



EXECUTIVE SUMMARY
ALPINE WATER SUPPLY LEVEL I MASTER PLAN

Wyoming Water Development Commission

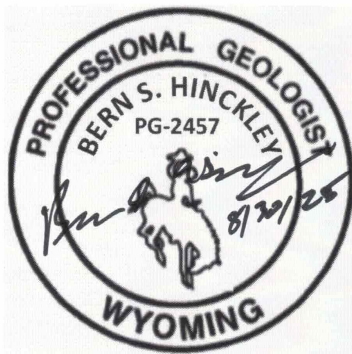
August 2025



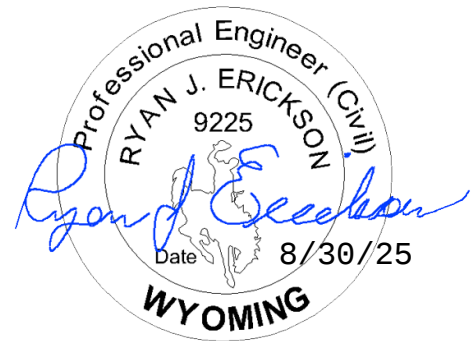


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EXECUTIVE SUMMARY

1.0 INTRODUCTION

The Town of Alpine is an incorporated community at the north end of Lincoln County, Wyoming and is situated at the confluence of the Snake, Greys, and Salt Rivers. As of the 2020 U.S. Census, the Town population had grown to 1,220 people in an area of approximately 0.9 square miles. The Alpine water system was originally constructed for the Alpine Water and Sewer District in the early 1970's, which obtained water from a spring collection system near the Mill Creek area approximately 1 ¼ miles southeast of the Town. Due to variable flows from the springs and a drought in 1977, a well was drilled to provide a more reliable water source and outfitted with a 50 hp pump. A second well with a 40 hp pump was drilled in 1988, and the spring was later removed as a water source.

The Town of Alpine was incorporated in February 1989, at which time the water system and water rights were transferred to the Town. Two storage tanks were installed in 1996 to serve two pressure zones. A third well was drilled in 2008 as part of a WWDC Level II Study.

The Town has annexed numerous parcels into its boundaries over the years, including large developments north of the Snake River. Many of these areas were served by North Star Utility (NSU) for water and sewer. NSU water and sewer facilities were turned over to the Town in 2015, and were then connected across Snake River Bridge to the Town systems. The NSU system included two wells located at the Flying Saddle Resort, along with a 543K gallon storage tank located on US Forest Service (USFS) lands. Various parcels and developments have continued to be annexed, some served by existing water facilities and some not.

A large well located north of the Snake River was purchased by the Town in 2018 in exchange for connection credits and other considerations. Called the "Megawell" due to its apparent large production capability, the well serves two residential areas and is not currently connected to the Town system, although it has piping in close proximity to the former NSU system.

The Wyoming Water Development Commission (WWDC) contracted with Sunrise Engineering in April 2024 to conduct this Alpine Water Supply Level I Master Plan Study. The project sponsor is the Town of Alpine.

2.0 INFORMATION REVIEW

This section is a review of existing information from past relevant studies, other documents available from the sponsor, and Town data (development plans, zoning ordinance, etc.). It also contains a discussion of recommended improvements from previous studies and whether the improvements have been implemented.

Existing information gathered and reviewed during this study include the following documents:

1. WWDC Star Valley Regional Master Plan, Town of Alpine, Water System Investigation and Evaluation – 2009, Sunrise Engineering



2. WWDC Level II – Alpine Master Plan Update – 2009, Rendezvous Engineering
3. WWDC Alpine Junction Water Level I Study – 1995, Sunrise Engineering
4. Town of Alpine Master Plan, 2006
5. Town of Alpine Land Use & Development Code, 2025
6. Lincoln County Land Use Regulations
7. EPA Sanitary Surveys

3.0 INVENTORY AND EVALUATION

Information for the Alpine water system was collected from previous studies and record drawings. Site visits and information obtained from Town representatives were completed to verify and proof the existing mapping and to make an inventory of the system. Major system components were also visited on the ground and evaluated in the field.

Source

The Town of Alpine water system has three well sources as part of the Town water system located just south of the Town boundaries near Greys River Road. In addition, the Town obtained two additional wells located north of the Snake River as part of the purchase of the NSU water system. These wells have not been actively used since the water system connection across the Snake River Bridge was completed. The Town also obtained a well from a developer as part of negotiations regarding the proposed Alpine Lakes development (known colloquially as the Mega Well).

Table 1: Water Source Capacity Compared to Average Day Demand

Source	Permitted Capacity (gpd)	Permitted Capacity (gpm)	Current Production (gpm)
Alpine Well #1 Capacity (largest well, not included)	1,008,000	700	455
+ Alpine Well #2 Capacity	1,008,000	700	445
+ Alpine Well #3 Capacity	936,000	650	361
- Average Daily Demand (2050)	973,000	676	676
Excess Capacity =	971,000 gpd	674 gpm	130 gpm

While the WDEQ requirement to meet average day demand is met (see Table 1), the current water sources are utilized to their capacity during the summer months. During the past two summers, SCADA data show that all three



wells are running 24 hours per day for several days. This indicates that the wells cannot fill the tanks and catch up to demands over that time. Additional source capacity would help alleviate this issue.

A recent water main break in June 2025 illuminated the concern with all three wells being in one location. A source in another location would have allowed for filling of the tanks and supplying water to residents, even if under limited emergency conditions.

Table 2: Water Source + Storage Capacity Compared to Maximum Day Demand

	Permitted Capacity	Current Production
Well Capacity	2,952,000 gpd	1,815,840 gpd
+ Storage capacity	1,295,000 gallons	1,295,000 gallons
- 2 x Maximum daily demand (2050)	2 x 2,308,000 gpd	2 x 2,308,000 gpd
Capacity Deficit =	(980,000 gpd)	(1,505,160 gpd)

Based on this analysis (see Table 2), the system currently has a deficit of combined source and storage through the 25-year planning horizon of this study.

Water Treatment

Chlorination equipment installed in the Control Building adjacent to Alpine Wells #1, #2, and #3 is capable of chlorinating the water produced by those wells. A peristaltic pump injects disinfectant into the pipeline from a tank of sodium hypochlorite. The chlorine injection location is prior to water leaving the Control Building to either storage or the distribution system. Similar facilities are installed in the Megawell wellhouse for that system, consisting of a peristaltic pump to inject sodium hypochlorite into the system.

Transmission & Distribution Lines

The core of the transmission pipeline system consists of 10-, 8-, and 6-inch PVC pipes of varying type and condition running from the wellhouse to storage tanks, and to and through the downtown area. A connection across the Snake River Bridge uses 12-inch diameter ductile iron pipe.

The former NSU water system has a 12-inch PVC pipeline extending down from the storage tank to US Highway 26/89, and extends west to the junction of US Highway 89 and US Highway 26 (Alpine Junction). Other 8-inch PVC pipelines extend to and through Alpine Meadows Subdivision, Snake River Junction Subdivision, and Refuge Subdivision.

The distribution piping in the Town of Alpine system consists of mainly 6-inch piping, with some 8-inch and 4-inch diameter pipes. Many pipelines have been replaced with PVC C-900 pipe as the originally installed pipelines were sometimes constructed with non-municipal grade pipe and were subject to leaks.



Water Storage

Water storage in the Town of Alpine system is located on both sides of the Snake River. The main storage facility is the 500,000-gallon cylindrical reinforced concrete storage tank located just south of the Town on Forest Service property. A 250,000-gallon cylindrical reinforced concrete storage tank is also located south of Town on Forest Service property. The tank is located further up the hill, and water is gravity fed into the upper pressure zone. A 543,000-gallon cylindrical glass-fused-to-steel tank was constructed on the hill north of the Snake River as part of the Alpine Meadows Subdivision and North Star Utility (NSU) water system in approximately 2006. The overflow elevation of this tank was constructed to match that of the 500,000-gallon tank south of the Town in order to be compatible with the Town of Alpine water system.

While some individual WDEQ requirements show that source and storage are adequate, the combined source and storage are not adequate for maximum use days in the summer, which has been verified by the system operator. One reason that the system seems to operate with less capacity is likely the layout of the water system. The majority of the water use takes place south of the Snake River, estimated at 85% based on number of connections. Yet the south side of the river only has 58% of the storage capacity. Further yet, the Upper Tank (250K) is only available to the upper pressure zone, as the PRV valves are closed during typical operations to help protect against emptying tanks during a main break event. This leaves the majority of users to be served by essentially only 500,000 gallons of storage (about 39% of the total available).

Snake River Bridge Crossing

A visual inspection was conducted on the water pipeline crossing the Snake River Bridge using a drone to obtain photos and videos for the entirety of the pipe length. No issues such as damaged casing, damaged pipe, or apparent leaks were identified during the visual inspection, with the 10-year-old facility appearing to be in good shape. Sunrise Engineering also conducted a Heat System Assessment for the heat system installed with the water and sewer lines intended to prevent freezing in the pipes, which appeared to be working as intended.

System Management and Operation

The Town of Alpine is an incorporated municipality that owns and operates the water system along with other infrastructure (sewer system, road system, etc.). The Town has a water department with employees to operate and maintain the water system. Among these employees is the Public Works Director who is a certified operator, as well as other employees working on certification. Billing and bookkeeping are conducted by Town employees including the Public Works Administrator and Clerk/Treasurer. The system appears to be well managed, maintained, and operated.

Since the last master plan study in 2009, large areas in various stages of development north of the Snake River have been annexed into the Town boundaries. Other adjacent areas have also been annexed into the Town along with the major subdivisions. With the connection across the Snake River Bridge, all areas are served by one connected system with the exception of the areas served by the MegaWell. Individual services are metered, however the meters have limited capability for data collection.



GIS

The Town of Alpine does not currently utilize a geographic information system (GIS) for management of the water system. As part of this study, GPS data points were collected for all known valves, hydrants, wells, storage tanks, and so forth. Known information regarding pipes throughout the system was also added. This data will be provided to the Town as a base map for a GIS that can be used to manage the system.

4.0 HYDRAULIC MODEL

Hydraulic modeling was conducted to evaluate the current performance of the Alpine water system and to project future needs through 2050. The analysis was performed using Aquanuity's AquaTwin software, which simulated system behavior under various demand conditions.

Demand Scenarios Assessed:

- Average Day Demand (ADD): Total annual water use is divided by 365 days.
- Maximum Day Demand (MDD): Highest 24-hour water demand during the year.
- Peak Hour Demand (PHD): Highest single-hour demand on the system.

In addition to these scenarios, an Extended Period Simulation (EP) was performed to reflect real-world conditions, particularly during peak summer months when the wells reportedly run 24 hours a day for an extended period. While the system currently meets ADD, MDD, and PHD, the EP simulation identified areas of concern during prolonged high-demand periods, especially during peak summer months.

The model was developed to assess the system's ability to provide safe, reliable drinking water under current and future conditions. It also evaluated water age and fire flow capacity. Modeling followed standards set by the Wyoming Department of Environmental Quality (WDEQ), the Ten States Standards, and best practices from the American Water Works Association (AWWA) M32, 4th Edition.

The future scenario model builds upon the existing system by incorporating the recommended improvements to reflect projected 2050 conditions. These include upsizing pipes, enhanced pump performance, the addition of the Megawell, an extra 500,000 gallons of storage, and anticipated increases in system demand.

5.0 WATER SOURCES

The Alpine municipal water supply currently comes from 3 wells on the south side of Town, Well Nos. 1, 2, and 3. Included in the study are the Flying Saddle Wells No. 1 and 2, and the "Megawell", which are also owned by the Town.

The underlying bedrock carbonates (Mission Canyon and Lodgepole Limestones) have little intrinsic permeability, but are extensively deformed in the Alpine area, creating zones of greatly enhanced permeability. The fracturing



associated with the Grand Valley Fault Zone along the east side of the Alpine area appears to be the reason for dramatically higher well yields. Groundwater production from the Salt Lake Formation is notoriously variable throughout its area of occurrence in western Wyoming. In the Alpine area, however, experience suggests the formation generally contains too much fine-grained material (e.g. a conglomerate in a clay matrix) to be more than minimally productive. In contrast to the local Salt Lake Formation, the overlying alluvial deposits are generally quite permeable.

Based on the materials encountered by the Alpine-area wells, Well Nos. 1, 2, and 3 draw water from the older bedrock, limestone formations, whereas the Megawell is completed in the alluvial deposits associated with the Snake River terrace. With the bedrock Salt Lake Formation at 100 feet beneath the alluvial deposits, the Megawell appears to have encountered a particularly large thickness of productive material, i.e. something of a low spot in the topography upon which the alluvium was deposited.

Conclusions

- Well Nos. 1, 2, and 3 continue to perform well, have access to a deep-seated aquifer with abundant recharge, and should remain the core of the Alpine municipal water system.
- Additional pumping capacity may be available in all three wells at times of high aquifer water levels.
- Wells should be equipped with water-level monitoring equipment to allow flow modulation in response to large seasonal changes in background aquifer water levels.
- The Megawell was completed in a particularly favorable location, i.e. a relatively large thickness of highly-permeable sand and gravel. This makes the well extraordinarily productive (hence the name, “Megawell”).
- 1,200 gpm is recommended as a conservative design rate for the Megawell going forward. This rate would accommodate substantially lower aquifer water levels than have been tested to date and substantial decreases in aquifer transmissivity as sustained production draws upon areas of the aquifer beyond the reach of the testing conducted to date.
- The natural groundwater quality of the Alpine-associated aquifers is excellent.
- The required water-use reporting should be brought up to date to the extent possible, and routine reporting should be established going forward. A program should be instituted to measure and report the required water-level data.
- Alpine should request enlargement of the system-wide cap on groundwater production, both to reflect recent production history and to establish a margin for future growth. (This process has been initiated in association with re-permitting the Megawell as “Alpine Well No. 4”, with a permit flow rate of 2500 gpm, and a system volumetric cap of 1800 ac-ft/yr (TFN 47-3-001). Also, the future use of the Megawell and the Flying Saddle wells will be “municipal”, rather than the present “miscellaneous”.

6.0 GROWTH AND DEMAND PROJECTIONS

The Town of Alpine is an incorporated municipality and a Town in the U.S. Census, with an area of 0.9 square miles. The Town was incorporated in February 1989, and so data for the community has been part of the U.S Census since that time. Annexations to the Town have occurred on occasion, with significant annexations north of the Snake



River since the purchase of the NSU water and sewer systems. Since incorporation, the Town of Alpine has been one of the fastest growing municipalities in Wyoming.

The number of water connections served by the Town of Alpine water system has increased over the years. This has been from infill of lots within the Town and additions through annexations. There are currently 663 connections on the Town system, each with a meter. Per the Sunrise 2009 report, the Town had 413 connections and 400 Equivalent Residential Units (ERUs) taking the varied usage for apartments and commercial units into account. Much of the growth since 2009 involved the purchase of the NSU water system, which served areas north of the Snake River.

When breaking out the original Town area connections (south of the Snake River) and comparing them to past studies, it is apparent that there has been significant growth in that area over the last 15 years. The resulting growth rate was over 15% from 2009 to 2024, which is an average annual growth rate of approximately 1%. This shows that while the bulk of the population growth for the Town of Alpine has been through annexation, growth within the historic Town boundaries has also been strong.

Based on review of population and service connection growth as described above, a community population growth rate of 1.0% will be assumed for the next 25 years. The projected population served by the Alpine system will increase as shown in Table 3. If actual growth rates experienced are higher, then those projected population numbers will be reached sooner.

Table 3: Projected Population and Water Connections Alpine (2020-2050 – 1.0% Growth Rate)

	2025	2030	2040	2050
Alpine System Population	1532	1610	1779	1965
Alpine System Connections	663	697	770	850

Table 4 shows the projected water use at a growth rate of 1%.

Table 4: Estimated Current and Future Water Demand

Period	Current Demand (2025)	Estimated Future Demand (2050)
Average Daily Water Use (gallons/day)	759,000	973,000
Maximum Daily Water Use (gallons/day)	1,800,000	2,308,000

With the demands experienced by the Town over recent years, employing water conservation measures would help to moderate increases in water use.



7.0 RECOMMENDATIONS AND COST ESTIMATES

Based on the analysis presented in this study several alternatives for improvements will be investigated. The Alpine system is lacking in source capacity and/or storage capacity at this time. The transmission system is in need of improvement to connect the Megawell to the system with adequate capacity for transmission of water from this large well. The distribution system has areas with aging pipelines that likely have leak issues. Alternatives are also presented for adding additional storage to the system as dictated by future demand. A project to replace all service and mainline meters is currently underway, with completion expected later this year. Because of this, no meter replacements are included in the examined alternatives. The estimated project costs are summarized in Table 5.

Table 5: Estimated Project Costs

Improvement 1	Connection to Megawell Water System	\$405,000
Improvement 2	Increase Megawell Production	\$1,830,000
Improvement 3	Additional 500K Gallon Storage Tank	\$1,610,000
Improvement 4	Alpine Wellhouse Improvements	\$255,000
Improvement 7	Upgrade Pipe to Lower Tank	\$245,000

8.0 WATER SYSTEM FINANCING

System Finances

The Town of Alpine water system serves connections inside and outside of Town boundaries. Rates for connections within the Town are set by the Town Council. Rates for the Alpine Utility District are also set by the Council, but must be approved by the Wyoming Public Service Commission through their extensive process.

In April 2025, the Town Council passed an ordinance to prohibit additional water connections outside of Town boundaries. Nearly all of the areas originally serviced by the NSU system have been annexed into the Town; essentially the only served area outside of Town boundaries is The Refuge development at the Alpine Airpark, of which roughly 2/3 of the lots have been developed.

Current rates are close to Wyoming statewide averages per the 2022 Public Water System Survey Report produced by the Wyoming Water Development Commission. The average monthly water bill for Alpine is approximately \$65. For a monthly use of 5,000 gallons, the bill would amount to \$41; for 10,000 gallons would be \$51; and for 20,000 gallons would be \$71. Use of increasing block rate billing could provide more revenue while promoting water conservation.

The following is a summary of the Town's water system income and expenses:



- The water fund is self-supporting. Over the last five years income has exceeded expenses except for one year in which capital expenses occurred.
- Expenses have increased over the last five years, and income has also increased.
- The water fund has reserve accounts for emergencies and future capital projects. It appears that the account balances have been relatively stable.
- Existing debt payments are manageable and will be paid off in the next six years.

The Town has expressed a desire to raise connection fees in the near future to cover demands to a growing system and to ensure payment for connection materials.

Project Funding Scenarios

This study will review three funding scenarios for the Alternatives and Phases identified in Section 7. The scenarios are:

1. No State or Federal Funding Assistance.
2. WWDC funding for 50% grant 50% loan for eligible costs. All other costs by loan from other sources.
3. WWDC funding for 50% grant eligible costs. All other costs from one of the following:
 - a. Wyoming Drinking Water State Revolving Fund Program (DWSRF)
 - b. USDA Rural Utilities Series (RUS)

A table showing each scenario for each improvement, along with the potential debt service and affect to user rates are included in the study.

9.0 CONCLUSIONS

Maintenance

The Town of Alpine water system is in good condition. The main system was constructed in the 1970's to 1990's and has seen a number of pipeline replacements over the last 30 years. Some of the existing components currently need repair and replacement. The Town should plan and budget to continue with pipeline replacements, repairs at the wells and wellhouses, and replace cathodic protection and seals at the NSU Tank.

Source

The water sources are in good condition with good water quality but are operating under full capacity. The current system configuration is utilizing the three Alpine wells on the south side of the Snake River to serve users on both sides. The Flying Saddle wells are currently not operational. The Megawell currently only serves a limited area. While there is some redundancy in source for the system, improvements could strengthen the source situation.

Storage



The Alpine water system has nearly 1.3 million gallons of storage serving two pressure zones and on both sides of the Snake River. Based on analysis in this study, additional storage would help operations during maximum day demands in the summer, particularly south of the Snake River in the lower pressure zone where the majority of the demand is seen.

Transmission

The Alpine system has transmission lines from the wellhouse to the storage tanks that are currently 8-inch diameter, which is smaller than ideal under current conditions and will present a larger bottleneck as the wells are brought to full capacity. Transmission lines extending from the wellhouse and tanks into the center of Town are acceptable as there is a network of pipelines allowing for multiple flow paths. Fire flow capacity is acceptable throughout the service area assuming typical residential use fire flow requirements.

Transmission lines north of the Snake River are acceptable under current conditions. When the Megawell is added to the system and the pump enlarged to produce 1,200 gpm, there will be bottlenecks in the piping between the well and the storage tank. Fire flow capacity is acceptable throughout the service area assuming typical residential use fire flow requirements.

Water Losses

Water loss in the Alpine system is suspected due to water at the service meters accounting for much less than the calculated water that is being produced by the wells and delivered to the tanks. Soils in the service area are very rocky and coarse, which would allow significant leaks to continue undetected from the surface. It is unknown where water may be leaking and lost, and further investigation is needed to determine locations of leaks.

Finances

Water rates, income and expenses of the Alpine system were reviewed as part of this report. The Town's water income is greater than the expenses and the system actively maintains and builds a reserve. The system has two Drinking Water SRF loans that will be paid off in 2031 and a local loan that will be paid off in 2026. The additional available budget should be used for making needed repairs to some of the aging infrastructure in the system.

