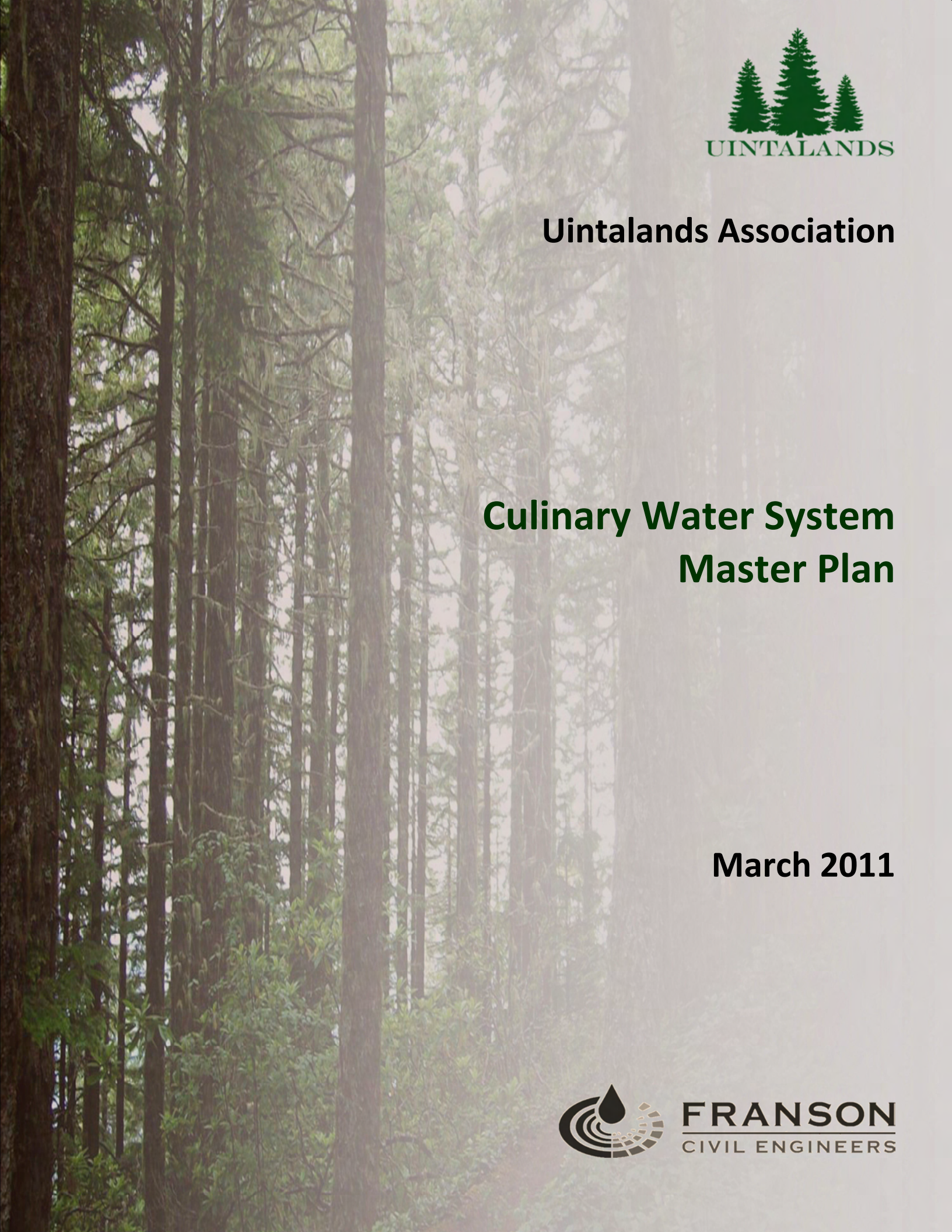


UINTALANDS

Uintalands Association

Culinary Water System Master Plan

March 2011

FRANSON
CIVIL ENGINEERS

Table of Contents

Tables and Figures

Executive Summary

Introduction

In September of 2010, Uintalands Association (Uintalands) retained Franson Civil Engineers to prepare a Water Master Plan. This Executive Summary provides a brief overview of the efforts and recommendations provided within the Master Plan document.

Statement of Purpose

The purpose of the Water System Master Plan is to evaluate the existing culinary water system and to provide recommendations for facilities and operations for the existing and future needs of the community. This plan covers Uintalands' existing uses (current cabins and RV's) and full build out (cabins on all properties).

The specific objectives of the plan include the following:

- Quantify existing and future demands on the water system
- Create a hydraulic model of the water system
- Evaluate the existing system with current needs
- Evaluate the existing system with future needs
- Identify major distribution system improvements
- Identify funding opportunities

Existing and Future Demands

Existing demands for the entire system were determined using the State of Utah Drinking Water Rules for public drinking water facilities. By their definition, a public drinking water system is a system, either publicly or privately owned, providing water for human consumption and other domestic uses. These rules for water systems – including water sources, storage tanks, and pipelines – are intended to assure that the facilities are reliably capable of supplying adequate quantities of water, meet drinking water quality requirements, and do not pose a threat to public health.

This study only accounts for indoor demands, as outdoor water uses are not allowed by Uintalands. The future demands are dependent on the completion of cabins within Uintalands and is referred to as "full build-out" in this report.

Water System Modeling

A hydraulic model was developed using Haestad's WaterCAD, a computer software program, to analyze the water distribution system under existing and future conditions. The distribution system was evaluated based on pipeline capacity, demands, and water storage capacity. Future demands, based on completion of all cabins, were placed in the model to determine how they affect the overall system.

System Evaluation

The existing system, constructed in 1976, consists mainly of 4-inch pipeline, but also has 2-inch and 6-inch distribution lines. The existing system was evaluated in the hydraulic model using DDW's guidelines for demands as discussed in Chapter 3. Information on system pressures, capacities, and velocities were calculated throughout the system to determine whether adequate pressure is available for everyday use and for fire protection. Areas of low and high pressures are located throughout the system with limited areas remaining within the allowable pressure ranges. This is a result of the 2-inch pipelines being too small to carry the needed flows throughout the system, and of the tanks elevations and elevation changes throughout the Association. Existing pressure reducing valves help to reduce high pressures to water supplied in the bottom end of the system and at the lower elevations. Additional pressure reducing valves can be placed at various locations to solve additional high pressures in the system. A booster pump can be placed at the top of the system to eliminate low pressures at the top of the system.

The current system is not adequate to supply fire flow demands without seriously affecting some areas of the system with low and negative pressures. Water users have also noted pressure deficiencies in the system during normal conditions. When problems arise in the future, existing pipelines will need to be replaced. As breaks occur, we recommend increasing pipeline sizes to meet DDW's requirements.

Uintalands has an adequate water source supply from the spring. However, no other water source is available. DDW guidelines recommend every water supplier to have at least two water sources in order to protect a community's water supply. We recommend that the Association obtain another water source to provide a backup water supply.

Recommendations

The recommendations are based on the system at full build-out conditions. The Uintalands' Board has chosen to not provide fire protection. The recommendations reflect this decision. Recommendations are grouped into short-term and long-term improvements, with cost estimates. Details of the recommendations and cost estimates are in Chapter 5. Additional recommendations to comply with DDW's requirements for water systems are also summarized. It is also recommended to review Uintalands' policies and procedures to verify that measures are taken to meet the water system rating criteria and consumer confidence reports required by the Utah Division of Drinking Water.

There are several funding options in Utah for culinary water systems, including the Division of Drinking Water and Community Impact Board. A funding application is being submitted to DDW for the short-term recommendations.

Chapter 1: Project Overview

1.1 Project Background

Uintalands Association (Uintalands) is located in the beautiful mountains of Summit County. Located along Highway 150, Uintalands is about 30 miles south of Evanston, Wyoming or 50 miles northeast of Kamas. Figure 1-1 shows the project location within Summit County.

Uintalands was originally developed in 1976. Of the 276 lots, 180 cabins have been built and 52 lots are currently occupied by RV's. Lot owners are assessed an annual fee that is placed into a general account, which is then allocated into certain budgets as voted on at an annual meeting held in November. The water system currently does not have its own account. The 2011 water budget, including pumping costs, is $35,000, up from $20,000 in 2010.

The original water system was designed and constructed 34 years ago with Schedule 40 pipe. However, with yearly maintenance due to pipe breaks, most of the current system has been placed within the past 7 years with C-900 pipe. The system consists mainly of 4-inch pipeline, but also has 2-inch and 6-inch distribution lines. A spring provides the only water source for Uintalands. However, lack of water has never been an issue, even during holiday weekends. The system has four storage tanks holding a combined capacity of 104,000 gallons.

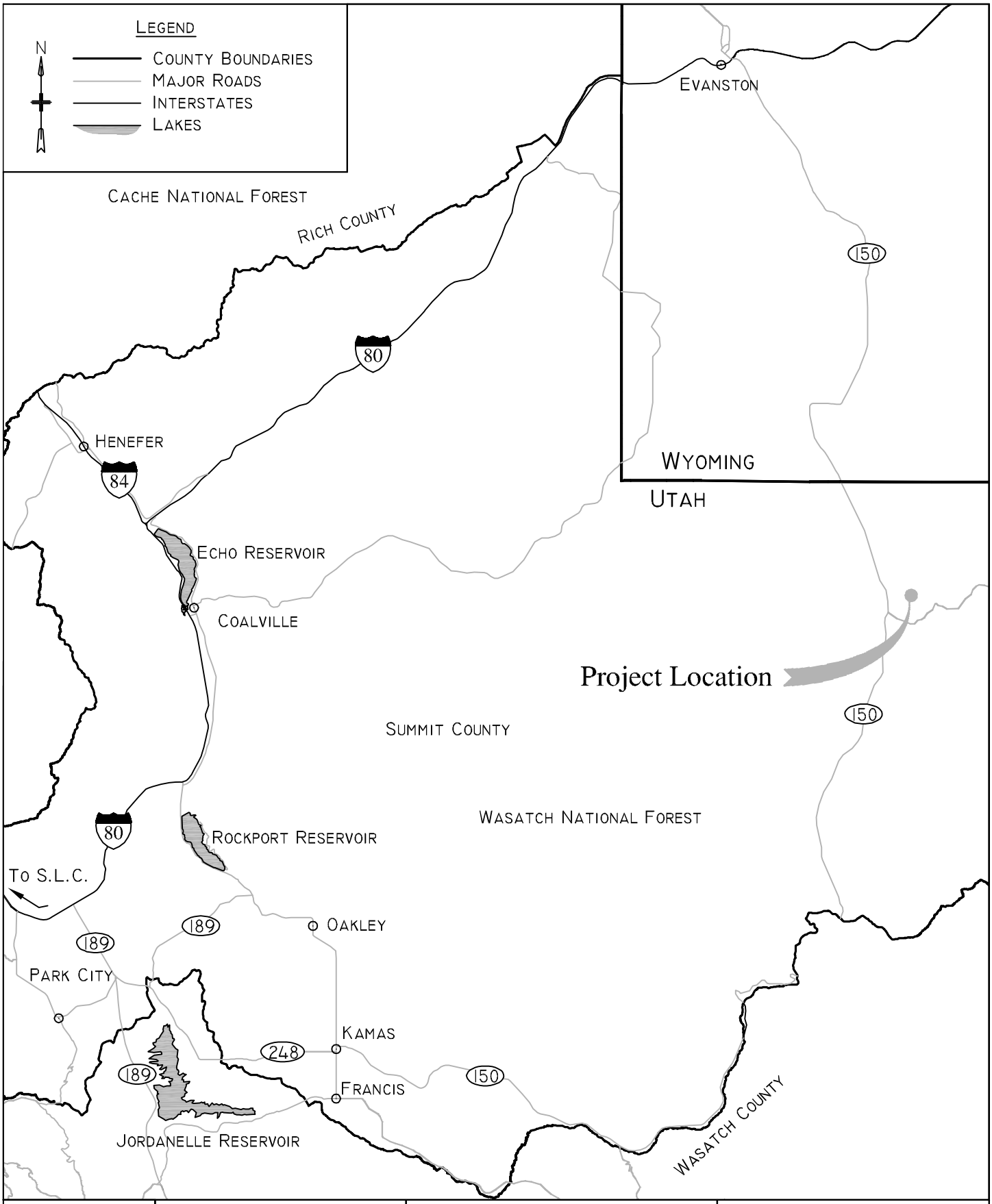
The system has areas of pressure deficiencies as noted by water users and areas of excessive pressures.

1.2 Statement of Purpose

The purpose of this Water Master Plan is to evaluate the existing water system and to provide recommendations for facilities and operations with the existing – and future – needs of the association.

The specific objectives of the plan include the following:

- Quantify existing and future demands on the water system
- Create a hydraulic model of the water system
- Evaluate the existing system with current demands
- Evaluate the existing system with future demands with all lots developed
- Identify system operation improvements
- Identify major distribution system improvements
- Identify funding opportunities



FRANSON CIVIL ENGINEERS	DATE: MARCH 11, 2011 SCALE: Location Map.dwg H:\CLIENT\9-North Utah Area\Uinta Lands\Drawings LAYOUT: Layout1	UINTALANDS ASSOCIATION WATER MASTER PLAN	FIGURE 1-1 PROJECT LOCATION MAP

1.3 Master Plan Development Activities

Members of the Uintalands Association have primarily designed and maintained their water system. This is the first professional review of their water system. This document will provide a review of its system to provide alternatives to bring the system into compliance with Division of Drinking Water requirements. The following is a summary of tasks performed to produce this Master Plan:

Prepare Facility Inventory

An important element of the master planning process is the facility inventory. Franson Civil staff collected information related to the existing water system. The following illustrates specific data obtained:

- Existing water system map
- Site visit to review current conditions
- Existing connections and locations

Culinary System Map

A schematic map of the culinary system has been prepared, which shows the pipeline locations and sizes, storage tank locations, meters, fire hydrants, pressure reducing valves and weepers.

Design and Planning Criteria Development

Division of Drinking Water guidelines were utilized to review and plan for the existing system's operations, facility sizing, and demand development. Specific criteria reviewed included pipe pressures, velocities, fire flow, storage requirements, and water rights.

Hydraulic Model Development

The information obtained in prior tasks was used to prepare a hydraulic model. Existing and future conditions were analyzed in the system. The model will serve as a tool to analyze the system in the future as improvements are made.

Existing System Evaluation

The hydraulic model was used to evaluate system pressures, fire flow conditions, and velocities against criteria limits. This process identified problem areas within the distribution system. Water sources were also reviewed to identify any deficiencies in the existing facility capacities.

Future System Development

Future system needs were examined by placing demands into the existing system model. Future demands were added for all the empty lots to simulate full build-out. The hydraulic model was used to size pipelines and determine other future system improvements.

Recommendations and Cost Estimates

Using the model as a guide, recommendations were determined to allow the system to meet existing and future needs. These recommendations were reviewed with the water committee members and presented at the annual owner's meeting on November 10, 2010.

In February, the Uintalands' Board made a decision to not provide fire protection. The document still includes a discussion on the requirements to provide fire protection. The recommendations reflect this decision. Recommendations are grouped into short-term and long - term improvements with their associated cost estimates. Details of the recommendations and cost estimates are in Chapter 5.

Chapter 2: Existing Culinary Water System

2.1 General

Uintalands Association's (Uintalands) existing water distribution system is comprised of a pipe network, water storage facilities, and water supply connections. Two-hundred and thirty-two (232) connections, consisting of 180 cabins and 52 RV's, are currently served by the system. Figure 2-1 is a map of the roads and lots within Uintalands. Figure 2-2 shows the existing water distribution system. This chapter summarizes the existing system facilities and water sources.

2.2 Water Source

Uintalands obtains its entire water supply from a spring. The spring produces a constant flow which is measured once a month. There have been no reported shortages, even during a high use holiday weekend. The state reported on August 10, 2010 that the lid on the spring collection box had multiple unsealed openings where contamination could potentially enter the spring water. This issue has been resolved by sealing the openings with balm. The current condition of the spring will be video inspected in May/June of 2011 to determine if any maintenance is required.

Uintalands recently replaced their spring hypochlorinator, which provides disinfection for the system. Plan Approval and an Operating Permit have been issued for it by the Department of Environmental Quality.

2.3 Water Rights

Three water rights are held in the name of Uintalands Association for a total of 101.451 acre-feet for use from January 1 to December 31. They each identify the same unnamed spring at a location of S 447 ft W 676 ft from E4 corner, Section 10, Township 2N, Range 10E, SL&M.

Water Right No.	Amount	Source	EDU*
21-1600	100 acre-feet	Unnamed Springs	272 EDU
21-1673	1.001 acre-feet	Unnamed Spring	4 EDU
21-1719	0.45 acre-feet	Unnamed Springs	1 EDU

*Equivalent Domestic Unit

2.4 Water Usage

Although there are no long term records for actual water use, ten years of pump data are available for pumping water from the spring to the water storage tanks. The maximum amount of water pumped occurred in 2008 at 18.14 acre-feet per year. Based on the 231 current connections, this is 0.08 acre-feet/year per connection. Short term records indicate a jump in usage during weekends as expected. Individual connections do not have meters. There are five meters on the current distribution system which are read to locate leaks within the system. Annual association dues cover the water expenses. There is no incentive for water conservation.

FIGURE 2-1 UINTALANDS MAP	DATE: MARCH 11, 2011 SCALE: Uintalands Map.dwg H:\CLIENT\9-North Utah Area\Uinta Lands\Drawings LAYOUT: Layout1	UINTALANDS ASSOCIATION WATER MASTER PLAN	FRANSON CIVIL ENGINEERS

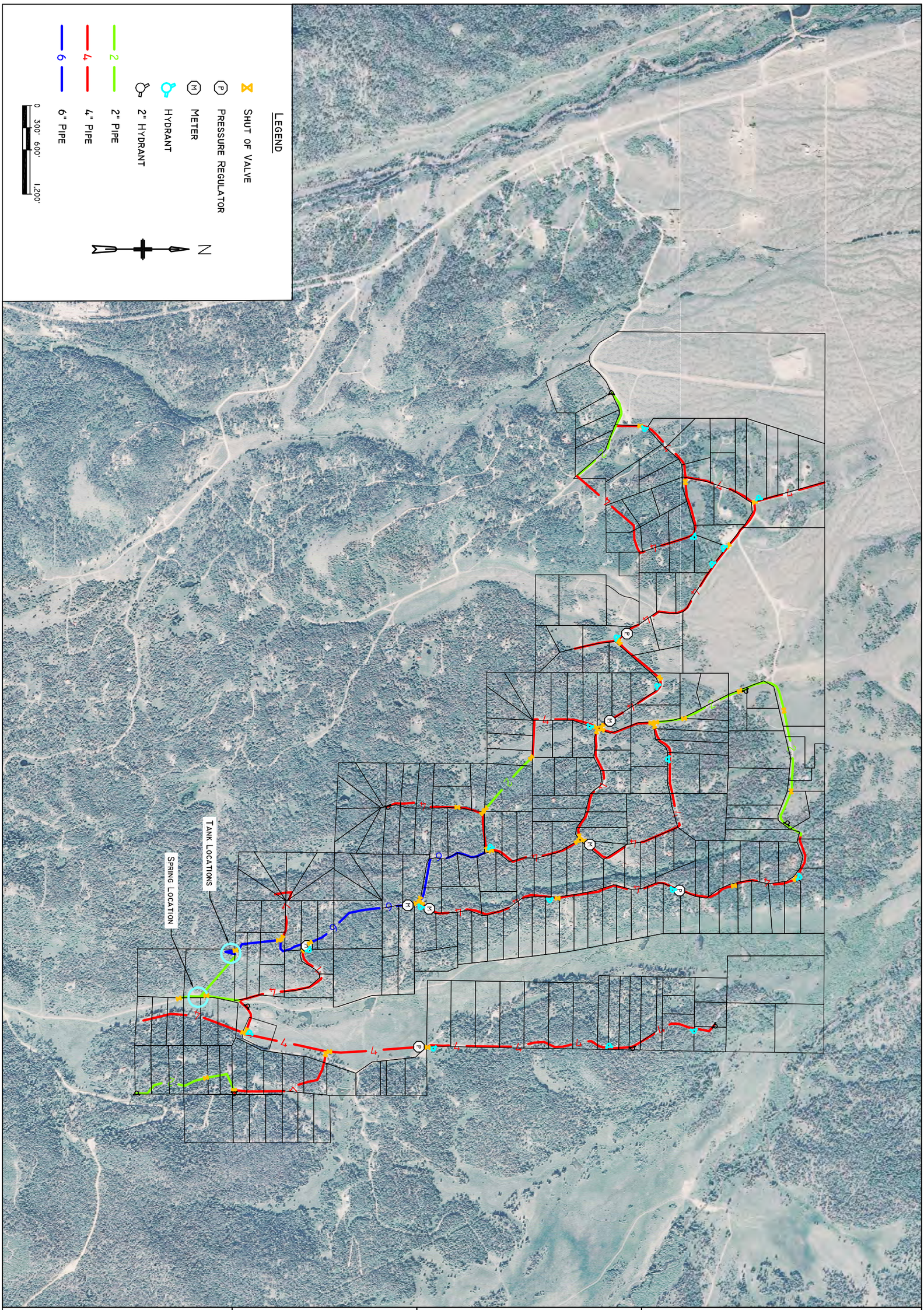


FIGURE 2-2

EXISTING SYSTEM

DATE: MARCH 11, 2011

SCALE:

Existing Conditions.dwg

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LAYOUT: Existing

UINTALANDS

WATER MASTER PLAN

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2.5 Pipeline Network

The original water system was designed and constructed 34 years ago with 2-inch Schedule 40 pipe. However, with yearly maintenance due to pipe breaks, most of the current system has been placed within the past 7 years with C-900 pipe. The system consists mainly of 4-inch pipeline, but also has 2-inch and 6-inch distribution lines. Additionally, thrust blocks were not placed during construction and subsequent replacement, creating added weak spots within the system. When problems arise in the future, existing pipelines will need to be replaced.

2.6 Storage Facilities

The system has four storage tanks holding a combined capacity of 104,000 gallons. There are three steel 28,000 gallon tanks and one square concrete 20,000 gallon tank. A proper gasket was recently installed on the access hatch on Tank #1.

The four tanks have not been inspected since they were installed over 20 years ago. The condition of the tanks is unknown. The water committee has scheduled a video inspection for May/June of 2011 to determine if any maintenance is required.

2.7 Pump System

Two pumps, which have capacities of 35 gpm and 38 gpm, are used to pump the spring water to Tank #1 (concrete). A booster pump lifts water from Tank #1 to the upper storage tanks (steel). When the upper three tanks drop, the booster pump automatically kicks on. The pumps typically run for 5 to 6 hours a day and pump 20,000 gallons per day.

The booster pump installed in 2008 has received Plan Approval and an Operating Permit by the Department of Environmental Quality.

2.8 Existing Operation

The operation of the existing system is managed by opening and shutting valves in an effort to balance water pressures for visiting members and minimize water lost to leaks. While this is done with the best intention, it actually adds to the deterioration of the system. The valves are being used to regulate the amount of water allowed into a part of the system, which over time, will increase wear and tear on the valves, cause damage to the pipe through surges and water hammer, may cause cavitation, and potentially create velocity issues in isolated areas.

The system experiences pressure issues due to elevations and inadequate pressure regulation. Several cabins at the top of the system, which experience low pressures, have installed private booster pumps. A few have installed a holding tank to pump from.

Chapter 3: Water Demands And Hydraulic Modeling

3.1 General

A hydraulic model was developed in WaterCAD to analyze the water system. The distribution system was evaluated based on system demands, and storage capacity. In addition, analyses were performed by placing a fire flow demand of 1,000 gallons per minute on several fire hydrants located throughout the system. The current and full build-out demands were analyzed separately and the results are summarized in Chapter 4. This chapter discusses the details associated with the development of the model and as a reference for future model use.

3.2 Hydraulic Analysis

Information obtained from water committee members, and a site visit, were utilized in creating the hydraulic model for the water distribution system. The model allows analysis of the system's flows and pressures as the system operates to meet existing and projected demand scenarios. System improvements were added to the model to determine when the system meets the demands.

3.3 Development of Water Demands

The Utah Division of Drinking Water (DDW) rules for public drinking water facilities – including water sources, storage tanks, and pipelines – are intended to assure that the facilities are reliably capable of supplying adequate quantities of water, meet drinking water quality requirements, and do not pose a threat to public health. Using DDW guidelines, water demands were calculated for the existing connections and full build-out using the public drinking water system category of "transient non-community water system." This means a non-community public water system that does not serve 25 of the same nonresident persons per day for more than six months per year.

The system was evaluated by modeling for two conditions, peak instantaneous demand and peak day demand, which are described below. It is important to analyze the water system under these two demand conditions because they represent the worst-case scenarios for the distribution system.

Peak Instantaneous Demand

The Peak Instantaneous Demand is the highest flow rate that can be expected through the distribution system at any moment in time. Peak instantaneous demands were determined by the DDW's recommended formula for determining system demands. It was calculated as 2,189 gallons per day per connection (or approximately 1.52 gallons per minute) for existing connections, and 2,059 gallons per day per connection (or approximately 1.43 gallons per minute) for full build-out.

Peak Day Demand

The second evaluation was made using Peak Day Demands, which is the amount of water delivered by the system on the day of highest consumption. Without outdoor uses, this peak day likely occurs during a busy holiday weekend. Fire flow conditions are also evaluated with the peak day demand condition.

DDW's recommended demand of 400 gallons per day per connection was used to calculate indoor demands. The system's peak day demand for all connections was calculated as 92,400 gallons per day (or approximately 64 gallons per minute) for existing connections, or 110,000 gallons per day (or approximately 76 gallons per minute) for full build-out.

Fire Flow Demands

The DDW's specifications for fire protection require a minimum fire flow of 1,000 gallons per minute for one and two family dwellings. Fire flow demands were created in the model to determine how they affected the rest of the system's capacities and pressures. The current system is not capable of supporting fire flow demands without seriously affecting some areas of the system with low and negative pressures.

3.4 Other System Capacity Criteria

Additional criteria are stipulated in the DDW's guidelines for water systems, including water source capacity, storage capacity, water line velocities, pressure constraints and minimum pipe sizes. These guidelines were used to calculate demands and capacity requirements for the system, as well as determine recommendations described in Chapter 5.

Source Capacity

The DDW's minimum water source requirements for recreational home development water systems state that there will be enough water to meet demands for daily use and annual use. If the requirements are met, the source can be relied upon to adequately serve the system under most, if not all, conditions. The requirements for residential connections are listed below:

- Peak use period daily
  Indoor use: 400 gallons per day/connection
  Outdoor use: N/A
- Annual requirement
  Indoor use: 146,000 gallons/connection
  Outdoor use: N/A

DDW's Minimum Storage Capacity Requirements

The DDW's minimum storage requirements for recreational home development water systems are listed below:

- Recreational home development, inside use: 400 gallons per connection
- Recreational home development, outside use: N/A
- Fire flow if Hydrants are provided: 120,000 gallons

The current storage of 104,000 gallons is adequate for existing connections if the fire hydrants are turned off as the storage requirement is 92,400 gallons. At full build-out, the requirement is 110,000 gallons and with fire storage it is 230,000 gallons.

Water Line Velocity

High velocities in water lines over a length of time will lead to unnecessary replacements and damage to the water line. The model was used to analyze the velocities during different peaking conditions. The following guidelines were used to determine the adequacy of water lines:

- Normal Operation During Peak Instantaneous – Velocities shall be less than 5 feet per second.
- Fire Flow plus Peak Day Demands – Velocities shall be less than 10 feet per second.

Velocities under normal conditions are within acceptable limits. However, the system has been operated in an effort to maximize water pressures for visiting members by opening and shutting valves. While this was in the best intention, it actually adds to the deterioration of the system. The valves are being used to regulate the amount of water allowed into a part of the system, which over time, will increase wear and tear on the valves, cause damage to the pipe through surges and water hammer, may cause cavitation, and potentially create velocity issues in isolated areas.

Pressure Constraints

Areas within the water system with excessive or insufficient pressures were identified. Normal system operation consists of pressures ranging from 40 to 100 psi. Pressures outside of this range may damage water lines and residential plumbing or provide inadequate pressures during high usage or fire flow events. The following guidelines were used to determine adequate pressure ranges in the system:

- A minimum of 30 psi at residential connections during Peak Instantaneous Demands
- A minimum of 20 psi in the system during fire flow events
- A maximum of 100 psi in the system

When static pressure exceeds 100 psi, pressure reducing devices should be provided on main lines in the distribution system, or individual home pressure reducing valves should be installed per the Utah Plumbing Code.

Minimum Pipe Sizes

The DDW's minimum recommended pipe diameter size is 8-inches, primarily to meet adequate fire protection needs. If a pipeline does not have a fire hydrant, the minimum diameter size is 4-inches. The existing system's pipelines under 4-inches without hydrants and under 8-inches with hydrants do not meet DDW's requirements.

3.5 Modeling Parameters

Several assumptions were made in creating the model. General demands and flows dictated by the DDW requirements were used and do not necessarily indicate actual water usages. The model also assumes that the flow and pressure provided by tanks will remain constant.

Chapter 4: Identify System Needs

4.1 General

The existing and full build-out water distribution system was evaluated based on distribution piping, pumping, storage, and fire flow capacity with the current and full build-out demands on the system. The needed improvements will be identified as current needs and needs at full build-out.

The system was evaluated by modeling for the two conditions described in Chapter 3 to determine its ability to meet the system demands. Those conditions being, peak instantaneous demands and peak day demands plus fire flow conditions. It is important to analyze the system under these two demand conditions because they represent the worst-case scenarios for the distribution system.

4.2 Water Rights

Uintalands has 101.451 acre-feet of water rights. Although the DDW's minimum requirement is 0.45 acre-feet/year per connection, Uintalands was granted a reduction on this requirement to the seasonal requirement of 0.25 acre-feet/year. DDW approved this reduction because Uintalands submitted historical pump data for the past 10 years. The maximum annual water use was 18% of the typical year-round residential connection requirement.

For the existing 231 connections, 53 acre-feet per year is needed, so the minimum requirement is met. For the full build-out of 275 connections, 68.75 acre-feet per year is needed, the minimum requirement is met. No additional water rights are needed.

4.3 Water Source

The capacity on the spring is limited by the current pumps, with capacities of 35 gpm and 38 gpm. They typically pump for 5 to 6 hours per day. The DDW's source capacity requirement for peak day use is approximately 64 gallons per minute for the system. The system currently meets this requirement.

Uintalands currently receives water only from the spring. DDW guidelines recommend water suppliers have at least two water sources. The system does not meet this requirement.

4.4 Water Storage

Based on the DDW's storage requirements described in Chapter 3, the water system must store 92,400 gallons for current indoor uses. Another 120,000 gallons of storage is required for fire protection. The combined storage capacity of 104,000 gallons from the four tanks exceeds the requirement for the existing connections. At full build-out, the total requirement is 110,000 gallons, and with fire storage it is 230,000 gallons. An additional 6,000 gallons is needed for full build-out without fire flow storage and 126,600 gallons is needed for fire flow storage.

4.5 Distribution Piping

Most of the pipes have been installed within the past 7 years and are likely in good condition. If problems arise, existing pipelines may need to be replaced in the future. Any new pipes installed should meet DDW's minimum recommended size of 8-inch diameter for pipelines serving a fire hydrant lateral, or 4-inch diameter for pipelines not serving a fire hydrant.

Velocity

The velocities under both conditions, peak day and peak instantaneous demands, were analyzed. A velocity of 5 feet per second (fps) is considered to be the maximum allowable velocity. Velocities under normal conditions are within acceptable limits.

Pressure

The normal working pressure limits within the distribution system should be between 40 psi and 100 psi, with a minimum pressure of 30 psi during peak instantaneous demand conditions. Additionally, when fire flows are needed, a minimum pressure of 20 psi at all points in the system is required. When pressures drop below these limits, the system runs the risk of having negative pressures, which could potentially contaminate the system and water supply by sucking in bad water.

The hydraulic model identified problem areas within the existing system having low and high pressure areas, which consistently occur under the various evaluations. The low and high pressure areas are identified in Figure 4-1. The low pressures are concentrated along Pine Lane, Fir Lane, and Deer Lane. The high pressures are concentrated along the northwest of Aspen Circle to Elk Lane and parts of Spruce Circle and Uinta Drive. Table 4-1 shows the results of the pressure evaluation under the two conditions. Detailed model results are located in Appendix A.

Table 4-1: Pressure Range under Existing Conditions

	Peak Instantaneous Demand (Min. 30 psi, Max. 100 psi)
Lowest pressure (psi)	3.4
Highest pressure (psi)	161
# locations below limits	16
# locations above limits	38

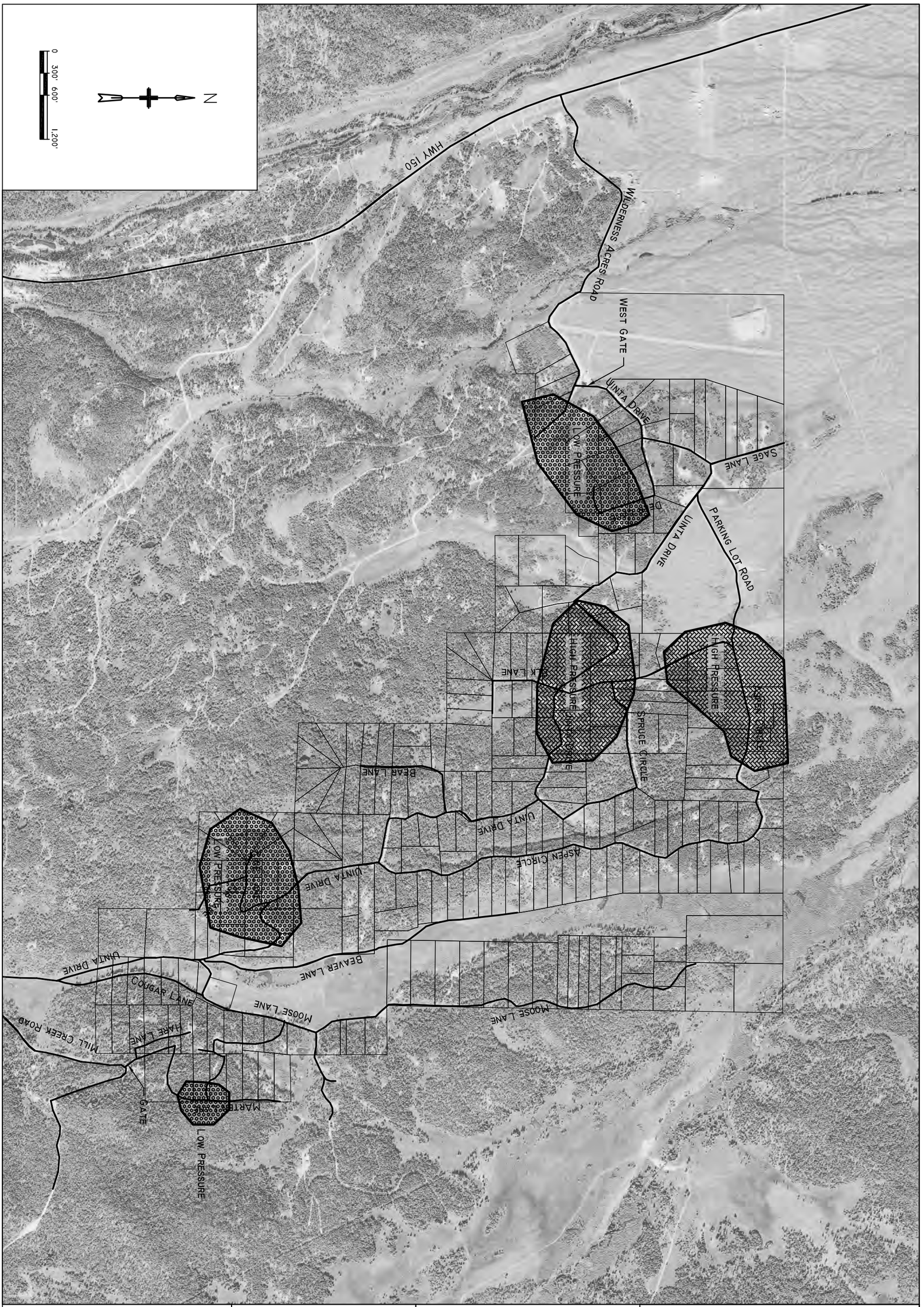

FIGURE 4-1

HIGH AND LOW PRESSURES IN EXISTING SYSTEM

DATE: MARCH 11, 2011

SCALE:

Uintalands Map.dwg

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LAYOUT: Pressure

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The model was used to identify problem areas and to identify needed improvements to the system, including distribution pipelines and storage facilities. In order to alleviate these high and low pressures, in the full build-out model a booster pump was placed at the top of the system and 6 additional pressure reducing valves (PRV's) throughout the system. It is also anticipated that as pipes break, all new pipe will be replaced with 8-inch pipe. With these improvements, the pressures are within acceptable limits as shown in Table 4-2. The highest pressure of 104 psi is located at the top of Aspen Circle. The lowest pressure of 26 psi is located at the bend in Pine Lane. Although not a 100% within the target for pressures, they are within acceptable limits and additional expense would be required to achieve 100%.

Table 4-2: Pressure Range under Full Build-Out Conditions

	Peak Instantaneous Demand (Min. 30 psi, Max. 100 psi)
Lowest pressure (psi)	26
Highest pressure (psi)	104
# locations below limits	2
# locations above limits	6

Fire Flow

The current system is not capable of supporting fire flow demands due to pipe size and storage capacity. If used, the system could experience low and negative pressures, potentially contaminating the water system. It is not recommended to use the fire hydrants for fire protection without the appropriate system improvements.

Chapter 5: Recommendations and Funding

5.1 General

This chapter describes the recommendations as a result of the study presented in the previous chapters. It also incorporates the decision by the Uintalands Board on February 8, 2011 to not provide fire protection. Confirmation from the local fire authority is needed that Uintalands does not need to provide fire protection.

At the request of the Uintalands water committee, a cost estimate was prepared for system improvements to provide fire protection, and for system improvements that would not provide fire protection. Both alternatives include the necessary system improvements needed regardless of whether fire protection is provided or not. Table 5-1 shows the cost estimate for all system improvements without providing fire protection at full build-out conditions. All the results are shown in Appendix D but the cost difference to provide fire protection is an estimated $3.5 million. The recommendations in this chapter reflect the board's decision to not provide fire protection.

Table 5-1: Total Cost Estimate

Item	Total cost
Replace 2-inch Pipeline on Aspen Circle with 4-inch line	$207,000
Booster Pump and PRV's	$65,000
Meters	$42,000
Remove existing fire hydrants (19 @ $1,000)	$19,000
Spring Re-development	$40,000
Tank (110,000 gallons)	$237,100
Replace existing 2-inch lines with 4-inch lines	$298,000
Install 4-inch line between Deer Lane and Wilderness Acres Road	$52,400
Total Cost (rounded)	**$961,000**

All recommendations are based on the system at full build-out conditions. Additional recommendations to comply with DDW's requirements for water systems are also summarized. Recommendations are grouped into short-term and long-term improvements, with cost estimates. Finally, potential funding sources are summarized.

5.2 Short-Term Recommendations

The short-term projects identified to improve the system are:

- Replace 2-inch pipeline on Aspen Circle
- Reduce high pressures by strategically installing PRV's
- Increase low pressures with in-line booster pump
- Add meters to improve leak detection
- Remove all existing fire hydrants

- Spring re-development
- Construct Water Storage Tank

Figure 5-1 shows the location of the short-term recommendations as described below. Costs are based on probable costs for 2011 and may increase with time. All cost estimates include costs for design and engineering, and contingencies for unforeseeable construction costs.

Distribution Piping

Velocity

The velocities under the peak instantaneous and peak day demands plus fire flow conditions were analyzed. The model detected no pipelines that exceeded the allowable velocity of 5 fps during normal conditions. However, it is recommended that the 2-inch pipeline at the top of Aspen Circle be replaced with 4-inch pipeline as recommended by DDW for systems not providing fire protection.

Table 5-2: Replace 2-inch Pipeline on Aspen Circle

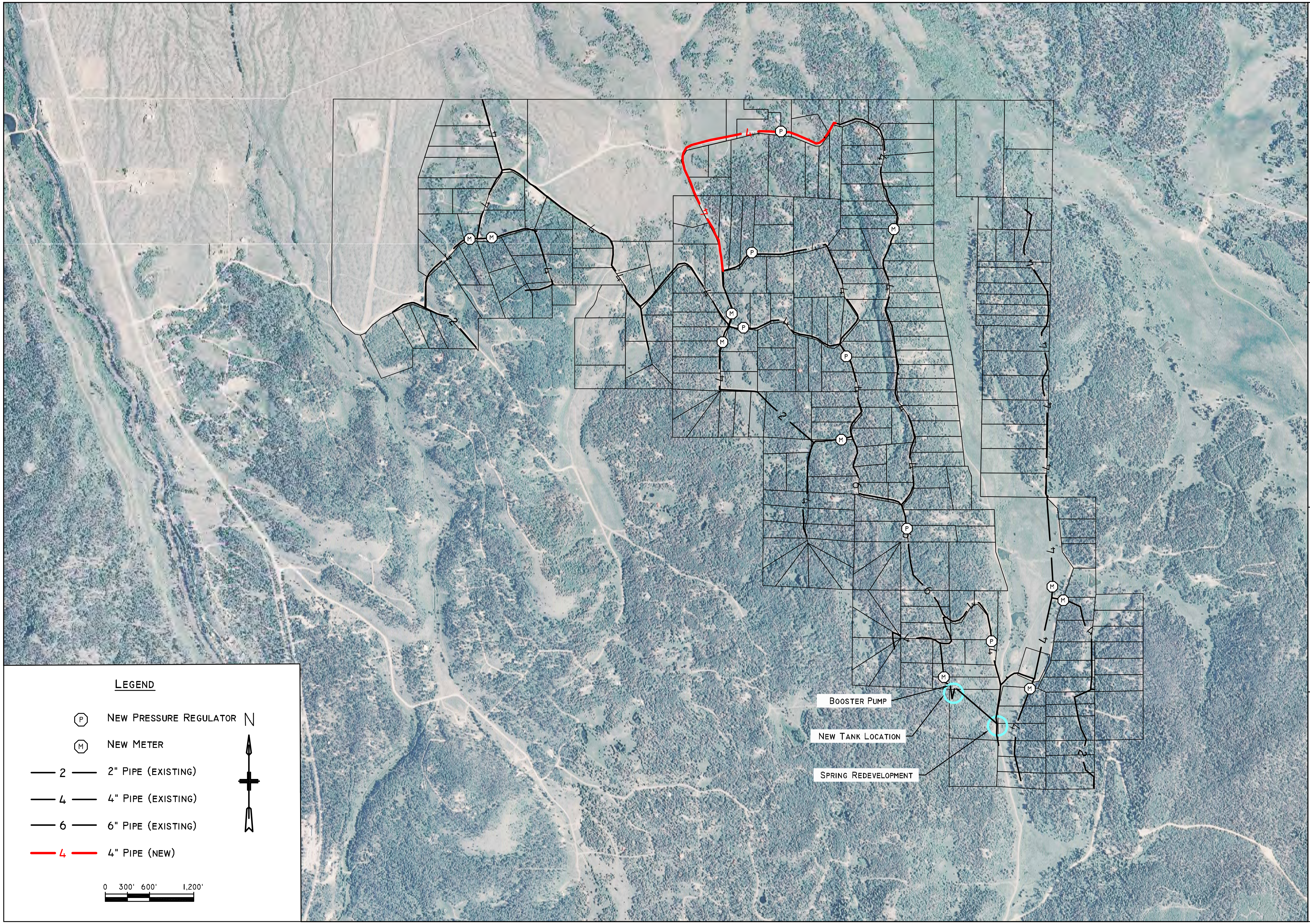
	Amount/Cost	Aspen Circle
Furnish/Install 4-inch pipe	4,025 LF @ $9/LF	$36,225
Furnish/Install Pipe Bedding	1,090 tons @ $22/ton	$24,000
Furnish/Install backfill Material	5,200 tons @ $13/ton	$67,600
Furnish/Install Roadbase Material	1,010 tons @ $25/ton	$25,300
Design & Engineering (~15%)		$23,000
Contingencies (~20%)		$30,625
Total Cost (rounded)		**$207,000**

Pressure

In order to alleviate the high and low pressures within the system, it is recommended that a booster pump be placed at the top of the system and 6 additional pressure reducing valves (PRV's) throughout the system. As improvements are made to the system and additional connections are made, the pressure settings on the PRV's can be adjusted to regulate the pressures.

Table 5-3: Booster Pump and PRV's

	Quantity	Unit Cost	Total Cost
Booster Pump, Controls and Structure	1	$12,000	$12,000
4-inch PRV with By-pass in Vault	6	$6,000	$36,000
Design & Engineering (~15%)			$7,200
Contingencies (~20%)			$9,600
Total Cost (rounded)			**$65,000**



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Uintalands

Water Master Plan

Date: March 11, 2011

Scale:

Existing Conditions.dwg

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Layout: Mid

Figure 5-1

Short Term Recommendations

Meters

There are five meters on the current distribution system which are read to locate leaks within the system. However, the water committee spends an enormous amount of time trying to detect leaks. It is recommended that an additional 10 meters are added at strategic locations to aid in leak detection. Either a 4-inch or 6-inch meter can be placed on the existing 6-inch line by using pipe fittings for the 4-inch.

Table 5-4: Meters

	Quantity	Unit Cost	Total Cost
4-inch Meters	10	$3,125	$31,250
Design & Engineering (~15%)			$4,700
Contingencies (~20%)			$6,250
Total Cost (rounded)			**$42,000**
	-or-		
4-inch Meters	9	$3,125	$28,125
6-inch Meters	1	$5,400	$5,400
Design & Engineering (~15%)			$5,000
Contingencies (~20%)			$6,700
Total Cost (rounded)			**$45,000**

Remove Existing Hydrants

The existing fire hydrants are not functional with the current system. The DDW will require the removal of all existing fire hydrants, which provide a false sense of security. The cost estimate is $19,000 to remove the existing hydrants.

Spring Re-development

A video inspection of the spring will be done in May/June 2011. The information obtained will determine if redevelopment of the spring is needed. At a minimum, a manhole should be constructed at the end and the sediment flushed out. A cost estimate of $40,000 was included for the worst case situation.

Water Storage Tank

Based upon the DDW's rules discussed in Chapter 3 for storage, the system must store at least 110,000 gallons for 275 connections. The combined storage capacity of 104,000 gallons from the four storage tanks is not adequate to serve the full build-out conditions. An additional 6,000 gallons is required to meet DDW's requirements.

Additional storage will be required in the future. Additionally, the video inspection of the tanks in the Spring of 2011 will provide information on the current condition of the four existing tanks. It is recommended that a 110,000 gallon tank is built. This will provide adequate storage for Uintalands for full build-out of 275 connections.

Table 5-5: Tank Cost Estimate

	110,000 gallon tank
Tank cost ($1.50 unit price)	$165,000
Design & Engineering	$39,100
Contingencies (~20%)	$33,000
Total Cost (rounded)	**$237,100**

Water Supplier Requirements

The DDW has requirements for water suppliers that must be met in order to be in compliance as summarized below. The DDW imposes penalties for not being in compliance. Additional information, including compliance and enforcement, is in Appendix C. We recommend reviewing Uintalands' policies and procedures to verify that measures are taken to meet these requirements.

Water System Rating Criteria

Every public water system in Utah is assigned a water system rating of either, "Approved," "Corrective Action" or "Not Approved" based on the system's compliance with the Improvement Priority System (IPS) Rule. This rule sets forth the rating criteria and specifies the points associated with the infraction of the DDW's rules. Points are awarded based on such items as water quality and monitoring, physical facilities, operator certification, cross connection control, drinking water source protection, and maintenance issues. Accumulated points for a community water system less than 150 connections are rated as "Approved."

Based on the latest Sanitary Survey in August 2010, a total of 118 IPS deficiency points were assessed against Uintalands, subjecting the water system to a possible unapproved status.

- Fifty points were assessed due to not meeting the minimum pressure requirements. As the recommended improvements are made under short-term projects, these points will be removed.
- Twenty points were assessed due to lack of a trained personnel to manage the Cross Connection Control Program and test history and documentation of on-going enforcement. Training can be obtained through the State of Utah or through Rural Water Users Association to comply with this requirement. Once the training is complete, the records that are kept will be approved and the 20 points will be removed.
- Fifty points were assessed due to multiple unsealed openings on the spring collection box. This issue has been remedied and the points are being removed.
- Five points were assessed due to the overflow pipe on Storage Tank #2 not being between 12 and 24 inches above the ground surface. This issue will be evaluated during the video inspection of the tanks.
- Three points were assessed due to Storage Tank #1 lacking a proper gasket. This issue has been remedied and the points are being removed.

- Zero points were assessed due to chlorine residuals not being tested three times a week. This is because, according to Brad Holdaway at the Department of Environmental Quality, Uintalands submits these records each quarter on the DBP quarterly report and are up to date. He also checked SARA and the next DBP sample is due in Quarter 3 of 2011.
- Ten points were credited because the system has a current Emergency Response Program.

Consumer Confidence Reports

A "Consumer Confidence Report" needs to be prepared by each operator of a public drinking water system, in compliance with a rule that the EPA finalized in October 1998. This report is to provide public information on the water quality monitoring and assurance program of each water system. The report covers water treatment processes, water quality monitoring performed, concentrations of any detected contaminants customers may be exposed to in comparison with potential contaminants in bottled water, violations of treatment and monitoring requirements, and an advisory regarding special customer sensitivity to contaminants.

Operators of systems serving less than 500 people may simply mail a notice to each customer describing the report and advising how to obtain a copy. Every operator, regardless of size, must send a copy of the report to the DDW with a certification that the report is correct and consistent with monitoring data previously submitted to the DDW.

Future Operation and Maintenance

The continued operation and maintenance of the water system should occur to maintain the system in operating condition. The shutoff valves should only be used as intended, which is for emergency shutoff if a pipeline break occurs. As breaks occur, we recommend increasing pipeline sizes to meet DDW's requirements of 4-inch minimum pipe size for systems not providing fire protection. It is recommended that the weeps be opened as temperatures reach freezing to reduce the potential for pipes freezing.

5.3 Long-Term Recommendations

The long-term projects include recommendations to:

- Meet DDW requirements, which is necessary to obtain funding, including:
  - Replace remaining 2-inch pipelines with 4-inch pipelines
  - Install 4-inch pipeline between Deer Lane and Wilderness Acres Road to create loop and improve low pressures
- Provide adequate pressures and capacity

Figure 5-2 shows the location of the long-term recommendations as described below. Costs are based on probable costs for 2011 and may increase with time. All cost estimates include costs for design and engineering, and contingencies for unforeseeable construction costs.

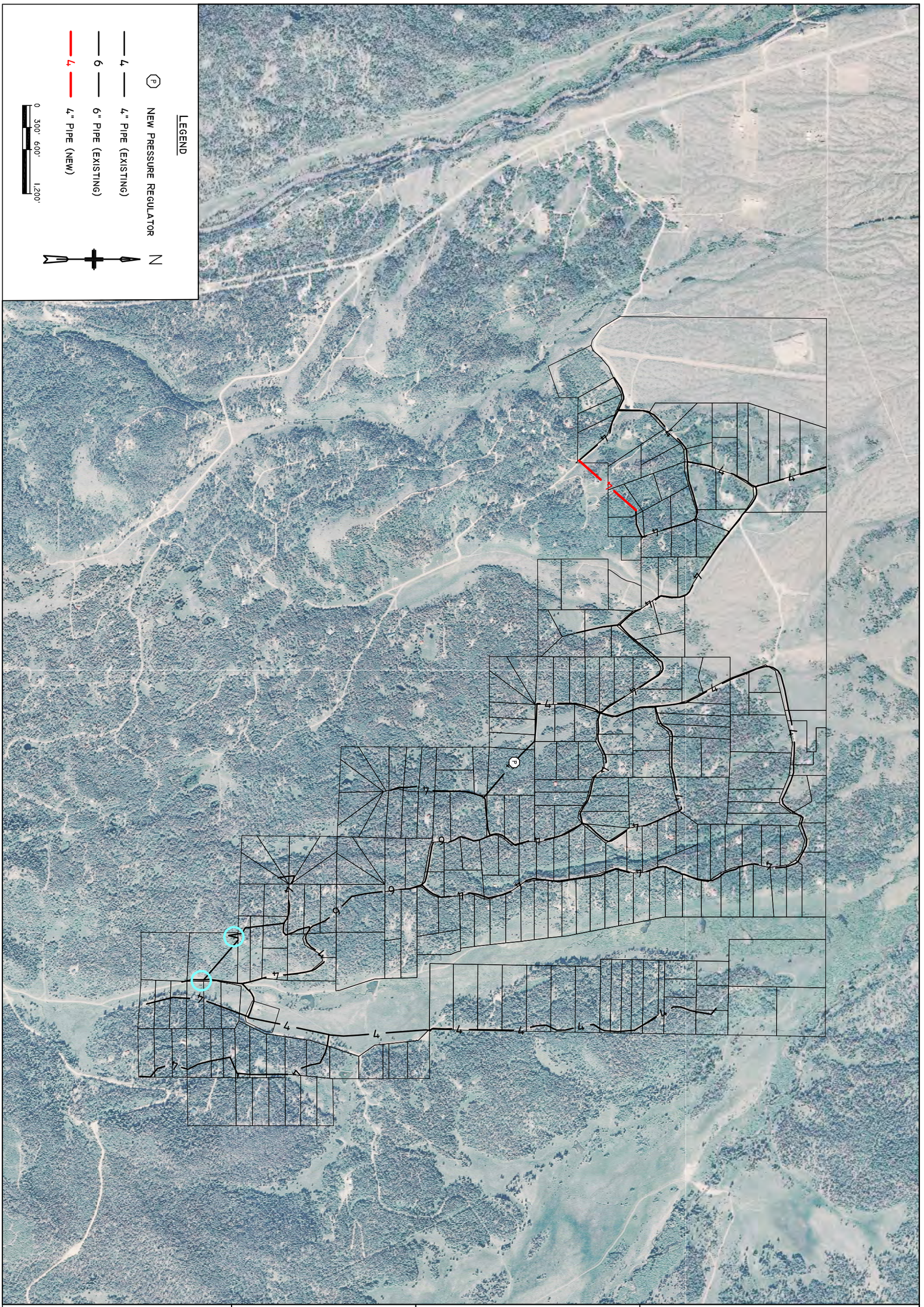

FIGURE 5-2

LONG TERM RECOMMENDATIONS

DATE:	MARCH 11, 2011
SCALE:	
Existing Conditions.dwg	
H:\CLIENT\9-North Utah Area\Uinta Lands\Drawings	
LAYOUT: Future	

UINTALANDS ASSOCIATION

WATER MASTER PLAN

FRANSON CIVIL ENGINEERS

Distribution System

It is recommended that all 2-inch pipes be replaced with 4-inch diameter pipes to meet DDW's minimum recommendation for pipelines not providing fire protection. This also includes installing a 4-inch line between Deer Lane and Wilderness Acres Road to create a loop and improve the low pressures, and to replace the 2-inch line between Deer and Elk Lane that is currently shutoff from the system. A PRV is needed in this location.

Table 5-6: Replace 2-inch pipelines with 4-inch and Install 3-inch pipeline between Deer Lane & Wilderness Acres Road

	Existing 2-inch lines 4,840 ft*	Proposed 4-inch line 1,020 ft**
Furnish/Install 4-inch pipe	$43,600	$9,180
Furnish/Install Pipe Bedding	$28,800	$6,100
Furnish/Install backfill Material	$81,200	$17,100
Furnish/Install Roadbase Material	$30,400	$6,400
4-inch PRV with By-pass in Vault (along 2-inch line between Deer & Elk Lanes)	$6,000	$0
Design & Engineering (~15%)	$33,000	$5,800
Contingencies (~20%)	$44,000	$7,800
Total Cost (rounded)	**$298,000**	**$52,400**

*Does not include Aspen Circle, which is a short term need
** Provide a loop to reduce low pressures at end of lines

Water Rights

Uintalands has adequate water rights to satisfy the full build-out conditions of the system. No new water rights are needed. A letter from the Division of Water Rights is being prepared.

Water Source

The spring provides adequate water source for Uintalands. No other source is needed for capacity. However, DDW guidelines recommend water suppliers have at least two water sources. It would be in the best interest of the Uintalands water system to locate and obtain a secondary water source, in case of contamination, supply cut off, or other unforeseeable circumstances.

It is recommended that a second water source be obtained. Additional studies would be needed to identify potential water sources and issues associated with each.

Water Quality

If a water system utilizes surface water or groundwater under the influence of surface water, the drinking water source and distribution system must be monitored for various potential contaminants specified by the DDW. The constituents to be monitored at the water source

depend on the type of source (i.e. well, alluvium, surface diversion or spring) and the location of the source with respect to potential contaminants. The constituents to be monitored in the distribution system depend on the type of pipe in the system and the potential for contamination from other sources.

Testing must be done by a certified operator who has passed a written examination and been issued a certificate for the type and size of facility involved. Division of Drinking Water certification requirements and procedures, which address EPA guidelines, are available on DDW's website.

Source Protection Plan

A source protection plan is required for each public drinking water system whose source is groundwater or surface water. The source protection plan evaluates the potential for contamination and specifies measures taken to avoid or minimize the potential for contamination. Groundwater sources include wells, springs or alluvium.

SCADA System

A SCADA System (Supervisory Control And Data Acquisition) allows for remotely monitoring and controlling the system. It would automatically read the meters and allow the operator to change settings as necessary. The cost for a SCADA system would depend on what type and quality of system was desired.

5.4 Funding Sources

There are several funding options in Utah for water systems. Applications must be made to the funding agency, which all have unique applications and deadlines, as shown in Table 5-6.

Table 5-7: Funding Sources

Funding Source	*Type of Loan*	*Application Deadlines*	*Percentage Range*
Division of Drinking Water	Loan/grant	2011: Mar 7, May 16, July 18, Sept 12, Oct 31	0-3%
Community Impact Board (435) 781-5486	Loan/grant (depends on project cost & financial factors)	Feb 1, Jun 1, Oct 1	0-3%

These funding agencies communicate with each other determining whether a requestor has applied to several agencies. The Division of Drinking Water has provided our clients with the best loan/grant options for our clients. However, with Uintalands being a second home community, it is unknown what funding will be available. During the funding application process, the wording will be phrased to best allow for funding.

5.5 Environmental Concerns

There are no foreseen environmental issues that may arise due to the construction of the proposed short-term or long-term projects. All construction areas have been previously developed and the project will not disturb any new areas.

APPENDIX A

Model Results of Existing System

Current peak Inst. Junctions

ID	Label	Elevation (ft)	Pressure (psi)
25	J-1	8477.07	91.6
46	J-14	8361.12	78.3
59	Zone 4	8335.68	18.3
62	J-24	8204.01	75.9
78	J-33	8532.8	66.3
104	J-44	8267.71	47.8
263	J-124	8283.95	40.7
646	J-168	8361.58	76.1
648	J-169	8261.1	111.7
651	J-171	8478.99	87.6
652	J-172	8479.28	87.5
653	J-173	8477.8	88.1
655	J-174	8262.11	111.3
657	J-175	8500.26	81.6
661	J-177	8512.5	76.3
662	J-178	8593.98	37.7
663	J-179	8598.52	35.1
665	J-180	8299.29	155.8
666	J-181	8292.06	98.1
668	J-182	8251.03	54.9
669	J-183	8247.45	56.5
671	J-184	8311.87	93.3
673	J-185	8264.24	111.1
676	J-187	8331.64	19.9
680	J-189	8374.46	122.8
682	J-190	8569.78	50.4
683	J-191	8569.84	50.3
685	J-192	8293.41	154.4
686	J-193	8293.41	154.4
688	J-194	8457.87	38
689	J-195	8457.89	38
690	J-196	8293.4	154.4
691	J-197	8299.31	155.8
692	J-198	8299.34	155.8
693	J-199	8492.5	83.8
694	J-200	8492.57	83.8
696	J-201	8337.29	139
697	J-202	8337.22	139
699	J-203	8337.35	139
700	J-204	8463.2	94.6
701	J-205	8463.41	94.5
703	J-206	8690.15	6.1
704	J-207	8689.9	6.2
705	J-208	8293.24	154.4
708	J-210	8486.16	77.4
709	J-211	8486.36	77.3

Current peak Inst. Junctions

ID	Label	Elevation (ft)	Pressure (psi)
711	J-212	8486.42	77.2
712	J-213	8638.28	25.8
713	J-214	8638.09	25.9
714	J-215	8463.12	94.6
716	J-216	8337.1	139
717	J-217	8492.8	83.7
719	J-219	8514.23	72.7
720	J-220	8514.36	72.6
723	J-222	8251.87	54.6
725	J-224	8374.22	72.8
727	J-225	8492.67	83.7
728	J-226	8234.88	63.2
729	J-227	8234.98	63.2
731	J-228	8639.45	25.4
732	J-229	8639.27	25.4
735	J-231	8232.38	63.6
741	J-234	8456.25	92.6
743	J-236	8563	53.1
744	J-237	8563.06	53
747	J-239	8467.7	33.1
749	J-240	8251.73	54.7
751	J-241	8374.15	72.8
756	J-245	8370.17	125.4
759	J-247	8447.18	41.7
762	J-249	8473.37	30.6
764	J-251	8238.85	61.8
766	J-252	8477.86	80.9
767	J-253	8478.97	80.4
770	J-256	8337.12	139
772	J-257	8280.46	161.3
774	J-259	8232.98	63.3
775	J-260	8232.72	63.5
777	J-261	8592.85	38.2
779	J-263	8492.07	79.4
781	J-265	8452.36	94.2
783	J-267	8471.37	93.8
784	J-268	8514.29	72.6
785	J-269	8514.13	72.6
788	J-271	8335.8	139.5
794	J-274	8268.66	47.4
797	J-275	8498.41	76.5
804	J-278	8478.14	87.9
808	Zone 10	8337.59	135.2
809	Zone 24	8632.54	31
812	J-282	8413.81	55.9
815	Zone 22	8551.01	56.1

Current peak Inst. Junctions

ID	Label	Elevation (ft)	Pressure (psi)
824	J-284	8570.43	50.1
825	J-285	8570.32	50.2
827	J-286	8690.4	6.1
829	J-287	8569.56	50.5
833	J-289	8639.57	25.3
839	J-292	8684.92	12.2
862	J-293	8289.29	157.8
906	J-298	8502.85	80.5
911	J-299	8512.57	76.3
950	J-300	8299.31	155.8
957	J-301	8337.28	139
960	J-302	8337.2	139
978	Zone 1	8238.89	60.2
982	Zone 2	8283.27	40.9
986	Zone 3	8260.09	51.1
989	Zone 5	8338.94	16.9
992	Zone 6	8273.98	45.1
996	Zone 7	8232.94	63.2
999	Zone 8	8218.4	69.6
1004	Zone 9	8286.08	42.8
1007	Zone 11	8324.33	143.8
1011	Zone 12	8376.88	121.7
1014	Zone 13	8436.22	97.6
1017	Zone 14	8266.58	109.1
1020	Zone 15	8299.48	96.6
1023	Zone 16	8406.83	58.9
1026	zone 17	8389.84	117
1030	Zone 18	8468.39	87.6
1034	Zone 19	8484.36	85.3
1038	Zone 20	8509.02	73.1
1042	Zone 21	8439.27	45.1
1046	Zone 22	8458.63	96.4
1057	Zone 23	8596.6	40.2
1060	Zone 25	8699.86	3.4
1065	Zone 26	8521.29	71.3
1069	Zone 27	8581.53	48.9
1073	Zone 28	8601.98	33.5
1076	Zone 29	8559.54	52.6
1089	Lot 63C	8434.11	47.3
1092	Lot 65 A	8458.75	36.8
1095	Lot 65 B	8467.42	33.1
1099	Lot 66 B	8465.54	34
1102	Lot 1997 A	8467.19	33.9
1105	Lot 84 A	8589.03	39.5
1109	Lot 84 b	8595.66	36.5
1112	Lot 30 B	8441.06	44.4

Current peak Inst. Junctions

ID	Label	Elevation (ft)	Pressure (psi)
1115	Lot 27 A	8380.36	70.1
1116	J-359	8376.14	71.9
1120	Lot 22 C	8291.18	100.1
1123	Lot 20 C	8262.83	110.9
1126	Lot 37 A	8334.74	140.6
1127	J-363	8330.28	142.5
1131	Lot 41 B	8474.29	85.9
1134	Lot 51 B	8499.51	75.9
1137	Lot 61 B	8523.04	68
1138	J-367	8509.52	73.9
1142	Lot 68 A	8580.13	46.4
1143	J-369	8580.67	46.2
1147	Lot 77 A	8611.18	36.9
1150	Lot 81 B	8683.78	8.3
1153	Lot 78 B	8641.73	24.2
1156	Lot 69 D	8590.91	42.2
1157	J-374	8589.89	42.7
1161	Lot 53 A	8527.09	67.4
1162	J-376	8520.75	70.2
1166	Lot 42 B	8460.61	88.2
1167	J-378	8458.04	89.3
1171	Lot 49 A	8449.91	91.8
1172	J-380	8447.3	93
1176	Lot 71 B	8520.1	69.6
1179	Lot 56 B	8371.49	124.1
1180	J-383	8369.38	125
1184	Lot 36 B	8291.54	156.9
1187	Lot 17 C	8285.19	158.8
1190	Lot 14 B	8268.25	49.9
1193	Lo 6 C	8242.68	58.9
1196	Lot 11 C	8338.95	16.9
1199	J-389	8482.81	82.4
1238	J-396	8514.51	72.5
1248	J-397	8298.99	95.1
1255	J-398	8456.34	90
1257	J-400	8311.71	148.9
1258	J-401	8330.04	142.6
1302	J-407	8700	6.5
1311	J-409	8337.43	138.9
1315	J-411	8403.06	112.2
1318	J-412	8375.09	124
1324	J-414	8445.43	93.7
1325	J-415	8438.61	97.3

APPENDIX B

Model Results of Future System

Scenario: Future Peak Inst.

future Peak Inst Junction

ID	Label	Elevation (ft)	Pressure (psi)
25	J-1	8477.07	87.2
46	J-14	8361.12	79.3
59	Zone 4	8335.68	41.5
62	J-24	8204.01	98.5
78	J-33	8532.8	63
104	J-44	8267.71	70.9
263	J-124	8283.95	63.8
646	J-168	8361.58	79.1
648	J-169	8261.1	104.3
651	J-171	8478.99	79.5
652	J-172	8479.28	79.4
653	J-173	8477.8	79.4
655	J-174	8262.11	103.8
657	J-175	8500.26	77.2
661	J-177	8512.5	71.9
662	J-178	8593.98	36.5
663	J-179	8598.52	34.5
665	J-180	8299.29	87.8
666	J-181	8292.06	90.9
668	J-182	8251.03	78.1
669	J-183	8247.45	79.6
671	J-184	8311.87	100.6
673	J-185	8264.24	102.9
676	J-187	8331.64	43.2
680	J-189	8374.46	56.1
682	J-190	8569.78	41
683	J-191	8569.84	41
685	J-192	8293.41	90.2
686	J-193	8293.41	90.2
688	J-194	8457.87	38
689	J-195	8457.89	38
690	J-196	8293.4	90.2
691	J-197	8299.31	87.8
692	J-198	8299.34	87.8
693	J-199	8492.5	80.5
694	J-200	8492.57	80.4
696	J-201	8337.29	71.4
697	J-202	8337.22	71.4
699	J-203	8337.35	71.4
700	J-204	8463.2	93.1
701	J-205	8463.41	93
703	J-206	8690.15	29
704	J-207	8689.9	29.1
705	J-208	8293.24	90.3
708	J-210	8486.16	40.1
709	J-211	8486.36	40.1

ID	Label	Elevation (ft)	Pressure (psi)
711	J-212	8486.42	40
712	J-213	8638.28	50.8
713	J-214	8638.09	50.8
714	J-215	8463.12	93.1
716	J-216	8337.1	71.5
717	J-217	8492.8	80.3
719	J-219	8514.23	64.4
720	J-220	8514.36	64.4
723	J-222	8251.87	77.7
725	J-224	8374.22	73.6
727	J-225	8492.67	80.4
728	J-226	8234.88	85.1
729	J-227	8234.98	85.1
731	J-228	8639.45	50.3
732	J-229	8639.27	50.3
735	J-231	8232.38	86.2
741	J-234	8456.25	90
743	J-236	8563	43.9
744	J-237	8563.06	43.9
747	J-239	8467.7	33.7
749	J-240	8251.73	77.8
751	J-241	8374.15	73.7
756	J-245	8370.17	90.3
759	J-247	8447.18	42.6
762	J-249	8473.37	31.3
764	J-251	8238.85	83.4
766	J-252	8477.86	43.7
767	J-253	8478.97	43.3
770	J-256	8337.12	71.5
772	J-257	8280.46	95.9
774	J-259	8232.98	85.9
775	J-260	8232.72	86
777	J-261	8592.85	37
779	J-263	8492.07	74.5
781	J-265	8452.36	91.7
783	J-267	8471.37	89.7
784	J-268	8514.29	64.4
785	J-269	8514.13	64.5
788	J-271	8335.8	72
794	J-274	8268.66	70.5
797	J-275	8498.41	71.8
804	J-278	8478.14	79.8
808	Zone 10	8337.59	71.1
809	Zone 24	8632.54	53.9
812	J-282	8413.81	56.5
815	Zone 22	8551.01	48.3

future Peak Inst Junction

ID	Label	Elevation (ft)	Pressure (psi)
824	J-284	8570.43	40.7
825	J-285	8570.32	40.7
827	J-286	8690.4	28.9
829	J-287	8569.56	41.1
833	J-289	8639.57	50.2
839	J-292	8684.92	32.3
862	J-293	8289.29	92.1
906	J-298	8502.85	76
911	J-299	8512.57	71.8
950	J-300	8299.31	87.8
957	J-301	8337.28	71.4
960	J-302	8337.2	71.4
978	Zone 1	8238.89	83.3
982	Zone 2	8283.27	64.1
986	Zone 3	8260.09	74.2
989	Zone 5	8338.94	40.1
992	Zone 6	8273.98	68.2
996	Zone 7	8232.94	85.9
999	Zone 8	8218.4	92.2
1004	Zone 9	8286.08	63
1007	Zone 11	8324.33	77
1011	Zone 12	8376.88	54.4
1014	Zone 13	8436.22	61.7
1017	Zone 14	8266.58	101.9
1020	Zone 15	8299.48	87.7
1023	Zone 16	8406.83	59.5
1026	zone 17	8389.84	81.8
1030	Zone 18	8468.39	84.7
1034	Zone 19	8484.36	77.2
1038	Zone 20	8509.02	67.2
1042	Zone 21	8439.27	46
1046	Zone 22	8458.63	95.1
1057	Zone 23	8596.6	67.9
1060	Zone 25	8699.86	25.2
1065	Zone 26	8521.29	68
1069	Zone 27	8581.53	75.2
1073	Zone 28	8601.98	33
1076	Zone 29	8559.54	51.4
1089	Lot 63C	8434.11	48.2
1092	Lot 65 A	8458.75	37.6
1095	Lot 65 B	8467.42	33.8
1099	Lot 66 B	8465.54	34.7
1102	Lot 1997 A	8467.19	34
1105	Lot 84 A	8589.03	38.6
1109	Lot 84 b	8595.66	35.8
1112	Lot 30 B	8441.06	44.7

future Peak Inst Junction

ID	Label	Elevation (ft)	Pressure (psi)
1115	Lot 27 A	8380.36	71
1116	J-359	8376.14	72.8
1120	Lot 22 C	8291.18	91.3
1123	Lot 20 C	8262.83	103.5
1126	Lot 37 A	8334.74	72.5
1127	J-363	8330.28	74.4
1131	Lot 41 B	8474.29	82.2
1134	Lot 51 B	8499.51	71.3
1137	Lot 61 B	8523.04	61.1
1138	J-367	8509.52	67
1142	Lot 68 A	8580.13	74.8
1143	J-369	8580.67	74.5
1147	Lot 77 A	8611.18	62.4
1150	Lot 81 B	8683.78	31.6
1153	Lot 78 B	8641.73	49.2
1156	Lot 69 D	8590.91	70.2
1157	J-374	8589.89	70.6
1161	Lot 53 A	8527.09	59
1162	J-376	8520.75	61.7
1166	Lot 42 B	8460.61	51.2
1167	J-378	8458.04	52.3
1171	Lot 49 A	8449.91	55.8
1172	J-380	8447.3	57
1176	Lot 71 B	8520.1	61.7
1179	Lot 56 B	8371.49	56.8
1180	J-383	8369.38	57.7
1184	Lot 36 B	8291.54	91.1
1187	Lot 17 C	8285.19	93.8
1190	Lot 14 B	8268.25	70.7
1193	Lo 6 C	8242.68	81.7
1196	Lot 11 C	8338.95	40.1
1199	J-389	8482.81	78.5
1238	J-396	8514.51	64.3
1248	J-397	8298.99	87.9
1255	J-398	8456.34	53
1257	J-400	8311.71	82.4
1258	J-401	8330.04	74.5
1302	J-407	8700	26
1311	J-409	8337.43	71.3
1315	J-411	8403.06	76.1
1318	J-412	8375.09	88.2
1324	J-414	8445.43	57.8
1325	J-415	8438.61	60.7

APPENDIX C

Water Supplier Requirements
For Public Drinking Water Suppliers
Compliance and Enforcement

For Public Drinking Water Suppliers

Openline Newsletter

The Board recently prepared a Resolution regarding Security Vulnerability Assessments & Emergency Response Plans

Utah Drinking Water Annual Compliance Report 2002

Entry Point/Common Aquifer Policy: The Division has finalized our policy that allows chemical sampling for sources that combine at an entry point to the distribution system, and sources in a common aquifer. For a common entry point grouping, the policy states in order to maintain the entry point status that systems must submit to DDW a sampling plan. If your system has sources in a common aquifer then you must apply for those sources to be grouped into a sampling station. The requirements for this application are in the Entry Point and Common Aquifer Policy. The deadlines for your system to submit either the sampling plan or the common aquifer application are in the policy.

Are You Going to Construct a NEW Public Drinking Water System?

Click here.

Do you manage or operate an EXISTING Public Drinking Water System?

- 2006 Survey of Community Water Systems (includes average water bill information)
- You should be aware of the rules which govern the operation, maintenance and construction of any public drinking water system.
- You must take a minimum number of bacteriologic and chemical samples from your system. Samples must be analyzed by a certified laboratory. Monitoring waivers may be available for certain chemicals.
- DDW_SAMPLING_POINTS.mdb (updated 6/2/10) is an Access database that provides an additional resource for Public Water Suppliers, Laboratories, and Sample Collectors. The database is a useful reference that will assist in the proper identification and labeling of Drinking Water Compliance Samples submitted to laboratories. Proper identification of Water System Facilities and their associated Sampling Points is crucial to improving data quality and allows for timely and accurate data reporting by means of electronic data submission directly from the laboratory to DDW.
  This database contains a number of tables derived from the DDW SDWIS database including tables of water systems, water system facilities, sampling points, analyte codes, and standard method codes as well as a table of Sampling Points specific to sampling for TTHM/HAA. Also provided is a query against these tables (qrySAMPLING_POINTS) that can retrieve details of water systems, water system facilities, and sampling points for all drinking water systems in Utah.
- The water you deliver to your customers must meet certain quality standards.
- If your system fails to meet monitoring or quality requirements, you will be required to give public notice. Here are some templates to help you.
- Your water system will be periodically inspected and given a rating.
  - 2010 Sanitary Survey Schedule
- Certain water systems must have a certified operator.
- If you treat your water, monthly operational reports must be sent to the Division of Drinking Water.
- Lead and Copper sampling is required for Community and Non-Transient Non-Community systems. To learn about the specific requirements of the rule please see Lead and Copper Rule (pdf). The Lead (pdf) and Copper (pdf) forms must be filled out and returned to DDW along with copies of the analytical results. Systems that treat for Corrosion Control need to fill out a Monthly Report (pdf). For current information about Lead in Utah (pdf) or Lead in our schools checklist (pdf), click the link. How does lead get into our drinking water (pdf)? Here's EPA sampling information about lead in day care facilities (pdf)

(over 7MB) and lead in schools (pdf) (over 4MB).

- You may be required to have a source protection plan for each of your sources.
- Developing new drinking water sources can be challenging. See Guidance for Developing New Drinking Water Sources.
- If you are constructing a new well, a Well Approval Checklist is available.
- You must notify the Division of Drinking Water before the construction of any new facility (e.g. storage tank, treatment facility, well source, distribution system improvements). Construction must not commence until plan approval is obtained from the Division. Once constructed, the facility shall not be put into operation until an operating permit is obtained.
- Financial assistance for constructing new facilities may be available.
- You must have a cross-connection control program in place - see also R309-105(12). For additional information contact Mike Moss
    - Cross Connection Program Training - Schedule (updated 4/2/2010)
    - Backflow Technician Certification - Class I - Cross Connection Control Administrator Certification - Class Schedule
    - Certified Backflow Technician testers listed by Name (pdf) as of 10/4/2010 (use the search feature in Adobe Reader to find by License #).
- Systems serving 500 or more connections must have a water management and conservation plan. See Utah Division of Water Resources - Conservation Plans for further information.
- You may be required to send your customers a Consumer Confidence Report (CCR) every year.
- Some water systems are required to conduct a Vulnerability Assessment. All systems are encouraged to have an emergency response plan (pdf) in place. In many areas of the state the possibility of earthquake damage must be realistically considered.
- You should be generally aware of what diseases can be transmitted through drinking water. Recognizing Waterborne Disease is a website that is intended for health care professionals. It may be interest to water suppliers. Registration is required.
- Non-governmental technical assistance is available to you through various local professional organizations including the Rural Water Association of Utah and the Intermountain Section of the American Water Works Association. The Utah Water Quality Alliance is a group of Utah water suppliers working to optimize the performance of surface water treatment plants. The National Drinking Water Clearinghouse provides on-line resources for water suppliers.

Water System Rating Criteria
Rule R309-400 Summary

Summary

This rule sets forth the rating criteria and specifies the points associated with the infraction of the Division's rules. It is also known as the "Improvement Priority System Rule" or IPS.

Water System Ratings

Each Public Water System shall be assign a rating of either: "Approved", "Corrective Action" or "Not Approved" based on the system's compliance with the Rules. In order to qualify for an Approved rating, the public water system must maintain a point total less than the following:

Community water system - 150 points;
Non-Transient Non-Community water system - 120 points; and
Non-Community water system - 100 points.

In order for a public water system to receive a Not Approved rating the accumulation of points for the water system must equal or exceed the totals listed above.

In order to qualify for a Corrective Action rating the public water system must submit the following:

1. A written agreement to the Executive Secretary stating a willingness to comply with the requirements set forth in the Rules;
2. A compliance schedule with a time table agreed upon by the Executive Secretary outlining the necessary construction or changes to correct any physical deficiencies or monitoring failures; and
3. Proof of financial ability to correct the deficiencies.

The Corrective Action rating shall continue until the total project is completed. The Executive Secretary may at any time rate a water system not approved if an immediate threat to public health exists. This rating shall remain in place until such time as the threat is alleviated and the cause is corrected.

Any water system may appeal its assigned rating or assessed points to the Drinking Water Board by filing a request for a hearing with the Executive Secretary.

Quality, Monitoring and Public Notification Violations

Bacteriological	Points
Major routine monitoring	35
Public Notice	5
Minor routine monitoring	10
Public Notice	2
Major repeat monitoring	40
Public Notice	5

Bacteriological (cont.)	Points
Minor repeat monitoring	10
Public Notice	2
Non-acute MCL	40
Public Notice	10
Acute MCL	50
Public Notice	10

Chemical	Points
IOC, Sulfate, Rads, Asbestos, VOC, Pesticides	
Major monitoring	20
Public Notice	3
Minor monitoring	10
Public Notice	1
MCL	30
Public Notice	5
Nitrate & Nitrite	
Monitoring	35
Public Notice	5
MCL	50
Public Notice	10
Total Trihalomethanes	
Monitoring	10
Public Notice	1
MCL	30
Public Notice	5
Lead & Copper	
Major monitoring	20
Public Notice	3
Minor monitoring	10
Public Notice	1
Corrosion Treatment	35
Public Notice	10
Public Education	10
Lead line replacement	5
Public Notice	2
Groundwater Turbidity	
Monitoring	35
Public Notice	5
MCL	50
Public Notice	10

Surface Water Treatment

	Points
Plant Operation	20 to 150
For: a) disinfectant level less than 0.2 milligrams per liter, b) turbidity exceeding 5 NTU, c) the percentage of turbidity measurements meeting the treatment plant limit is less than 95 percent and d) the percentage of occurrences where there is no detectable levels of disinfection is greater than 5 percent.	
Treatment	20 to 50
No treatment of groundwater under the direct influence of surface water within 18 months of notification.	

Physical Facilities

		Points
Surface Water Diversion Structures and Impoundments		
Failure to provide:		
Multiple level intake structures		2
facilities to waste less desirable water held in storage		2
minimize frazil ice formation	2	
protection from damage by ice buildup		2
exclusion of large quantities of fish or debris		2
removal of shrubbery from reservoir high water level		2
management of nutrient loading		10
Well Sources		
Failure to provide:		
Sanitary well seal		50
food grade mineral oil for pump lubrication	25	
well casing terminates 12" above floor and 18" above ground, and/or 5' above the highest flood elevation or fitted with pitless adaptor		1 to 20
well casing vent covered with a No. 14 mesh screen		5
well discharge piping equipped with: 1) a smooth nosed sampling tap, 2) check valve, 3) pressure gauge, 4) means of measuring flow and 5) shutoff valve		1 to 5
means to release trapped air from the discharge piping		5
well house drain-to-daylight	5	
Spring Sources		
Failure to provide:		
diversion of surface water away from collection area		1 to 20
a minimum of 10' of impervious cover or a liner		10
deep rooted vegetation within the fenced area		10
removal of vegetation interfering with spring collection		10

Spring Sources (cont.)	Points
collection and/or junction box with a lockable shoebox lid, gasket, and # 14 mesh screen on the vent line and locked	1 to 25
proper fence	10
diversion channel capable of diverting surface water	5
a permanent flow measuring device	5
an overflow/drain with a proper screen and adequate freefall	5 to 10

Disinfection by gaseous chlorine

Failure to provide:	
a detectable chlorine residual	10
proper heating, lighting and ventilation	2
a chlorine test kit	2
a cylinder wrench on the yoke valve	2
a one ton cylinder leak detection and repair kit	15
a 150 pound cylinder leak detection and repair kit	2
chlorine cylinders restrained or isolated	2
feeder line properly vented to the outside	2
measurement of chlorine usage	2
a properly stored gas mask	5
a means of measuring the volume of water treated	2

Disinfection by liquid hypochlorite

Failure to provide:	
a detectable chlorine residual	10
properly housed and secured hypochlorinator	2
a chlorine residual test kit	2
maintain a spare parts repair kit	2
a means of measuring the volume of water treated	2

Storage

an uncovered finished reservoir shall be rated Not Approved.

Failure to provide:	
reservoir access shoebox lid at least 4" above tank roof	10
proper vent	5
screened overflow, air gapped drainage	5 to 15
adequate drainage capacity	2
water tight roof and/or sidewalls	10 to 50
access ladder, or railing	2
internal coatings ANSI/NSF 61 approved	30

Distribution

Failure to provide:	
provide at least 20 psi at all times	50
use approved pipe and materials	30

Distribution (cont.)		Points
adequate separation from sewer lines		30
air vacuum release valve properly screened	2	
(up to a maximum of 20 points per system)		
proper drainage for air vacuum release valve chambers		20
(up to a maximum of 50 points per system)		

Quantity requirements

Failure to provide:

sufficient source capacity	5 to 50
sufficient storage capacity	5 to 50

Operator Certification

		Points
Failure to provide:		
appropriately certified operator where required		30
a certified operator at the appropriate level	10	
for grade 3 or 4 system that do not have all direct responsible charge operators certified at no more than one grade level below the level of the system		5 to 15
Credit points given for:		
a certified operator when none is required		10
operators certified at a higher level than required		10
operators certified in other appropriate areas		10

Note: a maximum of 20 credit points given for certifications

Cross Connection Control Program

	Points
Failure to provide:	
local enforce authority	10
public education	10
trained staff	10
written records of cross connection control activities	10
on-going enforcement	10

Drinking Water Source Protection

	Points
Failure to provide:	
source delineation	5
an inventory of potential contamination sources	5
control of potential contamination sources	5
a plan to address new potential contamination sources	5

Drinking Water Source Protection (cont.) Points

Credit points given for:

a system that completes a source protection plan prior to the deadline or on source where a plan is not required 20

Administrative Issues

Points

Administrative

Failure to provide:

a responsible for party or individual 10

plan approval prior to construction 1 to 50

Emergency Response Program

Credit points given for:

an emergency response plan 10

Financial Management Plan

Credit points given for:

an adequate financial management plan 10

Sampling Site Plans

Failure to provide:

an adequate bacteriological sampling site plan 5

a lead/copper sampling site plan 10

Customer Complaint

documented customer complaints including: a) turbidity, b) pressure, c) taste & odor, d) water suspected sickness, e) waterborne disease outbreak, and f) periods of water outages 1 to 100

Systems with a waterborne disease outbreak shall be rated Not Approved

Agency Directives

When directives including: a) administrative orders, b) rule defined action, c) compliance schedules, d) variance/exemption requirements, and e) bilateral compliance agreement. 1 to 100

Data Falsification

for each occurrence 1 to 50

Reporting and Record Maintenance Issues

Failure to provide:

monthly water treatment plant reports 10

monthly chlorination reports 10

R309-405. Compliance and Enforcement: Administrative Penalty.

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R309-405. Compliance and Enforcement: Administrative Penalty.

R309-405-1. Authority.

Utah Code Annotated, Sections 19-4-104 and 19-4-109

R309-405-2. Purpose, Scope, and Applicability.

(1) This rule sets the criteria and procedures the Board will use in assessing penalties to public drinking water systems for violation of its rules.

(2) This guidance and ensuing criteria is intended to be flexible and liberally construed to achieve a fair, just, and equitable result with the intent of returning a public water system to compliance.

(3) This rule is applicable to all public drinking water systems.

R309-405-3. Limits on Authority and Liability.

Nothing in this rule should be construed to limit the Board's ability to take enforcement actions under Utah Code Annotated, Section 19-4-109.

R309-405-4. Assessment of a Penalty and Calculation of Settlement Amounts.

(1) Where the Executive Secretary determines that a penalty may be appropriate, the Executive Secretary shall propose a penalty amount by sending a notice of agency action, under Title 63, chapter 46b of the Administrative Procedures Act, to the public water system. The notice of agency action shall provide that the public water system may submit comments and/or information on the proposed penalty to the Executive Secretary within 30 days. The criteria the Executive Secretary will use in establishing a proposed penalty amount shall be as follows:

(a) Major Violations: $600 to $1000 per day for each day of violation. This category includes violations with high potential for impact on drinking water users, major deviations from the requirements of the rules or Safe Drinking Water Act, intentional fraud, falsification of data, violations which result in a public water system being considered by the Environmental Protection Agency to be: "Significant Non-Compliers" (SNC), or violations that may have a substantial adverse effect on the regulatory program. Specific violations that are subject to a major violation category can include the following:

(i) Violations subject to $1000 per day penalty:

(A) Any violation defined by R309-220-5 which would trigger a Tier 1

public notification.

(B) Not having any elements of a source protection plan as required in R309-600 for ground water sources and R309-605 for surface water sources.

(C) Failure to respond to an Administrative Order issued by the Drinking Water Board.

(D) Introduction by the water system of a source water that has not been evaluated and approved for use as a public drinking water source under R309-515.

(E) Construction or use of an interconnection to another public water system which has not been reviewed and approved in accordance with R309-550-9.

(F) Having over 20 IPS points (Improvement Priority System points based on R309-150, the Water System Rating Criteria) specifically for operating pressures below that required by R309-105-9.

(G) Having 50 IPS points specifically for an inadequate well seal as required in R309-515.

(H) Having over 50 IPS points (not including the deficiencies in (F) and (G) above) specifically assessed in the physical facility section of an IPS report.

(I) Use of a surface water source without proper filtration treatment in accordance with R309-525 or 530.

(J) Exceeding the rated water treatment plant capacity as determined by review under R309-525 or 530.

(K) Insufficient disinfection contact time as evaluated under R309-215-7.

(ii) Violations subject to $800 per day penalty:

(A) Not having any of the required components of a cross connection control program in place as required by R309-105-12.

(B) Any violation of the turbidity requirements outlined in R309-215-9(4)(b)(iii -iv) for individual filter turbidities using consecutive readings taken 15 minutes apart.

(b) Moderate Violations: $400 to $600 per day for each day of violation. This category includes violations with a moderate potential for impact on drinking water users, moderate deviations from the requirements of the rules or Safe Drinking Water Act with some requirements implemented as intended, or violations that may have a significant notable adverse effect on the regulatory program. Specific violations that are subject to a moderate violation category can include the following:

(i) Violations subject to $600 penalty:

(A) Any violation defined by R309-220-6 which would trigger a Tier 2 public notification.

(B) Having a disapproved status on a source protection plan (R309-600 and 605) for a period longer than 90 days.

(C) Installation or use of disinfection equipment that has not been evaluated and approved for use under R309-520.

(D) Having measured turbidity spikes of greater than 0.5 or 1.0 NTU in two consecutive fifteen minute readings as defined in R309-215-9(4)(b)(i) or (ii) respectively.

(E) Insufficient source capacity, storage capacity, or delivery capacity as established by review of the system design under R309-500 through 550.

(F) Not complying with plan approval requirements as set forth in R309-500. The term infrastructure can include the disinfection process, surface water treatment process, and physical facilities such as water treatment plants, storage reservoirs, sources and distribution piping.

(c) Minor Violations: Up to $400 per day for each day of violation. This category includes violations with a minor potential for impact on drinking water users, slight deviations from the rules or Act with most of the requirements implemented, or violations that may have a minor adverse effect on the regulatory program. Specific violations that are subject to a minor violation category can include the following:

(i) Violations subject to $400 per day penalty:

(A) Any violation defined by R309-220-7 which would trigger a Tier 3 public notification or a violation of the monitoring requirements of R309-515-4(5), except for turbidity monitoring for surface water treatment facilities and violations termed as minor monitoring as outlined in R309-150-3 (minor bacteriological routine monitoring violation, minor bacteriological repeat monitoring violation and minor chemical monitoring violation).

(B) Failure to upgrade a Preliminary Evaluation Report for a source protection plan as required in R309-600 and 605.

(C) Failure to update a source protection plan as required in R309-600 and 605.

(D) Construction or use of a storage reservoir that has not been evaluated for use under R309-545.

(ii) Violations subject to $200 per day penalty:

(A) Lacking individual components of a cross connection control program as required by R309-105-12.

(B) Not having a certified operator on staff as required in R309-300-5(10) after 1 year or 4 operator certification exam cycles.

(C) Any minor monitoring violation as defined by R309-150-3 (minor bacteriological routine monitoring violation, minor bacteriological repeat monitoring violation and minor chemical monitoring violation).

(D) Any violation of the turbidity requirements outlined in R309-215-9(4)(b)(i-ii) for individual filter turbidities using consecutive readings taken 15 minutes apart.

(2) The Executive Secretary will assess the penalty, if any, after reviewing information submitted by the public water system. The public water system may appeal the assessment of the penalty to the Board by requesting a formal hearing under R309-115 and the Utah Administrative Procedures Act within 30 days of the date of assessment of the penalty.

R309-405-5. Factors for Seeking or Negotiating Amount of Penalties.

The Executive Secretary, in assessing the penalty, may take into account the following factors:

(1) Economic benefit. The costs a person or organization may save by delaying or avoiding compliance with applicable laws or rules.

(2) Gravity of the violation. This component of the calculation shall be based on:

(a) The extent of deviation from the rules;

(b) The potential for harm to drinking water users, regardless of the extent of harm that actually occurred;

(c) The degree of cooperation or noncooperation and good faith efforts to comply. Good faith takes into account the openness in dealing with the violations, promptness in correction of problems, and the degree of cooperation with the State;

(d) History of compliance or noncompliance. The penalty amount may be adjusted upward in consideration of previous violations and the degree of recidivism. Likewise, the penalty amount may be adjusted downward when it is shown that the violator has a good compliance record; and,

(e) Degree of willfulness or negligence. Factors to be considered include how much control the violator had over the violation and the foreseeability of the events constituting the violation, whether the violator made or could have made reasonable efforts to prevent the violation, whether the violator knew, or should have known, of the legal requirements which were violated, and degree of recalcitrance.

(3) The number of days of non compliance

(4) Public sensitivity. The actual impact of the violation(s) that occurred.

(5) Response and investigation costs incurred by the State and others.

(6) The possible deterrent effect of a penalty to prevent future violations.

R309-405-6. Satisfaction of Penalty Under Stipulated Penalty Agreement.

The Executive Secretary may accept the following methods of payment or satisfaction of a penalty to promote compliance and to achieve the purposes set forth in Utah Code Annotated Section 19-4-109:

(1) Payment of the penalty may be extended based on a person or organization's inability to pay. This should be distinguished from an unwillingness to pay. In cases of financial hardship, the Executive Secretary may accept payment of the penalty under an installment plan or delayed payment schedule with interest.

(2) In circumstances where there is a demonstrated financial hardship, the Executive Secretary may allow a portion of the penalty to be deferred and eventually waived if no further violations are committed within a period designated by the Executive Secretary.

(3) In some cases, the Executive Secretary may allow the violator to satisfy the penalty by completing a Supplemental Environmental Project (SEP) approved by the Executive Secretary. The following criteria shall be used in determining the eligibility of such projects:

(a) The project must be in addition to all regulatory compliance obligations;

(b) The project must relate to some or all of the issues of the violation;

(c) The project must primarily benefit the drinking water users;

(d) The project must be defined, measurable and have a beginning and ending date;

(e) The project must be agreed to in writing between the public water system and the Executive Secretary;

(f) The project must not generate the public perception favoring violations of the laws and rules.

R309-405-7. Penalty Policy for Civil Proceedings.

Pursuant to Utah Code Annotated Section 19-4-109(2)(b), any person who willfully violates any rule or order made or issued pursuant to the Utah Safe Drinking Water Act, Utah Code Annotated Section 19-4-101 et seq, is subject to a civil penalty of not more than $5000 per day for each day of violation. The Board and Executive Secretary shall apply the provisions of R309-405-4, 5, and 6 in pursuing or resolving willful violations except that the penalty range per day for each day of violation for major violations shall be $3000 to $5,000, for moderate violations shall be $2000 to $3000, and for minor violations shall be up to $2000.

KEY: drinking water, environmental protection, administrative procedures, penalties
Date of Enactment or Last Substantive Amendment: March 8, 2006
Notice of Continuation: May 16, 2005
Authorizing, and Implemented or Interpreted Law: 19-4-104; 63-46b-4

APPENDIX D

Cost Estimate prepared for Uintalands
Fire Protection vs. No Fire Protection

Uintalands Association

Fire Protection vs. No Fire Protection

Uintalands current water system is not capable of supporting fire flow demands due to pipe size and storage capacity. If used, the system could experience low and negative pressures, potentially contaminating the water system. It is not recommended to use the fire hydrants for fire protection without the appropriate system improvements, including 8-inch pipeline throughout the system and increased storage capacity.

Due to this information, Franson Civil Engineers was asked by the Uintalands Water Committee to prepare a cost estimate for system improvements with two alternatives:

1. Provide fire protection, and
2. Not provide fire protection.

Both alternatives include the necessary system improvements needed regardless of whether fire protection is provided or not. These short term improvements include replacing the 2-inch pipeline on Aspen Circle, installing a booster pump near the tanks, and six pressure reducing valves (PRV) and ten meters located throughout the system. Although the water tank may be a long term improvement, we have included its cost estimate because the tank size changes with both alternatives.

The first alternative is to provide the system improvements needed without supplying fire protection. This alternative would require, as per DDW, the removal of all existing fire hydrants, which provide a false sense of security. Additionally, confirmation from the local fire authority is needed that Uintalands does not need to provide fire protection. The second alternative is to provide the system improvements needed including supplying fire protection. Below is a summary of the system improvements and cost estimate for each alternative. Detailed cost estimates are located at the end of the document.

Alternative 1: System Improvements for Full Build-out without Fire Protection

- Provide pressures within acceptable limits
- Optimize operation of system
- Provide additional meters for assisting in leak detection and water usage
- Remove existing fire hydrants
- Construct water tank (if existing tanks are deteriorating)
- As pipes break, replace with 4-inch pipeline
- Install 4-inch line between Deer Lane and Wilderness Acres Road to create loop and reduce low pressures

Cost Estimate

Item	Total cost
Replace 2-inch Pipeline on Aspen Circle with 4-inch line	$207,000
Booster Pump and PRV's	$65,000
Meters	$42,000
Remove existing fire hydrants (19 @ $1,000)	$19,000
Tank (110,000 gallons)	$223,000
Replace existing 2-inch lines with 4-inch lines	$298,000
Install 4-inch line between Deer Lane and Wilderness Acres Road	$52,400
Total Cost (rounded)	**$906,000**

Alternative 2: System Improvements for Full Build-out with Fire Protection

- Provide pressures within acceptable limits
- Optimize operation of system
- Provide additional meters for assisting in leak detection and water usage
- Storage tank to include 120,000 gallons fire storage
- Replace all pipe with 8-inch pipeline
- Fire hydrants placed at 500-foot increments

Cost Estimate

Item	Total cost
Replace 2-inch Pipeline on Aspen Circle	$272,000
Booster Pump and PRV's	$96,000
Meters	$103,000
Tank (230,000 gallons)	$311,000
Replace existing 2-inch lines	$338,000
Replace existing 4-inch lines	$2,727,000
Replace existing 6-inch lines	$320,000
Install additional fire hydrants (88 @ $3,000 each)	$264,000
Total Cost (rounded)	**$4,431,000**

Detailed Cost Estimates for Full Build-out (without Fire Protection)

Replace 2-inch Pipeline on Aspen Circle Cost Estimate

	Amount/Cost	Aspen Circle
Furnish/Install 4-inch C900	4,025 LF @ $9/LF	$36,225
Furnish/Install Pipe Bedding	1,090 tons @ $22/ton	$24,000
Furnish/Install backfill Material	5,200 tons @ $13/ton	$67,600
Furnish/Install Roadbase Material	1,010 tons @ $25/ton	$25,300
Design & Engineering (~15%)		$23,000
Contingencies (~20%)		$30,625
Total Cost (rounded)		**$207,000**

Booster Pump and PRV's Cost Estimate

	Quantity	Unit Cost	Total Cost
Booster Pump, Controls and Structure	1	$12,000	$12,000
4-inch PRV with By-pass in Vault	6	$6,000	$36,000
Design & Engineering (~15%)			$7,200
Contingencies (~20%)			$9,600
Total Cost (rounded)			**$65,000**

Meters Cost Estimate

	Quantity	Unit Cost	Total Cost
4-inch Meters	10	$3,125	$31,250
Design & Engineering (~15%)			$4,700
Contingencies (~20%)			$6,250
Total Cost (rounded)			**$42,000**

Tank Cost Estimate*

	110,000 gallon tank ($1.50 unit price)
Tank cost ($1.50 unit price)	$165,000
Design & Engineering (~15%)	$24,750
Contingencies (~20%)	$33,000
Total Cost (rounded)	**$223,000**

*If the existing tanks need to be replaced. A video inspection of the tanks in the Spring of 2011 will provide information on the current condition of the four existing tanks.

Replace 2-inch Pipelines with 4-inch and Install 4-inch line between Deer Lane & Wilderness Acres Road Cost Estimate

	Existing 2-inch lines 4,840 ft*	Proposed 4-inch line 1,020 ft**
Furnish/Install 4-inch C900	$43,600	$9,180
Furnish/Install Pipe Bedding	$28,800	$6,100
Furnish/Install backfill Material	$81,200	$17,100
Furnish/Install Roadbase Material	$30,400	$6,400
4-inch PRV with By-pass in Vault (along 2-inch line between Deer & Elk Lanes)	$6,000	$0
Design & Engineering (~15%)	$33,000	$5,800
Contingencies (~20%)	$44,000	$7,800
Total Cost (rounded)	**$298,000**	**$52,400**

*Does not include Aspen Circle, which is a short term need
** Provide a loop to reduce low pressures at end of lines

Detailed Cost Estimate for Full Build-out (with Fire Protection)

Replace 2-inch Pipeline on Aspen Circle Cost Estimate

	Amount/Cost	Aspen Circle
Furnish/Install 8-inch C900	4,025 LF @ $21/LF	$85,000
Furnish/Install Pipe Bedding	1,090 tons @ $22/ton	$24,000
Furnish/Install backfill Material	5,200 tons @ $13/ton	$67,600
Furnish/Install Roadbase Material	1,010 tons @ $25/ton	$25,300
Design & Engineering (~15%)		$30,000
Contingencies (~20%)		$40,000
Total Cost (rounded)		**$272,000**

Booster Pump and PRV's Cost Estimate

	Quantity	Unit Cost	Total Cost
Booster Pump, Controls and Structure	1	$12,000	$12,000
6-inch PRV with By-pass in Vault	6	$7,750	$46,500
Tie-into 8-inch pipes	6	$2,100	$12,600
Design & Engineering (~15%)			$10,700
Contingencies (~20%)			$14,200
Total Cost (rounded)			**$96,000**

Meters Cost Estimate

	Quantity	Unit Cost	Total Cost
8-inch Meters	10	$7,660	$76,600
Design & Engineering (~15%)			$11,500
Contingencies (~20%)			$15,000
Total Cost (rounded)			**$103,000**

Tank Cost Estimate

	126,000 gallon tank ($1.50 unit price)	230,000 gallon tank ($1.00 unit price)
Tank cost ($1.50 unit price)	$189,000	$230,000
Design & Engineering (~15%)	$28,000	$35,000
Contingencies (~20%)	$38,000	$46,000
Total Cost (rounded)	**$255,000**	**$311,000**

The video inspection of the tanks in the Spring of 2011 will provide information on the current condition of the four existing tanks. It is recommended that either a 126,000 gallon tank is built, providing the four tanks are in working order, or a 230,000 gallon tank, if they are not.

Replace Pipelines with 8-inch Cost Estimate

	Existing 2-inch lines 4,840 ft*	Existing 4-inch lines 40,215ft	Existing 6-inch lines 4,573 ft
Furnish/Install 8-inch C900	$101,600	$844,500	$96,000
Furnish/Install Pipe Bedding	$28,800	$240,000	$27,300
Furnish/Install backfill Material	$81,200	$675,000	$76,700
Furnish/Install Roadbase Material	$30,400	$252,600	$28,700
6-inch PRV with By-pass in Vault (along 2-inch line between Deer & Elk Lanes)	$7,750	$7,750	$7,750
Design & Engineering (~15%)	$38,000	$303,000	$36,000
Contingencies (~20%)	$50,000	$404,000	$47,000
Total Cost (rounded)	**$338,000**	**$2,727,000**	**$320,000**

*Does not include Aspen Circle, which is a short term need