Regional Water Supply Agreement
Administration Advisory Committee
MINUTES

Meeting date:	April 23, 2025
Time:	12:00 – 2:00 pm
Location:	533 E Waterworks Drive, St. George UT
Participants:	Administration Advisory Committee members Zach Renstrom, Ben Billingsley, Nannette Billings, Kaden DeMille, Kelly Wilson, Kyle Gubler, Jeremy Redd, Kress Staheli, Rick Rosenberg, Brock Jacobsen, John Willis, Michele Randall, Dale Coulam, Chris Hart, Ed Bowler, and Jean Krause. Also present were Washington County Commissioners Adam Snow and Victor Iverson. Advisory Committee member Justin Sip was not present. Other meeting attendees are noted on the attached sign-in sheet.

New Regional Master Plan demand and project overview

Aaron Anderson of Bowen Collins & Associates gave a presentation on the draft update to the District's regional water master plan, noting that while the plan is still being finalized, it outlines current projections for supply and demand. He highlighted the importance of reuse water as the District's primary source of new supply, with plans to allocate it for both potable and secondary irrigation use. According to current forecasts, the existing and planned reuse systems will meet county demands through approximately 2043–2044. After that, additional water sources such as the Lake Powell Pipeline, Virgin River desalination, or deep wells will likely be needed to meet continued growth.

Mr. Anderson emphasized that the 20-year planning horizon remains the foundation of the District's current water strategy. He walked through a secondary water supply chart, noting that while it may appear irregular due to fluctuations in reuse water allocation, the key takeaway is that the District is strategically maximizing reuse based on demand. Variations in the chart reflect shifts in how reuse water is applied sometimes toward potable uses via exchange or indirect potable reuse, and other times toward secondary irrigation systems. He advised not to focus too much on the dips early in the chart, explaining that they represent shifts in application, not a reduction in supply. Ultimately, reuse is being stretched to meet needs through 2043, with a flexible approach that channels water where it is needed most.

Mr. Anderson provided an overview of the District's ongoing and planned local water supply development projects, emphasizing that most are familiar efforts, many already underway, and all are vital to meeting future water demands.

1. **Ash Creek/Chief Toquer Reservoir Project**
    - **Pipeline**: Completed.
    - **Reservoir**: Currently under construction; anticipated completion in 2027–2028.
    - **Yield**: Estimated at 17,148 acre-feet/year.
    - **Benefit**: Frees up Toquerville Springs for potable use.

2. **Cottam Well #3**
    - **Cotton Wells Location**: North of Toquerville near Anderson Junction
    - **Purpose**: Optimizes system interconnectivity and capacity; allows delivery across the county
    - **Cottom Well (#4)**: Planned on the back side of the existing Cottam well tank site
    - **Combined Yield**: Nearly 2,400 acre-feet/year
    - **Additional Work**: Involves reallocation of water rights (Sullivan Wells area) and adding diversion points

3. **Cove Reservoir (Kane County)**

- **Status**: In planning phase (no detailed design yet).
- **Function**: Seasonal storage in Kane County, with water released to be captured at Virgin River Diversion
- **Yield**: 566 acre-feet/year
- **Partnership**: Joint effort with Kane County

4. **Sand Hollow Well #7**
    - **Pumping Capacity**: About 800 gallons per minute
    - **Purpose**: Maximizes output without exceeding the recharge capacity of the aquifer
    - **Serves**: Hurricane area and regional system via Sand Hollow regional pipeline

5. **Kolob Dam Modification**
    - **Modifications**: Raise dam by 8 feet and other infrastructure improvements.
    - **Yield**: Estimated at 194 acre-feet/year.

6. **Ence Well redevelopment**
    - **Background**: Previously supplied Kayenta; now inactive due to taste/odor issues.
    - **Plan**: Relocate diversion points and drill new wells to find better water quality.
    - **Yield**: 1,281 acre-feet/year.
    - **Objective**: Revive underutilized rights for regional benefit.

Mayor Billings asked a question regarding the Cove Reservoir whether there are existing water rights in Kane County or if water is being purchased for that project, and how the number 566 acre-feet of yield was determined.

Corey Cram responded that there are water shares in Kane County that can be transferred to the District.

Aaron Anderson commented that there has been some modeling done on the reservoir to simulate hydrology, drought conditions, and other influencing factors. The figure of 566 acre-feet represents the reliable annual yield based on the District's existing water rights and modeling under extended dry-year scenarios. The number reflects a conservative estimate to ensure water supply reliability. It does not include groundwater rights only surface water and storage modeling.

Commissioner Victor Iverson asked a question about the Ence Wells. “I understand they do not have arsenic, but there are other wells in that area with elevated arsenic levels. Are we mixing those, or are we just not using them? I know some wells produce water but have too much mineralization. Are those being set aside for possible future use?”

Aaron Anderson responded that the Gunlock Wells, located south of the reservoir, do have some arsenic, but St. George city operates a treatment plant there that removes arsenic to below the MCL (Maximum Contaminant Level). The Santa Clara irrigation wells are not known to have arsenic issues, but they are high in total dissolved solids (TDS) and salt content.

Mr. Anderson explained the regional reuse system is designed to take treated wastewater and put it to beneficial use. There are three key reuse applications.

1. **Type 1 Reuse** – Traditional irrigation water for residential landscapes and gardens non-potable, high-quality.
2. **Ag Exchange** – Swap Type 1 reuse water with higher-quality water from the Santa Clara or Virgin Rivers which can be treated for drinking purposes.
3. **Indirect Potable Reuse (IPR)**– Further treat wastewater to drinking water standards and recharge it into Quail Creek or Sand Hollow for future potable use.

Most wastewater is collected and treated at the St. George Regional Water Reclamation Facility (SGRWRF), which serves from Ivins to Washington. Wastewater from Hurricane, La Verkin, and Toquerville currently flows to the lagoons north of Dixie Springs. When the Confluence Park Water Reclamation Facility is completed, it will treat water from LaVerkin and Toquerville, leaving only Hurricane on the existing lagoons.

SGRWRF to Reuse Forebay Project is a pipeline from the St. George facility to a forebay pond near Ash Creek, from there, water is conveyed along the Quail Creek Pipeline back to agricultural users in Hurricane and La Verkin. This setup will support AG exchange and future IPR.

1. IPR Treatment Facility:
    - Proposed site north of Sand Hollow.
    - Will take highly treated wastewater and inject it into storage reservoirs (Quail Creek/Sand Hollow) for potable reuse.
2. Eastern Reuse System:
    - Confluence Park Plant (1 year from completion).

- Pumps treated water through:
  - A new proposed pond in north end of La Verkin.
  - The existing TSWS pond.
  - Ultimately to Chief Toquer Reservoir for storage.
- This enables seasonal water banking, especially storing water in winter for irrigation use in the summer.

Commissioner Iverson asked when the pipeline from Confluence Park to Chief Toquer Reservoir is expected to be completed.

Mr. Anderson responded that the first phase involves constructing the pipeline from Confluence Park to the Upper La Verkin Pond. The next phase, which would extend the pipeline from Upper La Verkin Pond to Chief Toquer Reservoir, is likely a few years out.

Mr. Anderson explained that the District is currently in the design and bidding phases for major upgrades to the Quail Creek Water Treatment Plant. The current capacity is 60 MGD and will be upgraded to 90 MGD. The upgrade also includes new ozone treatment process and new solids lagoons. This project is critical for maximizing both the treatment plant's output and the capacity of the regional pipeline that delivers water from the plant through Washington and up to Ivins City

The West Side Water Treatment Plant will be possible through agricultural water exchanges. The concept is to exchange reuse water for existing agricultural use, freeing up Gunlock Reservoir water to be treated for drinking water. This will serve the areas of Santa Clara, Ivins, and west side of St. George. The plant will be between 10 to 15 MGD and provide a dedicated drinking water supply for the fast-growing west side of the county.

The Quail to Cottam Pipeline is **a** nearly complete major conveyance project. There is one final segment remaining that will be finished at a later date. The pipeline will transfer finished water from the Quail Creek Water Treatment Plant into the Cotton Well system. The water can be routed south through the regional line (Washington, St. George) or pumped north into Cottam supporting Toquerville, La Verkin, Virgin, and parts of Hurricane. The capacity adds 4,500 GPM from Quail Creek Reservoir to Cottam.

There will be a number of pump stations in the master plan. These pump stations are critical for moving water between sources and demand centers, adding versatility and flexibility to the regional system. The Purgatory Flat pump station has already been built. It will pump water from Quail Creek Water Treatment Plant to the Sand Hollow area. It will support Dixie Spring**s**, and areas along the Sand Hollow Regional Pipeline including St. George and Washington. The next pump station near Sand Hollow will supply water to Hurricane Valley system and potentially serve the southern part of Hurricane City. The Toquerville Springs to Cottam pipeline pump station will pump the Toquerville Springs water into the Cottam line and supply the northern service areas.

The Washington Fields Conveyance Project will establish a new pipeline connection through the Washington Fields area. The pipeline size has not been determined. It is estimated to be 30-inch to 36-inch and will interconnect the regional pipeline and the sand hollow regional pipeline. It will enable water transfer from the regional pipeline down through Washington Fields and support the southern areas of St. George. It will ensure reliable supply to the west side of the county.

The Cottam Well transmission line upgrade will increase conveyance capacity from the Cottam Wells through Toquerville and out to Virgin. The pipeline is an 18-inch and 24-inch. This will support growth in Toquerville, Virgin and surrounding areas.

The storage projects planned for the next 10 years include a 10 MG tank at Quail Creek Water Treatment plant. The project has been bid, and construction will be starting soon. The 2 MG tank is being constructed near Sand Hollow Reservoir right next to the existing 3 MG tank. The West Side Storge tank will be 5 MG tank.

The District's 10-year Capital Improvement Plan outlines major investments for the reuse projects, local water supply development, conveyance and transmission systems, water treatment facilities, water storage infrastructure. When combined, these projects represent an investment of over $700 million over the next decade. In addition to the 10-year Capital Improvement Plan, the District has identified a number of long-range projects. They are later stage components of the regional reuse system, extended conveyance, and transmission infrastructure a future water treatment plant at Sand Hollow Reservoir and additional large-scale storage projects. These long-term investments are expected to exceed $1 billion, reflecting the scale and complexity of future regional needs.

The District remains engaged with the Lake Powell Pipeline (LPP) project. While focus in recent years has shifted toward advancing the regional reuse system and optimizing local water supply development, the LPP continues to be a key component of the District's long-term water strategy. The reuse system combined with existing sources will meet demand for a time. However, to support projected growth beyond that point, the District will need to either identify additional local water supplies or move

forward with major infrastructure projects such as the Lake Powell Pipeline. The LPP remains a viable and necessary long-term solution, and the District is committed to keeping the project moving forward.

Scott Taylor asked a question regarding the Advanced Water Treatment Plant being developed as part of the regional reuse system. He noted the process currently involves treating wastewater to Type 1 reuse standards, then further upgrading it at the advanced treatment facility to drinking water standards. That water is then sent to Quail Creek, where it blends with existing natural flows before being recaptured, treated again, and distributed an approach known as Indirect Potable Reuse (IPR). Is the District taking this path due to public perception around Direct Potable Reuse (DPR), and whether in the future perhaps 40 years from now when supplies are even more limited, the District may need to pivot toward DPR to conserve every possible drop. Mr. Anderson commented that his personal opinion with DPR, there are potential concerns or risks particularly because there is no buffer between the advanced treatment plant and the drinking water distribution system. There are water quality concerns, such as acetone, could potentially pass through a treatment plant without being fully removed.

Morgan Drake commented that the public is ready, with growing acceptance of DPR across the United States and throughout the world. El Paso, Texas recently broke ground on the biggest DPR facility in the United States. Ultimately, it comes down to operational flexibility and determining what works best for our community.

Zach Renstrom commented that to him "the big wild card in all of this is the Virgin River." If we can make the exchange work on the Virgin River, that is by far the cheapest alternative. When you compare that to the cost of building a new treatment plant where you are looking at hundreds of millions of dollars it really stands out. We are going to need to keep evaluating that option closely as we move forward."

Scott Taylor commented that he "understands the value of environmental buffer, but there are ways around that. He feels it is a little backwards to treat water to drinking standards, then dump it into dirty water, only to treat it again, all while losing some of it to evaporation." Mr. Taylor said that long-term, he thinks DPR could be the more efficient solution.

Ms. Drake commented that she has heard from other utilities working on indirect potable reuse, and "one consistent piece of feedback is that with direct reuse, the plant has to be running all the time you lose the ability to pause or buffer. With indirect reuse, the environmental buffer gives you some operational flexibility. You can store water and manage flow more easily. So, I have wondered if, in the future, the best approach might actually be a hybrid system some water going straight to direct use, and some stored through indirect means."

Water shortage contingency plan

Staff Engineer Whit Bundy explained the Water Shortage Contingency Plan. The purpose of this plan is to identify actions that can equitably reduce water demand and ensure all community members remain safe, healthy, and resilient during any disruptions to the water supply.

Drought is a major concern right now, but this plan is designed to be implemented in a variety of emergencies including infrastructure failure, wildfire, contamination events, and earthquakes. In any circumstance where the area faces a water shortage, this plan helps stretch available resources and provides a framework for response and relief.

Mr. Bundy said it can be tricky to visualize what each stage of a water shortage actually looks like especially when it comes to how reservoirs and supply systems respond under various conditions. He said, "What I would like to show today is a forecast model we developed using historical water use data applied to different hypothetical shortage scenarios. The goal is to demonstrate how implementing the Water Shortage Plan at the right times can make a measurable difference in our water supply outlook."

Each stage in the plan is designed to gradually reduce water consumption as conditions worsen. The model is built on assumptions about the expected savings from each stage's implementation actions:

- **Stage 1**: 10% reduction
- **Stage 2**: 20% reduction
- **Stage 3**: 40% reduction
- **Stage 4**: 60% reduction

For example, when the model indicates the area is entering Stage 2, it assumes a 10% reduction from Stage 1 and that the area will now realize an additional 10% for a total of 20% savings. This forecast helps visualize the impact of timely, staged implementation of the plan and shows how it can extend available water supply during a shortage

To determine when to initiate various water shortage stages, the team used a model developed by A2S that integrates both supply and demand indicators to generate a trigger score. This trigger is the foundation for identifying when the area moves into each drought or shortage stage.

The demand-side indicators include culinary water production and temperature trends. The supply-side indicators include precipitation, stream flow, reservoir volume and soil moisture. Each of these indicators is weighted based on its significance, and the combined score produces a clear, quantifiable trigger.

To demonstrate how the model functions under real-world conditions, the team used actual reservoir volumes as of March of this year to create three scenarios: a wet year, average year, and dry year. These scenarios project what might occur through the end of 2026, based on historical trends from the past five years.

The model includes a critical threshold line. This line represents the point at which the area may have less than one year's worth of water in storage, considering average demand, evaporation, and seepage. Dropping below this line indicates a serious risk and would prompt urgent action through the water shortage plan.

The Dry Year Scenario. Under dry conditions, reservoir levels drop significantly. However, by implementing the staged shortage actions for example, hitting a Stage 2 later this year with a corresponding 20% demand reduction can delay reaching critical levels in the reservoirs. The watershed is highly dependent on snowpack and spring runoff. Extending the reservoir supply even by a few months could get the area through another winter, increasing the chances of natural system recovery. Essentially, this plan buys time. Under no action, reservoir levels fall below 30% combined capacity. With shortage plan implementation, that number improves to approximately 43%, which is a savings of 13% in reservoir volume. The model prioritized maintaining levels in Quail Creek Reservoir, since it feeds the treatment plant directly. Sand Hollow Reservoir, while still impacted, retains enough volume under the shortage plan to keep boat ramps functional, maintain some recreational access, and ensures minimum operational elevations. Two years of hot, dry conditions are challenging but the shortage plan softens the impact. It stretches limited resources and protects critical infrastructure and quality of life elements, like recreation and public health access. So, while this is just a forecast based on historical data, it underscores the value and necessity of proactive planning.

Conservation Manager Doug Bennett explained the urgency for the water shortage plan. This winter was the driest on record, with St. George precipitation data going back to 1893 confirming the unprecedented nature of the drought. The snowpack, which is the area's primary and most critical reservoir, was the weakest ever measured since instruments were installed in the 1970s. As a result, agricultural allocations have been slashed and many farmers are receiving just 33% of their normal supply, meaning they are being forced to make drastic decisions regarding what to plant or whether to plant at all.

Due to the unusually dry conditions, residential water use surged during the winter. Water demand in January through March is 20% higher than normal, as residents turned on irrigation earlier and more often.

Mr. Bennett explained that to address the severe lack of rainfall and ongoing drought conditions, it is important to remember that this plan did not come together overnight. It is the product of a long and collaborative process. "I want to remind everyone that this has been a long process just to even get to this point. Over the past **year**, a dedicated Drought Task Force of 17 members has been working diligently to analyze the situation, evaluate options, and help shape the current shortage response framework. Their work was supported by the RWSA members, whose input helped refine and guide the process. There was also consensus survey conducted with over 60 municipal officials."

Mr. Bennett showed a graphic illustrating how the model would characterize shortage conditions in the prior 30 years and went on to describe some characteristics of response in the various stages:

Stage 1 – Awareness and Messaging

- Would have occurred in approximately 3 out of every 10 years (about 30% of the time).
- Focus is primarily on public awareness and voluntary conservation.

Stage 2 – Active Reduction Measures

- Would have occurred in 5 out of the last 30 years (around 17% of the time).
- The most significant period was during the 2002–2004 drought, the harshest period of the Colorado River drought, which also severely affected the Virgin River.
- This stage includes more aggressive conservation and supply actions.

Stage 3 & 4 – Emergency Conditions

- A few individual months reached Stage 3 criteria, but not the sustained conditions required for declaration.

Mr. Bennet said that under the plan, "it takes three consecutive months of qualifying conditions before a stage declaration is made. We want to avoid a scenario where we announce an emergency only to reverse course shortly afterward due to temporary changes like a rainstorm. This approach ensures the public receives consistent and credible messaging, and that the actions tied to each stage are justified and sustainable."

Mr. Bennett explained the measures implemented will depend on the severity and duration of the drought conditions. Each drought stage triggers a set of increasingly stringent actions to manage demand and preserve supply. There is broad consensus among municipalities that it is critical to move forward together in response to drought. While participation is encouraged, cities that choose not to adopt this regional drought plan will face reduced water deliveries from the District.

According to Mr. Bennett, "residential water use accounts for two-thirds of overall demand. You cannot achieve meaningful reductions without participation from the residential sector. While commercial and other sectors will also contribute, residential conservation is the cornerstone of success."

The plan aims to sustain essential services such as healthcare, public safety, and basic municipal operations even in severe drought stages. Conservation measures should be implemented in ways that minimize economic disruption and help maintain employment, particularly in sectors closely tied to water use. Priority is placed on preserving long-term, irreplaceable landscape assets, such as mature trees and critical vegetation that contribute to community resilience, shade, and ecosystem health. While lawns can be re-established in a season or two, a 40-year-old tree cannot be quickly replaced, making such landscape elements a higher priority.

The drought response plan uses a phased approach, with incremental and escalating measures that correspond to the severity of the drought:

- **Stage 1:** Initial awareness and voluntary conservation.
- **Stage 2:** Mandatory measures with greater restrictions.
- **Stage 3:** Significant reductions and stricter enforcement.
- **Stage 4:** Emergency-level actions with critical limitations

One of the largest sources of water use with the least community value is decorative areas of lawn that serve no recreational or functional purpose and are only accessed for maintenance, such as mowing. These areas are difficult to justify in times of drought and are among the first to face restrictions.

The drought plan emphasizes tiered reductions in services, aiming to conserve water while still maintaining some level of benefit.

- **Car Washing**: May still be allowed, but with limits on frequency or requiring recycling systems.
- **Development Review**: Cities may allow only essential or water-efficient projects during higher drought stages.
- **Golf Courses**: Will be required to reduce water use, with self-directed conservation plan**s** tailored to each course's design.
- **Splash Pads:** Might operate on reduced schedules (e.g., certain days only) to balance community enjoyment and water savings.

Mr. Bennett explained landscape uses more than half of the region's urban water supply, making it the single largest category of water demand. Using aerial imagery and modeling data provided by Bowen Collins, the District analyzed the composition of irrigated landscapes. Total landscape irrigation in the region accounts for an estimated 9–10 billion gallons of water per year. Lawn grass alone, 40 percent of which serves a decorative purpose, consumes about 75% of that total, making it the most water-intensive landscape element. This data reinforces that turf reduction and smarter landscape practices will be essential components of any effective drought response or long-term conservation strategy.

Mr. Bennett described the key reasoning behind each of the stages of the plan:

Stage 1 - 10% water use reduction through moderate, low-impact measures and public engagement. Defer lawn planting during the hottest months and encourage planting in spring or fall when water demand is lower. New single-family residential pools would be limited to 600 square feet and any request for new service in the top 1 percentile would be refused unless a city deems the use "critical." Golf courses would have a voluntary 10% reduction in water use by golf facilities and courses may design their own conservation methods to achieve the goal. The cities would have to make adjustments on their rates, recognizing the dual crisis of water shortage and potential revenue loss.

Stage 2 - represents a critical turning point in the drought response plan. It is the action stage and calls for 20% water use reduction. Only drip-irrigated plants would be allowed to be irrigated. All ornamental lawn irrigation would be prohibited. Fountains and misting systems would be shut off. The District would enhance its incentive programs to support residents transitioning from ornamental lawns to drought-tolerant landscaping. Only community pools would be allowed to be built. Residential swimming pools, which increase household water use by up to 20%, would not be allowed during Stage 2. Lawn planting would be suspended on all permitted projects and prohibited for new permits. New building permits would be issued with strict water allocation limits. If a permit previously allowed lawn installation, that aspect would be deferred until conditions improve. New water connections for non-essential facilities using over 3 million gallons per year (top 5% users) would be deferred. Cities, not the District would determine what qualifies as a critical facility. Car washing would be limited to once per week. Enforcement would rely heavily on community compliance and cooperation. Efforts would focus on limiting frequent, non-essential usage

Stage 3 - 40% reduction in water use is required across sectors. Irrigation is limited to once per week and must be done only with a handheld hose or drip system. Lawn conversion to drought-tolerant, drip-irrigated plants is still permitted and encouraged. The District would defer all new connections except critical facilities and low water use projects. Swimming pools must use evaporation barriers or covers and be limited to make up water only. Splash pads and water parks would be suspended. Vehicle washing would be limited to once per month maximum. Golf Courses would be subject to a more stringent water budget, potentially accompanied by revised rate structures developed by the respective agencies.

Stage 4 – 60% reduction, all outdoor irrigation prohibited, and all non-essential facilities prohibited. At this level, the focus shifts heavily toward preserving water for health and human safety, including drinking water, sanitation, and fire protection not only for structural fires but also for wildfires.

Mr. Bennett explained that the area has never seen Stage 3 or 4 conditions before. But, the area is facing the greatest water demand in the community's history, while simultaneously experiencing the lowest water supply it has ever had. It is critical that leaders plan accordingly to ensure the security and well-being of the citizens they serve.

Mr. Bennett explained that the Administration Advisory Committee's role is to make recommendations to the Water District Board regarding the adoption of the plan. The Board of Trustee ultimately puts the plan into effect. The District believes it is the responsibility of individual municipalities to determine how they will enforce those measures.

Mr. Bennett strongly encourages this committee, even if there are elements some may not feel completely comfortable with, to recommend that the Board adopt the plan. If needed, additional committees can work through the implementation details. There will be plenty of opportunities to refine how the plan rolls out. The community is navigating uncharted territory here, but this plan gives us a critical starting point.

Discussion:

Mayor Randall commented that she just had a chance to skim through this today, and her concern is until we have a regional reuse plan in place the way we manage reuse water is critical. St. George uses its reuse water for schools, parks, and golf courses and has already made significant cutbacks especially on the city's golf courses but continuing to reduce that usage without a proper storage solution means we are just sending that reuse water down the Virgin River to Lake Mead, and frankly, that does not make sense to me.

Mr. Bennett commented that he agrees with that. This is ultimately a policy decision that each community using reuse water will need to address. Cities will have to determine what their policies should say about reuse water particularly when it comes to golf courses and parks. But just as important is making sure the public understands the reasoning behind those policies. It is not just about making the decision; it is about communicating the value behind it so that citizens are informed and supportive

Mayor Randall also said there are a lot of things in this plan where enforcement is going to be a challenge. Mayor Randall said that "just today, while I was driving down River Road, I noticed there are two churches, and the one on the east side, closer to 900 South, is tearing out a bunch of grass. They still have a lot left, but it is a start. Honestly, churches and many businesses too are still low-hanging fruit when it comes to water conservation. There's so much grass that no one ever uses. You never see anyone on it. No one walks on it. That kind of landscaping just does not make sense anymore, and that is where we need to start focusing our efforts on."

Mr. Bennett responded that the district has had numerous discussions with the Church of Jesus Christ of Latter-Day Saints and also noted that many local governments still have ample opportunity to improve water use on public facilities.

Mayor Billings said that looking at the historical frequency of shortage conditions over the past 30 years based on the data in the yellow zone, which represents Stage 1, occurred nine times. That is the stage where people are encouraged to consider changes

like alternative planting choices or maybe opting not to build a large pool over 600 square feet. According to that same data, five of those years would have qualified for Stage 2 conditions for the entire year, while 16 years fell into the 'normal' category meaning no major adjustments would have been necessary.

Mayor Billings said that the issue she has is that the data has not been updated in the last three years. It does not reflect the current situation. Mayor Billing said that her question is what stage would the region actually be in today? She said, "if we are being asked to adopt this plan, we need to clearly understand what level we are currently at and what specific actions that would trigger."

Whit Bundy explained based on the model, the area entered Stage 2 conditions this past month. However, according to how the plan is structured, Stage 2 conditions must persist for three consecutive months before a Stage 2 declaration can be officially adopted. As of now, the model indicates the area is experiencing Stage 2-type conditions.

Mr. Bennett commented that if the plan were adopted immediately—say, at the next meeting—it is possible to see a Stage 2 declaration later this summer.

Mr. Bundy commented that under the plan right now, it will still be in Stage 1. But if current trends continue, it will likely transition into Stage 2 by late summer or early fall.

Mayor Wilson asked if it take three months of being in stage 2 to get out of stage 2. Mr. Bennett responded, yes, exactly. Let us say you had three months in Stage 2, followed by a month in Stage 1, and then another month in Stage 1—you would still remain in Stage 2. You would not move back down until you had three consecutive months of Stage 1 conditions, at which point you could make that declaration."

Mayor Billings agrees with Mayor Randall about the issue of storage—it does not make sense to just send reuse water downstream. But Mayor Billings said that she struggles with groundwater. Mayor Billings said what while most of the conversation has focused on surface water, groundwater is still part of the picture. Mayor Billings said that it is difficult to say the regional is not going to use groundwater when it remains a critical resource that has not been fully addressed in this discussion.

Mr. Bennett commented "the state engineer believes that our groundwater is fully appropriated. However, Sand Hollow does provide some groundwater storage capacity. It is important to understand, though, that the more we pump from the wells in the Sand Hollow basin, the faster we deplete that storage. In fact, as we increase pumping, the water level in the Sand Hollow Reservoir itself will decline. Essentially, when you are pumping from wells in that hydrologic basin, it is like you are drinking directly from the Sand Hollow Reservoir—so it is one or the other. And if we believe there's additional groundwater available beyond what is currently allocated, the state requires us to prove that through detailed hydrologic studies to demonstrate its sustainability."

Mayor Billings said that Hurricane has conducted hydrological studies that has shown from the 1970s to now there has not been a significant change in groundwater depths. So even though the region has gone through some of these drought stages and the population has grown, studies have not observed a notable shift in the static water levels. Mayor Billings also said that it is important to consider that when reducing outdoor watering as discussed in many of these conservation measures it can have an impact on the aquifer. Less watering means less incidental recharge, so the region is not putting as much water back into the ground.

Mr. Bennett explained that he "is not going to defend the idea that overwatering your lawn somehow recharges the aquifer. It is true that in agricultural settings, like flood irrigation on orchards, some of that water does make its way back into the groundwater. But in urban irrigation, that is typically not the case. If water is reaching the aquifer from a residential lawn, it usually means you are significantly over-irrigated. And even then, we have to be cautious because urban runoff or leachate can carry nitrates and other contaminants we do not want in our groundwater."

Mayor Hart asked if the 2,000-acre-feet allocation guaranteed to the Shivwits Band is a fixed amount. Mr. Renstrom commented that is a guaranteed hard number, and that was done by the State of Utah and Federal Government. So, the Shivwits band is not subject to the water shortage plan.

Scott Taylor commented "in reality, we are already in Stage 2 conditions right now. If this continues for two more months, we will officially declare Stage 2. So realistically, by the end of the year, front lawns in every community could be dead."

Mayor Billings commented that she "is not saying we should not take action, what we need to do is carefully consider what issues we are addressing. It is not just about lawns it is about avoiding unnecessary panic. I do not want to scare people or create fear. Our goal is to encourage everyone to be responsible stewards, to conserve water, and to do all the right things, but in a way that is thoughtful and measured."

Mayor Randall pointed out that the moment you tell people they cannot water their front lawns and those lawns start dying, there will be backlash. People will question why are you even issuing building permits under those conditions.

Mr. Bennett said "one of the key takeaways from the survey was that there is a strong desire to sustain as much economic activity as possible. And we all recognize that a significant portion of that economic activity is tied to development. So, in crafting this plan, we aimed to allow certain types of development to continue, even under constrained water conditions."

Mr. Bennett said "each of you has to consider which of the difficult outcomes I have described would have the greatest negative impact on your community and your constituents. You saw the chart Whit presented: if we do not adopt a meaningful plan, we risk facing the harshest consequences, especially if we have a hot summer followed by another dry winter. I take no pleasure in presenting something that feels like a dilemma. The district is not trying to impose hardship; we are trying to offer solutions to what are foreseeable problems. These conditions are entirely foreseeable. You can walk into any of your city halls and see historical images—floods, droughts, and hardships our pioneers endured. We have built a strong system over the years, but there is one thing we cannot control: how much water Mother Nature provides. The only thing we can control is the demand we have created for that water."

Commissioner Adam Snow commented that he thinks "the outcome could swing the other direction too. If the decision is, everybody can keep watering their lawns, but we are going to halt all new building permits, that is going to trigger a strong reaction. Developers will mobilize. You will likely see a new AAC form almost immediately in response. They will find a candidate who supports continued development, and there will be millions of dollars backing that person. So, it really comes down to who are you willing to upset the most, because no matter what, you are going to make someone mad. I do agree with your point about reuse water, which is an important part of the conversation. And even the topic of front lawns is worth discussing. At my house on 300 South growing up, we did not have a backyard; our front lawn was where we played. It was our football field. The house was set far enough back that the front yard was our main recreation space. The garden was in the back, but that was it. So, if we are going to have this conversation, we need to define what we are asking people to give up."

Mr. Bennett commented that the district would have no objection to a policy that includes an exemption mechanism allowing homeowners without a backyard to designate their front lawn as a primary recreational area.

Mayor Randall commented that instead of setting the timeline at three months for issuing Stage 2, perhaps it could be extended a bit further. Could we consider four or five months instead of just three? Mayor Randall also said that some of this may need more time.

Mr. Bennett commented that there is no obligation for the board to act on specific timelines. It is ultimately at the board's discretion. The board is not compelled to make a declaration while the policy suggests certain actions occur at specific stages, each stage of drought must be formally declared by the District's board.

Regarding the list of actions tied to specific drought stages, John Willis asked whether the certain percentage reductions can adjust. Mr. Willis said, "Can these actions be modified or moved between stages? For example, not watering grass or halting building permits does not quite feel appropriate for Stage 2. Those seem more fitting for a Stage 3 response."

Mr. Bennett commented that the consensus survey results showed the average value for that measure did not exceed 3 when responses from elected officials were evaluated.

Mr. Willis commented that it is up to the board to provide a recommendation and noted that the proposed measures can be modified if the board chooses to do so.

Mr. Bennett commented that the goal is for this body to make a recommendation to the board to adopt the plan. If the recommendation includes forming a committee that meets on a monthly basis, it could help the district stay ahead of future challenges by regularly assessing direction, needs, and potential modifications. Mr. Bennett emphasized the importance of proactive planning, saying "you always have about 90 days of warning to see where things may be headed." Mr. Bennett also pointed out that the models assume each stage meets their respective water reduction goals, but current usage suggests otherwise. "I just showed that we are using 20% more water than expected in Stage 2. So, if the goal is a 20% reduction from baseline, and we are already exceeding that by 20%, we are actually looking at a 40% gap."

Mayor Randall questioned where the 20% increased water usage is occurring, asking "is it all residential or a specific community?"

Mr. Bennett responded that an analysis could be conducted to better understand the source of the increased water use. Mr. Bennett suggested that the study could look at how much of the increase is due to the thousands of additional building permits

issued each year, and how much is attributable to existing residents using more water perhaps because they had to irrigate more during an exceptionally dry period compared to a relatively normal winter.

Mayor Hart commented that the core issue is not about political consequences or whether any of the current officials are re-elected it is about the reality of limited water resources under drought conditions. Mayor Hart said, “the decision is not whether we lose just our front yards it is whether we want to risk losing both front and back. If we do not act now, we could end up in Stage 3. The completely irresponsible thing to do would be to not adopt a plan like this.” Mayor Hart said there may be concerns about image, messaging, and enforcement, but emphasized the importance of framing the issue effectively. He said, “the message is not turn off water to your front lawn - it is choosing your lawn, front or back. Which one do you want to keep, because if we do nothing, the reality is we could lose both. We are talking about an essential, life-giving commodity.”

Mayor Billings said that “I do not think any of us want to bury our heads in the sand. The real question is where do we want to save water, and I do not think its right to ask people to take out their lawns or stop development.” Mayor Billings commented that there are immediate actions that do not involve stopping development or removing front lawns. She said, “we have been talking about places like churches and other properties with ornamental grass, those can be 100% addressed first, and that alone might account for 20% of water use. I am just saying, I do not think we have fully explored all the options yet.”

Mayor Hart commented that the plan should have been adopted long ago. He said, “I am just saying that if we do not adopt this now we are already behind. This should have been done 10 years ago. We should have had something like this in place for years, and we do not. Now we are facing a critical year.”

Mayor Randall commented that there seems to be a conflicting message that is difficult to reconcile. She said, “We keep saying, we have a 20-year plan, we are good, and now we are suddenly saying we do not have enough water.”

Mayor Staheli said that he appreciates the input from fellow mayors and emphasized the need for balance. “I honestly don’t disagree with Mayor Hart, Mayor Billings, or Mayor Randall. What we are trying to find is that middle ground. The reality is we are already there. We are in Stage 1 and moving into Stage 2, which will bring more serious challenges. The key question is: where do front lawns and ornamental grass fall? Are those Stage 2 issues? Stage 3? Should there be a phased timeline before implementation?” Mayor Staheli said he would be prepared to make a motion recommending approval of the plan. Mayor Staheli said that he feels like there is still a bit more messaging around what specifically is expected in terms of grass appearance. For instance, Mayor Staheli asked, “does the grass need to be green or brown in Stage 2, or can that expectation wait until Stage 3 or 4?” Mayor Staheli also said that the leaders knew this was coming and are not blind to the fact that we live in a desert. He said, “We just caught it now, and there are a few small details we need to work through as a group to be fully prepared, but there has to be something in place.”

Mayor Randall said that she agrees with Mayor Staheli that we need to have a plan in place. Mayor Randall said she thinks “there is room for some adjustments and maybe it is up to each municipality to reach out to businesses and churches that have large areas of ornamental grass and start that conversation.”

Mayor Staheli suggested that perhaps in Stage 2, the focus should be on ornamental grass at churches and businesses letting that go brown first as a visible warning to residents. If the area reaches Stage 3, then residential lawns follow. Mayor Staheli said that he does not know where the right balance is and that he does not discount the urgency of having a plan. Mayor Staheli said that “we all agree that we are 100% aligned on about 90% of it.”

Mr. Bennett emphasized the importance of adopting a plan while remaining open to adjustments. Mr. Bennett said, “we have not started messaging Stage 2 or Stage 3 yet, and we do still have some time, but what concerns me is the need for a plan that addresses the conditions we are currently facing. There is still time to possibly shift some elements around. The challenge is that even among those of us who served on the committee, we had these same difficult discussions. It is just a hard issue to navigate.”

Mayor Billings said that it is hard to resolve difficult discussions when key decision-makers are not present. She said, “maybe we need to have a real working meeting in a few days, where we bring concrete suggestions about the tough choices we are actually willing to make.” Mayor Billings said she is not opposed to having a plan. She said, “I want one, but it is hard to reconcile a system where people who have been here for generations and are now being told to rip out their grass and stop watering, while others are still allowed to come in and build whatever they want.” Mayor Billings said that she does not feel like she can “go to her residents right now and say, we are just going to limit pools to 600 square feet, because that is not really saving us anything and even deferring lawn planting is not going to have much impact. If we want to see real results, we need to come up with something that will actually conserve water.”

Mayor Hart said that there has really only been one main concern raised which is the issue of removing grass. He has not heard anyone express concern about anything else. Mr. Hart suggested sending the matter to the committee to find a way to eliminate decorative grass, except for some allowances on front lawns.

Adam Snow asked “how much water savings would be if you just did business municipal properties? Mr. Bennett responded that businesses account for about 15% of total water demand.

Mayor Rosenberg said that he is ready to make a recommendation to the board. “I think we should consider allowing cities the flexibility to meet the 10% reduction target in ways that make sense for their unique circumstances. Every city is different and may have specific strategies to reduce outdoor water use.” He also explained that in Santa Clara, about 30% of the city is irrigated by a canal company, which owns the water. Mayor Rosenberg said, “we cannot just shut off that water. We need to figure out how to account for those kinds of unique situations.” Mayor Rosenberg also pointed out that some cities have golf courses to manage, while others do not. Each city needs to take a deep dive into its own situation. He expressed appreciation for the seriousness of the discussion and glad everyone is treating this as a warning. “It has been talked about for two years, and it has never gotten as intense as it has today and honestly, I am kind of excited that it has finally reached this point.”

Mr. Renstrom asked Mayor Wilson and Mayor Krause to share their thoughts.

Mayor Wilson said most of the irrigation water in La Verkin is under contract that use to be with the canal company. La Verkin owns the water right but is still obligated to provide water to the people. Mayor Wilson said, “so, even if we move into the next stage of restrictions, you are still going to see a lot of green lawns.”

Mayor Krause commented that you will see the same situation in Virgin. “Right now, most of the homes with really nice green lawns aside from the new developments from the last couple of years are using irrigation water, and they will continue to have green lawns because of that.”

> ***Mayor Billings moved for the group meet back in three, four, or five days to come up with solutions, and then make a decision. The packet was just received yesterday, and we need to actively work together on this. Mayor Billings also said that she loves the idea of finding real solutions and “this is a mastermind moment where we put our heads together and figure out how to make it work. Even though the group has already been working on it, if we are serious about achieving a 10 to 20% reduction in water use, we need to clearly identify where those savings are actually going to come from.”***
>
> ***Mayor Staheli offered a counter motion: “After hearing Mayor Rosenberg’s comments, I feel the urgency to move this forward to pass it now, while recognizing that there is flexibility within the Water Shortage Contingency Plan to make changes. We are here now, and this is the time to act. Before it goes to the board, I believe there’s still room for additional discussion, further recommendations, and possible modifications. Ultimately, the goal is to achieve a 10% reduction in Stage 1, 20% in Stage 2, and so on. My motion is to recommend adoption of the Water Shortage Contingency Plan to the Washington County Water Conservancy District Board, recognizing the built-in flexibility of the plan.”***
>
> ***Adam Snow seconded the motion adding that there is real urgency here. If we do not fully agree with every word in this plan right now, then it is even more important that we reconvene in a few days with specific input. Otherwise, the board may adopt this as-is, and it becomes the standard moving forward.***

Discussion on the motion:

Mayor Hart said, “I think what I am hearing is that the board will ultimately make the final decision on this and, suggestions can still be submitted to the district, shared with the committee that developed the plan, and then passed along to the board. Then the board will then determine which of those recommendations address the concerns raised here. Is that an accurate understanding?”

Mayor Billings responded, “we should be recommending something we actually support not something we are immediately suggesting needs to be changed. I understand there is flexibility, and that is fine, but we need to be clear: if we are recommending a plan while also saying it still needs modifications, then it is not quite the same.”

Mayor Randall said that before the board meets, she will sit down with St. George Water Services Manager Scott Taylor and St. George City Manager John Willis to review the plan and identify if there is anything "we might be able to tweak. I want to bring those suggestions back to the board for discussion to see if they are open to making any adjustments.”

Mayor Hart said that, “ultimately, all of this is going to come back to the individual cities. The board is not deciding what will be implemented in each of our communities and that responsibility lies with our respective City Councils.”

> **With the exception of Mayor Billings, all members voted “aye” in favor of Mayor Staheli’s motion.**

Large water use approvals

Water District General Manager Zach Renstrom said that the District frequently receives proposals from developers involving high water usage such as golf courses, water parks, or more recently, a data center that proposed using nearly 500 acre-feet of water annually, which is comparable to a golf course.

Mr. Renstrom added that he has been considering how to better manage large water-use proposals. Currently, there is no formal definition of what constitutes a large water use.

Mr. Renstrom recommended that for any entity requesting large water usage such as building a golf course, the request should come before the AAC. The group would then decide whether to allocate the RWSA's limited water resource to such a project. Mr. Renstrom pointed out that the District's current 20-year water plan does not include any new golf courses, and approving even one could consume a year's worth of projected water availability from the plan.

Mr. Renstrom said that he values the input of the AAC as a body and he would like to hear feedback on this idea before the District begins drafting a formal policy.

Commissioner Snow commented that from the County's perspective, "we see this frequently." Commissioner Snow said, "when developers come to us with high water-use proposals, we try to provide direction and often refer them to the Conservancy District. But what happens next is that they immediately start shopping around with different cities to find one that is most likely to approve their project. This makes it critically important that we have a consistent and coordinated approach, because decisions in one city can affect water availability for everyone."

Mayor Staheli stated that he wanted to build on Commissioner Snow's comments, expressing support for the board's resolution limiting large water users, which he sees as just as critical as the current water shortage contingency plan. Mr. Staheli pointed out the concern about developers "shopping" their projects among different cities and the tendency to politicize large water use approvals.

Mayor Staheli recommended that any exceptions to the board's resolution on large water users when brought before AAC should not be approved by a simple majority. Instead, he proposed requiring a supermajority vote of at least two-thirds, to ensure broad consensus among all entities participating in the Regional Water Supply Agreement.

Mayor Billings asked a clarifying question regarding Hurricane City's ordinance. She noted that the city's current resolution allows for certain high-water-use developments such as water parks or golf courses if the developer brings their own water supply.

Zach Renstrom responded, noting that St. George City has a similar policy to Hurricane City regarding developments bringing their own water supply. Mr. Renstrom explained that while the District has limited ability to regulate or work with projects that provide their own water, a common situation arises where developers claim to have water rights for example from the Santa Clara River but want to use the District's infrastructure in places like Toquerville. Mr. Renstrom emphasized that this creates a complex dynamic, but ultimately, if a developer truly brings their own independent water supply and infrastructure, they can build their project as they wish.

Mr. Renstrom said that the District will draft a proposal outlining what the policy might look like regarding the large water users and will bring the draft for discussion or potential approval to the next AAC meeting.

Consider approval of January 29, 2025 minutes

Michele Randall made a motion to approve January 29, 2025 minutes, with the amendment of the discrepancy in the attendance section, the motion was seconded by Rick Rosenberg and all voted aye.

Next meeting Wednesday, August, 27, 2025 from 12:00 pm to 2:00 pm

The meeting was adjourned upon motion.

Mindy Mees
Secretary

2025 Water Shortage Contingency Plan

Discussion Draft

This plan identifies actions to reduce water demand incrementally in response to conditions that range from routine conservation to catastrophic deficiencies. Disasters – earthquakes, wildfires, critical infrastructure failure, prolonged drought or supply contamination – can occur unexpectedly. Having a uniform plan helps to ensure all community members can stay safe, healthy and resilient during disasters or disruptions to the water supply.

Executive Summary

As one of Utah's hottest and driest regions, and one of the nation's fastest growing metropolitan areas, Washington County is vulnerable to impacts of reduced water supply and shortage. To prepare for emergency water shortage conditions, the Washington County Water Conservancy District (district) developed this Water Shortage Contingency Plan (plan). The plan was developed in partnership with its municipal partners to provide a collaborative system for prioritizing drinking water under circumstances of diminishing supply. The district's municipal partners are the cities of St. George, Washington, Hurricane, Santa Clara, Ivins, Toquerville, La Verkin, and the town of Virgin.

Additional stakeholders and an established task force (see Appendix A) were involved to help guide and inform the planning process. In addition, guidance was sought from more than 60 elected officials and technical experts through a survey instrument. The plan includes mitigation measures, drought monitoring, identification of shortage stages, response actions, a vulnerability assessment, operational framework, and an update process.

While drought is an ever-present threat in the region, other circumstances can result in water shortages, earthquakes, power interruptions or necessary infrastructure repairs can interfere with the ability to deliver water. The measures in this plan may be used to curtail demand in any scenario that diminishes the supply or distribution of water.

Mitigation Measures

The district and municipal partners have invested over $60 million in conservation measures and programs to reduce water demand, successfully reducing per capita usage by nearly 40% from the year 2000. The county's ongoing conservation efforts serve to increase shortage resiliency and mitigate impacts of water supply issues.

Drought Monitoring

The district developed a drought monitoring tool for identifying drought, quantifying conditions, and assessing severity. The monitoring tool consists of a drought model and dashboard. The drought model processes historical and current data to categorize water supply conditions into five numerical categories of increasing drought severity. These categories, or drought stages, will be directly linked to response actions. As this region moves from one stage to another, as defined in this report, the drought monitoring tool will update the drought dashboard and identify needed responses.

Water Shortage Stages
The five shortage stages range from "0" (normal conditions) to "4" (extreme shortage). The descriptors for each stage were carefully selected with consideration of public perception, and response actions were set to best communicate desired responses to varying shortage conditions. The response actions describe, in one word, how the district, its municipal partners, and the public should respond to the shortage stage.

WATER AVAILABILITY AND RESPONSE STAGES					
	Stage 0	Stage 1	Stage 2	Stage 3	Stage 4
	Normal	Dry	Prolonged Shortage	Escalated Shortage	Extreme Shortage
Response Stage	Conserve	Caution	Concern	Alarm	Crisis

Response Action Plans
Shortage response actions (actions) are directly linked to the stages, prioritized by severity. The actions align with necessary reductions in water consumption at each stage and are detailed for each response group.

Vulnerability Assessment
This assessment identifies areas of vulnerability in existing facilities, system capabilities, and water practices of the district and its customers. Additionally, the vulnerability assessment factors in climate, Utah state policy, supply, demand, and climate change.

Communication Plan
The task force will meet periodically to review technical information and make recommendations to the district's Board of Trustees, who will decide whether to announce a shortage stage change.

The district will coordinate with its municipal partners to provide information to the public via websites, social media and newsletters. Public outreach will extend to include press announcements, advertising, signage, and enhanced collaboration as necessary.

Plan Maintenance and Updates
The district will evaluate and update the plan every five years. Evaluation of the plan will focus on the accuracy of the shortage model and associated dashboard, response actions, and the communication plan.

Chapter 1 Plan Introduction and Background

Introduction

Washington County is Utah's hottest and driest region and one of the nation's fastest growing metropolitan areas. Population projections estimate a 155% increase in the county by the year 2060. The sole water source for Washington County's population centers, the Virgin River basin, is a small desert tributary prone to drought and climate variability that is fully appropriated. As the county approaches full utilization of its annual reliable water supply, the need for more stringent water resource management increases. Local municipal partners depend on the district to manage water supplies and provide for current and future use.

Background

To prepare for emergency shortage conditions and comply with Utah's water conservation requirements, the Washington County Water Conservancy District (district) developed this Water Shortage Contingency Plan (plan) in partnership with municipal partners that include the cities of St. George, Washington, Hurricane, Santa Clara, Ivins, Toquerville, La Verkin, and the town of Virgin.

This collaborative process designed a system for prioritizing drinking water under circumstances of diminishing water supply. A task force was developed to help guide this system, which included 18 technical experts from the district and its municipal partners (see Appendix A).

In developing the response actions described in Chapter 7, the district surveyed more than 60 stakeholders, including the elected council members, mayors and city managers of all municipal partners.

Elements

The plan was developed to include six elements: drought monitoring, vulnerability assessment, mitigation actions, response actions, operational and administrative framework, and plan development and update process.

Implementation

The task force reviews technical information and makes recommendations to the district's Board of Trustees. The board serves as the policy arm of the district and determines plan implementation.

The task force membership is comprised of representatives well-versed in water management and technical resources. The board is comprised of appointed officials who are policy and political decision makers.

Chapter 2 Vulnerability Assessment

The goal of the vulnerability assessment is to identify areas in which the district and its municipal

partners are vulnerable to shortage. The assessment quantifies the impacts of climate change, drought, and water demand on supply.

Climate

The district is in an arid region subject to frequent and prolonged dry periods and is one of the fastest growing areas in the US. These environmental and demographic dynamics make it challenging to plan for, manage, and operate a water system. Climate uncertainty further compounds this challenge and presents additional vulnerabilities. Washington County is extremely vulnerable to shortage for the following primary reasons:

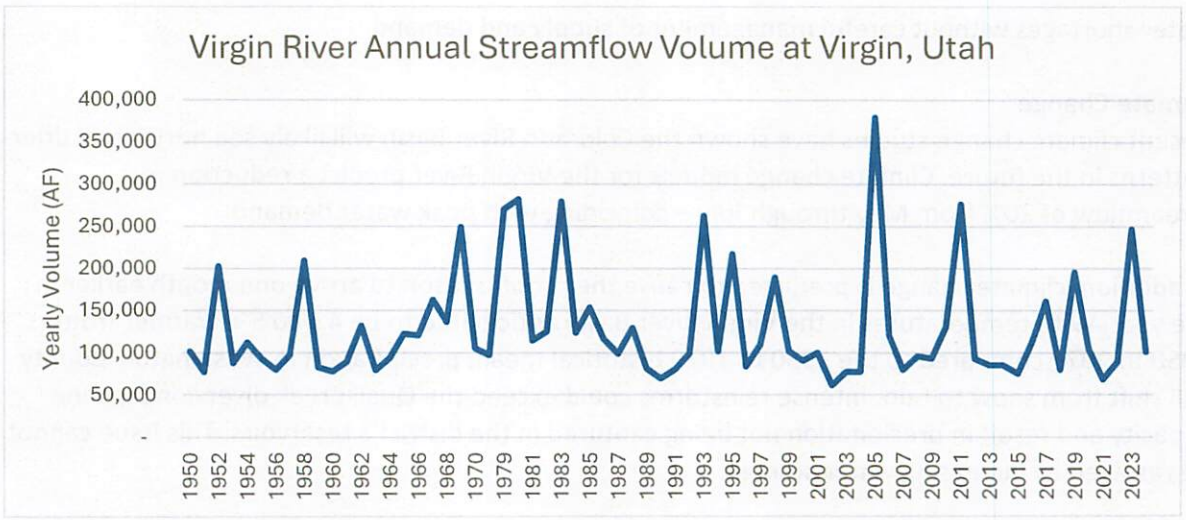
- Exclusive reliance on the Virgin River basin for its supply
- Prone to meteorological drought with long periods of drier than normal conditions
- Virgin River May-July streamflow is predicted to decline 20% based on the Bureau of Reclamation's 2014 climate change analysis
- County population growth has averaged nearly 3.5% per year over the past 10 years. Over that same period, Utah's growth was 2% annually
- Current annual water demand is approaching the annual reliable system supply

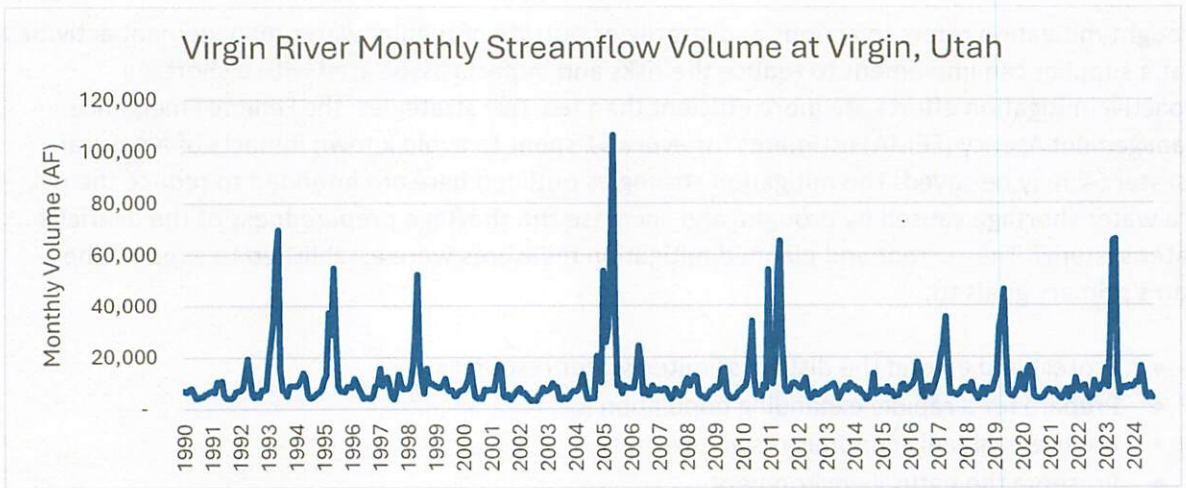
The district and the Utah Department of Natural Resources have taken a proactive approach to these challenges by frequently assessing water supplies, demand dynamics, and developing plans to improve resiliency. Visit wcwcd.gov for previous studies and reports related to this issue.

Water Supply

The district's water supply is approximately 80% surface water and 20% groundwater in the Virgin River watershed.

Surface water storage is highly dependent on annual flow in the Virgin River. Streamflow gage data for the Virgin River has shown a gradual decline over the past 100 years. While the precipitation, snowmelt and soil moisture that determine the amount of surface flow in the Virgin River are variable, there has been a demonstratable drop in available yield from this source over the last century.





Water Demand

The district is a wholesale water provider to its municipal partners. Based on the 2020-2024 five-year average, the current monthly demand for district water is 664 AF December through February and 3,562 AF June through September. The combined volume of water deliveries as reported by the district's municipal partners is 1,465 AF for the winter months and 2,503 AF for the summer months.

Drought History

Washington County is within a naturally drought-prone climate. The district's reservoir and groundwater supplies provide drought resilience; however, future climate models predict more extreme drought conditions in both magnitude and duration. Prolonged drought could result in

water shortages without careful management of supply and demand.

Climate Change

Recent climate change studies have shown the Colorado River Basin will likely see hotter and drier patterns in the future. Climate change models for the Virgin River predict a reduction in streamflow of 20% from May through July – coinciding with peak water demand.

In addition, climate change is predicted to cause the runoff season to arrive one month earlier in the year. With temperatures in the Virgin River Basin anticipated to be 4.5 to 5°F warmer from 2050 to 2079 compared to the 1950 to 1979 historical mean, precipitation in Washington County will shift from snow to rain. Intense rainstorms could exceed the Quail Creek diversion pipeline capacity and result in precipitation not being captured in the district's reservoirs. This issue cannot be resolved by increasing water storage.

Chapter 3 Mitigation Measures

Drought mitigation refers to actions and strategies outside of regular water management activities that a supplier can implement to reduce the risks and impacts associated with a shortage. Proactive mitigation efforts are more efficient than reactive strategies: the Federal Emergency Management Agency (FEMA) estimates for every $1 spent to avoid known impacts of a natural disaster $4 may be saved. The mitigation strategies outlined here are intended to reduce the risk of a water shortage caused by drought and increase the shortage preparedness of the district's water systems. The current and planned mitigation measures were established to support the plan's primary goals to:

- Protect and extend the district's limited water resources
- Prepare for a rapidly expanding population
- Provide regional economic resiliency
- Preserve the natural environment
- Prolong the longevity of water infrastructure

All mitigation measures described are generally compatible with the district's Water Conservation Plan and Best Management Practices suggested by the Utah Division of Water Resources. These include current, in-progress, and future or planned mitigation strategies, which are broken down into two general categories:

Institutional Strategies: These are non-engineered, administrative or legal strategies that include economic incentives, education and outreach, and development standards. Mitigation measures in this category address water use.

Water Supply Augmentation Strategies: These are engineered strategies that address water supply by increasing the district's water supply resiliency to drought and water shortages. These

may include the addition of new water sources, increased storage capacity, and expanded distribution systems for both potable and secondary supplies.

Current and planned institutional and watery supply augmentation mitigation strategies are highlighted below and described in more detail in the district's Water Conservation Plan, available on wcwcd.gov.

Summary of Current Shortage Mitigation Measures

Mitigation Measures		Description
Institutional Strategies		
CURRENT	Tiered Water Conservation Rate	Increased charges for higher use customers to incentivize conservation
CURRENT	Excess Water Use Surcharge	Accounts with excess water use are assessed substantial surcharges of up to $10/1,000 gallons
CURRENT	Financial Incentives for Conservation Efforts	Includes incentive to install weather-based irrigation controllers, high-efficiency appliances, water-wise landscaping
CURRENT	Education and Outreach	Provide education on outdoor water use to all citizens
CURRENT	Water Loss reduction	Establish a Water Loss Management Committee to identify projects that will reduce non-revenue water throughout the system.
CURRENT	New Development Standards	Coordinate with municipalities to enact new construction standards requiring water efficient fixtures and landscapes
CURRENT	Advanced Metering Infrastructure (AMI)	Provide automated meter reading and data collection to inform property owner of use and mitigate loss to leaks; most municipal connections have AMI meters
Planned	Advanced Water Modeling	Refinement of the Virgin River Daily Simulation Model for increased real-time data on the impact of river changes on the overall water supply
Water Supply Augmentation Strategies		
Current	Aquifer Recharge at Sand Hollow Reservoir	Recharge of the Navajo Sandstone Aquifer by the Sand Hollow Reservoir to be stored and reserved for dry periods to supplement supply
Current	Reuse Facility at St. George Regional Water Reclamation Facility (SGRWRF)	The reuse facility filters and chlorinates effluent from the SGRWRF to Type I reuse for agricultural, commercial, and residential irrigation. Currently treats 7 MGD but can be expanded to 10.5 MGD
Planned	Additional storage, wells, and pipelines	Addition of several new wells, pipeline, and water storage to increase distribution system flexibility

	Treatment Plant Expansion	Expanding treatment plant capacity to capitalize on high flows to offset periods of drought
	Gunlock Groundwater Optimization Study	Study the Gunlock aquifer recharge and define the actual sustainable yield for water supply optimization
	Regional Reuse Purification System	Expand non-potable reuse so additional irrigation water can free up quality drinking water for potable use. Future treatment will purify reuse water for potable use
	System Connectivity Strategies	New system connections to add redundancy and reliability
	Lake Powell Pipeline Project	Utilize a small portion of Utah's water right on the Colorado River

Water Supply Augmentation Strategies

The district and its municipal partners have several projects underway that are intended to increase the resiliency of their water supply. These projects encompass both potable and secondary water supplies or distribution improvements including:

- Recharging the Sand Hollow Aquifer, adding 5,000 to 18,000 AF per year depending on available supply
- Adding additional groundwater storage tanks for the Cottam, Sand Hollow, Quail Creek and Sullivan wells
- Expanding well fields in the Cottam, Sullivan and Sand Hollow regions
- Creating additional surface water storage in reservoirs including Graveyard Wash, Chief Toquer and Kolob
- Expanding the Quail Creek Water Treatment Plant from 60 to 90 million gallon per day (MGD) plant
- Performing groundwater studies in the Gunlock region
- Developing a regional reuse purification system that will produce about 24,000 AF per year of additional supply
- Enhancing system connectivity between Toquerville Springs and the town of Virgin, and wells in the Sand Hollow region
- Constructing the Lake Powell Pipeline

Additional project information is available in the district's 2023 10-Year Capital Improvement and System Replacement Recommendations.

Planned Mitigation Measure Prioritization

Mitigation measures are prioritized based on three evaluation criteria: water savings/addition, ease of implementation, and drought tolerance. The criteria for each mitigation measure were

scored on a scale of 1-5 with 1 being the least and 5 being the greatest. The sum of criterion scores for each strategy determined overall priority. Scores of 10 and above are considered high priority, 8-9 are medium priority, and a score of 7 or below are low priority. The results are displayed below.

Mitigation Measure Prioritization Matrix

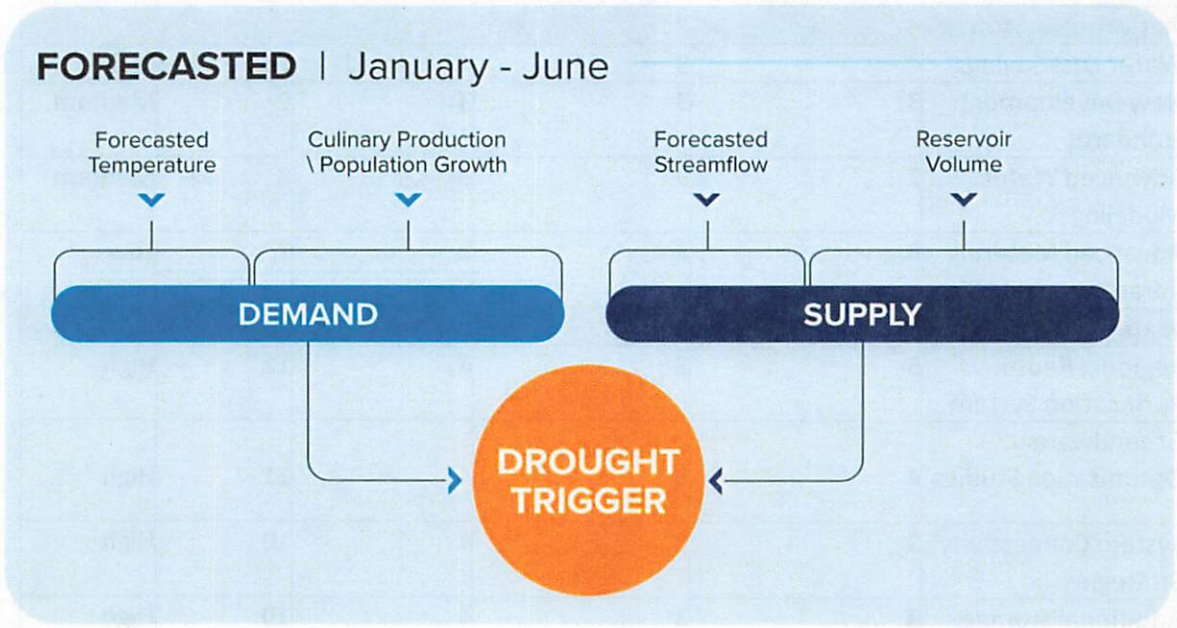
Mitigation Measures					
	Water Savings/Addition	Ease of implementation	Drought Tolerance	Total Score	Priority
Institutional Strategies					
Water Loss Savings	4	3	4	11	High
New Development Standards	3	3	3	9	Medium
Advanced Water Modeling	2	3	3	8	Medium
Advanced Metering Infrastructure (AMI)	3	2	2	7	Low
Water Supply Augmentation Strategies					
Regional Reuse Purification System	5	3	4	12	High
Groundwater Optimization Studies	4	3	4	11	High
System Connectivity Strategies	3	3	4	10	High
Additional storage, wells, and pipelines	3	3	4	10	High
Lake Powell Pipeline Project	5	1	3	9	Medium
Quail Creek Water Treatment Plant Expansion	2	2	3	7	Low

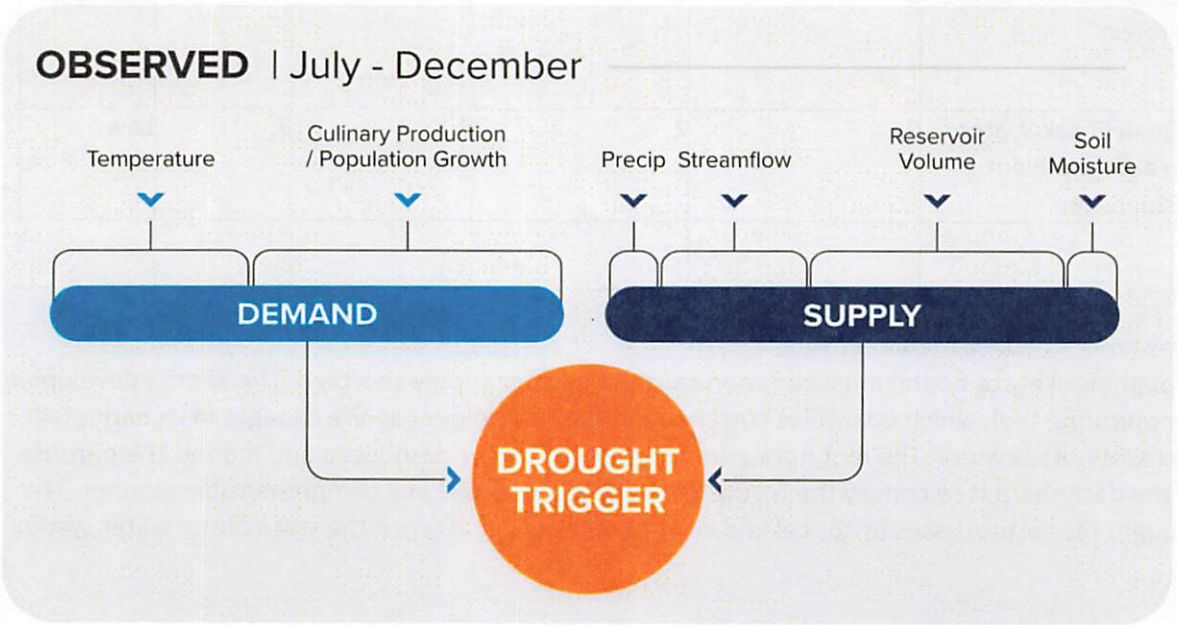
Chapter 4 Drought Monitoring

Drought is likely to be the most common cause of a water supply shortage. The district developed a monitoring tool, which quantifies current conditions to help recognize drought in its early stages and assess its severity. The monitoring tool consists of both a dashboard and model. The purpose of the dashboard is to convey the results of the drought model in a comprehensible manner. The drought model processes historical and current data to characterize the state of the water system

into five numerical categories of increasing drought severity (see shortage stages). These categories will be directly linked to drought response actions (see action plans). The drought model is programmed to automatically communicate with existing data sources to minimize the need for manual data upload; however, some datasets will still need to be routinely updated by the district.

The forecasted drought trigger components are illustrated in the following figures showing the observed components.





Water Supply Data Sources
Precipitation, reservoir volumes, streamflow, and soil moisture are used to calculate the supply component of the drought trigger.

Precipitation
The precipitation record used consist of measurements taken from nearly 13,000 stations owned by COOP, SNOTEL, Snowcourse, RAWS, CDEC, Agrimet, and EC (Canada). The data period of record ranges from January 1895 to the present.

Reservoir Volumes
The reservoirs considered for use in the model include Gunlock, Ivins, Kolob, Quail Creek, and Sand Hollow. Quail Creek and Sand Hollow Reservoirs were used in the drought monitoring model as a combined indicator in terms of percent capacity; together they constitute 86% of the district's current reservoir storage capacity.

Observed Streamflow
Monthly streamflow volumes were calculated from daily average flow and then ranked against the period of record.

Forecasted Streamflow
Streamflow forecasts in the winter are used to help predict water supply in the spring. Forecasts for the Santa Clara River near Pine Valley (USGS 09408400) and Virgin River at Virgin, UT (USGS gage 09406000) stations are available through the Natural Resources Conservation Service (NRCS) Web Service tool. The NRCS uses statistical models to produce streamflow forecasts.
These statistical models are equations expressing a fitted mathematical relationship between the target streamflow volume and predictor variables, including snow water equivalent, precipitation, and antecedent streamflow.

Soil Moisture
Modeled soil moisture information was obtained from NASA's North American Land Data Assimilation System (NLDAS). Soil moisture content is available at different levels; the model uses, the moisture content from ground level down 100 cm using the VIC model configuration.

Water Demand Data Sources
Air Temperature
Air temperature measurements are used to calculate the irrigation-driven component of the demand score due to its cause-and-effect relationship. Records for air temperature over the Washington County area will be accessed using the same methodology as the precipitation data. The period of record covers January 1895 to the present day on a monthly timestep. The county-wide monthly average temperature can be calculated by taking the average of all grid cells within Washington County.

Forecasted Air Temperature
Forecasted air temperatures in winter are used to predict irrigation-driven demand in spring. Seasonal temperature forecasts are available in 3-month increments and provided by the National Weather Service's Climate Prediction Center. Forecasts are given in terms of percentages above and below normal. Seasonal temperature forecasts are based on climate and weather models, recent trends, and historical records showing what temperature conditions resulted from similar patterns in the past.

Population
Annual Washington County population estimates are used to calculate the component of the demand score until 2020. Historical population data from 1900-1940 were linearly interpolated from available U.S. Census Bureau decennial census data. Population estimates from 1941-2020 were collected from the Kem C. Gardener Policy Institute of the University of Utah. For use in the drought monitoring model, a percentage change from the rolling 3-year average was used as the population indicator.

Production
Production data refers to all groundwater and surface water pumped and diverted into the water system by the district and its municipal partners. The historical record for production data consists of monthly volumes from 2017-2021. Monthly production volumes will be uploaded each month by the district. For use in the drought monitoring model, a percentage change from the rolling 3-year average is used as the production indicator. Production data is used to estimate the component of the demand score after 2020.

Data Server
For automated monthly updates, most of the datasets discussed in this plan will be retrieved directly from their respective sources; however, some data will come directly from the district. The district will need to upload two datasets to an FTP Server:

- Reservoir volumes (weekly)
- Production data (monthly)

The model will be programmed to automatically search for and retrieve these datasets from the FTP server.

Future Model Improvements and Ongoing Calibration
The drought monitoring model will require ongoing calibration as changes to existing data sources occur. It is recommended the task force convenes monthly to review, discuss, and confirm the district's current drought status.

Additionally, whenever a new major supply or demand data source is added to the model, or software is updated, a model revision will be required.

Without the addition of new or major changes to existing supply or demand data sources, the rate of recalibration and updates to the model are left at the discretion of the district. However, it is recommended that the model be updated at a maximum of every five years to evaluate accuracy and efficiency, account for changes in production growth rates, reservoir operation, and a longer period of record on all data sources affecting probability distributions.

Chapter 5 Shortage Stages

The shortage model applies the variables described in Chapter4 to generate a value that corresponds to one of five shortage stages (stages). Stages range from "0" for abnormally wet to normal conditions up to "4" for extreme shortage. These stages communicate the severity of shortage and water supply conditions to district partners and the public. Each of the five stages were assigned meaning, descriptions and associated actions that will help communicate the plan and necessary response actions (actions). The actions are discussed in more detail in Chapter 6.

To make a declaration of a particular stage, or to transition from one declared stage to another, the condition must persist for at least three calendar months, or ninety days. This measure was implemented by the task force to provide continuity of messaging and policy. Once declared, it would require three consecutive months of stage conditions to transition into a declaration of another stage. The district board, however, may advance or repeal a stage declaration at any time and for any duration if conditions merit such action.

Each stage is intended to produce enough water savings to abate the shortage and decrease the likelihood of experiencing advanced conditions.

Stage 0 – Normal

Stage "0" occurs when water supply meets current demands and is adequate to maintain or increase stored supplies. This stage reflects the region's typically dry and arid conditions with seasonal monsoon rains. This will be the stage when the district wants to communicate that regular conservation efforts are sufficient to support the water demands being placed on the system for the foreseeable future.

Stage 1 – Dry

Stage "1" describes meteorological conditions when water demands tap into stored supplies faster than they can be replenished. When stored supplies are dropping, additional actions will need to be taken to slow drawdown and bring the demand back in line with sustainable supplies.

Stage 2 – Prolonged Shortage

Stage "2" is established when water supply has been diminished (e.g. reservoir levels are low) and the meteorological conditions have failed to replenish the supply. This can occur if the actions of stage 1 were ineffective in reducing the demand to match supply, or when there is lower than normal precipitation over an extended time. In this stage, responses become more intrusive and

aggressive to conserve available water in case the dry meteorological conditions persist.

Stage 3 – Escalated Shortage
Stage "3" identifies a significant deterioration in available water supply, approaching critical levels. This stage will likely occur when there have been abnormally dry meteorological conditions for an extended time, or the precipitation levels continue to decrease from previous shortage conditions. Response actions in this stage command a prioritization of water uses. At this stage, water will be rationed and redistributed to maintain life sustaining uses and fire protection. Due to sufficient storage and quality infrastructure, a period of escalated shortage has yet to occur within the county's recent history.

Stage 4 – Extreme Shortage
Stage "4" is the most extreme stage and occurs when the region is in a declared state of emergency. Storage supplies have been depleted and water use will be limited to what becomes available in each season. Infrastructure will be unable to capture and store what precipitation may fall. All non-essential water use will be terminated and human health and safety will be the highest priority with water primarily allocated to health, sanitation and fire protection. A period of extreme shortage as defined here has yet to occur within the 53-year period for which modeling occurred.

The descriptors for each stage were selected to communicate the desired response and public perception of the shortage conditions. The descriptors escalate in severity and, in one word, describe how the district, its municipal partners, and the public should respond to the shortage condition.

Even though the model incorporates weather conditions, the stages refer to the water availability status. This was done intentionally to reinforce the message that not all precipitation is available for public consumption. The weather conditions impact how much water is recharging the system and how much of that water will become available to store for use; but are not direct drivers of the demand versus supply equation. This plan strives to connect the public's effectiveness in conservation actions directly to how much water can be left in the existing reservoir storage system and therefore available for future use.

The following table shows the results of applying the shortage model to 30 years of past conditions in Washington County. A historic review of the model for a period of more than 50 years showed the region would have been in stage 0 (normal) conditions 62% of the time, stage 1 conditions 29 percent of the time, and stage 2 conditions 9 percent of the time.

Historical Frequency of Shortage Conditions

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DROUGHT DECLARATION
1993	0	0	0	0	0	0	0	0	0	0	0	1	NO
1994	2	1	1	1	1	1	1	1	1	1	1	2	YES
1995	0	0	0	0	0	0	0	0	0	0	0	0	NO
1996	1	1	1	2	2	2	2	2	0	0	0	0	YES
1997	0	1	1	0	1	0	0	0	0	0	0	0	NO
1998	0	0	0	0	0	0	0	0	0	0	0	0	NO
1999	0	0	0	0	0	0	0	0	0	1	1	1	YES
2000	1	0	0	0	0	1	1	1	1	0	0	1	YES
2001	0	0	0	0	0	0	0	0	1	1	0	0	NO
2002	1	1	2	2	2	2	2	2	1	1	1	1	YES
2003	1	1	1	1	2	2	2	2	2	2	1	1	YES
2004	2	2	2	2	2	2	2	1	1	0	0	1	YES
2005	0	0	0	0	1	0	1	0	0	0	0	0	NO
2006	0	0	0	0	0	0	0	0	0	0	0	0	NO
2007	1	2	2	2	2	2	2	1	1	1	2	0	YES
2008	1	1	1	1	1	1	1	1	1	1	1	0	YES
2009	0	0	0	0	0	0	0	0	1	0	1	0	NO
2010	0	0	0	0	0	0	0	0	0	0	0	0	NO
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2019	0	0	0	0	0	0	0	0	0	0	0	0	NO
2020	0	0	0	0	0	0	0	0	0	0	0	0	NO
2021	1	1	2	1	1	1	1	1	1	0	1	0	YES
2022	1	1	1	1	1	1	1	0	0	0	0	0	YES

Chapter 6 Response Action Plans

Shortage Response Actions (actions) correspond to each of the five stages discussed in Chapter 5. The actions prioritize the response based on the level of the shortage's severity.

Principles of the Response Plan

Whereas water is critical to the region's economy, this plan seeks to protect core economic functions to the extent possible. This plan focuses heavily upon discretionary, consumptive and large water uses. The plan uses incremental measures that are intended to moderate user impacts and negative economic consequences.

The plan calls for water use reductions across every sector: residential, commercial, industrial and institutional. Despite that, some sectors may be more impacted than others due to the nature of water use (landscape vs. domestic), the relative value of the use (ornamental lawns vs. active spaces), or the enormity of the demand (top tier water users).

Landscape

Seventy percent of urban water in the region is used consumptively. Consumptive uses include, but are not limited to, landscape irrigation, evaporation from water surfaces, mist cooling systems, water system leakage and evaporative cooling systems. Collectively, consumptive uses are estimated at about 12 billion gallons each year. Irrigated landscape is estimated to account for 75% of consumptive use, or 9.4 billion gallons.

Type of Landscape	Estimated Annual Water Use	Percent of total water supply (2023)
All landscape types	9.4 billion gallons	54%
All lawn grass	7.0 billion gallons	40%
Functional lawn grass	4.2 billion gallons	24%
Ornamental lawn grass	2.8 billion gallons	16%
Other landscape types	2.4 billion gallons	14%

A 2023 analysis conducted by the district estimated there are 180 million square feet of lawn in the region and as much as 70 million square feet that are primarily ornamental.

Ornamental lawns are those that provide no recreational function, either because of their size, shape or accessibility. Whereas irrigated lawns use about four times as much water as drip irrigated plantings, this plan calls for restrictions on the use of spray irrigation and ornamental lawns before prohibiting drip irrigated plantings. Where development has been allowed, the installation of irrigated lawn areas may be deferred or prohibited, depending upon shortage stage.

Prohibiting irrigation of ornamental lawns could yield up to a 16% reduction in water demand without sacrificing active lawn areas or risking loss of mature trees and shrubs. In combination with such a measure, the district would provide an increased incentive for the permanent conversion of ornamental lawns to drip irrigated plants.

For purposes of shortage response, ornamental lawns would include, but not be limited to, decorative lawn areas at businesses and homeowners' associations and front lawns of residential homes. Areas that don't meet a municipality's definition of an active recreation area are also ornamental.

Allowing drip irrigated landscape to be installed and sustained will be critical to sustaining the region's tree canopy and mature plants and will help sustain economic activity in the landscape industry. By converting lawn areas to drip irrigated plantings during water shortage, the region will also improve long-term shortage resilience.

What is an Active Recreation Area?

Dedicated active play areas where irrigated lawn is used as the playing surface, such as a sports field or park designed for public use. Minimum requirements:

- 1,500 contiguous square feet of lawn area
- not less than 30 feet in any dimension
- not less than 10 feet from vehicular traffic
- accessible to large populations
- co-located with amenities, such as benches, tables, walking paths, drinking water and play equipment.

Water Recreation

Water recreation is a discretionary use. Home swimming pools are usually about 425 square feet in surface area and require 20,000 gallons annually to maintain. Homes with pools may use 20% more water than those without. Most of a pool's water demand is attributable to evaporation, however, some estimates suggest up to 30%of pools have leaking shells that lose water into the surrounding soil.

This plan calls for improved management practices on existing pools and a reduction of new pools during a declared drought condition. Because swimming pools may not be left empty without damage to the shell, and unmanaged pools can pose health and safety hazards, this plan allows the water level to be maintained in existing pools but calls for more efficient operational practices, such as the use of a vapor barrier (cover) to reduce evaporation and a prohibition on draining and refilling.

Community swimming pools provide recreation for hundreds or even thousands of people. In areas where a community pool exists, homeowners are less likely to install private swimming pools. Due to the economy of scale, this plan allows community swimming pools to continue to be constructed to a conservation standard during stage 1 and 2 conditions. This allows community pools to serve as a viable option to private swimming pools and also helps sustain employment.

Commercial water parks use 15 to 30 million gallons annually, which places them among the top

one percent of commercial and industrial users in the region. Water parks typically operate for just 4-5 months each year and cater to a limited sector of the population. Where not already prohibited, permits for construction of these projects are suspended in stage 1 and operation of existing facilities is suspended in stage 3.

Splash pads are water-play areas without a ponded water surface, most of which are associated with municipal parks. These facilities use about 300 gallons per square foot of play area annually and typically operate 5 months of the year. Most splash pads operate as single-pass water use, where water delivered through nozzles sprays onto bathers and then directly flows to the wastewater collection system where it may be recovered for reuse. Some splashpads may recirculate water through a swimming pool filtration system or recover the water for landscape irrigation on-site. Seventy percent of splashpad use is estimated to be captured to the drain, while the remaining 30% is lost to evaporation from the play surface and bathers. Operations of these facilities can be curtailed or suspended with little or no concern about damaging the infrastructure.

New Development

Increasing water demand during a water shortage is precarious. New permits for non-critical facilities are restricted at various stages of shortage, but projects with existing water commitments and appropriate permits that have already initiated construction may have a legal basis to proceed. Allowing previously permitted projects to advance while simultaneously restricting certain types of new permits creates a "glide path" for reduction of activity in the construction and development industries. This approach will soften economic impacts as compared to a sudden and absolute prohibition.

In some cases, the shortage plan requires the district or municipalities to refuse new service for certain types of water intensive facilities, such as, but not limited to, golf courses, water parks and data centers.

Even in a declared drought, the district foresees the need to construct facilities that meet a critical need for the community. There are also benefits in approving the construction of facilities that have nominal water demands during and after construction. Municipalities will determine what constitutes a critical facility, a low water use project, or a project that merits additional permits to reach completion. The district will honor these determinations where reasonable.

The district has adopted the following guidelines for determining whether a project merits designation as a critical facility:

- A critical facility is one that meets a pressing need for the general population, such as health care facilities or utility infrastructure.
- Depending upon supply conditions, housing may be deemed a critical facility, but preference should be given to multi-family dwellings and ultra-water efficient (UWE)

communities intended to serve as primary residences.

- Where UWE housing development is occurring, communities should be given consideration to develop community parks or swimming pools subject to the UWE design standard.
- Construction already permitted may proceed, subject to specific direction or intervention by a municipality. For example, if building lots have been prepared and transportation and utility infrastructure installed, construction of homes may be a nominal part of the total water demands of the project. However, if a permitted project has substantial water demands, a municipality may determine water shortage is a compelling reason to suspend or defer the project, within the scope of the jurisdiction's powers.
- Permits for facilities that require nominal water to construct or operate may be approved, even if they are not critical facilities.
- Permits issued should include clear stipulations that allow the municipality to suspend construction in water supply shortage conditions.

Drought Stage and Action Summary

Shortage Stage 0: Conserve
Water availability is at normal supply

- Implement Conservation Plan

Shortage Stage 1: Caution
Water availability is abnormally dry or decreasing supply
Target 10% reduction in water use

- Deploy stage 1 communications
- Promote stage 1 watering guidelines
- Reduce irrigation of public facilities by 10%
- Stage 0 actions plus:
    - Leverage smart metering systems to strengthen messaging
    - Monitor and report reservoir levels as a percentage of total surface water storage
    - Prevent lawn installations May through September
    - Limit residential swimming pool permits to 500 square feet or less surface area
    - Reject new connections for non-critical facilities with demands over 9 million gallons/year (MGY)
    - Implement stage 1 water rate structure
    - Increase enforcement of municipal water waste policies

Shortage Stage 2: Concern
Water availability is at prolonged shortage, or diminished supply
Target 20% reduction in water use

- Deploy stage 2 communications
- Promote stage 2 watering guidelines
- Reduce irrigation of public facilities by 20%

- Implement stage 2 rate structure
- Stage 1 actions plus:
    - Defer new grass installation. Drip irrigated, water-efficient plants only
    - Prohibit irrigation of ornamental lawns in all sectors
    - Defer new private swimming pool permits
    - Require new housing to meet Ultra-Water-Efficient standard
    - Reduce operation hours of public splashpads
    - Reject new connections for non-critical facilities with demands over 3 MGY
    - Restrict car washing frequency to 1x per week
    - Prohibit ornamental fountain operation
    - Prohibit comfort mist cooling systems
    - Implement golf water budgets for 20% reduction
    - Increase incentives for water efficient landscape 50%

Shortage Stage 3: Alarm
Water availability is at escalated shortage, or deteriorated supply
This is a critical stage to minimize the likelihood of reaching stage 4 conditions
Target 40% reduction in water use

- Deploy stage 3 communications
- Promote stage 3 watering guidelines
- Reduce irrigation of public facilities by an additional 10% (40% total)
- Turn off outdoor water features, including splash pads
- Implement stage 3 rate structure
- Stage 2 actions plus:
    - Spray irrigation prohibited except for communal active recreation areas
    - Watering limited to drip irrigation or hose with positive shut-off nozzle
    - Implement water budgets for golf courses to reduce demand 40%
    - Planting only allowed for conversion of lawn areas to water-efficient landscape
    - No new connections approved except critical facilities or low-water demand facilities
    - Swimming pools must be covered when not in use (where swimming pools are allowed). Only make up water is allowed, no draining and refill.
    - Recreational water parks and splash pad operations suspended

Shortage Stage 4: Crisis
Water availability is at extreme shortage, or depleted supply. Health, sanitation and fire protection are primary objectives
Target 60% reduction in water use

- Deploy stage 4 communications
- Deploy stage 4 watering guidelines
    - Irrigation prohibited
    - Implement stage 4 rate structure
    - Stage 3 actions plus:

- All outdoor water recreation suspended
- Car washing prohibited, except dry wash products

MEASURES	Stage 1 - CAUTION	Stage 2 - CONCERN	Stage 3 - ALARM	Stage 4 - CRISIS
Landscape	Municipalities target 10% reduction Increase enforcement of municipal water waste policies Planting lawn grass prohibited May through September Spray irrigation prohibited 11A to 7P May through September	Municipalities target 20%reduction Drip irrigated plant installs only. Ornamental lawn irrigation prohibited Operation of ornamental fountains over 25 square feet prohibited	Municipalities target 40%reduction. Outdoor irrigation limited to 1x per week using a handheld hose or drip irrigation system. Conversion from lawn to drip irrigated landscape allowed	Irrigation prohibited.
Water recreation	Private residential pool permits limited to 600 square feet surface area Public/semi-public facilities scaled based upon number of eligible users	No permits for new private residential pools. Public or multi-family pool facilities permitted. Municipal splash pad operation hours reduced or suspended	Pool evaporation barriers required when not in use (where allowed). Drain/refill prohibited. Make up water only. Water park and splash pad operations suspended.	All outdoor water recreation facilities suspended.
New Development	Water efficiency standard applies, but allowable lawn may not be planted May through September District defers	New residential construction permits subject to ultra-water efficiency standards. District defers connections for	District defers all connections except critical facilities or low-water demand projects (see guidance).	

	connections for new non-critical facilities with demand greater than 9 MGY Permits with water commitment may proceed using approved design	new non-critical facilities with demand greater than 3 MGY		
Incentives		Water Efficient Landscape incentives increase 50%		
Golf Courses	Stage 1 golf water budget applied	Stage 2 golf water budget applied	Stage 3 golf water budget applied	Irrigation prohibited
Car washing	Caution advised	Limited to 1x per vehicle per week using a commercial facility or hand wash with bucket and positive shut off Mobile wash limited to 10 gal per vehicle	Stage two techniques, but 1x per vehicle per month.	Car washing prohibited
Rates	Stage 1 rates may apply	Stage 2 rates may apply	Stage 3 rates may apply	Stage 4 rates may apply
Other		Comfort mist-cooling systems prohibited		

Chapter 7 Communication Plan

The district has developed a toolbox of resources to reflect conditions for each stage so any changes can be accomplished easily once a board decision is made. The district will encourage each municipal partner to publish the current stage and link to the district's water shortage page on wcwcd.gov.

Outreach and Communication Plan

Public awareness and adoption are vital to the plan's success. The district will coordinate with its municipal partners to provide information regarding water supply availability and response stages to the public via the following sources:

- **Website** – the district will have dedicated pages on wcwcd.gov with information; the district will encourage the county and all municipal customers to link their respective websites to this page
- **Social media** – the district will post information on its various social media platforms and encourage the county and all municipal partners to do the same
- **E-newsletter** – the district will draft and distribute information in its electronic newsletter and share this content with the county and all municipal partners for distribution to their respective subscribers

Public Outreach

When needed, the district may enhance outreach to include:

- **Press announcement and/or press conference** – the district will prepare and distribute information to media representatives with the intent of generating news coverage
- **Advertising** – the district has a robust media campaign that includes online, social media, broadcast production and billboard advertisements that may be used to communicate messaging
- **Speakers' bureau** – District representatives will speak at events hosted by community and civic organizations
- **Signage** – the district will work with the county and cities to post educational materials at public facilities including libraries, community centers, recreational facilities, and other centralized public locations.
- **Enhanced collaboration** – the district will request the use of county and/or city resources to communicate information. Potential resources include newsletters, utility bill inserts, direct mail pieces, marquees/signs, and any other available means for reaching a broad, diverse audience.

Chapter 8 Plan Maintenance and Updates

The district will update the plan as needed and once approximately every five years. As the district begins the update process, it will ensure the new plan incorporates any changes recommended by the task force, as well as any new federal or state requirements.

The task force will meet monthly during active periods of declared shortage conditions. Evaluation of the plan will center around three main topics to assure it is working effectively. These topics include:

- Shortage monitoring (the model)
- Shortage response actions
- Communications

The Model

The model output will be vetted based on actual experiences. The model factors in weather conditions along with system demand and storage and was built to be sensitive to these inputs. Comparisons with actual conditions and system demand and storage will be evaluated to determine the model's effectiveness and to identify any concerns with accuracy or sensitivity.

Response Actions

While technical issues will be handled by the model and recommendations, the municipal partners will be responsible for enforcing the response actions. Task force evaluation will determine if actions are being implemented and are effective.

Communications

Successful implementation of the plan relies on effective communication with municipal partners and their respective constituents. Ongoing evaluation will allow for the task force to revise or implement additional strategies to communicate more effectively.

Appendix A – Task Force Members

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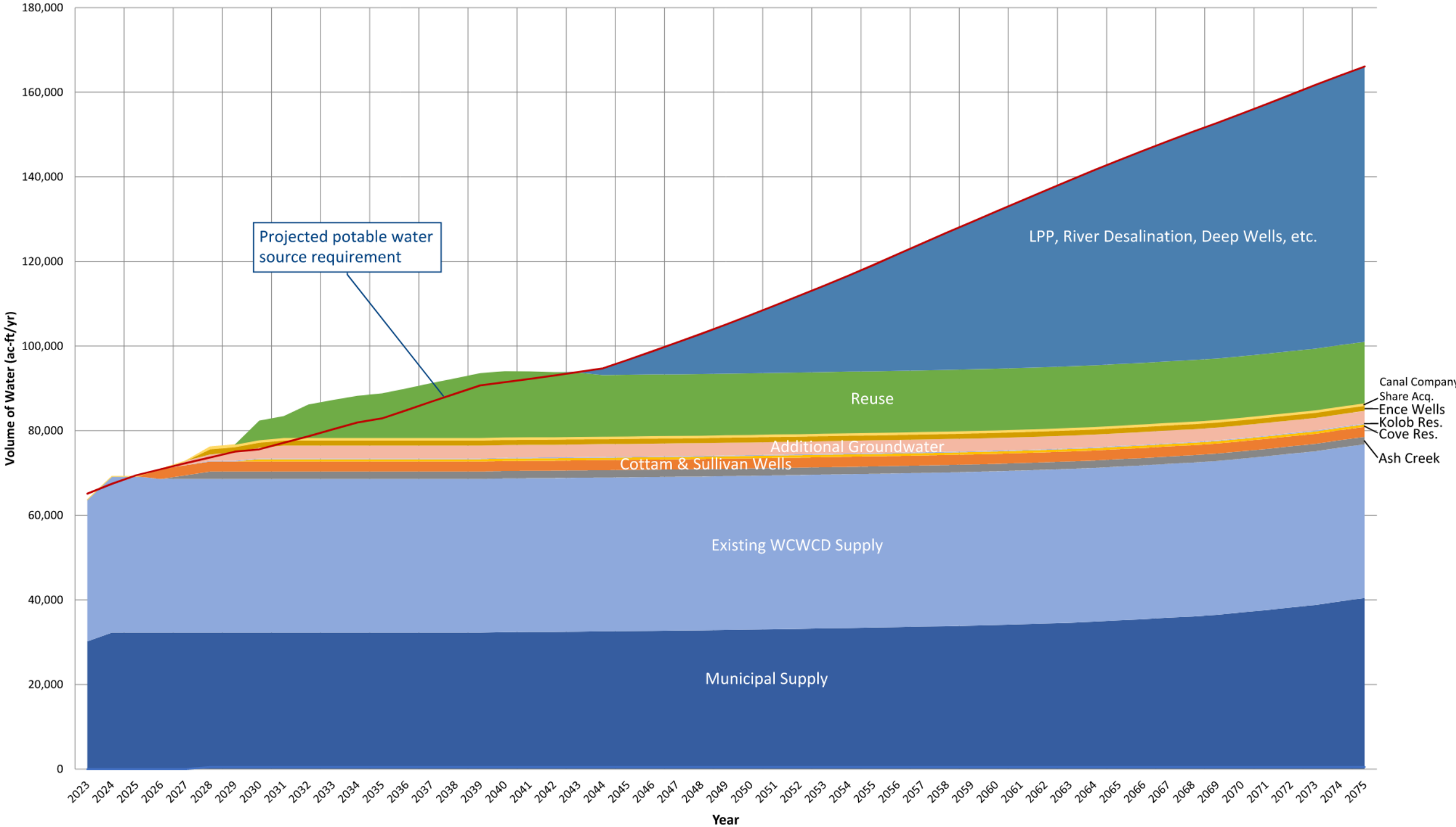
WASHINGTON COUNTY
WATER
CONSERVANCY
DISTRICT

Draft Water Master Plan Project Review

Prepared by Bowen Collins & Associates

RWSA AAC Meeting | April 23, 2025


Volume of Water (ac-ft/yr)
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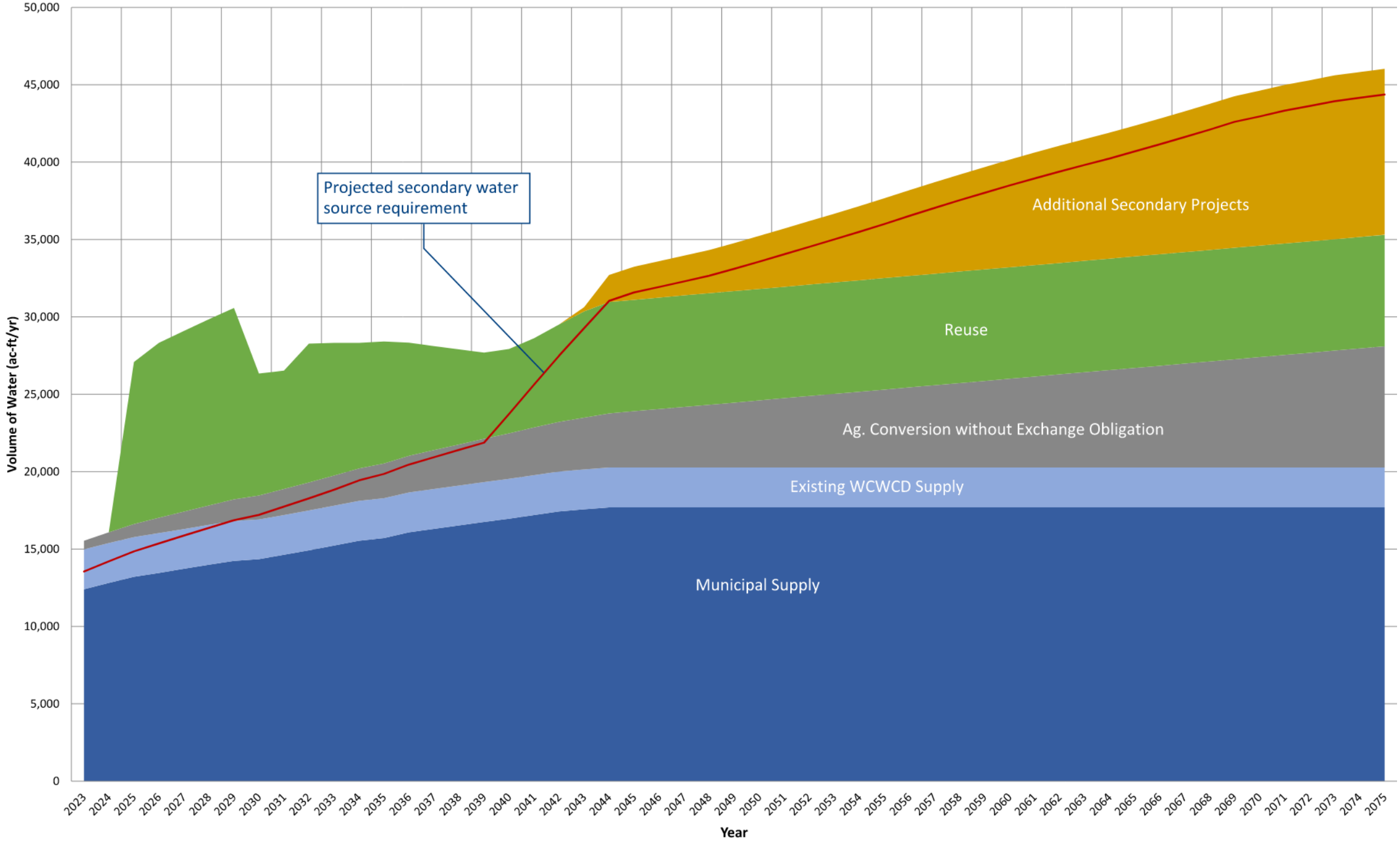
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Year
2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075
Projected potable water source requirement
LPP, River Desalination, Deep Wells, etc.
Reuse
Canal Company Share Acq.
Ence Wells
Kolob Res.
Cove Res.
Additional Groundwater
Cottam & Sullivan Wells
Ash Creek
Existing WCWCD Supply
Municipal Supply


Projected secondary water source requirement
Additional Secondary Projects
Reuse
Ag. Conversion without Exchange Obligation
Existing WCWCD Supply
Municipal Supply
Volume of Water (ac-ft/yr)
Year
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2023
2024
2025
2026
2027
2028
2029
2030
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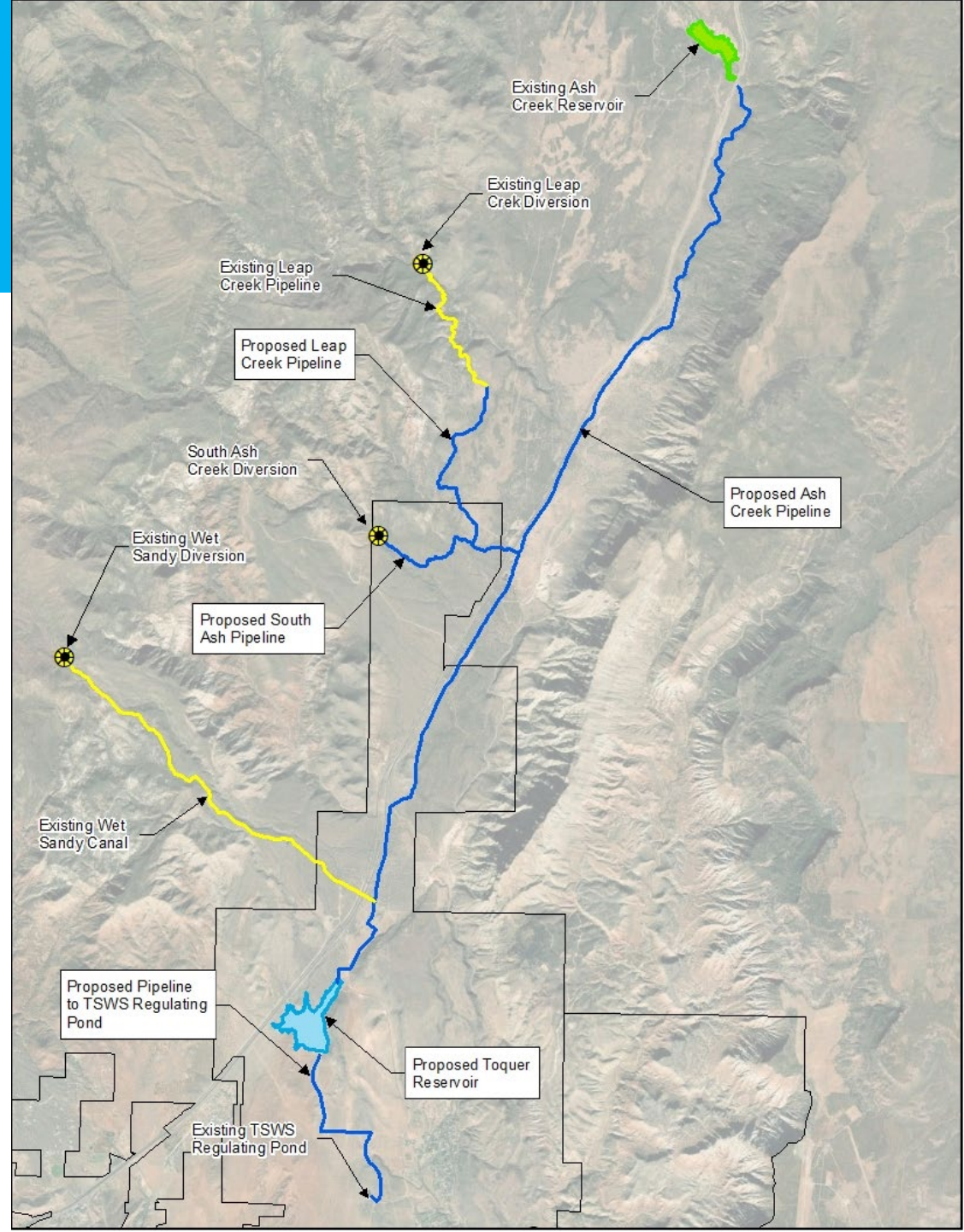
Local Water Supply Development Projects

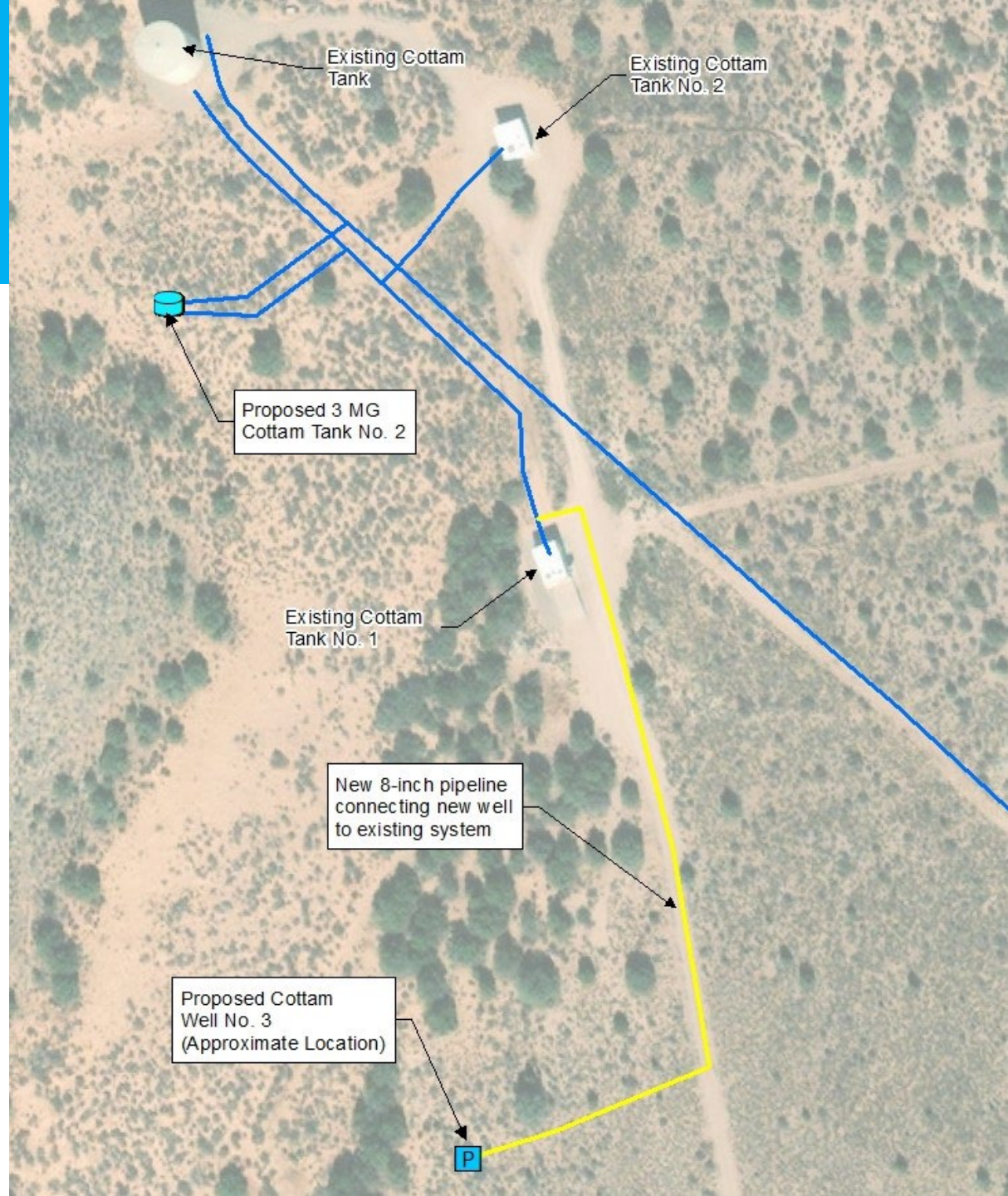
Ash Creek Pipeline & Toquer Reservoir

- Pipeline from Ash Creek Reservoir to Chief Toquer Reservoir
- Picks up water from other drainages west of I-15
- Estimated reliable yield of 1,748 ac-ft/year



Cottam Well 3

- Third well at Cottam Well site
- Maximizes system peaking capacity
- Increases system resiliency
- 800 gpm capacity

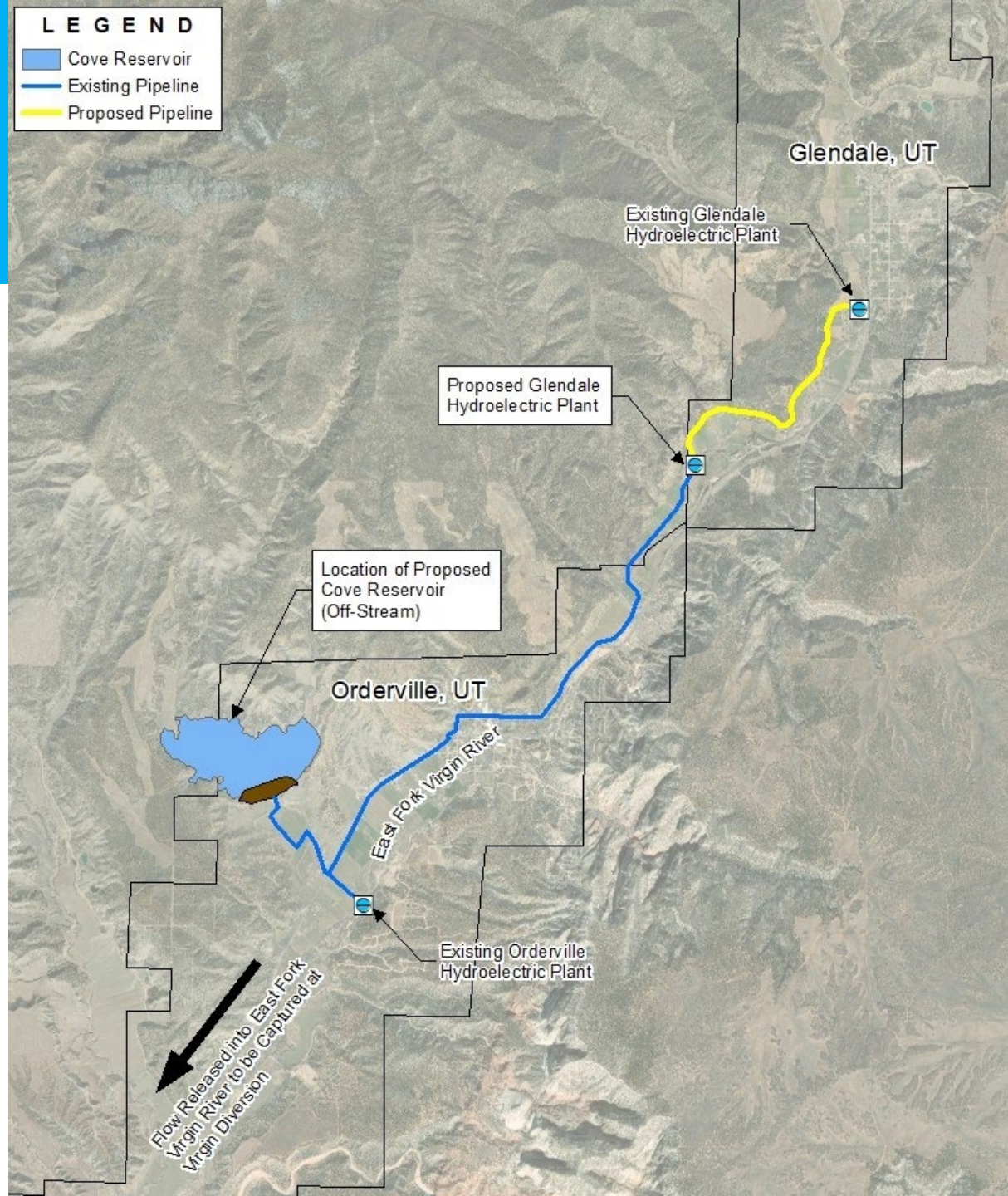


Cottam Well 4

- Additional water rights in Cottam Well system
- Increases system yield and resiliency
- 800 gpm capacity
- 2,375 ac-ft/year of new supply

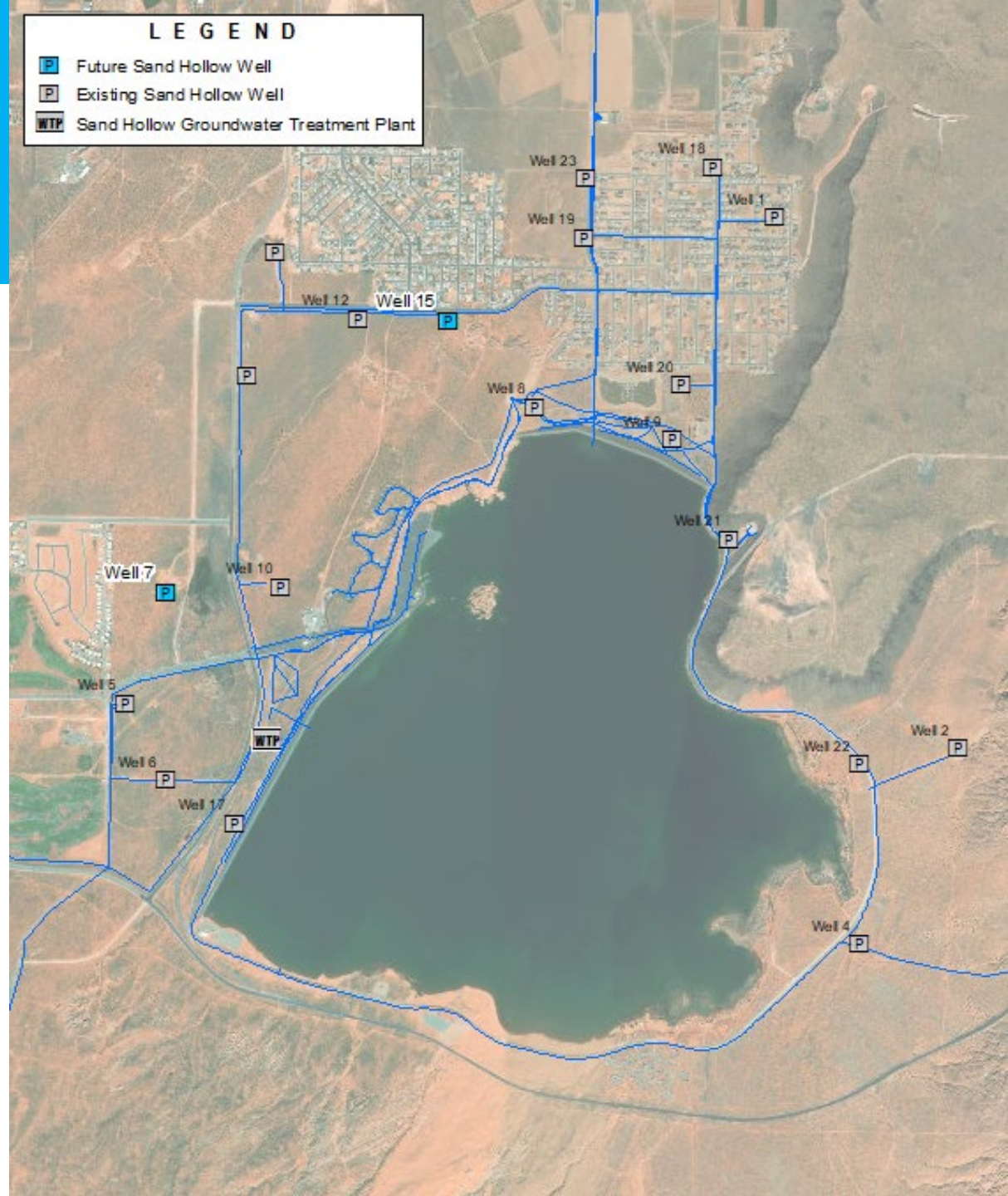
Cove Reservoir

- Reservoir in Kane County
- Flow released from Cove Reservoir and captured at Virgin Diversion
- 566 ac-ft/year



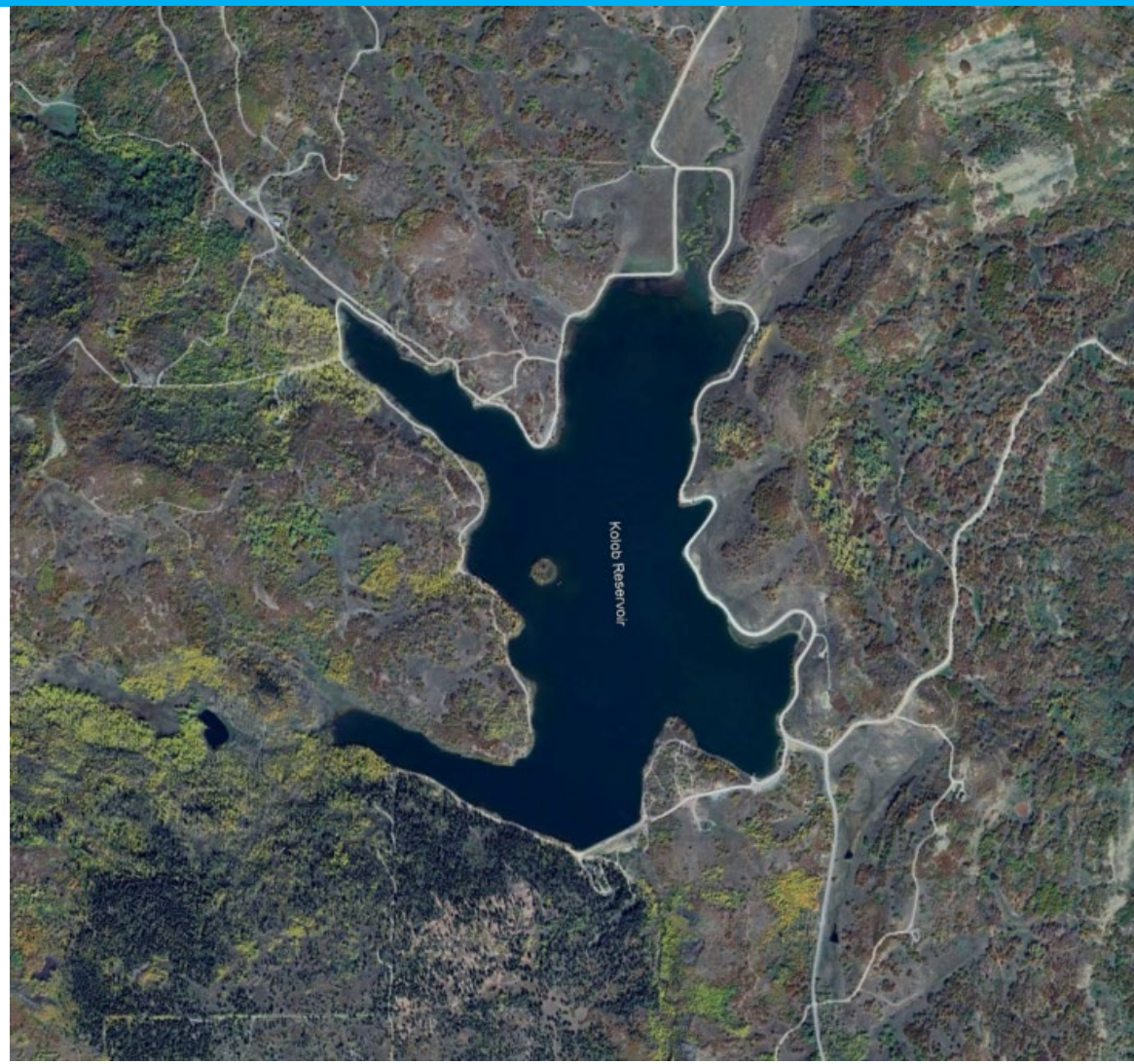
Sand Hollow Well 7

- Additional production well in Sand Hollow system
- Estimated 800 gpm pumping capacity



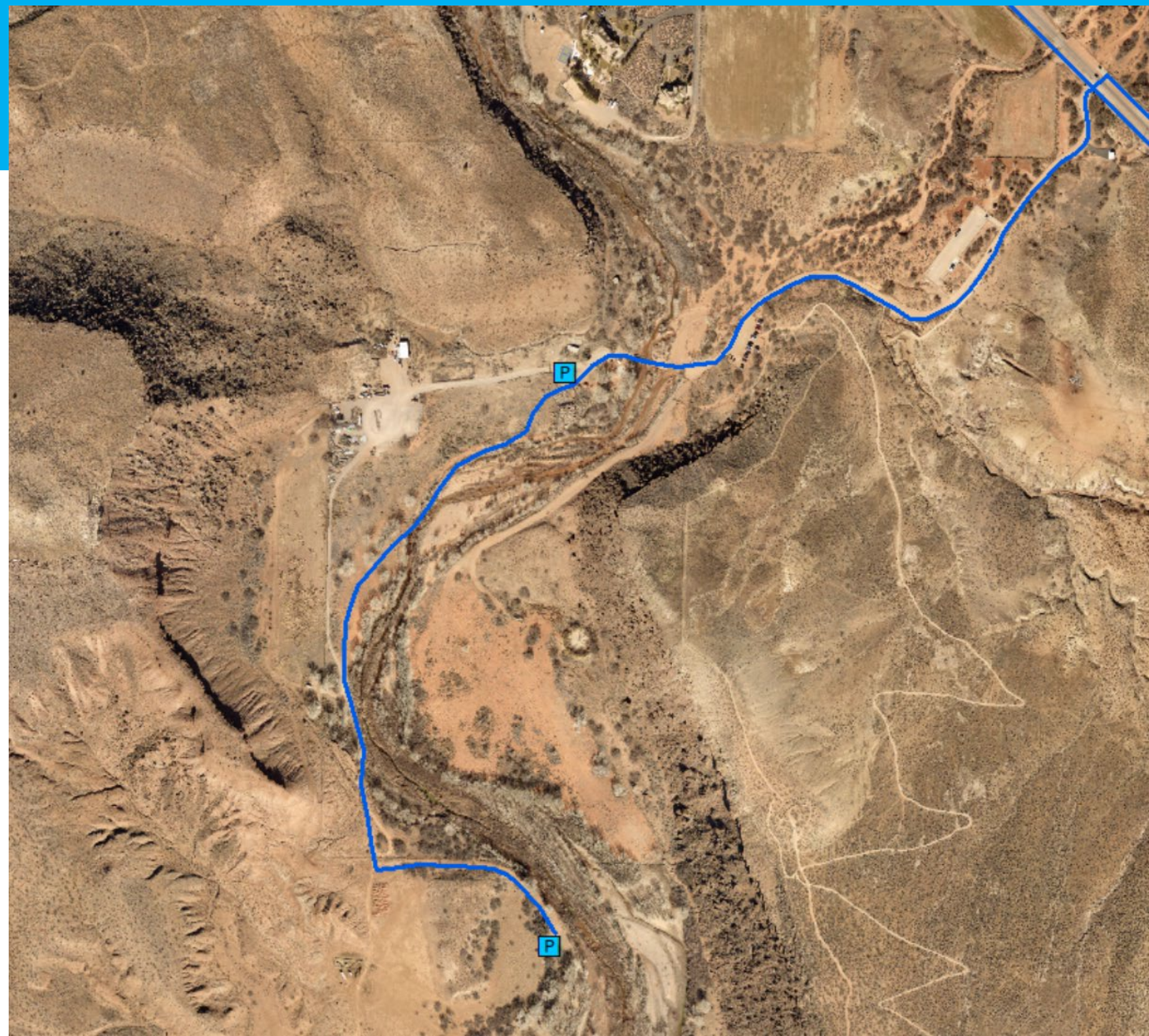
Kolob Dam Improvements

- Reconstruction and raising of Kolob Reservoir Dam
- 8-foot increase in dam height
- 194 ac-ft/year

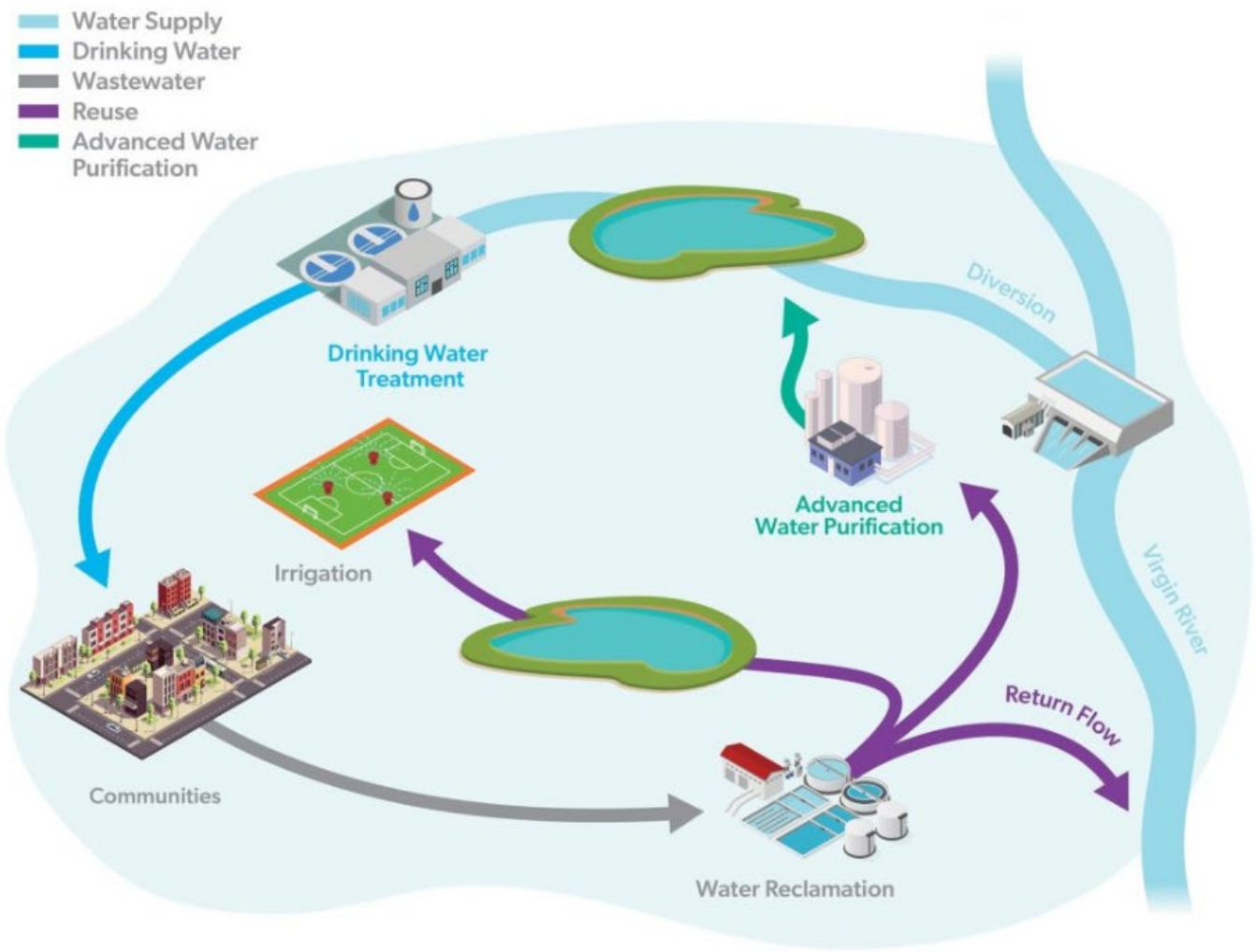


Ence Well Redevelopment

- Water rights change application for Ence Wells and Santa Clara Irrigation Wells
- 2 new production wells (location TBD)
- 1,281 ac-ft/year of new supply

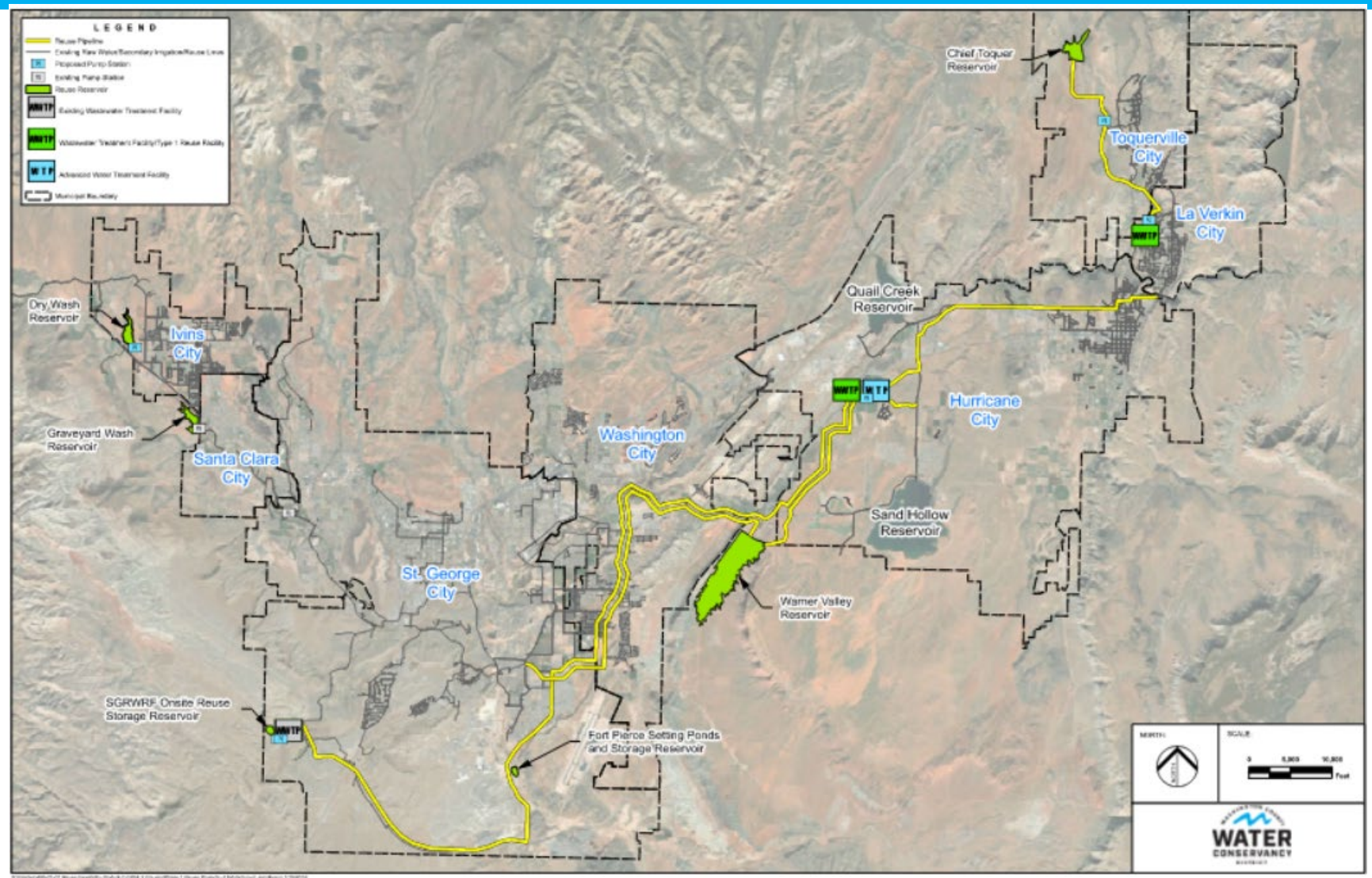


Regional Reuse System



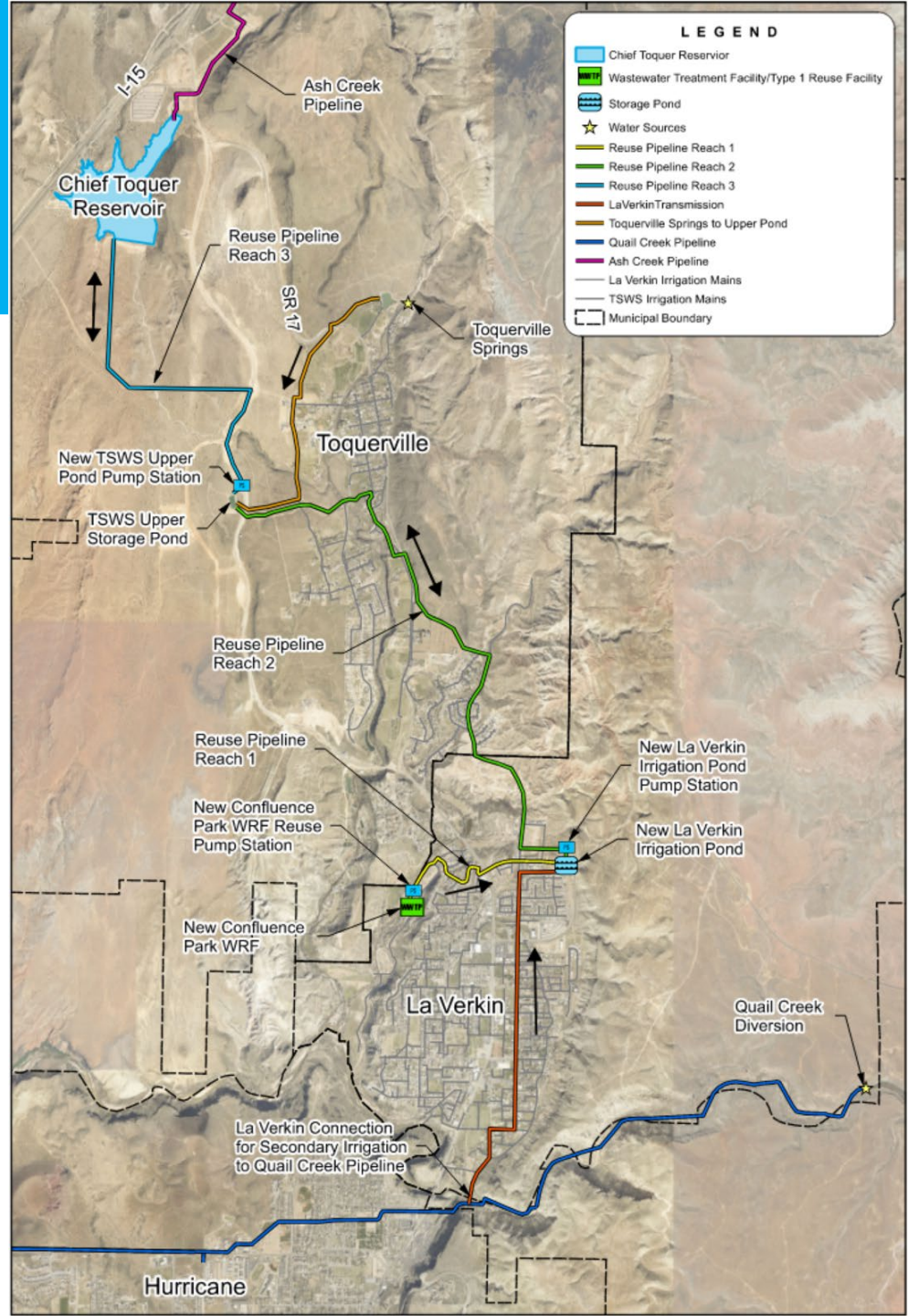
SGRWRF/ACWRF System

- SGRF to Reuse Forebay
- Reuse Forebay and Pump Station
- Reuse Forebay to Ag Users
- Future IPR and river exchange



Confluence Park System

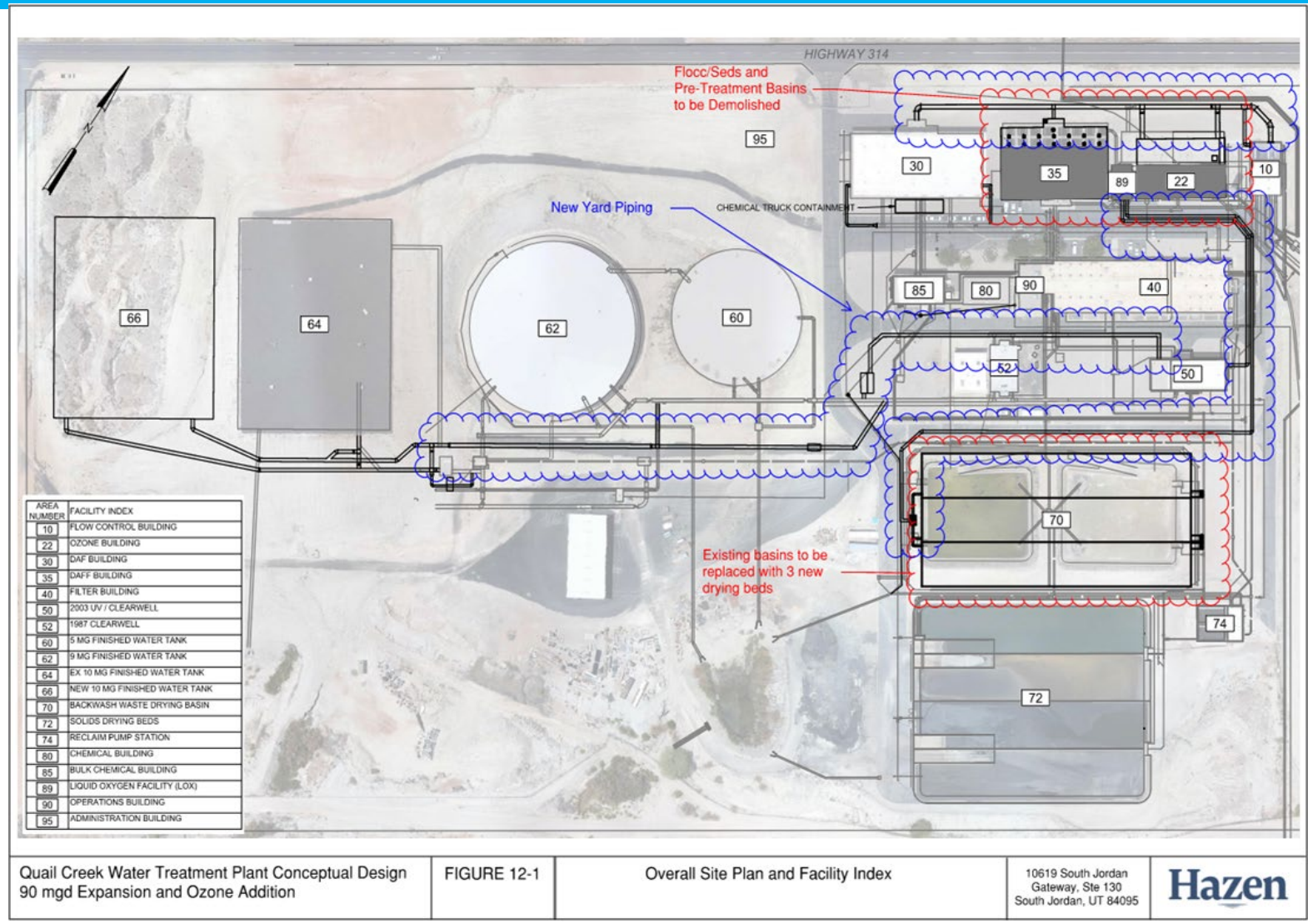
- Chief Toquer Reservoir
- CTR to TSWS Pipeline & Pump Station
- La Verkin Pond to TSWS Pipeline and Pump Station
- CPWRF to La Verkin Pond Pipeline and Pump Station



Water Treatment Projects

Quail Creek WTP Expansion

- Upgrade plant capacity from 60 to 90 MGD
- Ozone treatment process
- New solids lagoon



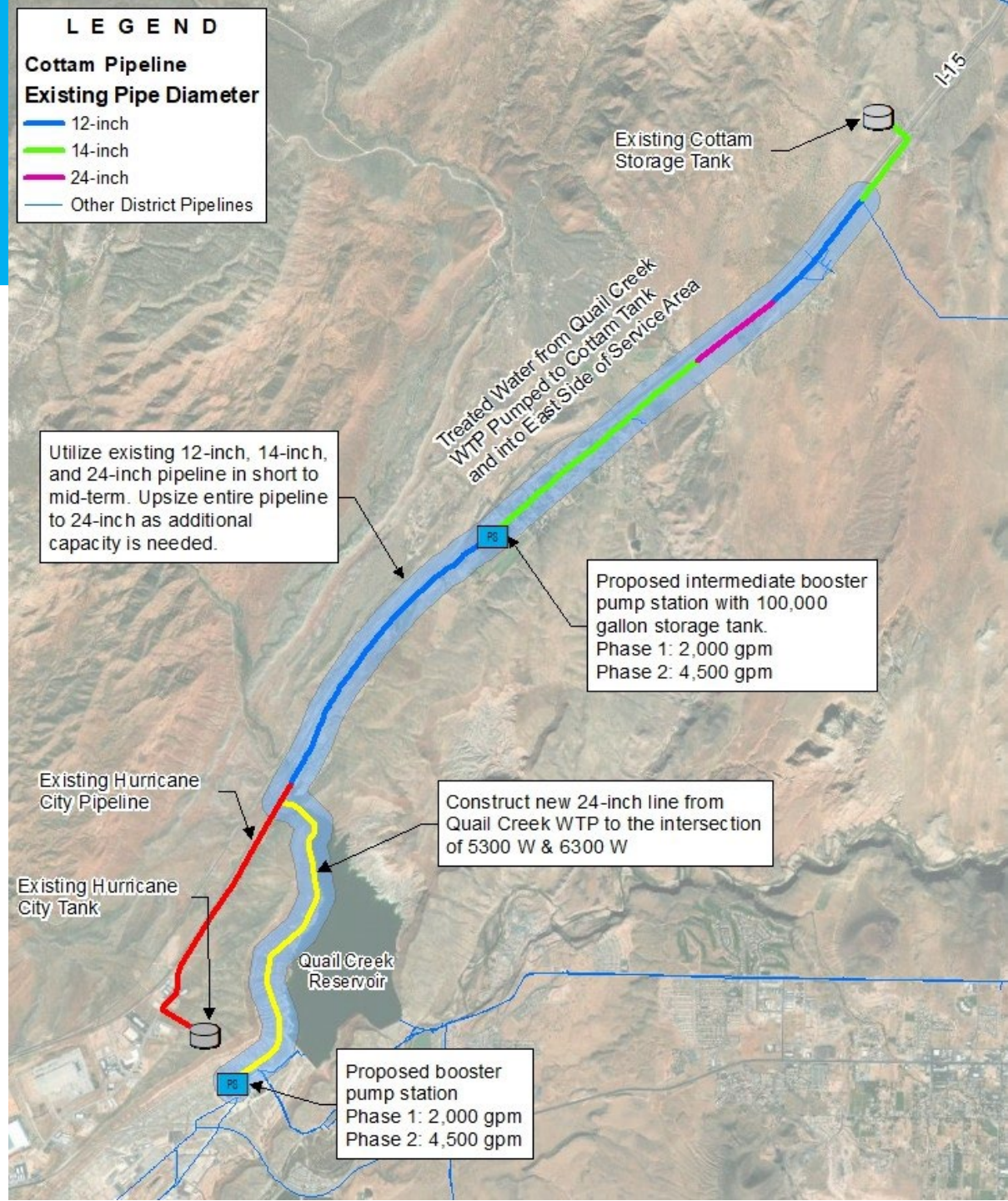
West Side WTP

- Construct 10-12 MGD water treatment plant supplied by Gunlock Reservoir
- Reuse exchange with irrigation companies
- Supply water to west side of county

Major Water Conveyance Components

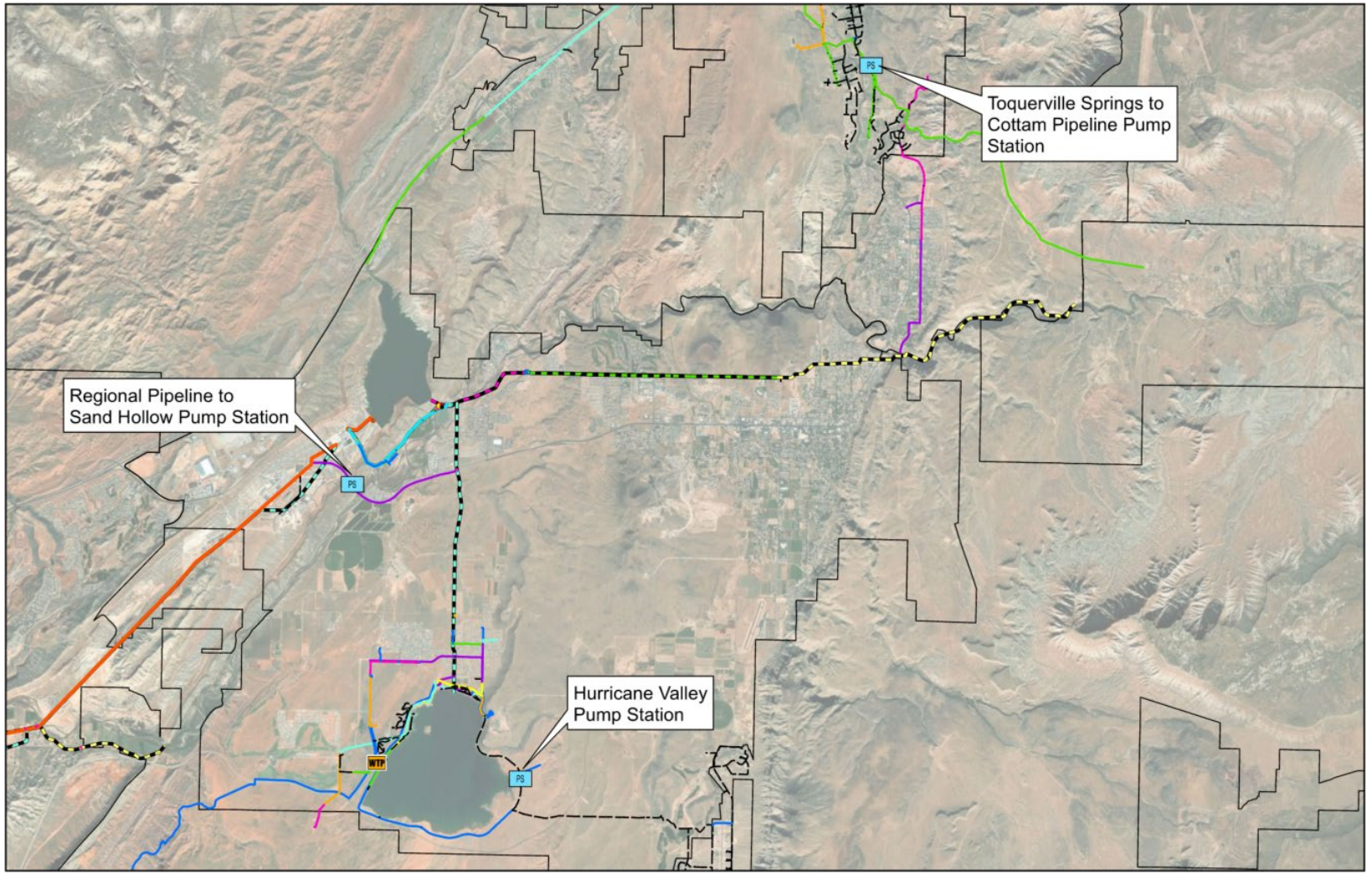
Quail to Cottam Pipeline

- 24-inch pipeline and 2 pump stations
- Up to 4,500 gpm



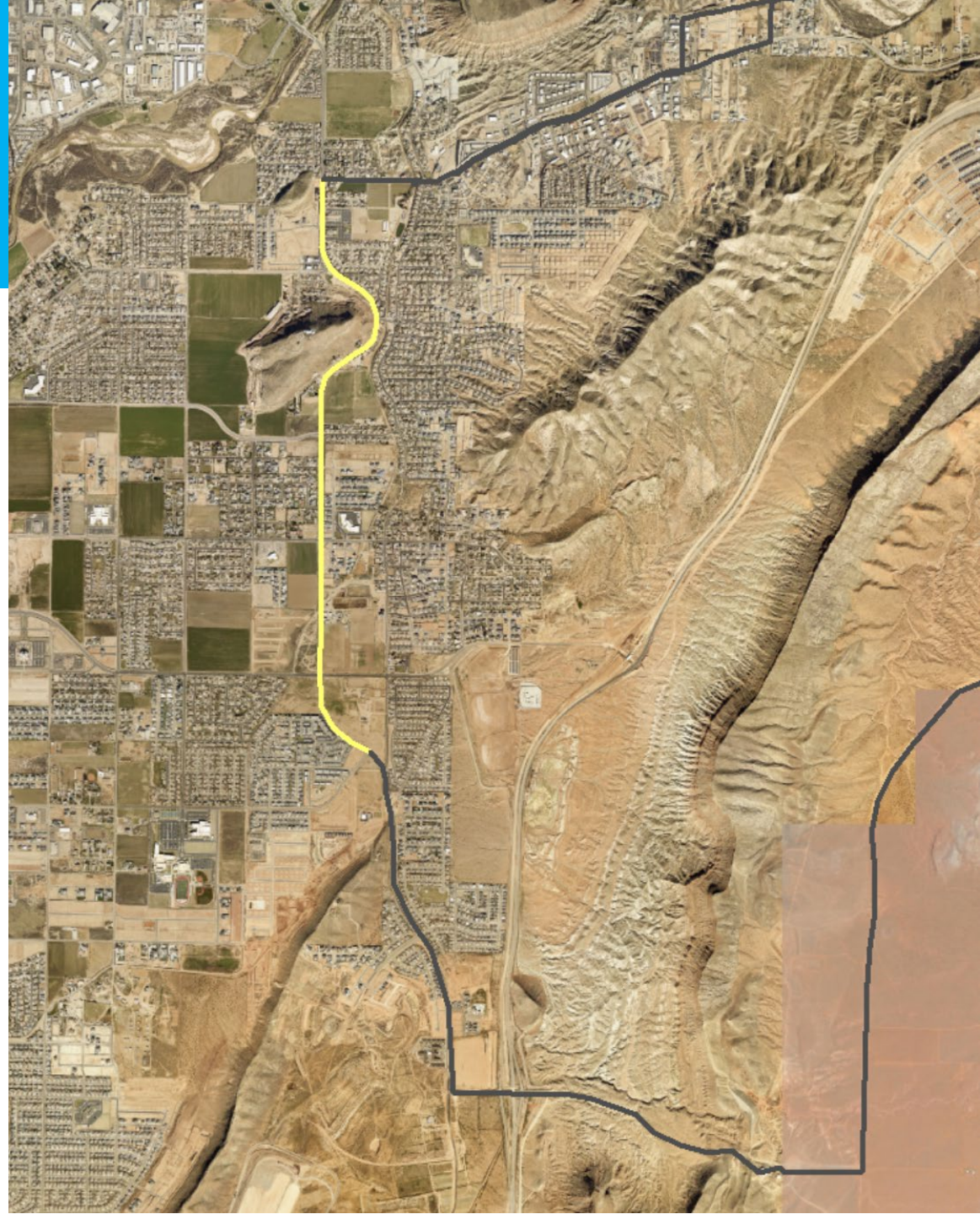
Pump Stations

- Regional Pipeline to Sand Hollow
- Toquerville Springs to Cottam Line
- Hurricane Valley



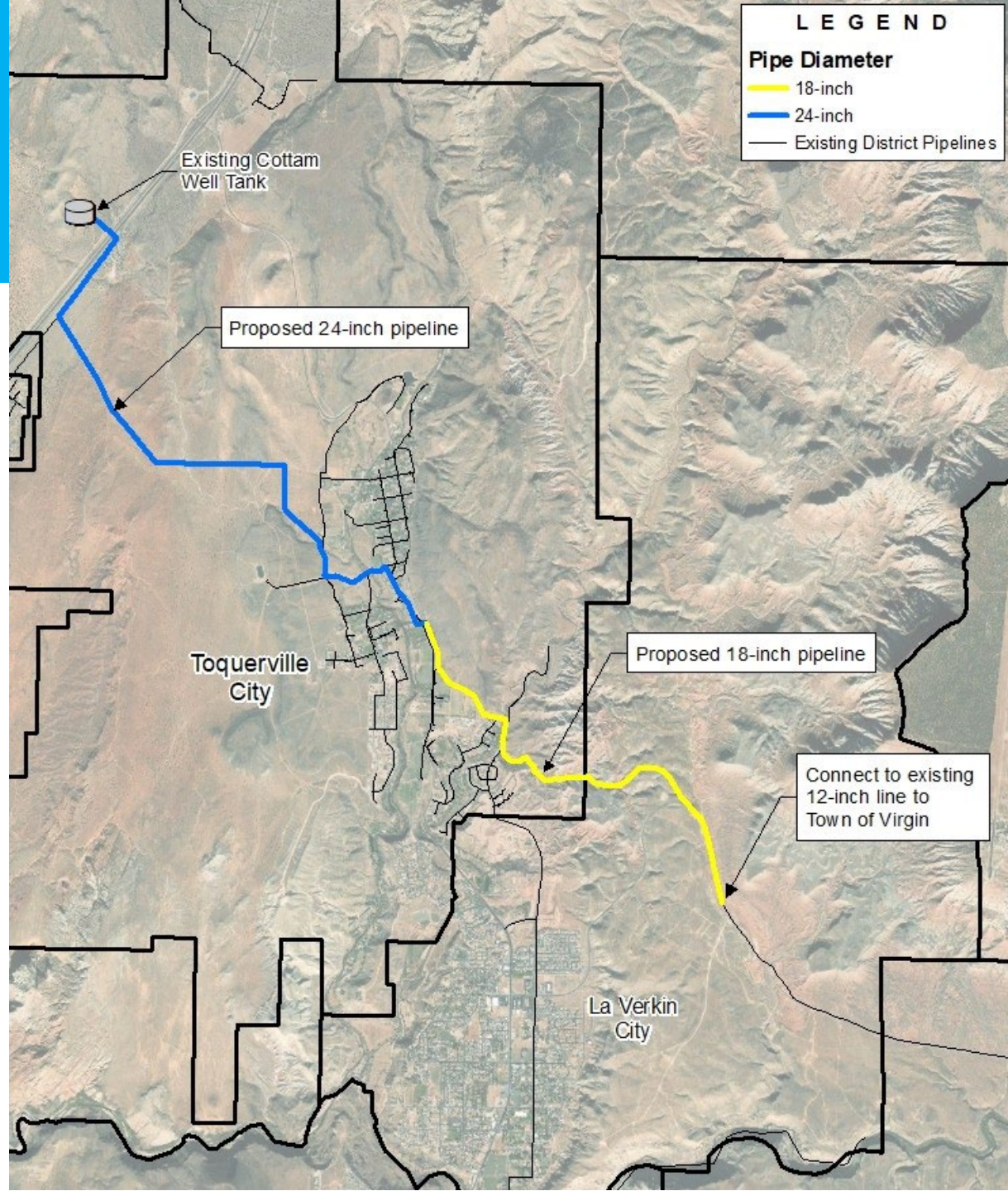
Washington Fields Regional Pipeline to SHRP Interconnect

- 30-inch pipeline
- Provide capacity from Regional Pipeline
- Interconnect to the Warner Valley Tank



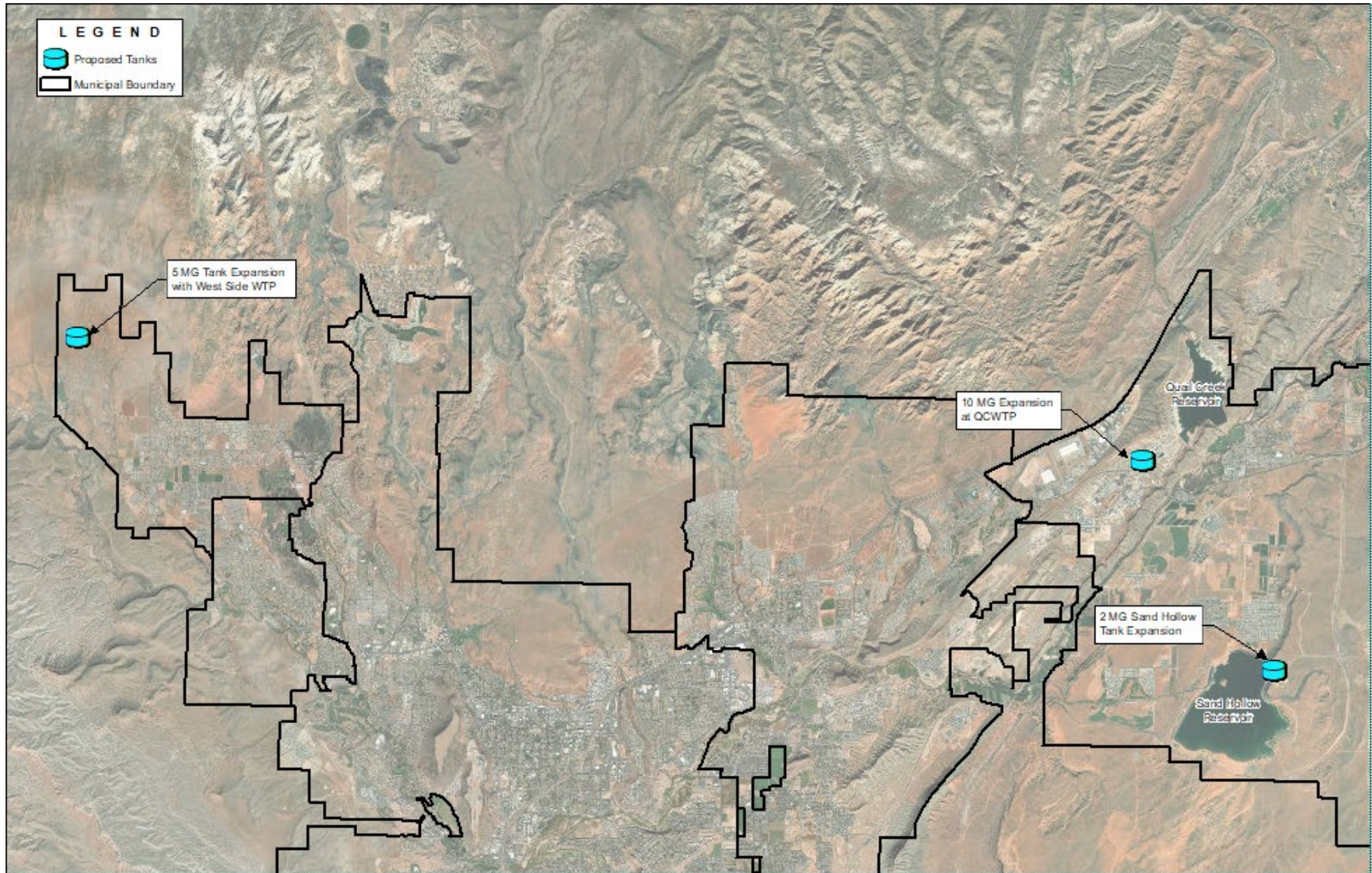
Cottam Well Transmission Line Upgrade

- 18-inch and 24-inch pipeline from Cottam Wells to Virgin
- Increases conveyance capacity into Toquerville, La Verkin, Hurricane and Virgin



Water Storage Projects

Storage Projects
Sand Hollow 2 MG Tank
Quail Creek 10 MG Tank B
West Side Water Treatment Plant Storage Tanks (5 MG)



Recommended 10-Year Capital Improvements

Reuse Projects	Total Estimated Project Cost	Proposed Completion Date
Chief Toquer Reservoir	$53,239,000	2026
Chief Toquer Reservoir to TSWS Pipeline	$2,950,000	2027
TSWS to Chief Toquer Pump Station	$1,500,000	2027
CPWRF to La Verkin Pond Pipeline (Including Pond)	$7,536,000	2026
CPWRF Reuse Pump Station	$7,500,000	2026
La Verkin Pond to TSWS Pipeline	$7,600,000	2032
La Verkin Pond to TSWS Pump Station	$1,500,000	2032
SGRF to Reuse Forebay Pipeline and Pump Station	$191,000,000	2030
Reuse Forebay and Pump Station	$32,861,000	2029
Reuse Forebay to Hurricane Hydro Pipeline	$70,638,000	2030
Subtotal	$376,324,000	
Local Source Development Projects	Total Estimated Project Cost	End Date
Cottam Well No. 3	$2,000,000	2025
Sand Hollow Well No. 7	$1,900,000	2025
Ash Creek Pipeline	$30,000,000	2027
Ence Well Redevelopment, Includes	$4,000,000	2028
Cove Reservoir	$9,000,000	2030
Kolob Dam Raising	$7,000,000	2030
Cottam Well No. 4	$2,500,000	2028
Subtotal	$56,400,000	
Conveyance/Transmission Projects	Total Estimated Project Cost	End Date
Quail to Cottam Pipeline and Pump Stations	$15,500,000	2025
Toquerville Springs to Cottam Pump Station	$1,300,000	2026
HVWS Pump Station and Pipeline	$3,000,000	2026
Washington Fields Regional Pipeline to SHRP Interconnect	$15,500,000	2030
Cottam to Virgin Pipeline (Portion of Project)	$7,000,000	2027
Subtotal	$42,300,000	
Water Treatment Projects	Total Estimated Project Cost	End Date
Quail Creek WTP 90 MGD Upgrade	$150,000,000	2028
West Side Water Treatment Plant	$45,000,000	2033
Subtotal	$195,000,000	
Storage Projects	Total Estimated Project Cost	End Date
Sand Hollow 2 MG Tank	$7,400,000	2025
Quail Creek 10 MG Tank B	$27,000,000	2026
West Side Water Treatment Plant Storage Tanks (5 MG)	$15,000,000	2033
Subtotal	$49,400,000	
Total 10-Year Capital Projects	$719,424,000	

Recommended Capital Project Beyond 10 Years

Reuse Projects	Total Estimated Project Cost	Proposed Completion Date
Reuse Forebay to Warner Valley Pipeline	$26,510,000	2036
Warner Valley Reservoir	$277,465,000	2040
Advanced Water Purification Facility (21 MGD)	$557,753,000	2037
AWP to Quail/Creek/Sand Hollow Reservoir Pipeline	$7,741,000	2037
Subtotal	$869,469,000	
Conveyance/Transmission Projects	**Total Estimated Project Cost**	**End Date**
Cottam to Virgin Pipeline Upgrade, Phase 1(portion)	$4,000,000	2035
Cottam to Virgin Pipeline Upgrade, Phase 2 (portion)	$3,000,000	2035
SHRP Parallel Pipeline	$20,000,000	2040+
Subtotal	$27,000,000	
Water Treatment Projects	**Total Estimated Project Cost**	**End Date**
Sand Hollow Surface Water Treatment Facility, Phase 1	$125,000,000	2050
Subtotal	$125,000,000	
Storage Projects	**Total Estimated Project Cost**	**End Date**
Additional Sand Hollow Storage, Phase 1 (12.5 MG)	$37,500,000	2035
Replace Cottam Well Tank 1	$9,000,000	2041
Additional Sand Hollow Storage, Phase 2	$37,500,000	2046
La Verkin East Bench Storage Tank	$10,500,000	2054
Additional Sand Hollow Storage, Phase 3	$45,000,000	2056
Additional Sand Hollow Storage, Phase 4	$12,000,000	2067
La Verkin East Bench Storage Tank, Phase 2	$10,500,000	2067
Subtotal	$162,000,000	
Total Project Cost	$1,183,469,000	

Lake Powell Pipeline

- Pipeline from Lake Powell to Sand Hollow Reservoir
- Up to 83,756 ac-ft/year

Q&A

Information presented by:
Aaron Anderson, P.E.
Bowen Collins & Associates
aanderson@bowencollins.com

WASHINGTON COUNTY
WATER
CONSERVANCY
DISTRICT

Water Shortage Contingency Plan

RWSA AAC Meeting | April 23, 2025

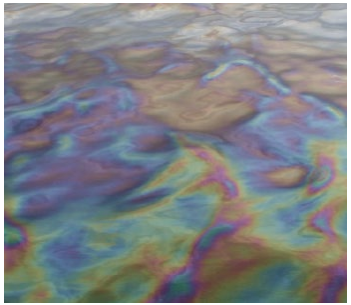
Purpose

This plan identifies actions to reduce water demand equitability to help ensure all community members stay safe, healthy and resilient during disasters or disruptions to the water supply.

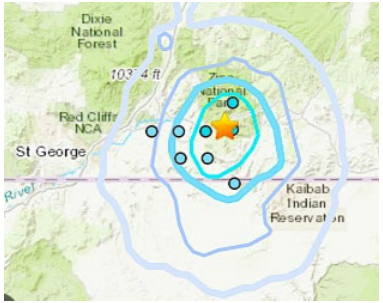
Potential Water Supply Disruptions…

Infrastructure failure

Wildfire



Supply contamination



Earthquake

Drought

Forecasting Reservoir Levels Under Water Shortage Contingency Plan

Whit Bundy, WCWCD Engineer

Reduction at Each Stage

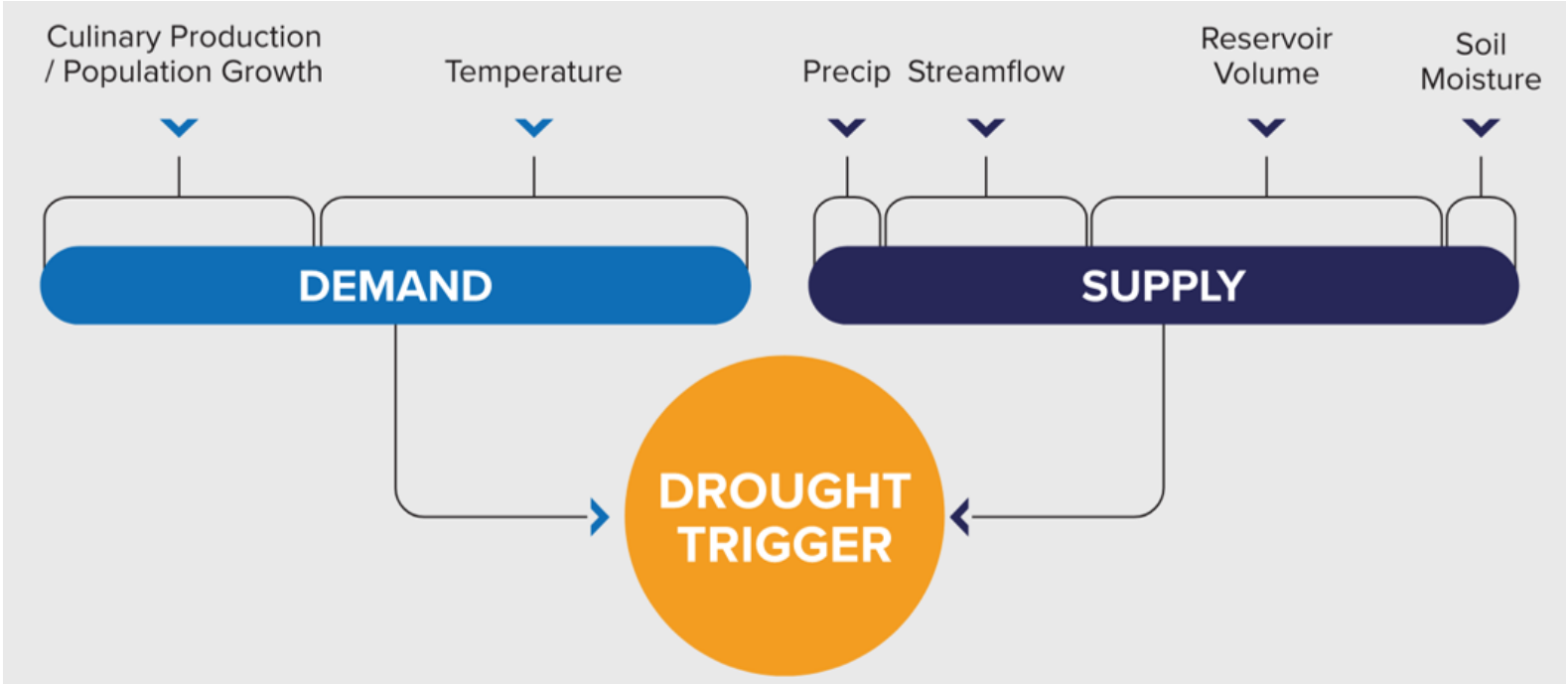
10%

20%

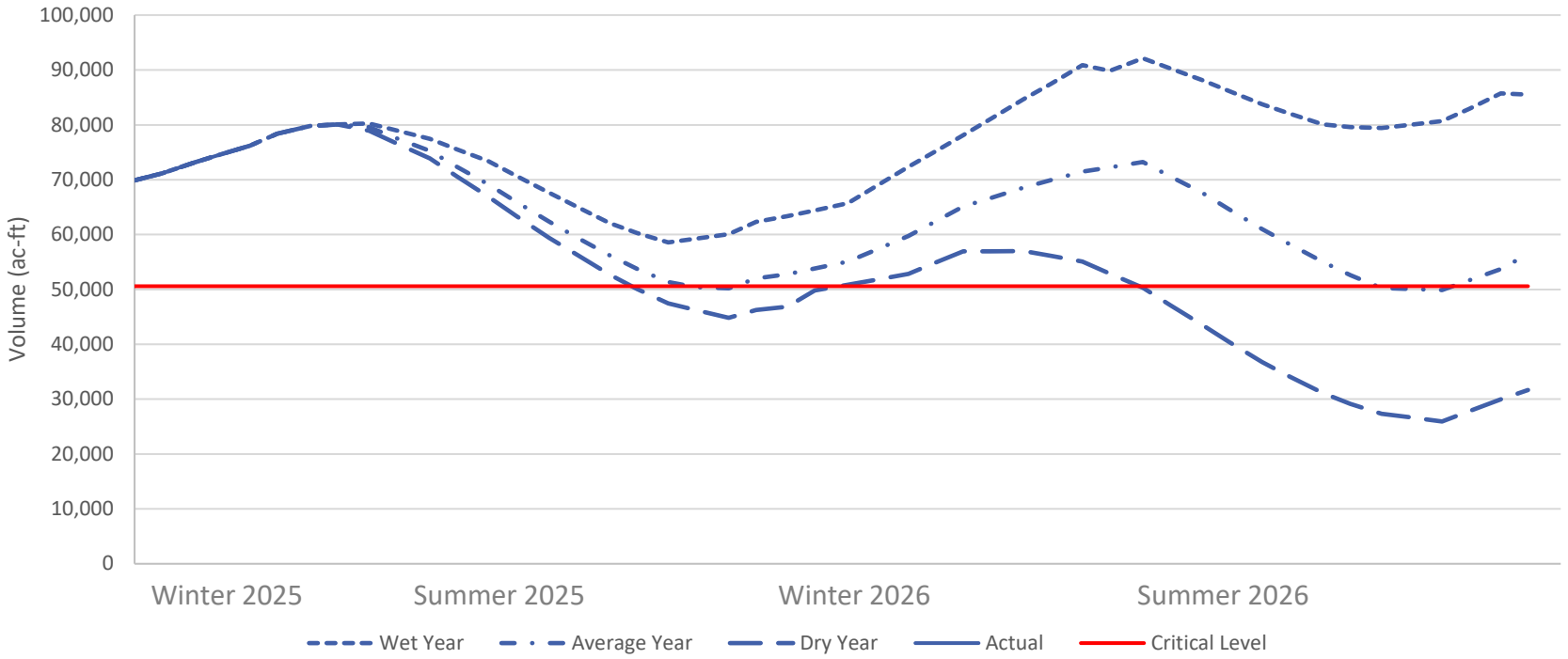
40%

60%

Model Inputs



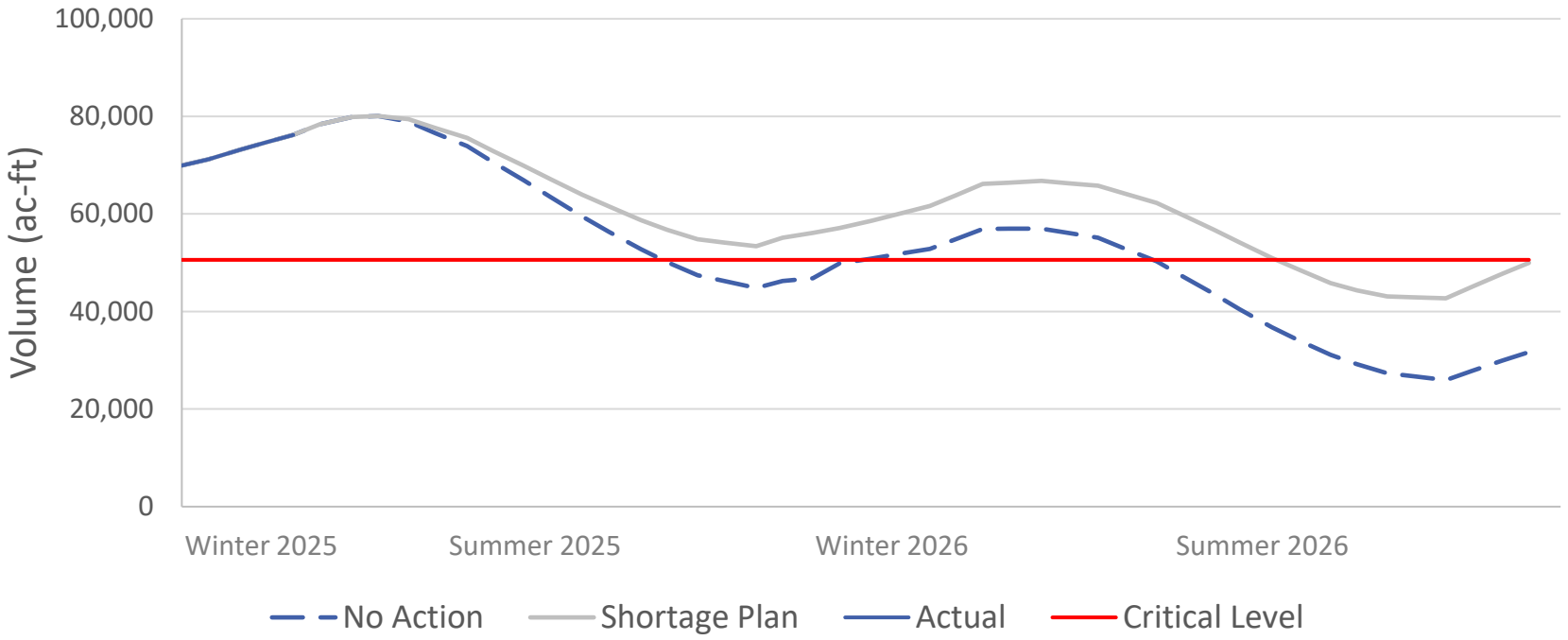
Quail Creek & Sand Hollow



Critical level = less than 1 year supply in storage

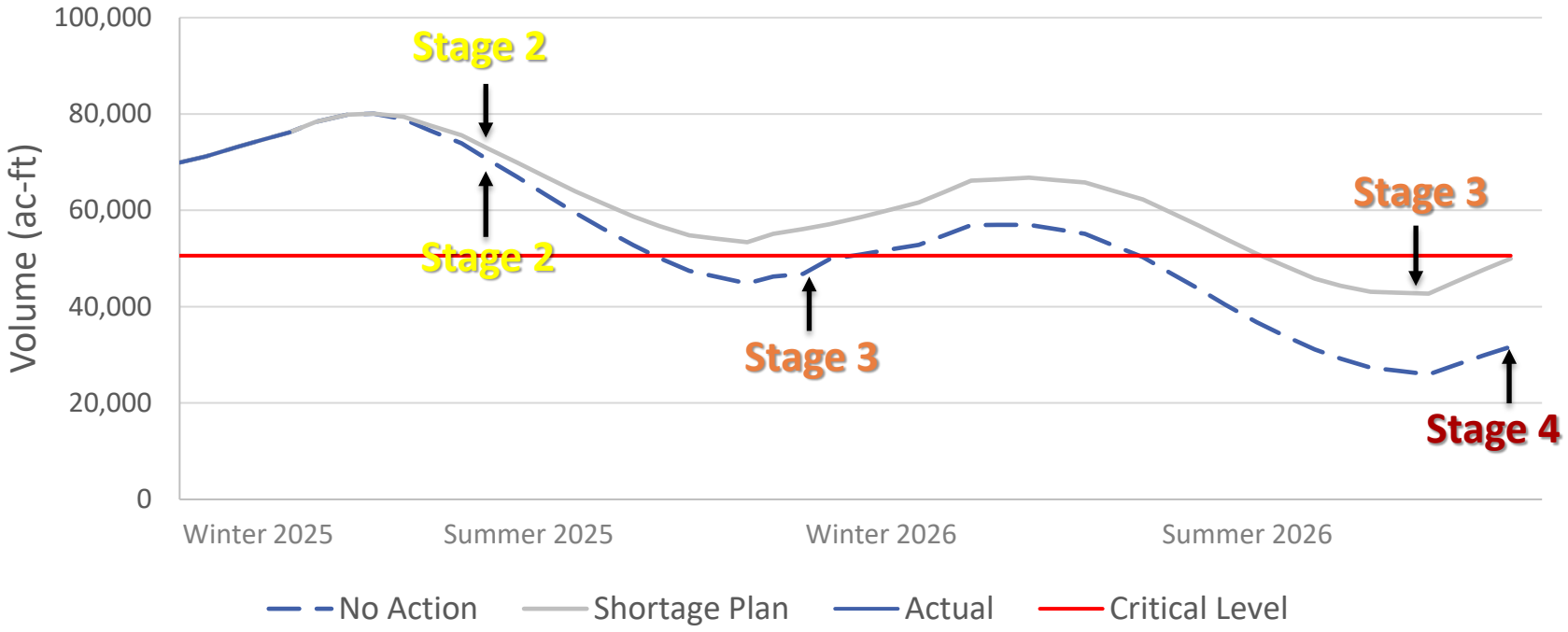
Quail Creek & Sand Hollow

Low Projection



Quail Creek & Sand Hollow

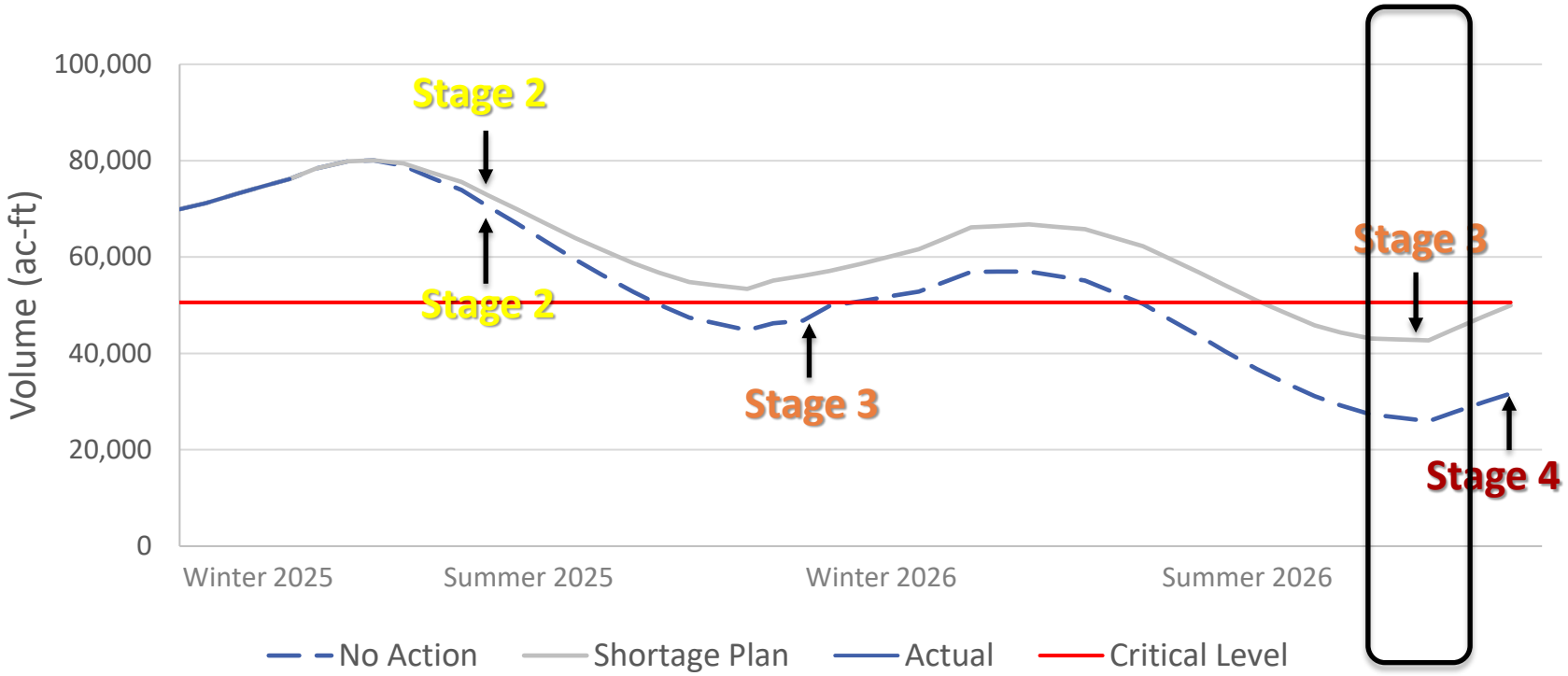
Low Projection



Quail Creek & Sand Hollow

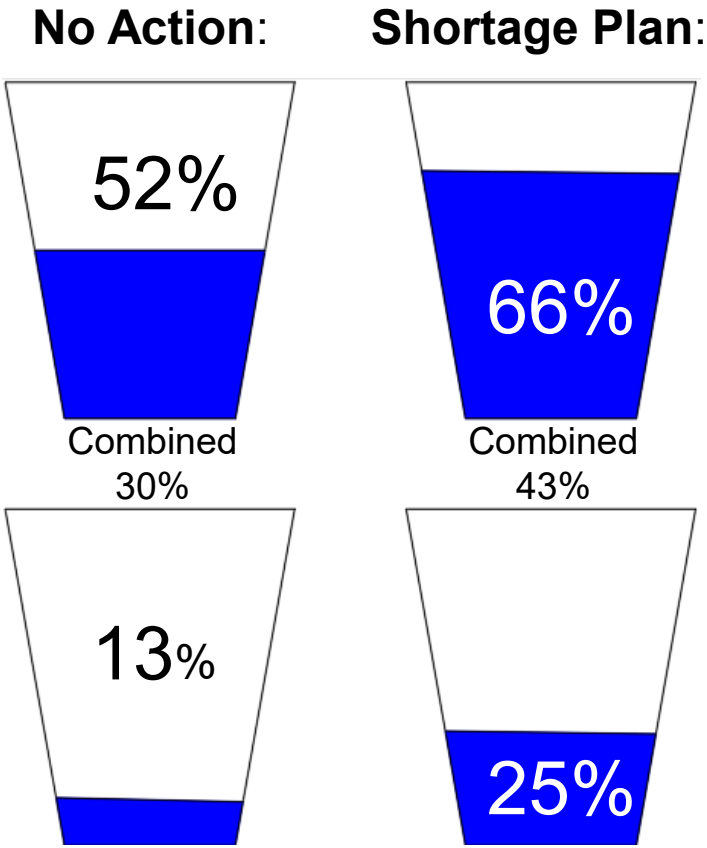
Low Projection

Let's compare



Low Projection

October 2026



Low Projection

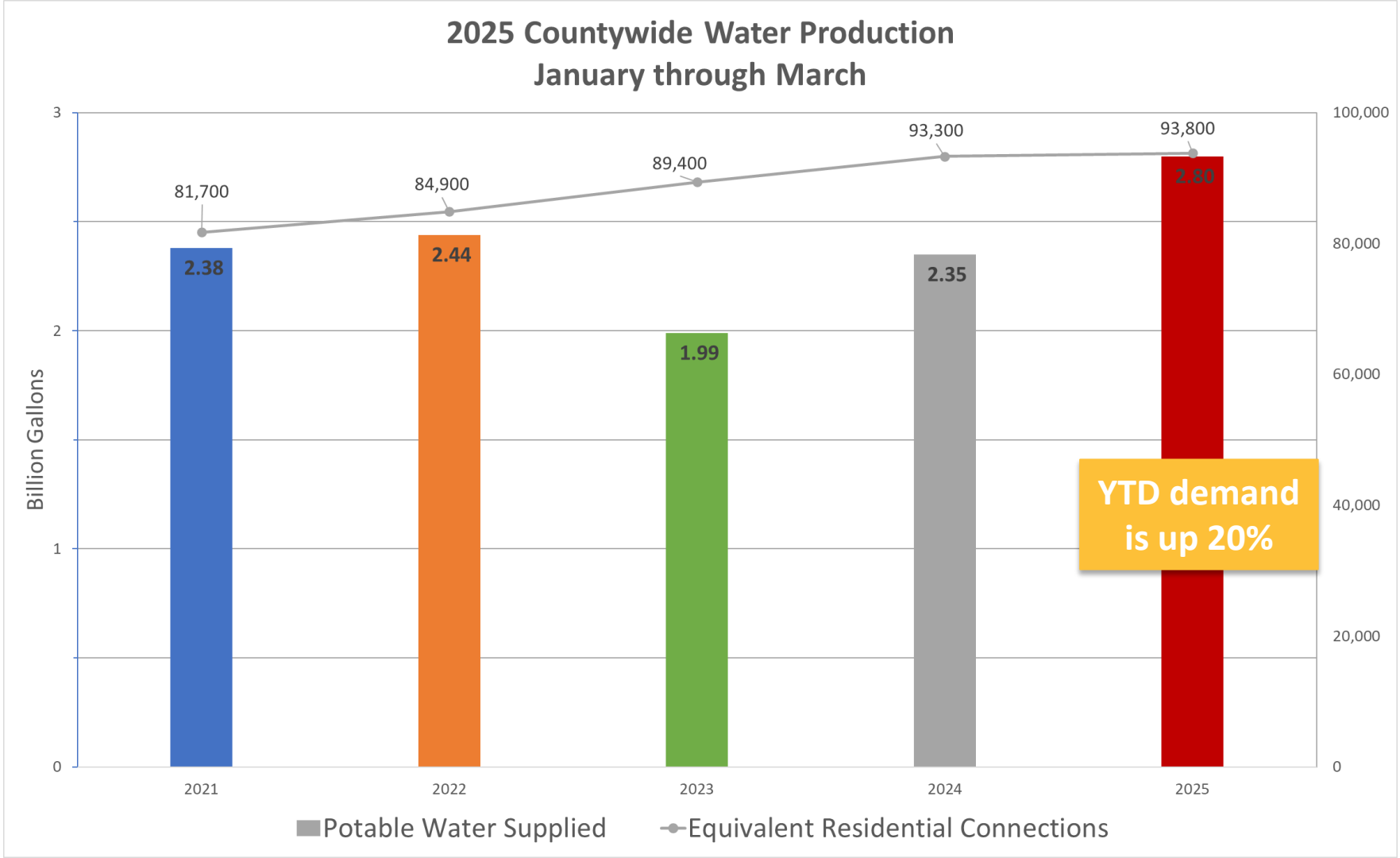
October 2026


Image © 2025 Airbus
Google Earth


Image © 2025 Maxar Technologies
Google Earth

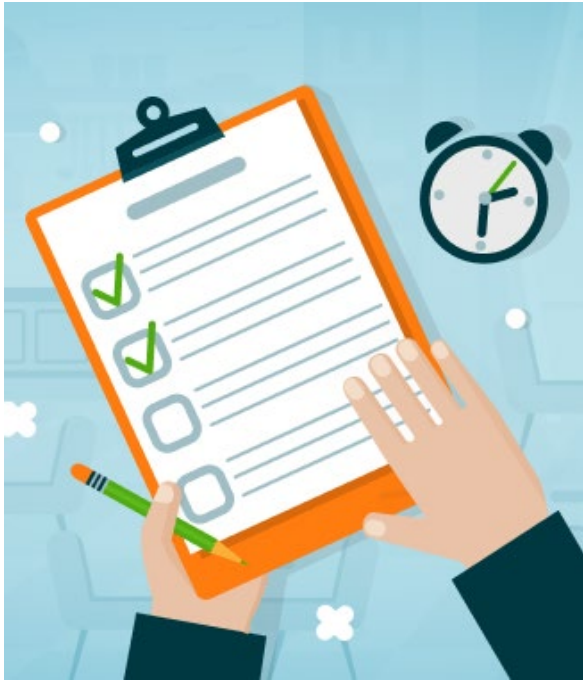
Plan Principles, Measures and Processes

Doug Bennett, WCWCD Conservation Manager


2025 Countywide Water Production
January through March
Billion Gallons
3
2
1
0
100,000
80,000
60,000
40,000
20,000
0
81,700
84,900
89,400
93,300
93,800
2.38
2.44
1.99
2.35
2.80
2021
2022
2023
2024
2025
YTD demand is up 20%
Potable Water Supplied
Equivalent Residential Connections

The Planning Process

- Consultant-guided process
- 17-member task force, including representatives from each RWSA partner
- Consensus survey of more than 60 municipal officials



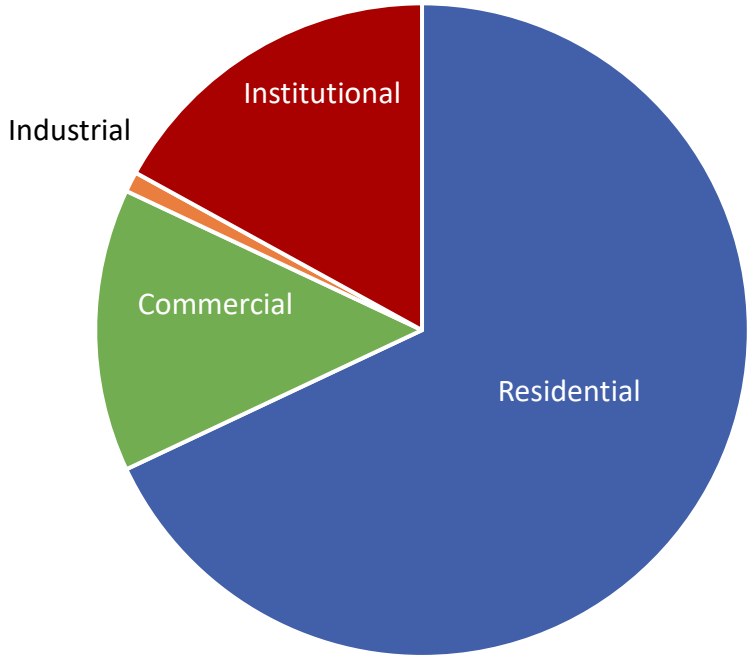
Historical Drought Performance

YEAR	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	DROUGHT DECLARATION
1993	0	0	0	0	0	0	0	0	0	0	0	1	NO
1994	2	1	1	1	1	1	1	1	1	1	1	2	YES
1995	0	0	0	0	0	0	0	0	0	0	0	0	NO
1996	1	1	1	2	2	3	2	3	0	0	0	0	YES
1997	0	1	1	0	1	0	0	0	0	0	0	0	NO
1998	0	0	0	0	0	0	0	0	0	0	0	0	NO
1999	0	0	0	0	0	0	0	0	0	1	1	1	YES
2000	1	0	0	0	0	1	1	1	1	0	0	1	YES
2001	0	0	0	0	0	0	0	0	1	1	0	0	NO
2002	1	1	2	2	2	2	2	2	1	1	1	1	YES
2003	1	1	1	1	2	2	2	2	2	2	1	1	YES
2004	2	2	2	2	2	2	2	1	1	0	0	1	YES
2005	0	0	0	0	1	0	1	0	0	0	0	0	NO
2006	0	0	0	0	0	0	0	0	0	0	0	0	NO
2007	1	2	2	2	2	2	2	1	1	1	2	0	YES
2008	1	1	1	1	1	1	1	1	1	1	1	0	YES
2009	0	0	0	0	0	0	0	0	1	0	1	0	NO
2010	0	0	0	0	0	0	0	0	0	0	0	0	NO
2011	0	0	0	0	0	0	0	0	0	0	0	0	NO
2012	0	0	0	0	0	0	0	0	0	0	1	0	NO
2013	1	1	1	1	1	1	0	0	0	0	0	0	YES
2014	1	1	1	1	1	1	1	0	0	1	1	0	YES
2015	0	0	0	1	0	1	0	1	1	0	0	0	NO
2016	0	0	0	0	0	0	0	0	0	0	0	0	NO
2017	0	0	0	0	0	0	1	0	0	0	0	0	NO
2018	0	0	0	1	1	1	1	1	1	0	0	0	YES
2019	0	0	0	0	0	0	0	0	0	0	0	0	NO
2020	0	0	0	0	0	0	0	0	0	0	0	0	NO
2021	1	1	2	1	1	1	1	1	1	0	1	0	YES
2022	1	1	1	1	1	1	1	0	0	0	0	0	YES

- Stage 1 conditions would have occurred in nine years (30%)
- Stage 2 conditions would have occurred in five years (17%)
- Stage 3 and 4 conditions would not have been declared

Plan Principles

- Address shortage conditions
- Cities may opt out but will receive reduced deliveries; shortages need to be shared equitably
- All customer sectors contribute



Use by Sector

Plan Principles

SUSTAIN VITAL SERVICES

PROTECT JOBS

PRESERVE HIGH-VALUE LANDSCAPE, SUCH AS TREES

APPLY INCREMENTAL, ESCALATING MEASURES

OPTIMIZE POST SHORTAGE RESILIENCY

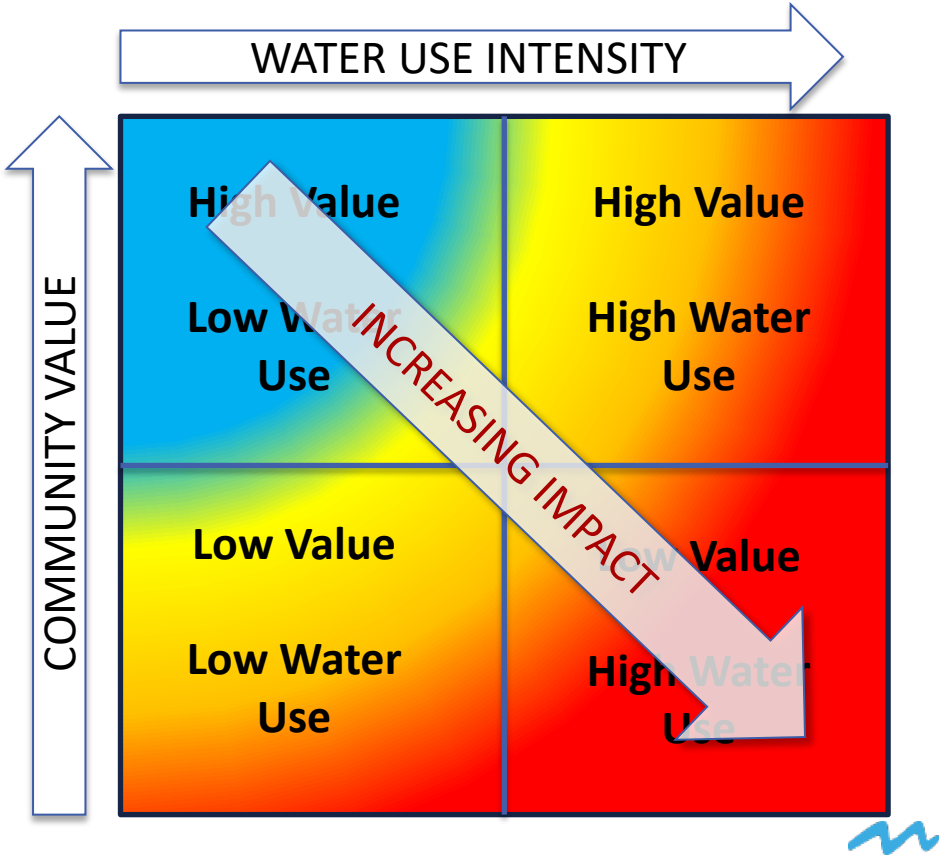
Plan Principles

High value uses with low conservation potential will be most protected

High value uses with high water use contribute through modified operations

Low value uses (including some with low water use) may be prohibited

Low value uses with high water use will be most affected



Plan Principles

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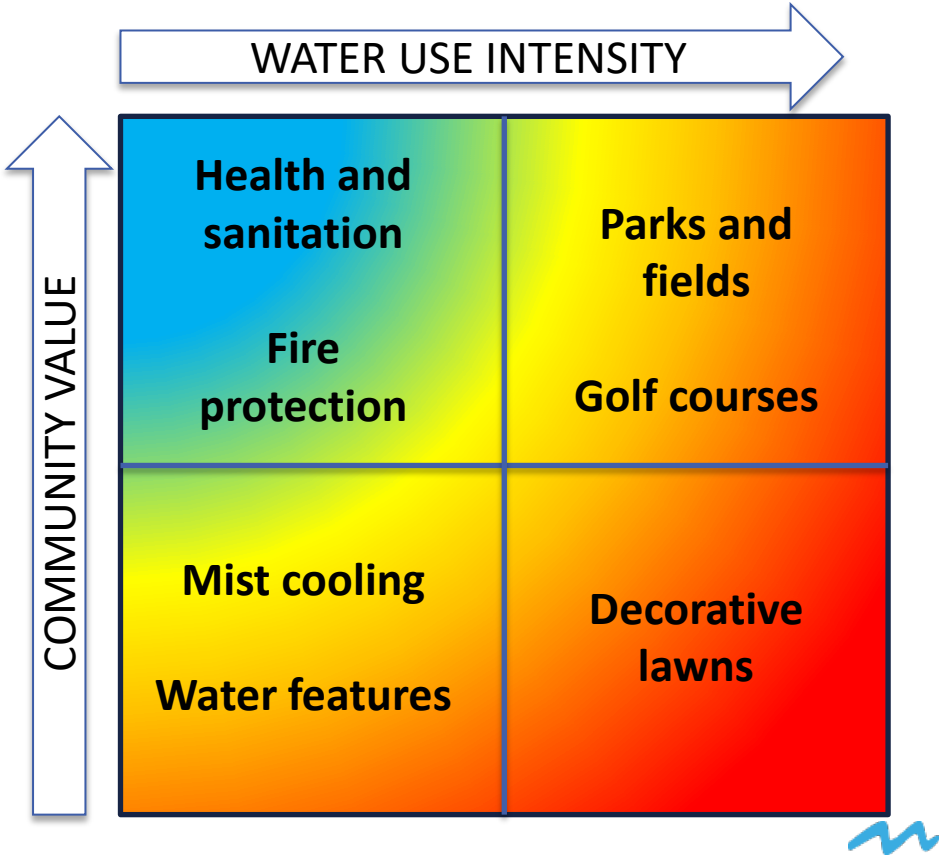

Incremental Measures

Decrease the amount or frequency of water use without eliminating the function

- Car washing
- Development
- Golf courses
- Water play

Landscapes

Use more than half of the community supply

Lawns are estimated to comprise 75% of all landscape water demand

Type of Landscape	Estimated Annual Water Use	Percent total water supply (2023)
All landscape types	9.4 billion gallons	54 percent
All lawn grass	7.0 billion gallons	40 percent
Functional lawn grass	4.2 billion gallons	24 percent
Ornamental lawn grass	2.8 billion gallons	16 percent
Tree & shrub	2.4 billion gallons	14 percent

Stage 1 Measures – 10% Reduction

LANDSCAPE

Defer lawn planting, May-August

DEVELOPMENT

Limit SFR pools to 600 SF

Refuse new connections for non-essential facilities >9MGY (top 1 percent user)

OTHER

Strengthen enforcement of existing water use codes

Stage 1 golf water budget (90%)

Stage 1 rate structure (as determined by agencies)

Stage 2 Measures – 20% Reduction

LANDSCAPE

Drip irrigated plant installs only

Ornamental lawn irrigation prohibited

Fountain & mist system operation prohibited

Water Efficient Landscapes Program increase

DEVELOPMENT

Community pools only

Lawn planting suspended on permitted projects, prohibited for new permits

Defer new connections for non-essential facilities >3MGY (top 5%)

OTHER

Car washing 1x per week maximum

Stage 2 golf water budget (80%)

Stage 2 rate structure (as determined by agencies)

Stage 3 Measures – 40% Reduction

LANDSCAPE

Outdoor irrigation by hose or drip system 1x per week

Lawn conversion to drip irrigated plants allowed

DEVELOPMENT

Defer all new connections except critical facilities & low water use projects

OTHER

Evaporation barriers required on pools. Make up water only

Splash pads and water park operations suspended

Car washing 1x/month maximum

Stage 3 golf water budget (60%)

Stage 3 rate structure (as determined by agencies)

Stage 4 Measures – 60% Reduction

LANDSCAPE

All outdoor irrigation prohibited

DEVELOPMENT

Continue Stage 3 strategies

All non-essential facilities prohibited

OTHER

Use limited to:

- Human health
- Sanitation
- Fire protection

Not Impacted Stages 1-3

Impacted in Stage 2

Process Steps

AAC recommendation to WCWCD Board

Adoption of plan by WCWCD Board

Adoption of regional plan by municipalities

Development of municipal policy and code

Recommendation

Move to recommend adoption of the Water Shortage Contingency Plan by the WCWCD Board