



Tonto Hills Domestic Water Improvement District

Water Conservation and Drought Contingency Plan

Prepared and Approved by:

Tonto Hills Domestic Water Improvement District (THDWID)

10 September 2014

EXECUTIVE SUMMARY

Tonto Hills Utility Company (THUC) acquired a water allocation of 71 acre-feet per year from the Central Arizona Water Conservation District (CAWCD) via the Central Arizona Project (CAP) canal and brought it online in March 2004. This allocation was one of the assets purchased by the Tonto Hills Domestic Water Improvement District (THDWID) in December 2010. Currently, the CAP supply is the only feasible long-term source of water for the Tonto Hills community.

The Water Conservation and Drought Contingency Plan of the Tonto Hills Domestic Water Improvement District (THDWID) is an integral part of the District's overall policies and procedures. Drought is a natural climatic condition, which has occurred many times in the past and which will occur again. The purpose of this plan is to provide a management framework to address water conservation. In addition, it will be used to manage water shortages or emergencies that result in temporary loss or reduction in service due to non-climate related factors. Because Arizona is so dependent on the Colorado River as the main renewable water source, it becomes more vulnerable to a drought-induced water shortage. In the event Colorado river water deliveries are reduced to Tonto Hills, THDWID customers may be affected. This plan provides a management framework to deal with possible water shortages.

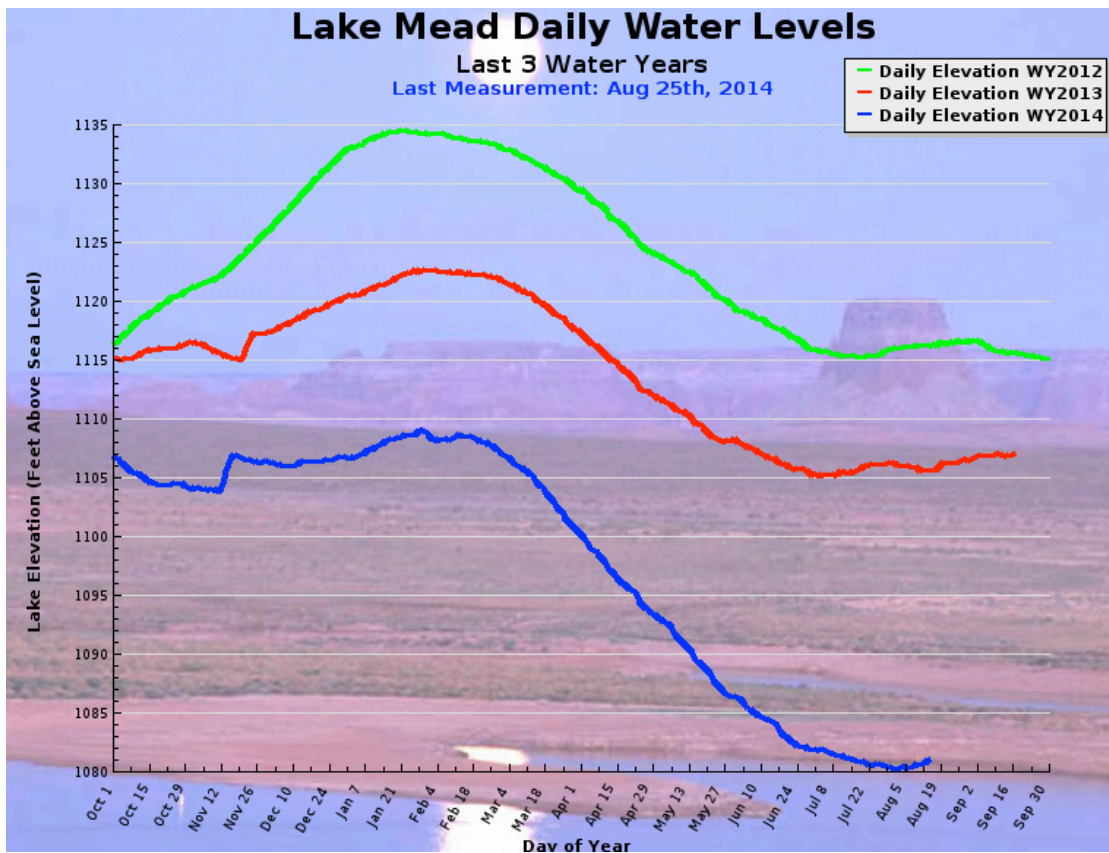
The Arizona Department of Water Resources (ADWR) requires the development of water conservation plans for water districts and public suppliers. A water conservation plan is defined as:

“A strategy or combination of strategies for reducing the volume of water withdrawn from a water supply source, for reducing the loss or waste of water, for maintaining or improving the efficiency in the use of water, for increasing the recycling and reuse of water, and for preventing the pollution of water. A water conservation plan may be a separate document identified as such or may be contained within another water management documents(s).”

- ADWR requires all water districts must, through management procedures and water conservation plans, to develop and maintain the following:
 - Utility Profile
 - Specification of Goals Before January 2013
 - Specification of Goals After January 2018
 - Accurate Metering
 - Universal Metering
 - Determination and Control of Unaccounted Water
 - Public Education and Information Program
 - Non-Promotional Water Rate Structure
 - Reservoir (Water Tank) System Operation Procedures
 - Means of Implementing and Enforcement
 - Coordination with Regional Water Planning Group

Arizona is in the midst of a prolonged drought that has significant impacts on our environment. Specifically regarding water supplies in central Arizona, the current drought does not immediately equate to water shortage. Tonto Hills is not running out of water. In fact, the THDWID water supply is guaranteed for 100 years through a contract with the federal government and State of Arizona for Central Arizona Project surface water. Also, the THDWID is steadily working toward efficient management of our allocation, acquisition of additional supplies, and utilization of water banking and storage credits rather than relying solely on our CAP water source. During the last ten years, Arizona has seen a decline in water resources exacerbated in large part by the drought. The graph below shows the Lake Mead daily water levels for the last three years. With less water available due to decreased precipitation and overall water demand growing, the cumulative decline in water levels in the lake is increasing.

Historic Water Level Decline in Central Arizona (1)



This Conservation and Drought Contingency Plan will respond to possible reductions in CAP surface water allotment or to the inability to satisfy system water demand for any reason. The plan describes our general water conservation approach and potential actions (if required) in drought contingency planning. The conservation section focuses on the effective and efficient use of the THDWID water allocation. Components of the plan include minimizing unaccounted water usage, implementation of a pricing structure to encourage water conservation, and development of a consumer education plan on conservation.

The drought contingency section details the THDWIDs approach for managing water shortages due to drought or water emergency conditions. Included in this section are defining of critical water conditions, defining and implementing levels of water restrictions, methods of publicizing restrictions, and enforcement. Each drought or water shortage stage is associated with a set of response measures. Each successive stage from Stage I to Stage IV represents an increasingly severe condition and includes an increasingly stringent list of response measures. **Table 1** below summarizes the four stages.

Table 1 - Summary of Water Shortage Condition Stages and Planned Response

Conservation Stage	Planned Response
Stage One - Water Watch Normal Operations	<ul style="list-style-type: none"> •Increase Customer Awareness thru Conservation Education •Continue Overall Water Management Efforts
Stage Two - Water Warning THDWID BoD monitors drought conditions; precipitation last 12 months AND Overall Lake Mead water levels	<ul style="list-style-type: none"> •Voluntary Reduction of Water Use by 5% •Request Voluntary Water Reduction Measures <ul style="list-style-type: none"> - Limit Landscape Watering to every other day after 8:00 pm and 6:00 am - Avoid other outdoor water uses including misters and car washing •Continue Overall Water Management Efforts
Stage Three - Water Alert Any combination of build out, water use, and adjustments to useable allocation causes 80% or more of the total useable allocation to be used.	<ul style="list-style-type: none"> •Mandatory Reduction of Water Use by 5% •Require trucked water for new construction •Institute Conservation / Drought Stage 3 tier 3 rate structure •Mandatory Water Reduction Measures <ul style="list-style-type: none"> - Limit Landscape Watering to every other day after 8:00 pm and 6:00 am - Avoid other outdoor water uses including misters and car washing - All pools and spas must be covered with evaporation inhibiting material. •Continue Overall Water Management Efforts
Stage Four-Water Emergency Any combination of build out, water use, and adjustments to useable allocation causes 90% or more of the total useable allocation to be used	<ul style="list-style-type: none"> •Mandatory Reduction of Water Use by 10% •Institute Conservation / Drought Stage 4 tier 4 rate structure •Continue stoppage of Potable Water use for Construction •Require Additional Mandatory Water Reduction Measures <ul style="list-style-type: none"> - Ban filling pools or spas. Turn off fountains - Ban Landscape Irrigation except to trees and shrubs 1 day per week between 8:00 pm and 6:00 am - Ban irrigation of turf or ground covers - Ban car washing •Continue Overall Water Management Efforts

1.0 INTRODUCTION

Water conservation is a priority for the Tonto Hills Domestic Water Improvement District (THDWID). A plan is required to implement conservation projects and efforts in a manner that protects the water resource allocated to this community. The water supply has always been a key issue in the development of Tonto Hills. The seventy-one (71) acre-feet per year of water allocated to Tonto Hills by contract with the Central Arizona Project (CAP) is our sole source of water, other than expensive emergency water trucking. Recent growth in the community has led to growing demands for water. About half of our annual CAP allotment is now used by the THDWID. The THDWID Board is preparing for unforeseen interruptions in CAP water supply by banking our unused CAP allocation at a Groundwater Savings Facility and obtaining long-term storage credits against which Scottsdale can pump groundwater in lieu of CAP water to temporarily continue meeting our needs, if necessary. The district began water banking and accumulation of storage credits with a recharge facility in 2013. These storage credits will be a source of additional water during times of critical need. The district is also investigating additional supplies to meet future demands that might exceed our allocation because these may be expensive and difficult to develop, and may not be available at all. Therefore, it is important that we make efficient use of existing supplies and make them last as long as possible. These efforts will eliminate or delay the need for new supplies, minimize the environmental impacts associated with developing new supplies, and delay the high cost of additional water supply development.

A drought plan establishes the criteria for action and endeavors to achieve the least possible impact on the community. The Arizona Department of Water Resources (ADWR) requires all water providers to have a water conservation and drought contingency plan. Although no water shortages currently exist, no one knows how long the current drought conditions might last; the longer it lasts, the higher the risk of water shortages. Some climatologists are predicting that we are in a 20 to 30 year drought cycle; therefore, it is important to have a plan in place that can respond to a reduction of our available water supply due to a drought.

Drought conditions can impact community water systems quickly and severely because they cause an immediate and continuous reduction in the water available to meet user demands. The failure to plan for potential shortages of water is irresponsible. The plan, to be effective, must be based on a comprehensive inventory of our water resources and the demand on that resource. By compiling this information, THDWID can develop a plan to protect these water resources through voluntary and mandatory means. A water conservation plan is a vision for the future health of our community. Recognizing the need for efficient use of existing water supplies, the THDWID has developed this water conservation and drought contingency plan for our water supply. The THDWID has adopted this water conservation plan pursuant to ADWR guidelines and requirements. The ADWR guidelines and requirements for water suppliers are referenced in Section 3.

The water conservation plan states the reasons for the plan's implementation as well as the expected goals of its application. The overall objective of this plan is to protect the water resources of Tonto Hills and maintain or improve this resource. The goals of the water conservation plan are:

- To reduce water consumption
- To reduce the loss and waste of water
- To improve efficiency in the use of water
- To extend the life of current water supplies by reducing demand

Not all uses of water are the same. Some uses, such as reserves for fire suppression, critical cooling applications, and medical necessity will have to take priority over less universally beneficial applications. Lower priority uses of the resource include landscape irrigation, maintenance of decorative fountains, and cooling of outdoor areas. Conservation planning gives the THDWID the opportunity to react quickly and implement appropriate restrictions early, while making allowances to meet specific needs of every situation. The THDWID is sensitive to the needs of its water customers and wants to be sure that all customers are treated the same should drought management conditions arise.

This Water Conservation and Drought Contingency Plan aims to supplement our water resources agreements. This plan adds procedures and strategies for water conservation as a practice and when our water supply may not meet our needs because of years of drought. Four essential components comprise our conservation plan. As a requirement of THDWID's agreement with the Central Arizona Water Conservation District (CAWCD), THDWID must develop an effective water conservation plan. At five-year intervals, THDWID will submit the plan to ADWR for review and approval. In keeping with those requirements, THDWID shall:

- a) Minimize the amount of un-billed water usage
- b) Have a pricing structure to encourage water conservation
- c) Develop and implement on an ongoing consumer education plan
- d) Institute new build requirements / remodel requirements (see Appendix B)
- e) Define critical water shortage conditions and restriction levels

The Plan provides ways for the THDWID and community to aid in water demand reduction when a water supply shortage occurs. The plan includes voluntary and mandatory conservation steps and actions based on the severity of water shortages. Each shortage stage, from Stage I to Stage IV represents an increasingly severe condition and includes an increasingly stringent list of response measures (see **Appendix A**). Although the THDWID Board of Directors may ask for voluntary reduction in water consumption at any time, the Water Conservation and Drought Contingency Plan is enacted by THDWID's Board of Directors because the legal framework for the Plan is established by Rule.

2.0 DEFINITIONS

Drought - Drought is a long period of abnormally low precipitation (rain or snow) or other forms of water supply shortage, especially one that adversely affects growing or living conditions which will cause a critical water condition. Drought can be caused by seasonal or

multi-year weather conditions, a curtailment of delivery from raw water suppliers because of water quantity or quality problems.

Ornamental Fountain - Ornamental fountain is any fountain that is solely or partially used for decorative purposes.

Potable Water - Potable water is water suitable or safe for drinking. Water is considered safe to drink if it meets or exceeds all of the federal, state, and local standards that are legally enforceable. If your water does not meet any one of these standards the supplier must notify its customers of the problem.

Supply Insufficiency - Supply insufficiency occurs when water available in an area is not sufficient to meet immediate unrestricted demand. While drought is usually systemic and regional in nature and of indeterminable length, a supply insufficiency may be system-wide or very localized, can be of relatively short duration, and may be caused by unforeseen increases in water demand or failure of a localized part of the storage or delivery system to provide a sufficient unrestricted supply of water.

3.0 WATER CONSERVATION PLAN

The THDWID plan includes a set of policies and procedures that defines our water conservation approach. Additional actions will be initiated based on the severity of the water shortage or drought. Although the district is not a municipality, municipal-scale enforcement options are available by rule. Yet the district must rely primarily on its customers to voluntarily comply with requests with water reduction. However, the district can implement a surcharge to its rate, limit potable water for construction use, limit water for swimming pools, and in the most severe drought response stage, not approve water service agreements for new construction projects. The main focus of THDWID's Water Conservation and Drought Contingency Plan is to continue its overall objective of sound water management. A primary tool is the current cooperation with Central Arizona Project (CAP) and the City of Scottsdale (CoS) to develop a renewable storage system. By converting our unused CAP water allocation into long-term groundwater storage credits, our water can be used to serve our future needs during times of water shortage.

3.1 Conservation Monitoring

A requirement of THDWID's agreement with ADWR is for THDWID to develop an effective water conservation plan. At five-year intervals, THDWID will submit the plan to ADWR for review and approval. In keeping with those requirements, THDWID shall minimize the amount of un-billed water usage by:

1. Reading consumer meters as close to the date that Scottsdale reads our Point of Entry meter as possible.

2. Reporting monthly on the total water received from Scottsdale, the sum total of water use based on the consumer meter readings, and the difference between these values in gallons as a percentage of received gallons.
3. Recording the gallons used by the Tonto Hills Volunteer Fire Department (THVFD), in line flushing, and other maintenance processes.
4. Tracking this difference over time and reporting the facts and trend to the Board of Directors monthly.
5. Reducing the difference between received gallons and billed gallons to at least 11%.
6. Identifying and rectifying the problem whenever the facts/trend indicates a potential problem and cost effective solutions.
7. Investigating and employing leakage detector technologies that make economic sense.
8. Comparing individual parcel usage vs. history. In the event usage spikes, notifying the owner of a potential problem and providing ideas on potential causes and solutions.
9. Executing a systematic plan for meter testing and cost effective replacement.
10. Installing water tank gauging technology to obtain realtime accurate tank water levels and track hourly usage.

3.2 Pricing Structure for Water Rates

The THDWID recently modified the rate structure from a three-tier water rate structure to five tiers. The rate structure was revised to encourage water conservation. Specific structure levels may vary, as determine by the Board of Directors to address specific water usage issues. The fourth and fifth tiers of the structure were created as a mechanism that could be adjusted if necessary, so excessive usage results in a higher unit price per gallon. The Board will continue to monitor water usage and pricing structures of nearby water companies.

3.3 Community Education on Water Conservation

The goal of the public education program is to generate an appropriate level of public awareness that results in active community participation. Areas of focus include; long-term management solutions, general awareness of water issues, and the recognition that Tonto Hills is a desert community with a desert's limited supply of water. The importance of educating community residents and property owners about the need to conserve water is critical. This is a long-term effort to promote conservation every year. This action will work to heighten awareness of drought and modify behavior to conserve water above and beyond normal use patterns. This Water Conservation Plan identifies a number of different techniques to increase community awareness about water conservation. These techniques include:

- Publish newsletters that inform individuals on conditions and restrictions
- Direction on how to read water meters and monitor individual water use
- Publishing semi-annual system high usage data
- Status letters to high volume water users

- Newsletters detailing suggested water conservation
- Referencing water conservation web site such as; amwua.org and city governments
- Giving water conservation updates at Tonto Hills Improvement Association (THIA) and annual THDWID General Meetings.
- Providing a FAQ section to the district web site including conservation Q & A's.

The greatest water savings can be achieved by combining the use of conservation devices with behavioral changes since these two actions tend to reinforce each other. A FAQ section will be added to the district web site that includes conservation questions and answers. Residential plumbing retrofit is one of the most practical and effective approaches in providing customers with "how-to" information on altering their water use habits. At the same time, it provides them with the technology to save water with the least impact on their lifestyle. Outdoor water use is a significant portion of everyday consumption in Tonto Hills. Water consumption increases as much as 40 to 60 percent from March through October. Voluntary restrictions, including time-of-day watering or odd/even watering based on house numbering, will be encouraged.

The THDWID shall develop and implement on an ongoing consumer education plan including:

1. Providing new residents with water conservation materials.
2. Provide material on efficient plumbing fixtures, pool covers, desert plants, landscape irrigation design, maintenance, and timer management, etc.
3. Distributing timely material on pipe freezing dangers and prevention. In the event of a burst pipe, work with the customer to minimize water loss and prevent future breaks.
4. Providing material to customers via newsletters, meetings, and personal visits.

4.0 DROUGHT CONTINGENCY PLANNING

This Water Conservation and Drought Contingency Plan aims to supplement our water resources agreements. This plan adds procedures and strategies for when our water supply insufficiency may not meet our needs because of years of drought. The Plan provides ways for the THDWID and community to aid in water demand reduction when a water supply shortage occurs. The plan includes voluntary and mandatory conservation steps and actions based on the severity of water shortages. Each shortage stage, from Stage I to Stage IV represents an increasingly severe condition and includes an increasingly stringent list of response measures (see **Appendix A**). Although the THDWID Board of Directors may ask for voluntary reduction in water consumption at any time, the Water Conservation and Drought Contingency Plan is enacted by THDWID's Board of Directors because the legal framework for the Plan is established by Rule.

The THDWID's plan includes a designated set of actions based on four drought condition stages defined by the district Board. CAP stages are based on the simple combination of the amount of precipitation during the last twelve months in the Colorado River Basin and the annual decline of overall water levels. Stage One (Water Watch) calls for voluntary customer actions.

There are times when members must limit their demand to achieve a level of fair and equitable usage. In addition, members must remember that we live in a time of extended drought and should expect to react accordingly. The THDWID has developed a water shortage contingency plan that includes: a) Defining levels of Critical Water Conditions, b) Defining respective water restriction levels, c) Publicizing the water restriction level to the Community, and d) Enforcing the water restrictions.

4.1 Voluntary Water Conservation Actions

Stage one is the THDWID's normal operations conservation stage. The THDWID will work to increase customer awareness about conservation, the drought, and water resources through education and information. THDWID will work with neighboring water providers to look at cooperative efforts that include providing emergency backup as well as joint conservation efforts. Most importantly, THDWID will continue its overall water conservation and management efforts on the water supplies and system. THDWID has been in the Stage One condition since its inception. Refer to Appendix A Table 1, Stage 1 - Water Watch.

Stage Two (Alert) is initiated when the precipitation of the last 12 months in the Colorado River Basin is 50% to 70% of normal and overall Lake Mead water levels declined annually 2.5' to 3.9' over a two year period. The THDWID requests customers to limit landscape irrigation to two days per week between 8:00 pm and 6:00 am as well as avoid other outdoor water uses. for example ban hosing down driveways and washing vehicles. Under Stage Two, all of the measures of Stage One will also continue. Refer to Appendix A Table 2, Stage 2 - Water Alert - Mandatory (Reduction Goal 5%).

4.2 Water Conservation Mandatory Actions

Should worsening drought condition stages occur or voluntary actions are not sufficient, mandatory actions may be required. The THDWID must implement an aggressive actions to reduce heavy water usage. A program is in place to assist in maintaining full metering of fire hydrant use, and to evaluate appropriate field or construction water use. The THDWID Superintendent shall monitor the projected supply and demand for water, by its highest use customers, on a daily basis during periods of emergency or drought and shall recommend to the Board of Directors the extent of the conservation required through the implementation and/or termination of particular conservation stages to prudently plan and supply water to its customers. The Board of Directors then may order the implementation and/or termination of the appropriate phase of water conservation. The declaration of any stage beyond Stage One shall be made by public announcement and shall be published a minimum of one (1) time for three (3) consecutive days within the community via email. The stage designated shall become effective immediately upon announcement.

Stage Three - Stage Three (Water Warning) is initiated when any combination of build out, water use, and adjustments to useable allocation causes **80% or more of the total useable allocation** to be used. In Stage Three, THDWID will not permit the use of potable water for

construction including dust control; water trucked in from outside the community must be used. Evaporation-inhibiting covers will be required for pools, ponds, spas, and other larger water features. THDWID Board will institute a Level 3 Conservation Rate Schedule that contains five tiers. Additional mandatory water reduction measures will be requested from customers including the limiting of landscape irrigation to one day per week between 8:00 pm and 6:00 am. In addition to avoiding outdoor water uses, customers will not be allowed to empty or fills their pools and fountains must be turned off. The other measures of Stage One and Stage Two will continue. Refer to Appendix A Table 3, Stage 3 - Water Warning - Mandatory (Reduction Goal 10%).

Stage Four - Stage Four (Water Emergency) is initiated when any combination of build out, water use, and adjustments to useable allocation causes **90% or more of the total useable allocation** to be used. Under Stage Four, THDWID will institute the Conservation Rate Schedule that contains five tiers. No potable water will be used for construction or the filling of pools, ponds, spas, and other large water features. Customers will be notified that a ban on landscape irrigation (except for trees and shrubs 1 day per week between 8:00 pm and 6:00 am) is in effect and no irrigation of turf or ground covers. All other previous measures will continue. The tables in Appendix A, Table 4, Stage 4 - Water Emergency Mandatory (Reduction Goal TBD by THDWID) summarizes the conservation requirements for each stage.

5.3 System Wide Restrictions and Penalties

An important concern created by a drought situation is the negative impact on revenues as a result of successful demand reduction. Such drops in revenue come at a time when operational expenses tend to increase. The district board has established financial systems that allow for fines, surcharges, or other measures to support the acquisition or development of new water supplies.

Charges for water consumption have significant influence on the amount of water consumed. If the drought condition continues to the point that voluntary conservation is not sufficient, the THDWID will implement means identified in Stages 3 and 4 to reduce water use during the critical period. The standard response in communities all across the country has been surcharges and rationing.

The surcharge amount will be determined at a drought stage based on the cost of services to implement water saving programs or acquisition costs necessary to meet reasonable water delivery demands. In Drought Stage Four, Water Emergency, the surcharge would be raised above revenue requirements specifically as a strong disincentive for use, until demand matches supply.

Future Boards may adopt water rationing as part of drought surcharges as an economical alternative. It will be up to future Board members to review consumption and determine the appropriate course of action. Price rationing, offers the consumer more flexibility in quality-of-life issues and has less impact on the districts revenue stream which has normal or higher-than-

normal operational expenses during a drought. The key elements of a successful rationing program are that:

- (1) The resources and the hardships are shared as equitably as possible, and
- (2) Customers are kept informed about the status of the shortage.

However, allocation disagreements are to be expected and procedures to handle valid exceptions and variances need to be part of the rationing program. Pertinent information regarding water use and supply must be published and disseminated at least weekly to continually reaffirm customer commitment. Physical rationing programs are generally patterned after one of these basic allocation plans: percentage reduction and specific use bans. To better demonstrate the difficulty and expense that would be created by choosing to implement physical rationing for a utility the size of THDWID, the various physical rationing plans are defined.

A percentage reduction assigns customers a consumption reduction goal, depending on water use, as a percentage of the consumption level used in a similar billing period during a normal season. Specific use bans are a rationing alternative; however, they do not increase or change the billing calculations. Instead they are imposed primarily through public education and enforcement. Specific use bans, such as landscape irrigation watering only every other day, prohibition on swimming pool filling, and prohibition on use of water features can be effective. Bans generate awareness and prioritizing of water use and they establish a sense of equity in the community. Another implementation approach is to define the reduction based on household occupancy and applying the appropriate Stage goal to industry standards of use.

Appendix A - Water Use Reduction Matrix

Stage One - Water Watch - Normal Operations Voluntary	
Residential & Commercial	Essential Use Exemptions
Request reduction of outdoor watering to every other day between 8 pm and 6 am	Any use to maintain health and safety of Tonto Hills water customers are exempt from water restrictions including THVFD
Request automobile washing only with bucket and hose with shut off nozzle	
Request fountain shut off, unless gray water is used or fountain is part of indoor cooling system, must be posted	
Request no washing down of sidewalks, decks, driveways, patios, etc.	
Request reducing use of misting in outdoor areas	

Stage 1 water use restrictions are voluntary.

Stage Two - Water Warning Voluntary (Reduction Goal 5%)	
Residential & Commercial	Essential Use Exemptions
Request voluntary reduction of water use by 5%	Any use to maintain health and safety of Tonto Hills water customers are exempt from water restrictions including THVFD
Request Voluntary Water Reduction Measures - Limit Landscape Watering to three times a week after 8:00 pm and 6:00 am	
Request automobile washing only with bucket and hose with shut off nozzle	
Request fountain shut off, unless gray water is used or fountain is part of indoor cooling system, must be posted	
Wash down of sidewalks, decks, driveways, patios, etc. prohibited	
Prohibit misting of outdoor areas	•

Stage 2 water use restrictions are mandatory

Stage Three - Water Alert - Mandatory (Reduction Goal 5%)	
Residential & Commercial	Essential Use Exemptions
Mandatory reduction of water use by 5%	Any use to maintain health and safety of Tonto Hills water customers are exempt from water restrictions including THVFD
Institute Conservation / Drought Stage 3 restrictions and tier 3 rate structure	Construction restrictions apply only to projects not necessary to maintaining the health, safety, and welfare of the public.
Consider implementing fines on water bills	
Require trucked water for construction projects. Construction water use will not be supplied by the THDWID	
Outdoor water use restricted <ul style="list-style-type: none"> - Outdoor water use restricted to twice a week (Sunday and Tuesday) between 8 pm and 6 am - Avoid other outdoor water uses including misters and car washing 	
Fountain shut off	-
Pools may not be filled or refilled with Tonto Hills provided water without evaporation inhibiting material (POOL COVERS).	-

Stage 3 water use restrictions are mandatory.
The THDWID may declare a Stage 4 with further restrictions.

Stage Four - Water Emergency Mandatory (Reduction Goal 10%)	
Residential & Commercial	Essential Use Exemptions
Mandatory reduction of water use by 10%	Any use to maintain health and safety of Tonto Hills water customers are exempt from water restrictions including THVFD
Institute Conservation / Drought Stage 4 restrictions and tier 4 rate structure	Construction restrictions apply only to projects not necessary to maintaining the health, safety, and welfare of the public.
Consider implementing fines on water bills	
Require trucked water for construction projects. Construction water use will not be supplied by the THDWID	
Fountain shut off	
<ul style="list-style-type: none"> •Require Additional Mandatory Water Reduction Measures <ul style="list-style-type: none"> - Turn off fountains - Ban Landscape Irrigation except to trees and shrubs 1 day per week between 8 pm and 6 am - Ban irrigation of turf or ground covers - Ban car washing 	

Stage 4 water use restrictions.
Water demand shall be further reduced by methods determined by THDWID BoD

Appendix B - THDWID New Build / Remodel Water Requirements

Tonto Hills Utility Company (THUC) acquired a water allocation of 71 acre-feet per year (AF/yr) from the Central Arizona Water Conservation District (CAWCD) via the Central Arizona Project (CAP) canal and brought it online in March 2004. This allocation was one of the assets purchased by the Tonto Hills Domestic Water Improvement District (THDWID) in December 2010. Currently, the CAP supply is the only feasible long-term source of water for the Tonto Hills community.

In accordance with our state-required Conservation Plan, the THDWID Board is preparing for unforeseen interruptions in CAP water supply by banking our unused CAP allocation at a Groundwater Savings Facility and obtaining long-term storage credits against which Scottsdale can pump groundwater in lieu of CAP water to temporarily continue meeting our needs, if necessary.

It must be strongly emphasized that our water supply is secure and the likelihood of a shortage is low. We estimate our current supplies could support an average monthly use of about 8,000 gallons per parcel at full build out. The fact remains that our supply is based on an allocation system that does not provide unlimited water to our community. Therefore, it is important to recognize this limitation and that excessive water use practices by THDWID members can impact the sustainability of our water supply.

To lessen the likelihood of a shortage, the THDWID Board of Directors has adopted the following recommendations and requirements for new build and applicable remodel applicants:

Following are recommendations:

- **TOILETS:** Toilets should be the high efficiency type that uses 1.6 gallons or less per flush. A family of four can save 14,000 to 25,000 gallons of water per year using these as opposed to the older type of toilets.
- **SHOWERHEADS:** Showerheads should be of the high efficiency type with a flow rate of 2.5 gallons per minute or less. Showering typically accounts for approximately 17% of indoor water use. The high efficiency showerheads can achieve water savings of 25% to 60% over older models.

- **FAUCETS:** Consider using faucets with the “WaterSense” label. Faucets typically account for about 15% of indoor water use. “WaterSense” bathroom sink faucets can reduce water flow by 30% without sacrificing performance. “WaterSense” is an EPA program having partnership agreements with many manufacturers.
- **DISHWASHERS:** Consider installing an “EnergyStar” qualified model. An old style dishwasher can waste about 10 gallons of water per cycle.
- **CLOTHES WASHERS:** Consider installing an “EnergyStar” qualified model. High efficiency washers use 35% to 50% less water and 50% less energy per load. The model should also have a low water factor. A water factor is the number of gallons per cycle per cubic foot that a clothes washer uses. If a washer uses 18 gallons per cycle and has a tub volume of 3.0 cubic feet, the water factor is 6.0. The lower the water factor, the more efficient the washer. Some models have load sensing capability and adjust the amount of water used based on the size of the load.
- **OUTDOOR PIPES:** Tonto Hills experiences freezing weather a few times per year. This can result in burst pipes and many gallons of wasted water. Consider insulating pipes. Use heat tape or thermostatically controlled heat cables to wrap pipes. (Use products approved by Underwriters Laboratories and follow instructions carefully.) Also, seal leaks that allow cold air to enter where pipes are located. Look for air leaks around electrical wiring, dryer vents, and pipes.
- **LANDSCAPING:** Consider landscaping with low-water requirement desert plants. Go to http://www.amwua.org/advanced_search.html for an appropriate desert plant search engine. Turf or grass planting should not exceed 25 square feet. Consider equipping drip systems with rain shut-off devices or soil moisture sensors. Consider decorative rain barrels to catch rain for landscape watering. These barrels are available for around \$100.
- **ON-DEMAND HOT WATER:** A family of four wastes 10,000 to 15,000 gallons of water annually running faucets while waiting for hot water. There are several types of on-demand hot water systems including: recirculating pumps, demand type pump systems, thermo-siphon systems, and point-of-use water heaters. The downsides of these systems are initial costs and on-going energy costs. To minimize ongoing energy costs, insulate all pipes and install a timer to turn the systems on/off tied to showering hours. Another consideration is a tank-less water heater running on propane located near the primary shower or a small capacity 110-volt electric under sink water heater.
- **HUMIDIFIERS:** Many new homes are built with humidifier systems as part the HVAC system. The two types of humidifiers available are evaporative and steam. The model of evaporative humidifier varies depending on the size of the house. (Consider cubic feet measurements if ceilings are high.) These humidifiers can use from 3 gallons per hour (gph) to 6 gph. If a 6-gph humidifier ran constantly, it could use 4,320 gallons in a month. Many factors impact actual usage, but assuming it ran about 6 hours per day; the

monthly total would be 1,080 gallons. For each gallon used in humidifying, 5 gallons go down the drain. To ensure the unit runs only when needed, install a digital humidistat. Steam humidifiers use only 0.6 to 1.8 gph with very little going down the drain. The downside is that they use 11.5 amps vs. less than 1 amp for a large evaporative humidifier.

Following are requirements:

- **SHUT-OFF VALVES:** All THDWID Members who have or request connection to the THDWID's system shall install and maintain a private shut-off valve. The THDWID shall provide a like valve on the THDWID's side of such meter. The THDWID also recommends the installation of one or more pressure reducing valves (PRVs) on the Customer's side of the meter at the Customer's expense to regulate water pressure and prevent over-pressure damage to appliances and other equipment. The THDWID shall not be responsible for the effects of high water pressure on the Customer's side of the meter. The THDWID requires backflow prevention devices.
- **POOL COVERS:** A 600-square-foot pool has approximately 34,000 gallons of water evaporation each year. This figure can vary depending on humidity (low humidity means higher evaporation), air temperature vs. pool temperature (the cooler the air in relation to the pool, the more evaporation), solar exposure, and wind. A pool cover can prevent most of this evaporative water loss. A low-cost pool cover is a solar cover. They look similar to packing material, but have UV inhibitors and a thicker grade of plastic. There is also a variety of vinyl covers. Pool covers come with manual, semi-automatic, or automatic pool cover retraction. A basic cover for a 450-square-foot pool costs about \$80; a storage reel costs about \$160. A high quality insulating pool blanket costs about \$700. A pool cover in Phoenix can reduce energy costs by \$2,000 annually and reduce chemical costs.
- **NEGATIVE EDGE POOLS:** Negative edge pools have higher rates of evaporation than regular pools and standard pool covers are less effective. Negative edge pools are not permitted unless an automatic pool cover designed specifically for this type of pool is built-in as part of the construction.
- **BACKFLOW:** Following is the backflow prevention policy for all members:

A.C.C. R18-4-215 E1, which states, "A public water system may make installation of a required backflow prevention assembly a condition of service. A user's failure to comply with this requirement shall be sufficient cause for the public water system to terminate water service." The THDWID has adopted a policy requiring installation of backflow prevention assemblies as a condition of initial and continued water service.

The THDWID requires that residences and commercial properties be in compliance with Section P2902.1 of the International Residential Code for One- and Two-Family Dwellings. Section P2902.1 states, “A potable water supply system shall be designed and installed as to prevent contamination from non-potable liquids, solids, or gases being introduced into the potable water supply. Connections shall not be made to a potable water supply in a manner that could contaminate the water supply or provide a cross-connection between the supply and a source of contamination unless an approved backflow prevention device is provided. Cross-connections between an individual water supply and a potable water supply shall be prohibited.”

THDWID also requires vacuum breakers on all hose bibs used to fill water reservoirs, such as horse troughs, to prevent backflow. Backflow prevention devices should be inspected annually.

The following are the recognized types of backflow prevention assemblies that the THDWID requires:

- 1) *Air gap*: The unobstructed vertical distance through free atmosphere between the lowest point of a water supply outlet, pipe, or faucet supplying potable water to a tank, plumbing fixture, or other device and the flood level rim of the tank, plumbing fixture, or other device. An approved air gap shall be at least twice the diameter of the supply pipe or faucet and in no case less than one (1) inch.
- 2) *Reduced pressure principle assembly (“RP”)*: A backflow prevention assembly containing two independently-acting approved check valves together with a hydraulically-operating, mechanically-independent pressure differential relief valve located between the check valves, and at the same time below the first check valve. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.
- 3) *Double check valve assembly (“DC”)*: A backflow prevention assembly composed of two independently-acting, approved check valves, including tightly-closing shutoff valves located at each end of the assembly and fitted with properly located test cocks.

- 4) *Pressure vacuum breaker assembly (“PVB”)*: A backflow prevention assembly containing an independently-operating, loaded check valve and an independently-operating, loaded air inlet valve located on the discharge side of the check valve. The assembly shall be equipped with properly located test cocks and tightly-closing shutoff valves located at each end of the assembly.