Maricopa Water District
Northern Avenue Lateral
Surface Water Capacity Restoration
Phoenix AMA
Cover Page
APPENDIX 3:

WMAP Groundwater Conservation Grant Application Cover Page

Program/Project Title AND Brief Description: *Northeast Avenue Irrigation Surface Water Capacity Restoration*

- Restore capacity to deliver surface water and eliminate groundwater use.

**Type of Program or Project:**

- [x] Infrastructure Water Efficiency
- [ ] Water Innovation & Technology
- [ ] Ecological Enhancement
- [ ] Public Outreach & Engagement

Your level of commitment to maintenance of project benefits and capital improvements:

- [ ] < 5 years
- [ ] 5-10 years
- [ ] 11-15 years
- [x] 16-20 years

**Applicant Information:**

Name/Organization: *Maricopa Water District*

- Address: 14825 W. Grand Ave
- City: Surprise
- State: AZ
- ZIP Code: 85374
- Phone: 623-546-8266
- Tax ID No.: [Redacted]

**AMA:**

- [ ] Phoenix
- [ ] Tucson
- [ ] Prescott
- [ ] Pinal
- [ ] Santa Cruz

If the project is located outside of an AMA, it is not eligible for funding.

**Contact Person:**

Name: *Andrew Fraser*

- **Title:** Project Engineer
- **Phone:** 623-546-8266
- **e-mail:** Andrew.F@mwda2.com

Does this project meet any of our priority criteria? If so, which?

- [x] Additional contribution
- [ ] Innovative qualities
- [x] Demonstrate high impact
- [ ] Demonstrate multiple benefits

**Water Management Assistance Program Grant Amount Requested:**

$251,500

**Additional Contribution Obtained and Secured:**

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<th>Amount ($)</th>
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**Total:** $60,000

Signature of the undersigned certifies understanding and compliance with all terms, conditions and specifications in the application. Additionally, signature certifies that all information provided by the applicant is true and accurate. The undersigned acknowledges that intentional presentation of any false or fraudulent information, or knowingly concealing a material fact regarding this application is subject to criminal penalties as provided in A.R.S. Title 13. The ADWR Director may approve Grant Awards with modifications to scope items, methodology, schedule, final products and/or budget.

**Name of Applicant / Authorized Representative:** *Andrew Fraser*

**Title:** *Project Engineer*

**Telephone Number:** 623-546-8266

**Signature:** [Signature]

**Date Signed:** 2/14/2020
Project Map
Project Map

All project activities will take place within MWD’s boundaries which is entirely located within the Phoenix AMA. The MWD well site included in the project is located at the southwest corner of Northern Avenue and Citrus Avenue in Waddell, AZ (33.551481 N, -112.444468 W).

Figure 3 Maricopa Water District and Phoenix Active Management Area
Executive Summary
Maricopa County Municipal Water Conservation District Number One, commonly known as Maricopa Water District (MWD), is an irrigation and water conservation district that serves approximately 60 square miles in northwest Maricopa County. Historically dominated by agricultural production, MWD’s service area has seen significant commercial and residential development over the last two decades and overall water demand has fallen. With both renewable surface water and groundwater resources, MWD has adjusted to falling demand by reducing groundwater use and relying more heavily on surface water. Since 1999 annual groundwater use by the district has fallen by 35%. In addition to demand-based reductions, there are opportunities to reduce groundwater pumping further through capital improvements improving MWD’s capacity to deliver its renewable surface water to various areas throughout the district.

MWD’s original delivery system consisted of the mainline Beardsley Canal and over 100 miles of concrete ditches and delivery structures. As development has occurred within the district a significant portion of open concrete ditch has been transitioned to pipeline and new structures. These new facilities have improved surface water delivery efficiencies and eliminated capacity bottlenecks allowing MWD to rely more on the renewable surface water supply where these new facilities exist. While there are fewer miles of aging and open concrete ditch, those that remain are likely to be in place for the foreseeable future. These facilities include deteriorating concrete ditches, culverts, and delivery structures that now operate well below their historic capacity. MWD is looking to make capital improvements to these facilities to restore surface water capacity and reduce supplemental groundwater pumping but existing funds are limited.

The Northern Avenue distribution lateral that runs from the Beardsley Canal to SR303 is operating at 60% its historic capacity. The lateral is now incapable of meeting peak demand with only surface water. Over the last five years an average of 250 acre-feet of groundwater has been used to supplement surface water supplies and meet irrigation demand. MWD is proposing an improvement project replacing damaged culverts along Northern Avenue to restore capacity and eliminate supplemental groundwater pumping.
Project Overview
Project Overview

Maricopa County Municipal Water Conservation District Number One (MWD) is an agricultural irrigation and water conservation district that holds both certified surface water rights to the Agua Fria River and groundwater rights within the Phoenix Active Management Area. Historically, lands within the district were dominated by agriculture and both surface water and groundwater were used to support agriculture enterprises. However, over the last 20 years numerous commercial and residential developments have replaced agricultural production and the total demand for irrigation water within the district has steadily fallen. Annual groundwater withdrawals from MWD’s well field have fallen 35% since 1999 (Figure 1). Today, MWD can meet much of the irrigation demands with renewable surface water. Although sufficient surface water is available to meet demand some areas of the district are unable to make full use of theses resources due to a combination of capacity constraints, aging delivery infrastructure and seasonal water demand. MWD is looking to make improvements to aging delivery infrastructure to enable a fuller utilization of our surface water supply and reduce groundwater use further.

Figure 1 MWD Well Water Withdrawals (Acre-Feet) 1999-2019 As a result of commercial and residential development taking historical agriculture lands out of production MWD’s groundwater withdrawals have fallen 35% over the last 20 years.

MWD’s gravity-fed delivery infrastructure consists of the Beardsley Canal, which conveys water from Lake Pleasant and an interconnect with the Central Arizona Project, and approximately 100 miles distribution laterals and sub-laterals made up of concrete ditches and pipelines. Forty-nine active wells are located throughout the district and connected to the ditch and pipeline distribution system. Over the last twenty years, many of MWD’s historic concrete ditches have transitioned to pipeline with the commercial and residential development within the district. This modernization has restored capacity to many of our distribution laterals where
aging and damaged infrastructure had constrained the ability to deliver surface water from the Beardsley Canal. MWD is now less reliant on groundwater in these areas of the district. In contrast, there are still areas within the district that rely on an aging concrete ditch and culvert distribution system. The physical decline of these facilities has resulted in significant capacity losses that constrain MWD’s ability to deliver surface water. Due to existing land uses it is unlikely that several key distribution laterals will transition to pipeline. Repairing and upgrading existing facilities in these areas will increase capacity and enable MWD to rely on more surface water and eliminate some groundwater usage.

One the key distribution laterals unlikely to see pipeline conversion is the concrete ditch along Northern Avenue that runs from the Beardsley Canal to SR 303. Because existing residential properties abut county right-of-way and MWD’s delivery facilities, future development in this area is highly unlikely. Historically this lateral was able to convey more than 11,200 gallons per minute (gpm) of surface water from the Beardsley Canal. As recently as 2006 it still had a capacity of more than 10,000 gpm. Today, the max capacity of the Northern Avenue lateral is 60% of the historical high (6,700 gpm). The reduced capacity along this lateral is primarily the result of degraded culverts that cross roadway intersections. Additionally, unlike other portions of the district, the area served by the Northern Avenue lateral has largely remained unchanged over the last 20 years and irrigation demand has remained relatively stable. Long-term demand is likely to remain at current levels due to existing development and the proximity of Luke Airforce base which limits development on remaining agricultural lands. During the late spring and summer months, demand frequently outpaces the surface water capacity of the Northern Avenue lateral. As a result, one of MWD’s wells located at the corner of Northern Avenue and Citrus Road (ADWR Well Registry Number 55-613005) has been utilized to supplement surface water supplies. Over the last five years (2015-2019) an average of 250 acre-feet (AF) of groundwater has been used due to the reduced capacity of the Northern Avenue lateral. Even with supplemental groundwater, MWD is still unable to meet peak demand requiring MWD customers to also rely on their own private wells. MWD is proposing the replacement of damaged culverts to restore historic capacity and eliminate 250 AF of direct groundwater use during peak periods of demand. Additional groundwater savings may be realized if the new capacity meets or exceeds total demand which would allow MWD customers to reduce the use of their private wells.
MWD has identified six culverts along the Northern Avenue Lateral where degraded or crushed corrugated metal pipe culverts are constraining lateral capacity. These culverts are passed the point of rehabilitation and will require full replacement to restore original capacity. MWD is replacing one of the culverts located at Northern Avenue and 185th Avenue in the Spring of 2020. While MWD would like to replace the remaining five culverts the district does not know if will have available capital improvement funds in the coming years. MWD is seeking grant funds to accelerate the timeline and complete culvert replacements along Northern Avenue over the next two years.

Culvert Locations:

1. Northern Avenue and Perryville Road
2. Northern Avenue and 183rd Avenue
3. Northern Avenue and 181st Avenue
4. Northern Avenue and Citrus Road
5. Northern Avenue and 177th Avenue
Scope of Work
Scope of Work

Task 1 – Preliminary Hydrologic Analysis

Objective: Determine appropriate sizing for replacement culverts to restore surface water capacity to 11,200 gpm.
Description: An engineering analysis of the existing hydrology of the Northern Avenue Lateral at each culvert will be conducted to determine the extent to which it is currently reducing system capacity and to make recommendations for replacement conditions.
Responsible Personnel: Andrew Fraser, Project Engineer, MWD
Deliverable Description: Detailed engineering report
Deliverable Due Date: September 30, 2020

Task 2 – Replace Damaged Culverts

Objective: Restore historic capacity of Northern Avenue Lateral.
Description: A series of five separate construction projects to replace damaged culverts underneath roadways. In addition to culvert replacement new headwalls will also be built to improve hydrology. MWD estimates culvert replacements will take place over two years.
Responsible Personnel: Andrew Fraser, Project Engineer, MWD and MWD’s on-call contractor CJ Robbins
Deliverable Description: Report detailing the construction of each culvert and an estimate of its improvement to the hydrologic capacity of the system.
Deliverable Due Date: September 30, 2022

Task 3 - Final Report

Objective: Accounting of realized groundwater savings one year after project completion and to estimate future groundwater savings.
Description: MWD will show groundwater savings achieved through the reduction in use of its own well and will also include groundwater savings resulting from the reduced use of private wells of MWD customers. Regional development forecasts will be used to estimate total groundwater savings of the project over the short-, mid-, and long-term futures.
Responsible Personnel: Andrew Fraser, Project Engineer, MWD
Deliverable Description: Report
Deliverable Due Date: September 30, 2023
Budget Breakdown
## Budget Breakdown

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**Total Project Budget** | $251,500
Budget Narrative
Budget Narrative

Maricopa Water District is requesting $251,500 to replace five aging culverts along Northern Avenue and restore historic capacity in the surface water distribution system. By restoring surface water capacity, MWD will be able to eliminate a minimum of 250 acre-feet of supplemental groundwater pumping annually.

The total award is proposed to be spent exclusively on Task 2 to pay for the construction and permitting costs associated with the replacement of five culverts along Northern Avenue. Approximate costs per culvert are $50,000 for construction and $250 for county permitting. Costs are derived from a current MWD project to replace a single culvert on Northern Avenue. A breakdown of associated construction costs can be seen in Figure 2.

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**Figure 2 Budget Estimate for Replacement of Culvert at Northern Avenue and 185th**
Additional Contribution Breakdown
Additional Contribution Breakdown

Maricopa Water District has committed approximately $51,000 already to restoring the capacity of the Northern Avenue distribution lateral with the Spring 2020 replacement of the culvert at Northern Avenue and 185th Avenue. Additionally, MWD will provide in-kind contributions for engineering services for Task 1 and Task 3. Estimated total in-kind contribution $9,000 (120 total hours @ $75 per hour). Total estimated MWD Contributions: $60,000.
Supplemental Information:

Evidence of Physical and Legal Availability of Water
Evidence of Physical and Legal Availability of Water

MWD has certified water rights to the Agua Fria River for the purposes of irrigation (Figure 4).

Figure 4 Certificate of Water Right - Agua Fria River
The well referenced in the study is ADWR Well Registry Number 55-613005 (Figure 5).

Figure 5 ADWR Registration of MWD Well 10-3 (ADWR Well Registry Number 55-613005)
Evidence of Control and Tenure of Land
Evidence of Control and Tenure of Land

MWD’s land rights associated with the project are recorded with the Maricopa County Recorders Office on Book 15, Page 35 and Book 24, Page 3 (Figure 6 & 7).

Figure 6 MWD Land Rights, Maricopa Recorder Book 15, Page 35
State Historic Preservation Office (SHPO) Review Form
APPENDIX 5:
STATE HISTORIC PRESERVATION OFFICE
Review Form

In accordance with the State Historic Preservation Act (SHPO), A.R.S. 41-861 et seq, effective July 24, 1982, each State agency must consider the potential of activities or projects to impact significant cultural resources. Also, each State agency is required to consult with the State Historic Preservation Officer with regard to those activities or projects that may impact cultural resources. Therefore, it is understood that recipients of state funds are required to comply with this law throughout the project period. All projects that affect the ground-surface that are funded by AWPF require SHPO clearance, including those on private and federal lands.

The State Historic Preservation Office (SHPO) must review each grant application recommended for funding in order to determine the effect, if any, a proposed project may have on archaeological or cultural resources. To assist the SHPO in this review, the following information MUST be submitted with each application for funding assistance:

- A completed copy of this form, and
- A United States Geological Survey (USGS) 7.5-minute map
- A copy of the cultural resources survey report if a survey of the property has been conducted, and
- A copy of any comments of the land managing agency/landowner (i.e., state, federal, county, municipal) on potential impacts of the project on historic properties.

NOTE: If a federal agency is involved, the agency must consult with SHPO pursuant to the National Historic Preservation Act (NHPA); a state agency must consult with SHPO pursuant to the State Historic Preservation Act (SHPA),

OR

- A copy of SHPO comments if the survey report has already been reviewed by SHPO.

Please answer the following questions:

1. Grant Program: ADWR Groundwater Conservation Award
2. Project Title: Northern Avenue Lateral Surface Water Capacity Restoration
3. Applicant Name and Address: Maricopa Water District, 4102 N. Grand Ave. Surprise, AZ 85374
4. Current Landowner/Manager(s): Maricopa Water District
5. Project Location, including Township, Range, Section: 3-2N-2W, 2-2N-2W
6. Total Project Area in Acres (or total miles if trail): 2 miles
7. Does the proposed project have the potential to disturb the surface and/or subsurface of the ground? ☑ YES ☐ NO
8. Please provide a brief description of the proposed project and specifically identify any surface or subsurface impacts that are expected:

Replace existing culverts at roadway intersections. Excavation and trenching to a depth of four feet required.

9. Describe the condition of the current ground surface within the entire project boundary area (for example, is the ground in a natural undisturbed condition, or has it been bladed, paved, graded, etc.). Estimate horizontal and vertical extent of existing disturbance. Also, attach photographs of project area to document condition:

Paved Road

10. Are there any known prehistoric and/or historic archaeological sites in or near the project area?

☐ YES  ☒ NO

11. Has the project area been previously surveyed for cultural resources by a qualified archaeologist?

☐ YES  ☐ NO  ☒ UNKNOWN

If YES, submit a copy of the survey report. Please attach any comments on the survey report made by the managing agency and/or SHPO

12. Are there any buildings or structures (including mines, bridges, dams, canals, etc.), which are 50-years or older in or adjacent to the project area?

☐ YES  ☒ NO

If YES, complete an Arizona Historic Property Inventory Form for each building or structure, attach it to this form and submit it with your application.

13. Is your project area within or near a historic district?

☐ YES  ☒ NO

If YES, name of the district:

Please sign on the line below certifying all information provided for this application is accurate to the best of your knowledge.

[Signature]

Applicant Signature

[Date]

Applicant Printed Name

FOR SHPO USE ONLY

☐ SHPO Finding: Funding this project will not affect historic properties.
☐ Survey necessary – further GRANTS/SHP consultation required (grant funds will not be released until consultation has been completed)
☐ Cultural resources present – further GRANTS/SHP consultation required (grant funds will not be released until consultation has been completed)
Application Checklist
APPENDIX 2:

ARIZONA DEPARTMENT OF WATER RESOURCES
WMAP Groundwater Conservation Grant Application Checklist

☑ Project Proposal

☒ Cover Letter

☑ Executive Summary

☒ Project Overview

☐ Scope of Work

☒ Budget Breakdown & Narrative

☐ Additional Contribution Breakdown (if applicable)

☐ Project Map

☐ Supplemental Information

☒ Evidence of physical and legal availability of water

☒ Evidence of Control and Tenure of Land

☒ State Historic Preservation Office Review Form