Memorandum

To: Mayor, Town Council
From: Rick Wixom
Date: February 3, 2023
Re: **February 8, 2023 Town Council Meeting**
Culinary Water Management and Conservation Plan Draft

Sunrise Engineering has been working on a revision to the Town's water management and conservation plan. This plan is required by State Code of water systems and water providers who have either more than 500 connections or receive money from the Board of Water Resources. The Town fits both criteria.

The state statutes related to this plan can be found in Utah Code section 73-10-32. The Code requires that before a water system adopts or updates a water management and conservation plan, the entity will provide notice and hold a public hearing. This item is an opportunity for the Council to discuss the goals and other information contained in the draft plan, direct staff and Sunrise related to modifications to the current draft, and schedule a public hearing on the plan update, tentatively planned for the Council's March 8th meeting.

We have provided a copy of the draft to the staff at the Division of Water Resources. They are required to sign off on the contents of the plan and provide the official approval of the plan by the State. They won't provide this approval until after the public hearing and any received public comments have been addressed in the plan. They recommend the Council hold the public hearing and, depending on the amount of public comment, either adopt the plan in March following the hearing (if there is no or little public comment received) or in a following meeting if there is significant public comment and revisions to the plan document.

The plan includes several goals related to water conservation. The primary goal is meeting the State's recently established regional water conservation goals. The goal for our region is a 14% reduction in water use by 2030. The regional goals use data from 2015 as the baseline to evaluate progress on the goal. The Council may want to review and determine if the goals outlined in the plan update meet statutory requirements and meet the town's water conservation objectives.

TOWN OF SPRINGDALE

WATER MANAGEMENT
AND
CONSERVATION PLAN

January 2023

MAYOR---------- Barbara Bruno
COUNCIL MEMBER ---------- Randy Aton
COUNCIL MEMBER ---------- Jack Burns
COUNCIL MEMBER ---------- Suzanne Elger
COUNCIL MEMBER ---------- Lisa Zumpft
TOWN MANAGER ---------- Rick Wixom
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TOWN OF SPRINGDALE
WATER MANAGEMENT AND CONSERVATION PLAN

INTRODUCTION

In response to the increasing demands and concerns pertaining to water resources throughout the State of Utah, the state legislature has passed and revised the Water Conservation Plan Act in the 2004 legislative session (Section 73-10-32 Utah Code Annotated). This Act requires that communities with over 500 connections prepare or update a Water Conservation and Management Plan every five years. Springdale last adopted a water conservation plan in 2017. This updated water management and conservation plan is written to address the concerns of leaders and citizens of both the Town of Springdale and the State of Utah and will build on what previous plans have accomplished. The main reasons for concern regarding water conservation entail being able to meet future water needs, saving citizen's money, being located in a desert, and preserving the environment and natural resources.

DESCRIPTION OF SPRINGDALE AND MUNICIPAL WATER SYSTEM

The Town of Springdale is located in Washington County, Utah, just outside the south entrance of Zion National Park, along S.R.-9. Springdale has an approximate population of 650 residents, in addition to several commercial facilities. The Town currently owns and operates its own culinary water system which provides water to the residences and businesses in the Town. The Town currently services approximately 353 residential/other connections and 136 commercial connections. The Town and the Springdale Consolidated Irrigation Company (SCIC) provide irrigation service to much of the Town through a separately operated secondary water distribution system.

Since the Town is located at the entrance of Zion National Park it is actively involved in maintaining the natural features, vegetation, and views of Zion Canyon surrounding the Town as well as the overall village character of the Town itself. The Town and Zion National Park are mutually dependent on each other. The Town's economy relies on the tourists visiting the Park, and the Park depends on Springdale as a gateway community to provide services that Park visitors want. Springdale's businesses include hotels, restaurants, and various retail shops. Consequently, meeting water demands in the Town requires considerable amounts of water.

The Town of Springdale first completed a water management and conservation plan in 2009. Since that time, several conservation related accomplishments have been implemented or completed and are noted in the Current Conservation Practices Section below.

Springdale is growing and is expected to continue to grow. This growth changes the utilization of the land and can put a strain on the water supply and distribution system in order to meet demands. By means of careful preparation and efficient utilization of the available water supply these increased demands can and will be met.

EXISTING WATER RESOURCES

The Town of Springdale along with the Springdale Consolidated Irrigation Company (SCIC) have approximately 1,908.14 acre-feet of water that can be diverted annually from several water sources including wells, springs, and the North Fork of the Virgin River. Table 1 shows the water rights and the total allowable annual withdrawal.

Table 1. Springdale Town Water Rights Summary

Water Right No.	Source	Duty (ac-ft)
Springdale Town		
81-105	Spring above ZNP Campground	11.58
81-220	Birch Springs East – West of ZNP Museum	30.41
81-274	Birch Springs West – West of ZNP Museum	50.68
81-585	Hummingbird Well	238.91
81-1326	Cemetery Well	104.98
81-2413	Big Springs	380.08
81-3392	North Fork Virgin River	365.95
	Subtotal	**1,182.59**
Springdale Consolidated Irrigation Company		
81-1142	North Fork Virgin River (Irrigation)	725.55
	Total	**1,908.14**

The water rights located at Birch Springs West, Birch Springs East, and the Zion National Park Campground are not currently being used but a plan is in place to connect these rights through infrastructure improvements that will enable the Town to fully utilize these rights. The Cemetery Well water right is also not currently being used, but the town is in the process of changing the point of diversion to utilize this water at the Town's wastewater treatment facility.

PRESENT WATER USE AND FUTURE WATER NEEDS

Using the population and usage data from the Town of Springdale, the following data can be found regarding the average usage of culinary water from the town's treatment plant for residential and commercial connections. The average usage for the residential connections includes minimal outdoor usage since the secondary irrigation system is not accessible to all residential connections.

Table 2. Culinary Water Use Summary (2017 vs 2021)

	Number of Connections	Average Water used (gpcd)
Residential - 2017	281	61.9
Residential - 2021	353	76.4
Commercial - 2017	118	875.7
Commercial - 2021	136	1390.4

The data shows that the average commercial usage per connection has increased substantially since 2017. Such a significantly high figure is primarily due to the fact that the commercial sector of the Town includes large hotels and restaurants used by visitors to the national park. The number of visitors that come to the park each year has increased significantly since 2017.

A secondary irrigation system is being used for outdoor water needs for most connections in the Town. Recent connection data shows that there are approximately 100 connections to the secondary irrigation system that are managed and billed through the Town. The additional connections are managed by the SCIC shareholders. Currently, there are approximately 445 shares within the irrigation company.

The total acre feet of water allotted for the culinary and irrigation systems is as follows:

- Total allotment for town ---------- 1,815.47 acre-feet
- Portion of allotment used for culinary water ---------- 311 acre-feet
- Portion of allotment for secondary/irrigation use ---------- 1,504.47 acre-feet

The average yearly culinary water production or the water treatment plant effluent is just over 311 acre- feet a year. If that amount is subtracted from the total acre feet of water allotted to the Town and Irrigation Company, 1,504.47 acre-feet remain available for irrigation.

The Town has historically averaged a growth rate of approximately 2% per year. It is anticipated that the Town will continue to grow at a rate of 2.0% per year through the year 2040. This population projection is based on past trend data and may deviate from the actual population experienced in the future.

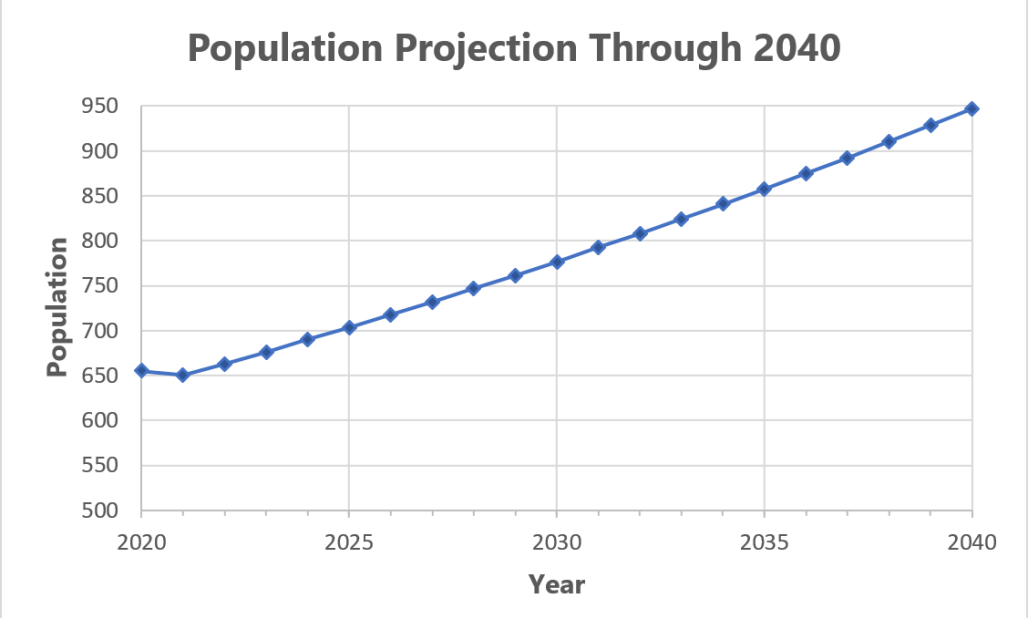

Figure 1. Population Projection

As the population grows, it is expected that irrigation usage will decrease while residential and commercial usage will increase. This conversion from agricultural usage to residential and commercial usage is expected to provide water for the growth of the Town.

In addition to a growth in population, the Town of Springdale must also plan for an increase in hotels, restaurants, and retail businesses. New parks and other open spaces are planned in conjunction with new residential and commercial developments, all of which will require both culinary and irrigation water connections.

WATER CONSERVATION GOALS

The following three goals have been identified to help monitor and track the success of the various programs and conservation measures being implemented.

1. **Goal 1 - Reduce the Town's per capita usage by 14 % by 2030.**

   This is the regional goal from the Utah Division of Water Resource's that was made in 2019. This goal uses the usage data from 2015 and the projected timeline to reach the 14% reduction is 2030.

2. **Goal 2 - Retain a financially sustainable and well-maintained water system.**

   The water rate structure determined by the Town for the culinary water system should continue to encourage the user to conserve water; ensuring that revenues meet the financial needs of the water system. Implementing water audit and leak detection programs will keep the system financially stable and physically maintained.

3. **Goal 3 - Pursue a well-managed and maintained secondary system.**

   Continue to improve efficiency of the community's secondary water system. By doing so, programs and systems can be implemented by the Town to ensure accountability for water usage. The town has already taken the first step in this by installing meters for the town customers.

   Part of having a well-managed system is having adequate funds. SCIC should be paying an equitable portion of costs for the system. Recently an agreement between the Town and the SCIC was updated that will require both parties to update cost sharing based on meter readings once all of their shareholder connections have been metered. This updated agreement between the Town and the SCIC will more equally distribute the costs to run the secondary system based on metered usage.

4. **Goal 4 - Reduce unaccounted for losses in water system to 15% or lower.**

   The Town has already taken steps to achieve this goal and to reduce the amount of non-revenue water and lost water in the system. The Town is putting meters on all publicly available water such as in the parks, cemetery, and water filling stations to track water use and potential losses through the billing software. Other water maintenance issues such as system leaks, overflows, etc. are harder to quantify and will lead to higher unaccounted for losses in the system. Water audits and leak detection programs should be implemented to help lower losses in the system.

WATER SYSTEM CONSERVATION CHALLENGES

To meet the goals established by the Town some challenges to water conservation need to be addressed. By identifying these areas of concern, conservation practices can be implemented that can drastically reduce the water usage and water losses in the Town's Systems. This section will cover these topics and their associated conservation practices.

Leakage and Losses in the System

According to the American Water Works Association, leaks make up about 14% of indoor water usage. In the Town of Springdale this results in nearly 11 gallons per person per day. With a population of about 650, this results in nearly 2.6 million gallons a year lost through leaks in the home. Cutting this quantity in half would account for a reduction in residential water usage of about 7%. The Town may assist in checking homes for leaks or provide home owners with methods of checking for leaks themselves. Information for detecting leaks could be sent out with the monthly water bill.

With the implementation of the Town's new metering system customers can sign up for an app (eye-on-water) to help them detect leaks in their homes. This app enables users to see their water usage on a near real-time basis and can alert the user if the meter tracks an excess amount of water through a 24-hour period.

A water audit is effective in determining the water distribution system's efficiency. The overall goal is to identify, quantify, and verify water and revenue losses. Once the total losses in the system have been identified, a leak detection program may proceed. Leak detection is a systematic approach to surveying the system and identifying the exact locations of hidden underground leaks.

It may be difficult to conduct a thorough economic survey of the water system for leaks unless the unaccounted-for loss is 15 percent or more. In past studies, unaccounted-for losses within the Town of Springdale were at nearly 18 percent. This means that the Town could launch a limited water audit and leak detection program to decrease the unaccounted-for losses within the system. If substantial results are anticipated from the limited program, then a full scale program may be initiated. A recommended source for information with regards to conducting an audit in conjunction with a leak detection program comes from the American Water Works Association's *"Water Audit and Leak Detection"* Guidebook.

Land Use and Planning

The General Plan for The Town of Springdale establishes a goal to maintain the Town's unique village atmosphere and character. This vision is the key factor in determining future land use and how the town develops. The Town also recognizes that portions of the open and agricultural land that add to the small town feel and rural charm in the town has development potential and development rights under the current land use ordinance. If this land becomes developed for other uses a focus should be made to reduce the amount of water used in the new development compared to water that the land was previously using for irrigation.

In a study published in January 2022 by Hansen, Allen & Luce, Inc. and the Department of Civil and Construction Engineering, BYU, researchers analyzed how landscape irrigation can be better managed. The study focused on the relationships between water use, irrigated area, plant health, and water rate structures. The study found that larger parcels of land required lower water application rates than smaller parcels to achieve comparable plant health metrics. Based on the results of the study it is recommended that land use policies should be adjusted to avoid producing small, irregular, and/or disconnected landscaped areas.

Additional land-use policies to help with conservation could include the following:

- Requiring new developments to use xeriscape landscaping.
- Requiring new developments that have irrigated landscaping to install smart irrigation systems.

Irrigation Overwatering

In the Hansen, Allen, & Luce study previously referenced, researchers drew some other conclusions relating to plant health in correlation to irrigation practices. They found that plant health does not strictly increase with the increase in water application but has an optimum point, and that water application rates above this point reduce overall plant health. They also found that many water users irrigate above this point. From these conclusions it is recommended that water users should be educated on the adverse effects of overwatering and proper fertilizer application

to support healthy lawns, gardens, and fields.

Along with educating users on the negative effects of overwatering, watering schedules should be enforced to prevent overwatering. Making sure that users are aware of what times and days they can irrigate their land will reduce the amount of water used in the system.

Irrigation Accountability and Metering

In 2019, just under 75% of the water taken from the Town's water sources was used for irrigation purposes. This means that roughly 75% of the water pumped into the Town's irrigation and culinary systems has no accountability affixed to the amount used or its application. The Town cannot afford to have such large quantities of water going unaccounted for in their system.

With the recent installation of irrigation meters on town customers and the future installation of meters on the SCIC shareholders, the system will be able to identify where irrigation water is being used. This will allow the town to hold users accountable for the amount of water being used. It is recommended that the town use the available usage data to provide programs and incentives for irrigation users to conserve irrigation water.

A common conservation incentive is a tiered water user rate structure. An aggressive rate structure would incentivize lowering the amount of water used by users by charging higher rates for users that would otherwise use excessive amounts of water. The irrigation management study referenced above has shown that tiered water rates discourage excessive water use. The data they collected shows that in areas with comparable plant health measures, areas that have tiered water rates have lower water application rates than areas that have flat-rate pricing.

CURRENT CONSERVATION PRACTICES

The Town has installed meters on all residential, commercial, and industrial water connections. The Town reads the meters on a regular basis, providing them with critical data used for billing and to inform the customers of their water usage.

The Town has shown its desire to conserve water by adopting a progressive water rate structure that encourages users to take less water where possible. This rate structure is also designed to cover the estimated costs of providing water service to the Town. The following table summarizes the water user rates.

Table 3. Springdale Water Usage Rates

	Current Rates (11/9/22)	Effective 1/1/23	Effective 1/1/24	Effective 1/1/25	Effective 1/1/26	Effective 1/1/27
Base Charge	**$17.78**	**$18.73**	**$19.29**	**$19.87**	**$20.47**	**$21.08**
Usage Tiers (in Gallons)	**Volume Charge (per 1000 gallons)**					
0 – 5,000	$5.57	$5.70	$5.87	$6.04	$6.22	$6.41
5,001 – 10,000	$7.84	$7.11	$7.32	$7.54	$7.77	$8.00
10,001 – 25,000	$9.74	$8.87	$9.13	$9.41	$9.69	$9.98
25,001 – 50,000	$11.26	$11.06	$11.39	$11.73	$12.09	$12.45
Over 50,000	$12.40	$13.80	$14.21	$14.64	$15.08	$15.53

The Town has also adopted ordinances and implemented conservation practices to work towards the water conservation goals. These ordinances and practices include:

- Implementation of a progressive culinary rate structure that increases the cost of water as a property uses more.
- Adoption of ordinances regarding limited water use in the foothills and limited use of culinary water for irrigation.
- Implementation of a time-of-day watering schedule to reduce water lost through evaporation.
- Installation of water meters on secondary water connections on Town-owned properties and town customer properties.
- Adoption of revised hydrant meter rules and procedures to prohibit the use of a private hydrant meter and change the way the Town manages water used through a hydrant.
- Replacement of culinary water meters and hydrant meters. The new meters utilize ultrasonic technologies to improve meter readings.
- Community education through monthly town newsletters.
- Access to rebates and fixture replacement programs administered by the State of Utah and Washington County Water Conservancy District.

The Town's Fee Schedule, Town Code, and other currently adopted conservation practices can be found through their website at:
Springdale, UT Official Website - (springdaletown.com)

ADDITIONAL CONSERVATION MEASURES

Additional conservational efforts should be implemented, in conjunction with the current conservation practices, to effectively meet the Town's goals and solve the problems previously identified. This section will focus on possible programs and actions that can be executed to help reach those goals.

1. Plumbing Fixture Replacement Program

The Town may be able to provide incentives to homeowners and businesses to

exchange their old high water-use plumbing fixtures for more efficient ones. The first program works on encouraging the public to replace high water-consuming devices potentially found in their homes or businesses. Applicable information should be extracted from the following figures during the implementation of this program.

Water saving fixtures can provide an inexpensive and long-lasting approach to conservation. Plumbing fixtures can be installed and used without major disruptions in water use habits, making replacement of these fixtures a conventional way to conserve. The following paragraphs provide conservation information regarding three major plumbing fixtures in the home: the toilet, shower, and sink.

Toilets are the highest water-consuming devices in the home, accounting for about 27% of indoor water use. In 1992, the U.S. Congress passed legislation prohibiting construction of certain high flow plumbing fixtures, which brought manufacturing standards down from 3.5 or 5 gallons per flush to 1.6 gallons per flush. If a home or business owner has these high flow toilets still in use, then the problem can be resolved by either placing a water-resistant object in the tank to displace a portion of the toilets flush volume or replace the older toilets with newer and more efficient models.

Installing a water efficient toilet can range anywhere from $100 to $500 a toilet. By replacing high flow toilets, it was determined that a family of 4 would save nearly 40,000 gallons or $437 a year, according to the current cost of water in Springdale.

Pre-1992 showerheads put out about 5 gpm, whereas post-1992 showerheads put out half that, 2.5 gpm. Calculations show that the average showerhead for the Town puts out just under 2.5 gpm. Therefore, information regarding shower head efficiencies should be distributed and savings should be determined by the user on a case-by-case basis. Similarly, installing a faucet aerator will reduce the output of a non-aerated faucet from 2.5 gpm to 1.5 gpm. Water savings should be determined by the user on a case-by-case basis.

Understanding this information and conveying it to the public is the first step in any replacement program. The public must first determine if high-water consuming devices can be found in their homes. Next, they should be educated about the incentives to replace them. These incentives can be a result of their own investment in new fixtures and the subsequent savings and increased value of the home.

2. Consumer Education Program

A large impact will come from informing the community of the conservation goals made by the Town and the conservation methods endorsed by them. Getting the community involved and having information about efficient outdoor and indoor practices readily available to them is important. Distribution of the information may include posting it on the Town's website, at the Town Hall, the library, and occasionally circulated with the water bill and Town newsletter. The dispersed information should include some of the tips and methods of proven conservation

practices provided by the Utah Division of Water Resources.

These methods and tips can be found through the Utah Division of Water Resources website:
Conserve Water Utah - (conservewater.utah.gov)

The Division of Water Resources (DWR) and the Washington County Water Conservancy District (WCWCD) are also major resources for educational programs and materials. The WCWCD also offers free water checks by an irrigation specialist from May 15 to September 30, that provides participants with a free recommendation on an efficient watering schedule. The DWR has many educational resources for the youth. There are also teacher resources that include PowerPoint presentations, games, and lesson manuals to help educate children on water conservation. The DWR also offers many different brochures and mailers that could be sent out with the monthly water bill. The DWR also has different ideas for ordinances to promote water conservation. Getting in contact with the WCWCD and DWR and their staff would prove beneficial when starting up or conceiving any new conservation awareness programs.

For current programs offered by the WCWCD, visit:
WCWCD Programs - (wcwcd.org)

Due to the large number of hotels and restaurants in the Town of Springdale, it would be beneficial to identify those users which have high water usage and approach them with specific water conservation plans for their facilities or encourage them to create their own. As mentioned previously, the WCWCD offers programs and ideas for residents and businesses. One program, Save the Towel, encourages guests to reuse towels and sheets during their stay. Hotels can display door hangers and place cards notifying guests of their conservation efforts, and that they will only wash sheets and towels if requested.

The potential for water conservation programs should be discussed, including the planning of water conservation programs, rationale behind certain proposed actions, and monetary benefits to the customer. The newly implemented increased water rates provide a good opportunity for people and businesses to become more conscientious about their water usage and how to save money. In combination, the Town should also ensure that any proposed programs or increased rates don't compromise the financial viability of the system operating costs.

3. Growing Water Smart Program

The state government in coordination with the Babbit Center has created the Growing Water Smart Program to integrate water and land-use planning at the state level. In order to apply for this program, the town must establish a team made up of around five to seven individuals. The team needs to be diverse, with team members who are land-use planners, water utility managers, regional planning organizers, consultants employed by the town, developers, and one currently elected official. "The heart of Growing Water Smart is getting land-use planners and water managers from the same communities together to talk to each other, sometimes for the very

first time," says Faith Sternlieb of the Babbitt Center, who helps with the program. After these relationships are established, it helps water and land-use planning to integrate a lot smoother because the people involved know each other and are already willing to work together.

4. Water Conservation Rebates

The State of Utah has instituted a statewide rebate program called Utah Water Savers. The program offers statewide rebates for the purchase of smart irrigation timers that save water by adjusting watering schedules automatically to account for local weather and landscape needs. Additional rebates that are funded on a regional basis by local water providers can be claimed by replacing old high flow toilets and by completing water-efficient landscaping projects. The program plans to expand the number of statewide rebates available in the future.

All available rebates offered through the Utah Water Savers program can be found by creating a free account on:
Utah Water Savers - (utahwatersavers.com)

DROUGHT RESPONSE

In the event of a drought the Town will be faced with an increased strain on the water system. To prepare for the possibility of a future drought, the Town, in coordination with Western Water Assessment and the Towns of Hurricane and Rockville, participated in a Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) Workshop. This section will highlight the issues that were discussed during the VCAPS workshop that can arise during a drought and the possible actions that the Town can take to respond to these issues.

1. Reduced Municipal Water Availability

- Educate consumers on how much water they are using.
- Place caps on water use.
- Public education campaigns about water conservation.
- Pay meters on the hotel showers.
- Require low flow toilets and other water efficient fixtures in hotels.
- Encourage use of recycling water heaters.
- Add Knee levers for dish washing.
- Install automatic faucets in public restrooms.
- Educate the public about xeriscaping.
- Promote xeriscaping in the lower canopy (less grass, less bushes) but keep trees for shade.
- Develop drought mitigation plan.

2. Sustained Reduction to Irrigation Water

- Increase efficiency of agricultural irrigation.
- Offer reimbursement for irrigation blocks and other efficiency measures, education about proper irrigation amounts to overwatering.

3. Prioritization of Water use

- Use gray water systems for irrigation residential landscapes.
- Develop drought management plan, specifically one with multiple stages.
    - This could include items such as a reduced watering schedule for irrigation, restrictions on water uses (pools, washing cars, etc.) or adjustments to culinary and/or secondary water user rate tiers.
- Change building codes and ordinances to promote water conservation.

SUMMARY

In conclusion, the Town of Springdale is growing and will continue to grow into the future. Increasing water demands can be a concern, but water conservation can provide a critical component in overcoming these concerns and help meet future needs.

The State has made a goal of reducing the 2015 per capita water demand from public community systems by at least 14% before 2030. The Town is implementing this goal as its first priority water conservation goal and plans to accomplish this by implementing the strategies identified in this plan. Many problems associated with accomplishing this goal have been identified and outlined in this plan. Moreover, possible solutions and suggested actions to these problems have also been addressed in this plan.

Several options were given stronger recommendations throughout this plan and are summarized as follows.

- For the culinary water system, the Town should execute a water audit and leak detection program.
- Encourage proper irrigation practices to reduce overwatering.
- Utilize proper land-use policies to lower water use.
- Institute an aggressive rate structure to discourage excessive use.

The Town is confident that executing these measures will produce the desired effect in accomplishing the Town's conservation goals.

REFERENCES

1. Arens, S., K. Clifford and D. Rumore (2018). Final Workshop Report for Vulnerability Consequences and Adaptation Planning Scenarios (VCAPS) for the Cities of Springdale, Rockville and Hurricane. Western Water Assessment: Salt Lake City, UT.

2. Shurtz KM, Dicataldo E, Sowby RB, Williams GP. Insights into Efficient Irrigation of Urban Landscapes: Analysis Using Remote Sensing, Parcel Data, Water Use, and Tiered Rates. *Sustainability*. 2022; 14(3):1427. https://doi.org/10.3390/su14031427