Date: November 6, 2018

To: Members of the Phoenix Groundwater Users Advisory Council

From: Carol Ward-Morris, Assistant Director, AMWUA

Subject: AMWUA Water Loss Control Training & Technical Assistance Program Proposal

Aging infrastructure, escalating costs, and drought impacts to water supplies are driving increasing focus on distribution system efficiency and water loss control. Nationwide, approximately 17% of total water consumed is lost by distribution systems. To help address this issue, regulatory and financial oversight agencies in states from Georgia to California to Hawaii are placing growing attention on system performance.

In the early 2000s, an international standard for water loss control best management practice methodology was established. The American Water Works Association (AWWA) M36 Manual details that method and guides utilities to determine cost effective actions. Advances in guidance and tools assist utilities to methodically audit their systems and make judgments about how to best reduce those volumes to economic levels. More than a dozen states in the U.S. have adopted the M36 methodology and/or provide technical assistance to utilities to assist them in adopting and implementing it.

Since the early 1980s, Arizona has required large and small providers in the Active Management Areas (AMAs) to limit lost and unaccounted for water to 10 and 15 percent, respectively. The basic water loss estimation methods and performance standards put in place more than thirty years ago have provided a sound foundation.

Arizona agencies and providers now recognize that additional, sustainable reductions in water loss are both possible and cost-effective.

• The Arizona Corporation Commission (ACC) is addressing the issue of water loss as part of a strategic, multi-prong approach to water conservation and the need for an updated and more collaborative approach to water loss methodology for ACC-regulated utilities.
• The Governor’s Water Augmentation Council has recognized the importance of water loss control to ensure long-term water supplies for Arizona and recommended that ADWR act to address water loss control outside of the Active Management Areas.
• Other supporters include the Arizona Municipal Water Users Association (AMWUA), the Arizona Department of Environmental Quality, the United States Environmental Protection Agency, and the AZWater Association.
In 2017, Arizona launched a Water Loss Technical Assistance Pilot Program for utilities outside of the AMAs where there is no requirement to calculate or report water loss estimates and the need for assistance is most pressing. The Arizona Department of Water Resources (ADWR) and the Water Infrastructure Finance Authority (WIFA) provided funding and direct staff support for the program. ADWR contributed additional funding and support. The project took initial steps towards determining the feasibility of standardizing and promoting water loss auditing among utilities across the state.

The Phase I pilot program and feedback from participants and supporting agencies demonstrated the value of the training and technical assistance, reinforcing the experience gained in other states. Phase II of the pilot is currently underway. This phase of the pilot has expanded to include 25 small and medium sized providers both outside and inside the AMAs. The state has focused the pilot program on smaller utilities with less experience with water loss control. The pilot program introduces the basic concepts of the M36 methodology and trains staffs in the fundamentals of auditing distribution systems.

AMWUA proposes implementing a pilot for its ten members, among the largest water providers in the state. Collectively, AMWUA’s members—the municipalities of Avondale, Chandler, Gilbert, Glendale, Goodyear, Mesa, Peoria, Phoenix, Scottsdale, and Tempe—serve a population of 3.5 million people, more than 50% of the state’s population. These cities operate 28 water treatment plants; maintain 18,000 miles of water distribution lines, more than 1 million water meters, and 135,000 fire hydrants; and deliver nearly 800,000 acre-feet of water annually to their residents and businesses.

AMWUA’s members have historically maintained a focus on distribution system loss through leak detection, pipeline replacement, and meter repair and replacement. They all meet and exceed state requirements for water loss control. They have decades of experience tracking supply, consumption, and loss volumes, and they are familiar with system audits. Most, however, have relatively limited experience with the M36 standard.

Based on member requests for more information on the methodology and its benefits, as well as more specific inquiries regarding implementation, AMWUA contracted with Cavanaugh & Associates, P.A. (Cavanaugh) to conduct an informational webcast on the M36. In follow-up, at AMWUA’s request, Cavanaugh canvassed the members regarding their prior experience with water loss control, their needs, and their level of interest in training and technical assistance. Participating members indicated a clear desire to move beyond current efforts to implement more advanced practices from the M36.

In particular, the members expressed interest in advanced data validation and economic-based target setting. The M36 utilizes a suite of recommended metrics that indicate validity, volume, and value of water loss components. Once data validity is determined to be actionable, the volumes and values (costs) of water loss components provide clear prioritization and focus to ensure water loss reductions are cost-effective. Additionally, the methodology utilizes a target-setting approach that is tailored to a system’s physical and cost characteristics, which
effectively drives loss to economically optimal levels. In short, the AMWUA members are seeking training and expert technical assistance to enable them to continuously improve the quality of their system data to ensure they target their interventions as productively and as cost-effectively as possible.

Consistent with those interests, Cavanaugh recommended AMWUA scope a program that focuses on stages 2 and 3 of the M36 methodology. Member staffs would receive training on the concepts, while a subject matter expert would provide the execution of the analysis and activity along with determining prioritization of members’ current activities including leak detection, meter replacement, and pipeline replacement. This will allow member staffs exposure and learning on the M36 methodology without undue burden on time and resources.

AMWUA’s proposed pilot for water loss control technical assistance and training will expand on the work accomplished through the Phase I and Phase II Pilots implemented by WIFA and ADWR. The state’s pilot program has demonstrated the value and benefit of providing foundational training and support to smaller utilities. The state’s pilot focused on stage 1 of the M36 methodology with a basic level 1 validation. AMWUA’s pilot will delve deeper, addressing phases 2 and 3, the technical and economic analyses that lead to recommendations for how to cost effectively target interventions to address real losses. Utilities will gain insight into where efficiency gains can be achieved, improving the operational bottom line, supporting optimized rate setting, and demonstrating ongoing commitment to careful water resource management.

It is important to note that although the AMWUA members view water loss control training and technical assistance as valuable and beneficial, it is one of many competing priorities. It is unlikely any individual member would be able to contract for such training and technical assistance at this time, nor would AMWUA be able to raise sufficient funding from its members to implement a program of this scope. If state funding can be secured, the majority of the AMWUA members have indicated both strong interest and commitment to participating in a technical training and assistance program.

While the AMWUA members are relatively few, they comprise half the population of the state and a large percentage of the municipal water served. A program tailored to these providers will maximize the impact to water supplies and well as the benefit to ratepayers. ADWR staff members recognize that such a program could provide substantial benefit to larger systems and see value in a pilot effort for large providers. AMWUA appreciates their support in bringing this
proposal forward for possible funding through the Phoenix AMA Water Management Assistance Program.

On September 6, 2018, AMWUA’s Board of Directors unanimously endorsed an AMWUA proposal to request Water Management Assistance Program funding for a water loss control training and technical assistance program. AMWUA staff estimates the program will cost approximately $300,000 and run for one year, based on similar programs in other states. In-kind contributions to this project will include AMWUA staff time to scope, contract, and organize the program, as well as the AMWUA members’ staff time to participate. Final costs and the project timeline will be determined once a consultant is selected and the project is scoped.

AMWUA requests that the Phoenix Active Management Area Groundwater Users Advisory Council recommend that the Director of the Arizona Department of Water Resources approve $300,000 in funding from the Water Management Assistance Fund to support the implementation of the proposed AMWUA water loss control training and technical assistance program.

Attachment: AMWUA Water Loss Control Canvass Summary Memo
AMWUA Water Loss Control Canvass – Summary Memo
Gauging member needs in training and technical assistance

PREPARED FOR: AMWUA DATE: June 20, 2018
PREPARED BY: Cavanaugh PROJECT NUMBER: WE.18.006
PROJECT TEAM: Steve Cavanaugh, P.E., Drew Blackwell, Will Jernigan, P.E.

Purpose

Water supply challenges and the need for robust conservation planning are driven by growing demand, declining water supplies, and aging utility infrastructure. Water loss control is an increasingly important part of water resource management for water utilities and state agencies throughout the country. The Arizona Municipal Water Users Association (AMWUA) member agencies serve approximately 3.5 million people—more than half of the state’s population—and have long worked to limit water loss in their distribution systems. Based on the interest of AMWUA member staffs, Cavanaugh was contracted to provide a webcast on advancements in water loss control best management practices and to assess the members’ needs for water loss control training and technical assistance. The purpose of this report is to present the findings of the canvassing effort.

Background

The importance of water loss control for state and regional agencies is supported by the incredible momentum across the United States.

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<th>State</th>
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<td>Arizona</td>
<td>Pilot Program (Phase 1), Expanded Program (Phase 2)</td>
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<td>California</td>
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<td>Colorado</td>
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<td>Georgia</td>
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<td>Utah</td>
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In Arizona, water loss control training has recently taken hold through the completion of the Arizona M36 Water Loss Technical Assistance Program Phase 1 which involved six utilities outside of the Active Management Areas. In summer of 2018, Phase 2 of the program was launched to expand the number of utilities and eligibility for participation across the state. The Arizona Department of Water Resources (ADWR) and the Water Infrastructure Finance Authority (WIFA) provided funding and direct staff support for the program. AMWUA was instrumental in advocacy support for the program.

In January 2018, Cavanaugh provided AMWUA staff and member agencies with an overview of advancements in water loss control best management practices—in particular, the AWWA M36 Methodology and its benefits. In March 2018, an informational webcast was conducted for a broader group of the AMWUA member staffs, providing more detail on the M36 Methodology, the potential for recovery of revenue lost to non-revenue water, and examples of programs in place across the country.

At AMWUA’s request, Cavanaugh performed canvassing calls shortly after the March 2018 webcast to speak with member agencies individually, answer questions one-on-one, and assess the members’ needs and interest in water loss control training and technical assistance.

**Approach**

The approach to the canvassing calls are outlined below through preparation, scheduling, Information gathering, and compilation.

### Preparation
- Coordination with AMWUA on utility points of contact
- Understanding of AMWUA role and desire to gauge needs

### Scheduling
- Go To Meeting format where slides and other resources could be shared
- Utility staff coordination for call attendance

### Information Gathering
- Overview of M36 Methodology big picture to utilities (slide deck)
- Call script/Q&A
- Documentation of the calls

### Compilation
- Results - needs, interest and level of commitment

**Preparation & Scheduling**

There are 10 AMWUA member agencies: The cities of Avondale, Chandler, Glendale, Goodyear, Mesa, Phoenix, Peoria, Scottsdale, Tempe and the Town of Gilbert. Prior to contacting the utilities, it was acknowledged that these canvassing calls were intended to answer questions in follow-up to the March webcast, then methodically gain a better understanding of member needs and interest in training and technical assistance. The effort was not to promote a program or approach. If there were sufficient
interest and commitment expressed, then AMWUA staff would explore options based on the results, including the potential for securing funding to support a Water Loss Technical Assistance Program.

Cavanaugh scheduled web meetings (shared-screen) with seven AMWUA members interested in participating in the canvassing. All utility staffs involved in water loss control were encouraged to attend. Each call’s discussion was documented.

**Information Gathering & Compilation**

During the meeting, a slide deck providing an overview of the AWWA M36 concept and methodology was presented to the utilities, either as a refresher for those that attended the March 2018 webcast or as foundational material to support the purpose and intent of the call. The slide deck is included in the Attachments.

Cavanaugh conducted each interview using standardized questions, with question logic stemming from ‘Have you ever used the AWWA Free Water Audit Software?’ Depending on the response, the next series of three questions differed from one utility to the next. A template of the stock questions is provided in the Attachments. The utility responses were documented and compiled.

**Outcomes**

All seven AMWUA members that participated were appreciative of the approach that AMWUA took to seek to understand the members’ needs. Through the interview the members volunteered information on their systems and their prior experiences with water loss control. Common themes in the member responses were:

1) Most members have historically maintained a reasonable focus on distribution system loss through leak detection and pipeline replacement, given the Lost & Unaccounted for (L&U) regulatory structure in Arizona;

2) Most members do not see distribution system loss as an area of immediate concern, given they are in compliance with the 10% L&U threshold;

3) While most members feel familiar with distribution system loss, they identify as relatively new to the M36 Methodology, which orients their current needs and interests to those elements of the M36 Methodology outside of leak detection and distribution system loss;

4) The most common needs and interests expressed from the members were on advanced validation and economic-based target setting.

The full list of needs and interests expressed by the members for training & technical assistance ranged from baseline practices to advanced practices:

- General M36 Methodology and building a water balance;
- Developing the internal water loss control team;
- Advanced validation activities including supply meter verification, lag-time correction, & billing database analytics;
- Economic analysis for cost-benefit & target setting.

The members did not express specific need or interest for training & technical assistance in advanced water loss control interventions, such as district metered areas (DMAs), pressure optimization and
revenue recovery programs. These activities may be more of a need and/or interest at a future time, as they tend to naturally follow in the M36 Methodology, once validation and economic target setting are in place for a given utility and the business case for intervention is known.

The participating members expressed a commitment to dedicate the staff time to participate in potential training & technical assistance if it were focused on the needs & interests. Given the members’ time and budget constraints and the fact that their L&U requirement is currently being met, the group’s interest for AMWUA-facilitated training & technical assistance can be characterized as moderate (if self-funded) to very strong (if state-funded).

Individual responses are presented in the Attachments.

**Recommendations/Next Steps**

The needs and interests expressed by the members are themed on building from historic distribution system loss and L&U focus, to implement advanced practices from the M36 Methodology. While some of the members have not yet worked with the M36 water audit software, all of the members have years of tracking supply, consumption and loss volumes under the L&U reporting framework. As such the primary focus of training & technical assistance is recommended to be on Stages 2 and 3 (below). This would be consistent with the most common needs and interests expressed by the members – advanced validation and economic-based target setting. Stage 1 would still need to be included, but using the members’ current tracking and reporting information to build from this would serve as a step into Stages 2 and 3. The stages are rational and methodical, with Stage 3 informed by Stage 2, and Stage 2 informed by Stage 1. A training and technical assistance program could address the expressed needs and interests by guiding members through Stages 1 to 3, providing member staffs with training on the concepts while execution of the analysis and activity is provided by a subject matter expert. This allows
member staffs exposure and learning on the M36 Methodology without undue burden on time and resources. In Stage 3 the business case for intervention is determined, which provides members with valuable insight on which field activities to prioritize. Stage 3 findings can also provide insight regarding higher or lower prioritization of members’ current activities including leak detection, meter replacement and pipeline replacement.

While Stage 1 of the M36 Methodology requires relatively few resources, full implementation of the M36 Methodology is complex and can take considerable time and resources. Members can download the freely available M36 water audit software, and obtain the AWWA M36 Manual for Water Audits and Water Loss Control at nominal cost. Many utilities, however, do not have the resources or subject-matter expertise to implement beyond the annual M36 water audit in Stage 1. A regional or statewide approach to aggregate and focus resources for a targeted group has proven in several states to be an effective means for large scale adoption of best-practices. A regional program also allows knowledge and resource sharing to occur between members. Examples of this include where a given member has already engaged in supply meter verification or customer meter testing activities — equipment, contractor references and lessons learned can be shared with other members.

It is important to note that while the members view training and technical assistance on industry best-practices as positive and beneficial for their operations, management, and finances, it is not an immediate priority for funding for most members given competing priorities. The highest likelihood of advancing the technical assistance is through a state-funded initiative. Based on this and the needs and interests described by the members, it is recommended that AMWUA develop a detailed scope and seek state funding for a Water Loss Training & Technical Assistance Program for its members.

Attachments

1) Questionnaire template with individual responses
2) Canvassing call slide deck