

HILDALE CITY & TOWN OF COLORADO CITY CULINARY WATER MASTER PLAN UPDATE

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DRAFT

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I. INTRODUCTION

Hildale City is located along Highway 59 in Washington County in southwestern Utah. The Town of Colorado City is neighboring Hildale, just across the border in Mohave County, Arizona. The water system is shared and funded by both communities (city) and is operated and maintained by the Hildale & Colorado City Utility Department (HCCUD) through an Inter-Governmental Agreement (IGA) with Colorado City. This plan was created with coordination from staff from Hildale City, the Town of Colorado City and the HCCUD.

Hildale City completed a previous Culinary Water Master Plan Update in 2020, which was an update to their 2014 plan. Hildale City has contracted with Sunrise Engineering to complete an update to the 2020 plan. While this is a shorter window between plans than is typical, the city has recognized that conditions and future projections have changed significantly in that short time period. The intent of this update is to account for these changes.

The culinary water system has been analyzed under the State of Utah Division of Drinking Water guidelines to determine the current system status and to evaluate possible system needs as the community grows during the next 20 years. As part of this plan, Sunrise Engineering, Inc. has included recommended improvements to the culinary water system and has developed a potential financing plan that will help Hildale City and the Town of Colorado City obtain the necessary funds for the recommended improvements.

This plan also serves as the Impact Fee Facilities Plan for Hildale City and includes an Impact Fee Analysis. This plan also serves as the Infrastructure Improvements Plan for the Town of Colorado City.

This report does not analyze water rights or a secondary water system. This plan also does not include a user rate analysis.

II. SYSTEM USERS' ANALYSIS

A. LENGTH OF PLANNING PERIOD

It is typical for a master plan to use a 10 or 20-year planning period. The first year of a 10-year planning period would be the calendar year 2024 with the 10th and final year being 2033. This plan will use fiscal years and will assume a 20-year (2024-2043) planning period for recommended improvements. This period will allow an adequate evaluation of the system for potential infrastructure improvements or other needs. Revenue sources should be carefully evaluated each year as budgets are set by the city and town council.

B. PROJECTED GROWTH RATE

An important element in the development of the water system and capacity analysis is the projection of the city's population growth rate on an annual basis. This projection gives the planner an idea of the potential future demands on the culinary water system for the length of the planning period.

Projecting the number of future culinary water connections can be a subjective process. The most effective method of estimating the number of future connections is by analyzing past historical numbers of connections and census records. Because Hildale and Colorado City utilize the same water system, the census records and past numbers of connections of both Hildale and Colorado City were included in the analysis. In the past five years the communities have seen a fluctuation of positive and negative growth rates. Due to this fluctuation, analyzing the historical growth rates is an inaccurate method of predicting future growth for these communities. Figure II-1 below shows the historic population in both communities.

Figure II-1: Historic Population

Calendar Year	Hildale Population	Colorado City Population	Total Population	Est. Growth Rate	Number of Connections
2018	2,916	4,825	7,741	0.21%	863
2019	2,910	4,836	7,746	0.06%	763
2020	2,727	4,531	7,258	-6.30%	799
2021	2,825	4,694	7,519	3.60%	855
2022	2,931	4,871	7,802	3.76%	1,113

At the time of the previous plan, the communities anticipated minimal to no growth for the first few years of the planning window. However, in the past few years the communities have seen a significant increase in number of connections, and there are multiple new developments that are in various stages of construction and planning that are anticipated to come to each community in the planning window. Development is anticipated to continue at a relatively high rate for the length of the planning window. This abrupt change in growth is one of the main reasons the city is updating their culinary water master plan after only a few years.

Staff and elected officials from both communities looked at the upcoming developments in different stages of the approval process to determine a realistic number of anticipated new connections in future years. The number of anticipated new connections was used to determine a growth rate. In the discussions with staff from each community, it was determined that based on the expected timeline of new developments, a higher than typical growth rate will be assumed over the 20-year planning period. The following growth rates were used for this study:

- 2024-2028 (first 5 years) – 10% per year
- 2029-2033 (second 5 years) – 12% per year
- 2034-2038 (third 5 years) – 10% per year
- 2039-2043 (last 5 years) – 8% per year

C. PROJECTED POPULATION & NUMBER OF CONNECTIONS

Based on the forecasted growth rates referenced above, the number of connections the city will need to plan for can be calculated with the compound interest formula shown below.

$$F = P(1 + i)^N$$

F = Future Population P = Present Population

i = Projected Growth Rate N = Years

This equation was used to project the community population and number of connections for each year in the planning period. Figure II-2 below shows a summary of the growth rate analysis. Appendix A shows the full analysis.

Figure II-2: Growth Rate Analysis Summary

Calendar Year	Est. Growth Rate	Hildale Population	Colorado City Population	Total Population	Hildale Connections	Colorado City Connections	Total Connections
2023		3,224	5,358	8,582	435	790	1,224
2024	10.0%	3,547	5,894	9,440	478	869	1,347
2025	10.0%	3,901	6,483	10,384	526	956	1,481
2026	10.0%	4,291	7,132	11,423	578	1,051	1,630
2027	10.0%	4,720	7,845	12,565	636	1,156	1,792
2028	10.0%	5,192	8,629	13,822	700	1,272	1,972
2029	12.0%	5,816	9,665	15,480	784	1,425	2,208
2030	12.0%	6,513	10,825	17,338	878	1,596	2,473
2031	12.0%	7,295	12,124	19,419	983	1,787	2,770
2032	12.0%	8,170	13,578	21,749	1,101	2,001	3,103
2033	12.0%	9,151	15,208	24,359	1,233	2,242	3,475
2034	10.0%	10,066	16,729	26,794	1,357	2,466	3,822
2035	10.0%	11,073	18,401	29,474	1,492	2,712	4,205
2036	10.0%	12,180	20,241	32,421	1,641	2,984	4,625
2037	10.0%	13,398	22,266	35,663	1,806	3,282	5,088
2038	10.0%	14,738	24,492	39,230	1,986	3,610	5,596
2039	8.0%	15,917	26,452	42,368	2,145	3,899	6,044
2040	8.0%	17,190	28,568	45,758	2,317	4,211	6,528
2041	8.0%	18,565	30,853	49,418	2,502	4,548	7,050
2042	8.0%	20,050	33,321	53,372	2,702	4,912	7,614
2043	8.0%	21,654	35,987	57,641	2,918	5,305	8,223

It is important to understand that projected growth rates are not the cornerstone of this plan. If the number of system connections projected is reached earlier or later than anticipated, future improvements to support growth may come either earlier or later.

D. PROJECTED EQUIVALENT RESIDENTIAL UNITS (ERU)

The water system is made up of multiple connection types. Hildale City and the Town of Colorado City report their different connections to the state as either residential, commercial, industrial, or institutional. Figure II-3 shows a summary of the number of connections by type.

Figure II-3: Total Number of Units Per Connection Type

Year	Residential	Commercial	Industrial	Institutional	Total
2018	730	72	24	37	863
2019	667	66	18	12	763
2020	695	70	20	14	799
2021	742	75	23	15	855
2022	939	98	28	48	1,113
2023	1,033	108	31	53	1,225

Each of these different connection types use different amounts of water at different flow rates. To properly analyze the systems usage, the number of connections is converted to equivalent residential units (ERU). This is done by taking the usage per connection of each connection type and dividing by the usage per connection of the average residential connection. Figure II-4 and Figure II-5 show the number of ERUs per connection type and the total number of ERUs. This plan will use the number of ERUs instead of the number of connections.

Figure II-4: ERUs Per Connection Type

Residential	Commercial	Industrial	Institutional
1.0	1.4	1.1	1.7

Figure II-5: Total Number of ERUs Per Connection Type

Year	Residential	Commercial	Industrial	Institutional	Total
2018	730	71	14	33	848
2019	667	90	23	26	806
2020	695	114	14	32	855
2021	742	109	22	51	924
2022	939	142	32	82	1,195
2023	1,033	156	35	90	1,314

Applying the growth rates that were established in Figure II-2 to the number of ERUs, the projected number of ERUs can be found for the end of the planning period.

Figure II-6: Projected Number of ERUs

Calendar Year	Hildale ERUs	Colorado City ERUs	Total ERU
2023	468	847	1,315
2024	515	931	1,446
2025	566	1,024	1,591
2026	623	1,127	1,750
2027	685	1,239	1,925
2028	754	1,363	2,117
2029	844	1,527	2,371
2030	945	1,710	2,656
2031	1,059	1,915	2,974
2032	1,186	2,145	3,331
2033	1,328	2,403	3,731
2034	1,461	2,643	4,104
2035	1,607	2,907	4,514
2036	1,768	3,198	4,966
2037	1,945	3,518	5,462
2038	2,139	3,870	6,009
2039	2,310	4,179	6,489
2040	2,495	4,513	7,008
2041	2,695	4,875	7,569
2042	2,910	5,265	8,175
2043	3,143	5,686	8,829

E. AVERAGE CULINARY WATER USAGE

The State of Utah Public Drinking Water regulations require public water systems to meet requirements based upon usage. These requirements are found in the State Code R309. The code provides a standard usage based upon the types of connections serviced in a system. For a standard residential connection, the code says to assume an average daily usage of 400 gallons per day (gpd) per ERU. Historical usage data was provided by the HCCUD and that usage was compared against the 400 gpd to check if it would adequately represent the usage in the city's system.

The historical usage from the city was from meter data over the past 5 years (2018-2022). To check against the usage indicated in the State's Code R309, the average usage per ERU was calculated from the historical usage. The total average usage over the past 5 years was divided by the average number of ERUs and then converted to gpd/ERU as shown in the calculations below.

$$285,751,000 \text{ gallons} / 926 \text{ ERU} = \mathbf{308,920 \text{ gallon/ERU/year}}$$

$$308,920 \text{ gallon/ERU/year} / 365 \text{ days/year} = \mathbf{846 \text{ gpd/ERU}}$$

Figure II-7 shows a summary of the average usage and historical data that is explained above.

Figure II-7: Hildale & Colorado City Historical Usage Summary

Year	Total Usage (Thousand Gallons)	Number of Connections	Usage per Conn (gpd/conn)	Number of ERUs	Usage per ERU (gpd/ERU)
2018	303,105	863	962	848	979
2019	251,780	763	904	806	856
2020	285,109	799	978	855	914
2021	279,736	855	896	924	829
2022	309,026	1,113	761	1,195	708
5-Year Avg:	285,751	879	900	925	846

The 846 gpd/ERU average usage calculated from the city's historical usage is significantly higher than the usage that is indicated for use in the state code. This is because the average household size in the communities of Hildale City and Colorado City is larger than the average household size in the rest of the state. Because of the larger usage per ERU, this plan will determine usage demand based on the historical usage instead of the numbers from the state code. This method will result in a more realistic analysis and is the more conservative of the two methods.

The calculations in this report will be based on the historical average usage of **846 gpd/ERU** (0.59 gpm/ERU). It is recommended that future improvements be sized based on this average usage.

F. PEAK DAY DEMAND CULINARY WATER USAGE

Peak Day Demand (PDD) is defined by the Utah Administrative Code as the “anticipated water demand on the day of the highest water consumption”. The state code uses 800 gpd/ERU for a peak day demand of a standard residential unit which is twice the average day demand. Therefore, it can be assumed that the PDD for this plan is double the 846 gpd/ERU average demand calculated above. Doubling the average usage results in a peak demand of **1,692 gpd/ERU** (1.17 gpm/ERU).

G. PEAK INSTANTANEOUS DEMAND CULINARY WATER USAGE

Peak Instantaneous Demand (PID) can be described as the highest demand at any one instance in the system. This can be determined based on hourly usage if such data is available. Where hourly usage data does not exist, which is the case of this study, the State Code uses the following method to calculate the PID:

Indoor Usage:

$$Q_{peak\ indoor} = 10.8 \times N^{0.64}$$

Where N is the number of connections and Q is the flow in gpm

Outdoor Usage:

$$Q_{peak\ outdoor} = N \times Irr. \text{ Acreage} \times Demand\ Factor$$

Where N is the number of connections, Irr. Acreage is the average area that is irrigated throughout the system and the Demand Factor is based on the zone given in Table 510-7 of R309-510 of the Utah Administrative Code.

This calculation results in a PID of **2,446 gpm** for the year 2024. It's important to note that the formula does not take into account the average household size, only the number of connections. The PID is expected to go down as the average household size decreases.

H. CONSERVATION

This plan assumes a conservation rate of 0.5% per year over the planning period. This conservation factor is used to represent any conservation efforts from the city, existing connections, or new connections. This rate also takes into account the decrease in average household size that the communities are currently experiencing. This conservation results in the following demands at the end of the planning window.

- ADD (2043) = 766 gpd/ERU
- PDD (2043) = 1,531 gpd/ERU

The conservation factor is not used for the PID. As mentioned above, the PID is the highest demand on the system at any given moment. Conservation efforts do not have a major impact on the amount of water that could be used at any given moment.

III. WATER SOURCE CAPACITY ANALYSIS

A. EXISTING WATER SOURCE

To analyze source capacity, all available culinary water sources must first be identified. These sources are listed in Figure III-1. The flow capacity numbers were acquired from the HCCUD.

Figure III-1: Hildale and Colorado City Existing Water Sources

Name/#	Flow (CFS)	Flow (gpm)
Wells		
4	0.265	119
8	0.134	60
10	0.189	85
11	0.178	80
17*	0.223	100
19	0.223	100
21	0.446	200
22	0.223	100
24	0.178	80
Academy	0.512	230
Power Plant**	0.000	0
Subtotal	2.571	1154
Springs		
Jans Canyon	0.036	16
Maxwell Canyon	0.143	64
Subtotal	0.178	80
Total Source	2.750	1234

*Well 17 is currently being refurbished and is anticipated to produce 100 gpm once it is finished.

**Power Plant Well can produce 244 gpm but is currently not plumbed to the treatment plant so it is unavailable and not counted as a source.

Listed spring flows are relatively constant. These springs were developed from a horizontal bore into the Navajo sandstone formation. The springs are currently used for Maxwell Park and a fill station. With the springs being used for these non-culinary uses the culinary system does not realize the full 80 gpm associated with the springs. These uses are unmetered, so it is not known what percentage of the spring water goes into the culinary water system.

B. EXISTING REQUIRED WATER SOURCE CAPACITY

The Utah State Code R309-510-7 states that a water system's source needs to meet "the anticipated water demands on the day of the highest water consumption which is the Peak Day Demand". The PDD was determined Section II.F as 1,692 gpd/ERU. The source capacity demand for the water system was calculated by multiplying the PDD from Section II.F by the total number of ERUs existing in the system. The results of the analysis are presented in gallons per minute. The results of this analysis are shown in Figure III-2 and the calculation is shown in Appendix B.

Figure III-2: Required Source Capacity (Existing Conditions)

Total Required Source Capacity	1,700 gpm
Total Existing Source Available	1,234 gpm
Existing Source Capacity Deficit	-466 gpm

C. PROJECTED REQUIRED WATER SOURCE CAPACITY

The projected culinary water source capacity required at the end of the planning period is determined from the same factors explained in Section III.B, but the projected number of ERUs is inserted into the calculations instead of the number of existing ERUs. The results of the analysis are shown below in Figure III-3, Figure III-4, and Figure III-5.

Figure III-3: Required Source Capacity (5-year Planning Period)

Total Required Source Capacity	2,440 gpm
Total Existing Source Available	1,234 gpm
Existing Source Capacity Deficit	-1,206 gpm

Figure III-4: Required Source Capacity (10-Year Planning Period)

Total Required Source Capacity	4,190 gpm
Total Existing Source Available	1,234 gpm
Existing Source Capacity Deficit	-2,956 gpm

Figure III-5: Required Source Capacity (20-Year Planning Period)

Total Required Source Capacity	9,397 gpm
Total Existing Source Available	1,234 gpm
Existing Source Capacity Deficit	-8,163 gpm

D. RECOMMENDED WATER SOURCE CAPACITY IMPROVEMENTS

The analysis above shows that the existing available source is not sufficient to accommodate a peak day demand. The historical experience has been that during peak summer months with the system running at full capacity, the city is unable to provide enough water. Without being able to provide enough water to meet system demand the water levels in the storage tanks gradually drop during summer months affecting available fire flow and water pressures. This has caused both communities to enact water restrictions during summer months for the last several years.

Significant source availability improvements are needed now as well as in upcoming years. Hildale City and the Town of Colorado City have performed multiple studies over the years looking at different ways to improve the quantity and quality of available source. These studies, as well as this plan, provided several recommended improvements. This plan incorporates the recommendations from these studies. However, these improvements do not provide enough sources to cover the required source capacity in the planning windows.

In order to increase the available source to meet the projected required source capacity, this plan assumes that a significant number of new wells will need to be drilled. In addition to the recommended improvements from previous studies, this plan recommends additional well fields to be installed at the 0–5-year, 6-10-year, and 11-20-year windows. These well fields are included in the recommendations as 6 single projects with one well field for each community in each of the planning windows. The following assumptions were used in calculating the number of needed wells:

- Each well has a flow of 120 gpm, the average flow of all existing wells.
- The required flow for each planning window's well field is equivalent to the source deficit at the end of each planning period.
- The number of wells required was found by taking the total required flow divided by the average flow per well, then multiplied by the respective percentage to split the number of wells between the two states.

It is recommended that a well siting study be performed to identify the best possible locations to drill new wells. Because locations are not specified for these additional wells, the wells are not shown in the recommended improvements map in Appendix D.

1. 1 TO 5 YEAR IMPROVEMENTS

- Treatment Plant Wells – The quickest available option to help increase source capacity is to drill two additional wells on the Arizona side of the system, one shallow well and one deep well. This portion of Arizona is an open basin and does not require obtaining water rights to drill and use a well. The city is currently working on a study to evaluate the locations of these two wells. The preliminary idea is to drill the wells near the treatment plant. Based on the output of existing wells, it is anticipated that these wells will produce roughly 80 gpm for the shallow well and 120 gpm for the deep well. The well study will help refine these estimated flows.
- 5-Year Arizona Well Field – It is anticipated that this project will comprise of 7 wells producing the needed total of 840 gpm.
- 5-Year Utah Well Field – It is anticipated that this project will comprise of 7 wells producing the needed total of 840 gpm and will require corresponding water rights.

2. 6 TO 10 YEAR IMPROVEMENTS

- 10-Year Arizona Well Field - It is anticipated that this project will comprise of 8 wells producing the needed total of 960 gpm.

- 10-Year Utah Well Field - It is anticipated that this project will comprise of 8 wells producing the needed total of 960 gpm and will require corresponding water rights.

3. 11 TO 20 YEAR IMPROVEMENTS

- Trailhead Well 1 – The city is looking at drilling additional wells in the nearby canyons to the northeast. The water from these canyons would be obtained from different geologic formations than their current wells. The hope is that the water quality is similar to the Jans Canyon and Maxwell Canyon springs. Trailhead Well 1 would be located on city owned property near the Squirrel Canyon Trailhead. This well would provide additional source to the city but primarily will act as a test to determine potential quantity and quality of water. It is estimated that this well could produce 175 gpm. These wells are in Utah and will require water rights to drill and use the well. The city currently has water rights that can apply for a water rights transfer to the location of the proposed well.
- Trailhead Well 2- If the Trailhead Well 1 proves to be a successful route for obtaining additional source, it is recommended that the city continue to pursue this source with an additional well on the city owned land next to the Squirrel Canyon Trailhead. This well and all future wells up the canyon will require obtaining additional water rights. This well is also estimated to produce 175 gpm.
- Hildale Groundwater Project Phase I - If the Trailhead Wells are successful at producing good quality water, this plan recommends that additional wells be drilled in the area northeast of Hildale. These wells would be located on Bureau of Land Management (BLM) property and would require environmental studies and going through BLM's process (such as a SF299 application and Plan of Development) for obtaining right-of-way on BLM land. The city has already begun working through this process with the help of the Washington County Water Conservancy District. Based on the best available information that the city has, it is estimated that this project would produce roughly 350 gpm. The exact location of these wells will be determined through coordination with the city and BLM.
- Hildale Groundwater Project Phase II- This phase involves drilling two additional wells in different location than Phase I but in the same general BLM owned area. Phase II would require the same BLM process and need for additional water rights. This phase is also estimated to produce roughly 350 gpm.
- Hildale Groundwater Project Phase III – This phase is similar to the first two and involves additional wells in the BLM owned area Northeast of Hildale. It is estimated that this phase will produce 175 gpm.
- 20-Year Arizona Well Field - It is anticipated that this project will comprise of 14 wells producing the needed total of 1,680 gpm.
- 20-year Utah Well Field - It is anticipated that this project will comprise of 14 wells producing the needed total of 1,680 gpm and will require corresponding water rights.

These recommended improvements are summarized in Figure III-6. The projects with identified locations are shown in the Recommended Improvements exhibit in Appendix D.

Figure III-6: Summary of Recommended Source Improvements

Name/#	Flow (CFS)	Flow (gpm)	Est. Year Installed
Wells			
Treatment Plan Shallow	0.178	80	2024
Treatment Plant Deep	0.267	120	2024
1-5 Year AZ Well Field	1.872	840	2026
1-5 Year UT Well Field	1.872	840	2026
6-10 Year AZ Well Field	2.139	960	2033
6-10 Year UT Well Field	2.139	960	2033
Trailhead Well 1	0.390	175	2034
Trailhead Well 2	0.390	175	2034
Hildale Groundwater Project PH I	0.780	350	2035
Hildale Groundwater Project PH II	0.780	350	2036
11-20 Year AZ Well Field	3.743	1,680	2039
11-20 Year UT Well Field	3.743	1,680	2039
Hildale Groundwater Project PH III	0.390	175	2040
Total Projected New Source	18.683	8,385	

The estimated schedule for the recommended improvements is based on projected growth and the anticipated project priority. It is recommended that the early projects be pushed forward as much as possible as funding options become available.

E. SOURCE CAPACITY SUMMARY

Figure III-7 and Figure III-8 show the comparison between the available source capacity and the projected required source capacity. The available source capacity in Figure III-8 represents the source capacity available with the implementation of the recommended improvements including the various new wells required in each planning window.

Figure III-7: Projected Source Capacity with Existing Conditions

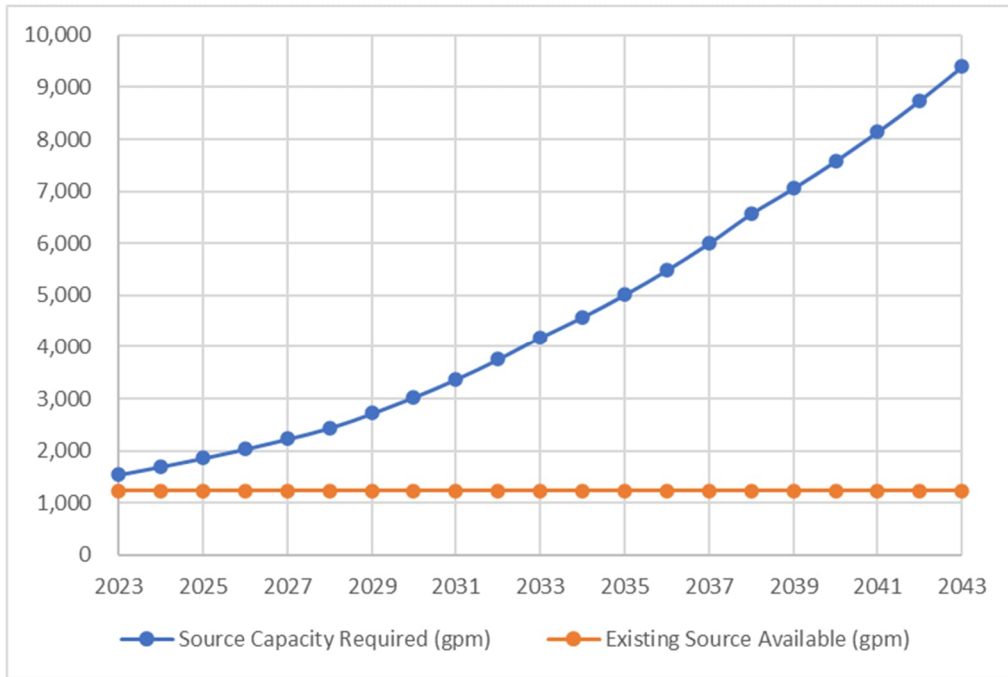
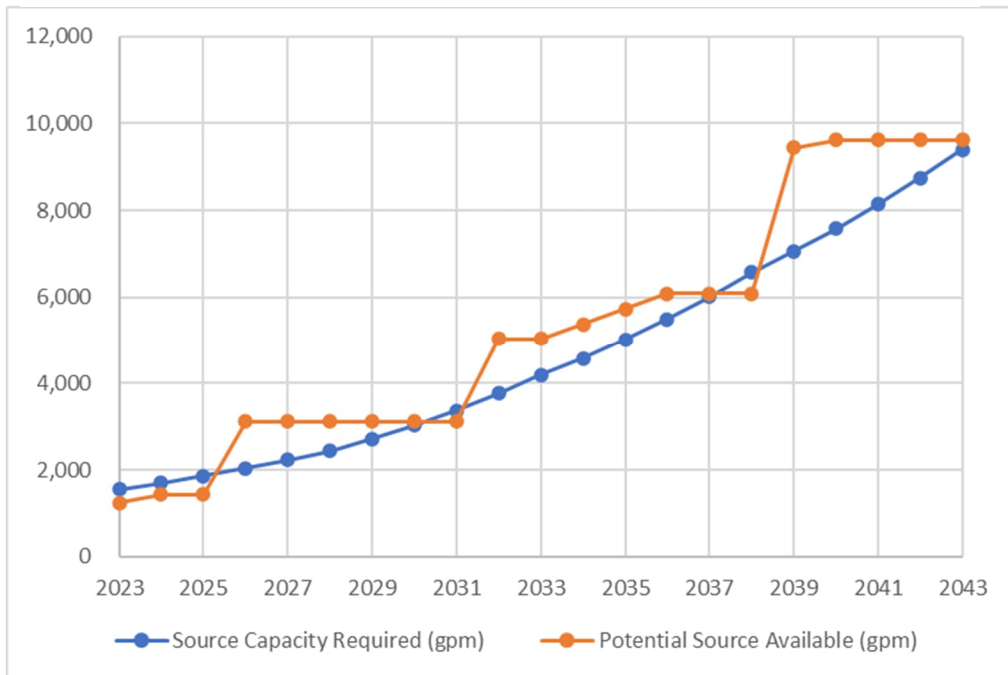


Figure III-8: Projected Source Capacity with Recommended Improvements



IV. WATER STORAGE CAPACITY ANALYSIS

Water storage capacity requirements are found in the State of Utah Public Drinking Water Regulations, R309-510. These regulations require storage for the community's culinary water system to meet one full day's average use requirement for all connections in the community in addition to fire flows for a minimum of two hours.

A. EXISTING WATER STORAGE CAPACITY

There are currently four existing water storage tanks. These tanks are identified in Figure IV-1 below. The Saddle Tank is higher than the other three, and it receives water from the springs. The outlet to the Saddle Tank is near the top of the tank allowing unpressurized outflow. In an emergency, there is a valve that can be opened to utilize the storage in the tank. The other three tanks all have the same high-water elevation and receive water from the wells through the treatment plant.

Figure IV-1: Storage Capacity Summary

Existing Tank	Available Storage (gal)
Saddle Tank	60,000
800,000 Gallon Tank	800,000
600,000 Gallon Tank	600,000
Elm Street Tank	1,000,000
Total Existing Storage Capacity	2,460,000

B. EXISTING REQUIRED WATER STORAGE CAPACITY

As shown in Section II-E, average water usage per ERU also known as the Average Day Demand (ADD) in the water system is 846 gpd/ERU. In general, fire flow requirements are set by the local Fire Authority or are based on building size and type of construction. This plan uses the same minimum fire flow as the previous plans of 1,500 gpm.

The required storage capacity was calculated by multiplying the ADD by the total number of ERUs currently existing in the system and adding the required fire flow of 1,500 gpm for 2 hours. When compared with the system's total storage capacity summarized above, the calculation shows that the city has surplus total storage capacity under current conditions. The results of this analysis are shown in Figure IV-2.

Figure IV-2: Required Storage Capacity (Existing Conditions)

Total Required Storage Capacity	1,404,162 gal
Total Existing Storage Available	2,460,000 gal
Existing Storage Capacity Surplus	1,055,838 gal

C. PROJECTED REQUIRED WATER STORAGE CAPACITY

The projected culinary water storage capacity required at the end of the planning period is determined from the same factors explained in Section IV.B, but the projected number of ERUs is inserted into the calculations instead of the number of existing ERUs. The results of the analysis are shown below in Figure IV-4 and Figure IV-5.

Figure IV-3: Required Storage Capacity (5-Year Planning Window)

Total Required Storage Capacity	1,756,821 gal
Total Existing Storage Available	2,460,000 gal
Existing Storage Capacity Surplus	703,179 gal

Figure IV-4: Required Storage Capacity (10-Year Planning Window)

Total Required Storage Capacity	3,196,811 gal
Total Existing Storage Available	2,460,000 gal
Existing Storage Capacity Deficit	-736,811 gal

Figure IV-5: Required Storage Capacity (20-Year Planning Window)

Total Required Storage Capacity	6,945,872 gal
Total Existing Storage Available	2,460,000 gal
Existing Storage Capacity Deficit	-4,485,872 gal

The current storage capacity is not able to provide enough water for the 10- and 20-year windows. Therefore, improvements will be required in the future.

D. STORAGE CAPACITY CHALLENGES

The storage capacity analysis results show that the city has adequate storage for their current needs. However, with the growth the city is expecting, the required storage will surpass the currently available storage capacity. In addition, there are still some concerns and shortcomings with the existing storage facilities.

- During summer months water operators have expressed concerns that because they are barely able to meet system demands with the wells during the day, and are not able to keep the tanks full. Therefore, the system does not have the full available storage shown in the calculation above.
- The water system consists of a single pressure zone. There are multiple areas around the system within each of the community's limits that are at an elevation higher than the existing tanks can serve and still meet pressure requirements.

E. RECOMMENDED WATER STORAGE CAPACITY IMPROVEMENTS

Improvements need to be made to provide storage for the projected growth. An analysis was done to determine the location of the ERUs at the end of the planning period based on the available information regarding upcoming development mentioned in Section II.B. The system was divided into six regions and the total projected ERUs were placed in their corresponding region. This resulted in the following total projected ERUs per region:

- Northeast: 251 ERUs
- Northwest: 5,305 ERUs
- Central East: 376 ERUs
- Central West: 345 ERUs
- Southeast: 1,630 ERUs
- Southwest: 327 ERUs

The results of this analysis was used to determine the location and size of the recommended storage improvements. Using the minimum sizing requirement of 846 gpd/ERU a storage requirement was calculated for each region. This results in the following approximate storage required for each region:

- Northeast: 215,000 Gallons
- Northwest: 4,500,000 Gallons
- Central East: 320,000 Gallons
- Central West: 300,000 Gallons
- Southeast: 1,400,000 Gallons
- Southwest: 280,000 Gallons

The areas that require the most storage is the Northwest and Southeast. The existing tanks are able to provide the storage required for the other four regions. To reach the required storage the system needs storage in the following locations:

- Northwest: 4,000,000 Gallons
- Southeast: 500,000 Gallons

This additional 4.5 million gallons of storage will reach the states minimum sizing requirements. To provide emergency storage this plan also recommends an additional 1 million gallons of storage. This plan recommends 4 different storage projects be installed within the planning period to provide this additional storage. The recommended projects are as follows:

1. 1 TO 5 YEAR IMPROVEMENTS

- Sandhill Tank 1 – This tank would be constructed above the Elm Street tank to create a higher-pressure zone that would cover the area north of Utah Avenue and east of the highway. This project would include a booster pump to get water to the tank and valving to create the new pressure zone. It is recommended this tank be at least a 2 million gallons.

2. 6 TO 10 YEAR IMPROVEMENTS

- There are no recommended improvements for this planning period.

3. 11 TO 20 YEAR IMPROVEMENTS

- Trailhead Tank - This tank would be installed on the same site as the two wells recommended in Section III-D in the area Squirrel Canyon. This tank would serve two purposes. First, it would collect the water from the proposed Trailhead Wells and the Hildale Groundwater Project wells. The second purpose is to create a higher-pressure zone on the northeast side of Hildale. This pressure zone would serve the existing services and new development up the canyons north of Williams Avenue. This plan recommends the tank capacity to be 500,000 gallons, but the capacity should be reevaluated after the city receives results on how much water can be obtained from Trailhead Well 1.
- South Concrete Tank – In the southeast region of Colorado City, additional storage is required to provide storage for the new developments that are anticipated to be built in the area. It is recommended that the tank be 1,000,000 gallons and installed to be at the same elevation as the existing tanks.
- Sandhill Tank 2 – Recently Hildale City annexed land west of the previous city limits. There are new developments for this area in the preliminary planning stages for this area and it is anticipated that these developments will be started within the planning window. This tank would be used to serve development in this area. This plan uses a recommended storage capacity of 2,000,000 gallons and anticipates that the tank will be located in a similar area and elevation as the Sandhill Tank 1. As these developments progress further along the planning stages it is recommended that the size and location of this tank be reevaluated.

These recommended storage improvements are summarized in Figure IV-5. Appendix D includes an exhibit showing the location of these improvements.

Figure IV-6: Summary of Recommended Storage Improvements

Proposed Tank	Available Storage	Recommended Elev. (ft)	Est. Installation Date
Sandhill Tank 1	2,000,000	5,340	2025
Trailhead Tank	500,000	5,270	2034
South Concrete Tank	1,000,000	5,160	2035
Sandhill 2 Tank	2,000,000	5,340	2038
Total Projected New Storage	5,500,000		

F. STORAGE CAPACITY SUMMARY

Figure IV-7 and Figure IV-8 show the comparison between the available storage capacity and the projected required storage capacity. The available storage capacity in Figure IV-8 represents the storage capacity available with the implementation of the recommended improvements.

Figure IV-7: Projected Storage Capacity with Existing Conditions

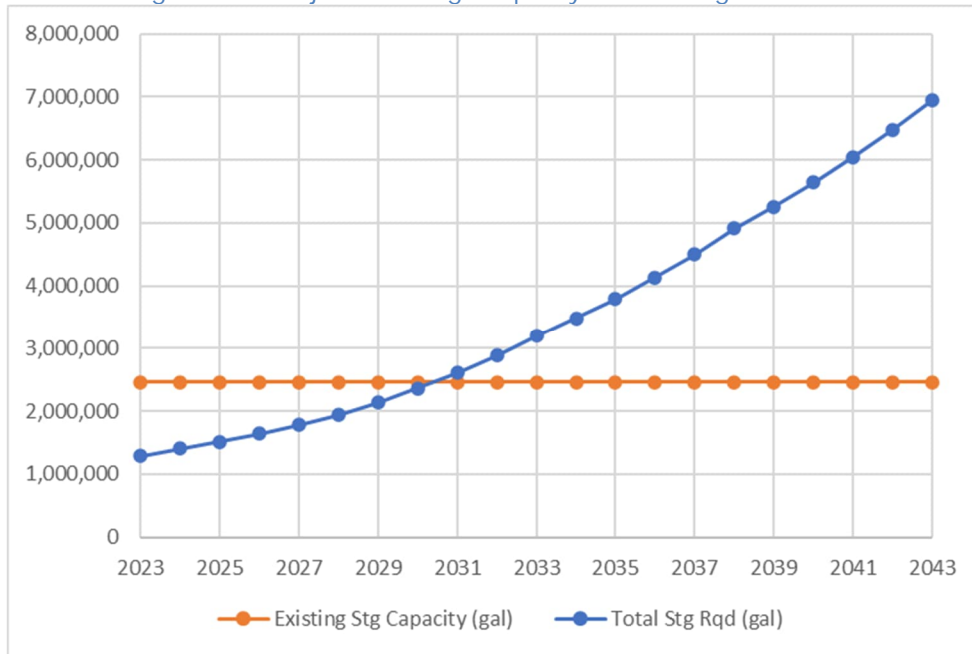
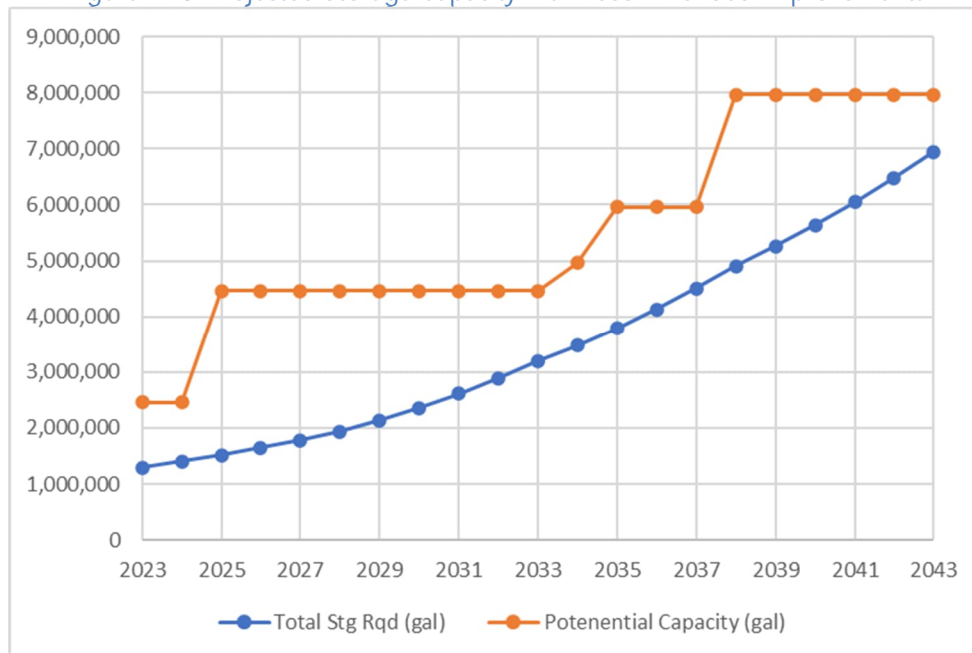


Figure IV-8: Projected Storage Capacity with Recommended Improvements



V. WATER TREATMENT REQUIREMENTS AND ANALYSIS

A. GENERAL REQUIREMENTS

The State of Utah Public Drinking Water Regulations, in accordance with the National Safe Drinking Water Act, have adopted “primary” regulations for the protection of public health and “secondary” regulations related to taste and aesthetics. The regulations recommend that all culinary water sources have provisions for continuous disinfection. Hildale and Colorado City have a culinary water treatment facility to treat the existing wells to meet the State’s requirements.

B. EXISTING TREATMENT FACILITIES

The existing culinary water treatment plant uses a greensand filtration process which includes pretreating the water with potassium permanganate. The plant contains 6 pressure vessels designed to operate in parallel and treat 2,400 gpm. However, based on available data and communicating with system staff, the plant has demonstrated a functional capacity to treat approximately 2,000 gpm. The treatment plant needs to be able to treat more than the PDD so the system doesn’t run out of water. Figure V-1 below shows how the treatment plant capacity compares to the PDD.

Figure V-1: Required Treatment Capacity (Existing Conditions)

Total Required Source Capacity (PDD)	1,700 gpm
Total Existing Treatment Capacity	2,000 gpm
Existing Source Capacity Surplus	300 gpm

C. PROJECTED WATER TREATMENT CAPACITY

As the communities continue to grow, the demands on the system will grow as well. The treatment plants will need to accommodate the increasing PDD. Below is a summary of the projected treatment capacity in relation to future treatment requirements.

Figure V-2: Projected Required Treatment Capacity (5-Year Planning Window)

Total Required Source Capacity (PDD)	2,440 gpm
Total Projected Treatment Capacity	2,000 gpm
Existing Treatment Capacity Deficit	-440 gpm

Figure V-3: Projected Required Treatment Capacity (10-Year Planning Window)

Total Required Source Capacity (PDD)	4,190 gpm
Total Projected Treatment Capacity	2,000 gpm
Existing Treatment Capacity Deficit	-2,190 gpm

Figure V-4: Projected Required Treatment Capacity (20-Year Planning Window)

Total Required Source Capacity (PDD)	9,397 gpm
Total Projected Treatment Capacity	2,000 gpm
Existing Treatment Capacity Deficit	-7,397 gpm

The existing treatment plant will not be able to treat enough water beyond the 5-year planning window. Improvements will need to be made to expand the treatment capacity in the near future.

D. RECOMMENDED WATER TREATMENT FACILITY IMPROVEMENTS

As mentioned before, the treatment plant has a surplus under existing conditions but will need to be improved within the next few years. The following recommendations are made to improve the treatment capacity:

1. 1 TO 5 YEAR IMPROVEMENTS

- Raw Water Transmission Line - The raw water transmission lines which carry water from the wells to the treatment plant should be improved. These lines are old, undersized, and have iron and other mineral deposits adhering to the pipe. It is possible the amount of flow going to the treatment plant is restricted by these deposits. This project is a part of the Mohave County ARPA Water project and it is currently in the design phase. It is recommended that a new 12" transmission line be installed in Richard St. to convey water from the wells south of the treatment plant. It is also recommended that access points be installed that allow water operators to flush and clean out the lines on the new line and on the remaining existing raw water lines.
- Small Treatment Plant – The treatment capacity needs to be increased within the 5-year planning window, so it is recommended that a new treatment plant be constructed. This plant is recommended to treat approximately 1,600 gpm. There is no specific location selected for this plant, however it is recommended that it be built near the Power Plant well so that it can be incorporated into the culinary water system.

2. 6 TO 10 YEAR IMPROVEMENTS

- There are no recommended improvements for this planning period.

3. 11 TO 20 YEAR IMPROVEMENTS

- Additional Treatment Capacity Phase I - With the previous plant implemented, the treatment facilities will again be at a deficit again in the 11-20-year window. An additional 3,000 gpm will need to be added. This can be accomplished by either expanding the previous plant or building an entirely new plant. For planning purposes this report assumes

that a new treatment plant will be constructed. There is no location selected for a new plant, but once a well site study has been completed, it's recommended that the location be central to the additional wells that are constructed.

- Additional Treatment Capacity Phase II – In this planning window, an additional 3,000 gpm is necessary to be able to treat enough water for the system. There is no direct recommendation for this, however some options include improving the existing plant, expanding upon the Phase I Improvements, or constructing a new plant. The EOPC in Appendix C shows the cost of constructing a new plant.

This plan only identifies the deficit in treatment capacity and recommends general projects to make up the deficit. It does not include a detailed analysis or evaluation of treatment options or equipment.

E. TREATMENT CAPACITY SUMMARY

Figure V-5 and Figure V-6 show the comparison between the available treatment capacity and the projected required treatment capacity. The available treatment capacity in Figure V-6 represents the treatment capacity available with the implementation of the recommended improvements.

Figure V-5: Projected Required Treatment Capacity

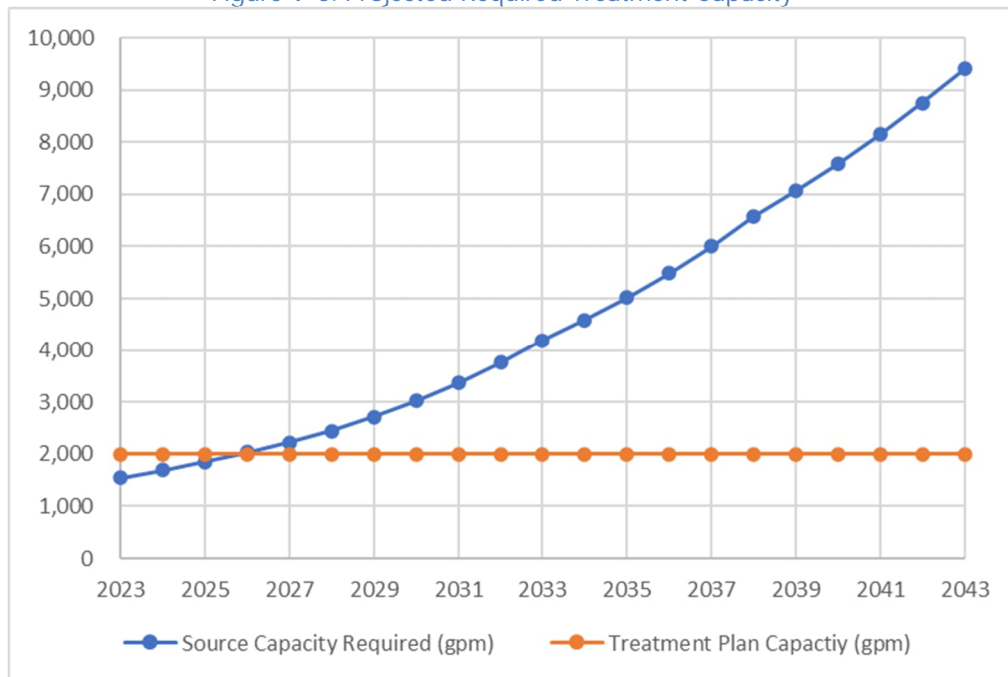
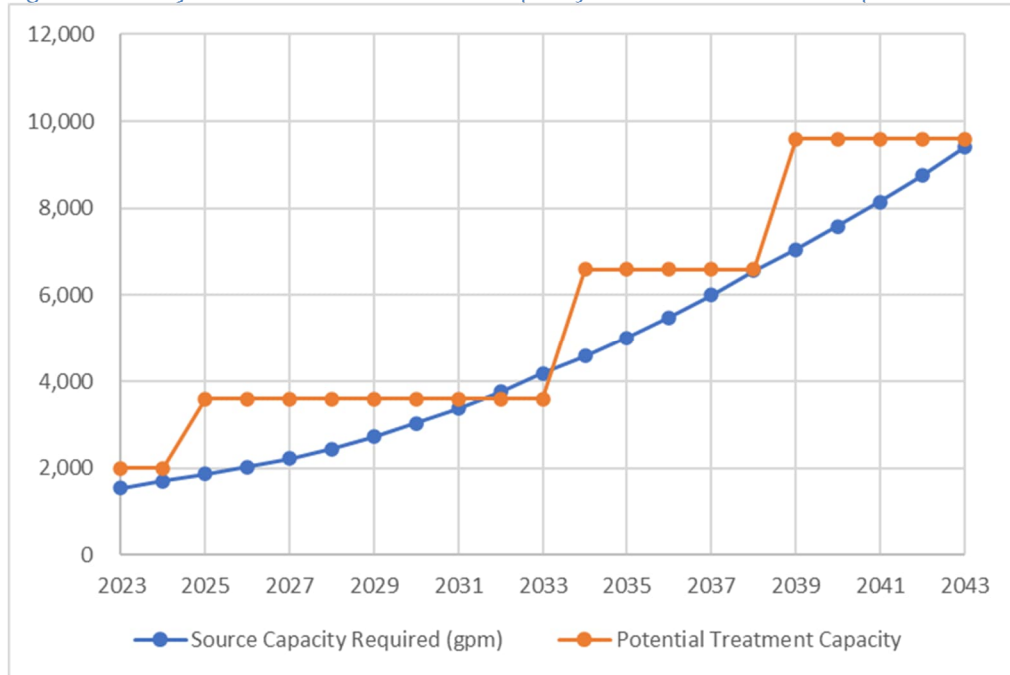


Figure V-6: Projected Available Treatment Capacity with Recommended Improvements



VI. WATER DISTRIBUTION SYSTEM ANALYSIS

The State of Utah Public Water Regulations, R309-105-9, states three pressure conditions which must be met to demonstrate adequate service capacity of a system. These conditions are:

- At least 40 psi must be retained as residual pressure in the distribution system under a Peak Day Demand (PDD).
- At least 30 psi must be retained as residual pressure in the distribution system under Peak Instantaneous Demand (PID)
- At least 20 psi must be retained as residual pressure in the distribution system under PDD plus fire flow conditions.

A. EXISTING DISTRIBUTION SYSTEM ANALYSIS

The existing PDD and PID were calculated in Section II. These flows are shown below:

- PDD – 1,692 gpd/ERU = 1,699 gpm with the existing number of ERUs
- PID – 2,446 gpm

As mentioned in Section IV.B, this report uses a fire flow of 1,500 gpm.

The existing Hildale and Colorado City culinary water distribution system has been modeled using the computer program WaterGEMS by Bentley Systems, Inc. For the existing system network there are areas which provide less than the required 40 psi of pressure for PDD, areas that provide less than 30 psi for PID, and areas that do not provide adequate fire flow. For the most part, the deficiencies in each of these requirements fall in the same areas of the system. Exhibits showing the areas of low pressure and fire flow are found in Appendix D. Below is a summary of these areas:

- Northwest Hildale (area between Utah Avenue and the Elm Street tank) – This area suffers from poor fire flow, lack of hydrants, and low pressure during PDD and PID. Fire flows in this area have been modeled as low as 253 gpm during PDD. This is largely the result of proximity to the elevation of the Elm St. tank. Pressures during PDD and PID are as low as 17 psi and 14 psi respectively.
- Northeast Hildale (area north of Jessop Avenue and west of Carlin Street) – This area suffers from poor fire flow, lack of hydrants, and low pressure during PDD and PID. Fire flows in this area have been modeled as low as 175 gpm during PDD. This is largely the result of proximity in elevation to the tanks, smaller line sizes, and lack of looping. Pressure during PDD and PID are as low as 27 psi and 21 psi respectively.
- East Colorado City (Between Edson Avenue and E Johnson Avenue) – This area suffers from poor fire flow and slightly low pressures during PDD and PID scenarios. Fire Flows

have been modeled as low as 544 gpm during PDD. This is largely due to the elevation of the area being too close to the same elevation of the existing tanks.

B. PROJECTED DISTRIBUTION SYSTEM ANALYSIS

The projected distribution system analysis is performed using the same assumptions as in the existing system analysis, except that the projected number of connections for the 20-year planning window is inserted into the calculations. The results of this calculation for both PDD and PID are shown below:

- PDD – 1,531 gpd/ERU = 9,387 gpm with the projected number of ERUs
- PID – 11,412 gpm

The same water model that was used to examine the existing distribution system was used to analyze the scenarios of the projected system at the end of the 20-year window. With the relatively high projected growth rate, according to the model, the entire system does not meet the requirements of R309-105-9. The recommended improvements in Section V.D and Section VI.D and are intended to keep the system in compliance with the state code at the end of the 20-year planning window.

C. FIRE HYDRANTS

State regulations require all new fire hydrants to be served from 8" diameter or larger pipelines unless it can be proven through the use of modeling that 6" lines are sufficient. There are several existing hydrants in the system that are on 6" or smaller pipes.

Utah state requirements also state that hydrants must be placed so no structure is further than 250 feet away from a hydrant. This means that generally, hydrants should be placed no more than 500 feet away from each other. There are numerous locations throughout the system where additional fire hydrants are needed to meet the required spacing.

D. RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

From the system deficiencies observed in the analysis, this plan recommends the following improvements:

1. 1 TO 5 YEAR IMPROVEMENTS

- Fire Hydrants – Install additional fire hydrants to meet the minimum required spacing. In placing these new hydrants, some smaller lines will need to be replaced with 8" lines to meet the requirements mentioned above. It is recommended that this project replace all

undersized lines which are not already included in the other improvements. This project would help bring the system into compliance with fire flow requirements.

- Upper Pressure Zone Improvements – Install a new 8" diameter water main on Jessop Avenue and Newell Avenue from Juniper Street to Redwood Street. This will provide looping and help create the pressure zone that will be implemented with the new Sandhill Tank 1. This project involves disconnecting 6 North/South lines in Utah Avenue so all flow going south will flow through one PRV connecting the two pressure zones.
- Northwest Hildale Transmission Line – As mentioned in previous sections, Hildale City has recently annexed new land west of the current city boundary. Currently there is no water infrastructure in place to provide water to this area. A transmission line would need to be installed from the Sandhill 1 tank west to the new development areas. This plan assumes that this would need to be a 16" line from Sandhill Tank 1 to the edge of the new annexation area.
- Canyon Street Line – Install a new 8" water main in Canyon Street from Memorial Street to Newell Avenue. This would provide looping to the northeast Hildale area and help mitigate some of the low pressures and low fire flows. This water main would also act as a trunkline for delivering water from the new wells in the Hildale Groundwater Project and the Trailhead Wells.

2. 6 TO 10 YEAR IMPROVEMENTS

- Hildale Street Line – Install a new 8" water main along Hildale Street from Academy Avenue to Cooke Avenue. This will provide looping to northern Colorado City and provide an additional line crossing the river.

3. 11 TO 20 YEAR IMPROVEMENTS

- Southwest Hildale Transmission Line – As the area west of Hildale City is developed, an additional transmission line should be constructed to provide additional looping to the system. The size and exact location of this line will depend on the timing and location of new development in the west side of the city. Depending on how the area develops, it is possible that this project will be installed in the earlier planning window instead of the Northwest Hildale Transmission Line.
- Transmission Line to Airport – Install a new 12" line extending south on Township Avenue towards the airport. The purpose of this line is to provide water service to potential commercial and industrial developments.

These recommended improvements are summarized in Figure VI-1. Appendix D includes an exhibit showing the location of these improvements.

Figure VI-1: Summary of Recommended Distribution Improvements

Proposed Improvement	Est. Installation Date
Fire Hydrant Project	2024
Upper Pressure Zone Improvements	2026
Canyon Street Line	2028
Northwest Hildale Transmission Line	2028
Hildale Street Line	2030
Southwest Hildale Transmission Line	2040
Transmission Line to Airport	2042

VII. WATER AVAILABILITY

A major concern for the community is long term availability of their water source. With the ongoing drought, this is a concern for most, if not all, communities in the surrounding counties. The following are ideas that the city could investigate to potentially lengthen the availability of water in the area. These ideas are not recommended improvements but starting points for future conversations.

A. WATER CONSERVATION PROGRAM

Implementing a water conservation program is a good way to reduce current water usage and prolong water availability as well as defer the need for some water infrastructure improvements. A conservation program is cheap in that it does not require any construction of infrastructure prior to implementation. Below is a potential list of items that could be included in such a program:

- Provide education on how much water local grasses and trees require and encourage residents to limit outdoor watering to not exceed what is needed.
- Perform a “water audit” on city owned irrigation to determine if outdoor water use could be reduced on city owned property.
- Look into capturing rainwater for outdoor watering. (This would require some investigation on how much water Utah and Arizona will allow to be captured and used)
- Provide incentives for residents to change their existing landscaping to something which requires less water such as Xeriscape.
- Add water conservation language in the Building and Zoning Codes

B. CONSTRUCTION WATER

Currently construction water is typically obtained from fire hydrants. This means that the construction in town typically uses culinary water for construction. This may not be a major usage of the culinary water system, but there may be some inexpensive options to provide non culinary grade water for use as construction water.

The Power Plant Well is currently unavailable for use in the culinary water system. This well could be set up with a connection to provide non culinary grade construction water. While this option does alleviate some strain from the culinary water system, it is still using the same aquifer (source) that the culinary water system is using.

C. RECYCLE BACKWASH WATER AT TREATMENT PLANT

Part of the process of the existing treatment plant includes backwashing the filters occasionally with clean, culinary grade water. Currently the backwash water is sent into the sewer system which is common in many similar plants. It is possible to capture the backwash water, reuse a portion of it, and send it back through the plant. This option saves a minimal amount of water, backwashes do not happen frequently, and they do not use a large amount of water per backwash. However,

this adjustment would save water and should be considered when making future improvements to the treatment facility.

D. SECONDARY WATER SYSTEM

Implementing a secondary water system would be a major benefit to the culinary water system. A secondary system in Hildale and Colorado City would reduce the culinary water use by roughly 40%. This reduction would greatly help with the deficiencies discussed in previous sections of this plan. However, constructing a new water system from the ground up is not cheap, and the added irrigation user rate needed to implement a new system would increase most customer water bills. It is possible to install a complete system in phases or install a small system just for parks or specific high outdoor use areas.

E. WASTEWATER REUSE

Treating wastewater for reuse is an option that would provide more water which is not coming from the same sources as the culinary water system. Treating wastewater sufficiently to be used for human consumption is very expensive and not likely practical for Hildale and Colorado City. However, reuse could be used for things such as construction water or irrigation for parks and agriculture that is not for human consumption. Treatment to this level is cheaper and may provide a cost-effective alternative for the city.

F. INSTALLING AUTOMATIC METERING

Installing instant read smart meters in the system would provide multiple benefits such as providing accurate usage data, acting as a leak detection system, and educating water users on their usage to encourage conservation. Smart metering can record usage to provide actual data for finding the ADD, PDD, and PID.

VIII. SUMMARY OF RECOMMENDED IMPROVEMENTS

A. PRIORITY OF IMPROVEMENTS

Figure VIII-1 shows a summary of the proposed improvements with the estimated cost for the project in today's dollars, the estimated year the improvements will be installed and the estimated cost of the project accounting for inflation. This plan uses an assumed inflation rate of 3%.

Figure VIII-1: Summary of Recommended Improvements

Project	Cost Estimate	Est Year of Installation	Cost Estimate With Inflation
Source Improvements			
Treatment Plant Wells	\$ 1,288,700	2024	\$ 1,327,400
5 Year Arizona Well Field	\$ 3,333,400	2024-2028	\$ 3,642,500
5 Year Utah Well Field	\$ 6,923,700	2024-2028	\$ 7,565,700
10 Year Arizona Well Field	\$ 3,809,600	2029-2033	\$ 4,970,700
10 Year Utah Well Field	\$ 7,912,800	2029-2033	\$ 10,324,400
Trailhead Well 1	\$ 2,445,300	2034	\$ 3,384,900
Trailhead Well 2	\$ 1,713,100	2034	\$ 2,371,300
Hildale Groundwater Project PH I	\$ 3,793,500	2035	\$ 5,408,600
Hildale Groundwater Project PH II	\$ 4,220,100	2036	\$ 6,197,400
Hildale Groundwater Project PH III	\$ 3,105,400	2040	\$ 5,132,800
20 Year Arizona Well Field	\$ 6,666,800	2033-2042	\$ 11,690,300
20 Year Utah Well Field	\$ 13,847,400	2033-2042	\$ 24,281,500
Source Subtotal	\$ 59,059,800		\$ 86,297,500
Storage Improvements			
Sandhill Tank 1	\$ 5,938,100	2025	\$ 6,299,700
Trailhead Tank	\$ 2,875,500	2034	\$ 3,980,400
South Concrete Tank	\$ 4,432,500	2035	\$ 6,319,700
Sandhill Tank 2	\$ 6,475,100	2038	\$ 10,088,000
Storage Subtotal	\$ 19,721,200		\$ 26,687,800
Treatment Improvements			
Raw Water Transmission Line	\$ 1,092,500	2024	\$ 1,125,300
Small Treatment Plant (1,600 gpm)	\$ 5,904,800	2025	\$ 6,264,400
Additional Treatment Capacity PH1	\$ 8,739,000	2034	\$ 12,096,800
Additional Treatment Capacity PH2	\$ 10,312,200	2039	\$ 16,548,100
Treatment Subtotal	\$ 19,051,200		\$ 36,034,600
Distribution Improvements			
Fire Hydrant Project	\$ 1,733,500	2024	\$ 1,785,500
Upper Pressure Zone Improvements	\$ 846,500	2026	\$ 925,000
Canyon St. Line	\$ 388,900	2028	\$ 450,800
Northwest Hildale Transmission Line	\$ 1,977,400	2028	\$ 2,292,300
Hildale St. Line	\$ 454,390	2030	\$ 558,800
Southwest Hildale Transmission Line	\$ 903,800	2040	\$ 1,493,800
Transmission Line to Airport	\$ 2,039,350	2042	\$ 3,576,000
Distribution Subtotal	\$ 8,343,840		\$ 11,082,200
Grand Total	\$ 106,176,040.00		\$ 160,102,100.00

The detailed cost estimate for each project is located in Appendix C.

IX. POSSIBLE FINANCING PLAN

The purpose of this possible finance plan is to show what a funding plan may look like to pay for the projects recommended for 2024. The city may also choose to complete the improvements in separate smaller projects. The projects are assumed to be paid with loan and grant money. It should be noted that agencies may require some amount of self-participation in order to provide funding. This plan assumes a 10% self-participation match.

Figure IX-1 outlines a possible financing plan from the Utah Division of Drinking Water (DDW). This plan assumes 20% of the funding from DDW will be grant and 70% will be loan with the remaining 10% as self-participation. The loan is assumed to be at a 4% interest rate and payback term of 20 years. It is possible a lower interest rate or higher portion of grants will be available. It is recommended that as the city prepares to start this project they contact DDW and other funding agencies such as the Water Infrastructure Finance Authority of Arizona, US Department of Agriculture - Rural Development, or the Utah Community Impact Board to determine what funding is available and where they can get the best financing terms.

The possible financing plan shown in Figure IX-1 results in an annual loan payment of \$224,525. This annual payment along with other O&M expenses for the water system, would require an average monthly charge for culinary water user rates to be \$51.35 per ERU.

The city is looking into adjusting their culinary water impact fees. A majority of the recommended improvements in this plan are fully or partially Impact Fee eligible. Collecting impact fees would help to fund the recommended improvements.

Figure IX-1: Possible Financing plan

HILDALE CITY/TOWN OF COLORADO CITY					
POSSIBLE FINANCING PLAN 2024 projects					
Total Project Cost (Construction + Professional Services):					\$ 4,238,200
Proposed Funding:	% of Proj.	Rate	Term	Principal	Est. Payment
Self Participation	10%			\$ 423,820.00	
DDW Grant	20%			\$ 762,876.00	
DDW Loan	70%	4.00%	20	\$ 3,051,504.00	\$224,535.01
TOTAL PROJECT ANNUAL PAYMENT (2023):					\$224,535.00
O&M EXPENSES: (First Year of New Debt Service Payment)					
Office Expenses and Travel				\$	38,867.63
Repairs and Maintenance				\$	375,825.72
Utilities				\$	189,954.97
Legal and Professional Fees				\$	68,482.00
Renewal and Replacement Fund					\$0
Interest Income				\$	(5,962.58)
Subtotal Expenses:					\$667,168
EXISTING DEBT SERVICE					
Existing Debt Service					\$0
Subtotal Existing Annual Debt Service:					\$0
GRAND TOTAL EXPENSES:					\$891,703
ANNUAL INCOME					
Impact Fees Expended for 2023 Projects				\$	-
Total Number Of ERU					1,447
Average Monthly Water User Rate/ERU					\$51.35
Charges for Services, Fees, etc.					\$891,703
GRAND TOTAL INCOME:					\$891,703

X. IMPACT FEE ANALYSIS

This plan constitutes an Impact Fee Facilities Plan (IFFP) and Impact Fee Analysis (IFA) for Hildale City and Infrastructure Improvements Plan for the Town of Colorado City. The Utah Administrative Code allows a community to charge an impact fee to provide funding for the projects required by this growth. The Arizona Administrative Code allows a community to charge a development fee to provide funding for the projects required by this growth. This plan was developed to have the fee comply with both the Utah Administrative Code and the Arizona Revised Statutes and uses the term "impact fee" to refer to development fee in Colorado City as well as the impact fees in Hildale City.

The plan identifies the existing demands on the system as well as future demands which will be placed on the system due to growth. The total cost that is eligible for the impact fee assessment is equal to the portion of a planned project in the planning window that is attributed or caused by growth. The combined costs of these projects are divided by the projected number of new ERUs that will be added to the system. Impact fees can also cover debt service that is incurred by projects that provide excess capacity to be used for growth.

While this master plan uses a planning window of 20 years, the IFFP & IFA use a planning window of 10 years encompassing the start of 2024 to the end of 2033. This shorter window is based on regulations on impact fee collection and use. Impact fees must be encumbered within six years of their receipt according to Utah State Impact Fee law and within 10 years of receipt according to Arizona State Development Fee law. This plan accounts for all incoming fees to be encumbered for eligible projects and debts in the continuous six-year window to satisfy the more stringent law.

A. EXISTING IMPACT FEES

Currently, neither community charges a culinary water Impact Fee.

B. LEVEL OF SERVICE

Impact Fee laws prohibit the use of Impact Fees to increase the level of service beyond that which is currently provided. This requires a determination of the existing level of service upon which to base future improvements. The existing level of service provided by the culinary water system, and which was used to evaluate the system in previous sections of the report, is the Utah State Code minimum sizing requirements.

C. PROPORTIONATE SHARE ANALYSIS

Impact fee laws in Utah and Arizona require that only that portion of the facility, whether existing, new, or future, that is required for growth may be included in the impact fee calculations. A proportionate share analysis must be made of all the facilities to determine a reasonable and logical ratio of cost for each improvement.

1. WATER SOURCE

The analysis in Section III shows that the existing system has a source capacity deficit of 465 gpm. Because this is an existing deficiency, the recommended improvements that fix this deficiency are not impact fee eligible. It is anticipated that the deep and shallow treatment plan wells are projected to provide 200 gpm which is less than the existing deficit of 465 gpm and therefore are considered non-impact fee eligible. The 5-Year well field for Utah and Arizona combined are projected to provide 1,680 gpm. This will bring the capacity above the 465 deficit and provide an additional 1,435 gpm. The additional 1,435 gpm above the existing capacity deficit is additional source capacity that is needed for the projected growth and therefore impact fee eligible. This results in both the 1-5 Year Arizona Well Field and 1-5 Year Utah Well Field projects being 84.3% impact fee eligible.

All of the other wells projects within the 10 year planning period provide additional source that is needed for the projected growth and are considered 100% impact fee eligible. This includes the following projects:

- 10 Year Arizona Well Field
- 10 Year Utah Well Field

2. WATER STORAGE

Only one water storage project is in the 10-year planning window, Sandhill Tank 1. The storage that is provided by this tank is needed for the projected growth. Therefore, the tank is considered 100% impact fee eligible.

3. WATER TREATMENT

The Raw Water Transmission Line is an improvement recommended in the water treatment section. This project helps with the operation and maintenance of the raw water line to the existing treatment plant and does not provide additional treatment capacity. Because this project does not provide any additional treatment capacity needed for the projected growth it is not considered impact fee eligible.

This plan has one recommended improvement to water treatment that will add to the treatment capacity. The Small Treatment Plant provides additional treatment capacity that is needed for the projected growth and is considered 100% impact fee eligible.

4. WATER DISTRIBUTION

A majority of the proposed water distribution projects in the 10-year planning period serve to improve the existing level of service for the system users or provide currently needed fire flows. These projects are not considered impact fee eligible. However, there are a few projects that would extend the service area to allow for growth in areas that currently do not have access to the water system and therefore are unable to be developed. These projects include the following:

- Upper Pressure Zone Improvements. – This project provides increased pressures for the existing units located north of Utah Avenue. This is an area that has historically had issues with low pressures and will fix an existing deficiency. However, this project also allows for the system to extend further north and allow for growth and development in new areas. Because this project fixes existing deficiencies and allows for the extension of the system it is considered 50% impact fee eligible.
- Northwest Hildale Transmission Line – This project extends the system northwest of Hildale and allows for areas to be developed that currently do not have access to the culinary water system. Because this project provides an area for growth to occur it is considered 100% impact fee eligible.

5. FUTURE PLANNING

It is recommended that the capital facilities plan be updated every five (5) years. Since this plan update falls within the 10-year planning period, it is 100% impact fee eligible.

D. ZONAL IMPACT FEES

For impact fees, Hildale and Colorado City each adopt their own impact fee ordinance for their corresponding communities. With the communities being in different states, they each have different Impact Fee laws that need to be followed for each ordinance. The recommended improvements also do not affect each community equally. Zonal impact fees were established with each community being its own zone.

With the projected growth in the 10-year planning window, it is expected there will be an additional 2,417 ERUs added to the system. Based on information currently available regarding future developments, it is anticipated that more of the additional ERUs will be located in Hildale than in Colorado City. For this reason, it is assumed that 55% of the 2,417 ERUs will be in Hildale, resulting in 1,330 ERUs. The remaining 1,088 additional ERUs, or 45%, will be located in Colorado City.

The Impact Fee Analysis will establish the impact fee eligible cost for each of the eligible projects and that cost will be divided amongst both zones based on the percentage of benefit that project provides to each zone.

E. IMPACT FEE ANALYSIS

The total cost that is eligible for the impact fee assessment is equal to the portion of any planned water improvements project that will be constructed in the next 10 years to accommodate new growth. The combined total cost that is due to new growth is divided by the projected number of new ERUs that will be added to the system.

It is recommended that Hildale City and the Town of Colorado City begin charging impact fees per ERU. Figure X-1 shows the impact fee per meter size for Hildale and Figure X-2 shows the impact fee per meter size for Colorado City. Should a lower impact fee be adopted, the remaining construction cost deficit would need to be funded through other means. Appendix E contains the analysis performed to determine the impact fee.

Figure X-1: Maximum Zonal Impact Fee- Hildale

Meter Size	ERUs	Impact Fee
5/8" & 3/4"	1.00	\$ 12,580.00
1"	1.78	\$ 22,364.44
1 1/2"	4.00	\$ 50,320.00
2"	7.11	\$ 89,457.78
3"	16.00	\$ 201,280.00
4"	28.44	\$ 357,831.11
6"	64.00	\$ 805,120.00

Figure X-2: Maximum Zonal Impact Fee- Colorado City

Meter Size	ERUs	Impact Fee
5/8" & 3/4"	1.00	\$ 11,807.00
1"	1.78	\$ 20,990.22
1 1/2"	4.00	\$ 47,228.00
2"	7.11	\$ 83,960.89
3"	16.00	\$ 188,912.00
4"	28.44	\$ 335,843.56
6"	64.00	\$ 755,648.00

It is important to note that these impact fees are for the improvements summarized in this Plan and do not provide for the city to design and build anything beyond the proposed projects. All new additions to the system will need to be considered in the impact fee calculations. Otherwise, the developer should be required to make the improvements.

F. IMPACT FEE CERTIFICATION

In general, it is beneficial to update this impact fee facilities plan and analysis at least every five years, or more frequently if drastic growth or changes affect the assumptions and data in this plan. It is assumed that this plan will be updated as recommended.

There are items relating to impact fees that Hildale City and the Town of Colorado City must consider when planning for, collecting, and expending impact fees in accordance with Utah Code 11-36a-101 and Arizona Code 9-463.05.

Staff from each community must understand that impact fees can only be expended for a system improvement that is identified in the Impact Fee Facilities Plan and that is for the specific facility type for which the fee was collected. Impact fees must be expended or encumbered for permissible use within six years of their receipt unless Utah Code 11-36a-602(2)(b) applies. Also, impact fees must have proper accounting (track each fee in and out) in accordance with Utah Code 11-36a-601 and Arizona Code 9-463.05.

In accordance with Utah Code 11-36a-306 a certification of impact fee analysis is in Appendix F.



APPENDIX A

Growth Rate Analysis

Population & Growth Rate

Calendar Year	Est. Growth Rate	Hildale Population	Colorado City Population	Total Population	Hildale Connections	Colorado City Connections	Total Connections	Number of ERUs
2023		3,224	5,358	8,582	435	790	1,224	1,315
2024	10.0%	3,547	5,894	9,440	478	869	1,347	1,446
2025	10.0%	3,901	6,483	10,384	526	956	1,481	1,591
2026	10.0%	4,291	7,132	11,423	578	1,051	1,630	1,750
2027	10.0%	4,720	7,845	12,565	636	1,156	1,792	1,925
2028	10.0%	5,192	8,629	13,822	700	1,272	1,972	2,117
2029	12.0%	5,816	9,665	15,480	784	1,425	2,208	2,371
2030	12.0%	6,513	10,825	17,338	878	1,596	2,473	2,656
2031	12.0%	7,295	12,124	19,419	983	1,787	2,770	2,974
2032	12.0%	8,170	13,578	21,749	1,101	2,001	3,103	3,331
2033	12.0%	9,151	15,208	24,359	1,233	2,242	3,475	3,731
2034	10.0%	10,066	16,729	26,794	1,357	2,466	3,822	4,104
2035	10.0%	11,073	18,401	29,474	1,492	2,712	4,205	4,514
2036	10.0%	12,180	20,241	32,421	1,641	2,984	4,625	4,966
2037	10.0%	13,398	22,266	35,663	1,806	3,282	5,088	5,462
2038	10.0%	14,738	24,492	39,230	1,986	3,610	5,596	6,009
2039	8.0%	15,917	26,452	42,368	2,145	3,899	6,044	6,489
2040	8.0%	17,190	28,568	45,758	2,317	4,211	6,528	7,008
2041	8.0%	18,565	30,853	49,418	2,502	4,548	7,050	7,569
2042	8.0%	20,050	33,321	53,372	2,702	4,912	7,614	8,175
2043	8.0%	21,654	35,987	57,641	2,918	5,305	8,223	8,829



APPENDIX B

Water Use Analysis

Year	Total Usage (Thousand Gallons)	Number of Connections	Usage per Conn (gpd/conn)	Number of ERUs	Usage per ERU (gpd/ERU)
2018	303,105	863	962	848	979
2019	251,780	763	904	806	856
2020	285,109	799	978	855	914
2021	279,736	855	896	924	829
2022	309,026	1,113	761	1,195	708
5-Year Avg:	285,751	879	900	925	846
This Master Plan will use a historic daily usage of 846 gpd/ERU					

Peak Instantaneous Demand Calculations (State)			
Indoor Peak Instantaneous Demand			
	$Q = 10.8 \times N^{.64}$		N= No. of ERU
2024	Q=	1,138	gpm
	Q=	1,132	gpd/ERU
Outdoor Peak Instantaneous Demand			
Irrigation Zone 5 =		9.04	gpm/Irrigated Acre
Irrigated Acres /ERU		0.1	Irrigated Acres/ERU
Q=	Irr Acres/ERU X Irr Zone Factor X No. ERU		
Example:			
2023	Q=	1,308	gpm

Current & Projected Required Source Capacity

Year	# of ERU	Percent Reduction In Usage Per ERU	Peak Day Usage (gpd/ERU)	Source Capacity Required (gpm)	Existing Source Available (gpm)	Treatment Plan Capacity (gpm)	Source Capacity Surplus/Deficit (gpm)
2023	1,315	0.0%	1,692	1,545	1,234	2,000	(311)
2024	1,447	0.0%	1,692	1,700	1,234	2,000	(466)
2025	1,592	0.5%	1,684	1,861	1,234	2,000	(627)
2026	1,751	1.0%	1,675	2,037	1,234	2,000	(803)
2027	1,926	1.5%	1,667	2,229	1,234	2,000	(995)
2028	2,119	2.0%	1,658	2,440	1,234	2,000	(1,206)
2029	2,373	2.5%	1,650	2,719	1,234	2,000	(1,485)
2030	2,658	3.0%	1,641	3,029	1,234	2,000	(1,795)
2031	2,977	3.5%	1,633	3,376	1,234	2,000	(2,142)
2032	3,334	4.0%	1,624	3,761	1,234	2,000	(2,527)
2033	3,734	4.5%	1,616	4,190	1,234	2,000	(2,956)
2034	4,107	5.0%	1,607	4,584	1,234	2,000	(3,350)
2035	4,518	5.5%	1,599	5,017	1,234	2,000	(3,783)
2036	4,970	6.0%	1,590	5,489	1,234	2,000	(4,255)
2037	5,467	6.5%	1,582	6,006	1,234	2,000	(4,772)
2038	6,014	7.0%	1,574	6,572	1,234	2,000	(5,338)
2039	6,495	7.5%	1,565	7,059	1,234	2,000	(5,825)
2040	7,015	8.0%	1,557	7,583	1,234	2,000	(6,349)
2041	7,576	8.5%	1,548	8,145	1,234	2,000	(6,911)
2042	8,182	9.0%	1,540	8,749	1,234	2,000	(7,515)
2043	8,837	9.5%	1,531	9,397	1,234	2,000	(8,163)

$$\text{Required Source Capacity} = \#ERU \times \frac{\text{gpd}}{\#ERU} \times \frac{1 \text{ Day}}{24 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min}}$$

Storage Capacity Analysis

Year	Number of ERUs	Percent Reduction In Usage Per ERU	Avg. Usage (gpd/ERU)	Storage Required (gal)	Fire Flow Stg Rqd (gal)	Existing Stg Capacity (gal)	Total Stg Rqd (gal)	Storage Capacity Surplus/Deficit (gal)	Project Name	Added Storage (gal)	Potenential Capacity (gal)	Potential Surplus (Gal)
2023	1315	0.0%	846	1,112,490	180,000	2,460,000	1,292,490	1,167,510			2,460,000	1,167,510
2024	1447	0.0%	846	1,224,162	180,000	2,460,000	1,404,162	1,055,838			2,460,000	1,055,838
2025	1592	0.5%	842	1,340,098	180,000	2,460,000	1,520,098	939,902	Sandhill Tank 1	2,000,000	4,460,000	2,939,902
2026	1751	1.0%	838	1,466,533	180,000	2,460,000	1,646,533	813,467			4,460,000	2,813,467
2027	1926	1.5%	833	1,604,955	180,000	2,460,000	1,784,955	675,045			4,460,000	2,675,045
2028	2119	2.0%	829	1,756,821	180,000	2,460,000	1,936,821	523,179			4,460,000	2,523,179
2029	2373	2.5%	825	1,957,369	180,000	2,460,000	2,137,369	322,631			4,460,000	2,322,631
2030	2658	3.0%	821	2,181,208	180,000	2,460,000	2,361,208	98,792			4,460,000	2,098,792
2031	2977	3.5%	816	2,430,393	180,000	2,460,000	2,610,393	-150,393			4,460,000	1,849,607
2032	3334	4.0%	812	2,707,741	180,000	2,460,000	2,887,741	-427,741			4,460,000	1,572,259
2033	3734	4.5%	808	3,016,811	180,000	2,460,000	3,196,811	-736,811			4,460,000	1,263,189
2034	4107	5.0%	804	3,300,796	180,000	2,460,000	3,480,796	-1,020,796	Trailhead Tank	500,000	4,960,000	1,479,204
2035	4518	5.5%	799	3,612,005	180,000	2,460,000	3,792,005	-1,332,005	South Concrete Tank	1,000,000	5,960,000	2,167,995
2036	4970	6.0%	795	3,952,343	180,000	2,460,000	4,132,343	-1,672,343			5,960,000	1,827,657
2037	5467	6.5%	791	4,324,452	180,000	2,460,000	4,504,452	-2,044,452			5,960,000	1,455,548
2038	6014	7.0%	787	4,731,695	180,000	2,460,000	4,911,695	-2,451,695	Sandhill Tank 2	2,000,000	7,960,000	3,048,305
2039	6495	7.5%	783	5,082,662	180,000	2,460,000	5,262,662	-2,802,662			7,960,000	2,697,338
2040	7015	8.0%	778	5,459,915	180,000	2,460,000	5,639,915	-3,179,915			7,960,000	2,320,085
2041	7576	8.5%	774	5,864,506	180,000	2,460,000	6,044,506	-3,584,506			7,960,000	1,915,494
2042	8182	9.0%	770	6,298,995	180,000	2,460,000	6,478,995	-4,018,995			7,960,000	1,481,005
2043	8837	9.5%	766	6,765,872	180,000	2,460,000	6,945,872	-4,485,872			7,960,000	1,014,128

$$\text{Required Storage Capacity} = \#ERU \times \frac{\text{gpd}}{\#ERU} + \text{Fire Flow (1,500gpm)} \frac{60 \text{ min}}{1 \text{ hr}} \times 2 \text{ hr}$$



Water Distribution Analysis

Year	No. ERU	ADD (gpm)	PDD (gpm)	PID Indoor (gpm)	PID Outdoor (gpm)	PID Total (gpm)
2023	1,315	773	1,545	1,070	1,189	2,259
2024	1,447	850	1,700	1,138	1,308	2,446
2025	1,592	931	1,861	1,210	1,439	2,649
2026	1,751	1,018	2,037	1,286	1,583	2,869
2027	1,926	1,115	2,229	1,366	1,741	3,108
2028	2,119	1,220	2,440	1,453	1,916	3,368
2029	2,373	1,359	2,719	1,562	2,145	3,707
2030	2,658	1,515	3,029	1,679	2,403	4,082
2031	2,977	1,688	3,376	1,806	2,691	4,497
2032	3,334	1,880	3,761	1,941	3,014	4,955
2033	3,734	2,095	4,190	2,087	3,376	5,463
2034	4,107	2,292	4,584	2,219	3,713	5,931
2035	4,518	2,508	5,017	2,358	4,084	6,443
2036	4,970	2,745	5,489	2,507	4,493	7,000
2037	5,467	3,003	6,006	2,664	4,942	7,606
2038	6,014	3,286	6,572	2,832	5,437	8,269
2039	6,495	3,530	7,059	2,975	5,871	8,846
2040	7,015	3,792	7,583	3,125	6,342	9,467
2041	7,576	4,073	8,145	3,283	6,849	10,132
2042	8,182	4,374	8,749	3,449	7,397	10,845
2043	8,837	4,699	9,397	3,623	7,989	11,612



APPENDIX C

Engineers Opinion of Probable Cost

Engineer's Opinion of Probable Cost					
Treatment Plant Wells Project Location: Colorado City					18-Oct-23 BCW/tcd
NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 37,800.00	\$ 37,800.00
2	Pre-Construction DVD and Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
3	GeoPhysical Logging	1	LS	\$ 15,000.00	\$ 15,000.00
4	Disinfection and Capping	1	LS	\$ 4,000.00	\$ 4,000.00
5	Well Driller's Report	1	LS	\$ 2,500.00	\$ 2,500.00
6	Site Restoration	1	LS	\$ 10,000.00	\$ 10,000.00
7	Misc. Electrical Improvements	1	LS	\$ 15,000.00	\$ 15,000.00
DEEP WELL					
8	Conductor Casing	100	LF	\$ 400.00	\$ 40,000.00
9	20" Diameter Well Drilling	700	LF	\$ 123.00	\$ 86,100.00
10	12" Diameter Well Drilling - Pilot Hole	700	LF	\$ 160.00	\$ 112,000.00
11	12" Well Casing	600	LF	\$ 170.00	\$ 102,000.00
12	2" Galvanized Tremie Pipe	100	LF	\$ 40.00	\$ 4,000.00
13	Furnish and Install Pea Gravel	400	LF	\$ 115.00	\$ 46,000.00
14	Bentonite Packer	1	LS	\$ 6,000.00	\$ 6,000.00
15	Conductor Casing Removal	1	LS	\$ 8,000.00	\$ 8,000.00
16	Flow Meter	1	EA	\$ 10,000.00	\$ 10,000.00
17	Initial Well Development	40	HR	\$ 700.00	\$ 28,000.00
18	Install Pump for Development and Testing	1	LS	\$ 40,000.00	\$ 40,000.00
19	Well Development and Pumping	80	HR	\$ 700.00	\$ 56,000.00
20	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
21	Well Head, Disinfection and Capping	1	LS	\$ 8,500.00	\$ 8,500.00
22	Well Pad and Pipping	1	LS	\$ 15,000.00	\$ 15,000.00
SHALLOW WELL					
23	Conductor Casing	1	LS	\$ 40,000.00	\$ 40,000.00
24	16" Diameter Well Drilling	120	LF	\$ 270.00	\$ 32,400.00
25	8" Well Casing	80	LF	\$ 100.00	\$ 8,000.00
26	8" Stainless Steel Screen	40	LF	\$ 300.00	\$ 12,000.00
27	2" Galvanized Tremie Pipe	20	LF	\$ 40.00	\$ 800.00
28	Instrument Pipe	120	LF	\$ 50.00	\$ 6,000.00
29	Furnish and Install Fine Silica Sand	120	LF	\$ 125.00	\$ 15,000.00
30	Bentonite Packer	1	LS	\$ 6,000.00	\$ 6,000.00
31	Conductor Casing Removal	1	LS	\$ 6,000.00	\$ 6,000.00
32	Sanitary Grout Seal	1	LS	\$ 150.00	\$ 150.00
33	Flow Meter	1	LS	\$ 10,000.00	\$ 10,000.00
34	Initial Well Development	40	HR	\$ 700.00	\$ 28,000.00
35	Install Pump for Development and Testing	1	LS	\$ 40,000.00	\$ 40,000.00
36	Well Development and Pumping	80	HR	\$ 700.00	\$ 56,000.00
37	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
38	Well Head, Disinfection and Capping	1	LS	\$ 8,500.00	\$ 8,500.00
39	Well Pad and Pipping	1	LS	\$ 15,000.00	\$ 15,000.00
SUBTOTAL					\$ 951,250.00
				CONTINGENCY 20%	\$ 190,300.00
CONSTRUCTION TOTAL					\$ 1,141,600.00
INCIDENTALS					
1	Engineering Design	4.3%	LS	\$ 55,000.00	\$ 55,000.00
2	Bidding & Negotiating	0.6%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.7%	HR	\$ 47,600.00	\$ 47,600.00
4	Topographic & Property Survey	0.4%	EST	\$ 5,000.00	\$ 5,000.00
5	Permitting	0.8%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.9%	EST	\$ 12,000.00	\$ 12,000.00
7	Miscellaneous Professional Services	0.8%	EST	\$ 10,000.00	\$ 10,000.00
SUBTOTAL					\$ 147,100.00
TOTAL PROJECT COST					\$ 1,288,700.00

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.



Engineer's Opinion of Probable Cost

Trailhead Well 1
Project Location: Hildale City

18-Oct-23
BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 83,600.00	\$ 83,600.00
2	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
4	Subsurface Investigation	4	HR	\$ 250.00	\$ 1,000.00
5	Materials Sampling & Testing	1	LS	\$ 7,500.00	\$ 7,500.00
6	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 10,000.00	\$ 10,000.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	Geophysical Survey	1	LS	\$ 20,000.00	\$ 20,000.00
10	Access and Drill Pad Construction	1	LS	\$ 145,000.00	\$ 145,000.00
11	Conductor Casing and Seal	100	LF	\$ 650.00	\$ 65,000.00
12	Drill 12" Pilot Borehole	600	LF	\$ 160.00	\$ 96,000.00
13	Drill 20" Reamed Borehole	600	LF	\$ 123.00	\$ 73,800.00
14	Geophysical Logging	1	LS	\$ 9,000.00	\$ 9,000.00
15	Well Installation - 12" Steel Casing	500	LF	\$ 170.00	\$ 85,000.00
16	Well Installation - 12" SS Screen 70 Slot	200	LF	\$ 350.00	\$ 70,000.00
17	Installation of Gravel Pack - 8-12	550	LF	\$ 115.00	\$ 63,250.00
18	Installation of Annular Grout Seal	150	LF	\$ 115.00	\$ 17,250.00
19	Initial Well Development	40	HR	\$ 750.00	\$ 30,000.00
20	Install Pump for Development and Testing	1	LS	\$ 42,000.00	\$ 42,000.00
21	Well Development by pumping	80	HR	\$ 425.00	\$ 34,000.00
22	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
23	Well Disinfecting	1	LS	\$ 5,000.00	\$ 5,000.00
24	Well Head	1	LS	\$ 2,500.00	\$ 2,500.00
25	Well Capping	1	LS	\$ 750.00	\$ 750.00
26	Roadway Restoration	48,000	SF	\$ 6.00	\$ 288,000.00
27	10" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	8,000	LF	\$ 72.00	\$ 576,000.00
28	10" Gate Valve Assembly	4	EA	\$ 5,000.00	\$ 20,000.00
29	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 1,798,650.00
				CONTINGENCY 20%	\$ 359,700.00
CONSTRUCTION TOTAL					\$ 2,158,400.00
INCIDENTALS					
1	Engineering Design	4.5%	LS	\$ 110,000.00	\$ 110,000.00
2	Bidding & Negotiating	0.3%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.7%	HR	\$ 89,900.00	\$ 89,900.00
4	Topographic & Property Survey	0.7%	EST	\$ 17,500.00	\$ 17,500.00
5	Water Right Change Application	0.8%	EST	\$ 20,000.00	\$ 20,000.00
6	Funding and Administrative Services	0.5%	EST	\$ 12,000.00	\$ 12,000.00
7	Permitting	0.4%	EST	\$ 10,000.00	\$ 10,000.00
8	Miscellaneous Professional Services	0.8%	EST	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 286,900.00
TOTAL PROJECT COST					\$ 2,445,300.00

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Engineer's Opinion of Probable Cost

Trailhead Well 2

18-Oct-23

Project Location: Hildale City

BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 32,000.00	\$ 32,000.00
2	Erosion Control Compliance	1	LS	\$ 5,000.00	\$ 5,000.00
3	Geophysical Survey	1	LS	\$ 20,000.00	\$ 20,000.00
4	Access and Drill Pad Construction	1	LS	\$ 50,000.00	\$ 50,000.00
5	Conductor Casing and Seal	100	LF	\$ 650.00	\$ 65,000.00
6	Drill 12" Pilot Borehole	600	LF	\$ 175.00	\$ 105,000.00
7	Drill 20" Reamed Borehole	600	LF	\$ 123.00	\$ 73,800.00
8	Geophysical Logging	1	LS	\$ 9,000.00	\$ 9,000.00
9	Well Installation - 12" Steel Casing	170	LF	\$ 170.00	\$ 28,900.00
10	Well Installation - 12" SS Screen 70 Slot	200	LF	\$ 350.00	\$ 70,000.00
11	Installation of Gravel Pack - 8-12	550	LF	\$ 115.00	\$ 63,250.00
12	Installation of Annular Grout Seal	150	LF	\$ 115.00	\$ 17,250.00
13	Initial Well Development	40	HR	\$ 750.00	\$ 30,000.00
14	Install Pump for Development and Testing	1	LS	\$ 42,000.00	\$ 42,000.00
15	Well Development by pumping	80	HR	\$ 425.00	\$ 34,000.00
16	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
17	Well Disinfecting	1	LS	\$ 5,000.00	\$ 5,000.00
18	Well Head	1	LS	\$ 2,500.00	\$ 2,500.00
19	Well Capping	1	LS	\$ 750.00	\$ 750.00
20	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	150	LF	\$ 65.00	\$ 9,750.00
21	8" Gate Valve Assembly	1	EA	\$ 2,900.00	\$ 2,900.00
22	Water Right Procurement	1	LS	\$ 650,000.00	\$ 650,000.00
SUBTOTAL					\$ 1,326,100.00
CONTINGENCY				20%	\$ 265,200.00
CONSTRUCTION TOTAL					\$ 1,591,300.00
INCIDENTALS					
1	Engineering Design	2.6%	LS	\$ 45,000.00	\$ 45,000.00
2	Bidding & Negotiating	0.4%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	2.0%	HR	\$ 33,800.00	\$ 33,800.00
4	Topographic & Property Survey	0.2%	EST	\$ 3,500.00	\$ 3,500.00
5	Permitting	0.6%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.7%	EST	\$ 12,000.00	\$ 12,000.00
39	Miscellaneous Professional Services	0.6%	EST	\$ 10,000.00	\$ 10,000.00
SUBTOTAL					\$ 121,800.00
TOTAL PROJECT COST					\$ 1,713,100.00

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Engineer's Opinion of Probable Cost

Hildale Groundwater Project PH I
 Project Location: Hildale City

18-Oct-23
 BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 132,900.00	\$ 132,900.00
2	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
4	Subsurface Investigation	4	HR	\$ 250.00	\$ 1,000.00
5	Materials Sampling & Testing	1	LS	\$ 7,500.00	\$ 7,500.00
6	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 10,000.00	\$ 10,000.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	Geophysical Survey	1	LS	\$ 23,000.00	\$ 23,000.00
10	Access and Drill Pad Construction	1	LS	\$ 130,000.00	\$ 130,000.00
11	Conductor Casing and Seal	100	LF	\$ 650.00	\$ 65,000.00
12	Drill 12" Pilot Borehole	650	LF	\$ 175.00	\$ 113,750.00
13	Drill 20" Reamed Borehole	650	LF	\$ 123.00	\$ 79,950.00
14	Geophysical Logging	1	LS	\$ 9,000.00	\$ 9,000.00
15	Caliper	1	LS	\$ 6,500.00	\$ 6,500.00
16	Well Installation - 12" Steel Casing	550	LF	\$ 100.00	\$ 55,000.00
17	Well Installation - 12" SS Screen 70 Slot	200	LF	\$ 350.00	\$ 70,000.00
18	Installation of Gravel Pack - 8-12	600	LF	\$ 115.00	\$ 69,000.00
19	Installation of Annular Grout Seal	150	LF	\$ 115.00	\$ 17,250.00
20	Initial Well Development	40	HR	\$ 750.00	\$ 30,000.00
21	Install Pump for Development and Testing	1	LS	\$ 42,000.00	\$ 42,000.00
22	Well Development by pumping	80	HR	\$ 425.00	\$ 34,000.00
23	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
24	Well Disinfecting	1	LS	\$ 5,000.00	\$ 5,000.00
25	Well Head	1	LS	\$ 2,500.00	\$ 2,500.00
26	Well Capping	1	LS	\$ 750.00	\$ 750.00
27	Roadway Restoration	30,000	SF	\$ 7.75	\$ 232,500.00
28	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	5,000	LF	\$ 65.00	\$ 325,000.00
29	8" Gate Valve Assembly	8	EA	\$ 2,900.00	\$ 23,200.00
30	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 15,000.00	\$ 15,000.00
31	Water Right Procurement	1	LS	\$ 1,300,000.00	\$ 1,300,000.00
SUBTOTAL					\$ 2,833,800.00
CONTINGENCY				20%	\$ 566,800.00
CONSTRUCTION TOTAL					\$ 3,400,600.00
INCIDENTALS					
1	Engineering Design	2.6%	LS	\$ 100,000.00	\$ 100,000.00
2	Bidding & Negotiating	0.2%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.0%	HR	\$ 113,400.00	\$ 113,400.00
4	Topographic & Property Survey	0.5%	EST	\$ 20,000.00	\$ 20,000.00
5	Funding and Administrative Services	0.3%	EST	\$ 12,000.00	\$ 12,000.00
5	Permitting	0.3%	EST	\$ 10,000.00	\$ 10,000.00
6	Environmental (Including Biological and Archeological) Report	0.9%	EST	\$ 35,000.00	\$ 35,000.00
8	BLM ROW Negotiation (SF299 Application & POD)	0.3%	EST	\$ 10,000.00	\$ 10,000.00
9	Miscellaneous Engineering Services	0.5%	EST	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 392,900.00
TOTAL PROJECT COST					\$ 3,793,500.00

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Engineer's Opinion of Probable Cost

Hildale Groundwater Project PH II
 Project Location: Hildale City

18-Oct-23
 BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 152,000.00	\$ 152,000.00
2	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
4	Subsurface Investigation	4	HR	\$ 250.00	\$ 1,000.00
5	Materials Sampling & Testing	1	LS	\$ 7,500.00	\$ 7,500.00
6	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 10,000.00	\$ 10,000.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	Geophysical Survey	1	LS	\$ 23,000.00	\$ 23,000.00
10	Access and Drill Pad Construction	1	LS	\$ 130,000.00	\$ 130,000.00
11	Conductor Casing and Seal	100	LF	\$ 650.00	\$ 65,000.00
12	Drill 12" Pilot Borehole	650	LF	\$ 175.00	\$ 113,750.00
13	Drill 20" Reamed Borehole	650	LF	\$ 123.00	\$ 79,950.00
14	Geophysical Logging	1	LS	\$ 9,000.00	\$ 9,000.00
15	Caliper	1	LS	\$ 6,500.00	\$ 6,500.00
16	Well Installation - 12" Steel Casing	550	LF	\$ 100.00	\$ 55,000.00
17	Well Installation - 12" SS Screen 70 Slot	200	LF	\$ 350.00	\$ 70,000.00
18	Installation of Gravel Pack - 8-12	600	LF	\$ 115.00	\$ 69,000.00
19	Installation of Annular Grout Seal	150	LF	\$ 115.00	\$ 17,250.00
20	Initial Well Development	40	HR	\$ 750.00	\$ 30,000.00
21	Install Pump for Development and Testing	1	LS	\$ 42,000.00	\$ 42,000.00
22	Well Development by pumping	80	HR	\$ 425.00	\$ 34,000.00
23	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
24	Well Disinfecting	1	LS	\$ 5,000.00	\$ 5,000.00
25	Well Head	1	LS	\$ 2,500.00	\$ 2,500.00
26	Well Capping	1	LS	\$ 750.00	\$ 750.00
27	Roadway Restoration	50,400	SF	\$ 7.75	\$ 390,600.00
28	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	8,400	LF	\$ 65.00	\$ 546,000.00
29	8" Gate Valve Assembly	9	EA	\$ 2,900.00	\$ 26,100.00
30	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 15,000.00	\$ 15,000.00
31	Water Right Procurement	1	LS	\$ 1,300,000.00	\$ 1,300,000.00
SUBTOTAL					\$ 3,234,900.00
CONTINGENCY				20%	\$ 647,000.00
CONSTRUCTION TOTAL					\$ 3,881,900.00
INCIDENTALS					
1	Engineering Design	2.8%	LS	\$ 120,000.00	\$ 120,000.00
2	Bidding & Negotiating	0.2%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	2.3%	HR	\$ 96,700.00	\$ 96,700.00
4	Topographic & Property Survey	0.5%	EST	\$ 22,000.00	\$ 22,000.00
5	Funding and Administrative Services	0.3%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.2%	EST	\$ 10,000.00	\$ 10,000.00
7	Environmental (Including Biological and Archeological) Report	0.9%	EST	\$ 40,000.00	\$ 40,000.00
8	BLM ROW Negotiation (SF299 Application & POD)	0.2%	EST	\$ 10,000.00	\$ 10,000.00
9	Miscellaneous Engineering Services	0.5%	EST	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 338,200.00
TOTAL PROJECT COST					\$ 4,220,100.00

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Engineer's Opinion of Probable Cost

Hildale Groundwater Project PH III
Project Location: Hildale City

18-Oct-23
BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 110,000.00	\$ 110,000.00
2	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
4	Subsurface Investigation	4	HR	\$ 250.00	\$ 1,000.00
5	Materials Sampling & Testing	1	LS	\$ 7,500.00	\$ 7,500.00
6	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 10,000.00	\$ 10,000.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	Geophysical Survey	1	LS	\$ 23,000.00	\$ 23,000.00
10	Access and Drill Pad Construction	1	LS	\$ 130,000.00	\$ 130,000.00
11	Conductor Casing and Seal	100	LF	\$ 650.00	\$ 65,000.00
12	Drill 12" Pilot Borehole	600	LF	\$ 175.00	\$ 105,000.00
13	Drill 20" Reamed Borehole	600	LF	\$ 123.00	\$ 73,800.00
14	Geophysical Logging	1	LS	\$ 9,000.00	\$ 9,000.00
15	Caliper	1	LS	\$ 6,500.00	\$ 6,500.00
16	Well Installation - 12" Steel Casing	500	LF	\$ 170.00	\$ 85,000.00
17	Well Installation - 12" SS Screen 70 Slot	200	LF	\$ 350.00	\$ 70,000.00
18	Installation of Gravel Pack - 8-12	550	LF	\$ 115.00	\$ 63,250.00
19	Installation of Annular Grout Seal	150	LF	\$ 115.00	\$ 17,250.00
20	Initial Well Development	40	HR	\$ 750.00	\$ 30,000.00
21	Install Pump for Development and Testing	1	LS	\$ 42,000.00	\$ 42,000.00
22	Well Development by pumping	80	HR	\$ 425.00	\$ 34,000.00
23	Misc. Well and Pump Testing	1	LS	\$ 10,000.00	\$ 10,000.00
24	Well Disinfecting	1	LS	\$ 5,000.00	\$ 5,000.00
25	Well Head	1	LS	\$ 2,500.00	\$ 2,500.00
26	Well Capping	1	LS	\$ 750.00	\$ 750.00
27	Roadway Restoration	39,000	SF	\$ 8.00	\$ 312,000.00
28	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	6,500	LF	\$ 65.00	\$ 422,500.00
29	8" Gate Valve Assembly	8	EA	\$ 2,900.00	\$ 23,200.00
30	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 20,000.00	\$ 20,000.00
31	Water Right Procurement	1	LS	\$ 650,000.00	\$ 650,000.00
SUBTOTAL					\$ 2,352,250.00
CONTINGENCY				20%	\$ 470,500.00
CONSTRUCTION TOTAL					\$ 2,822,800.00
INCIDENTALS					
1	Engineering Design	3.2%	LS	\$ 100,000.00	\$ 100,000.00
2	Bidding & Negotiating	0.2%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	2.2%	HR	\$ 68,100.00	\$ 68,100.00
4	Topographic & Property Survey	0.6%	EST	\$ 20,000.00	\$ 20,000.00
5	Funding and Administrative Services	0.4%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.3%	EST	\$ 10,000.00	\$ 10,000.00
7	Environmental (Including Biological and Archeological) Report	1.1%	EST	\$ 35,000.00	\$ 35,000.00
8	BLM ROW Negotiation (SF299 Application & POD)	0.3%	EST	\$ 10,000.00	\$ 10,000.00
9	Miscellaneous Engineering Services	0.6%	EST	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 282,600.00
TOTAL PROJECT COST					\$ 3,105,400.00

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Engineer's Opinion of Probable Cost

Arizona Well Fields

11-Oct-23

Project Location: Colorado City

MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION (ONE WELL)					
1	Mobilization	5%	LS	\$ 16,100.00	\$ 16,100.00
2	Traffic Control	1	LS	\$ 2,000.00	\$ 2,000.00
3	SWPPP Compliance	1	LS	\$ 2,000.00	\$ 2,000.00
4	Dust Control & Watering	1	LS	\$ 2,000.00	\$ 2,000.00
5	Subsurface Investigation	10	HR	\$ 40.00	\$ 400.00
6	Construction Staking	1	LS	\$ 500.00	\$ 500.00
7	Clearing, Grubbing, Excavation, & Demolition	1	LS	\$ 2,000.00	\$ 2,000.00
8	8" Diameter Test Well Drilling	150	LF	\$ 87.00	\$ 13,050.00
9	Develop and Pump Test Well	1	LS	\$ 17,400.00	\$ 17,400.00
10	Water Sampling (Full Drinking Water Standard)	1	EA	\$ 26,000.00	\$ 26,000.00
11	Furnish and Install Conductor Casing (Production Well)	1	LS	\$ 7,800.00	\$ 7,800.00
12	20" Diameter Production Well Drilling	150	LF	\$ 160.00	\$ 24,000.00
13	12" Diameter Casing	100	LF	\$ 52.00	\$ 5,200.00
14	12" Diameter Stainless Steel Screen	50	LF	\$ 350.00	\$ 17,500.00
15	3" Galvanized Gravel Pack Tremie Pipe	60	LF	\$ 16.00	\$ 960.00
16	2" Conduit for Level Indicator	150	LF	\$ 7.00	\$ 1,050.00
17	Concrete Grout and Seal	3	CY	\$ 1,200.00	\$ 3,600.00
18	Furnish and Install Pea Gravel (Disinfected)	3	CY	\$ 350.00	\$ 1,050.00
19	Bentonite Plug	1	LS	\$ 4,400.00	\$ 4,400.00
20	Furnish and Install Fine Silica Sand	3	CY	\$ 2,100.00	\$ 6,300.00
21	Develop Production Well	150	HR	\$ 435.00	\$ 65,250.00
22	Production Well Test Pump Equipment	1	LS	\$ 17,400.00	\$ 17,400.00
23	Test Pump Production Well	48	HR	\$ 260.00	\$ 12,480.00
24	Recovery Testing	12	HR	\$ 175.00	\$ 2,100.00
25	Disinfection and Capping	1	LS	\$ 550.00	\$ 550.00
26	Well House Building	1	LS	\$ 75,000.00	\$ 75,000.00
27	Piping to Connect to Raw Water System	1	LS	\$ 12,000.00	\$ 12,000.00
SUBTOTAL					\$ 338,100.00
				CONTINGENCY 20%	\$ 67,600.00
CONSTRUCTION TOTAL					\$ 405,700.00
INCIDENTALS					
1	Engineering Design	7.6%	LS	\$ 36,000.00	\$ 36,000.00
2	Bidding & Negotiating	1.6%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services/Miscellaneous Services	5.7%	HR	\$ 27,000.00	\$ 27,000.00
SUBTOTAL					\$ 70,500.00
TOTAL PROJECT COST FOR ONE WELL					\$ 476,200.00
0-5 YEAR WELL FIELD					
	Number of New Wells	7	EA	\$ 476,200.00	\$ 3,333,400.00
TOTAL PROJECT COST AZ 0-5 YEAR WELL FIELD					\$ 3,333,400.00
6-10 YEAR WELL FIELD					
	Number of New Wells	8	EA	\$ 476,200.00	\$ 3,809,600.00
TOTAL PROJECT COST AZ 6-10 YEAR WELL FIELD					\$ 3,809,600.00
11-20 YEAR WELL FIELD					
	Number of New Wells	14	EA	\$ 476,200.00	\$ 6,666,800.00
TOTAL PROJECT COST AZ 11-20 YEAR WELL FIELD					\$ 6,666,800.00

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Engineer's Opinion of Probable Cost

Utah Well Fields	11-Oct-23
Project Location: Hildale City	MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION (ONE WELL)					
1	Mobilization	5%	LS	\$ 16,099.50	\$ 16,099.50
2	Traffic Control	1	LS	\$ 2,000.00	\$ 2,000.00
3	SWPPP Compliance	1	LS	\$ 2,000.00	\$ 2,000.00
4	Dust Control & Watering	1	LS	\$ 2,000.00	\$ 2,000.00
5	Subsurface Investigation	10	HR	\$ 40.00	\$ 400.00
6	Construction Staking	1	LS	\$ 500.00	\$ 500.00
7	Clearing, Grubbing, Excavation, & Demolition	1	LS	\$ 2,000.00	\$ 2,000.00
8	8" Diameter Test Well Drilling	150	LF	\$ 87.00	\$ 13,050.00
9	Develop and Pump Test Well	1	LS	\$ 17,400.00	\$ 17,400.00
10	Water Sampling (Full Drinking Water Standard)	1	EA	\$ 26,000.00	\$ 26,000.00
11	Furnish and Install Conductor Casing (Production Well)	1	LS	\$ 7,800.00	\$ 7,800.00
12	20" Diameter Production Well Drilling	150	LF	\$ 160.00	\$ 24,000.00
13	12" Diameter Casing	100	LF	\$ 52.00	\$ 5,200.00
14	12" Diameter Stainless Steel Screen	50	LF	\$ 350.00	\$ 17,500.00
15	3" Galvanized Gravel Pack Tremie Pipe	60	LF	\$ 16.00	\$ 960.00
16	2" Conduit for Level Indicator	150	LF	\$ 7.00	\$ 1,050.00
17	Concrete Grout and Seal	3	CY	\$ 1,200.00	\$ 3,600.00
18	Furnish and Install Pea Gravel (Disinfected)	3	CY	\$ 350.00	\$ 1,050.00
19	Bentonite Plug	1	LS	\$ 4,400.00	\$ 4,400.00
20	Furnish and Install Fine Silica Sand	3	CY	\$ 2,100.00	\$ 6,300.00
21	Develop Production Well	150	HR	\$ 435.00	\$ 65,250.00
22	Production Well Test Pump Equipment	1	LS	\$ 17,400.00	\$ 17,400.00
23	Test Pump Production Well	48	HR	\$ 260.00	\$ 12,480.00
24	Recovery Testing	12	HR	\$ 175.00	\$ 2,100.00
25	Disinfection and Capping	1	LS	\$ 550.00	\$ 550.00
26	Well House Building	1	LS	\$ 75,000.00	\$ 75,000.00
27	Piping to Connect to Raw Water System	1	LS	\$ 12,000.00	\$ 12,000.00
SUBTOTAL					\$ 338,089.50
CONTINGENCY				20%	\$ 67,617.90
CONSTRUCTION TOTAL					\$ 405,707.00
INCIDENTALS					
1	Engineering Design	7.6%	LS	\$ 36,019.43	\$ 36,019.43
2	Bidding & Negotiating	1.6%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services/Miscellaneous Services	5.7%	HR	\$ 27,000.00	\$ 27,000.00
SUBTOTAL					\$ 70,519.43
TOTAL PROJECT COST FOR ONE WELL					\$ 476,200.00
0-5 YEAR WELL FIELD					
	Number of New Wells	7	EA	\$ 476,200.00	\$ 3,333,400.00
	Purchase Water Rights	677	AC-FT	\$ 5,300.00	\$ 3,590,318.61
TOTAL PROJECT COST AZ 0-5 YEAR WELL FIELD					\$ 6,923,700.00
6-10 YEAR WELL FIELD					
	Number of New Wells	8	EA	\$ 476,200.00	\$ 3,809,600.00
	Purchase Water Rights	774	AC-FT	\$ 5,300.00	\$ 4,103,221.27
TOTAL PROJECT COST AZ 6-10 YEAR WELL FIELD					\$ 7,912,800.00
11-20 YEAR WELL FIELD					
	Number of New Wells	14	EA	\$ 476,200.00	\$ 6,666,800.00
	Purchase Water Rights	1,355	AC-FT	\$ 5,300.00	\$ 7,180,637.23
TOTAL PROJECT COST AZ 11-20 YEAR WELL FIELD					\$ 13,847,400.00

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Engineer's Opinion of Probable Cost					
Sandhill Tank 1 Project Location: Hildale City					18-Oct-23 BCW/tcd
NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 211,800.00	\$ 211,800.00
2	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
3	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
5	Subsurface Investigation	20	HR	\$ 350.00	\$ 7,000.00
6	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 12,000.00	\$ 12,000.00
8	Materials Sampling & Testing	1	LS	\$ 35,000.00	\$ 35,000.00
9	Excavation & Demolition	1	LS	\$ 25,000.00	\$ 25,000.00
10	Earthwork & Grading	1	LS	\$ 400,000.00	\$ 400,000.00
11	2MG Concrete Storage Tank	1	LS	\$ 2,800,000.00	\$ 2,800,000.00
12	Tank Site Appurtenances	1	LS	\$ 75,000.00	\$ 75,000.00
13	Metering Station	1	LS	\$ 40,000.00	\$ 40,000.00
14	16" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	1,360	LF	\$ 120.00	\$ 163,200.00
15	16" Gate Valve Assembly	4	EA	\$ 6,750.00	\$ 27,000.00
16	12" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	2,264	LF	\$ 95.00	\$ 215,080.00
17	12" Gate Valve Assembly	10	EA	\$ 6,500.00	\$ 65,000.00
18	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 30,000.00	\$ 30,000.00
19	Surface Restoration	1	LS	\$ 15,000.00	\$ 15,000.00
20	Elm Street PRV and Vault	1	EA	\$ 100,000.00	\$ 100,000.00
21	Valving and Piping to Create New Pressure Zone	1	LS	\$ 45,000.00	\$ 45,000.00
22	Misc Electrical and SCADA Improvements	1	LS	\$ 20.00	\$ 20.00
23	Tank Access Road	28,992	SF	\$ 2.75	\$ 79,728.00
24	Fence and Gate	1	LS	\$ 75,000.00	\$ 75,000.00
SUBTOTAL					\$ 4,447,328.00
CONTINGENCY					20%
CONSTRUCTION TOTAL					\$ 5,336,800.00
INCIDENTALS					
1	Engineering Design	3.4%	LS	\$ 200,000.00	\$ 200,000.00
2	Bidding & Negotiating	0.1%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.5%	HR	\$ 266,800.00	\$ 266,800.00
4	Topographic & Property Survey	0.3%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.2%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.2%	EST	\$ 12,000.00	\$ 12,000.00
7	Permitting	0.2%	EST	\$ 10,000.00	\$ 10,000.00
8	Environmental (Including Biological and Archeological) Report	0.5%	EST	\$ 30,000.00	\$ 30,000.00
9	SCADA Design	0.3%	EST	\$ 15,000.00	\$ 15,000.00
10	BLM ROW Negotiation (SF299 Application & POD)	0.2%	EST	\$ 10,000.00	\$ 10,000.00
11	Miscellaneous Engineering Services	0.4%	EST	\$ 25,000.00	\$ 25,000.00
SUBTOTAL					\$ 601,300.00
TOTAL PROJECT COST					\$ 5,938,100.00

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Engineer's Opinion of Probable Cost

Trailhead Tank
 Project Location: Hildale City

12-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 100,700.00	\$ 100,700.00
2	Traffic Control	1	LS	\$ 5,000.00	\$ 5,000.00
3	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
5	Subsurface Investigation	30	HR	\$ 350.00	\$ 10,500.00
6	Restore Surface Improvements	1	LS	\$ 7,800.00	\$ 7,800.00
7	Construction Staking	1	LS	\$ 5,000.00	\$ 5,000.00
8	Materials Sampling & Testing	1	LS	\$ 35,000.00	\$ 35,000.00
9	Earthwork	1	LS	\$ 200,000.00	\$ 200,000.00
10	500K Concrete Storage Tank	1	LS	\$ 810,000.00	\$ 810,000.00
11	Tank Site Appurtenances	1	LS	\$ 100,000.00	\$ 100,000.00
12	Fence and Gate	1	LS	\$ 20,000.00	\$ 20,000.00
13	Metering Station	1	LS	\$ 34,000.00	\$ 34,000.00
14	Tank Access Rd	5,500	SF	\$ 2.00	\$ 11,000.00
15	10" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	8,000	LF	\$ 75.00	\$ 600,000.00
16	10" Gate Valve Assembly	5	EA	\$ 5,000.00	\$ 25,000.00
17	Misc. Connections, Fittings, and Tie-Ins	1	LS	\$ 20,000.00	\$ 20,000.00
18	Misc Electrical and SCADA Improvements	1	LS	\$ 20,000.00	\$ 20,000.00
19	PRV and Vault	1	EA	\$ 100,000.00	\$ 100,000.00
SUBTOTAL					\$ 2,115,500.00
				CONTINGENCY	20% \$ 423,100.00
CONSTRUCTION TOTAL					\$ 2,538,600.00
INCIDENTALS					
1	Engineering Design	3.3%	LS	\$ 95,000.00	\$ 95,000.00
2	Bidding & Negotiating	0.3%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.4%	HR	\$ 126,900.00	\$ 126,900.00
4	Topographic & Property Survey	0.3%	EST	\$ 8,000.00	\$ 8,000.00
5	Geotechnical Report	0.3%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.4%	EST	\$ 12,000.00	\$ 12,000.00
7	Permitting	0.3%	EST	\$ 10,000.00	\$ 10,000.00
10	Environmental (Including Biological and Archeological) Report	0.9%	EST	\$ 25,000.00	\$ 25,000.00
11	BLM ROW Negotiation (SF299 Application & POD)	0.3%	EST	\$ 10,000.00	\$ 10,000.00
39	Miscellaneous Professional Services	0.7%	EST	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 336,900.00
TOTAL PROJECT COST					\$ 2,875,500.00

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Engineer's Opinion of Probable Cost

South Concrete Tank
Project Location: Colorado City

12-Oct-23
MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 154,900.00	\$ 154,900.00
2	Traffic Control	1	LS	\$ 2,000.00	\$ 2,000.00
3	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
5	Subsurface Investigation	30	HR	\$ 350.00	\$ 10,500.00
6	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 12,000.00	\$ 12,000.00
8	Materials Sampling & Testing	1	LS	\$ 35,000.00	\$ 35,000.00
9	Excavation & Demolition	1	LS	\$ 25,000.00	\$ 25,000.00
10	Earthwork & Grading	1	LS	\$ 400,000.00	\$ 400,000.00
11	1MG Concrete Storage Tank	1	LS	\$ 1,500,000.00	\$ 1,500,000.00
12	Tank Site Appurtenances	1	LS	\$ 250,000.00	\$ 250,000.00
13	Metering Station	1	LS	\$ 40,000.00	\$ 40,000.00
14	12" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	4,000	LF	\$ 110.00	\$ 440,000.00
15	12" Gate Valve Assembly	10	EA	\$ 6,750.00	\$ 67,500.00
16	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 30,000.00	\$ 30,000.00
17	Surface Restoration	1	LS	\$ 15,000.00	\$ 15,000.00
18	PRV and Vault	1	EA	\$ 100,000.00	\$ 100,000.00
19	Valving and Piping to Create New Pressure Zone	1	LS	\$ 45,000.00	\$ 45,000.00
20	Misc Electrical and SCADA Improvements	1	LS	\$ 20,000.00	\$ 20,000.00
21	Tank Access Road	32,000	SF	\$ 2.00	\$ 64,000.00
22	Fence and Gate	1	LS	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 3,252,400.00
CONTINGENCY				20%	\$ 650,500.00
CONSTRUCTION TOTAL					\$ 3,902,900.00
INCIDENTALS					
1	Engineering Design	4.5%	LS	\$ 200,000.00	\$ 200,000.00
2	Bidding & Negotiating	0.2%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.4%	HR	\$ 195,100.00	\$ 195,100.00
4	Topographic & Property Survey	0.3%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.2%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.3%	EST	\$ 12,000.00	\$ 12,000.00
7	Permitting	0.2%	EST	\$ 10,000.00	\$ 10,000.00
8	Environmental (Including Biological and Archeological) Report	0.7%	EST	\$ 30,000.00	\$ 30,000.00
9	SCADA Design	0.3%	EST	\$ 15,000.00	\$ 15,000.00
10	BLM ROW Negotiation (SF299 Application & POD)	0.2%	EST	\$ 10,000.00	\$ 10,000.00
11	Miscellaneous Engineering Services	0.6%	EST	\$ 25,000.00	\$ 25,000.00
SUBTOTAL					\$ 529,600.00
TOTAL PROJECT COST					\$ 4,432,500.00

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Engineer's Opinion of Probable Cost

Sandhill Tank 2
Project Location: Hildale City

18-Oct-23
MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 232,100.00	\$ 232,100.00
2	Traffic Control	1	LS	\$ 2,000.00	\$ 2,000.00
3	Pre-Construction DVD & Project Sign	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
5	Subsurface Investigation	30	HR	\$ 350.00	\$ 10,500.00
6	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 12,000.00	\$ 12,000.00
8	Materials Sampling & Testing	1	LS	\$ 35,000.00	\$ 35,000.00
9	Excavation & Demolition	1	LS	\$ 25,000.00	\$ 25,000.00
10	Earthwork & Grading	1	LS	\$ 400,000.00	\$ 400,000.00
11	2MG Concrete Storage Tank	1	LS	\$ 2,800,000.00	\$ 2,800,000.00
12	Tank Site Appurtenances	1	LS	\$ 250,000.00	\$ 250,000.00
13	Metering Station	1	LS	\$ 40,000.00	\$ 40,000.00
14	24" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	2,700	LF	\$ 150.00	\$ 405,000.00
15	24" Gate Valve Assembly	6	EA	\$ 9,500.00	\$ 57,000.00
16	16" PVC (C900), Fittings, Installation, Pipe Bedding, Trench Backfill	2,350	LF	\$ 120.00	\$ 282,000.00
17	16" Gate Valve Assembly	5	EA	\$ 6,750.00	\$ 33,750.00
18	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 30,000.00	\$ 30,000.00
19	Surface Restoration	1	LS	\$ 15,000.00	\$ 15,000.00
20	PRV and Vault	1	EA	\$ 100,000.00	\$ 100,000.00
21	Valving and Piping to Create New Pressure Zone	1	LS	\$ 45,000.00	\$ 45,000.00
22	Misc Electrical and SCADA Improvements	1	LS	\$ 20,000.00	\$ 20,000.00
23	Tank Access Road	18,800	SF	\$ 2.00	\$ 37,600.00
24	Fence and Gate	1	LS	\$ 20,000.00	\$ 20,000.00
SUBTOTAL					\$ 4,873,450.00
				CONTINGENCY 20%	\$ 974,700.00
CONSTRUCTION TOTAL					\$ 5,848,200.00
INCIDENTALS					
1	Engineering Design	3.1%	LS	\$ 200,000.00	\$ 200,000.00
2	Bidding & Negotiating	0.1%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.5%	HR	\$ 292,400.00	\$ 292,400.00
4	Topographic & Property Survey	0.2%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.2%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.2%	EST	\$ 12,000.00	\$ 12,000.00
7	Permitting	0.2%	EST	\$ 10,000.00	\$ 10,000.00
8	Environmental (Including Biological and Archeological) Report	0.5%	EST	\$ 30,000.00	\$ 30,000.00
9	SCADA Design	0.2%	EST	\$ 15,000.00	\$ 15,000.00
10	BLM ROW Negotiation (SF299 Application & POD)	0.2%	EST	\$ 10,000.00	\$ 10,000.00
11	Miscellaneous Engineering Services	0.4%	EST	\$ 25,000.00	\$ 25,000.00
SUBTOTAL					\$ 626,900.00
TOTAL PROJECT COST					\$ 6,475,100.00

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Engineer's Opinion of Probable Cost

Raw Water Transmission Line	18-Oct-23
Project Location: Colorado City	BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 37,800.00	\$ 37,800.00
2	Traffic Control	1	LS	\$ 10,000.00	\$ 10,000.00
3	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
4	Subsurface Investigation	10	HR	\$ 250.00	\$ 2,500.00
5	Restore Surface Improvements	1	LS	\$ 15,000.00	\$ 15,000.00
6	Construction Staking	1	LS	\$ 10,000.00	\$ 10,000.00
7	Erosion Control Compliance	1	LS	\$ 5,000.00	\$ 5,000.00
8	Materials Sampling & Testing	1	LS	\$ 12,500.00	\$ 12,500.00
9	Excavation & Demolition	1	LS	\$ 20,000.00	\$ 20,000.00
10	12" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	2,500	LF	\$ 110.00	\$ 275,000.00
11	12" Gate Valve Assembly	8	EA	\$ 6,500.00	\$ 52,000.00
12	Pavement Restoration	26,400	SF	\$ 7.75	\$ 204,600.00
13	Access/Cleanout Structure	4	EA	\$ 5,000.00	\$ 20,000.00
14	Misc. Fittings, Connections, and Tie-Ins	1	LS	\$ 20,000.00	\$ 20,000.00
15	Electrical Conduit	2,500	LF	\$ 40.00	\$ 100,000.00
SUBTOTAL					\$ 794,400.00
				CONTINGENCY 20%	\$ 158,900.00
CONSTRUCTION TOTAL					\$ 953,300.00
INCIDENTALS					
1	Engineering Design	4.6%	LS	\$ 50,000.00	\$ 50,000.00
2	Bidding & Negotiating	0.7%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.6%	HR	\$ 39,700.00	\$ 39,700.00
4	Topographic & Property Survey	1.4%	EST	\$ 15,000.00	\$ 15,000.00
5	Permitting	0.5%	EST	\$ 5,000.00	\$ 5,000.00
6	Funding and Administrative Services	1.1%	EST	\$ 12,000.00	\$ 12,000.00
7	Miscellaneous Engineering Services	0.9%	EST	\$ 10,000.00	\$ 10,000.00
SUBTOTAL					\$ 139,200.00
TOTAL PROJECT COST					\$ 1,092,500.00

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Engineer's Opinion of Probable Cost

Small Treatment Plant (1,600 gpm)
 Project Location: Hildale City

12-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 206,000.00	\$ 206,000.00
2	Pilot Study	1	LS	\$ 75,000.00	\$ 75,000.00
3	Construction Staking	1	LS	\$ 15,000.00	\$ 15,000.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Package Pressure Filtration System	1	LS	\$ 1,300,000.00	\$ 1,300,000.00
6	Site Earthwork	1	LS	\$ 150,000.00	\$ 150,000.00
7	Water Treatment Plant Building & Appurtenances	1	LS	\$ 1,000,000.00	\$ 1,000,000.00
8	Chlorinator System	1	LS	\$ 100,000.00	\$ 100,000.00
9	Chlorine Contact Chamber	1	LS	\$ 200,000.00	\$ 200,000.00
10	Effluent Pump Station	1	LS	\$ 275,000.00	\$ 275,000.00
11	Electrical Systems	1	LS	\$ 350,000.00	\$ 350,000.00
12	Mechanical System	1	LS	\$ 200,000.00	\$ 200,000.00
13	Miscellaneous Piping to and from Site	1	LS	\$ 185,000.00	\$ 185,000.00
14	Miscellaneous Valves	1	LS	\$ 90,000.00	\$ 90,000.00
15	Miscellaneous Site Improvements (parking, fence, gate, etc.)	1	LS	\$ 110,000.00	\$ 110,000.00
16	SCADA Improvements	1	LS	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 4,326,000.00
CONTINGENCY				20%	\$ 865,200.00
CONSTRUCTION TOTAL					\$ 5,191,200.00
INCIDENTALS					
1	Engineering Design	5.3%	LS	\$ 311,500.00	\$ 311,500.00
2	Bidding & Negotiating	0.2%	HR	\$ 10,000.00	\$ 10,000.00
3	Engineering Construction Services	4.4%	HR	\$ 259,600.00	\$ 259,600.00
4	Topographic & Property Survey	0.3%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.2%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.3%	EST	\$ 20,000.00	\$ 20,000.00
7	Permitting	0.2%	EST	\$ 12,500.00	\$ 12,500.00
8	SCADA Design	0.4%	EST	\$ 25,000.00	\$ 25,000.00
9	Miscellaneous Professional Services	0.8%	EST	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 713,600.00
TOTAL PROJECT COST					\$ 5,904,800.00

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Engineer's Opinion of Probable Cost

Additional Treatment Capacity (3,000 gpm)
 Project Location: Not Specified

 12-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 306,800.00	\$ 306,800.00
2	Pilot Study	1	LS	\$ 75,000.00	\$ 75,000.00
3	Construction Staking	1	LS	\$ 15,000.00	\$ 15,000.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Package Pressure Filtration System	1	LS	\$ 2,300,000.00	\$ 2,300,000.00
6	Site Earthwork	1	LS	\$ 200,000.00	\$ 200,000.00
7	Water Treatment Plant Building & Appurtenances	1	LS	\$ 1,500,000.00	\$ 1,500,000.00
8	Chlorinator System	1	LS	\$ 100,000.00	\$ 100,000.00
9	Chlorine Contact Chamber	1	LS	\$ 325,000.00	\$ 325,000.00
10	Effluent Pump Station	1	LS	\$ 375,000.00	\$ 375,000.00
11	Electrical Systems	1	LS	\$ 400,000.00	\$ 400,000.00
12	Mechanical System	1	LS	\$ 275,000.00	\$ 275,000.00
13	Miscellaneous Piping to and from Site	1	LS	\$ 225,000.00	\$ 225,000.00
14	Miscellaneous Valves	1	LS	\$ 100,000.00	\$ 100,000.00
15	Miscellaneous Site Improvements (parking, fence, gate, etc.)	1	LS	\$ 175,000.00	\$ 175,000.00
16	SCADA Improvements	1	LS	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 6,441,800.00
CONTINGENCY				20%	\$ 1,288,400.00
CONSTRUCTION TOTAL					\$ 7,730,200.00
INCIDENTALS					
1	Engineering Design	5.5%	LS	\$ 479,800.00	\$ 479,800.00
2	Bidding & Negotiating	0.1%	HR	\$ 10,000.00	\$ 10,000.00
3	Engineering Construction Services	4.4%	HR	\$ 386,500.00	\$ 386,500.00
4	Topographic & Property Survey	0.2%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.1%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.2%	EST	\$ 20,000.00	\$ 20,000.00
7	Permitting	0.1%	EST	\$ 12,500.00	\$ 12,500.00
8	SCADA Design	0.3%	EST	\$ 25,000.00	\$ 25,000.00
9	Miscellaneous Engineering Services	0.6%	EST	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 1,008,800.00
TOTAL PROJECT COST					\$ 8,739,000.00

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Engineer's Opinion of Probable Cost

Additional Treatment Capacity PH2 (4,000 gpm)
 Project Location: Not Specified

12-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 363,300.00	\$ 363,300.00
2	Pilot Study	1	LS	\$ 75,000.00	\$ 75,000.00
3	Construction Staking	1	LS	\$ 15,000.00	\$ 15,000.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Package Pressure Filtration System	1	LS	\$ 3,000,000.00	\$ 3,000,000.00
6	Site Earthwork	1	LS	\$ 200,000.00	\$ 200,000.00
7	Water Treatment Plant Building & Appurtenances	1	LS	\$ 1,750,000.00	\$ 1,750,000.00
8	Chlorinator System	1	LS	\$ 100,000.00	\$ 100,000.00
9	Chlorine Contact Chamber	1	LS	\$ 375,000.00	\$ 375,000.00
10	Effluent Pump Station	1	LS	\$ 425,000.00	\$ 425,000.00
11	Electrical Systems	1	LS	\$ 450,000.00	\$ 450,000.00
12	Mechanical System	1	LS	\$ 315,000.00	\$ 315,000.00
13	Miscellaneous Piping to and from Site	1	LS	\$ 225,000.00	\$ 225,000.00
14	Miscellaneous Valves	1	LS	\$ 115,000.00	\$ 115,000.00
15	Miscellaneous Site Improvements (parking, fence, gate, etc.)	1	LS	\$ 150,000.00	\$ 150,000.00
16	SCADA Improvements	1	LS	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 7,628,300.00
				CONTINGENCY	20%
CONSTRUCTION TOTAL					\$ 9,154,000.00
INCIDENTALS					
1	Engineering Design	5.4%	LS	\$ 558,000.00	\$ 558,000.00
2	Bidding & Negotiating	0.1%	HR	\$ 10,000.00	\$ 10,000.00
3	Engineering Construction Services	4.4%	HR	\$ 457,700.00	\$ 457,700.00
4	Topographic & Property Survey	0.1%	EST	\$ 15,000.00	\$ 15,000.00
5	Geotechnical Report	0.1%	EST	\$ 10,000.00	\$ 10,000.00
6	Funding and Administrative Services	0.2%	EST	\$ 20,000.00	\$ 20,000.00
7	Permitting	0.1%	EST	\$ 12,500.00	\$ 12,500.00
8	SCADA Design	0.2%	EST	\$ 25,000.00	\$ 25,000.00
9	Miscellaneous Engineering Services	0.5%	EST	\$ 50,000.00	\$ 50,000.00
SUBTOTAL					\$ 1,158,200.00
TOTAL PROJECT COST					\$ 10,312,200.00

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Engineer's Opinion of Probable Cost

Fire Hydrant Improvements
 Project Location: Hildale City

 18-Oct-23
 BCW/tcd

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 61,700.00	\$ 61,700.00
2	Pre-Construction DVD and Project Sign	1	LS	\$ 2,500.00	\$ 2,500.00
3	Traffic Control	1	LS	\$ 10,000.00	\$ 10,000.00
4	Subsurface Investigation	24	HR	\$ 250.00	\$ 6,000.00
5	Materials Sampling & Testing	1	LS	\$ 16,000.00	\$ 16,000.00
6	Dust Control & Watering	1	LS	\$ 9,000.00	\$ 9,000.00
7	Construction Staking	1	LS	\$ 13,000.00	\$ 13,000.00
8	Erosion Control Compliance	1	LS	\$ 6,000.00	\$ 6,000.00
9	6" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	2,100	LF	\$ 50.00	\$ 105,000.00
10	6" Gate Valve Assembly	80	EA	\$ 2,000.00	\$ 160,000.00
11	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	2,930	LF	\$ 65.00	\$ 190,450.00
12	8" Gate Valve Assembly	8	EA	\$ 2,900.00	\$ 23,200.00
13	Fire Hydrant Assembly	78	EA	\$ 7,000.00	\$ 546,000.00
14	Restore Gravel Road	21,200	SF	\$ 3.25	\$ 68,900.00
15	Pavement Restoration	9,100	SF	\$ 7.50	\$ 68,250.00
16	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
SUBTOTAL					\$ 1,296,000.00
CONTINGENCY				20%	\$ 259,200.00
CONSTRUCTION TOTAL					\$ 1,555,200.00
INCIDENTALS					
1	Engineering Design	4.6%	LS	\$ 79,000.00	\$ 79,000.00
2	Bidding & Negotiating	0.4%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.7%	HR	\$ 64,800.00	\$ 64,800.00
4	Topographic & Property Survey	0.6%	EST	\$ 10,000.00	\$ 10,000.00
5	Funding and Administrative Services	0.7%	EST	\$ 12,000.00	\$ 12,000.00
6	Miscellaneous Engineering Services	0.3%	EST	\$ 5,000.00	\$ 5,000.00
SUBTOTAL					\$ 178,300.00
TOTAL PROJECT COST					\$ 1,733,500.00

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Engineer's Opinion of Probable Cost

Upper Pressure Zone Improvements
 Project Location: Hildale City

17-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 29,100.00	\$ 29,100.00
2	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 7,500.00	\$ 7,500.00
4	Subsurface Investigation	16	HR	\$ 250.00	\$ 4,000.00
5	Materials Sampling & Testing	1	LS	\$ 10,000.00	\$ 10,000.00
6	Dust Control & Watering	1	LS	\$ 7,500.00	\$ 7,500.00
7	Construction Staking	1	LS	\$ 7,500.00	\$ 7,500.00
8	Erosion Control Compliance	1	LS	\$ 6,000.00	\$ 6,000.00
9	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	5,000	LF	\$ 65.00	\$ 325,000.00
10	8" Gate Valve Assembly	14	EA	\$ 5,000.00	\$ 70,000.00
11	Disconnect and Reconnect Water Services	6	EA	\$ 2,000.00	\$ 12,000.00
12	Restore Gravel Road	30,000	SF	\$ 3.25	\$ 97,500.00
13	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
14	Misc. Connections, Fittings, and Tie-Ins	1	LS	\$ 10,000.00	\$ 10,000.00
15	6" Fire Hydrant Assembly	2	EA	\$ 7,000.00	\$ 14,000.00
				SUBTOTAL	\$ 611,600.00
				CONTINGENCY	20%
				CONSTRUCTION TOTAL	\$ 733,900.00
INCIDENTALS					
1	Engineering Design	5.3%	LS	\$ 45,000.00	\$ 45,000.00
2	Bidding & Negotiating	0.9%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.6%	HR	\$ 30,600.00	\$ 30,600.00
4	Topographic & Property Survey	0.9%	EST	\$ 7,500.00	\$ 7,500.00
5	Funding and Administrative Services	1.4%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.6%	EST	\$ 5,000.00	\$ 5,000.00
7	Miscellaneous Professional Services	0.6%	EST	\$ 5,000.00	\$ 5,000.00
				SUBTOTAL	\$ 112,600.00
				TOTAL PROJECT COST	\$ 846,500.00

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Engineer's Opinion of Probable Cost

Canyon Street Line
 Project Location: Hildale City

17-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 12,400.00	\$ 12,400.00
2	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 10,000.00	\$ 10,000.00
4	Subsurface Investigation	8	HR	\$ 250.00	\$ 2,000.00
5	Materials Sampling & Testing	1	LS	\$ 10,000.00	\$ 10,000.00
6	Dust Control & Watering	1	LS	\$ 10,000.00	\$ 10,000.00
7	Construction Staking	1	LS	\$ 7,500.00	\$ 7,500.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	1,500	LF	\$ 65.00	\$ 97,500.00
10	8" Gate Valve Assembly	5	EA	\$ 5,000.00	\$ 25,000.00
11	Restore Surface Improvements	1	LS	\$ 10,000.00	\$ 10,000.00
12	Pavement Restoration	9,000	SF	\$ 6.00	\$ 54,000.00
13	Misc. Connections, Fittings, and Tie-Ins	1	LS	\$ 7,500.00	\$ 7,500.00
14	Reconnect Water Services	5	EA	\$ 1,200.00	\$ 6,000.00
SUBTOTAL					\$ 260,900.00
CONTINGENCY				20%	\$ 52,200.00
CONSTRUCTION TOTAL					\$ 313,100.00
INCIDENTALS					
1	Engineering Design	6.4%	LS	\$ 25,000.00	\$ 25,000.00
2	Bidding & Negotiating	1.9%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.7%	HR	\$ 18,300.00	\$ 18,300.00
4	Topographic & Property Survey	1.9%	EST	\$ 7,500.00	\$ 7,500.00
5	Funding and Administrative Services	2.6%	EST	\$ 10,000.00	\$ 10,000.00
6	Permitting	1.3%	EST	\$ 5,000.00	\$ 5,000.00
7	Miscellaneous Engineering Services	0.6%	EST	\$ 2,500.00	\$ 2,500.00
SUBTOTAL					\$ 75,800.00
TOTAL PROJECT COST					\$ 388,900.00

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Engineer's Opinion of Probable Cost

Northwest Hildale Transmission Line
 Project Location: Hildale City

17-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 69,300.00	\$ 69,300.00
2	Traffic Control	1	LS	\$ 12,000.00	\$ 12,000.00
3	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Subsurface Investigation	8	HR	\$ 250.00	\$ 2,000.00
6	Restore Surface Improvements	1	LS	\$ 12,000.00	\$ 12,000.00
7	Erosion Control Compliance	2	LS	\$ 8,000.00	\$ 16,000.00
8	Construction Staking	1	LS	\$ 12,500.00	\$ 12,500.00
9	Materials Sampling & Testing	1	LS	\$ 12,000.00	\$ 12,000.00
10	Surface Restoration	32,500	SF	\$ 5.00	\$ 162,500.00
11	24" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	4,150	LF	\$ 150.00	\$ 622,500.00
12	24" Gate Valve Assembly	12	EA	\$ 9,500.00	\$ 114,000.00
13	16" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	2,350	LF	\$ 120.00	\$ 282,000.00
14	16" Gate Valve Assembly	12	EA	\$ 6,750.00	\$ 81,000.00
15	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 35,000.00	\$ 35,000.00
SUBTOTAL					\$ 1,454,300.00
CONTINGENCY				20%	\$ 290,900.00
CONSTRUCTION TOTAL					\$ 1,745,200.00
INCIDENTALS					
1	Engineering Design	5.3%	LS	\$ 105,000.00	\$ 105,000.00
2	Bidding & Negotiating	0.4%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.7%	HR	\$ 72,700.00	\$ 72,700.00
4	Topographic & Property Survey	0.8%	EST	\$ 15,000.00	\$ 15,000.00
5	Funding and Administrative Services	0.6%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.3%	EST	\$ 5,000.00	\$ 5,000.00
7	Miscellaneous Engineering Services	0.8%	EST	\$ 15,000.00	\$ 15,000.00
SUBTOTAL					\$ 232,200.00
TOTAL PROJECT COST					\$ 1,977,400.00

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Engineer's Opinion of Probable Cost

Hildale Street Line

17-Oct-23

Project Location: Colorado City

MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 13,200.00	\$ 13,200.00
2	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
3	Traffic Control	1	LS	\$ 18,000.00	\$ 18,000.00
4	Subsurface Investigation	4	HR	\$ 250.00	\$ 1,000.00
5	Materials Sampling & Testing	1	LS	\$ 7,500.00	\$ 7,500.00
6	Dust Control & Watering	1	LS	\$ 7,500.00	\$ 7,500.00
7	Construction Staking	1	LS	\$ 7,000.00	\$ 7,000.00
8	Erosion Control Compliance	1	LS	\$ 7,500.00	\$ 7,500.00
9	8" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	2,650	LF	\$ 65.00	\$ 172,250.00
10	8" Gate Valve Assembly	7	EA	\$ 5,000.00	\$ 33,125.00
11	Restore Surface Improvements	1	LS	\$ 8,500.00	\$ 8,500.00
SUBTOTAL					\$ 277,075.00
CONTINGENCY				20%	\$ 55,415.00
CONSTRUCTION TOTAL					\$ 332,490.00
INCIDENTALS					
1	Engineering Design	5.5%	LS	\$ 25,000.00	\$ 25,000.00
2	Bidding & Negotiating	1.7%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	4.3%	HR	\$ 19,400.00	\$ 19,400.00
4	Topographic & Property Survey	1.7%	EST	\$ 7,500.00	\$ 7,500.00
5	Funding and Administrative Services	2.2%	EST	\$ 10,000.00	\$ 10,000.00
6	Land & RoW Negotiation/Acquisition	11.0%	EST	\$ 50,000.00	\$ 50,000.00
7	Miscellaneous Engineering Services	0.6%	EST	\$ 2,500.00	\$ 2,500.00
SUBTOTAL					\$ 121,900.00
TOTAL PROJECT COST					\$ 454,390.00

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Engineer's Opinion of Probable Cost

Southwest Hildale Transmission Line
 Project Location: Hildale City

17-Oct-23
 MCG/bcw

NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 28,400.00	\$ 28,400.00
2	Traffic Control	1	LS	\$ 12,000.00	\$ 12,000.00
3	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Subsurface Investigation	8	HR	\$ 250.00	\$ 2,000.00
6	Restore Surface Improvements	1	LS	\$ 12,000.00	\$ 12,000.00
7	Erosion Control Compliance	2	LS	\$ 8,000.00	\$ 16,000.00
8	Construction Staking	1	LS	\$ 12,500.00	\$ 12,500.00
9	Materials Sampling & Testing	1	LS	\$ 12,000.00	\$ 12,000.00
10	Roadway Restoration	9,000	SF	\$ 6.00	\$ 54,000.00
11	12" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	1,900	LF	\$ 110.00	\$ 209,000.00
12	12" Gate Valve Assembly	12	EA	\$ 6,750.00	\$ 81,000.00
13	PRV and Vault	1	LS	\$ 100,000.00	\$ 100,000.00
14	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 35,000.00	\$ 35,000.00
SUBTOTAL					\$ 595,400.00
				CONTINGENCY	20%
CONSTRUCTION TOTAL					\$ 714,500.00
INCIDENTALS					
1	Engineering Design	11.6%	LS	\$ 105,000.00	\$ 105,000.00
2	Bidding & Negotiating	0.8%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.3%	HR	\$ 29,800.00	\$ 29,800.00
4	Topographic & Property Survey	1.7%	EST	\$ 15,000.00	\$ 15,000.00
5	Funding and Administrative Services	1.3%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.6%	EST	\$ 5,000.00	\$ 5,000.00
7	Miscellaneous Engineering Services	1.7%	EST	\$ 15,000.00	\$ 15,000.00
SUBTOTAL					\$ 189,300.00
TOTAL PROJECT COST					\$ 903,800.00

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Engineer's Opinion of Probable Cost

Transmission Line to Airport
 Project Location: Colorado City

17-Oct-23
 MCG/bcw

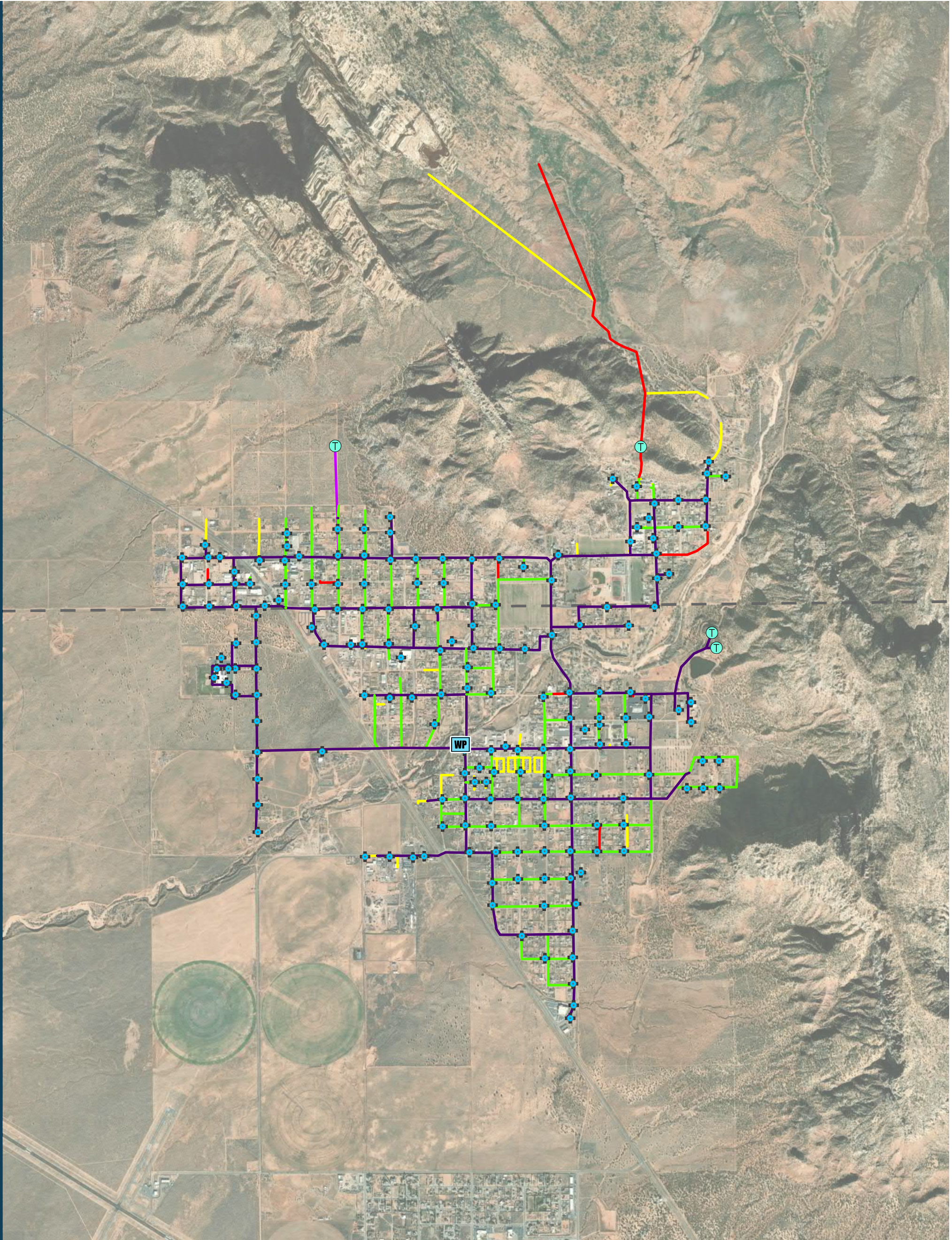
NO.	DESCRIPTION	EST. QTY	UNIT	UNIT PRICE	AMOUNT
GENERAL CONSTRUCTION					
1	Mobilization	5%	LS	\$ 71,600.00	\$ 71,600.00
2	Traffic Control	1	LS	\$ 12,000.00	\$ 12,000.00
3	Pre-Construction DVD	1	LS	\$ 1,500.00	\$ 1,500.00
4	Dust Control & Watering	1	LS	\$ 20,000.00	\$ 20,000.00
5	Subsurface Investigation	8	HR	\$ 250.00	\$ 2,000.00
6	Restore Surface Improvements	1	LS	\$ 12,000.00	\$ 12,000.00
7	Erosion Control Compliance	2	LS	\$ 8,000.00	\$ 16,000.00
8	Construction Staking	1	LS	\$ 12,500.00	\$ 12,500.00
9	Materials Sampling & Testing	1	LS	\$ 12,000.00	\$ 12,000.00
10	Roadway Restoration	42,750	SF	\$ 6.00	\$ 256,500.00
11	10" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	650	LF	\$ 90.00	\$ 58,500.00
12	10" Gate Valve Assembly	2	EA	\$ 5,250.00	\$ 10,500.00
13	12" PVC (C900) Line, Fitting, Tracer Wire, Bedding, & Backfill	7,900	EA	\$ 110.00	\$ 869,000.00
14	12" Gate Valve Assembly	17	EA	\$ 6,750.00	\$ 114,750.00
15	Misc. Connections, Fittings and Tie-ins	1	LS	\$ 35,000.00	\$ 35,000.00
SUBTOTAL					\$ 1,503,850.00
CONTINGENCY				20%	\$ 300,800.00
CONSTRUCTION TOTAL					\$ 1,804,650.00
INCIDENTALS					
1	Engineering Design	5.1%	LS	\$ 105,000.00	\$ 105,000.00
2	Bidding & Negotiating	0.4%	HR	\$ 7,500.00	\$ 7,500.00
3	Engineering Construction Services	3.7%	HR	\$ 75,200.00	\$ 75,200.00
4	Topographic & Property Survey	0.7%	EST	\$ 15,000.00	\$ 15,000.00
5	Funding and Administrative Services	0.6%	EST	\$ 12,000.00	\$ 12,000.00
6	Permitting	0.2%	EST	\$ 5,000.00	\$ 5,000.00
7	Miscellaneous Engineering Services	0.7%	EST	\$ 15,000.00	\$ 15,000.00
SUBTOTAL					\$ 234,700.00
TOTAL PROJECT COST					\$ 2,039,350.00

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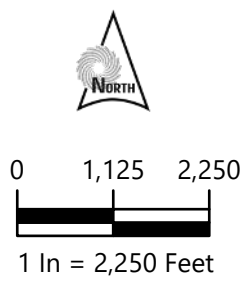
APPENDIX D

System Maps

EXISTING WATER SYSTEM



MAP LEGEND



- Water Mains
- 2"
 - 4"
 - 6"
 - 8"
 - 12"

- Water Hydrants
- Water Tank
- Treatment Plant

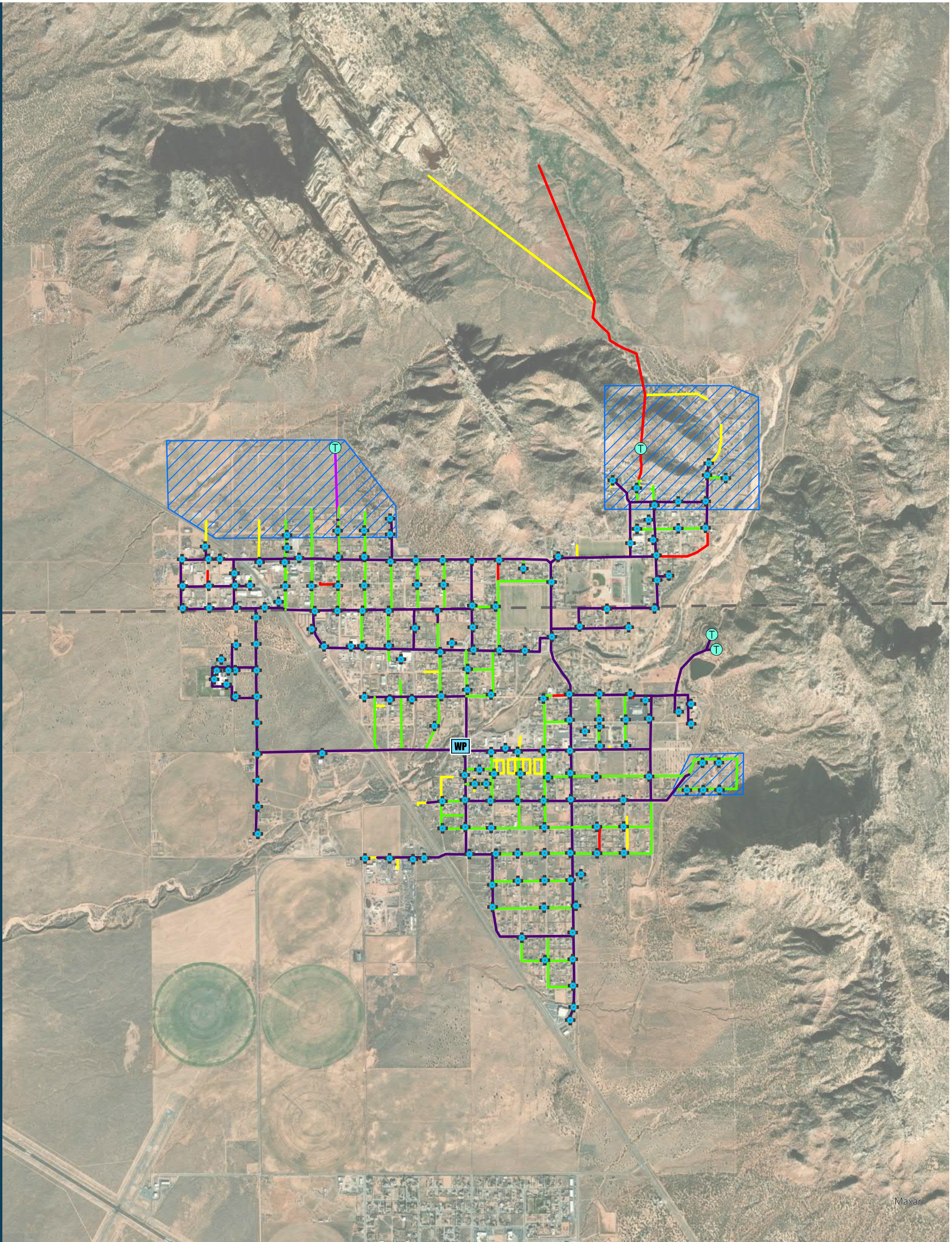
- State Boundary



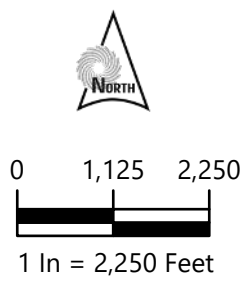
Map Date: 10.27.2023



LOW FIRE FLOW AREA



MAP LEGEND



- Water Mains**
- 2"
 - 4"
 - 6"
 - 8"
 - 12"

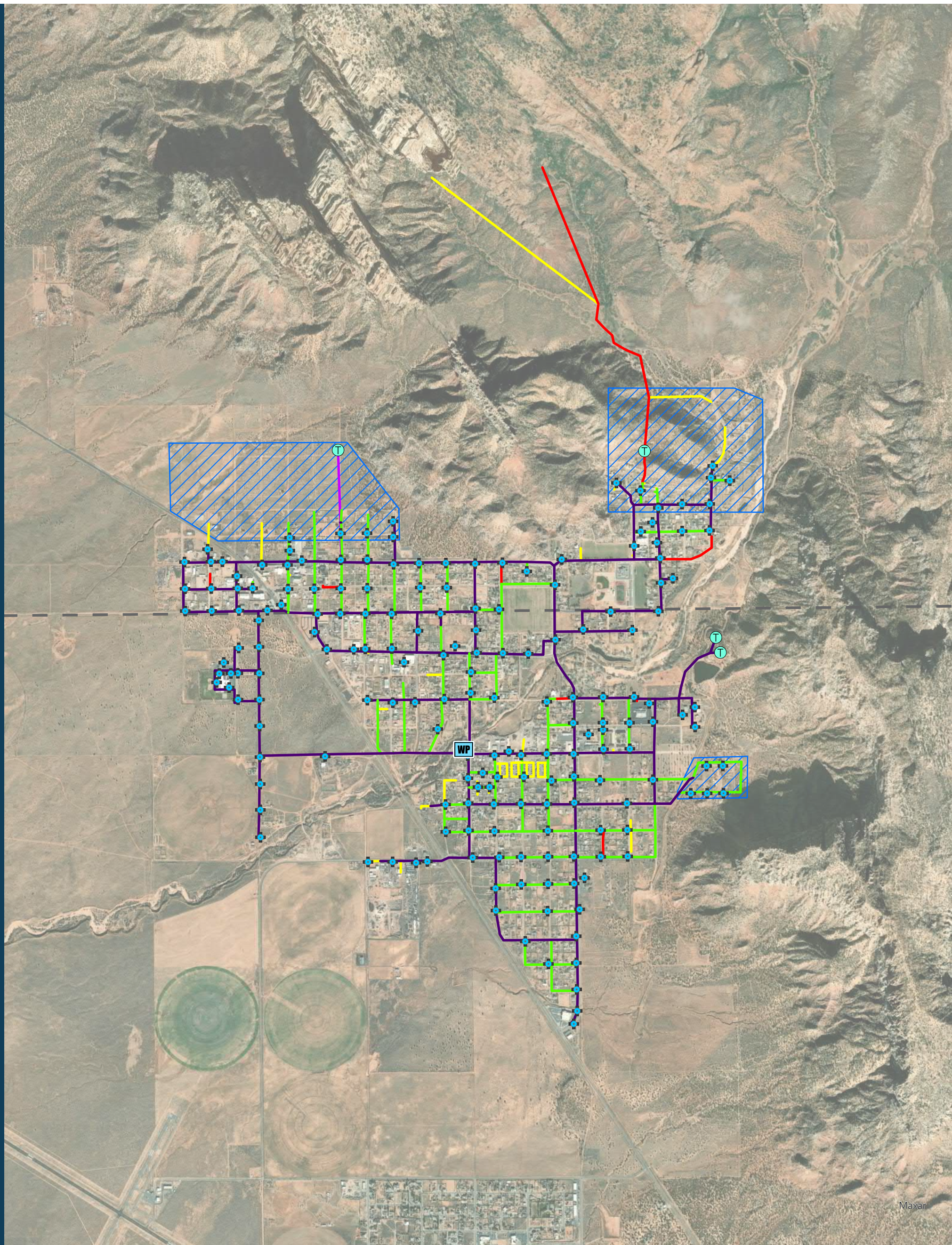
- Water Hydrants
- Water Tank
- Treatment Plant
- Pressure Zones
- State Boundary



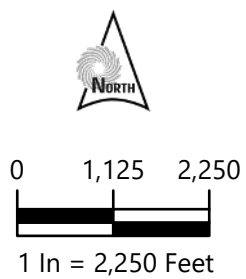
Map Date: 10.27.2023



LOW PRESSURE DURING PDD SCENARIO



MAP LEGEND



- Water Mains**
- 2"
 - 4"
 - 6"
 - 8"
 - 12"

- + Water Hydrants
- T Water Tank
- WP Treatment Plant
- Pressure Zones

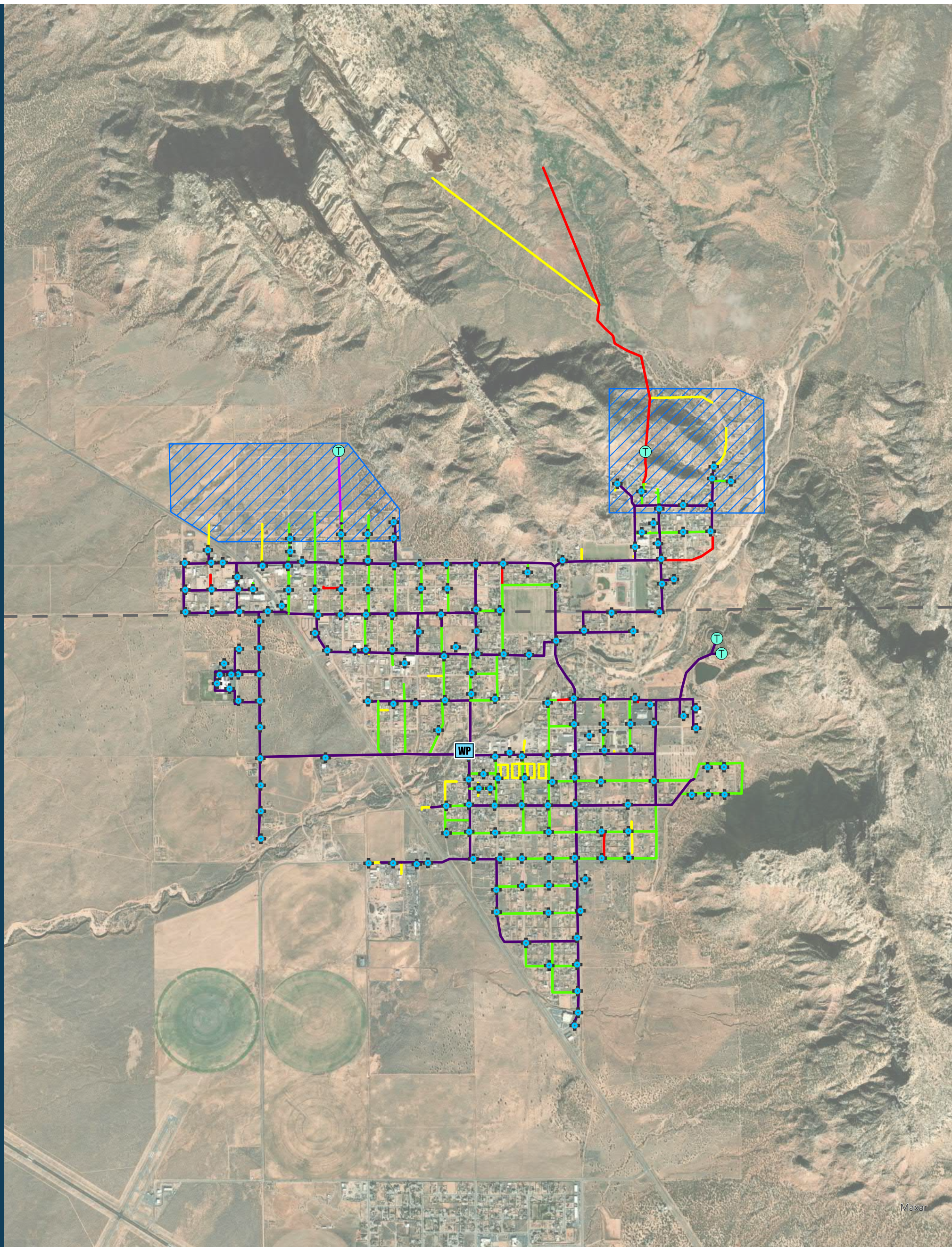
- State Boundary



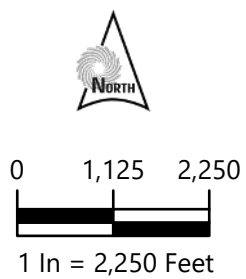
Map Date: 10.27.2023



LOW PRESSURE DURING PID SCENARIO



MAP LEGEND



- Water Mains**
- 2"
 - 4"
 - 6"
 - 8"
 - 12"

- + Water Hydrants
- T Water Tank
- WP Treatment Plant
- Pressure Zones

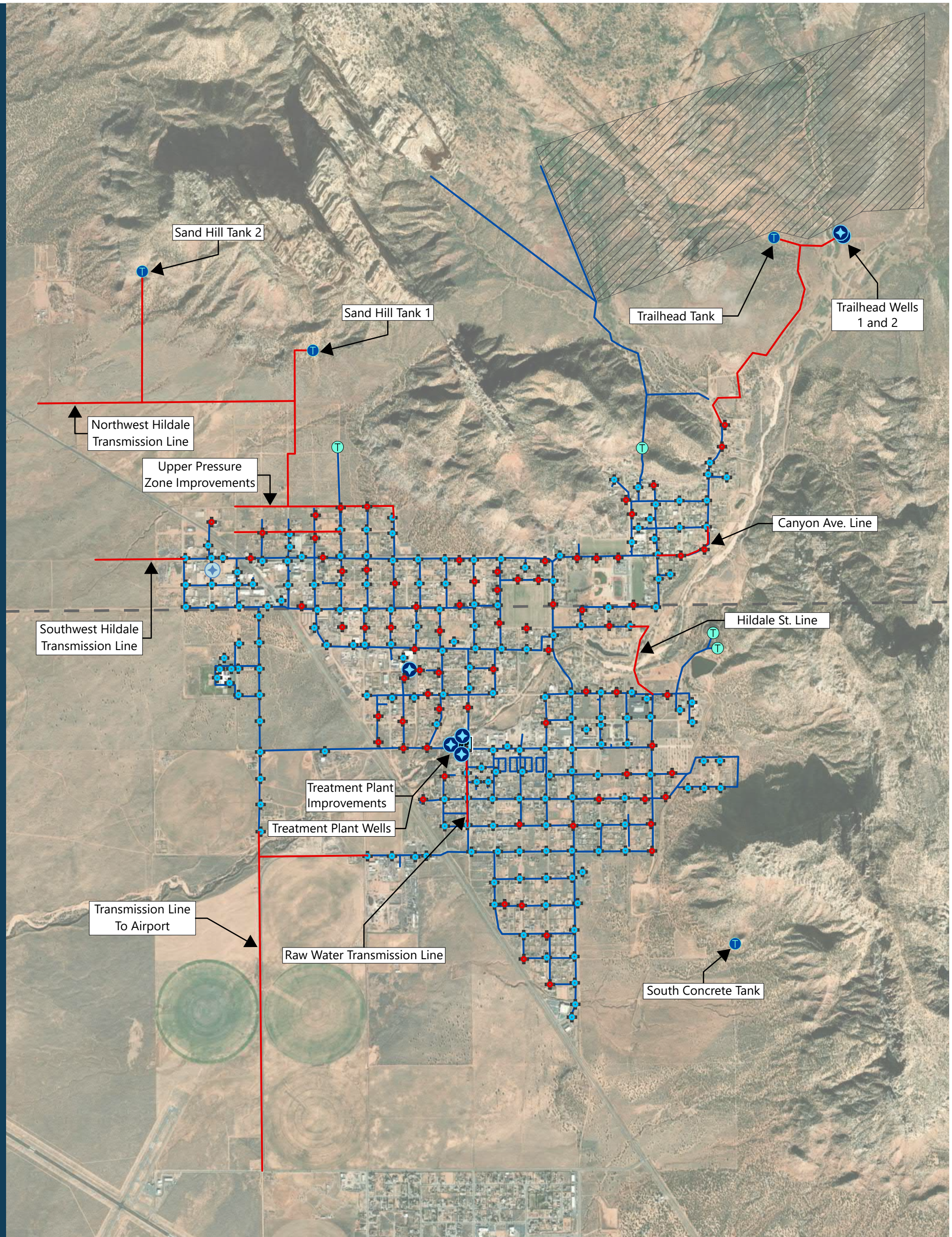
- State Boundary



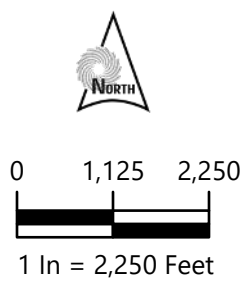
Map Date: 10.27.2023



RECOMMENDED IMPROVEMENTS



MAP LEGEND



Recommended Improvements

- Water Mains
- + Water Hydrants
- T Water Tank
- + Production Well
- Hildale Ground Water Project Area

Existing Water System

- Water Mains
- + Water Hydrants
- T Water Tank
- + Production Well
- WP Treatment Plant

State Boundary



Map Date: 10.27.2023





APPENDIX E

Impact Fee Analysis

Impact Fee Projects & Impact Fee Eligibility

Source Projects	Current Costs	Year	Costs w/ Inflation*	Financed Costs**	% IF El.	IF El. Cost	% Hildale	Hildale IF EL. Cost	% Colorado City	Colorado City IF EL. Cost
Treatment Plant Wells	\$ 1,288,700.00	2024	\$ 1,327,361	\$ 976,695	0.0%	\$ -	50%	\$ -	50%	\$ -
5 Year AZ Well Field	\$ 3,333,400.00	2026	\$ 3,642,496	\$ 2,680,212	84.3%	\$ 2,259,419	50%	\$ 1,129,709.00	50%	\$ 1,129,709.55
5 Year UT Well Field	\$ 6,923,700.00	2026	\$ 7,565,714	\$ 5,566,985	84.3%	\$ 4,692,968	50%	\$ 2,346,484.00	50%	\$ 2,346,484.07
10 Year AZ Well Field	\$ 3,809,600.00	2032	\$ 4,970,664	\$ 3,657,502	100.0%	\$ 3,657,502	50%	\$ 1,828,750.00	50%	\$ 1,828,750.76
10 Year UT Well Field	\$ 7,912,800.00	2032	\$ 10,324,409	\$ 7,596,881	100.0%	\$ 7,596,881	50%	\$ 3,798,440.00	50%	\$ 3,798,440.52
			Sub total	\$ 20,478,275		\$ 18,206,770		\$ 9,103,383		\$ 9,103,385
Storage Projects										
Sandhill Tank 1	\$ 5,938,100.00	2025	\$ 6,299,730	\$ 4,635,452	100.0%	\$ 4,635,452	70%	\$ 3,244,816.00	30%	\$ 1,390,635.54
			Sub total	\$ 4,635,452		\$ 4,635,452		\$ 3,244,816		\$ 1,390,636
Water Treatment Projects										
Raw Water Transmission Line	\$ 1,092,500.00	2024	\$ 1,125,275	\$ 827,997	0.0%	\$ -	50%	\$ -	50%	\$ -
Small Treatment Plant (1,600 gpm)	\$ 5,904,800.00	2025	\$ 6,264,402	\$ 4,609,457	100.0%	\$ 4,609,457	50%	\$ 2,304,728.00	50%	\$ 2,304,728.44
			Sub total	\$ 5,437,454		\$ 4,609,457		\$ 2,304,728		\$ 2,304,728
Distribution System Projects										
Fire Hydrant Project	\$ 1,733,500.00	2024	\$ 1,785,505	\$ 1,313,806	0.0%	\$ -	50%	\$ -	50%	\$ -
Upper Pressure Zone Improvements	\$ 846,500.00	2026	\$ 924,993	\$ 680,626	50.0%	\$ 340,313	100%	\$ 340,313.00	0%	\$ -
Canyon St. Line	\$ 388,900.00	2028	\$ 450,842	\$ 331,737	0.0%	\$ -	50%	\$ -	50%	\$ -
Northwest Hildale Transmission Line	\$ 1,977,400.00	2028	\$ 2,292,349	\$ 1,686,750	100.0%	\$ 1,686,750	100%	\$ 1,686,750.00	0%	\$ -
Hildale St. Line	\$ 454,390.00	2030	\$ 558,842	\$ 411,206	0.0%	\$ -	50%	\$ -	50%	\$ -
			Sub total	\$ 4,424,126		\$ 2,027,063		\$ 2,027,063		\$ -
Future Planning Projects										
Capital Facilities Plan and IFFP & IFA Updat	\$ 60,000	2028	\$ 69,556	\$ 79,474	100.0%	\$ 79,474	50%	\$ 39,737.00	50%	\$ 39,737.17
			Sub total	\$ 79,474		\$ 79,474		\$ 39,737		\$ 39,737
			Total	\$ 35,054,781		\$ 29,558,216	Impact Fee Amount	\$ 16,719,727	Impact Fee Amount	\$ 12,838,486

* Inflation is assumed at 3%

**Financed costs assume a 20-year 4% interest loan

Number ERU Start 2024	468	Number ERU Start 2024	847
Number ERU End 2033	1,797	Number ERU End 2033	1,934
Number New ERU	1,329	Number New ERU	1,087
Impact Fee per ERU	\$ 12,580.00	Impact Fee per ERU	\$ 11,807.00

