Updated Water Demand Projection Approach

METROPOLITAN COUNCIL

Metro Area Water Supply Advisory Committee | November 14, 2023 | Greg Johnson and Dan Marckel

Overview

- The preliminary 2050 Water Demand Projections Approach was discussed at the August 8th, 2023, MAWSAC meeting.
- MAWSAC provided feedback on the approach, including for the four different metro region development scenarios and the range of demands (+/- 20%).
- High-capacity private wells, or wells that produce over 10,000 gallons per day, have since then been added to the 2050 Water Demand Projections Approach.
- The updated approach was discussed with TAC at the October 10th, 2023, TAC meeting. TAC was generally in favor of the method but still had questions about the four different metro region development scenarios.

Original Proposed Approach: Projection of 2050 Municipal Water Demand

Use the average historical water use per capita demand and Met Council's population forecasts, including exploration of uncertainty with four different development scenarios, to represent a range of possible future (2050) water use as follows:

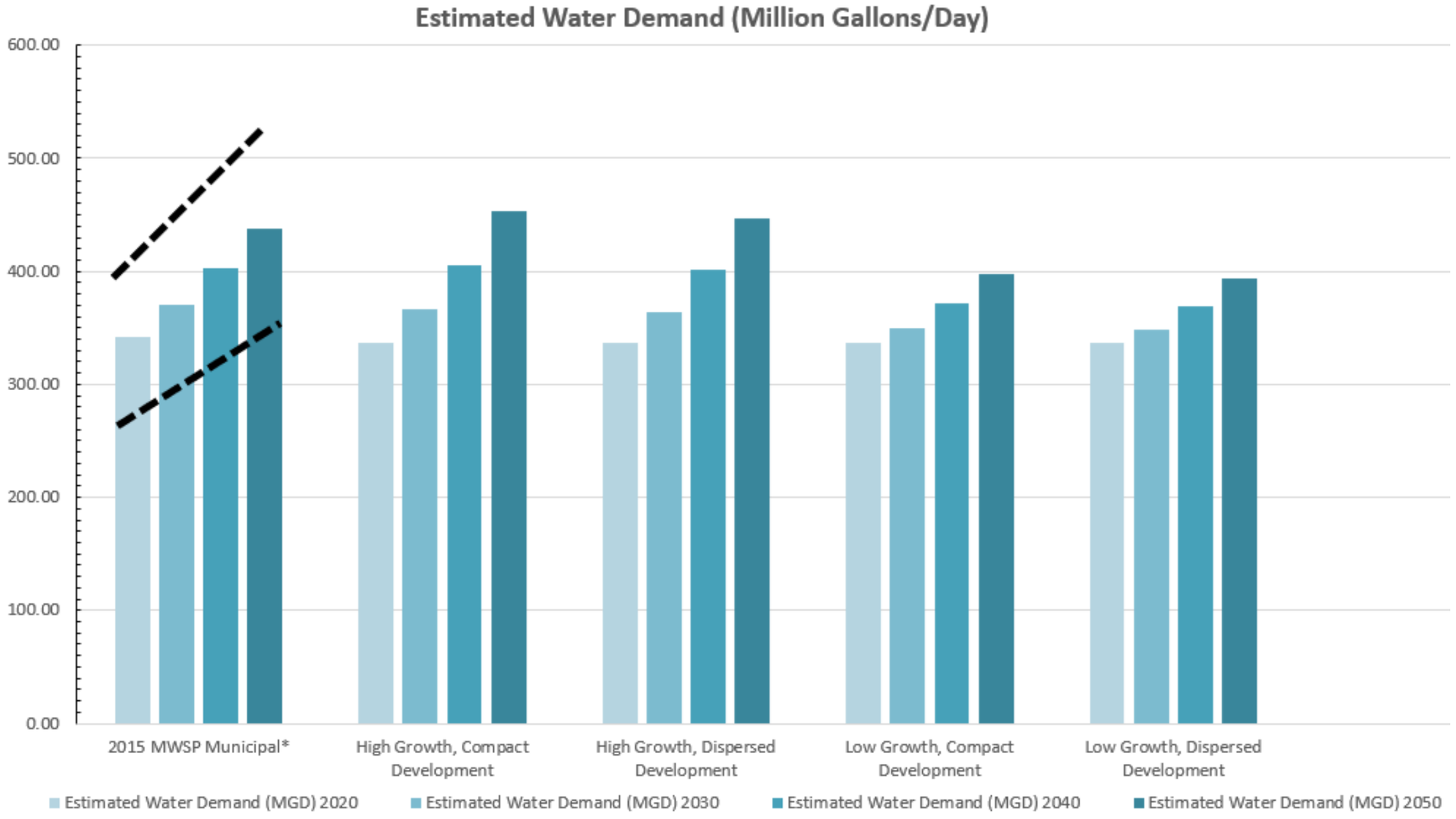
Projected Municipal Water Use = [Projected Population by Regional Growth Planning Scenario*]

x [Per Capita Water Use] with a Variable Range (+/- 20%)

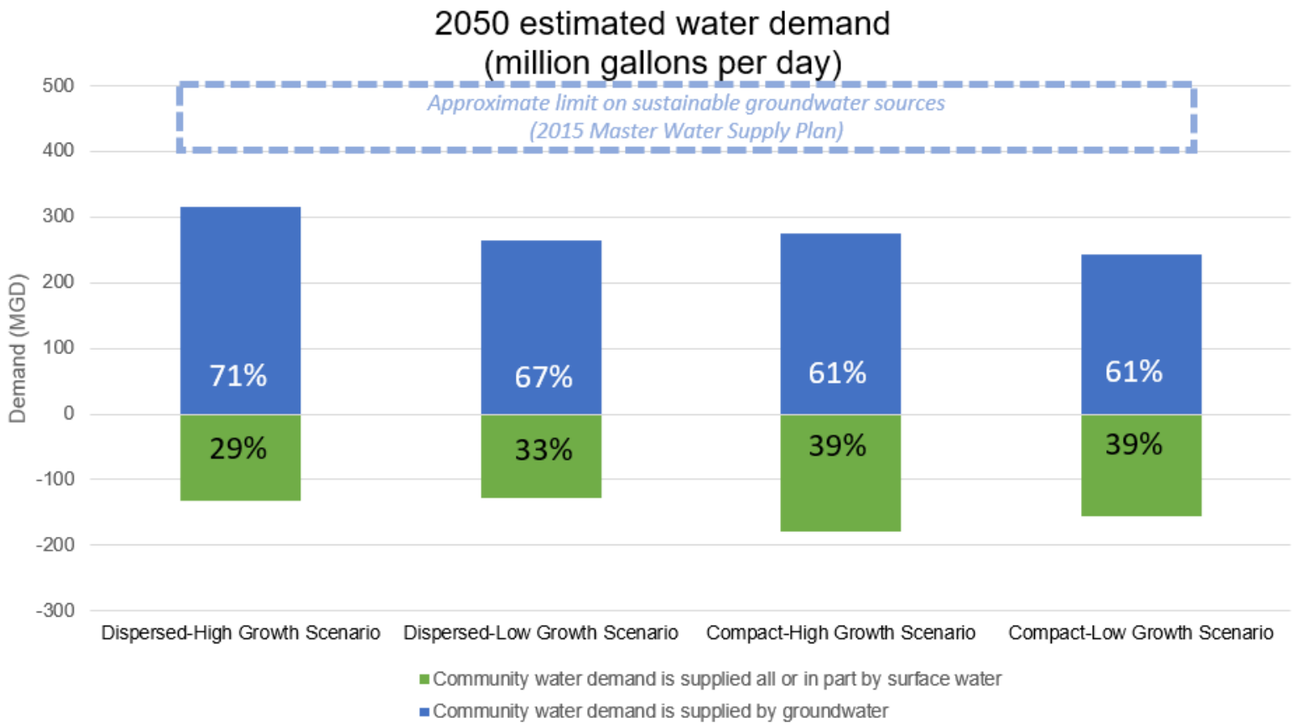
The four development scenarios include:

1. **High growth with compact development**
2. **High growth with dispersed development**
3. **Low growth with compact development**
4. **Low growth with dispersed development**

Preliminary Results of Original Proposed Approach vs. 2015 MWSP Demand



Preliminary Results of Original Proposed Approach: Water Demand by Source



Dispersed growth scenarios:

- More groundwater than surface water use, bringing us closer to limits of groundwater sustainably
- More pressure to provide water through additional private wells in areas not served by municipal systems

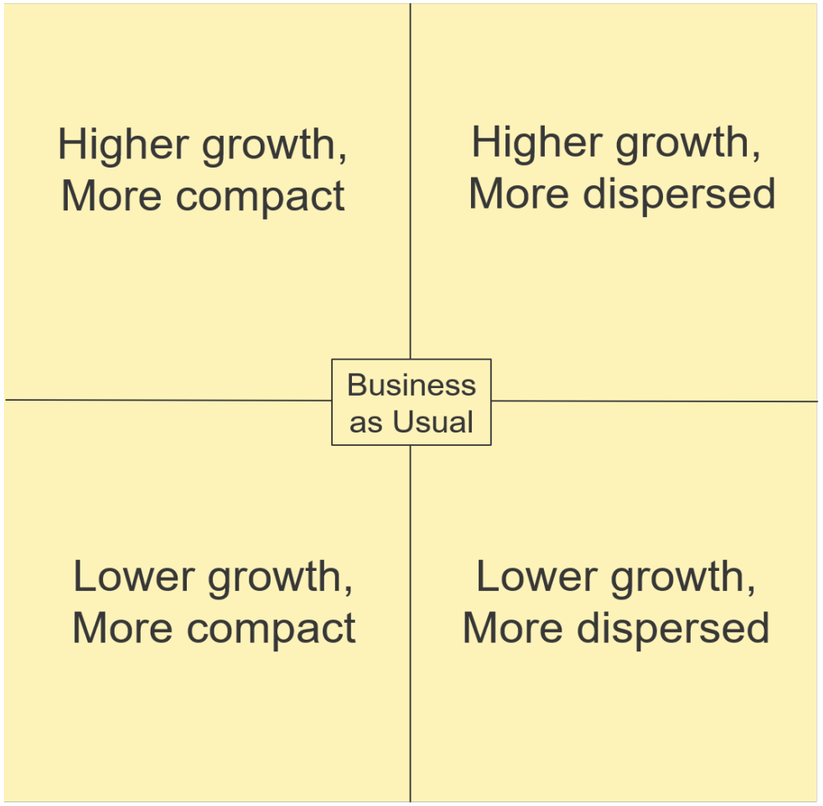
Compact growth scenarios:

- Increased use of existing surface water systems (Mississippi River), which currently has higher monitoring requirements, treatment, and costs.
- Higher risk of impact from sudden drought.

High growth versus low growth scenarios:

- More pressure to expand or create new public and private water supply systems

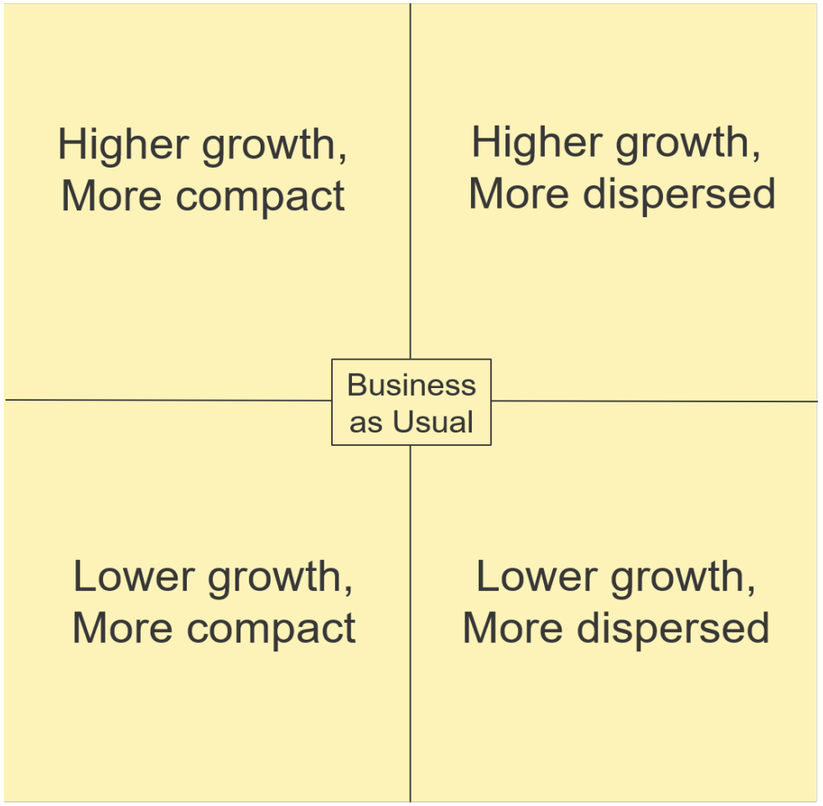
Notes on growth scenarios (1/2)



Scenario Framework

- A technique to make Imagine 2050 decisions in the face of future uncertainties.
- A shared framework for every Council policy team to stress-test their area of responsibility.
- A “tepid” range limited to:
  - adopted comp plan parameters
  - growth ranges we’ve previously seen
- Issues like climate change or telecommuting are factored in as growth effects and locational decisions
- Extraordinary events (major climate change, economic depression, new pandemics, meteor strikes) are **not** incorporated.
- Findings: relative lessons about our future; guidance to shape land use decisions, new policy alignments

Notes on growth scenarios (2/2)



Do the growth scenarios need to appear strongly in the Regional Water Supply Plan?

Pros

- Findings confirm that water supply planning is done well.
- The list of factors is more robust than water calculations alone.
- Including the scenarios work could give more assurance to readers.

Cons

- It looks complicated; hard to communicate?
- A new technique may be less supported?

Options

- Simplify how scenarios are included in charts
- Include appendix or references to the scenarios

Updated Approach:
Projection of 2050 Total Water Demand

Total Metro Region Water Demand =

Projected Municipal Water Use (groundwater and surface water systems)

+

Projected Private High Capacity Well Use

Updated Approach:
Projection of 2050 Municipal Water Demand

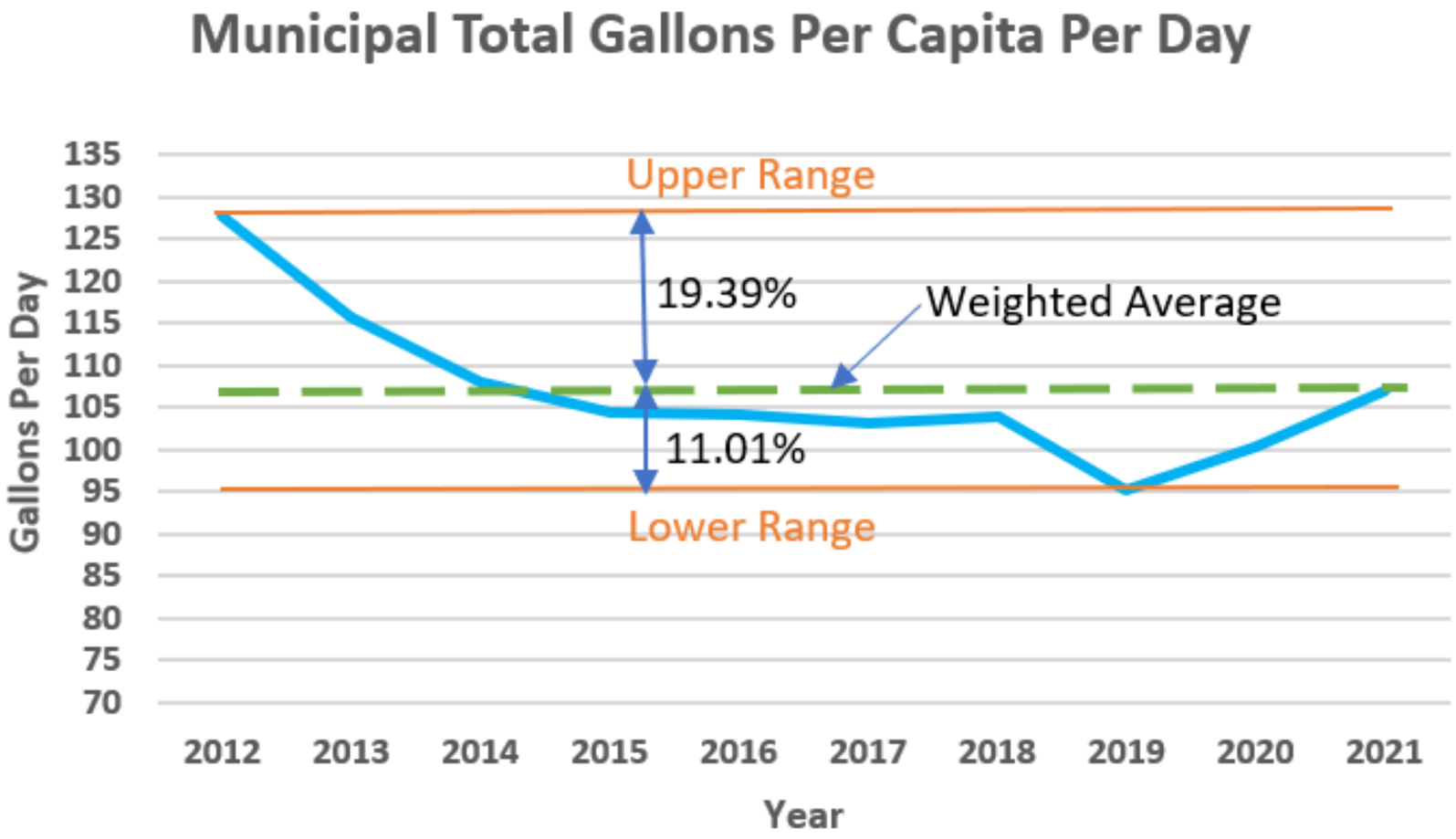
Use Met Council's population forecast for each community, the average per capita demand from 2012-2021 for each community, and a variable range to represent a range of possible future water use as follows:

Projected Municipal Water Use = [Projected Water Service Population]

x [2012-2021 Average Total Per Capita Water Use] with a Variable Range (+/- 20%)

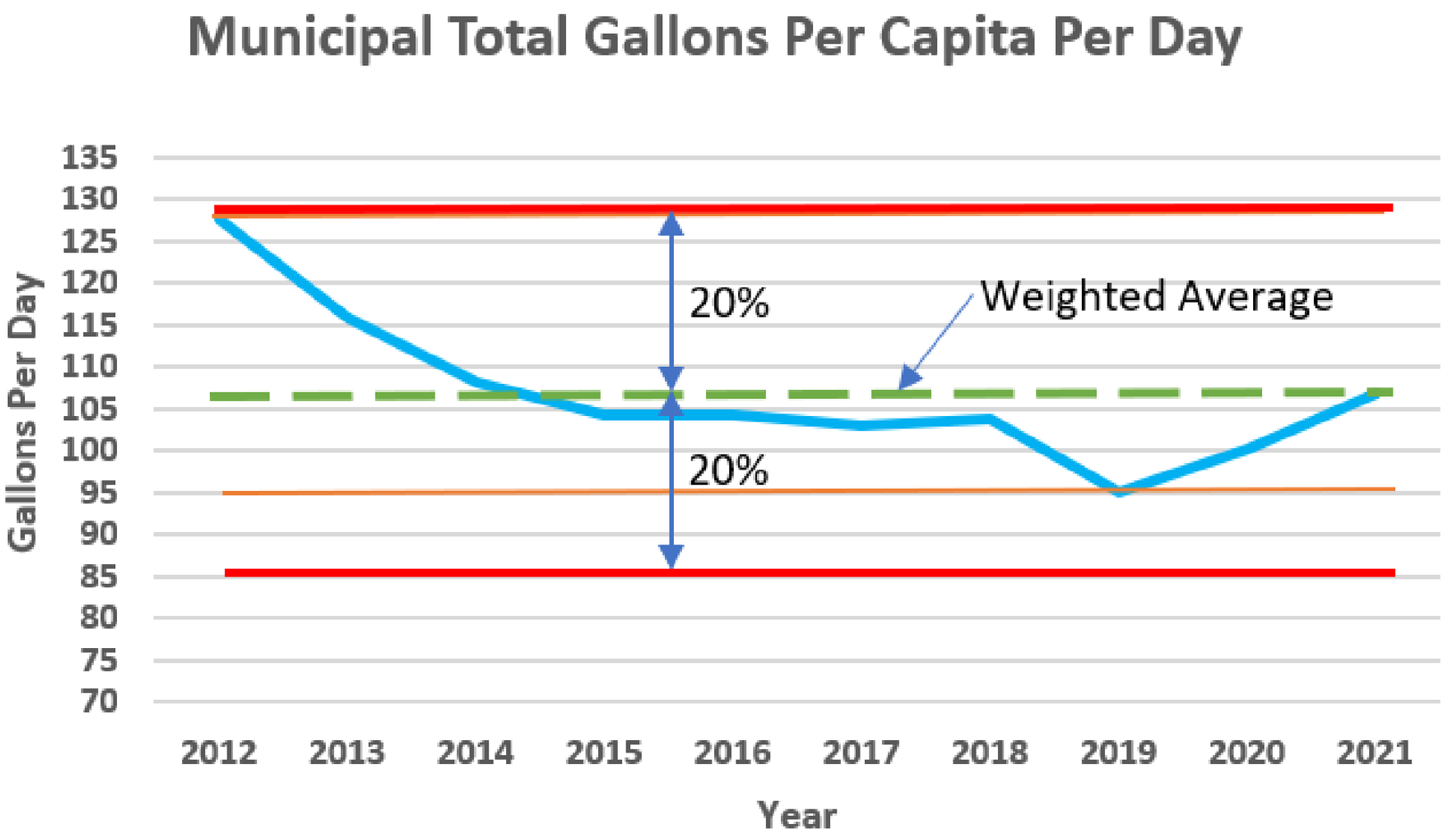
Variable Range Analysis

Year	Total GPCD (Total Usage/Service Population)
2012	127.65
2013	115.72
2014	108.04
2015	104.35
2016	104.17
2017	103.13
2018	103.83
2019	95.14
2020	100.26
2021	106.92
Range	95.14-127.65
Average (2012-2021)	106.92
% Above Average	19.39
% Below Average	-11.01



Recommended Variable Range

Year	Total GPCD (Total Usage/Service Population)
2012	127.65
2013	115.72
2014	108.04
2015	104.35
2016	104.17
2017	103.13
2018	103.83
2019	95.14
2020	100.26
2021	106.92
Range	95.14-127.65
Average (2012-2021)	106.92
% Above Average	19.39
% Below Average	-11.01



Updated Approach:
Projection of 2050 Private High Capacity Wells Water Demand

Use the community's current total annual high capacity wells demand from MPARS data, the average annual increase in demand from 2012-2021 as a percentage, and a variable range to represent a range of possible future water use as follows:

Projected High Capacity Wells Water Use = [Current Total Annual High Capacity Wells Demand] X [2012-2021 Average Annual Increase Percentage in Demand] with a Variable Range (+/- 20%)

Updated Approach:
Projection of 2050 Total Metro Region Water Demand

Total Metro Region Water Demand =

Projected Municipal Water Use = [Projected Water Service Population]

x [2012-2021 Average Municipal Total Per Capita Water Use] X 365 Days with a Variable Range (+/- 20%)

+

Projected Private High Capacity Wells Water Use = [Current Total Annual High Capacity Wells Demand] X [2012-2021 Average Annual Increase in Demand Percentage] with a Variable Range (+/- 20%)

Example Community Water Demand Projection (1 of 6)

Lady Slipper, Minnesota

2023 Populations – 15,353 total population and 12,525 water service population

2050 Projected Populations – 24,800 total population and 20,960 water service population

2012-2021 Average Municipal Total Per Capita Water Use – 97 GPCD

Firm Well Capacity – 2,000 gallons per minute (gpm)

Community DNR Groundwater Appropriation Permit Limit – 575 million gallons per year (MGY)

2012-2021 Average Maximum Day/Average Day Peak Multiplier – 2.20

Current Private High Capacity Well Use – 109 MGY

2012-2021 Average Private High Capacity Well Use Annual Growth Rate – 1.6%

Example Community Water Demand Projection (2 of 6)

2050 Total Water Demand =

Projected Municipal Water Use = [20,960 people]

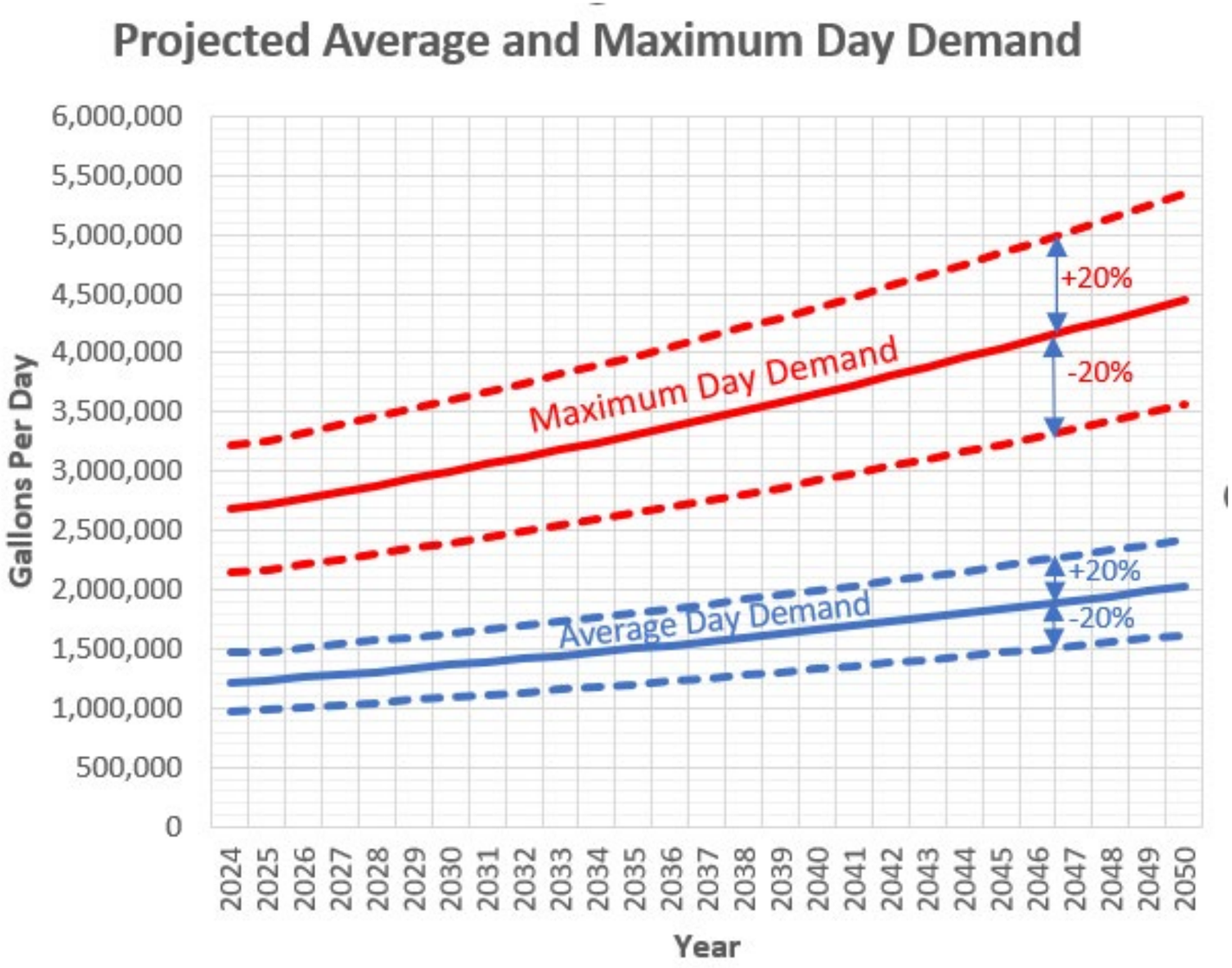
x [97 GPCD] X 365 Days with a Variable Range (+/- 20%)

+

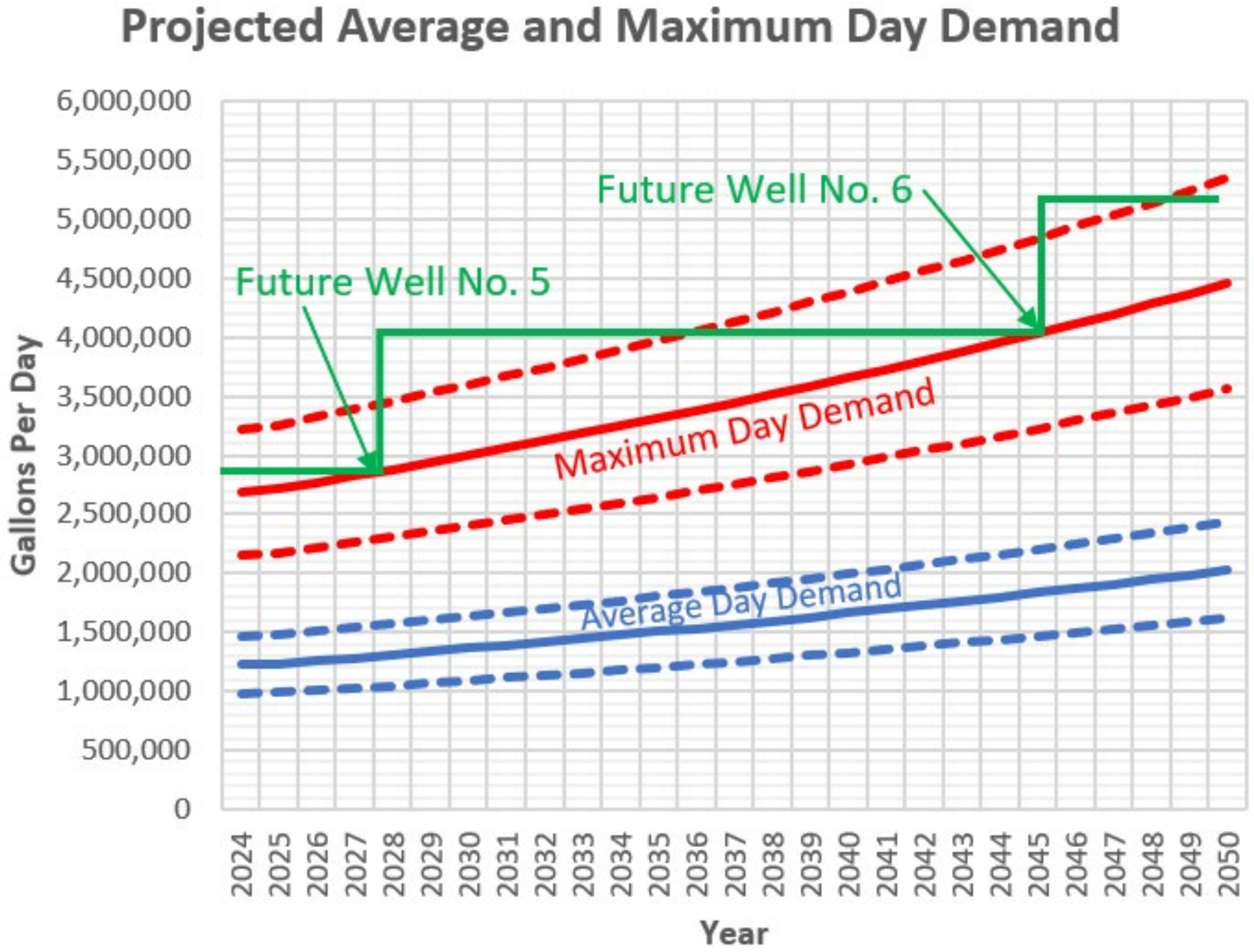
Projected High Capacity Wells Water Use = [109 MGY] X [1.6% per year growth rate] X [27 years] with a Variable Range (+/- 20%)

= 909.4 MGY +/- 181.9 MGY

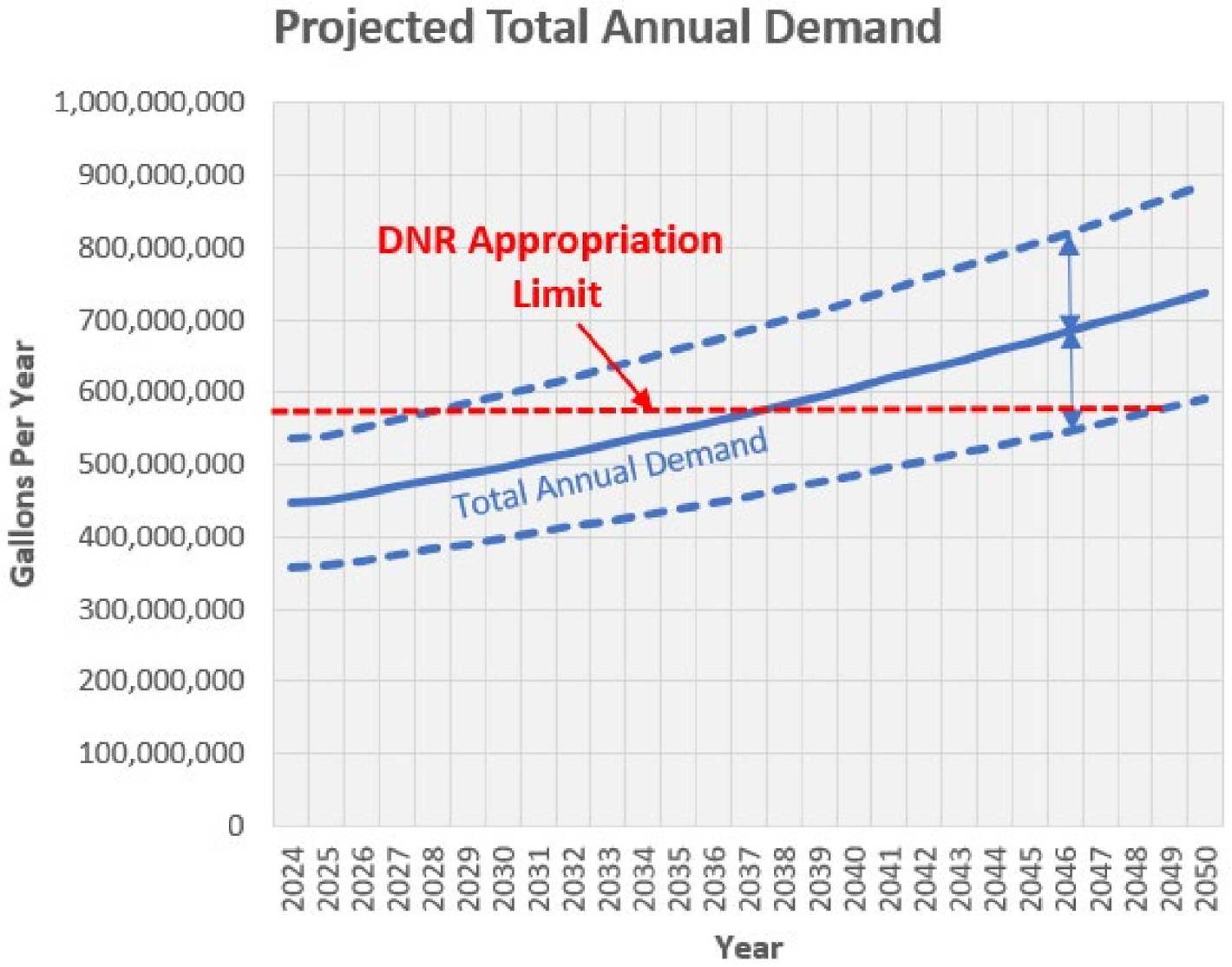
Example Community Water Demand Projection (3 of 6)



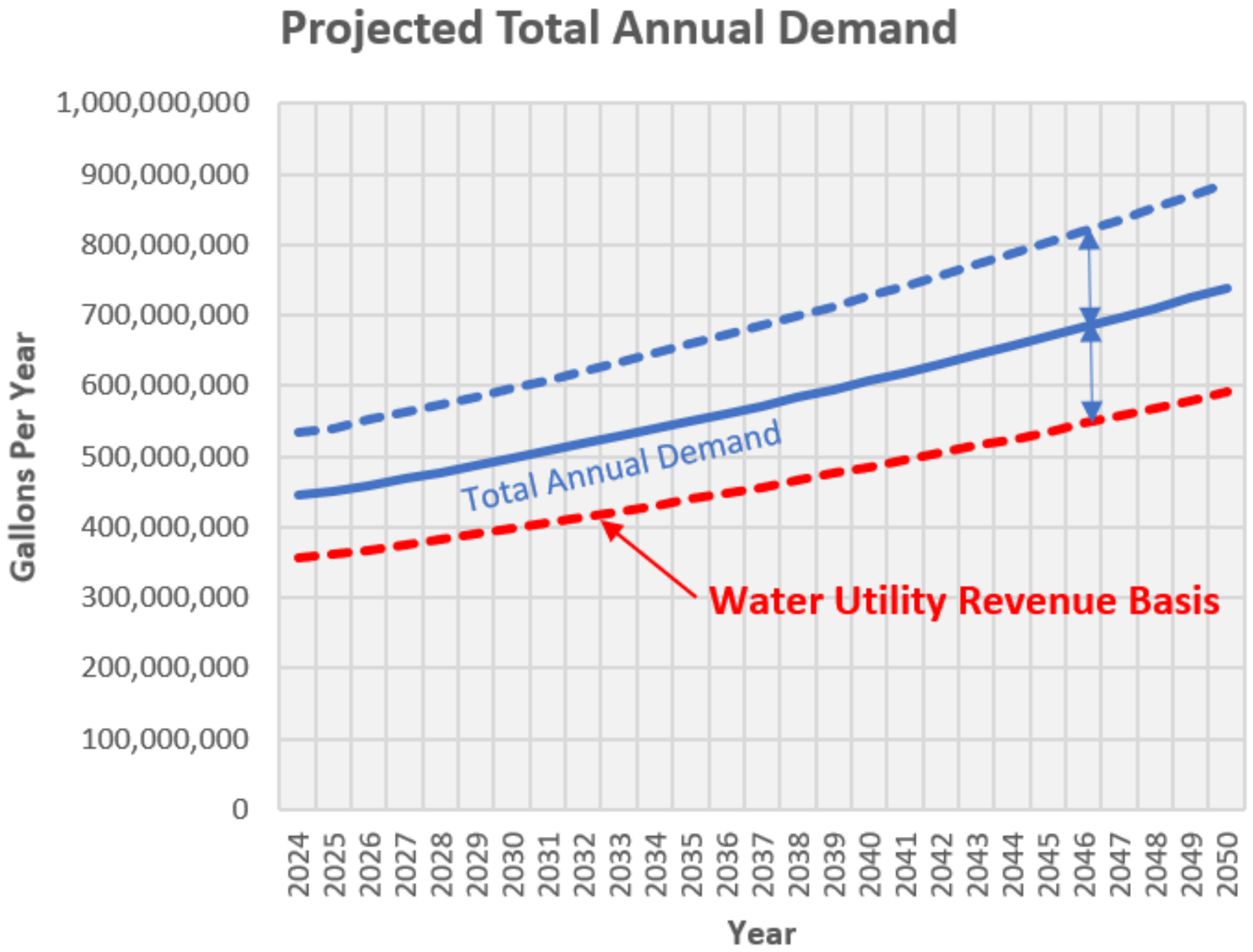
Example Community Water Demand Projection (4 of 6)



Example Community Water Demand Projection (5 of 6)



Example Community Water Demand Projection (6 of 6)



Questions for MAWSAC

As you think about your roles and the role of the Met Council:

- What do you think of the updated Water Demand Projection Approach?
- What are the ways in which you see this information about 10-, 20-, and 30-year projections of water demand being helpful in your organization's work?
- How should it inform regional policy?

Next Steps

- Work with the DNR to fill-in the missing data gaps from MPARS. Request missing data from communities for remaining data that the DNR cannot provide.
- Communicate water demand projection method at the subregional workshop on February 29th, 2024.
- Obtain final 2050 population projections from Met Council's Research staff.
- Calculate and develop water demand projections to year 2050.
- Complete other water demand analyses (ex. compare to wastewater flows, analyze water demands by individual wastewater sewershed areas, analyze employment demand projections, etc.)