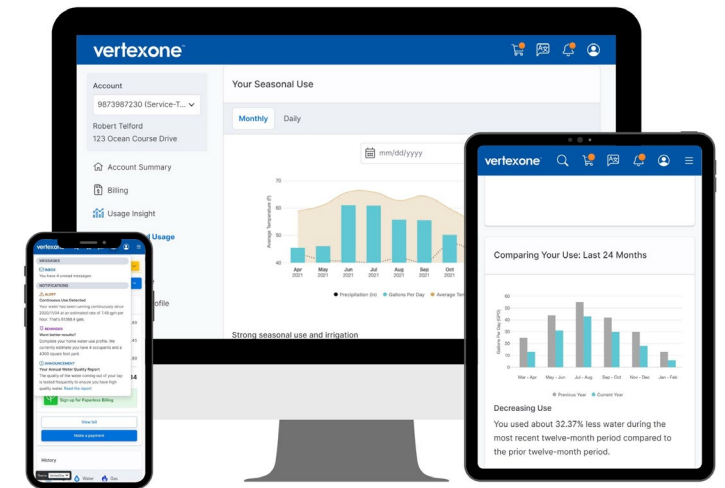
Water use information will still be included on utility bills, but more detailed info can be found in the portal.



Data on water usage is collected at the meter

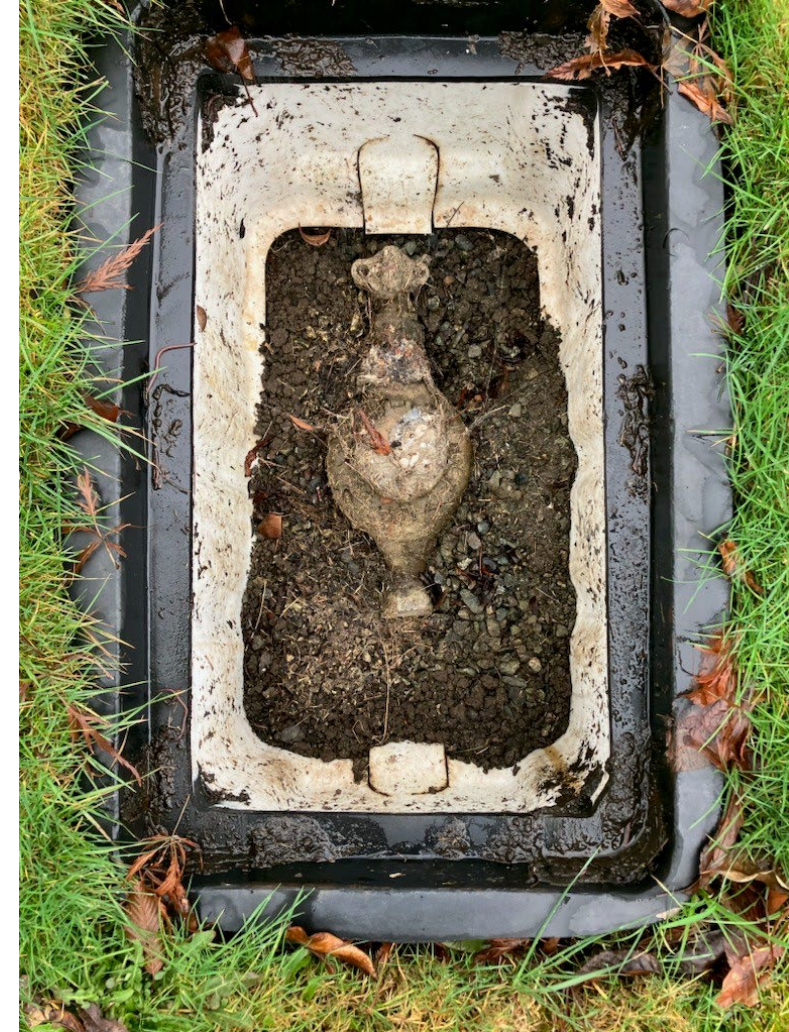
AMI System Operations

- When the AMI system is fully operational:
 - Water meters will transmit hourly water usage data to City system on 4-6 hour intervals.
 - Minimal meter reading required, allowing staff to focus on resolving meter issues.
 - Allow customers to monitor their water use through a customer portal.
 - Send notifications about potential leaks to City and customers, prompting faster response and issue resolution, reducing water loss and customer overpayment.



Existing Meter System

- 7,842 water meters – various manufacturers & technologies
 - Single family residential
 - Multifamily residential
 - Commercial
- 72% manual read, 18% radio read (drive-by)
- 70% of meters on Mercer Island water system are more than 15 years old
- Issues with older meters:
 - Slow down, under-register actual amount of water used
 - Prone to leaks





Water Loss

- All drinking water systems regulated by WA Department of Health
- Enforce the Water Use Efficiency rule, which was enacted in 2003 to help conserve water
- City must report unaccounted water loss each year
- Over a three-year period, no more than 10% of water in municipal water distribution system can be unaccounted for.
- In the last three years (2020-2022), City's water loss averaged 13%
- Substantial loss of revenue for City
- Expected to improve significantly with meter replacements

Project Timeline

- 2018 City began work with HDR to evaluate best system for Mercer Island
- 2019 Request for Proposals (RFP) issued, nine proposals received
- 2020 Ferguson/Sensus selected after extensive selection process, including pilot study
- 2022 Contract awarded to Ferguson (AB 6112)
- 2022-2023 Equipment procurement - delays due to high demand, especially for radio transmitters
- 2023 Meter boxes cleaned and repaired by City
- 2024 Meter replacements (March – August)

Public Engagement

CITY OF MERCER ISLAND
Water Meter Replacement Program

Over the next 18 months, the City of Mercer Island will replace all residential and commercial water meters with an advanced metering infrastructure (AMI) system. The project includes replacing all the meters with enhanced technology to improve water usage data. Mercer Island has contracted with Ferguson Waterworks to complete this essential work.

Program Benefits

- Approximately 60% of Mercer Island's water meters are over 15 years old. Replacing mechanical meters will result in improved accuracy and enhanced leak identification.
- The new AMI system can securely communicate water usage data to the City and reduce the need for manual meter reads.
- Manage water use wisely with the new online customer portal. View usage, get leak alerts, and other notifications.

What can I expect BEFORE the installation?
Prior to meter replacements, City crews are cleaning out and upgrading meter boxes and lids, as needed. You may see crewmembers near the water meter on your property.

What can I expect DURING the installation?
Customers will receive a postcard with more detailed information before the meter installation begins. The installation will require a brief water service interruption for up to 30 minutes. Door hangers will be left at the property's main entrance with updates regarding the meter visit.

Learn more at: [www.mercerisland.gov](#)

LET'S TALK
MERCER ISLAND

Home / Water Meter Replacement Project

Water Meter Replacement Project

The City of Mercer Island is investing in new tools to serve water customers better. Over the course of 2023 and 2024, the City will replace all residential and commercial water meters with an advanced metering infrastructure (AMI) system.

Approximately 70 percent of the meters on the City's water distribution system are over 15 years old. As meters age, they can become less accurate and only measure some of the water that is actually used. Meters of this age are also more likely to leak, wasting valuable water. Replacing mechanical meters will result in improved accuracy and enhanced leak identification.

The new water meters will automatically transmit data wirelessly to the City through the AMI system, reducing the need for manual meter reads. Customers will be able to manage water use wisely in the new online portal. Features include trackable water usage, leak alerts, and other notifications.

Mercer Island has contracted with Ferguson Waterworks to complete this essential work. Their subconsultant, Pedal Valves, Inc., will install the new meters at customer locations.

Have a question? Check the FAQs section, or ask it below!

Project Timeline

- Contract Award**
Mercer Island City Council awards contract for Meter Replacement Project to Ferguson Enterprises
July 2022
- Equipment Procurement**
Begins
September 2022
- Meter Box Preparation**
Begins
December 2022
City crews cleaning and preparing meter boxes for meter replacements
- Replace Water Meters Island-Wide**
Contractors will

- Significant public outreach including:
 - Mailer to every City water customer
 - Let's Talk page
 - MI Weekly
 - Social media
 - Leap for Green
 - Utility bill notifications
- Additional public engagement for data collector station permitting

Project Cost

Project implementation cost - \$7.4 million

- Ferguson/Sensus contract
 - Meter and transmitter equipment
 - Data collector equipment
 - Customer portal launch
 - Installation of meters, transmitters & data collector stations
- Project Management (HDR)
- City project staff (3.0 LTE)





Data Collector Stations



Data Collector Stations

- Primary focus of today's discussion
- Last major element of AMI system to be implemented, required to make system operational
- Make up the wireless system that allows data to be collected from individual meters
- Each station consists of two elements:
 - Antennas – 7'10" x 8" or 9'2" x 2"
 - Base station – 22" square



Data Collector Equipment Mounting

- Equipment must be mounted on poles or other structures:
 - Antennas higher, to allow uninterrupted signal
 - Base stations closer the ground, for ease of access
- Mounted with low-profile bracket
- Require power, coordination with PSE
- Equipment can be mounted on poles owned by the City or Puget Sound Energy (PSE)



PSE Pole Replacement

Using PSE poles for mounting equipment:

- Most PSE poles are between 30-40' tall, and must be replaced with taller poles to accommodate needed antenna height and clearance from power lines
- Process to replace PSE pole:
 - Costs approx. \$150-\$175k per pole
 - At least one year to complete
- No net increase of poles in the right-of-way
- No additional City pole maintenance



Example of antenna atop power pole

City-Owned Pole Installation

Using City-owned poles for mounting equipment:

- Net increase of poles in right-of-way
- Require City maintenance (infrequent)
- Lower cost to install: \$50-75k per pole
- Can be installed within short period: 4-6 months



Photo rendering of new City-owned pole



Propagation Studies



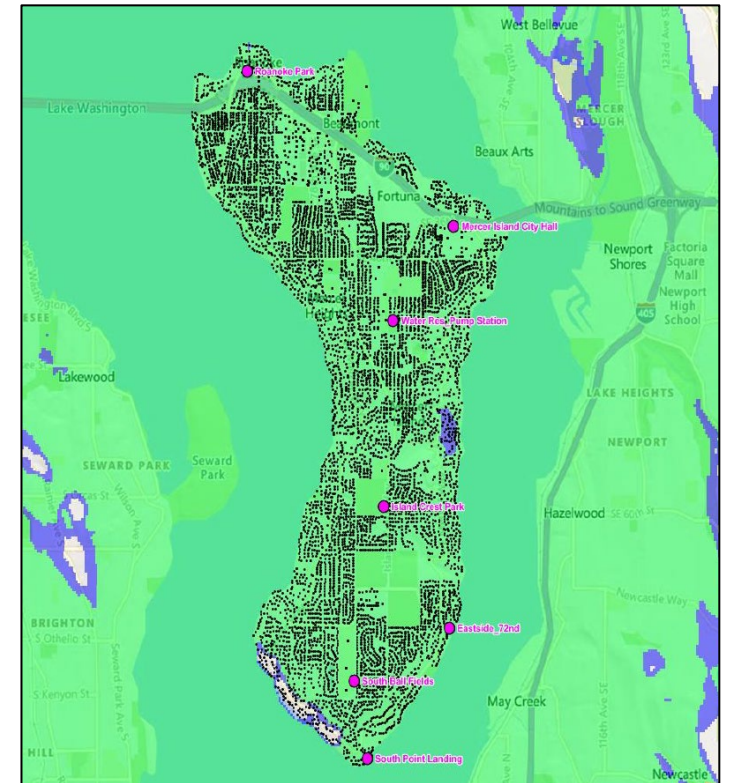
What is a propagation study?

- Computer-generated analysis that helps to design wireless networks to capture data from as many sites as possible
- In AMI, creates a map of best locations for antennae that can capture data from all (or most) water meters on the island
- Can set parameters in each study, such as locations or height



2021 Propagation Study

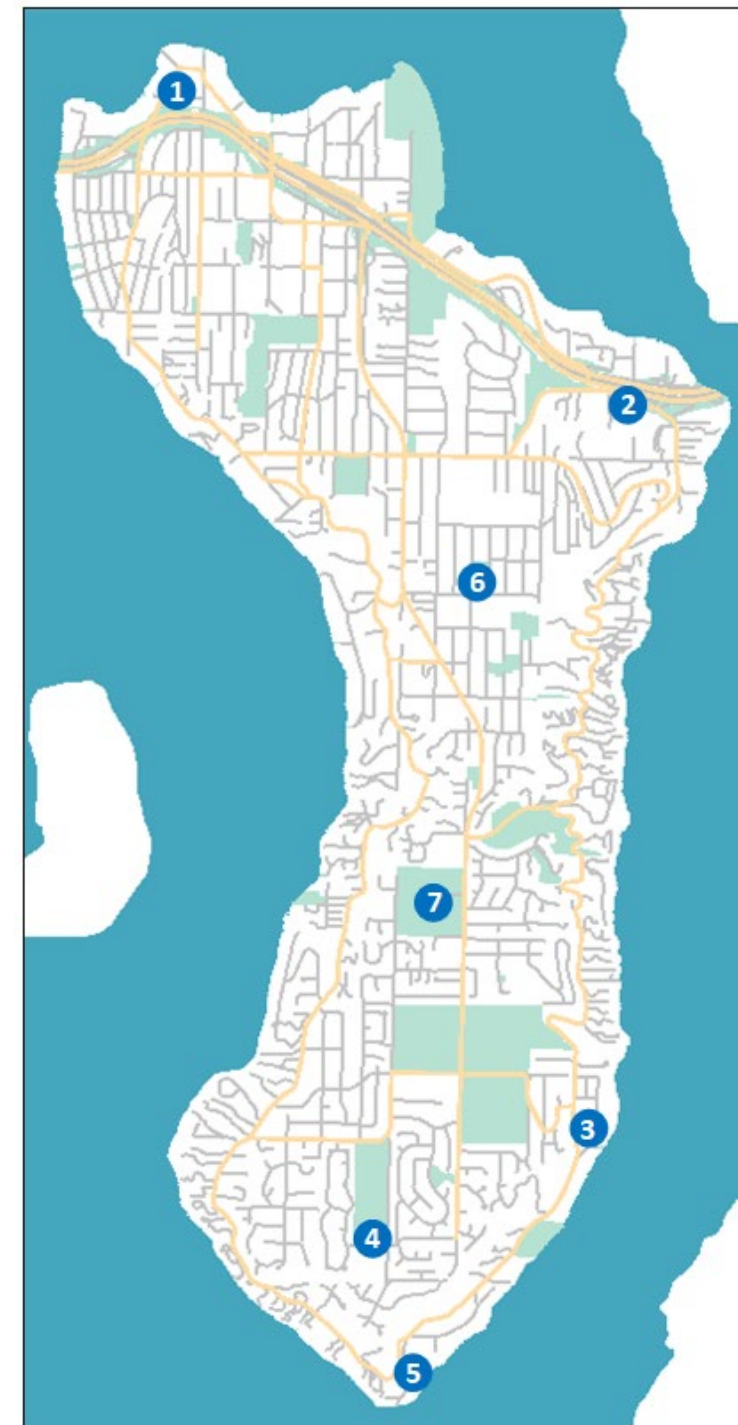
- Propagation study in 2021 was a refinement of a preliminary study conducted in 2019, as part of the RFP process
- Parameters of study:
 - Focus on locating data collector stations on or near to City or public properties and assets
 - Interest in minimizing the number of stations



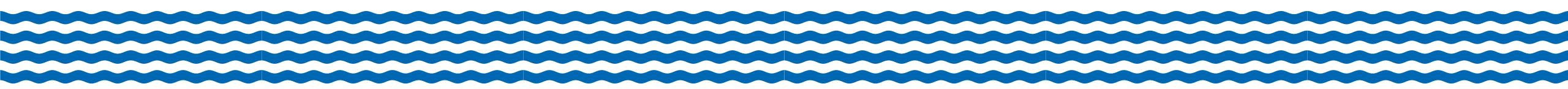
2021 Propagation Study

- Results concluded that **7 antennas** were required for maximum coverage of the island, given parameters:

Location	Antenna mount height	Pole information
1 - Roanoke/70th & 20th	80'	PSE-owned replacement pole
2 - MI City Hall	90'	New City-owned pole
3 - Eastside 71st & 72nd	80'	PSE-owned replacement pole
4 - South Mercer Playfields	80'	New City-owned pole
5 - South Point/Benotho Pl.	80'	PSE-owned replacement pole
6 - City Reservoir	80'	Existing City-owned structure
7 - Island Crest Park	110'	Existing City-owned pole

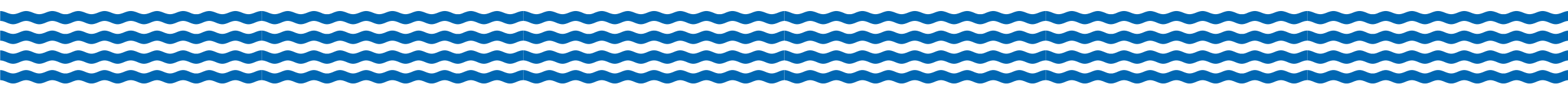


2021 Propagation Study

- Due to the height of these antennae, City required to get a Conditional Use Permit for each location.
 - CUP process requires robust public engagement process, which was launched in November 2023.
 - Received feedback from 11 households, primary concerned about two southernmost locations.
 - City paused permit application process for all locations except two.
 - **Permits for data collection equipment at Island Crest Park & the City reservoir were submitted in December 2023.**
 - Awaiting Public Hearing, anticipated in 2024.
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2024 Propagation Study

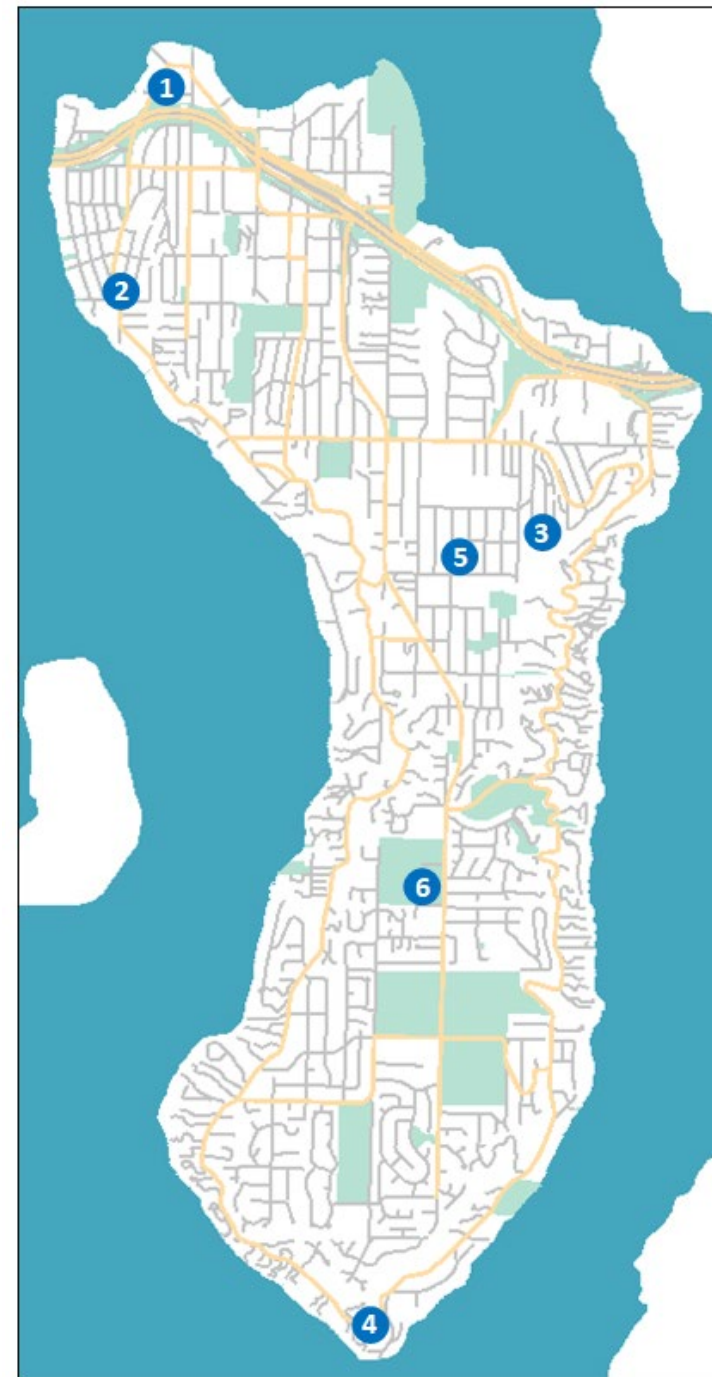
- Interest in evaluating designs that don't require very tall poles, reducing aesthetic impact
- Staff requested new propagation study from Sensus with new parameters:
 - Antennas should not be mounted higher than 50'
 - Use any pole locations in City right-of-way
- Although there was a height restriction, opened up much more area for potential sites than 2021 study.



2024 Propagation Study

- Results concluded that **6 antennas** were required for maximum coverage of the island, given parameters:

Location	Antenna mount height	Pole information
1 - Roanoke/70th & 20th	50'	PSE or City-owned pole
2 - WMW & 32nd	50'	PSE or City-owned pole
3 - Crestwood	50'	PSE or City-owned pole
4 - WMW & EMW	50'	PSE or City-owned pole
5 - City Reservoir	80'	Existing City-owned structure
6 - Island Crest Park	110'	Existing City-owned pole



Comparison of Propagation Study Designs

2021 Design - Option 1	2024 Design – Option 2
Include Island Crest Park and Reservoir locations	
Additional stations must each go through CUP process	
5 additional data collector stations needed	4 additional data collector stations needed
Antennas mounted at 80-90'	Antennas mounted at 50'
Mix of PSE and City-owned poles	PSE or City-owned poles can be used

Small Wireless Facilities – Option 3

- Not pursued due to early desire to minimize data collectors
- AMI data network could be redesigned as an assemblage of small cell facilities
- Small wireless facilities must be lower than 50' in height and use smaller antenna equipment
- Many unknowns:
 - Number of antennas & locations
 - Type of equipment
 - Cost
 - Timeline
 - Maintenance requirements
- First step: New propagation study



Example of small antenna on light post



Next Steps





What's Next?

- Continue permit process for Island Crest Park and City Reservoir sites
- Meter replacements will begin this week
- Bimonthly meter reading will continue
- No changes to utility billing

Contact Us

Customer Service Team

206.275.7600

customerservice@mercerisland.gov

Let's Talk

[Water Meter Replacement Project](#)

[Water Meter Data Collection Stations](#)

Next Steps

- Council feedback on presented options
- Staff will pursue favored option(s) to verify cost and timeline
- Additional information needed from staff?

Questions?

Jeff Hansen, PE | HDR | Utility Management Services Lead

Allen Hunter | Utility Operations Manager

Alaine Sommargren | Deputy Public Works Director

