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MEMORANDUM

Date: July 22, 2025

To: Water Utility Board

From: Pete Holmgren, P.E. – Chief Engineer
Krishna Kumar – General Manager

Subject: Madison Water Utility Graduate Program with UW-Madison, 2023-2025
Evaluation of Hydraulic Infrastructure Projects for Anticipated Urban Expansion

BACKGROUND

The collaborative research partnership between Madison Water Utility (MWU) and UW-Madison's (UW) Department of Civil and Environmental Engineering has been in place since September 2002. The thesis work, mutually agreed upon by MWU and UW, is usually conducted over a period of 1½ to 2 years, resulting in a final deliverable of a Master of Science thesis.

The current and 13th overall graduate student for this ongoing partnership, Jaxon Hoffman, has been working with MWU since September of 2023 on analyzing both the MWU infrastructure projects required to accommodate ongoing City of Madison population growth and the energy impacts of those projects. The focus of Jaxon's work was narrowed further to the City of Madison's west side, where MWU's current Master Plan document anticipates the greatest near-term water supply needs relative to anticipated growth.

The objectives of Jaxon's research were to:

1. Utilize MWU's hydraulic system model to evaluate future system demand conditions alongside future capital project options intended to address those demand conditions.

2. Contribute to 100% Renewable Madison by comparing greenhouse gas emissions and energy consumption anticipated for the identified capital project options.

3. Present the findings that can assist MWU in setting and prioritizing future capital projects based on their ability to meet future water demand, water quality expectations, and sustainability goals.

Four capital project alternatives were examined in detail with the above objectives in mind. These projects had been previously identified in MWU's current Master Plan document and were selected because of how they most directly addressed the expected water supply needs

on the City of Madison's west side. Two of the projects are categorized as "Transfer Water (TW)" projects and two of the projects are categorized as "Supply Water (SW)" projects. The four projects were:

1. TW-08: A new booster station facility in Elver Park on the boundary of Pressure Zone (PZ) 7 and PZ 8, which moves water from PZ 7 to PZ 8 to address a future water supply deficit in PZ 8.

2. TW-11: A pipeline upgrade along Raymond Road between Verona Road and McKenna Boulevard, which would allow for increased east-to-west water transfer capacity and efficiency.

3. SW-01: A new well facility in PZ 11 at the corner of Mineral Point and South Point Roads, which would provide water to PZ 10 and PZ 11 with the ability to serve Zone 8 in an emergency.

4. SW-03: A new well facility in PZ 8 at the corner of Pleasant View and Mid Town Roads, which would provide water to PZ 8 with the ability to serve PZ 9 when necessary.

FINDINGS

Findings from Jaxon's model analyses and energy research are summarized as follows:

- As it currently exists, the MWU system will be able to keep up with the projected increase in demand on the City of Madison's west side until approximately **2030**. Around that time, Unit Well 12 may need to serve as a dedicated PZ 8 facility.

- Projects TW-08 and TW-11 could meet the increasing west side demand until approximately **2035**. Project TW-11 would also require Unit Well 12 to serve as a dedicated PZ 8 facility to achieve this.

- Completing *either* of projects SW-01 or SW-03 would enable MWU's system to meet anticipated west side water demands through at least **2040**.

- Given the modeling estimate uncertainties (margins of error) for energy usage, there is no significant difference between the facility project alternatives in terms of energy usage or greenhouse gas intensity.

ATTACHMENTS

1. Memo (this document)
2. Presentation Slides