

Water Management Plan

Kyle Canyon Water District

June 17, 2003

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INTRODUCTION

The Las Vegas Valley Water District (LVVWD) has made every effort to incorporate the input of local Kyle Canyon residents and property owners into this Water Management Plan (Plan). During the months of March and April 2003, a series of eight (8) workshops were conducted to solicit feedback and/or additional recommendations on the Plan. Over 60 households, comprised of 32 full-time, 9 part-time, 8 weekend and 11 other (residential), participated in and contributed to the water conservation and water management measures detailed herein.

It is important to note that similar conservation efforts are being conducted on a regional basis as part of the Southern Nevada Water Authority's (SNWA) Drought Plan. Because Kyle Canyon's system operating conditions are determined by water levels within its three groundwater wells, and SNWA drought conditions are determined by Lake Mead water levels, these efforts should not be confused; this Plan was designed for the unique nature of the Kyle Canyon water system, its climate and other related factors.

This Water Management Plan serves as a tool to help Kyle Canyon residents reduce the impacts of the drought on Kyle Canyon's water supplies. As operating conditions become more severe, a higher level of response will be required to help ensure adequate drinking water supplies are available.

The Kyle Canyon Water Management Plan will become effective upon its adoption by the Kyle Canyon Water District Board of Trustees.

History:

The Kyle Canyon Water District was formed on December 5, 1973 when Clark County adopted Ordinance Number 419, pursuant to NRS Chapter 318, General Improvement Districts. Since 1974, the LVVWD has operated and managed the affairs of the Kyle Canyon Water District pursuant to an Interlocal Agreement between the two entities. Under the terms of the agreement and the requirements for General Improvement Districts, the Kyle Canyon Water District is responsible for bearing all costs of services rendered in conjunction with the administration, operation and maintenance of the water system.

When the Kyle Canyon water system was formed, it was comprised of 74 service connections; today, the system serves 349 residential accounts. Over time, a variety of reliability and distribution issues have challenged the system, including rapid growth, a series of well and reservoir outages, and broken distribution lines due to freezing and age.

Historically, Kyle Canyon's ability to be proactive in new system improvements has been limited by zero cash reserves, insufficient revenue streams, and higher operational costs that must be distributed among the system's very small service group. Because of these constraints, management of the system has typically been one of repair and maintenance. Several improvements have been recommended to help bring the water system up to Nevada operating standards. These improvements and their potential funding sources are discussed at length in the latter portion of this document.

Kyle Canyon Water System Condition:

In addition to infrastructure needs, the drought currently affecting much of the western United States continues to have a significant impact on the Kyle Canyon water system. For example, one of the primary drinking water wells serving the system (Echo Well No. 3) experienced two separate partial well failures last summer. Testing indicated that the water table dropped approximately 40 feet lower than what was expected for that time of year. Low precipitation and higher than normal water demands contributed to the severity of the water system's condition.

Under normal operating conditions, a well will not run continuously and flows in excess of demands are available to refill storage reservoirs. However, in June 2002, LVVWD's remote monitoring system indicated a zero-loss, zero-gain in production for Echo Well No. 3. This means that demands were equal to what the well could produce. The demands for water continued without interruption, resulting in excessive drawdown in the well. As a result of the lower water level, clay and other ground materials were drawn into the well and water supply.

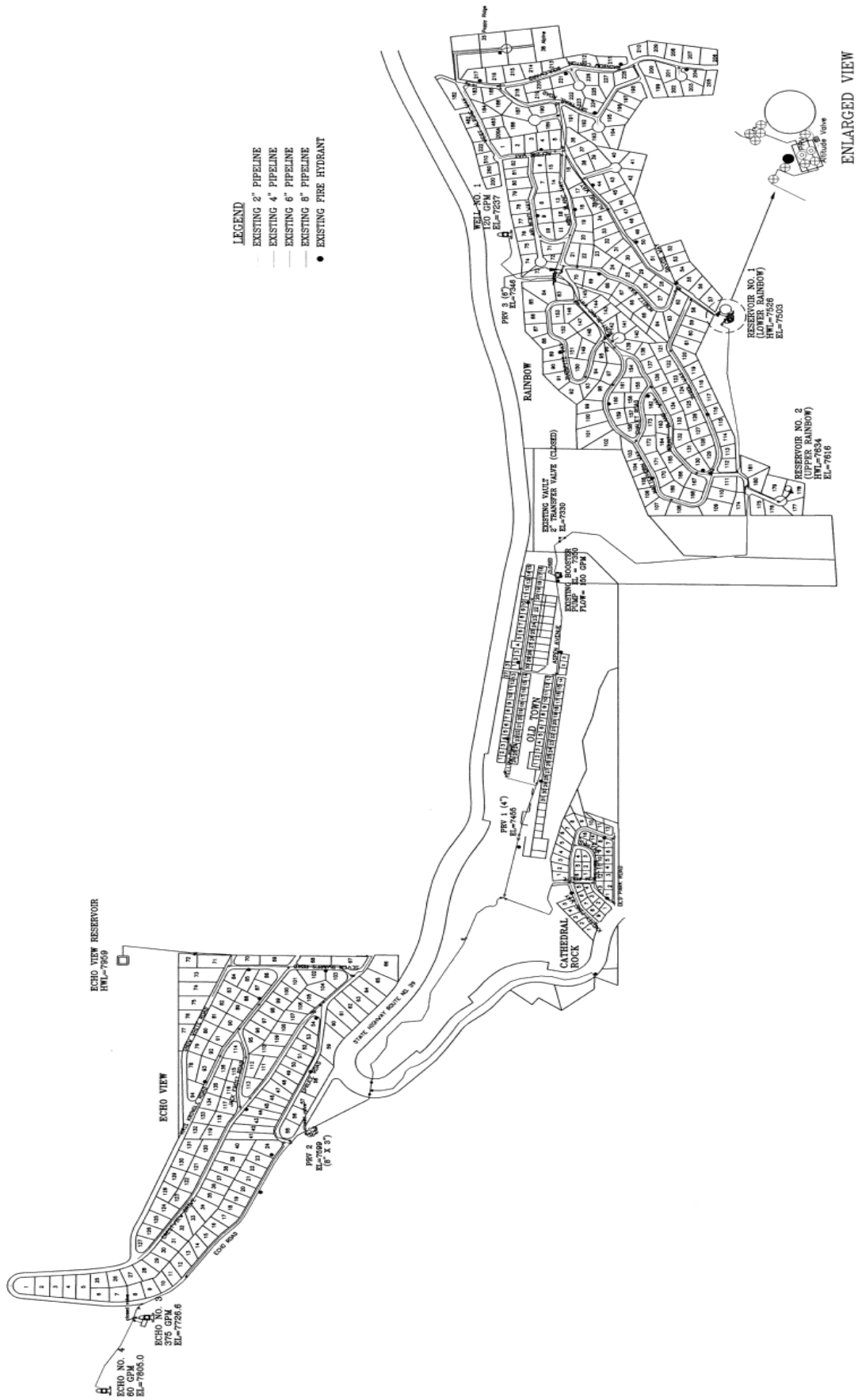
Water quality standards were never compromised by the situation, but the aesthetic concerns associated with an increase in turbidity prompted the LVVWD to make bottled water available to residents at the local library. To address declining water levels and excessive demands on the well, the LVVWD notified residents, the local Town Advisory Board and fire-fighting agencies with a hand delivered "urgent water advisory," asking residents to immediately curtail water use.

LVVWD Operations staff has indicated that similar or worse conditions can be expected in 2003. Historically low precipitation for several years has resulted in a lowering of water tables, locally and throughout the southwest. This situation, paired with higher than average water use in Kyle Canyon, contributes to significant system reliability concerns for spring, summer and fall of 2003.

Water Management Plan:

As a result, the LVVWD has developed this Water Management Plan in an effort to reduce water demands, promote conservation and prepare Kyle Canyon residents for potential water shortages and service interruptions. The Plan identifies several mitigation measures that will serve to improve water use efficiency in the area, and promote more aggressive and practiced water conservation in an effort to extend the utilization of local groundwater supplies.

Given the current situation, it is essential to recognize that reducing Kyle Canyon's vulnerability to service interruptions will require a sustained conservation effort by residents, vacationers and other visitors.



CHAPTER 1

Water Supply and Demands

As shown on the preceding page, the Kyle Canyon water system is divided into four major residential subdivisions: Echo View, Cathedral Rock, Old Town and Rainbow. The subdivisions are served by three groundwater wells and three water reservoirs. The system's water rights (permits 62265, 62266, 62267 and 62268) have a total combined duty of 480.895 acre-feet, roughly 156.7 million gallons of water per year. This figure refers to the maximum amount of water the wells are legally entitled to produce each year.

Production Wells:

Kyle Canyon is served by three primary groundwater wells: Echo Well No. 3, Echo Well No. 4 and the Rainbow Well.

Echo Wells No. 3 and 4 are geographically the highest in elevation (approximately 7,800 ft.) and serve as the exclusive water supply for the three highest neighborhoods, Echo View, Cathedral Rock and Old Town, which are located at 7,959 ft, 7,593 ft. and 7,350 ft., respectively. The two wells supply the Echo View Reservoir, which conveys groundwater to the Echo View neighborhood, and gravity feeds water downhill to serve the lower, Cathedral Rock and Old Town subdivisions.

The Rainbow Well serves the Rainbow subdivision, which is geographically the lowest in elevation at approximately 7,237 ft.

As illustrated in the table below, the lower Rainbow subdivision also depends on the Echo wells to meet peak demands; water from the Echo wells is gravity-fed to the lower Rainbow neighborhood. This typically occurs in the summer months when water demands in Rainbow exceed the production capacity of the Rainbow Well. However, due to a 600-ft. + vertical elevation difference between the Rainbow Well and the Echo View neighborhood, flows from the Rainbow Well cannot be transferred uphill to the higher neighborhoods. In 2002, over 23 million gallons of water from the Echo wells supplemented the water supply in the Rainbow subdivision.

The table below illustrates the complex operational capabilities of the three-groundwater wells.

	Echo View Elevation: ~7,800 ft.	Cathedral Rock Elevation: ~7,593 ft.	Old Town Elevation: ~7,350 ft.	Rainbow Elevation: ~7,237 ft.
Water Supply	<i>* Echo Well No. 3</i> Echo Well No. 4	<i>*Echo Well No. 3</i> Echo Well No. 4	<i>*Echo Well No. 3</i> Echo Well No. 4	<i>* Rainbow Well</i> Echo Well No. 3 Echo Well No. 4

** Primary Water Supply*

A well failure at either of the Echo wells has the potential to seriously stress the water system. The Rainbow well does not have the pumping or lift capacity to deliver water to the higher neighborhoods in the event of a well failure; consequently, while the Echo Wells supplement water needs in Rainbow, high overall system demands can contribute to well failures when water demands exceed the natural recharge rate of the well. It is for this reason that all neighborhoods need to reduce overall water demands on the system, especially during summer months when water use is typically higher.

The table below compares the safe water yield from each of Kyle Canyon's production wells to the current pumping capacity and projected pumping capacity for 2003. The safe water yield is the ideal maximum production level to maintain effective well operations during normal and drought aquifer conditions.

Production	Echo Well No. 3	Echo Well No. 4	Rainbow Well
Normal Safe Yield	Max 8 hrs. on with 2 hr. recovery Est. 280-330 gpm.	Max 24 hrs. on with 0 hrs. recovery Est. 100 gpm.	Max 22 hrs. on with 2 hrs. recovery Est. 135-145 gpm.
Drought Safe Yield	Max. 2 hrs. on with 8 hrs. recovery Est. 180 gpm.	Max 20 hrs. on with 4 hrs. recovery Est. 80-100 gpm.	Max 20 hrs. on with 4 hrs. recovery Est. 110-115 gpm.
2003 Projected Safe Yield	Max 2 hrs on with 8 hrs. recovery Est. 180 gpm.	Max 22 hrs on with 2 hrs. recovery Est. 100 gpm.	Max 22 hrs. on with 2 hrs. recovery Est. 115-120 gpm.

When community water demands begin to exceed the safe water yield of a well, the potential for well failure increases.

Water Reservoirs:

Kyle Canyon is also served by three water reservoirs: one (1) 100,000-gallon reservoir and one (1) 93,000-gallon reservoir in the Rainbow subdivision, and one (1) 100,000-gallon reservoir in the Echo View subdivision.

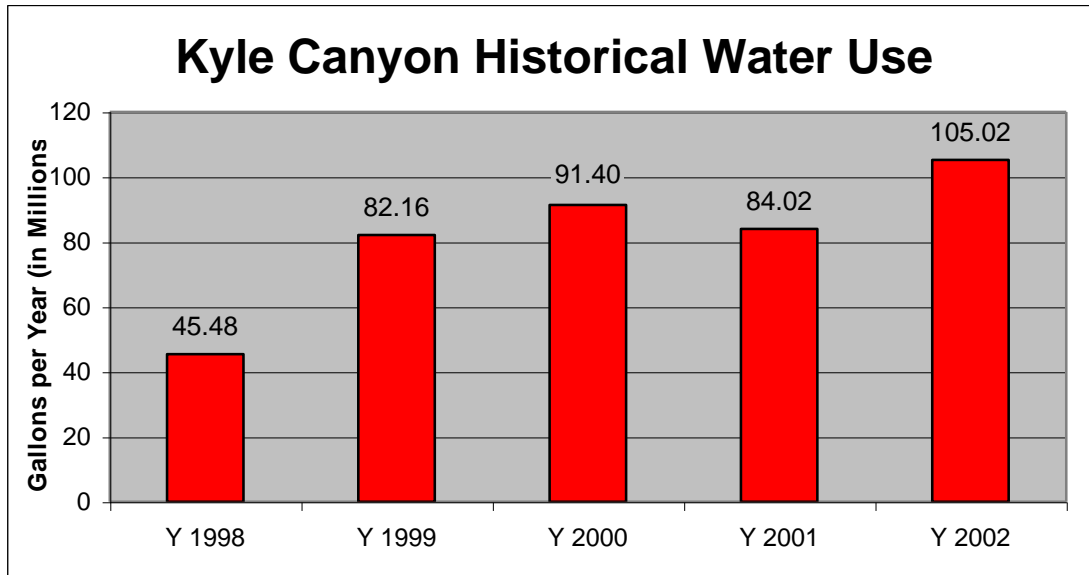
Similar to the well operations, elevation and lift capacity prohibit the transfer of water from the lower subdivisions to the Echo View area. Reservoirs will be filled to maximum capacity during summer months, and to the extent possible for safe operations of the system. In the event Echo Well No. 3 *or* 4 fails, storage is estimated to provide *less* than one full day of emergency water supply to the Echo View, Cathedral Rock and Old Town neighborhoods. This estimate is based on one well (either Echo Well No. 3 *or* Echo Well No. 4) remaining in production, the community immediately implementing emergency conservation measures and a total curtailment of water flows to the lower Rainbow subdivision. Under this scenario, the Rainbow subdivision would be required to reduce demands to coincide with the production capacity of the Rainbow Well and reservoirs.

CHAPTER 2

Water Use and Precipitation

Kyle Canyon Water Use

As illustrated in the chart below, Kyle Canyon has had significant increases in water consumption since 1998. In 2002, the water system produced 105,023,000 gallons or about 323 acre-feet of water – an increase of 131% since 1998. In that time, the system has experienced a net decrease in the number of accounts (10 new service connections have been added, 35 accounts have been closed).



Based on its current population of 1,049¹ residents, Kyle Canyon's per capita water consumption is approximately 260 gallons² of water each day, or 94,863 gallons of water each year. When compared to Las Vegas Valley Water District single-family residential per capita water use, Kyle Canyon residents use an average 19 gallons more water each day (per person). Over the course of a year, this equates to approximately 6,935 gallons per individual resident or nearly 7,300,000 more gallons for the community.

This disparity between Kyle Canyon and in-valley consumption is a particular concern, when one considers other factors, including:

- Several months out of each year, outdoor irrigation in Kyle Canyon – the largest contributor to water demands – is prohibitive due to snow and freezing conditions.
- Generally cooler temperatures in summer months (averaging 15-30 degrees lower than Valley temperatures) are conducive to far less outdoor irrigation – water evaporates at a slower rate and plants are not overstressed by extreme temperatures).
- A large percentage of the population is made up of part time residents that live in Kyle Canyon only seasonally, or on an irregular basis.

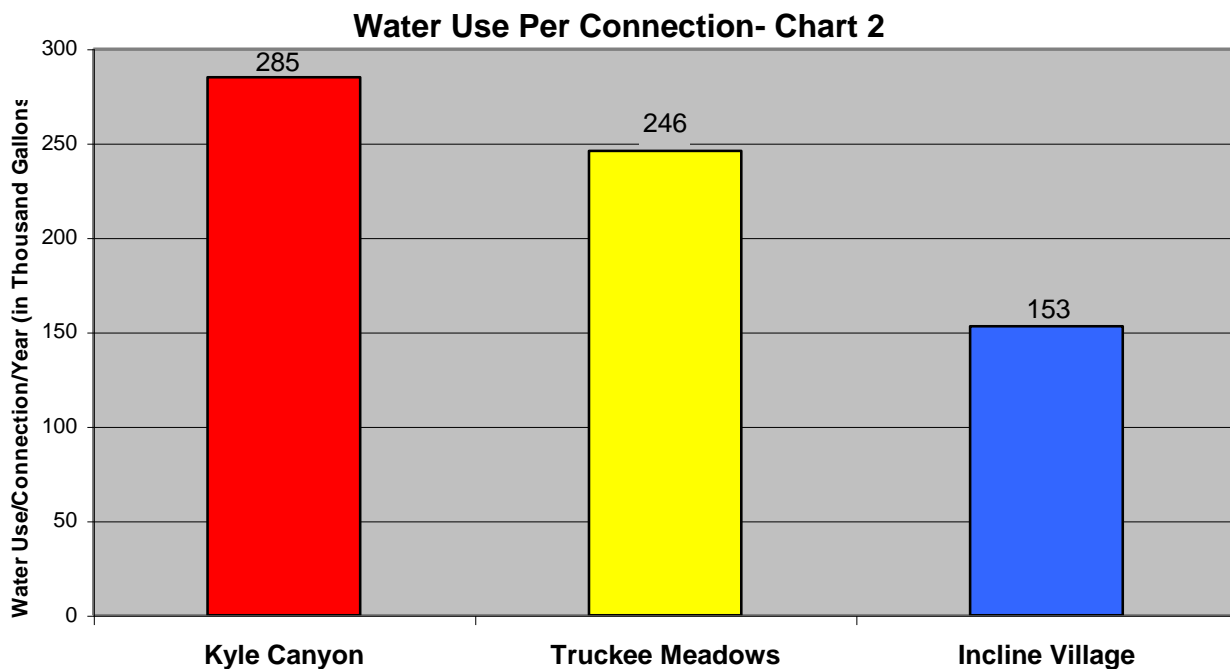
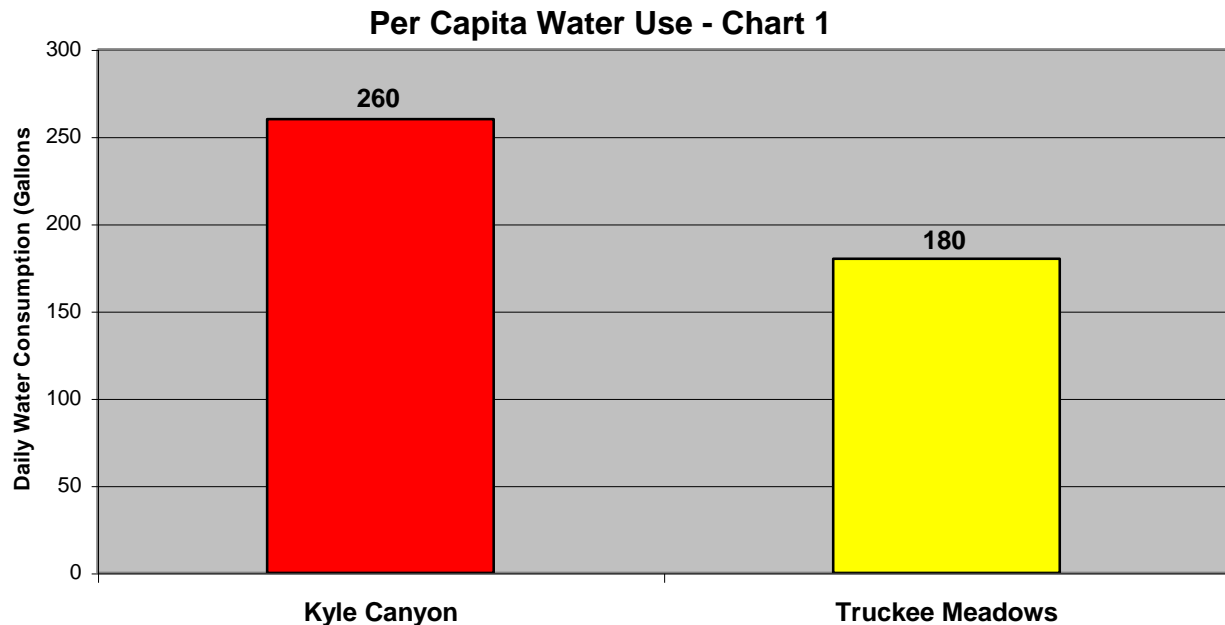
¹ Clark County Comprehensive Planning – July 1995

² Single-family residential water use only

These factors all indicate water demands on the Kyle Canyon water system should be far lower than water demands in the Las Vegas Valley.

Recognizing differences in living environments, a comparison was also made with similar mountain communities in Nevada. The charts below compare Kyle Canyon's water demands to Truckee Meadows¹ and Incline Village², two Northern Nevada communities.

As illustrated in *Charts 1 and 2 (below)*, Kyle Canyon is higher in per capita water use by comparison to Truckee Meadows, and higher than total water use per service connection as compared to Truckee Meadows and Incline Village

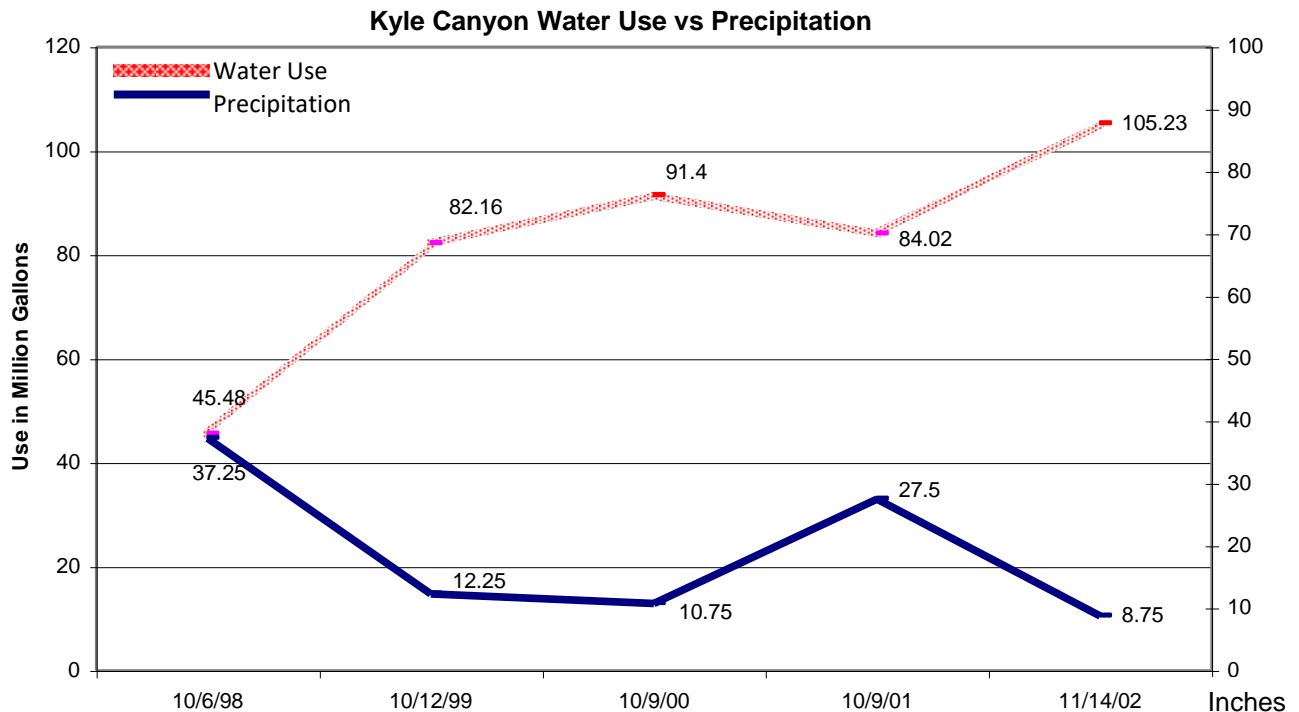


¹ Truckee Meadows Water Authority – Single-family residential water use

² Incline Village – Single-family residential water use

Precipitation:

As illustrated in the chart below, when precipitation goes down, Kyle Canyon's water use historically goes up. Yearly water demands are inversely correlated to precipitation. For example, during the years 1998 through 2000, water use patterns increased, while precipitation declined. In 2001, an above average precipitation year, water demands reduced slightly. However, in 2002, water demands increased to a record high; 2002 was the lowest precipitation year on record since before 1986.



On average, Kyle Canyon receives approximately 24.8 inches of precipitation each year. However, for the years 1999 through 2002, Kyle Canyon received a record low averaging only 14.9 inches, nearly half of its average yearly precipitation.

Historically low precipitation for the last several years, which limits the amount of water naturally recharged into the groundwater aquifers, paired with several years of increasing water demands have stressed all three of Kyle Canyon's groundwater wells. In 2002, the lowest precipitation and highest water demand year on record since 1986, the water table was approximately 40 feet lower than in normal years. This situation severely stressed Echo Well No. 3, contributing to multiple pumping problems.

CHAPTER 3

Water Conservation

For the purpose of water management, the LVVWD will use four water supply conditions for Kyle Canyon, each tied to the water levels in Kyle Canyon's wells or other outside influences that have impacted or can potentially impact the water system. This Water Management Plan identifies the four stages of water supply conditions as follows:

1. **Sustainable** – The “sustainable” stage implies that water supplies from the groundwater aquifer are sufficient to meet the needs of the Kyle Canyon community. This stage is triggered when water supplies are being used at a rate which does not exceed the well's ability to naturally recharge, water levels in each of the community wells are stabilized within ideal operating range and there is no immediate concern of infrastructure failure.
2. **Concerned** – The “concerned” stage implies that water supplies from the groundwater aquifer are being used at a rate consistent with the well's ability to naturally recharge. Concerned indicates that there is a potential for well failure. This stage is triggered when water levels fall below the following operating stage:
 - a. Echo Well No. 3, 90 ft. from surface
 - b. Echo Well No. 4, 170 ft. from surface
 - c. Rainbow Well, 145 ft. from surface
3. **Critical** – The “critical” stage implies that water supplies from the groundwater aquifer are being depleted at a rate higher than that which can be naturally recharged. Critical indicates that there is a high or imminent potential for well failure. This stage is triggered when water levels fall below the following operating range:
 - a. Echo Well No. 3, 110 ft. from surface
 - b. Echo Well No. 4, 230 ft. from surface
 - c. Rainbow Well, 165 ft. from surface
4. **Emergency** – The “emergency” stage indicates that a well outage, infrastructure or water quality issue has occurred. During emergency conditions, all or part of the community water system has failed and resources are not adequate to meet the demands of the community. An emergency may/will result in supply shortages and/or service interruptions.

While well/aquifer conditions and water demands are defined as key indicators of elevating operating stages, other factors such as main breaks, well or reservoir outages, similar types of infrastructure failures or water quality issues may require that operating stages be elevated. Such occurrences can be more difficult and/or impossible to predict.

Stage	Trigger*	Water Availability/Response
Sustainable (Ideal)	Water supplies are being used at a rate, which does not exceed the well's ability to naturally recharge.	Water supplies are sufficient to meet demands.
Concerned	Water supplies are being used at a rate consistent with the well's ability to naturally recharge. Water levels in one or more of the groundwater wells fall below: Echo Well No. 3, 90 ft. from surface Echo Well No. 4, 170 ft. from surface Rainbow Well, 145 ft. from surface	Use water to meet all indoor demands and <u>reduce</u> outdoor demands.
Critical	Water supplies are being depleted at a rate higher than that which the well naturally recharges. Water levels in one or more of the groundwater wells fall below: Echo Well No. 3, 110 ft. from surface Echo Well No. 4, 230 ft. from surface Rainbow Well, 165 ft. from surface	Water is available to meet all indoor demands if outdoor demands are <u>significantly reduced</u> . High or imminent potential for well/infrastructure failure.
Emergency	A well/infrastructure failure has occurred, or water recourses are not adequate to meet needs.	Expect service interruptions, poor water quality and/or water shortages.

**The impact of other factors that may influence the availability of groundwater supplies will be considered in determining operating stages.*

Notification of Water Supply Conditions:

The LVVWD will make reasonable efforts to notify residents of any changes to water supply conditions and operating stages by way of phone calls, mailers, fliers, signs, email, or any combination thereof. The LVVWD will also provide information to the Mt. Charleston Library for posting on the local bulletin board.

If appropriate, declarations of operating stages will be made by the LVVWD Director of Operations. The declaration of a higher operating stage will require the Kyle Canyon community to immediately and significantly reduce indoor and outdoor water use. If conditions subside after an initial declaration, the declaration can be lifted and the level of response adjusted. If the conditions worsen or emergency conditions persist, the community may find that existing measures are not effective enough and more restrictive measures may be required. In that case, the LVVWD and Kyle Canyon community will work to tailor their responses to the actual conditions.

CHAPTER 4

Kyle Canyon Service Rules

The Kyle Canyon Water District is governed by a Board of Trustees and by the Kyle Canyon Service Rules. The Rules address a variety of issues, including water commitments and conditions of service. These two measures, as defined below, are the foundation from which this Water Management Plan was developed.

Water Commitments:

Water use for irrigation is provided only for the property to which the water commitment was made (this does not include lands adjacent, nearby or immediately next to the property).

Condition of Service:

Water delivered through the Kyle Canyon Water District's water system should be used in a beneficial manner that promotes efficiency and avoids waste.

The Water Management Plan proposes specific conservation measures that were developed to promote conservation and to reduce water waste within the community. Water waste and exceptions to water waste are defined below.

Water Waste:

- Allowing water to flow or spray off of the parcel for which the water was provided.
- Malfunctioning device or supply line, where the customer or their agent has known of the problem for more than 48 hours.
- Washing vehicles, equipment, driveways, parking lots, sidewalks, streets or other surfaces or objects, where water is allowed to flow off of the parcel for a continuous period of five minutes or greater.
- Using spray irrigation (sprinklers) between the hours of 12 p.m. (noon) and 7 p.m. from May 1st through October 1st each year.

Exceptions:

The following is not considered water waste:

- Water waste generated as an inherent outcome of water used to abate a health or safety hazard where the proper application of water is the most appropriate and practical technology, or water used to reasonably meet the provisions of federal, state, or local law.
- Supervised testing or maintenance of system to repair, adjust, or conduct a performance assessment. Both the operation of spray irrigation and the generation of spray or flow from the parcel shall be exempt by this provision, provided that no reasonable alternative exists.

CHAPTER 5

Water Management Measures

This chapter lays out a comprehensive framework for how the Kyle Canyon Water District will implement proactive demand reduction measures to ensure appropriate response actions throughout the various operating stages.

This Plan anticipates what can be done in the early stages of concerned and moves through increasingly more complex critical and emergency operating stages. The following section describes tools and techniques that can assist the community in modifying water demands to meet available supplies. Because the demand response from a tool or technique may vary depending on specific conditions, additional tools or techniques may be required to achieve needed effects. For this reason, the chapter is not meant to be exhaustive, but is intended as a tool to help the Kyle Canyon Water District and community members better coordinate efforts to regain the levels of conservation necessary to meet water demands.

Landscape Watering Restrictions

Sprinkler Irrigation:

The landscape-watering schedule shown below will be implemented to help ensure that sprinkler irrigation demands are distributed evenly on the water system and to provide adequate resting periods for well recovery. The schedule assigns residents watering days based on the last digit of their property address. As stages are increased from Concerned to Critical, to Emergency, more stringent sprinkler watering restrictions become effective.

LANDSCAPE WATERING SCHEDULE

Spray/Sprinkler Irrigation

Address	Concerned	Critical	Emergency
Addresses that end in even numbers (0, 2, 4, 6 and 8) <i>No irrigation from Noon to 7 p.m. May 1 – Oct. 30</i>	<u>Spring/Fall</u> <i>May – June</i> <i>September till 1st freeze</i> 1 day/wk Monday <u>Summer</u> <i>July – August</i> 2 days/wk Monday and Thursday	<u>Spring/Fall</u> <i>May – June</i> <i>September till 1st freeze</i> 1 day/wk Thursday <u>Summer</u> <i>July – August</i> 1 day/wk Thursday	No Outdoor Irrigation.
Addresses that end in odd numbers (1,3, 5, 7 and 9) <i>No irrigation from Noon to 7 p.m. May 1 – Oct. 30</i>	<u>Spring/Fall</u> <i>May – June</i> <i>September till 1st freeze</i> 1 day/wk Tuesday <u>Summer</u> <i>July – August</i> 2 days/wk Tuesday and Friday	<u>Spring/Fall</u> <i>May – June</i> <i>September till 1st freeze</i> 1 day/wk Tuesday <u>Summer</u> <i>July – August</i> 1 day/wk Tuesday	No Outdoor Irrigation

Water Management Measures (Cont.)

Watering Timers for Irrigation Systems:

The following measures will help to ensure that the most efficient application of water to landscape is achieved, and to reduce the likelihood of over watering, which contributes to water waste:

- Equip irrigation systems, including subsurface and hose attachment (oscillating, pulsating, rotary and/or impulse) sprinklers, with a watering timer
 - Set timers for a maximum watering time of 15 minutes per area
 - Manually reset timers in 15-minute increments if additional water is necessary

Watering duration may vary, depending on the type of sprinkler used. Most subsurface and hose attachment sprinklers produce high water flows, which can significantly reduce the total watering time needed. Oscillating or fan sprinklers are less efficient and may require the maximum watering duration.

Hand Watering:

Demands on the water system are higher on weekends than during mid-week. For this reason, the potential for a well failure or inadequate supply is more likely to occur during this time.

The following measures for hand watering will help to ensure that basic domestic needs are met:

- Use a positive shut-off spray nozzle that is manually controlled at all times
- No unattended hand-watering (for example, running hose or sprinkler attachment)
- Hand-water at any time of the day, for any duration on weekdays (Monday – Friday)
- Limit hand watering to one day on the weekends (Saturday or Sunday)
- No hand-watering during emergency operating conditions

Surface, Building, Equipment and Vehicle Washing:

Critical and emergency are considered the most severe operating conditions. If operations reach the critical stage, all unnecessary water use must be minimized to the greatest extent possible. This will serve to minimize the potential for more severe, or emergency, operating conditions. When operating conditions reach the emergency stage, some form of system failure has occurred. For this reason, the following measure will be implemented:

Surface, Building and Equipment Washing:

- No surface, building and equipment washing during critical and emergency operating stages.

Vehicle Washing:

- Limit vehicle washing to one time per week during the concerned operating stage
- Use a positive shut-off nozzle.
- No vehicle washing during critical and emergency operating stages.

CHAPTER 6

Clark County Water Waste Ordinances

Kyle Canyon is located within the unincorporated area of Clark County. As such, the Kyle Canyon Water District is governed by County ordinances

Current or proposed Clark County ordinances relating to water use and conservation may be less stringent than what is necessary to ensure sustainable operating conditions for the Kyle Canyon water system. For this reason, revisions to the Kyle Canyon Service Rules are being proposed for adoption on July 15, 2003.

The revisions provide for the incorporation of conservation and water demand management measures identified in the Plan to occur based on the availability of water supplies and operating conditions. This includes activities to respond to operating condition declarations and penalties for water waste. If approved and when operating conditions warrant more stringent measures – as is currently the case – the Kyle Canyon Service Rules shall serve as a tool to manage these conditions and minimize the potential for well failure(s).

If operational conditions under the Service Rules would provide less stringent measures than what is called for under any applicable Clark County ordinance for drought conditions, then the ordinances for water use and conservation shall prevail.

CHAPTER 7

Water Conservation Recommendations and Implementation Schedule

During the months of March and April 2003, a series of eight (8) workshops were conducted with Kyle Canyon residents and property owners to solicit feedback and/or additional recommendations on the Kyle Canyon Water Management Plan.

The following represents the recommendations received during the workshops. Where appropriate and noted, recommendations have been incorporated into the Water Management Plan. The remaining recommendations have been organized in three categories: immediate, short-term and long-term implementation.

Most recommendations can easily be implemented in the immediate and short term. However, due to funding constraints and/or timing issues, some recommendations may take longer to implement as noted.

Immediate Implementation

Recommendation 1: *Revise Landscape Watering Schedule*

Several modifications landscape watering schedule were recommended, including:

- A. Allow fewer days for sprinkler irrigation
- B. Limit outdoor irrigation to hand-watering only
- C. Provide information on how much water is appropriate to use
- D. During “critical,” limit summer watering to 1 day/week
- E. Revise proposed watering schedule to have more days between watering
- F. Reduce the maximum watering duration from 30 to 15 minutes
- G. Water for irrigation is not necessary in March and May due to snow and freezing conditions

Implementation:

- Suggestions A, D, E, F and G have been incorporated into the Landscape Watering Schedule (Page 14).
 - Suggestion “B” may be implemented at a later date if conditions worsen or emergency conditions persist.
 - Suggestion “C” has been addressed in Recommendation 4.
-

Immediate Implementation (cont.)

Recommendation 2: *Re-evaluate the bandwidth between “concerned” and “critical”*

It was recommended that “concerned” measures become effective earlier. Residents suggested that implementing concerned measures sooner might reduce the potential for reaching the “critical” stage.

Implementation:

The Water Management Plan (pages 11 and 12) has been updated to reflect this recommendation. The revised well depths call for the implementation of “concerned” water management measures when water levels in any one of Kyle Canyon’s three groundwater wells reach the following depths:

Echo Well No. 3	90 ft. below land surface
Echo Well No. 4	170 ft. below land surface
Rainbow Well	145 ft. below land surface

Recommendation 3: *Notify residents of new/changing operating conditions*

It was recommended that the LVVWD establish a process for notifying residents of changing/heightened operating conditions.

Implementation:

The Water Management Plan (page 13) has been updated to reflect this recommendation.

The LVVWD will make efforts to notify residents of any changes to water supply conditions and operating stages by way of phone calls, mailers, fliers, signs, email, or any combination thereof. The LVVWD will also provide information to the Mt. Charleston Library for posting on the local bulletin board.

Recommendation 4: *Inform residents on ways to conserve water/reduce water waste*

It was recommended that the LVVWD provide community residents with additional information on the Kyle Canyon water system, including:

- Water system conditions
- Leak detection
- Appropriate fire prevention methods
- Appropriate measure of water for landscape use
- Deep root watering
- Water conservation/water waste
- Home winterization methods

Immediate Implementation (cont.)

Implementation:

The LVVWD has several forums for disseminating information to the Kyle Canyon community, including quarterly bill inserts, staff updates to the local Mt. Charleston Town Advisory Board, and on-line information at www.lvvwd.com (a link to information on the Kyle Canyon water system is available under “other service areas”).

The LVVWD will work to enhance public information specific to Kyle Canyon residents and their unique concerns and/or interests. Where appropriate, the LVVWD will partner with other agencies/specialists to ensure that the most appropriate source provides the requested information (for example, plumbing industry, fire/forest agencies, etc.).

Recommendation 5: *Provide water conservation incentives*

It was recommended that the LVVWD provide water conservation incentives, including low-flow toilet flappers and low-flush toilets.

Implementation:

Homes built before 1989 were not required to have low-flow water fixtures. Kyle Canyon residents, whose homes were built prior to 1989, are eligible to receive a free indoor retrofit kit, which includes:

- Water saving showerhead(s)
- Bathroom fixture aerator(s)
- Kitchen faucet aerator(s)
- Toilet diverters/flappers
- Leak detection tablets for the toilet

Kyle Canyon Water District customers are encouraged to call 258-SAVE to request an indoor retrofit kit. In addition, workshop attendees were provided the opportunity to sign up for such kits.

Limited funding prohibits the implementation of a low-flush toilet incentive program at this time.

Short Term – Implementation

Recommendation 6: *Notify high water users*

It was recommended that the LVVWD notify metered accounts if/when high water use is recorded.

Implementation:

Based on Southern Nevada Water Authority (SNWA) residential indoor consumption data, an average residential account should not exceed 10,000 gallons of water per month during winter months. This figure assumes that no water is being used outdoors for irrigation during winter months, when freezing or snow conditions exist.

Likewise, based on the 2003 projected safe yield for the Kyle Canyon water system (page 7), residential water usage should not exceed 40,000 gallons of water per month during all other months.

The LVVWD will issue notices to residential metered water customers if/when consumption exceeds 10,000 gallons of water per month during the months of November through April each year; and 40,000 gallons of water per month during all other months.

Additionally, in May/June 2003, the LVVWD will install radio remote meter reading technology (Firefly) to existing water meters in Kyle Canyon. Following the installation of Firefly, individual water meters will transmit a signal to a data collection device that will store residential water use data for each metered account. Firefly technology electronically stores water use data on an hourly, daily, weekly and monthly basis, which allows for a more comprehensive analysis of water use trends. The new technology will help to identify leaks or running pipelines within a property; consumption that registers a continuous flow for a 24-hour period indicates a leak may be present.

The LVVWD will monitor meter readings. If a meter registers a continuous flow over a 24-hour period, the resident will be notified that a leak may be present.

Recommendation 7: *Provide consumption data to metered customers*

It was recommended that the monthly consumption of metered accounts be printed on the corresponding account's water bill as a tool to help residents monitor water use.

Implementation:

There are currently 111 residential metered accounts in Kyle Canyon, which are charged the standard flat water rate of \$51.00 per month.

The LVVWD will reformat the monthly water bills of metered accounts to reflect actual water usage. This recommendation can be implemented in Summer 2003.

Short Term – Implementation (cont.)

Recommendation 8: *Kyle Canyon’s water supplies should not be used for dust control*

It was recommended that LVVWD prohibit Kyle Canyon’s water supplies from being used for dust control.

Implementation:

As part of the LVVWD’s education and outreach efforts, residents will be discouraged from using water to control dust outside their property. Per Kyle Canyon Water District Service Rules, water should not be used outside the property to which the water commitment was made; this includes watering roads or other areas outside the parcel.

Depending on system operating conditions, the LVVWD may also require that other agencies/contractors locate another water source for use in dust suppression.

Recommendation 9: *Establish a policy for water waste enforcement*

It was recommended that the LVVWD pursue an enforcement policy for water waste, including:

- Establish a phone number to report water waste
- Enforce water waste with monetary penalties
- Balance water waste fines with the cost of service (for example, labor/travel time, etc.)
- Shut off water abusers

Implementation:

The LVVWD will work to develop a water waste enforcement policy and associated penalties.

It is anticipated that any enforcement policy would be considered for adoption by the Kyle Canyon Board of Trustees, and, if approved, be incorporated into the Kyle Canyon Water Service Rules.

Recommendation 10: *Establish a water waste/leak monitoring committee*

It was recommended that Kyle Canyon residents form a “neighborhood watch” that would monitor water waste and/or report leaks.

Implementation:

LVVWD recognizes the importance of sustained community involvement and encourages residents to take an active role in protecting their local water supply. The proximity of a local watch group, comprised of Kyle Canyon residents, would help to promote greater conservation awareness.

The LVVWD supports this recommendation, which would be coordinated and implemented by local residents.

Long-Term Implementation

Recommendation 11: *Install/expedite the installation of individual water meters*

It was recommended that water meters be installed as a long-term solution for water conservation efforts.

Residents made additional recommendations regarding the installation of water meters, including:

- Require that water meters be installed when a property is sold as a condition of water service.
- Expedite and/or find alternative financing for the installation of individual water meters.

Implementation:

The installation of individual water meters in Kyle Canyon is a condition of future grant funding by the State of Nevada, Board for Financing Water Projects – a financing source that has provided over \$2.6 million in funds to make system improvements since 1996.

It is anticipated that additional critical improvements (distribution line replacements) will be necessary following the completion of current capital improvement activities in 2004/2005 (see Appendix). If the State requires that meters be installed as a condition of funding for the distribution line replacement project, meters would likely be installed within the next three to four years. If the Kyle Canyon Water District were to abstain from making additional funding requests from the State on the basis that meters should not be installed, Kyle Canyon residents would become responsible for all debt associated with future critical improvements.

The LVVWD will continue to research potential funding sources to expedite water system improvements, including the installation of individual water meters.

Recommendation 12: *Locate and repair leaking pipelines*

It was recommended that the LVVWD look for leaking pipelines and make timely repairs in an effort to reduce water lost to the system.

Implementation:

Several factors are considered in determining the appropriate response time to address water leaks. Response time to leaks varies depending on the severity of the leak (or amount of water lost), potential for pavement/property damage, availability of work crews, and funding for repairs. Leaks that pose a potential threat to health or safety will receive immediate attention; however, smaller leaks may be addressed less quickly depending on the factors discussed above.

Long-Term Implementation (cont.)

The LVVWD recognizes that there is a high potential for leaks within the Kyle Canyon Water distribution system, but limited funding is a key determination for how quickly major repairs can be made. The Kyle Canyon Water District, as a 318 District, is essentially self-funded – meaning it is responsible for funding all system costs. The LVVWD cannot provide this funding. The LVVWD is working to address water leaks through a capital improvement plan for Kyle Canyon, which identifies the replacement of leaking pipelines as a major initiative. To fund this work, the LVVWD has pursued grant funding on behalf of Kyle Canyon through the state. The implementation timeline for major repairs/replacements to the water distribution system are contingent on the availability of this grant funding.

It is anticipated that, if grant funding is received, major distribution repairs/replacements will begin following the completion of current capital improvement activities in 2004/2005. The project will include the replacement of approximately 20,600 liner feet of older 2 and 4-inch pipeline with new 6 and 8-inch pipeline. Pipeline replacements will reduce leaks within the distribution system, and significantly improve the availability of water for fire flow.

In the meantime, the LVVWD will conduct a leak assessment for Kyle Canyon in summer 2003, using advanced leak detection technology. The results of the leak assessment should provide a clearer understanding of the system water loss rate, as well as help to locate where leaks may be occurring in specific neighborhoods/residences. The LVVWD will provide additional information to the community on the results of the leak assessment as it becomes available.

Recommendation 13: Revisit policy/reduce fees for water turn-on/off

It was recommended that the Kyle Canyon Service Rules be revised to eliminate or reduce water turn-on/off fees. Residents suggested that reducing/eliminating fees might provide an incentive for customers to shut-off their water service when a property is not in use during winter months.

Implementation:

The Kyle Canyon Water District depends on monthly water bills to maintain the system, and/or repay debt. Virtually all of the existing flat rate reflects these ongoing costs – not the price of water. The existing turn-on/off policy is an essential component of this overall financial policy for the system, in the absence of a metered rate structure. The LVVWD will consider this recommendation as part of potential future revisions to the existing water rate structure, but discontinuing the existing turn-on/off policy would likely require an adjustment to current Kyle Canyon water rates.

In the meantime, the LVVWD encourages residents to insulate their pipes or properly drain their water lines as an alternative to letting faucets run during winter months. Letting faucets run to prevent pipes from freezing contributes significantly to water waste – thousands of gallons of water can be lost in a single month.

APPENDIX

Kyle Canyon System Improvements Project

In 2001, the LVVWD submitted a grant application to the State's small systems grant program requesting funding to make needed repairs to the system. The project included the following phases:

- Phase I – Drill and equip Echo Well No. 5
- Phase II – Construct a new 300,000 gallon water reservoir
- Phase III – Install/replace pipeline
- Phase IV – Install individual water meters

Due to numerous grant applicants and limited funds, the State initially agreed to fund only Phase IV improvements, considering the installation of water meters the highest priority. Once meter installations were complete, Kyle Canyon could reapply for additional funds for the remaining phases. While not formally documented, the State considers the installation of water meters a high priority and has since required grant applicants to perform meter installations as a condition of future funding awards.

However, due to critical system reliability concerns in 2000 and 2001 (discussed in chapter 2), the Kyle Canyon Water District requested that the State reconsider the funding priorities. The drilling and equipping of Echo Well No. 5, and construction of a new water reservoir (Phases I and II) were considered critical and necessary to ensure an adequate water supply in the Kyle Canyon community. The State agreed to reconsider the funding priorities and ultimately granted funding for Phase I and II improvements, awarding \$811,000 towards the \$2.2 million well and reservoir project.

System Improvements Project Phase I & II:

Phase I – Drill and Equip Echo Well No. 5: A contract has been awarded for the drilling and equipping of Echo Well No. 5, with construction to begin in spring of 2003.

To ensure that high water quality and production is achieved, the well contract includes provisions to drill up to four smaller exploratory pilot holes prior to drilling and equipping the final production well site. If good water quality and production is achieved on the first pilot hole, the contractor will be instructed to drill a full diameter borehole. Another contractor will be obtained to equip the well; if this scenario occurs, the project will likely be completed by early to late fall of 2003.

However, if the desired water quality and production is not achieved on the first pilot hole, then the contractor will be instructed to drill subsequent holes (up to a total of four) until a suitable site is located. Under this scenario, the project is not likely to be complete until spring of 2004.

Phase II – Construct a 300,000 Gallon Storage Reservoir: As of April 2003, the storage reservoir project design is 60% complete. The project is slated for bid in fall 2003, with construction to begin in spring 2004. The reservoir is designed as an above grade tank.

System Improvements Project Phases III & IV:

Phase III & IV project improvements includes the installation of approximately 20,600 linear feet of 6 and 8-inch diameter pipeline to provide system looping, increase fire flow to all fire hydrants, and improve system losses. These improvements will make a minimum of 1,000 gallon-per-minute (gpm) fire flow at a residual pressure of 20 pounds-per-square-inch (psi) available to all residence.

These improvements also include the installation of 252 three-quarter-inch water meters to promote water conservation and enhance leak detection

Financial Summary

Consisting of less than 349 service connections, the Kyle Canyon Water District has a limited number of accounts to dilute the impacts from debt. Financial constraints have limited Kyle Canyon's ability to make necessary improvements, requiring the system to rely heavily on grants and other sources of financial aid.

Recognizing that future improvements to the system, taken at full financial impact, would severely stress the water rate structure, the Las Vegas Valley Water District has worked to pair need infrastructure improvements with outside funding sources.

As a result of these efforts, Kyle Canyon has received substantial support for infrastructure repair and improvements through the State of Nevada's small system grant program. This assistance allowed Kyle Canyon to make improvements to increase drinking water capacity, preserve water quality and improve system reliability. For example, in 1995, the Kyle Canyon Water District received a grant for capital improvements from the State of Nevada's small system grant program. The grant covered 85 percent of the \$2.2 million project. The balance of the project costs was recovered through an increase to the local water rates.

In the most recent grant award for the Kyle Canyon System Improvements Project (well and reservoir project), the State awarded \$811,000. The State grant requires KCWD to fund the remaining 38.1% of project costs, equivalent to \$499,274, and KCWD must demonstrate this financing has been secured before the State will release the grant funds to KCWD. KCWD is pursuing a long-term, low interest loan for this amount through the Nevada Drinking Water State Revolving Loan Program; however, the application process is expected to take approximately 8-10 months. In the interim the Kyle Canyon Board of Trustees accepted funds from the LVVWD in the amount of \$499,274 to satisfy the State's conditions. This will allow the necessary work to begin. When the State loan funds are issued, the LVVWD loan will be retired.

Water rates in Kyle Canyon are currently a \$51.00 flat monthly fee.