
5. WATER RESOURCES ELEMENT

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5.a INTRODUCTION

Water is critical for life. Life requires water. There is no alternative. Water is a precious resource that must be maintained and respected throughout the water cycle from individual use to management of entire watersheds. In a desert environment, such as Clarkdale, attention must be given to protection of existing water sources, maintenance of the highest levels of water quality, and identification of new sources to meet the needs of a growing population.

A key point to understand is that the Town of Clarkdale does not own or control any water source or water delivery infrastructure in the town. This makes it difficult to plan for future water needs for the town. People in Clarkdale get their water in two different ways: either they are connected to the water lines of the private water company or they have their own on-site wells. Cottonwood Water Works, a privately owned and operated company, has wells at Haskell Springs as their main supply source. They serve various areas of the town through an infrastructure of underground pipes which they also own and maintain. The Haskell Springs wells are located along the base of the foothills of Mingus Mountain near Mescal Gulch towards the southwest corner of the town. The second major water source within the town is from private on-site wells. Private wells are supposed to be registered with the Arizona Department of Water Resources but there is limited enforcement of this regulation so the exact number of private wells, how much water is drawn from them or where they are all located is not known.

It is the purpose of the Water Resources Element to address the following:

1. Currently available surface water, groundwater and effluent supplies.
2. Sources to provide projected new development with water.
3. Opportunities to obtain additional new water supplies.
4. Water conservation recommendations.

5.b LEGISLATIVE REQUIREMENTS

ARS § 9-461.05.5. requires the following:

A water resources element that addresses:

- (a) The currently available surface water, groundwater and effluent supplies.
- (b) An analysis of how the future growth projected in the general plan will be adequately served by the legally and physically available water supply or a plan to obtain additional necessary water supplies.

5.c WATER PROGRAM

The Town is currently limited in the types of programs or policies that can enacted to affect water sources and delivery systems since it does not own any water source or delivery infrastructure. A comprehensive water program would address availability and protection of existing sources, water conservation programs, and policies to find and develop new sources to meet the needs of a growing population.

Groundwater

Groundwater is the primary source for water in Clarkdale. Cottonwood Water Works, a private water company, uses the Haskell Springs wells as their main source. Individual private wells throughout the town also serve residential, commercial and other water uses. The total amount of water drawn from these well sources on an annual basis is unknown. The amount of groundwater potentially available from sources within the town is also unknown and without additional data any amount calculated would only be speculation.

One of the big questions to be answered regards challenges from the Salt River Project (SRP) concerning their senior surface water rights on the Verde River and the relation of “sub-flow” water in areas within the Verde River corridor. Since the water drawn from the sub-flow zone is said to be hydraulically connected to the Verde River, the water from these wells is considered the same as surface water. There are questions as to the boundaries of the sub-flow zone associated with the Verde River and this could affect future abilities to locate new wells in those areas. It is generally considered that the wells at the lower elevations near the river are drawing on water associated with the Verde River sub-flow zone. There are additional questions concerning whether the water drawn from the Holocene alluvium, which is characterized by sand and gravel deposits near the side drainage washes, is also part of the Verde River sub-flow zone. The criteria for determining the delineation of the sub-flow zone still has to be determined by the Arizona Department of Water Resources. The determination of the sub-flow zone could have profound impacts on the ability to locate new private, commercial or municipal wells in Clarkdale.

Availability of Existing Supplies

The Town does not own any water source and therefore has no ability to address specific measures concerning availability of water sources. Surface water sources, such as from the Verde River or the privately owned Pecks Lake, are not considered as available sources due to prior allocations and claims. Groundwater sources are identified at Haskell Springs, which is owned by the private Cottonwood Water Works company, and at other private on-site wells located throughout the town. The development of new private wells in the vicinity of Haskell Springs and the Mingus foothills is considered a threat to the main town water source. Additional untapped groundwater sources may exist within the town but development of those sites would require additional study to identify potential sites for municipal well location.

Regional Water Planning

Coordination of comprehensive water programs, including source development, infrastructure development, wastewater treatment, and associated programs should be considered in terms of cooperative regional efforts that could potentially include adjacent municipalities, the County and various state agencies. Whether or not actual partnering occurs on specific projects, there should still be close coordination and communication of efforts between regional entities as that will ensure the most efficient and equitable approach for everyone in the region.

Municipal Town Water System

There are numerous questions concerning proposals to purchase the local private water company. This would include purchase of the land where the wells are located, the well facilities and the underground pipe delivery system. The condition of the delivery infrastructure is unknown but may be substandard for current and long-range needs. Substantial upgrades may be necessary to the water delivery infrastructure which has developed haphazardly over the years in terms of sizing, location, materials and maintenance.

Clarkdale could consider purchasing the water system separately and running it as a municipal system or it could consider partnership in a regional water utility that included the City of Cottonwood and/or other jurisdictions. A joint Water Resource Study has been underway by the Town of Clarkdale and the City of Cottonwood during 2001 and 2002 to consider a range of issues, including creation of a municipal water district. Purchase of the water system has to be carefully considered by all concerned to determine the functional, economic and social feasibility.

Water Quality

Nitrates According to the Yavapai County Cooperative Extension Service, which has done testing of private well water from throughout the region, the most pressing concern for water quality in Clarkdale and throughout the Verde Valley comes from elevated levels of nitrate in the water. The exact source of nitrates in local water supplies is not known, however, it is suspected that nitrate contamination is linked to the wide spread development of residential septic systems. On-site wastewater disposal that occurs with septic systems is considered one of the greatest threats not only to private wells but also to ground water aquifers due to subsurface leachate infiltrating the water table. Other sources of nitrates include agricultural run-off and large areas of fertilized and irrigated turf. High nitrate levels can be associated with elevated levels of coliform bacteria and wells should be tested by a certified laboratory when high nitrate levels are indicated.

“Non-point source pollution” This term is used to describe water pollution that does not come from a single identifiable source but instead comes from a variety of dispersed locations. Run-off of oil and gas from street surfaces is a typical “non-point source pollution” condition that effects water quality. Automobiles and trucks commonly leak small amounts of fluids on to streets. Rain washes these trace amounts of toxic surface deposits into side ditches and this can eventually make its way to water sources. Another major problem that has long-term negative effects on water quality concerns the disposal of used motor oil and other automotive or household hazardous wastes into sewer systems, septic systems or simply into the street or a nearby ditch. Efforts to educate the public and provide alternative disposal sites for household and automotive hazardous wastes would provide some relief for this ongoing problem. The use of chemical fertilizers, herbicides and pesticides for landscaping and lawns can also be a major contributor to non-point source pollution.

Arsenic Federal standards for arsenic in drinking water have been reduced to levels lower than that which occurs naturally in many water sources in Arizona. The arsenic standard, which was previously set at 50 ppb (parts per billion), has been reduced to 10 ppb. There are questions as to

whether the new lower standard is really necessary for safety. Relatively high levels of naturally occurring arsenic have been documented in certain Verde Valley water sources in the past. Mitigation to address the lower standard could be very costly for small systems. In order to meet the new standard, ADEQ Safe Drinking Water Division is working on a state-wide Arsenic Master Plan to assist small water systems in complying with the new standard.

Conservation Programs

Programs to encourage residents, businesses and other water users to reduce water use can result in substantial savings of water resources. This can pay off in the long term with reduced costs associated with developing new water sources and ensure adequate supplies during times of drought. Water restrictions, even during temporary seasonal fluctuations, result in serious disruptions to people's lives, business operations and local economic considerations. Water rationing and shortages require costly organized efforts to provide alternative sources, such as hauling water in tanker trucks. In a desert setting an ethic of water conservation should be thought of as a standard component of the way of life. The following list summarizes a few conservation programs that are known to have a positive effect. Other ideas should be considered as part of a permanent coordinated program.

Drought resistant landscaping There is no excuse for having big green grass lawns in the desert southwest. A small patch of grass may be okay as part of an overall landscape plan but there is no need for an entire lawn of water-intensive turf. Even if a property owner has their own well, this is a major waste of a precious resource that is shared in common by everyone. Often people move to this region from areas of the country with rainy climates and they want to re-create familiar surroundings. The natural surroundings of our desert landscape provide more than enough inspiration for creating attractive and beautiful landscaping around homes and buildings. A wide range of drought tolerant native and adaptive plants are available from local nurseries and should be considered as the main option for landscaping around homes and businesses.

Mulch and Compost Programs Use of mulch around plants and trees helps reduce evaporation, reduce weed growth and provides necessary nutrients to the plants. Programs to encourage backyard composting and mulching of household and kitchen organic debris also help divert and recycle organic material from the municipal waste stream.

Drip irrigation systems Sprinkler systems use more water than efficient well designed drip irrigation systems due to increased evaporation and run-off of excess water sprayed through the air. Electronic control devices used with drip irrigation systems can regulate the flow of irrigation water so that it's applied only when needed to avoid over-watering.

Education Programs:

- **School Curriculum.** K-12 educational curriculums can be used to involve children and their families in water education projects. A range of such materials currently exists.
- **Resident and Business Services.** Ongoing education projects can be directed to residents and businesses, including pamphlets, newsletters and other printed materials.
- **Water Education Month.** One month of the year can be designated for more intensive

coordination of activities.

- **Workshops.** Workshops on desert landscaping, installation of drip irrigation systems, tree pruning, and composting and mulching are related to water conservation.
- **Demonstration Garden.** Establish a model garden for desert landscaping. A public area landscaped with native and adaptive plants can have informational signs to inform the public of attractive options.

Water saving plumbing fixtures Residents, businesses, schools and other water users should be encouraged to install water conserving plumbing fixtures, including low flow toilets, showerheads, dishwashers, faucet aerators and other water conserving fixtures.

Rebate Programs Funds can be set aside to provide rebates for a portion of the cost for switching to low flow toilets, low flow showerheads and other water conserving plumbing fixtures. Rebate programs can also be used to encourage residents to replace water-intensive landscaping with drought-resistant xeriscape-style landscaping. Criteria and management programs have to be carefully defined in association with plumbing and landscape rebate programs.

Development of New Sources

There may or may not be additional sources of water in Clarkdale that could be developed for use by Clarkdale residents. The Town has to decide whether it wants to address long range water concerns as a public function or leave it up to private sector interests. The Town's involvement with new source development would have to be tied into full control of the town-wide service authority, which means the Town would have to own the existing water company before considering additional expansion. Regional coordination of new water source development may also be considered.

5.d WASTEWATER PROGRAM

A coordinated program to address town-wide wastewater needs and operations is a major part of a comprehensive water program. Wastewater from homes, businesses and other uses flows through an underground system of pipes to a treatment plant. The treatment plant consists of a series of settling ponds that processes and filters the wastewater. The treated effluent then has to be disposed of in some manner. If the effluent is treated to some acceptable level, then the water can be used for various types of secondary uses, such as for turf irrigation or some industrial uses. The use of recycled or reclaimed water saves clean water for other uses.

Wastewater Treatment Plant

The Town of Clarkdale owns and operates a wastewater treatment plant located adjacent to the Verde River near Tuzigoot Road. Sewer lines providing wastewater to this facility serve a portion of the town, including the historic townsite and industrial area, Centerville and a few properties along Highway 89A. The facility has a treatment capacity of 250,000 gallons per day (gpd) but capacity is also limited by the ability to properly dispose of effluent. The average daily flow to the wastewater treatment plant in 2002 is estimated to be approximately 200,000 gpd. By comparison, in 1991, the town's daily flows averaged approximately 100,000 gpd.

Effluent

As the wastewater goes through the treatment process, a certain amount of solids and biological contaminants are removed through settling, aeration and solar radiation on the surface of the ponds. The remaining water, known as effluent, must then be disposed of in some manner. Wastewater that is treated to high standards is appropriate for a variety of uses, including irrigation of landscaping and certain industrial uses. Lower quality effluent may be appropriate for groundwater recharge but is less advisable for situations where there might be any human contact due to potential contamination from biological material in the wastewater.

Gray Water

Household wastewater that originates from bathtubs, showers, bathroom sinks, or clothes washers is considered to be "gray water" and may be appropriate for certain types of household irrigation purposes. Water from toilets, dishwashers and kitchen sinks is not considered gray water and has higher requirements for treatment before secondary uses may be considered. Wastewater from toilets must go to septic systems or municipal sewage treatment plants. No special permit is required from the Arizona Department of Environmental Quality to install a household gray water system but their guidelines for gray water use must be followed. Although gray water may be diverted directly to irrigation uses, it is recommended that some type of pre-filtering system, such as a trickle-down sand filter, be used. Use of gray water systems requires some amount of education of residents. Residents must pay special attention to the type of soaps, detergents and other materials that are disposed of in the system. Household cleaners, chemicals, solvents and other toxic materials must not be disposed of in the gray water system at any time.

5.e WATER RESOURCES GOALS, OBJECTIVES AND POLICIES

The following Goals, Objectives and Policies provide direction and guidance for existing and future water resources concerns for Clarkdale:

GOAL 5-A ENSURE CLARKDALE HAS AN ADEQUATE, SAFE WATER SUPPLY TO MEET THE EXISTING AND LONG TERM NEEDS OF RESIDENTS, BUSINESSES AND OTHER USES.

Objective 5-A. a.

Develop a Water Resource Master Plan for Clarkdale to address short and long-range strategic planning for water sources, water treatment facilities, water distribution

infrastructure, wastewater systems, reclaimed water systems, conservation programs and funding plans.

- Policy The Water Resource Master Plan shall conform to and support the objectives and policies of the General Plan and the Capital Improvement Plan.
- Policy The Water Resource Master Plan shall be updated annually and undertake comprehensive revisions on at least a five-year cycle so as to address ongoing growth in the area.
- Policy Coordinate development of the Water Resource Master Plan with similar plans in the City of Cottonwood and Yavapai County.

Objective 5-A. b.

The Town shall pursue efforts to acquire the existing water supply system, including water sources, treatment facilities and distribution system.

- Policy The Town shall consider a cooperative partnership with the City of Cottonwood and other regional entities for the purpose of owning the municipal water system.
- Policy The Town shall actively pursue funding opportunities to address short and long range needs associated with purchase of the water system.

Objective 5-A. c.

The Town shall pursue efforts to locate and develop new water sources.

- Policy Support efforts to acquire water rights either within the town or through regional partnerships.

Objective 5-A. d.

Develop and support comprehensive water conservation policies and programs.

- Policy Support ongoing water conservation education programs.
- Policy Revise building codes to require water conserving plumbing devices in all new construction, including low flow fixtures.
- Policy Establish a rebate program to encourage conversion to water conserving plumbing fixtures in existing residences and businesses.
- Policy Revise the Zoning Code to require drought tolerant and water conserving landscaping for new construction.
- Policy Designate a staff-level water conservation coordinator to oversee a comprehensive

program to encourage water conservation.

GOAL 5-B PROVIDE ADEQUATE WASTEWATER TREATMENT FACILITIES TO MEET THE EXISTING AND LONG TERM NEEDS OF CLARKDALE

Objective 5-B. a.

Maintain and update the Wastewater Master Plan as necessary to address the needs of Clarkdale.

Policy The Wastewater Master Plan shall conform to goals and policies of the General Plan in terms of meeting current and future community needs.

Policy Require new development, including commercial expansion, planned developments and subdivisions, to participate in wastewater facility programs and to provide adequate facilities to address the new development, including associated sewer lines and reclaimed water systems.

Objective 5-B. b.

Pursue expansion of the wastewater treatment plant to ensure current and long-range needs will be addressed.

Policy Support current and long-range efforts to provide an adequate wastewater system to serve the entire town, including collection lines, treatment plant and effluent disposal.

Objective 5-B. c.

Support efforts to find and develop uses for reclaimed water and effluent.

Policy Support a level of development for the wastewater treatment plant, such as through improved technological processes, to ensure a quality of effluent appropriate for secondary uses such as landscape irrigation.

Policy Develop incentives for the use of reclaimed water.

Policy Support development of a reclaimed water infrastructure to ensure adequate delivery of treated effluent to secondary uses within the town.

5.f WATER RESOURCES IMPLEMENTATION STRATEGIES

Description of Implementation Measure

1. Develop a Water Resource Master Plan.
 Public Works
 1-3 Years General Fund

2. Acquire the Town Water System.
 Town Council
 2-5 Years Bond Funds
 Development Fees
 Improvement District

3. Expand Water Conservation Programs.
 Town Clerk
 Ongoing General Funds

4. Develop a Reclaim Water System.
 Town Council
 Town Engineer
 2-5 Years Bond Funds
 Development Fees
 Improvement District

Water Resources Implementation Strategies

Implementation Measure	Department or Program	Time Frame (Years)	Possible Funding Source
1. Develop a Water Resource Master Plan.	Public Works	1-3 Years	General Fund
2. Acquire the Town Water System.	Town Council	2-5 Years	Bond Funds Development Fees Improvement District
3. Expand Water Conservation Programs.	Town Clerk	Ongoing	General Funds

4. Develop a Reclaim Water System.	Town Council Town Engineer	2-5 Years	Bond Funds Development Fees Improvement District
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