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PINE HAVEN MASTER PLAN
LEVEL I STUDY

EXECUTIVE SUMMARY

DECEMBER, 2009

SUBMITTED TO:

THE WYOMING WATER DEVELOPMENT COMISSION

AND

THE TOWN OF PINE HAVEN

PREPARED BY:

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PINE HAVEN MASTER PLAN – LEVEL I STUDY

EXECUTIVE SUMMARY

For The

Wyoming Water Development Commission
05SC0293587

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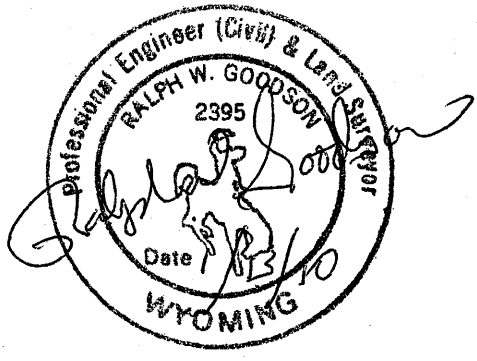
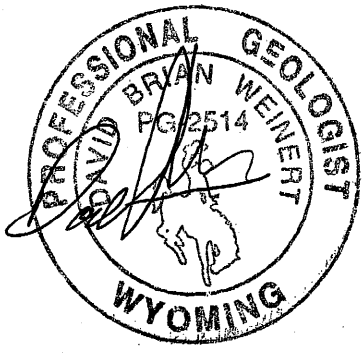




December 2009

EXECUTIVE SUMMARY – TABLE OF CONTENTS

PINE HAVEN MASTER PLAN
LEVEL I STUDY

"EXECUTIVE SUMMARY"

PROJECT LOCATION AND NEED

The town of Pine Haven is located in Crook County in the Northeastern corner of Wyoming as shown in Figure 1.1.1. Having been incorporated in March 1987, the town is relatively new. Pine Haven is located on a peninsula surrounded by Keyhole reservoir enhancing its appeal to recreational, retirees, and part time residents. Due to the recent population increases to this immediate area concerns with the productivity and capacity of the current water system arose. Those concerns were the catalyst for initiating this study.

Figure 1.1.1 – Wyoming Location Map

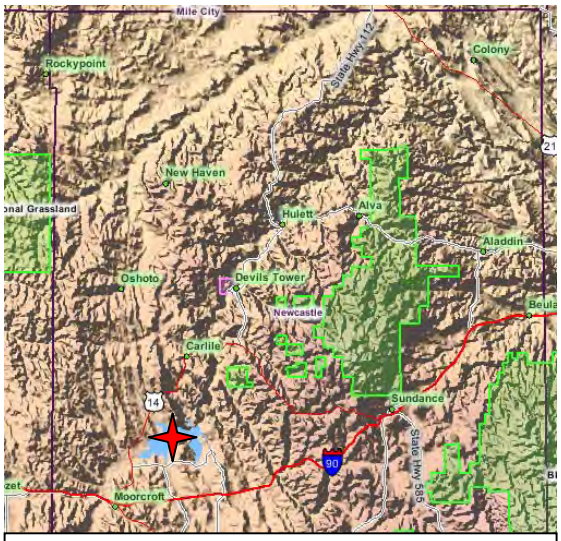


Figure 1.1.2 – Crook County Location Map

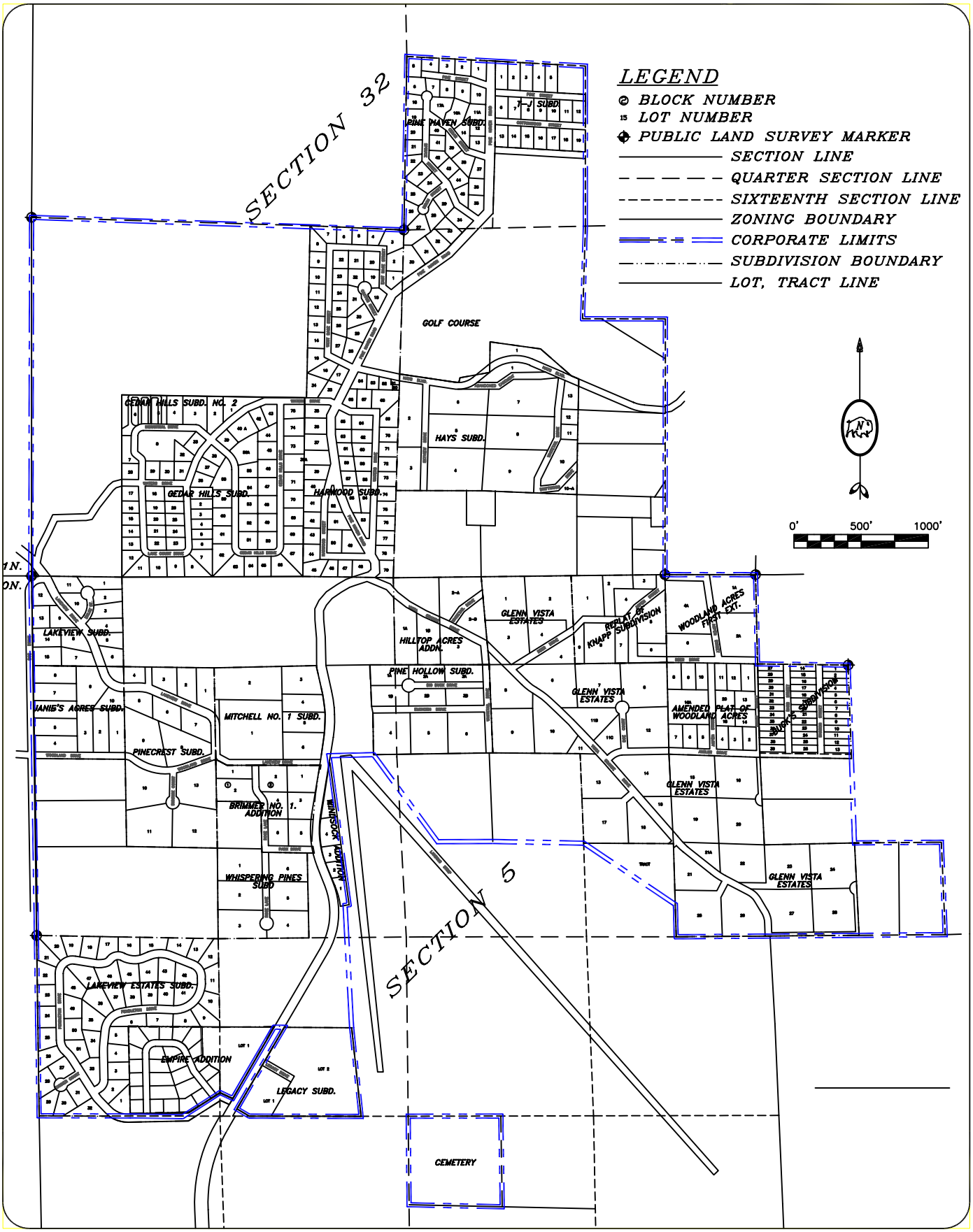
PROJECT STUDY AREA

The area of study for this project is limited to the corporate limits of the Town of Pine Haven (see Figure 1.0). This is an area totaling 709.1 acres. This report is based on the assumption that the corporate limits of the Town of Pine Haven will not increase.

PROJECT OBJECTIVES

This purpose of this Level I Study is to analyze the current water system's integrity, performance, and sustainability. This study provides a look into the needs to continue to provide adequate service to the current residents of Pine Haven and the water system needs to provide service to expected growth into the future.

The existing water system was modeled in a computer program to analyze current system conditions as well as conditions when proposed system alternatives area applied to the existing system. Preliminary design and cost estimates for all proposed system alternatives are included in this study.



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TOWN OF PINE HAVEN
MASTER PLAN
LEVEL 1 STUDY

FIGURE 1.0
CORPORATE LIMITS

CURRENT POPULATION AND WATER USAGE

The population in Pine Haven as of August 2008 is 547 people, 251 water service connections. The current population is referred to as Scenario 1 throughout the study. The Town of Pine Haven keeps daily and monthly records of the gallons of water pumped into the distribution system. This information along with the number of water service connections billed during each the corresponding month 2004-2007 was used to determine the existing water usage demands placed on the Pine Haven water system. The average annual day (AADD), average summer day (ASDD), and peak day demand (PDD) water usage that will be used for this entire study is displayed in the table below.

Demand	Total Usage (gallons)	Water Service Connections	Usage (gallons per capita daily)
AADD	66,060	197	154
ASDD	118,296	204	266
PDD	196,750	198	456

The water usage rates in the table above are used throughout the study for current water usage and estimated water usage at future populations.

The Keyhole County Club in Pine Haven implements an alternative water source. The country club irrigation water consumption was not included in the current water usage or projected water demand analysis. It is not anticipated that the municipal water system will ever be used to supply irrigation water to the country club.

PROJECTED POPULATION SCENARIOS AND SYSTEM DEMANDS

Population projections for the Town of Pine Haven are a difficult task. Due to the unpredictable and intense population increases experienced over the last 8 years several methods were employed to forecast an accurate future population for the Town of Pine Haven. Two future scenarios were assessed in the population projections for Pine Haven. First, the population projection for the year 2030 that is referred to as Scenario 2.

A trend was discovered in three of the five methods used for determining future population in 2030 for Pine Haven. The average of these three populations was used for the estimated year 2030 population that is 1550 people. Secondly, the population at corporate build-out for Pine Haven which is referred to as Scenario 3. Corporate build-out population is much simpler to determine since there is set area to be developed. The corporate build-out population determined and used for this study is 1850 people.

Figure 10.3.4 displays the projected populations along with different population growth trends that Pine Haven has experienced in years past.

When applying the water system usage from the above table, water system demands for the future Scenarios are determined. Demands at all three scenarios are displayed in Table 10.3.5 below.

FIGURE 10.3.4 - Observed & Projected Populations

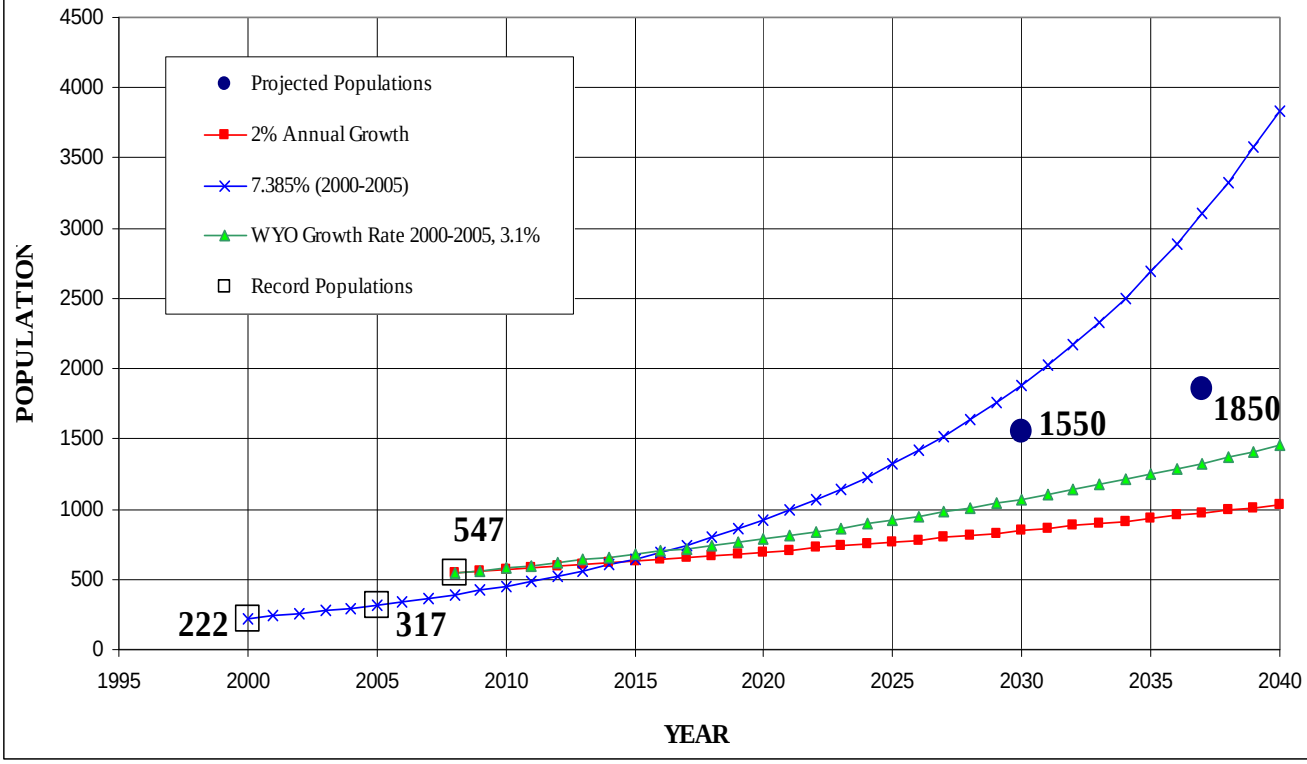


Table 10.3.5 – Demand Summary

	POPULATION	AVERAGE DAY	SUMMER DAY	PEAK DAY	
1 CURRENT CONDITIONS	547	84,238	145,502	249,432	GPD
(BASED ON POPULATION AUGUST 2008)		59	101	173	GPM
2 PROJECTED POPULATION IN 2030	1550	238,700	412,300	706,800	GPD
(BASED ON POPULATION GROWTH EXPERIENCED OVER THE PAST 5 YEARS)		166	286	491	GPM
3 PROJECTED POPULATION FOR CORPORATE BUILD-OUT	1850	284,900	492,100	843,600	GPD
(BASED ON ALL REMAINING UNSUBDIVIDED LAND WITHIN THE CORPORATE LIMITS BEING DEVELOPED)		198	342	586	GPM

AVERAGE ANNUAL DAILY DEMAND	154 GPCD
AVERAGE WINTER DAY DEMAND	93 GPCD
AVERAGE SUMMER DAY DEMAND	266 GPCD
PEAK DAY DEMAND	456 GPCD

GPCD = GALLONS USED PER DAY PER PERSON
GPD = GALLONS PER DAY
GPM = GALLONS PER MINUTE

THESE VALUES ARE ACTUAL DEMANDS EXPERIENCED OVER THE PAST 5 YEARS (2003-2007)

EXISITNG SYSTEM COMPONENTS

The Pine Haven water system consists of three basic areas: Supply, Storage, and Distribution. The components that compromise these three system sectors are discussed below. Figure B-4 displays the existing water system.

Supply

The Town of Pine Haven uses two groundwater sources for their water production. The first groundwater source is the Keyhole No. 1 Well. A Madison formation well, this was the sole water supply for the town until 2002, and now acts as a supplementary water supply source to the Pine Haven No. 2 Well. The Keyhole No. 1 Well was tested at 130 gallons per minute at its completion in 1980. The Pine Haven No. 2 Well, completed in 2002, is the primary groundwater source for the town. Also drawing from the Madison formation, the Pine Haven No. 2 Well was drilled as part of the WWDC's Pine Haven Well – Level II Project. Currently, the Pine Haven No. 2 Well is operated as the lead well and the Keyhole No. 1 Well is operated as the lag well, only used in case of pump failure in the Pine Haven No. 2 Well. The Pine Haven No. 2 Well is currently producing 250 gallons per minute.

System Control & Treatment

The well control and treatment facility is located next to the Pine Haven No. 2 Well. The existing storage tank is approximately 90 feet west of the Pine Haven No. 2 Well. The control building contains all the controls to operate the entire system; automated pump controls for the Pine Haven and Keyhole wells, storage tank level monitoring equipment, and chlorination for treatment for all of the groundwater for the distribution system.

Storage

The existing finished water storage for the Town of Pine Haven is a .25MG storage tank constructed in 1986. The tank is 50 feet tall, 30 feet in diameter and centrally located in the Town of Pine Haven in the direct vicinity of the Pine Haven No. 2 Well with a base elevation of 4275.5 feet. The tank contains a common inflow/outflow pipe. The levels in this tank control the running of the pumps in both wells.

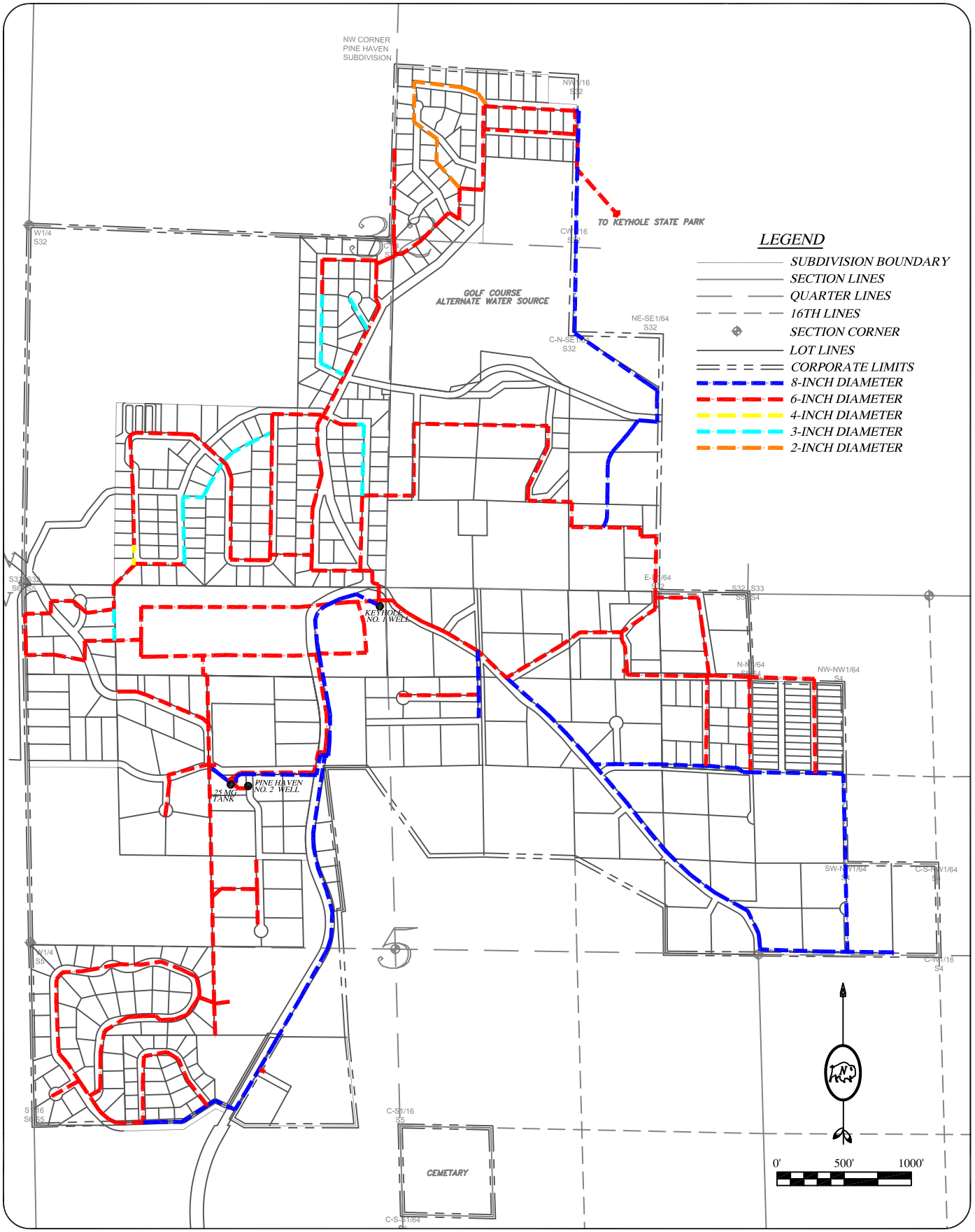
Distribution Piping

The distribution piping in the Pine Haven system contains approximately 58,000 feet (11 miles) of pipe, ranging in size from 3-inch to 8-inch. Due to the fact that the entire water system is fairly new, the majority of the piping system is in good operating condition. The smaller diameter pipes found in the older sections of town are substandard to current distribution regulations. Alternatives for replacement of these lines were addressed in Stetson's Level I Study conducted in 2000, and the progress of these projects are discussed in Section 14.2.

WATER QUALITY

Summary

Both the wells implemented by the Town of Pine Haven withdraw groundwater from the Madison Formation. Madison Formation water tends to be of good quality though it can be high in calcium, magnesium, and bicarbonates. The EPA Region 8 under the Safe Drinking Water Act regulates the water quality in the area of study. Based on all of the water quality data reviewed, the quality of the water meets all primary federal drinking water standards.



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TOWN OF PINE HAVEN
MASTER PLAN
LEVEL 1 STUDY

B-4
CURRENT WATER SYSTEM

Recommendations for Water Sources

To enable early detection of trends or maintenance issues in the wells the following work is recommended:

- Set up and perform standardized regular measurement of the static and pumping levels in both wells.
- Perform a 24-hour pump test of both wells to assess the current condition of the wells

Operation and Maintenance of Water Sources

- Continue water quality monitoring in accordance with EPA requirements with standardized methods and locations to be used when testing, to ensure consistency.
- Additional effort should be made to ensure anti-siphon devices are present where necessary to prevent back flushing of contaminants into the system and to secure the well head of both supply wells.
- The well head of the Keyhole No. 1 Well should be secured.
- The town should make every effort to have unused wells within the town properly abandoned.

WATER RIGHTS

A search of the Wyoming State Engineer's Office (SEO) records was conducted for the legal description of the town limits. Groundwater and surface water rights were researched using the SEO's online water rights database.

Groundwater Rights

The inquiry produced the proofs of appropriation and beneficial use for Keyhole No. 1, Pine Haven No. 2, and an enlargement for Pine Haven No. 2. The town of Pine Haven is allowed to pump a total combined quantity of 88 acre-ft of ground water on an average annual basis and a combined total quantity of no more than 100 acre-feet of ground water in any one calendar year from its water field. Record data for 5 previous years for acre-feet of water used by the town is displayed in the Table 13.1.4 below.

Table 13.1.4 - Record Acre-Feet Groundwater Usage

Year.	Acre-feet
2003	60.1
2004	87.7
2005	76.6
2006	66.3
2007	65.3

The previous 5 years have fallen within the apportioned values, but are very close to exceeding the allotted amount. When applying the average annual daily usage per capita of 154 gpd, discussed above, it is predicted that the current population of 547 people could use on average 94.4 acre-feet per year, which is over the permitted average annual value of 88 acre-feet. The current appropriated water will not be sufficient into the future; it is necessary for the town to apply for an enlargement for the total yearly volume of groundwater that may be used.

Surface Water Rights

The Town of Pine Haven holds no surface water rights. The only surface water rights with in the area searched is held by the United States Department of the Interior Bureau of Reclamation.

WATER ACCOUNTABILITY

In a system of this age, it seems unlikely that leakage would be a concern. The system operator has expressed no knowledge as to any existing leaks in the system. To verify that no abundant water losses were occurring in the town's system, the city requested a system-wide leak survey be conducted. The services of American Leak Detection of Montana were retained to conduct the municipal leak survey. All accessible gate valves, fire hydrants, and curb stops were used to complete the survey. One small leak in a service was found, no other leaks were indicated at this time.

SYSTEM ALTERNATIVES

When analyzing all of the system improvement alternatives, conclusions were drawn and a recommended plan of action was developed.

Storage

The current storage will be adequate through the population of 1039 people estimated from DEQ Standards using the current fire flow rate of 750-gpm referenced from the Insurance Service Office Fire Suppression Rating Schedule. It is recommended that the finished water storage be increased before this critical population. Three storage alternatives are discussed and one alternative is recommended. The new storage tank with a volume of 475,000 gallons located north of town at a higher elevation is the recommended storage alternative. This option will increase the storage capacity to the proposed future storage volume derived from DEQ Standards using the future fire flow rate "goal" of 1500-gpm from the Uniform Fire Code. The addition of this tank will produce the optimal 35-psi working pressures required by the DEQ for all existing lots and proposed areas of development within the corporate limits that are currently unserviceable by the current system due to the .25MG storage tank elevation. Estimated construction costs total $1,362,000.

Based on the demand and population projections discussed earlier, this alternative will satisfy the storage requirement through the project study period as well as corporate build-out.

Supply

The two ground water sources currently utilized by the town of Pine Haven currently produce a sufficient amount of water. Implementing the water usage rates discussed earlier and the DEQ requirements for water source production, the current wells shall be sufficient through the population of 1220 people. The date when this population shall be reached is an approximate at best. Using our population projections it is estimated that this will occur around the year 2023. At this time a new groundwater source must be drilled or the pumps in the existing wells must be upgraded to increase production.

Distribution

The existing distribution system lacks adequate fire protection for all residents in areas where fire hydrants do not exist. The installation on fire hydrants on existing mains in this area is a priority. The remainders of the proposed system alternatives are capital improvements associated with installation of new distribution lines to currently unoccupied lots, tracts or parcels. These improvements will be implemented on an "as needed" basis determined by population growth magnitude and location.

Summary

The following table displays the individual cost estimate values for every proposed improvement alternative.

Table 11.3 – Improvement Cost Estimates

No.	Project Cost Estimate	Improvement Alternative
1	$121,939	Janie's Acres/Pinecrest Subdivision
2	$310,212	Undeveloped Area 2
3	$20,682	Brimmer Subdivision
4	$149,560	Undeveloped Area 4
5	$24,988	Glenn Vista Estates A
6	$36,979	Glenn Vista Estates B
7	$76,027	Pine Hollow Subdivision
8	$192,555	Undeveloped Area 8
9	$559,872	Undeveloped Area 9
10	$73,563	Cemetery Service
11A	$1,361,899	New 475K Tank Addition
11B	$481,902	New 225K Tank Addition
11C	$2,244,897	New Elevated Tank Addition
12	$1,094,191	New Groundwater Source
13	$45,352	Existing Well Pump Upgrade
14	$76,355	Fire Protection on Existing Mains

RECOMMENDED PLAN OF ACTION

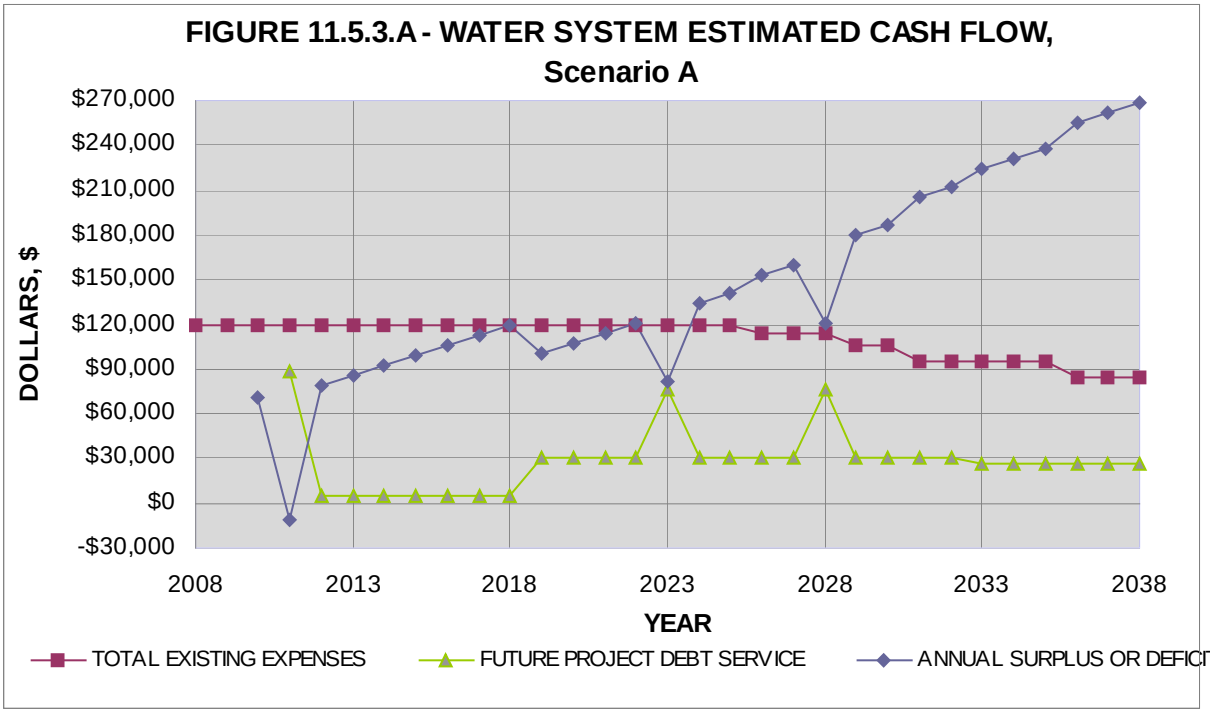
The Recommended Plan of Action includes first the enhancement of fire protection on existing mains where fire hydrants currently do not exist and no fire protection is available (Improvement No. 14). Secondly, the installation of a new 475k water storage tank north of the town of Pine Haven at an increased elevation to provide proper pressures and storage capacity for increased fire protection to the system (Improvement 11A). Finally, the pumps in the Keyhole No. 1 Well and Pine Haven No. 2 Well shall be upgraded at the estimated years of 2023 and 2028, respectively (both, Improvement 13).

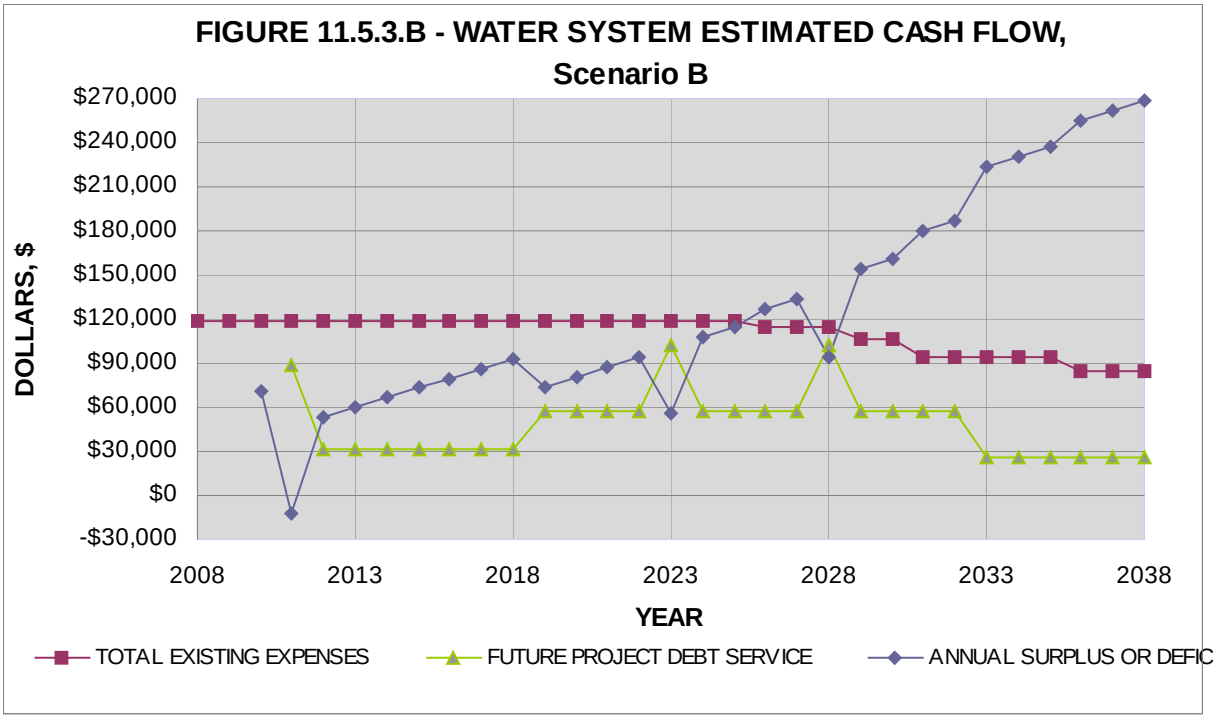
The above plan of action shall be sufficient through the estimated year of 2038, and through the project study period. This plan of action will be sufficient to meet the increased demand for larger population and provide fire protection to all structures in town.

WATER SYSTEM FINANCING

The cash flow analyses below represent two financial scenarios. Both scenarios represent implementing the "Recommended Plan of Action" described in the section above.

The Town of Pine Haven is currently pursuing stimulus funding for a project, Waterline Upgrades Phase II. Scenario A assumes that the stimulus funding in the amount of $414,500.00 for this project is rewarded in the form of a principal forgiveness loan. Due to the fact that this project carries a reasonably large financial burden, it is necessary to assume that the funding that the city is pursuing will not be awarded as well. This is displayed in Scenario B. Figure 11.5.3.A and Figure 11.5.3.B displays the total existing expenses and debt service, the future debt service, and the annual surplus that will be imposed by Scenario A and Scenario B respectively.





The estimates show that a deficit is projected in 2011 as a result of the funding for Waterline Improvements Phase I. This deficit will be covered by the surplus from the preceding year, assuming no major expenditures of the surplus become necessary. The cash flow analyses for both scenarios show that the Pine Haven water system will support the recommended improvements with the chosen population projections. Currently monthly charges and connection fees will cover the existing and proposed system expenses. Periodic adjustments to the monthly charges sand connection fees should be assessed to account for increases in wages, materials, and maintenance.