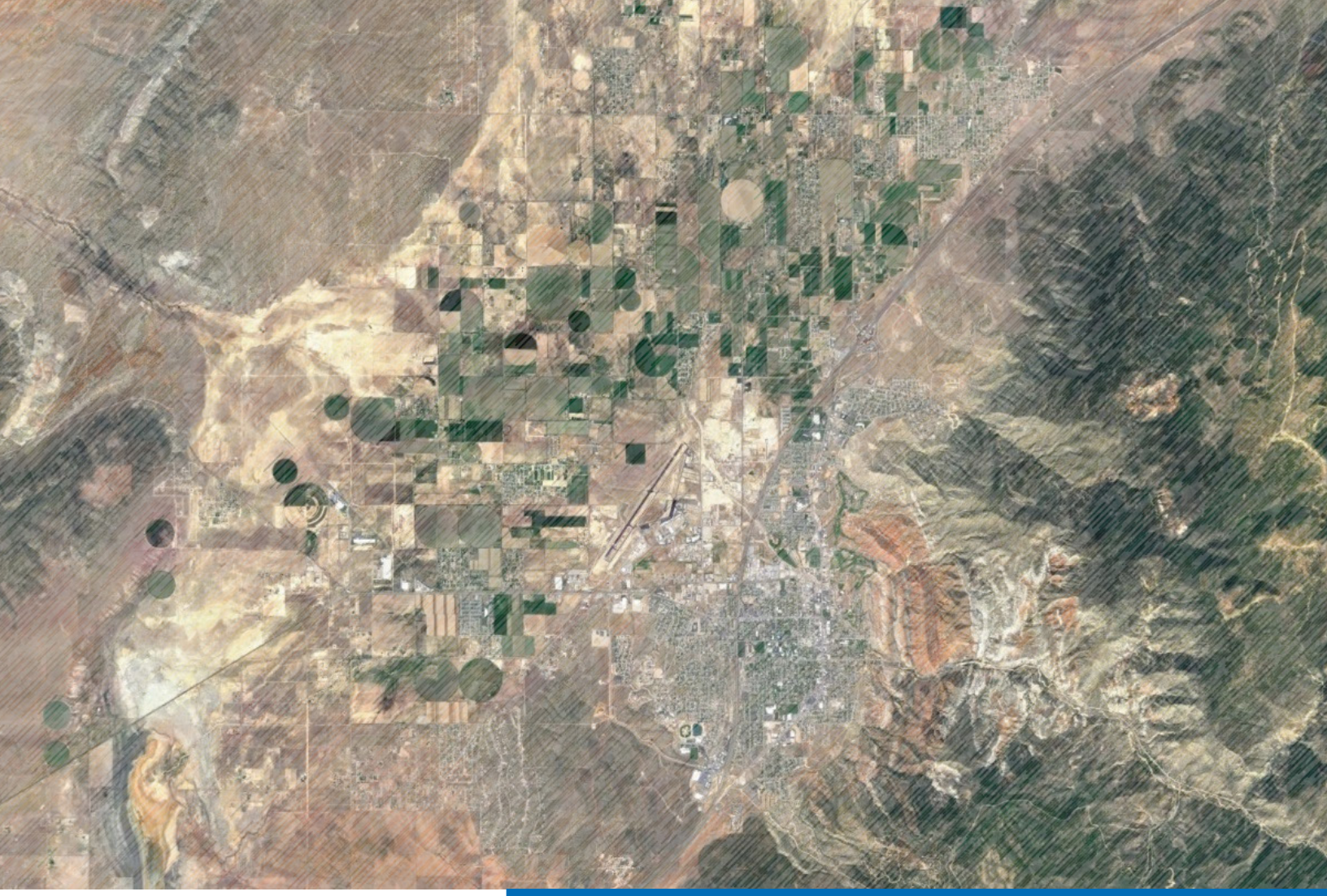

Central Iron County Water Conservancy District
Pine Valley Water Supply and Conservation Project

FINANCIAL BUSINESS PLAN AND WATER NEEDS ASSESSMENT

FINAL | June 2020

carollo

Central Iron County Water Conservancy District
Pine Valley Water Supply and Conservation Project

FINANCIAL BUSINESS PLAN AND WATER NEEDS ASSESSMENT

FINAL | June 2020

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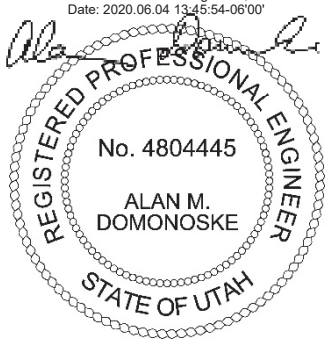

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Abbreviations

AFY	acre-feet per year
BPA	Bonneville Power Authority
Carollo	Carollo Engineers, Inc.
Cedar City	Cedar City Corporation
cfs	cubic feet per second
CICWCD	Central Iron County Water Conservancy District
DNR	Department of Natural Resources
DWR	Division of Water Rights
EIS	Environmental Impact Statement
FBPWNA	Financial Business Plan and Water Needs Assessment
GMP	Groundwater Management Plan
GOMB	Governor's Office of Management and Budget
gpcd	gallons per capita per day
gpm	gallons per minute
Kgals	thousands of gallons
LEPA	Low Energy Precision Application
LESA	Low Elevation Sprinkler Application
N/A	Not Applicable
O&M	operation and maintenance
PVWS	Pine Valley Water Supply
ROD	Record of Decision
SRF	State Revolving Fund
WIFIA	Water Infrastructure Finance and Innovation Act
WWTP	wastewater treatment plant

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Chapter 1
INTRODUCTION

1.1 Study Goals

Monitoring of the Cedar Valley Aquifer has shown that water table levels have dropped anywhere from 10 feet to over 100 feet in some areas over the past 80 years. While agricultural demands drive much of the area's groundwater use, communities in Iron County are continuing to grow and also drive a portion of the demands on this local resource. Because water is currently withdrawn from the aquifer at a rate that exceeds recharge, the Utah Division of Water Rights (DWR) has developed a draft Groundwater Management Plan (GMP) for the Cedar City Valley. The draft GMP calls for a series of cutbacks in water rights for users throughout the basin, with a goal of reducing net depletion use of local groundwater to sustainable levels. This will directly impact the ability of public water supply providers in Iron County to meet projected demands.

The Central Iron County Water Conservancy District (CICWCD) is proactively taking action to address the anticipated water supply shortfall. Agricultural irrigation is by far the largest use of water from the Cedar Valley Aquifer. The CICWCD has undertaken steps to support agricultural efficiency, including upgrading agricultural irrigation equipment in the valley to Low Energy Precision Application (LEPA) and Low Elevation Sprinkler Application (LESA) technologies as detailed in Chapter 2. The CICWCD has also invested in construction of facilities to increase the amount of water recharged to the aquifer from local surface water sources.

The CICWCD has implemented aquifer storage and conservation projects as well as acquired water rights outside of the Cedar Valley Basin, from a series of water basins in western Beaver County. These water rights will be groundwater development projects that will import water into the Cedar Valley. The Pine Valley Water Supply and Conservation (PVWS) project is the first phase to import water and includes development of wells and design and construction of a new pipeline from the Pine Valley wellfield to delivery points in the Cedar City Valley.

An economic and fiscal analysis study commissioned by the CICWCD in 2019 (Applied Analysis 2019) documented the financial benefits of the PVWS project, including estimates of employment generated by the project. Modeling conducted in the 2019 study found that constructing the PVWS (estimated at $254 million at the time of the analysis) would generate over $366 million in economic output and more than 3,100 person-years of employment, considering direct, indirect, and induced employment. Excerpts from the Applied Analysis economic report are included as Appendix A, and a link to the full report is provided in Chapter 5 (References).

This Financial Business Plan and Water Needs Assessment (FBPWNA) is an element toward making the CICWCD's vision a reality. The PVWS is envisioned as a regional project that can supply water to the vast majority of Iron County, consistent with the CICWCD's service area that covers more than 90 percent of the County's population. It is anticipated that with the PVWS in place, the CICWCD would serve a portion of the demands through direct retail service. The remainder of PVWS supply would be made available via wholesale deliveries to Cedar City,

Enoch City, and Kanarraville. These communities have not made decisions regarding participation in the project. This report provides information to support informed decision-making by the CICWCD and each of these key stakeholders.

This report outlines analyses conducted to assess the amount and timing of water needed to avoid a future supply gap (Water Needs Assessment) and the financial implications of implementing the project via cost sharing and outside funding opportunities (Business Plan). The Business Plan demonstrates how the project could be financed and funded, in light of incurring debt for the project, the revenues needed to cover that debt, and the associated changes to customers' water rates to provide the needed revenue.

1.2 Key Stakeholders

The CICWCD is leading efforts to plan the PVWS project. Key stakeholders that participated in the development of this FBPWNA are the same entities that could be future wholesale customers of CICWCD, should they choose to participate in the project. The key stakeholders referenced throughout this report include:

- Cedar City Corporation (Cedar City),
- Enoch City, and
- Town of Kanarraville.

Implementation of the project would include development of interlocal agreements between the CICWCD and participating key stakeholders.

Ensign Engineering has supported PVWS planning, including development of preliminary layouts of Pine Valley well field facilities, routing of the pipeline from Pine Valley to the Cedar City Valley, estimating capital costs for the PVWS infrastructure, and supporting permitting efforts initiated by the CICWCD.

1.3 Basis of Planning

Implementation of the PVWS project will require significant capital. For purposes of FBPWNA analyses, it was assumed that the CICWCD will carry debt to fund the project, and revenue for debt service will come from PVWS project water sales. That revenue will include a combination of direct water sales to CICWCD's retail customers and wholesale sales of water to the key stakeholders. A local economist, Dr. David Tufte, reviewed the underlying assumptions, financial factors, and methods used to conduct financial analyses detailed throughout this report.

Variations on the project financing framework, such as having each key stakeholder individually carry its pro-rata share of the PVWS debt, were not assessed in this study. Sources of outside funding (e.g., from state or federal-level grants or financing programs) were considered for their applicability and ability to moderate end-user rates.

Projections of water needs and future shortages are based on the methods and assumptions detailed in Chapter 2 of this report. Sources of information include information and studies published by state of Utah agencies, past studies and documents developed by the CICWCD and key stakeholders. A range of potential water supply strategies was evaluated, including options with and without construction of the PVWS project. It was generally assumed that new wells would be added as needed to meet demands until either the PVWS project comes online or water rights constraints preclude further expansion of local groundwater use.

1.4 Related Studies

Planning for the PVWS project, including details of the wells and conveyance infrastructure needed to deliver water to the Cedar City Valley, is documented in the CICWCD's "Pine Valley Groundwater Development and Transmission Pipeline Project – Conceptual Plan of Development" (draft prepared by Ensign Engineering, September 2017). The CICWCD has also conducted previous studies to evaluate regional water needs and financial aspects of the project, such as the CICWCD's Water Master Plan Report (Ensign Engineering, 2014) and the CICWCD's Water Resource Economic and Fiscal Analysis (working draft, Applied Analysis, June 2019).

A fundamental basis for this FBPWNA study is an assumption that DWR will implement water rights cutbacks in the Cedar City Valley Aquifer on the schedule and in the amounts described in the DWR 2019 draft GMP. Water use reports from CICWCD and key stakeholders demonstrate the historical demand trends, which were used as an initial basis of estimating future water demands in the study area. Conservation plans provided by Cedar City and Enoch City provide insights into future water use trends and conservation strategies. The amount and timing of water shortages identified in this FBPWNA report could be affected by any variations in the GMP quantity or timing, or by changes in the rate of water use in the CICWCD or key stakeholders' service areas.

A list of project reference materials is provided in Chapter 5 of this report.

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Chapter 2

INTEGRATED WATER RESOURCE PLAN

2.1 Water Needs Assessment Overview

The CICWCD and key stakeholders face challenges in meeting future municipal water demands. Water demands are forecasted to increase due to population growth in the Cedar City Valley. Combined with agricultural water use in the valley, this will apply further pressure to limited local water resources. The CICWCD and key stakeholders rely primarily on groundwater from the Cedar Valley Aquifer, and have implemented several projects to recharge the aquifer with available Coal Creek surface water when it is physically and legally available. Figure 2.1 provides a summary of Cedar City Valley aquifer use by sector (adapted from Utah DWR, 2016).

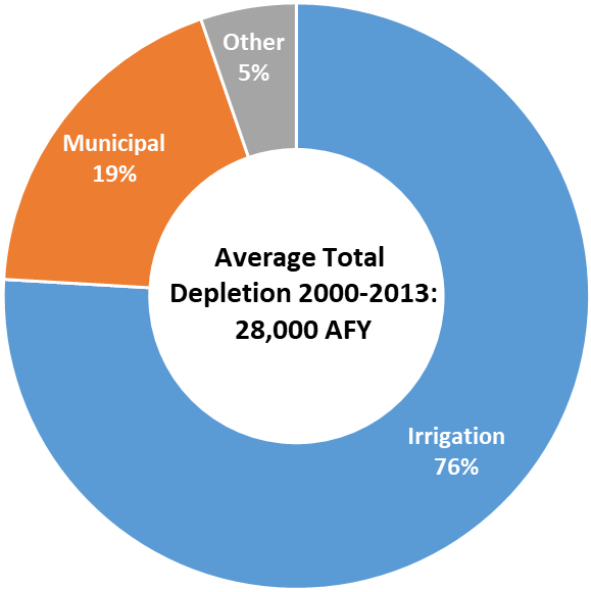

Figure 2.1 Cedar City Valley Aquifer Use by Sector

Despite these recharge efforts and ongoing conservation initiatives, data show that the combination of agricultural and municipal use of the Cedar Valley Aquifer has led to a declining water table for many years. Some areas in the valley have been reported to exhibit land subsidence as a result. A Utah Geological Survey 2014 study found that, "Lowering the potentiometric surface by groundwater pumping in excess of annual aquifer recharge has caused permanent compaction of fine-grained sediments of the Cedar Valley aquifer. In response to the land subsidence, a minimum of 8.3 miles of earth fissures have formed in the south-western and northeastern parts of Cedar Valley."

The Utah DWR has developed a draft GMP for the Cedar City Valley. The draft GMP calls for a series of cutbacks in water rights for users throughout the basin, with a goal of reducing net depletion use of local groundwater to sustainable levels.

The combination of growing service area demands for the CICWCD and key stakeholders, combined with planned cutbacks in water rights, results in an anticipated future scenario where legally available supplies from the local aquifer will fall short of demands. The PVWS project will resolve this predicted shortage by providing a new water supply to the CICWCD and key stakeholders (Cedar City, Enoch City, and Kanarraville).

This chapter describes the forecasted demands and anticipated shortages identified through a water needs assessment for the CICWCD and key stakeholders. The analysis includes a depiction of water shortages that would be anticipated under a "no action" alternative, then it explores six

different scenarios that could be used to avoid such shortages. This information was used to evaluate financial aspects of PVWS implementation in the Business Plan, documented in Chapter 3 of this report.

2.2 Population Projections

Municipal (public water supply) water use is directly correlated to service area population. Historical and projected population for the CICWCD and key stakeholders are presented in Table 2.1 and Table 2.2, respectively. Projections were made through 2070, consistent with statutory direction for a 50-year planning horizon.

Table 2.1 Historical Service Area Population

	2014	2015	2016	2017	2018
CICWCD Retail[1]	2,200	1,910	1,700	3,095	4,545
Cedar City[2]	29,162	29,483	30,184	31,223	31,806
Enoch City[3]	6,086	6,237	6,539	6,756	6,959
Kanarraville[4]	355	355	355	355	355
Total Service Area[5]	**37,803**	**37,985**	**38,778**	**41,429**	**43,665**

Notes:
(1) Source: CICWCD annual water reports.
(2) Source: Cedar City 2018 water report.
(3) Source: Enoch City water reports and Enoch City 2018 Impact Fee Plan.
(4) Source: 2010 United States Census Bureau estimate.
(5) Sum of rows may not equal total shown due to rounding of decimals.

Table 2.2 Projected Service Area Population

	2020	2030	2040	2050	2060	2070
CICWCD Total County Service Area[1]	52,890	66,454	80,744	98,074	118,466	143,098
CICWCD % of Service Area Connected[2]	60%	70%	80%	90%	95%	100%
CICWCD Retail[3]	5,642	7,890	10,009	12,213	13,346	13,788
Cedar City[4]	35,666	44,812	54,448	66,135	79,886	96,496
Enoch City[5]	7,382	9,921	13,334	17,919	24,082	32,364
Kanarraville[6]	439	450	450	450	450	450
Total Service Area[7]	**49,129**	**63,073**	**78,241**	**96,717**	**117,764**	**143,098**

Notes:
(1) Estimated as 92.7 percent of total Iron County population, based on CICWCD estimates of potential future service area (including retail and wholesale supply). Iron County population projections per Utah Governor's Office of Management and Budget (GOMB, 2012).
(2) Percent of total CICWCD potential retail service area that will be connected to the CICWCD system in the year indicated. Estimates provided by CICWCD and Ensign Engineering staff, October 2019.
(3) CICWCD total county service area at estimated percent connected, minus the population of the CICWCD's potential wholesale customers (Cedar City, Enoch City, and Kanarraville).
(4) Projections through 2060 per GOMB (2012); 2050-2060 growth percent used to estimate 2070 population.
(5) Projections through 2050 per Enoch City 2018 Impact Fee Plan; 2060 and 2070 populations extrapolated from 2050 at assumed 3 percent annual growth per Enoch City staff.
(6) Projections through 2020 per GOMB (2012). Population in 2030 and beyond was assumed constant at 450 per Kanarraville policy of ceasing further annexations.
(7) Total population that could potentially be served by the PVWS, including CICWCD direct retail customers and wholesale deliveries to Cedar City, Enoch City, and Kanarraville. Sum of rows may not equal total shown due to rounding of decimals.

Future population projections show that the CICWCD's retail service area will grow substantially over the coming decades through a combination of organic growth and new customers via adding connections to residential areas not currently supplied by the municipalities. Not all subscribers of the PVWS are known at this point in time, and there is a potential that agriculture or another industrial user could subscribe to the project. However, based on today's economics, it is unlikely that current crop farmland could afford the cost of imported water.

The forecasted population of the CICWCD's retail customer base was estimated by taking the total Iron County population, multiplied by 92.7 percent of the county population that CICWCD anticipates being able to ultimately serve, and subtracting the population of Cedar City, Enoch City, and Kanarraville that could be served via wholesale connections to the CICWCD's system. The population of the total service area that could be supported by the PVWS project is the sum of the CICWCD's retail population and the key stakeholders' population that could be supplied water through a wholesale connection to the CICWCD's system. The total service area population is projected to nearly triple from 2020 to 2070.

2.3 Demand Forecast

The forecasted demands for the potential PVWS service area were based on a per-capita approach using data unique to the CICWCD and each of the key stakeholders.

2.3.1 Total and per Capita Historical Water Use

Historical water demands were used as an initial foundation for projecting future use in the service area. Historical total water use is shown in Table 2.3 in terms of total "diversion" use, not accounting for net returns of water to the aquifer (which would reflect total "depletion" use). These demands reflect the water use of all customers, except demands of a major mining industry from CICWCD's 2014 and 2015 total water use. The mine is no longer using water from CICWCD, and anticipated reconnection to CICWCD is indefinite. Therefore, previous years' mine use was excluded from these calculations. It is anticipated that if the mines come back online, CICWCD would will drill a new well outside of the Cedar City Valley basin to supply the necessary water.

Table 2.3 Historical Diversion Water Use

	Total Diversion Use (AFY)				
Entity	**2014**	**2015**	**2016**	**2017**	**2018**
CICWCD Retail(1)	373	389	342	442	515
Cedar City	7,565	7,333	7,947	8,040	8,504
Enoch City	1,376	1,310	1,449	1,408	1,584
Kanarraville	134	152	180	188	225
Total(2)	**11,462**	**11,200**	**11,934**	**12,095**	**12,846**

Notes:
(1) Excludes mine water use.
(2) Total water diversion in acre-feet per year (AFY) or weighted average per capita use in gallons per capita per day (gpcd). Sum of rows may not equal total shown due to rounding of decimals.
(3) Highest per capita water use from 2014-2018 shown in bold. The highlighted value was used as the basis for diversion use projections for each entity, prior to additional conservation.

Trends in recent years' per capita water use for each entity are depicted in Figure 2.2. Variability in per capita demands from one community to another are expected, because of the unique

characteristics of each community's customer base and service area. The highest per capita diversion water use from 2014 through 2018 for each entity is highlighted in Figure 2.2. Per capita demands typically vary from year to year based on climatic conditions and use patterns in the service area. Data limitations on annual population for Kanarraville may affect the accuracy of Kanarraville per capita values, but the overall planning impact is minor because Kanarraville's population (and thus, projected future demand) is projected to remain a small fraction of the total area considered in this study.

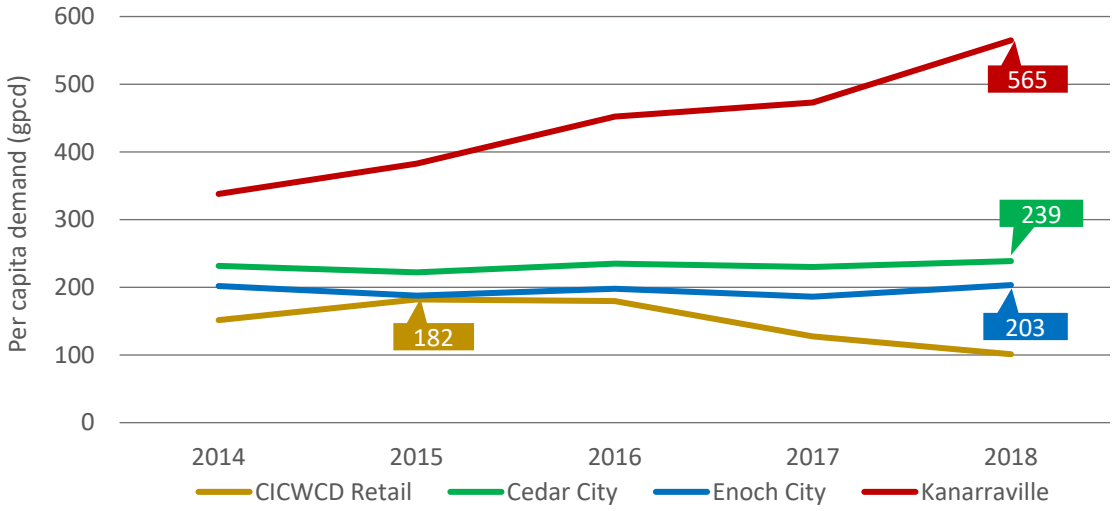

Figure 2.2 Trends and Maximum Values in Recent per Capita Water Use

The highest per capita value from 2014 to 2018 for each entity was used as the initial basis for future demands to reflect this variability. Doing so provides a level of conservatism in demand planning, essentially planning for a future scenario that may be similar to the peak in recent per capita demands. Ongoing enhancements to the CICWCD and key stakeholders' water conservation programs were subsequently used to adjust these values, as discussed later in this chapter.

2.3.2 Diversion and Consumptive Demands

Total diversion demands were forecasted for the CICWCD and each key stakeholder by multiplying the forecasted population by the recent maximum per capita demand for each entity. The resulting demand forecast, by decade through 2070, is provided in Figure 2.3. The CICWCD and key stakeholders' total water diversions would grow from 12,645 AFY in 2020 to about 36,265 AFY in 2070 if no further water conservation enhancements were achieved. Alternative approaches for meeting the projected demands are outlined later in this chapter.

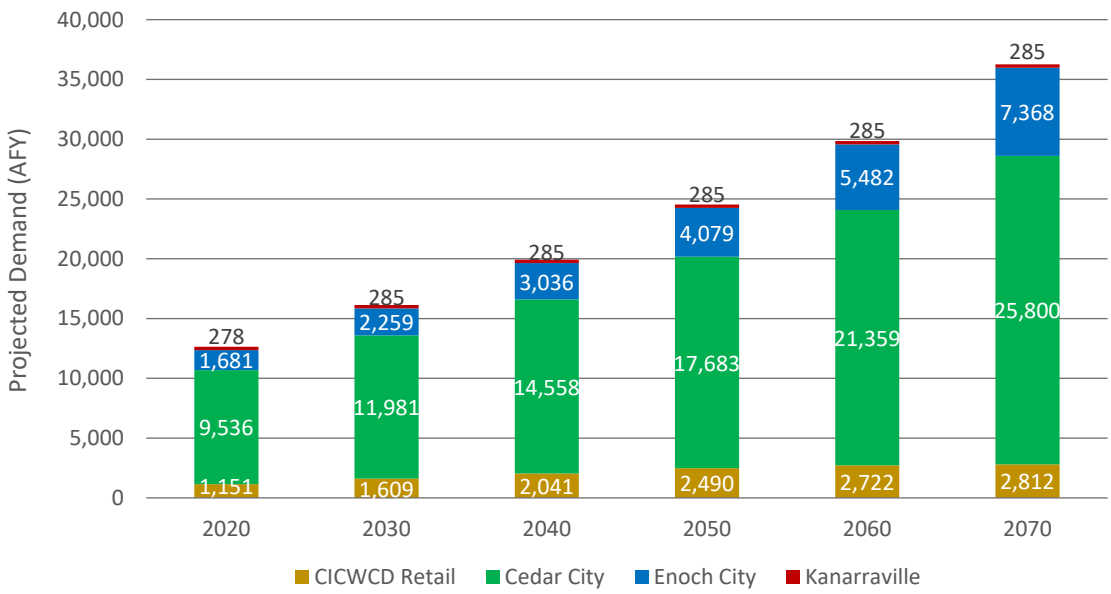

Figure 2.3 Forecasted Diversion Water Use without Additional Future Conservation

2.3.2.1 Municipal Water Conservation

The CICWCD and key stakeholders' planning reflects that additional water conservation will be an important component of meeting future demands. It is also recognized that the projected demands are most useful when expressed as a depletion value instead of a total diversion value, since the DWR GMP is expressed in terms of aquifer depletion values.

The following steps were taken to reflect those planning considerations:

- Per capita demand values were reduced to reflect future water conservation targets.
- Diversion water use forecasts were converted to depletion water use.

Future water conservation targets were assumed to be consistent with per-capita reductions proposed in the Utah Department of Natural Resources (DNR) document titled, "Utah's Regional M&I Water Conservation Goals (DRAFT)" (August 2019). Specifically, per capita water use reductions were assumed to match the reduction targets established by DNR in its August 2019 draft document in 2030, 2040, and 2065 relative to 2015 per capita demands for the "Lower Colorado River North" region of Utah, which includes all of Iron County.

For purposes of the current study, the reduction percentages shown in Table 2.4 were assumed to apply to the highest 2014 to 2018 per capita water use rate for each entity, because per capita demands vary from year to year and 2015 did not reflect the highest recent per capita water use for entities in the Cedar City Valley. The Utah DNR projections indicate conservation targets that some may consider being relatively aggressive. DNR does not provide clear guidance for how to meet those targets, and the CICWCD and most of the key stakeholders are already below the average unit water use value for the region. The resulting net projected diversion demand after additional future water conservation is summarized in Figure 2.4. The CICWCD and key stakeholders' water diversions will total about 26,110 AFY in 2070 if the conservation targets are achieved.

Table 2.4 Additional Future Conservation Targets and Revised per Capita Use

	Per Capita Demand Goals Relative to Baseline Plan (percent or gpcd)					
	2020	2030	2040	2050	2060	2070
Reduction[(1)]	0%	19%	24%	24%	24%	28%
CICWCD Retail	182	147	138	138	138	131
Cedar City	239	193	181	181	181	172
Enoch City	203	165	154	154	154	146
Kanarraville	565	458	429	429	429	407

Notes:
(1) Per Utah DNR draft regional conservation goals, August 2019. Applied to highest per capita demands from 2014-2018 for each entity (shown here as 2020 per capita demands).

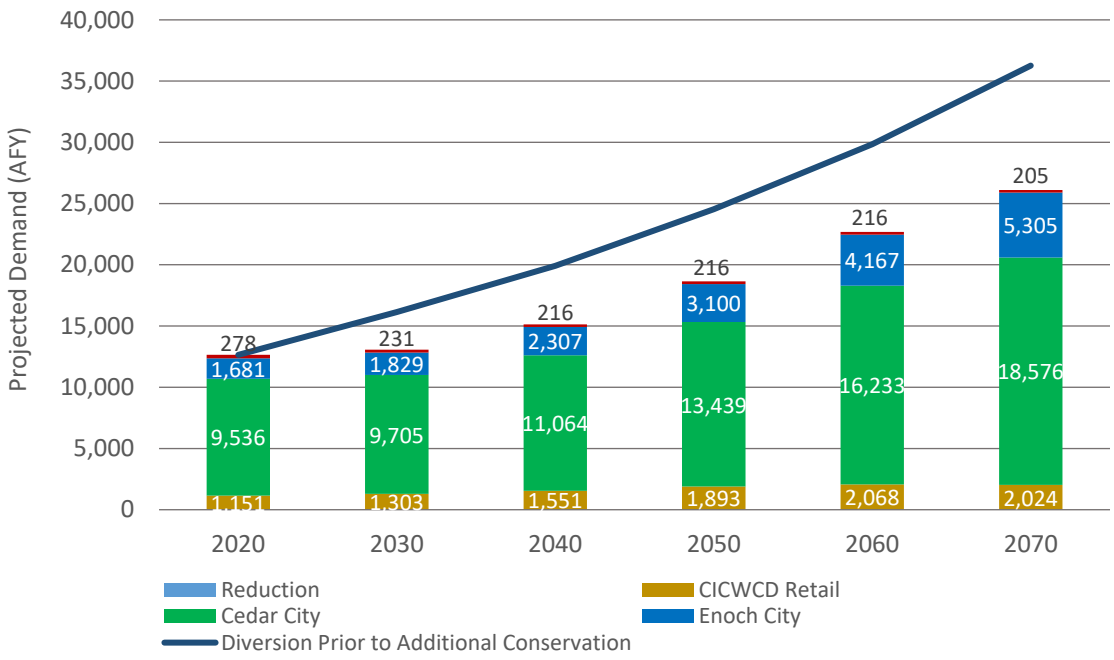

Figure 2.4 Forecasted Diversion Water Use with and without Additional Future Conservation

Notably, there has been no strong downward trend in per capita demands for the CICWCD or key stakeholders over the past several years, and none of these entities is currently investing in significant conservation measures or programs. Thus, there is significant uncertainty at the present time regarding whether and how these conservation targets might be met. Similarly, studies have not been completed to define the costs of achieving these conservation targets in the Cedar City Valley.

For reference, Figure 2.5 shows an example of a residential property with water-efficient landscaping, including limited turf grass (limited to 2,300 square feet of the half-acre lot in this example). This type of landscaping would be an important component in meeting the water conservation goals summarized in Table 2.4.

Figure 2.5 Example Residential Property with Water-Efficient Landscaping

2.3.2.2 Diversion versus Depletion

Forecasted water demands were converted from total diversion values to depletion values, in order to provide a direct comparison to GMP water rights requirements. The DWR online database of water rights (https://waterrights.utah.gov/researchDB/Cedar_WRListing.asp) was used to estimate a ratio of depletion to diversion for each entity. DWR tracks each water right in Utah in terms of both a diversion right and a depletion right. The overall ratio for each entity was estimated by summing all diversion water rights (in AFY) for the entity, and dividing it by the sum of the depletion rights (in AFY) for the entity. The resulting ratios were used to convert forecasted diversion water use to forecasted depletion water use (Figure 2.6). Total depletion water use by the CICWCD and key stakeholders will reach about 21,500 AFY in 2070 with additional conservation savings.

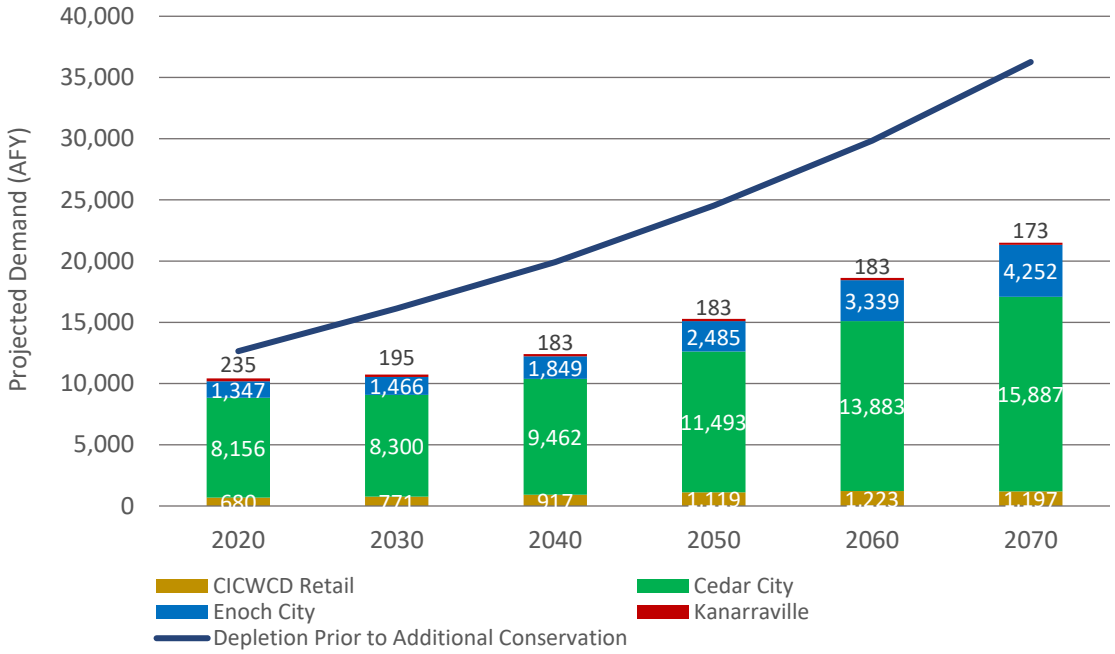

Figure 2.6 Forecasted Depletion Water Use with and without Additional Future Conservation

2.3.2.3 Agricultural Water Conservation

As the largest water use sector in the Cedar Valley, agricultural conservation can yield a significant benefit to regional water supplies. CICWCD estimates indicate that there are currently about 8,000 acres of farmland served by center pivots in Cedar Valley, irrigating 2 to 2.5 AFY per acre for a total use of 16,000 to 20,000 AFY. CICWCD also estimates that there are 1,560 acres of farmland in wheel-lines or flood irrigation, irrigating 3 to 4 AFY per acre for a total of 4,680 to 6,240 AFY. It is unclear how much of the wheel-line and flood irrigation is supplied by surface water versus groundwater. All told, agricultural irrigation is estimated to use upwards of 20,000 AFY in the valley, consistent with Utah DWR estimates of 21,400 AFY of agricultural depletion use of the local aquifer (Utah DWR, 2016).

The CICWCD has undertaken steps to support agricultural efficiency. In 2019, it upgraded nearly 2,000 acres of center pivot irrigation equipment (approximately 25 percent of agricultural irrigation land in the valley) to LEPA and LESA technologies.

The Bonneville Power Authority ([BPA], 2020) describes LEPA and LESA technologies as follows:

> *"LEPA places the emitter type sprinkler on or just above the soil surface. LESA has the sprinklers located three feet or less above the soil surface and uses spray type sprinklers. LEPA and LESA both double the number of sprinklers on a center pivot.*
>
> *Both technologies improve the sprinkler system application efficiency, reduce the direct evaporation from the sprinkler, reduce moisture loss from wet leaves, and require less pressure to operate; thus reducing the pump power consumption per acre-foot delivered. Although the technology is primarily used on pivots, it can also be used with lateral move irrigation systems. Washington State University and the University of Illinois found water savings of 5 to 15 percent. WSU and the U of I found that LESA's system may also reduce fertilizer requirements, and has the potential to improve crop quality and yield."*

Measurement of the increased efficiency and associated water savings from CICWCD's 2019 LEPA/LESA retrofit program is ongoing. It is anticipated that LEPA/LESA conversion of center pivots could reduce irrigation water use from the traditional 2 to 2.5 AFY per acre to around 1.7 to 2.1 AFY per acre. The State of Utah approved the Agricultural Optimization bill in 2018 to study these impacts. The study is currently underway, and 2020 is the second year of data collection. The research will determine if there is an equal or increased yield while diverting less water. New evapotranspiration equipment will be used to determine the amount of water that is used by the plant and lost to evaporation. Yield analysis of crops and a water diversion/depletion analysis will be conducted as well.

By comparison, CICWCD estimates that the rate of agricultural water use is similar on a per-acre basis to municipal water use. CICWCD estimates that existing residential customers of CICWCD, Cedar City, and Enoch City use about 0.75 AFY per connection. Under the State of Utah's proposed regional conservation goals (Table 2.4), that rate would drop to about 0.54 AFY per connection by 2070, or about 2.16 AFY per acre for a typical 1/4 acre residential lot size. This is very comparable to the 1.7 to 2.1 AFY per acre used by center pivots after LEPA/LESA conversion, or 2 to 2.5 AFY per acre for traditional center pivot irrigation.

2.4 Supply Assessment

2.4.1 Existing Sources

The analysis of available supplies initially considered preparing an inventory of the capacity of the CICWCD and key stakeholders' existing physical infrastructure to produce water from the Cedar Valley aquifer. Historical practice for the CICWCD and key stakeholders has largely consisted of acquiring sufficient groundwater rights and constructing and operating enough wells to meet demands.

Absent any driver to do otherwise, it is likely that these practices would continue indefinitely as the CICWCD and key stakeholders seek to meet growing demands over time. That is, new wells would be added over time to meet demands on an as-needed basis, and the water providers would continue to make sure that they secured enough water rights to meet the demand.

In reality, the water rights cutbacks detailed in the draft GMP will eventually become the limiting factor in using the local aquifer to meet demands. At some point, increasing demands will exceed the declining water rights available for use under the GMP, and the CICWCD and key stakeholders will be legally unable to withdraw enough groundwater from the Cedar Valley aquifer – no matter how much well capacity is physically in place to pump water from the aquifer. Recognition of this "legal availability" shortage shifted the focus of the Water Needs Assessment away from physical infrastructure capacities and on to legal availability (groundwater rights) over time under the GMP.

2.4.2 Groundwater Management Plan

The draft GMP for the Cedar City Valley, updated in April 2019, sets a path for reducing depletion of the aquifer to 21,107 AFY. The draft GMP defines depletion as follows:

> *Depletion due to municipal use will be the groundwater diversion minus any return flow resulting from the groundwater portion of wastewater effluent returning to the groundwater system and minus any return flow resulting from the groundwater portion of water used for lawn and garden irrigation and any other municipal purposes.*

The GMP is expected to stay in draft form until at least sometime in mid to late 2020. DWR is accepting public comments on the draft GMP through February 28, 2020. This report uses the values from the April 2019 draft GMP as the basis for projecting shortages for the CICWCD and key stakeholders.

CICWCD's and key stakeholders' depletion water rights in the Cedar Valley aquifer are summarized in Figure 2.7, starting with existing rights in 2020 and showing a summary of water rights that are expected to be remain ("not cut" by DWR) as the GMP is phased in over time.

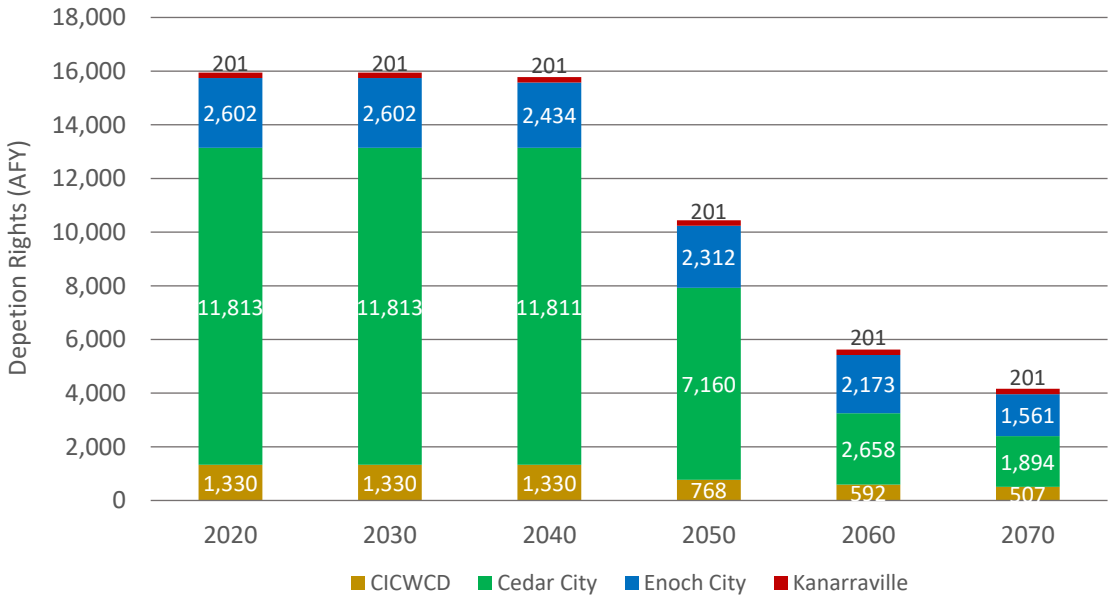

Figure 2.7 CICWCD and Key Stakeholders' Depletion Water Rights under Draft GMP

2.5 Aquifer Recharge

The CICWCD and key stakeholders have implemented several projects to recharge the aquifer with available Coal Creek surface water when it is physically and legally available for such use. Current practices include operating the recharge projects during the irrigation off-season, when the CICWCD and key stakeholders' water rights are in priority.

Looking forward, it is expected that the CICWCD and key stakeholders will continue to take maximum advantage of recharge opportunities when they arise, in order to offset groundwater pumping activities and preserve water table levels. It is unclear whether DWR would grant a one-for-one credit, where every acre-foot of water recharged would be credited toward additional depletion withdrawals from the aquifer. However, for the purpose of this study, recharge was tallied and added to the water budget as a net gain in the recharge to the basin.

In later 2019, CICWCD staff conducted an analysis of historical Coal Creek flows from October 1999 through April 2019 to assess recharge potential. That analysis found that seasonal Coal Creek flows (from November through April, the irrigation off-season months) averaged 7,682 AFY, with seasonal flows ranging from 3,822 AFY to 13,748 AFY over this 20-year analysis period.

Clearly, there is some practical limit to the peak flow capacity that constructed facilities can be constructed or physically expected to be able to recharge the aquifer. For purposes of this analysis, a maximum recharge rate of 100 cubic feet per second (cfs) was assumed as a cap on

recharge rates, based on input from CICWCD and Ensign Engineering. Flows above 100 cfs were assumed unavailable for recharge, from a physical capacity standpoint. Adding this physical limit to recharge reduced the potential seasonal Coal Creek recharge flows only by about 5 percent, from 7,683 AFY (November through April) to 7,297 AFY (November through April).

CICWCD staff assumed that between 2 and 3 cfs of water is needed to satisfy senior stock watering rights in the irrigation off-season. Assuming that 2.5 cfs of senior stock watering demand exists continuously, 896 AFY is seasonally needed to satisfy that need over the November through April timeframe.

For November through April, subtracting 896 AFY of senior stock watering rights from the 7,297 AFY of Coal Creek flows (capped at 100 cfs) results in a maximum recharge potential of about 6,400 AFY as a long-term average. For purposes of the present analysis, a long-term average recharge rate was considered appropriate (rather than the minimum or maximum, for example), since the aquifer would buffer variability between recharge rates and pumped water use from year to year.

It is acknowledged that there is uncertainty in whether DWR would grant the right to withdraw the full 6,400 AFY of recharged water, beyond base depletion rights. Also, no effort was made to allocate the 6,400 AFY of recharge potential to participating utilities. Rather, it was assumed that recharge projects (including existing and future recharge facilities) would be constructed and operated as a regional effort with regional benefits by and for the municipal water suppliers.

Figure 2.8 shows the annual flows and the 20-year average Coal Creek seasonal recharge potential of about 6,400 AFY when capped at 100 cfs.

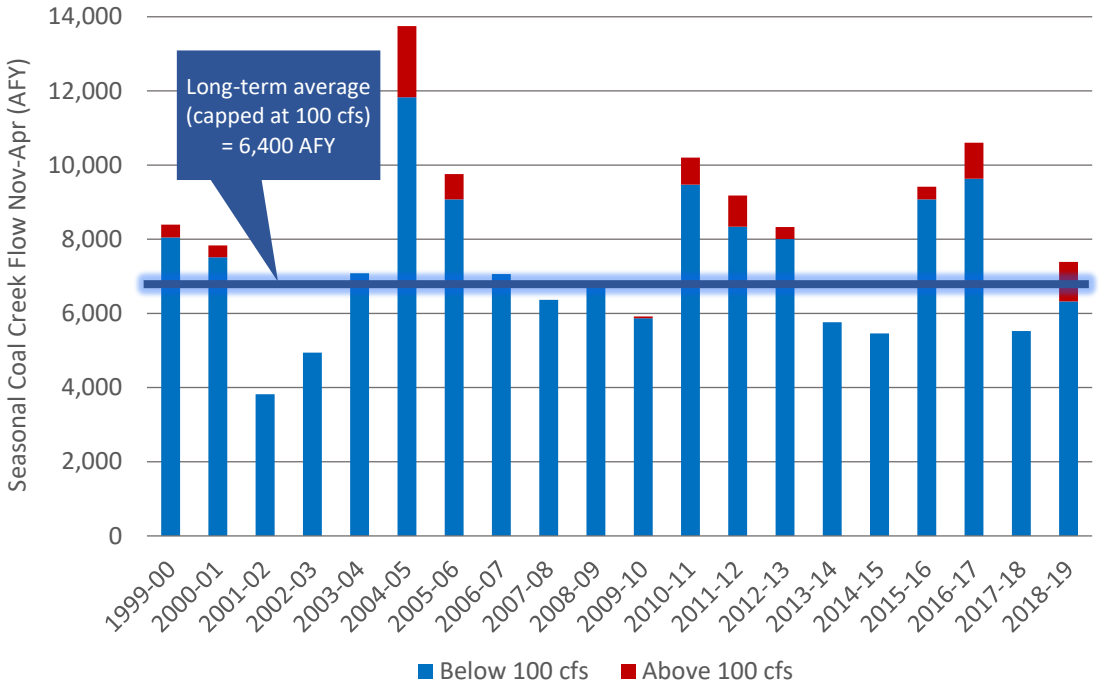

Figure 2.8 Historical Seasonal Coal Creek Flows (November through April)

2.6 Anticipated Supply Shortages and PVWS Implementation Timeline

Anticipated supply shortages were analyzed on a regional level via the following analysis:

- Subtract projected depletion demands (after additional conservation, Figure 2.6) from available depletion rights (Figure 2.7)
- Add credit for regional recharge projects, assuming up to 6,400 AFY of recharge can be credited directly toward groundwater rights, allowing pumping of up to 6,400 AFY more water than the GMP specifies on a regional basis.

The net result of this analysis depicts the water shortages that can be anticipated if no action is taken to increase water supply, as shown in Figure 2.9. If the draft GMP is implemented without further changes, and a regional recharge credit of 6,400 AFY is applied to offset municipal groundwater pumping, water rights would fall short of demands in the Cedar City Valley by approximately 2052. This shortage grows to nearly 11,000 AFY in 2070 and will continue to expand to the degree that demands continue to grow. If no recharge credit was available (whether due to recharge supply availability, recharge infrastructure, or permitting constraints), the regional shortage would first be encountered in the late 2040s instead of the early 2050s.

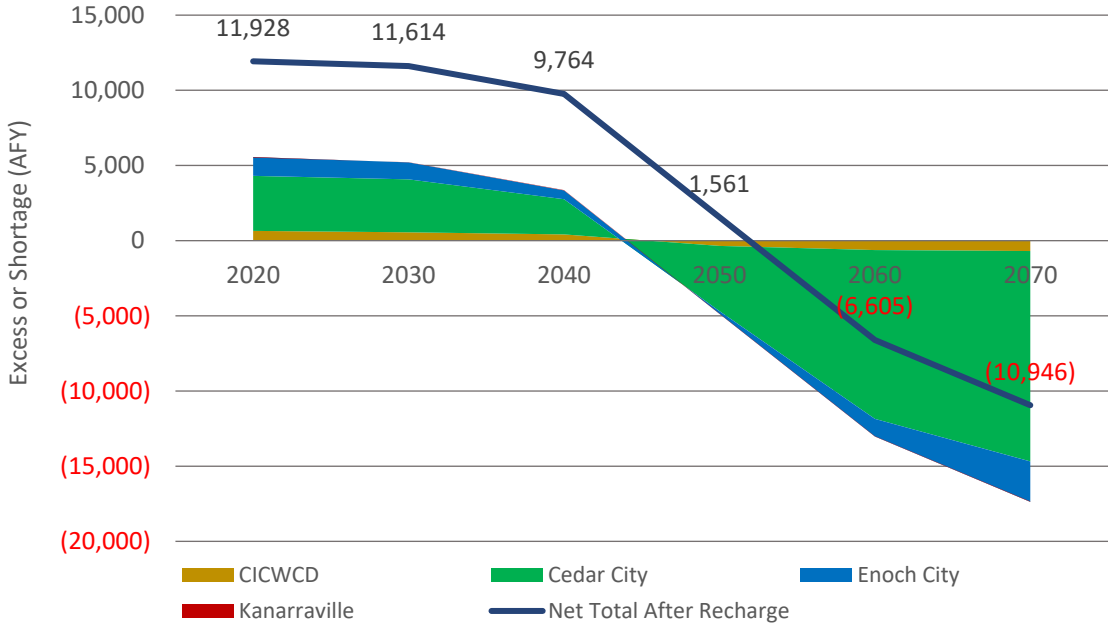

Figure 2.9 Projected Future Supply Surplus or Shortage with No Action

Clearly, such a shortage would be unacceptable. In Section 2.7, six different approaches (scenarios) for mitigating these shortages are defined and characterized. Four of those employ combinations of local water supply strategies to completely avoid the projected shortages, while the other two consider using the PVWS project to head off shortages. The first phase of the PVWS project would add 15,000 AFY of new water supply to the Cedar City Valley, offsetting the projected shortages through at least 2070.

All of the water supply scenarios described in Section 2.7 mitigate the shortages shown in Figure 2.9. The net impact on the Cedar Valley Aquifer with and without the PVWS project is depicted in Figure 2.10. The timing of PVWS implementation is yet to be established; this figure

shows PVWS Phase 1 (15,000 AFY from Pine Valley) coming online before 2050 to head off projected water rights shortages. PVWS Phase 2 would be implemented subsequently to address shortages in later decades.

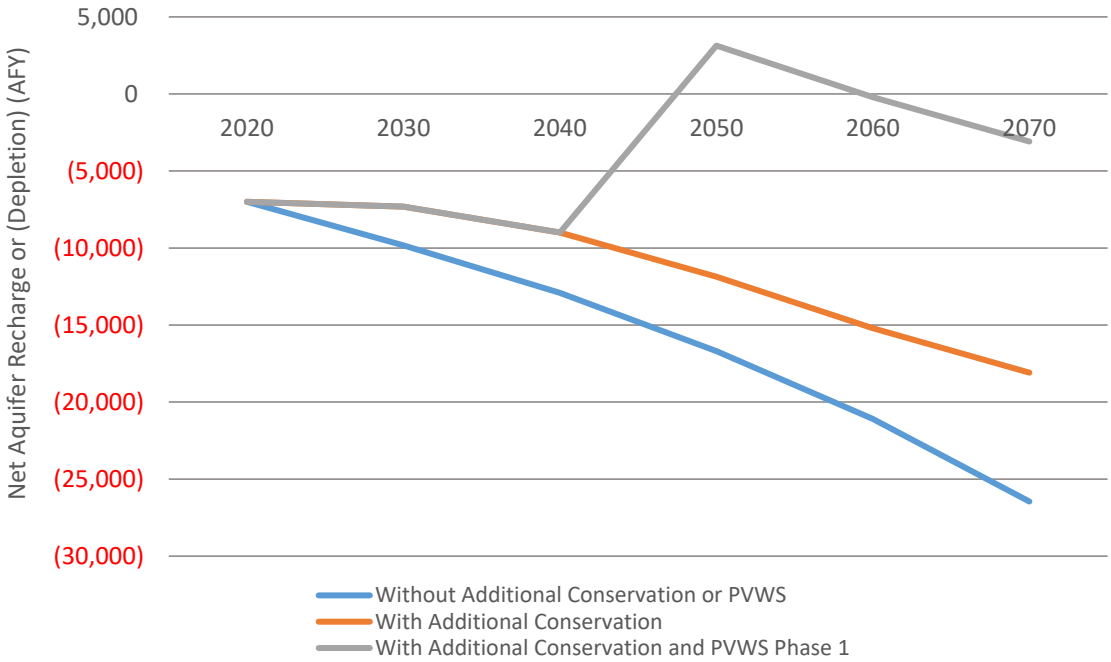

Figure 2.10 Net Recharge or Depletion of Cedar Valley Aquifer with and without PVWS Project

2.7 Alternate Water Supply Scenarios

Several alternative approaches for avoiding or mitigating the projected water supply shortages were characterized, so they could be evaluated in the Business Case Analysis. These included the following scenarios:

- Scenario 1: 100% Local Well Supply (purchase agricultural groundwater rights, no additional conservation, no recharge, no reuse).
- Scenario 2: Local Wells + Conservation (no recharge, no reuse).
- Scenario 3: Local Wells + Conservation + Recharge (no reuse).
- Scenario 4: Local Wells + Conservation + Recharge + Reuse.
- Scenario 5: Accelerated PVWS (with additional conservation and recharge, no reuse).
- Scenario 6: PVWS at Shortage (with additional conservation and recharge, no reuse).

Each of these scenarios would completely offset the projected water shortages described earlier in this chapter. Scenarios 1 through 4 would do so without the PVWS project, while Scenarios 5 and 6 would use the PVWS project to mitigate the anticipated shortages. A summary of the components included in each of the six scenarios is provided in Table 2.5.

Table 2.5 Overview of Components Comprising Scenarios 1 through 6

	Additional Conservation	Purchase Local Ground-water Rights	Aquifer Recharge	Water Reuse	Accelerated PVWS	PVWS at Shortage
Scenario 1: 100% Local Well Supply		✓				
Scenario 2: Local Wells + Conservation	✓	✓				
Scenario 3: Local Wells + Conservation + Recharge	✓	✓	✓			
Scenario 4: Local Wells + Conservation + Recharge + Reuse	✓	✓	✓	✓		
Scenario 5: Accelerated PVWS	✓		✓		✓	
Scenario 6: PVWS at Shortage	✓		✓			✓

All six scenarios assumed that new wells would be constructed when needed to meet demand, starting in 2021 and continuing either indefinitely (Scenarios 1 through 4) or until the PVWS is constructed and online (Scenarios 5 and 6). Capital costs were based on unit costs provided by CICWCD and Ensign Engineering highlighted in Table 2.6.

Table 2.6 Capital Cost Factors

Item	Value	Source / Notes
Cost of typical new groundwater well in the Cedar City Valley	$1,000,000	2019 costs per Ensign Engineering, personal communication 10/28/19
Yield of typical new groundwater well in the Cedar City Valley	1,000 gallons per minute (gpm)	Estimate per Ensign Engineering, personal communication 10/28/19
Cost of new groundwater rights in the Cedar City Valley	$4,500 per AFY	Estimate per CICWCD, personal communication 10/30/19; costs are expected to escalate more rapidly than construction costs

Key assumptions in the analysis included:

- Existing groundwater wells can meet demand to 2020; new wells will be needed to meet demand in 2021 and beyond. To the degree that existing wells can meet demands beyond 2020, the construction of new wells could be deferred.
- Groundwater rights in the Cedar Valley Aquifer would be available for purchase, and would be purchased as needed to offset the demand in Scenarios 1 through 4. Groundwater rights purchases would likely come from agricultural irrigators in the Cedar City Valley. Water rights conversions from agricultural to municipal use were assumed to not require purchase of the associated agricultural land by the CICWCD or key stakeholders, as that land could be transitioned to dryland farming, grazing, municipal development, or other uses.
- Conservation goals established by DNR could be achieved, but in lieu of studies detailing the methods necessary to achieve those goals, costs for additional conservation are not included in this analysis and would increase the costs of Scenarios 2 through 6.
- Alternatives that include reuse did not evaluate the potential reduction in aquifer recharge associated with reduced discharge from the Cedar City Wastewater Treatment Plant (WWTP).
- Reuse system in alternatives that include reuse was based on Alternative 5R (seasonal agricultural irrigation in Enoch Graben) per the Cedar City 2018 Water Reuse Feasibility Study (offsets 2,023 AFY of water demand).
- Cost of water reuse system is $17.4 million in 2018 dollars per the 2018 Water Reuse Feasibility Study. Reuse system costs were escalated to 2019 dollars at 3 percent per year. Engineering/legal/administrative costs were added at 15 percent of capital. Reuse project implementation assumed design and construction over a 3-year period starting in 2025.
- PVWS project implementation assumed design and construction over a 5-year period.
- Earliest possible PVWS design/construction initiation would be 2023 (for Scenario 5, "PVWS ASAP"), when the Environmental Impact Statement (EIS) Record of Decision (ROD) is anticipated. In Scenario 6 ("PVWS at Shortage"), PVWS design/construction would start in 2046 so it would be online once shortages start in 2052.
- Once the PVWS is online (Scenarios 5 and 6), no new local wells would be constructed and no further groundwater rights purchases would be made, rather than investing in both the PVWS and new local groundwater infrastructure and supplies.

Multi-year capital projects were assumed to follow a typical capital project design and construction expenditure schedule, as shown in Table 2.7.

Table 2.7 Assumed Capital Project Design and Construction Cost Expenditure Schedule

Project Duration (years)	Percent of Capital Cost Incurred Each Year				
	1	2	3	4	5
1	100				
2	30	70			
3	10	45	45		
4	10	35	35	20	
5	1	9	35	35	20

A summary of water supply components and cost factors for each of the six scenarios is provided in Table 2.8.

Table 2.8 Overview of Groundwater Components in Scenarios 1 through 6

	Number of New Wells 2020-2070	Amount of Purchased Groundwater Rights 2020-2070 (AFY)
Scenario 1: 100% Local Well Supply	13	25,700
Scenario 2: Local Wells + Conservation	7	17,300
Scenario 3: Local Wells + Conservation + Recharge	7	10,900
Scenario 4: Local Wells + Conservation + Recharge + Reuse	7	8,900
Scenario 5: Accelerated PVWS	7	0
Scenario 6: PVWS at Shortage	7	0

Under the draft GMP, a total of about 21,400 AFY of groundwater rights currently held by municipal, irrigation, and stockwatering/mining/other users would remain available ("not cut" by DWR) after all reductions are in place. Of that amount, about 17,900 AFY is currently held by irrigation and stockwatering/mining/other users. As such, purchasing 25,700 AFY of water rights under Scenario 1 from other (non-municipal) users in the basin is not a viable option. Under Scenarios 2 through 4, in theory, there would be sufficient water rights that could be purchased and converted to municipal use, with varying degrees of impact on agriculture in the Cedar City Valley.

Capital costs for the six scenarios were calculated in unescalated 2019 dollars, serving as the foundation for the business case analyses presented in Chapter 3. A summary of capital costs for the six scenarios is presented in Figure 2.11. Notably, these costs assume escalation rates for groundwater rights purchases in the Cedar Valley Aquifer. Also, in lieu of studies detailing the methods necessary to achieve DNR conservation goals, costs for additional conservation are not included in this analysis and would increase the costs of Scenarios 2 through 6.

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), Scenarios 2 through 4 would require purchase of between 50 and 97 percent of the remaining non-municipal and non-domestic water rights in the Cedar Valley Aquifer after GMP cutbacks are complete. Based on experience in other parts of the United States, purchases would likely have significant negative effects on the agricultural economy in the Cedar City Valley and could change the course of the valley's rich agricultural heritage.

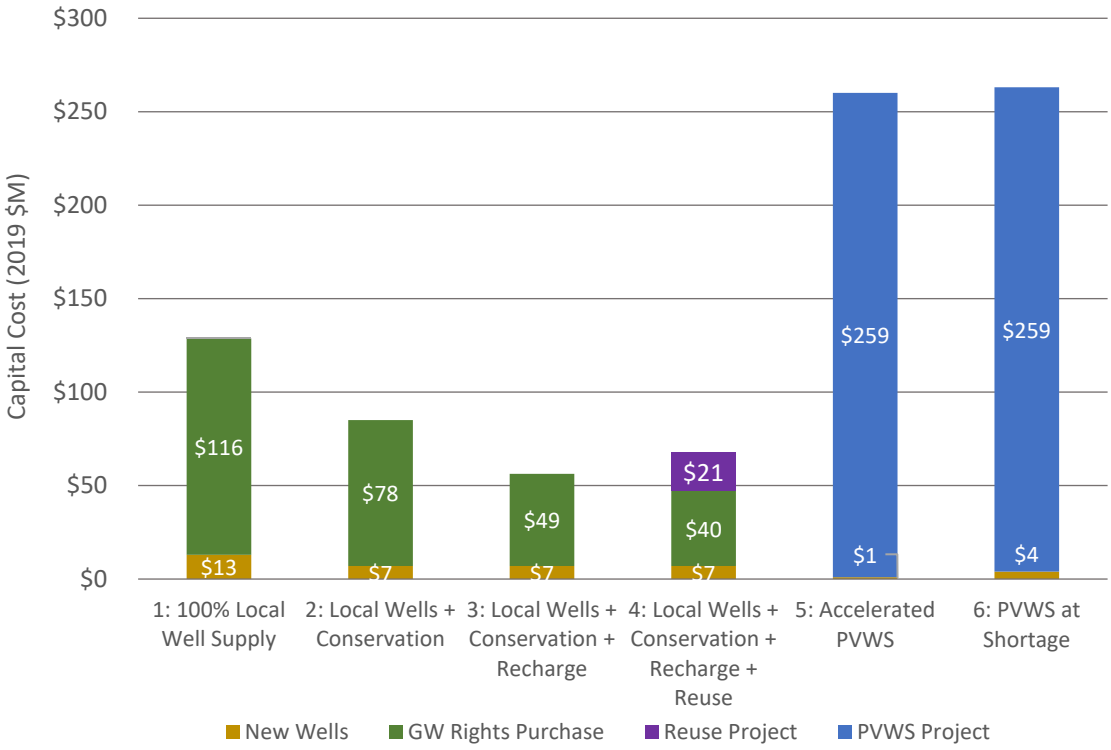

Figure 2.11 Capital Costs for Water Supply Scenarios 1 through 6

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Chapter 3
BUSINESS CASE

3.1 Introduction

Subsequent to identification of water demands, as ascertained from the Water Needs Assessment portion of this analysis, Carollo Engineers, Inc. (Carollo) was tasked with providing a real-time dynamic financial model that analyzed the financial impact of potential partnerships on the CICWCD and key stakeholders for which financial data were made available (Cedar City and Enoch City). This business case evaluation includes identification of potential outside funding opportunities and their respective financing costs as well as operation and maintenance (O&M) and capital cost projections throughout the study period. The financial model incorporates cash flows from three specific entities and presents annual revenue increases as well as comparative annual customer bill impact analyses under each of the identified scenarios.

As discussed previously in Section 2.7, Carollo evaluated six scenarios for this Business Case Analysis:

- **Scenario 1:** 100% Local Well Supply (purchase agricultural groundwater rights, no additional conservation, no recharge, no reuse).
- **Scenario 2:** Local Wells + Conservation (no recharge, no reuse).
- **Scenario 3:** Local Wells + Conservation + Recharge (no reuse).
- **Scenario 4:** Local Wells + Conservation + Recharge + Reuse.
- **Scenario 5:** Accelerated PVWS (with additional conservation and recharge, no reuse).
- **Scenario 6:** PVWS at Shortage (with additional conservation and recharge, no reuse).

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), it is included here as a basis of comparison against the other scenarios. Also, the costs for Scenarios 2 through 6 (and associated rate implications) would be higher than shown when costs for additional conservation are characterized and integrated into the analysis.

Scenario 4 evaluates estimated annual shortages for each of the three entities (CICWCD, Cedar City, and Enoch City). In any given year where water shortages are shown for Cedar City and/or Enoch City, it was assumed that water would be purchased from the CICWCD.

Scenarios 5 and 6 assume Cedar City and Enoch City purchase all of their water from the CICWCD upon completion and startup of the PVWS Project in 2028 and 2051, respectively.

These six scenarios are merely a starting point for further discussion and consideration as the PVWS Project timeline and requirements become further solidified. Ultimately, the actual scenario selected for implementation may be one not presented in this analysis. This FBPWNA study sought to provide the CICWCD with scenarios from varying ends of the spectrum in order to provide a more comprehensive starting point for further evaluations. Additionally, the real-time dynamic financial model developed in this study provides the CICWCD and other key stakeholders with the ability to update information as it becomes available.

3.2 Assumptions

Carollo worked closely with staff from CICWCD, Cedar City, and Enoch City to acquire and integrate into the financial model the most recent information available. As such, Carollo relied on data provided by each entity and cannot verify its validity or accuracy for purposes of this analysis. The financial model incorporated budget information and historical data and forecasts from three specific entities, CICWCD, Cedar City, and Enoch City.

The following items were provided by each entity:

- 2019 Budget (including O&M and capital costs).
- Outstanding Debt Service Schedules (annual principal and interest payments by issue).
- Annual Water Sales (total revenue and total usage in thousands of gallons [Kgals]).
- Number of Customers (connections to the system; customers receiving a monthly bill).

Carollo also assumed the following inflation rates throughout the financial model:

- General Inflation Rate: 3.0%
- Property Tax Rate: 3.0%
- Connection and Impact Fee Rate: 3.0%
- Interest Income Rate (Cash Balances): 1.0%
- Groundwater Rights Rate: 7.5%
- Typical Bill Impact Inflationary Trend: 3.0%

Growth rates vary annually by entity. These rates originated from United States Census Bureau data provided by decade and were then calculated annually based on exponential interpolation. The following rates, by entity, provide ranges of growth used throughout the financial model:

- CICWCD (constant): 3.0%
- Cedar City (varies by year): 1.8% to 2.6%
- Enoch City (varies by year): 2.6% to 3.4%

Additionally, Carollo, in conjunction with Ensign Engineering, applied preliminary estimates of O&M costs as well as capital costs under each scenario for inclusion, evaluation, and analysis within the financial model.

Lastly, in development of revenues under existing rates for all entities, Carollo assumed a simple average rate (dollars per Kgals) even though each entity's rate structure may include an inclining block rate. As an example, if one of the participating entities received $750,000 in total revenue for the year and recorded 500,000 thousand gallons of usage, Carollo would subtract monthly fixed charges for the year (assume $250,000 in this case) and divide the remaining revenue ($500,000) by the actual recorded usage (500,000 thousand gallons) to calculate the average unit water rate (dollars per Kgals).

3.3 Outside Funding Opportunities

In development of the business case, Carollo researched a comprehensive list of potential outside funding opportunities, which could assist CICWCD in funding the PVWS Project. For purposes of this analysis, funding opportunities were classified into two separate groups, loans, or grants. Loans must be repaid under the terms and conditions set forth by the respective program requirements and within the specified timeframe. Conversely, grants are one-time distributions provided to the CICWCD that do not require repayment. Each funding program

provides advantages and disadvantages. Of note is that the selection of certain programs can potentially disqualify the CICWCD from other programs.

Appendix B provides a summary description of potential funding options by program, agency, and type of funding. Additionally, Appendix B provides deadlines and contact information by program and agency.

3.4 Optimal Funding by Scenario

For purposes of this study, funding strategies were required to fully evaluate and compare those scenarios that required capital financing. After discussions with CICWCD staff and in consideration of Carollo's research, it was determined Scenario 4 would incorporate Revenue Bonds, while the best (and most pragmatic) combination of funding options for the PVWS Project (Scenarios 5 and 6) would those as listed in Table 3.1.

Table 3.1 Estimated Optimal Funding Opportunity

Program	Type	Interest Rate	Term	Percent of Funding	Debt Service Coverage Ratio
Water Infrastructure Finance and Innovation Act (WIFIA)	Loan	3.15%	30	~49%	130x
State Drinking Water State Revolving Fund (SRF) Loan	Loan	2.00%	20	~25%	130x
Revenue Bonds	Loan	5.00%	30	~25%	130x
Cash Reserves	Cash	N/A	N/A	~<1%	N/A

Notes:
(1) Numbers may not total due to rounding.
N/A Not Applicable

Carollo assumed, conservatively, annual debt service coverage (i.e., parity coverage on all debt) of 130x. Stated another way, the CICWCD would be required to have $1.30 in annual net revenue (calculated as total revenue minus O&M expenses) for every $1.00 in annual debt service.

It is also important to note that for purposes of this analysis, grants were excluded, as they tend to have lower certainty of being acquired, and tend to be smaller in quantity and more sporadically and arbitrarily distributed. Clearly, any acquisition of grant funding would help reduce the financial impact to rate payers for the CICWCD and other key stakeholders. Carollo recommends CICWCD apply early and frequently (typically annually, on the schedule unique to each opportunity) for any and all available grants. If CICWCD chooses to do so, Carollo could assist CICWCD with completing paperwork in pursuit of grant funding.

3.5 Financial Model Purpose and Background

Carollo's Excel based financial model incorporated and evaluated cash flows for CICWCD, Cedar City, and Enoch City, as all three entities are assumed to be reliant on one another for execution and delivery of the PVWS Project. For purposes of this analysis, it is assumed that CICWCD will issue all debt related instruments regarding design and construction costs for the PVWS project. Furthermore, Carollo's model assumes Cedar City and Enoch City purchase water directly from CICWCD under Scenarios 4, 5, and 6. These water purchases (sold by CICWCD) are shown as

expenses to Cedar City and Enoch City and conversely shown as a revenue source to CICWCD. CICWCD revenues will be used to pay down principal and interest on issued debt and meet debt service coverage covenants (130x). In the event that any cash flow (CICWCD, Cedar City, or Enoch City) results in an annual deficit in their respective ending fund balance or a resulting debt service coverage ratio below 130x, revenue increases to user rates (water sales) are required to meet the greatest deficiency.

It is important to note that under Scenarios 5 and 6 (which assume CICWCD issues all debt for the PVWS project), CICWCD will be required to increase rate revenues in order to meet all annual debt covenants. For example, if the CICWCD's debt service coverage ratio falls below its target (assumed to be 130x) in any given year, CICWCD is legally required/obligated to increase rate revenue, in that year and any subsequent years, until the target is met.

3.6 Cash Flow Analysis Results

Cash flows were developed for all three of the assumed participating entities to gain a broad understanding of the potential financial implications of each of the six scenarios. Each entity has its own individual cash flow that considers their respective 2019 Budgets, growth, and water demands. Under certain scenarios, more specifically Scenarios 4 through 6, Cedar City's and Enoch City's wholesale water rate is entirely dependent upon the rate charged by the CICWCD. These scenarios in turn require revenue adjustments through revenue increases as appropriate to remain financially viable. The following subsections will highlight results of the cash flow analysis and the potential revenue increases and associated typical monthly bills for each entity's customers under all six scenarios.

3.6.1 Central Iron County Water Conservancy District

Results of the CICWCD's cash flow analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, the CICWCD's cumulative (compounded) increases and typical monthly bills under each scenario are presented in the Table 3.2.

Table 3.2 CICWCD Cash Flow Analysis Results

	Existing	Projected					
	2019	2020	2030	2040	2050	2060	2070
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$41.56	$42.81	$57.53	$77.32	$103.91	$139.65	$187.69
Scenario 1							
Cumulative Increase	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Bill Impact	$41.56	$41.77	$41.77	$41.77	$41.77	$41.77	$41.77
Scenario 2							
Cumulative Increase	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Bill Impact	$41.56	$41.77	$41.77	$41.77	$41.77	$41.77	$41.77
Scenario 3							
Cumulative Increase	0.0%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Bill Impact	$41.56	$41.77	$41.77	$41.77	$41.77	$41.77	$41.77

	Existing	Projected					
	2019	2020	2030	2040	2050	2060	2070
Scenario 4							
Cumulative Increase	0.0%	0.5%	212.8%	212.8%	212.8%	212.8%	212.8%
Bill Impact	$41.56	$41.77	$130.00	$130.00	$130.00	$130.00	$130.00
Scenario 5							
Cumulative Increase	0.0%	0.5%	699.4%	699.4%	699.4%	699.4%	699.4%
Bill Impact	$41.56	$41.77	$332.22	$332.22	$332.22	$332.22	$332.22
Scenario 6							
Cumulative Increase	0.0%	0.5%	0.5%	0.5%	2,807.1%	757.6%	757.6%
Bill Impact	$41.56	$41.77	$41.77	$41.77	$1,208.20	$356.42	$356.42

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period. An actual cash flow analysis under this scenario was excluded from this analysis; however, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, CICWCD customers would experience a cumulative increase in their monthly bill of 351.5 percent in 2070 to $187.69 from $41.56 in 2019, an increase of $146.13.

Results from Scenarios 1 through 3 are identical in the Table 3.2 and exclude water sales made to Cedar City and Enoch City. Under each of these three scenarios, CICWCD customers would experience a cumulative increase in their monthly bill of 0.5 percent in 2070 to $41.77 from $41.56 in 2019, an increase of $0.21.

Scenario 4 requires that CICWCD commence providing varying amounts of water to Cedar City and Enoch City in 2044 and 2048, respectively. Under this scenario, CICWCD will be required to provide these entities with water due to a combination of growth, water demands, inadequate groundwater rights, and conservation requirements that result in an insufficient amount of water available for distribution to their customers. CICWCD customers would experience a cumulative increase in their monthly bill of 212.8 percent in 2030 to $130.00 from $41.56 in 2019, an increase of $88.44.

Scenario 5 requires that CICWCD provide wholesale water service to both Cedar City and Enoch City in 2028 and beyond as a result of completion of the PVWS Project. CICWCD customers would experience a cumulative increase in their monthly bill of 699.4 percent in 2030 to $332.22 from $41.56 in 2019, an increase of $290.66.

Scenario 6 requires that CICWCD provide wholesale water service to both Cedar City and Enoch City in 2051 and beyond as a result of completion of the PVWS Project. CICWCD customers would experience a cumulative increase in their monthly bill of 757.6 percent in 2070 to $356.42 from $41.56 in 2019, an increase of $314.86. Rates initially increase substantially when CICWCD begins paying debt service for PVWS construction, then ease somewhat after Cedar City and Enoch City begin to use water from the project and provide revenue to CICWCD accordingly.

Importantly, under Scenarios 5 and 6, CICWCD is required to increase rates charged to their ratepayers as a result of debt issuances used to design and construct the PVWS Project. During the design and construction period, CICWCD will not receive any revenue through water sales to Cedar City and Enoch City, nor will they receive any capital contributions. As a result, rate revenue decreases are projected under Scenario 5 (in 2028) and Scenario 6 (in 2051) when Cedar City and Enoch City are assumed to purchase all of their water from CICWCD. In this type of situation, industry ratemaking standards typically allow CICWCD to recover a rate of return on their investment (building the PVWS Project) in recognition of their contribution of capital (financing costs and rate revenue increases to their ratepayers) and assuming the risk associated with constructing the PVWS Project. In turn, this typically leads to CICWCD being allowed to charge a higher wholesale rate to Cedar City and Enoch City than would be normally required had the two entities provided upfront capital contributions of their own, in relation to their proportionate and respective water demands. This analysis has not considered this particular issue and a separate cost of service based rate study would be required in the future to accurately capture and recover the CICWCD's costs.

3.6.2 Cedar City

Results of the Cedar City Cash flow analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, Cedar City's cumulative (compounded) increases and typical monthly bills under each scenario are presented in Table 3.3.

Table 3.3 Cedar City Cash Flow Analysis Results

	Existing	Projected					
	2019	2020	2030	2040	2050	2060	2070
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$17.00	$17.51	$23.55	$31.66	$25.52	$25.52	$76.85
Scenario 1							
Cumulative Increase	0.0%	0.0%	0.0%	21.7%	29.2%	45.5%	60.7%
Bill Impact	$17.00	$17.00	$17.00	$20.70	$21.96	$24.74	$27.33
Scenario 2							
Cumulative Increase	0.0%	0.0%	0.0%	21.7%	29.2%	45.5%	60.7%
Bill Impact	$17.00	$17.00	$17.00	$20.70	$21.96	$24.74	$27.33
Scenario 3							
Cumulative Increase	0.0%	0.0%	0.0%	21.7%	29.2%	45.5%	60.7%
Bill Impact	$17.00	$17.00	$17.00	$20.70	$21.96	$24.74	$27.33
Scenario 4							
Cumulative Increase	0.0%	0.0%	0.0%	26.5%	50.4%	96.2%	124.4%
Bill Impact	$17.00	$17.00	$17.00	$21.51	$25.57	$33.36	$38.15

	Existing	Projected					
	2019	2020	2030	2040	2050	2060	2070
Scenario 5							
Cumulative Increase	0.0%	0.0%	319.6%	358.8%	365.7%	379.8%	396.9%
Bill Impact	$17.00	$17.00	$71.33	$78.00	$79.17	$81.57	$84.47
Scenario 6							
Cumulative Increase	0.0%	0.0%	0.0%	21.7%	183.5%	378.8%	403.3%
Bill Impact	$17.00	$17.00	$17.00	$20.70	$48.19	$81.40	$85.56

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period. An actual cash flow analysis under this scenario was excluded from this analysis; however, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, Cedar City customers would experience a cumulative increase in their monthly bill of 351.5 percent in 2070 to $76.85 from $17.00 in 2019, an increase of $59.85.

Results from Scenarios 1 through 3 are identical in the table above and exclude water purchases from CICWCD. Cedar City may continue conducting business as usual and will remain independent and fully in control of raising their water rates as they see fit. Under each of these three scenarios, Cedar City customers would experience a cumulative increase in their monthly bill of 60.7 percent in 2070 to $27.33 from $17.00 in 2019, an increase of $10.33.

Scenario 4 requires that Cedar City commence purchasing small amounts of water from CICWCD in 2044 when a combination of growth, water demands, inadequate groundwater rights, and conservation requirements result in an insufficient amount of water available for distribution to its customers. Cedar City customers would experience a cumulative increase in their monthly bill of 124.4 percent in 2070 to $38.15 from $17.00 in 2019, an increase of $21.15.

Scenario 5 requires that Cedar City commence purchasing all of its water from CICWCD in 2028 and beyond as a result of completion of the PVWS Project. Cedar City customers would experience a cumulative increase in their monthly bill of 319.6 percent in 2030 to $71.33 from $17.00 in 2019, an increase of $67.47. Rates increase when Cedar City starts receiving water from the PVWS project.

Scenario 6 requires that Cedar City commence purchasing all of its water from CICWCD in 2051 and beyond as a result of completion of the PVWS Project. Cedar City customers would experience a cumulative increase in their monthly bill of 403.3 percent in 2070 to $85.56 from $17.00 in 2019, an increase of $68.56. Again, rates increase when Cedar City starts receiving water from the PVWS project.

3.6.3 Enoch City

Results of the Enoch City Cash Flow Analysis vary by scenario and result in varying degrees of annual revenue increases and customer bill impacts throughout the study period. As such, cumulative (compounded) increases and typical monthly bills in Enoch City under each scenario are presented in Table 3.4.

Table 3.4 Enoch City Cash Flow Analysis Results

	Existing	Projected					
	2019	2020	2030	2040	2050	2060	2070
Inflationary Trend							
Cumulative Increase	0.0%	3.0%	38.4%	86.0%	150.0%	236.0%	351.5%
Bill Impact	$29.00	$29.87	$40.15	$53.97	$72.53	$97.49	$131.01
Scenario 1							
Cumulative Increase	0.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Bill Impact	$29.00	$31.03	$31.03	$31.03	$31.03	$31.03	$31.03
Scenario 2							
Cumulative Increase	0.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Bill Impact	$29.00	$31.03	$31.03	$31.03	$31.03	$31.03	$31.03
Scenario 3							
Cumulative Increase	0.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Bill Impact	$29.00	$31.03	$31.03	$31.03	$31.03	$31.03	$31.03
Scenario 4							
Cumulative Increase	0.0%	7.0%	7.0%	7.0%	7.0%	7.0%	7.0%
Bill Impact	$29.00	$31.03	$31.03	$31.03	$31.03	$31.03	$31.03
Scenario 5							
Cumulative Increase	0.0%	7.0%	319.9%	319.9%	319.9%	319.9%	319.9%
Bill Impact	$29.00	$31.03	$121.78	$121.78	$121.78	$121.78	$121.78
Scenario 6							
Cumulative Increase	0.0%	7.0%	7.0%	7.0%	111.2%	300.7%	300.7%
Bill Impact	$29.00	$31.03	$31.03	$31.03	$61.25	$116.19	$116.19

As a baseline case, which can provide a more easily understood starting point when comparing multiple scenarios, Carollo created an "Inflationary Trend" scenario that assumes annual increases of 3.0 percent throughout the study period. An actual cash flow analysis under this scenario was excluded from this analysis; however, this scenario was created to illustrate the cumulative increase required and effect on typical monthly bills for customers. Under this "Inflationary Trend" scenario, Enoch City customers would experience a cumulative increase in their monthly bill of 351.5 percent in 2070 to $131.01 from $29.00 in 2019, an increase of $102.01.

Results from Scenarios 1 through 3 are identical in Table 3.4 and exclude water purchases from CICWCD. Enoch City may continue conducting business as usual and will remain independent and fully in control of raising their water rates as they see fit. Under each of these three scenarios, Enoch City customers would experience a cumulative increase in their monthly bill of 7.0 percent in 2070 to $31.03 from $29.00 in 2019, an increase of $2.03.

Scenario 4 requires Enoch City commence purchasing small amounts of water from CICWCD in 2048 when a combination of growth, water demands, inadequate groundwater rights, and conservation requirements result in an insufficient amount of water available for distribution to its customers. Similar to Scenarios 1 through 3, Enoch City customers would experience a

cumulative increase in their monthly bill of 7.0 percent in 2070 to $31.03 from $29.00 in 2019, an increase of $2.03.

Scenario 5 requires Enoch City commence purchasing all of its water from CICWCD in 2028 and beyond as a result of completion of the PVWS Project. Enoch City customers would experience a cumulative increase in their monthly bill of 319.9 percent in 2030 to $121.78 from $29.00 in 2019, an increase of $92.78.

Scenario 6 requires Enoch City commence purchasing all of its water from CICWCD in 2051 and beyond as a result of completion of the PVWS Project. Enoch City customers would experience a cumulative increase in their monthly bill of 300.7 percent in 2070 to $116.19 from $29.00 in 2019, an increase of $87.19.

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Chapter 4
FINDINGS AND RECOMMENDATIONS

Carollo collaborated with CICWCD, Cedar City, and Enoch City staff to develop the six scenarios presented in this report. Each of the selected scenarios represents a starting point for further dialogue and consideration as the PVWS Project timeline and requirements become further solidified. The purpose of the six scenarios was to provide CICWCD, and its potential partners, with scenarios at varying ends of the spectrum, providing a more comprehensive starting point for further evaluations.

While Scenario 1 is not technically viable (due to limits on total water rights availability under the GMP), Scenarios 2 through 4 would require purchase of between 50 and 97 percent of the remaining non-municipal and non-domestic water rights in the Cedar Valley Aquifer after GMP cutbacks are complete. Based on experience in other parts of the United States, purchases would likely have significant negative effects on the agricultural economy in the Cedar City Valley and could change the course of the valley's rich agricultural heritage.

Selection of any of the local supply scenarios (Scenarios 2 through 4) would require policy-level consideration of the socioeconomic impacts of these actions. The feasibility, methods, and costs that would be required to meet the Utah DNR proposed conservation goals have not been studied, and would increase the costs shown in this report for Scenarios 2 through 6. Ultimately, the actual scenario selected for pursuit may be one not presented in this analysis.

However, the CICWCD and potential partners should consider moving forward with the PVWS Project and work towards completion of the project at some point in time between 2028 and 2051 (i.e., a scenario in between Scenarios 5 and 6). To facilitate this, each participating entity would enter into interlocal agreements for water service to delineate roles and responsibilities for each party. Under that arrangement, each entity should be required to provide a proportionate share, based on water demands, of capital contribution to design and construct the PVWS Project. Finally, it is recommended that a comprehensive cost of service rate study be conducted prior to first delivery of water service to each entity, to ensure all costs are appropriately allocated and recovered from the respective participating entities.

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Chapter 5

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Appendix A

EXCERPT FROM 2019 PVWS ECONOMIC AND FISCAL ANALYSIS STUDY

Quantifying the Economic Impacts of the Alternatives

Two Key Considerations

Types of Economic Impacts Considered

1

POSITIVE IMPACTS

One-time construction impacts on the local economy that are sourced to new infrastructure investments (e.g., Pine Valley and Wah Wah Valley projects)

2

NEGATIVE IMPACTS

The recurring economic losses sourced to an insufficient water system in the event no infrastructure investments are made, limiting future growth potential

One-Time Economic Impact of Infrastructure Investments

Quantifying the Impacts

In addition to the broader implications of a reliable water supply system, there are one-time economic impacts associated with the development of new infrastructure

Economic Output

Impact of Total Spending within the Local Economy

Wages and Salaries

Impact on Personal Incomes for Local Residents

Employment

Impact on the Number of Jobs within the Local Economy

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- —1 of 3 nationally recognized impact analysis software tools
- —Developed by Minnesota IMPLAN Group, Inc. and used by more than 1,000 public and private institutions
- —IMPLAN is an input-output model that utilizes complex economic equations to explain how the “outputs” of one industry become the “inputs” of others, and vice versa
- —This relationship is sometimes referred to as the “multiplier effect”, illustrating how changes in one sector of the economy can affect other sectors
- —See IMPLAN.com

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- IMPLAN data contains 546 sectors representing all private industries in the United States (anything from grain farming to surgical appliance manufacturing) as defined by the North American Industry Classification System (NAICS) codes
- Employment, employee compensation, industry expenditures, commodity demands, relationships between industries, and more are collected to form IMPLAN's ever-growing database

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- Inputs: For purposes of this analysis, the inputs for the economic impact analyses were sourced to CICWCD's estimated development costs for the Pine Valley ($253.6 million) and Wah Wah Valley ($165.7 million) infrastructure projects for a total cost of $419.3 million
- Location: IMPLAN databases specific to Iron County, Utah were acquired and utilized to develop the economic impacts of the proposed investments

One-Time Economic Impact of Infrastructure Investments

Approach, Methodology, and Assumptions

IMPLAN Model:

- Industry: In addition to the cost and location details, industry-specific metrics were utilized that most closely resemble the type of development contemplated (Industry Code 58 - Construction of other new nonresidential structures)
- Multiplier Effect: The following multipliers were generated based on the location and industry classification:

	Direct	Indirect	Induced	Total	Multiplier Effect
Output (Per $1.00 of Direct Output)	1.00	0.27	0.17	1.44	1.44x
Labor Income (Per $1.00 of Direct Output)	0.23	0.06	0.04	0.33	1.46x
Employment (Per $1.0 Million of Direct Output)	7.82	2.77	1.69	12.28	1.57x

One-Time Economic Impact of Infrastructure Investments

Multiplier Effect

Total Impact

The sum of direct, indirect and induced impacts

Note: Indirect and induced impacts sourced to IMPLAN.

One-Time Economic Impact of Infrastructure Investments

West Desert Supply Project

PINE VALLEY
15,000 ACRE FEET

Original Cost Estimate: **$150.0 Million**

Revised Cost Estimate: **$253.6 Million**

WAH WAH VALLEY
11,275 ACRE FEET

Original Cost Estimate: **$50.0 Million**

Revised Cost Estimate: **$165.7 Million**

TOTAL INVESTMENT: $419.3 MILLION

Source:CICWCD.

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary

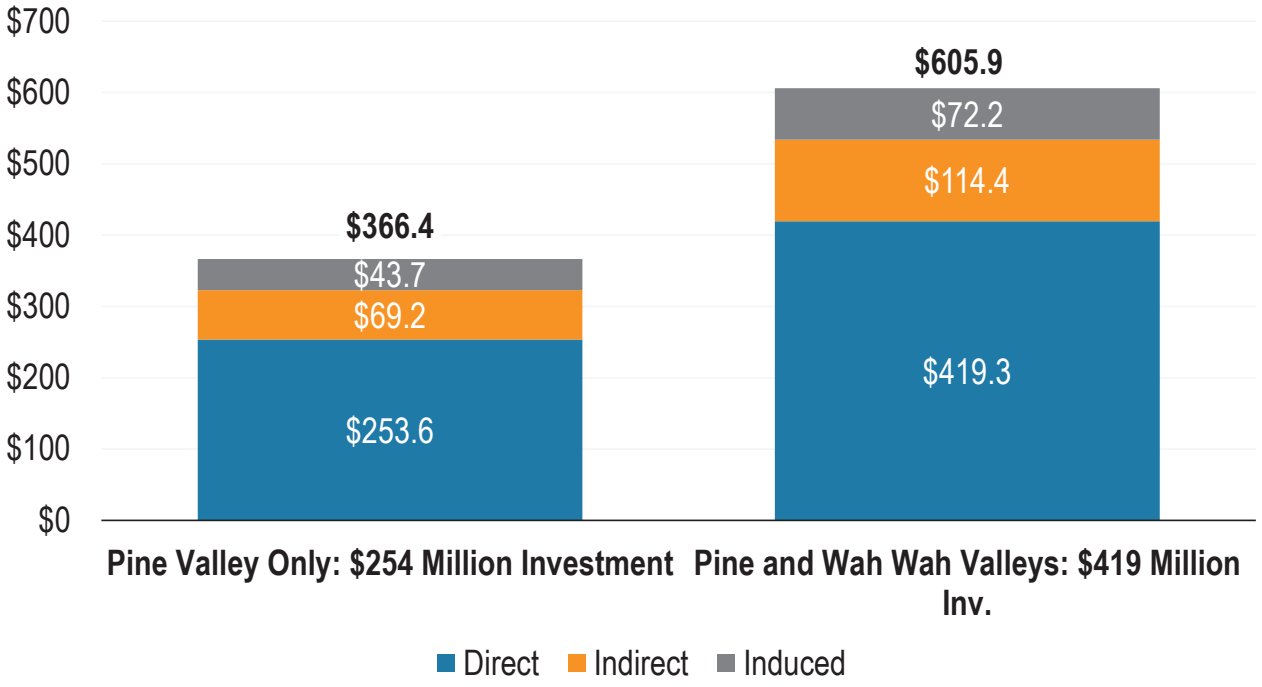
($ in Millions)	Direct	Indirect	Induced	Total
Pine Valley Only: $254 Million Investment				
Economic Output	$253.6	$69.2	$43.7	**$366.4**
Wages & Salaries	$58.2	$16.0	$10.6	**$84.9**
Employment	1,982	702	428	**3,113**
Pine and Wah Wah Valleys: $419 Million Investment				
Economic Output	$419.3	$114.4	$72.2	**$605.9**
Wages & Salaries	$96.3	$26.5	$17.5	**$140.3**
Employment	3,278	1,161	708	**5,147**

The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Economic Output

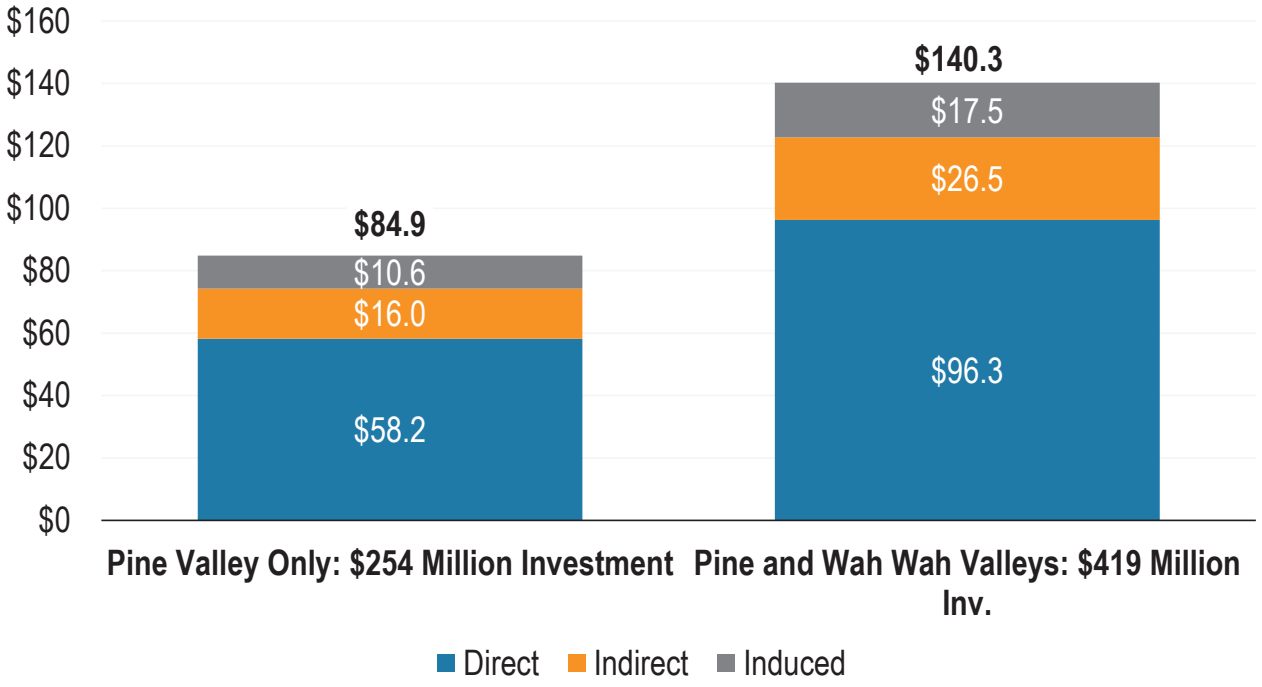


The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Wages and Salaries

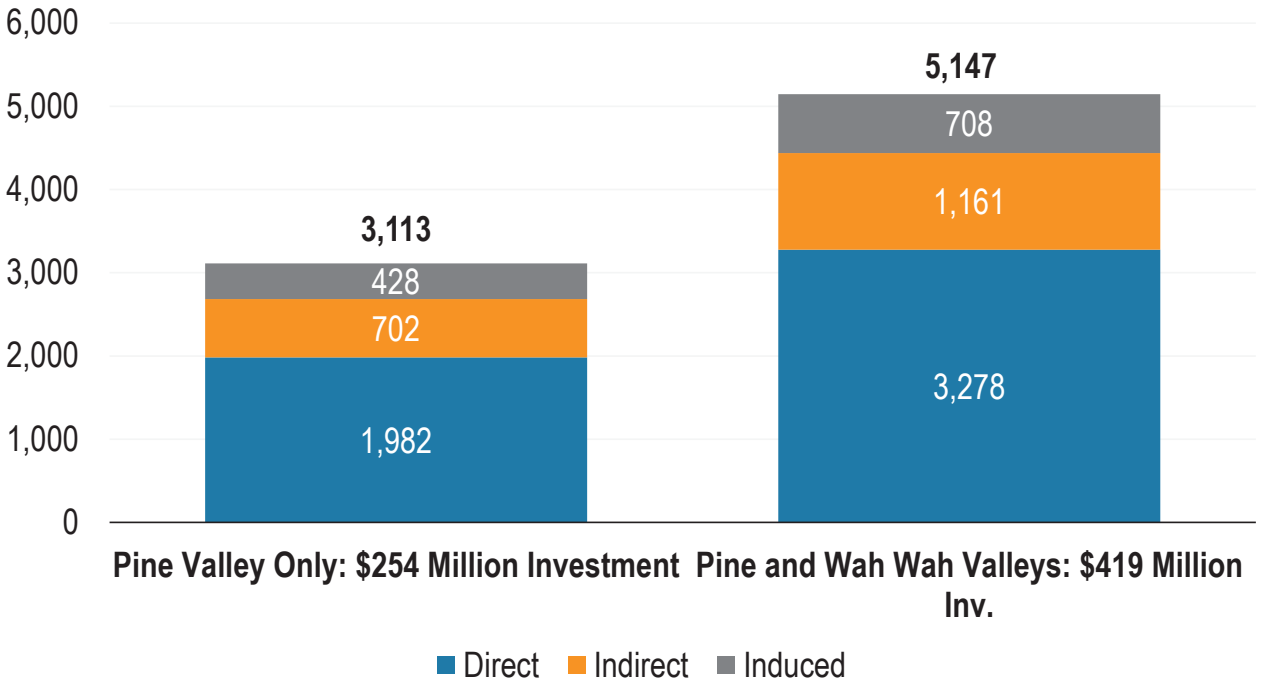


The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

One-Time Economic Impact of Infrastructure Investments

Economic Impact Summary: Employment



The potential economic impacts sourced to large-scale investment in infrastructure are significant with $606 million in output, supporting approximately $140 million in wages and an estimated 5,100 person-years of employment.

Note: Indirect and induced impacts sourced to IMPLAN; employment stated in person-years of employment (i.e., one person employed for an entire year).

Appendix B

FUNDING SOURCE INFORMATION

Overview

Funding sources investigated for the Pine Valley Water Supply project are summarized in Tables B.1 and B.2.

The larger funding programs, typically focused on implementation projects, provide the best opportunity to obtain large sources of funding. Smaller grants and loans can also be pursued for planning and design activities as they will be helpful in building relationships with funding agencies and reduce the financial burden on the Central Iron County Water Conservancy District (CICWCD). Viable Federal and State funding opportunities for Design, and/or Construction activities, include:

- United States Environmental Protection Agency (EPA) - Water Infrastructure Finance and Innovation Act (WIFIA) (Design/Construction Loan).
- State of Utah Department of Environmental Quality (DEQ) Drinking Water State Revolving Fund (DWSRF) Program – Planning/Design Advances.
- State of Utah DEQ, DWSRF Program – Construction Loan.
- Combination of DEQ's DWSRF Program and WIFIA Financing (Design/Construction Loan).
- Utah Department of Natural Resources (Division of Water Resources) (Design/Construction Loan).
- State of Utah Permanent Community Impact Fund (CIB).
- State Bonding Bill = Special Project.
- Private Equity Financing.

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Table B.1 Funding Source Summary

Program	Agency	Type	Description	Deadline	Contact Information
Federal					
WIFIA *Potential funding program for the project.*	EPA	Loan	• Financing mechanism for water and wastewater infrastructure projects, which provides financing for large dollar-value water/wastewater projects. Projects must cost more than $20 million or $5 million for small community projects (25,000 of fewer) (projects can be combined and submitted as a group of projects). Program provides reimbursement of expenses incurred (similar to the State Revolving Fund [SRF] program).FY 2019 lending capacity was $6 billion (anticipate similar for 2020). • Cover planning/design (retroactive) and construction activities. • Maximum amount of the loan cannot exceed 49% of the project costs. Requires 51% match (can include SRF or other programs). • The total WIFIA and other federal funding sources shall not exceed 80% of total project cost. • Single fixed rate established at closing – may receive multiple disbursements over several years. • Interest at a fixed rate, calculated by adding one basis point (0.01%) to the rate of securities of a similar maturity (based on the weighted-average life of the WIFIA Loan) as published, on the execution date of the WIFIA Loan Agreement, in the United States Treasury Bureau of Public Debt's daily rate table for State and Local Government Series (SLGS) securities, currently located on the Internet at https://www.treasurydirect.gov/GA-SL/SLGS/selectSLGSDate.htm. • Maximum loan term is 35 years (or useful life of the project). • Payments maybe deferred 5 years after substantial completion). Payments are semi or annual installments. • Customized repayment schedule to match anticipated revenues and expenses. • Application fees apply (average $300,000-$700,000 pending reviews and legal negotiations). • Reserve requirement – 1 year repayment. • Requires compliance with federal requirements (National Environmental Policy Act [NEPA], American Iron and Steel [AIS], Davis Bacon, etc.). • Project completion in 5 years (preferred) up to 7 years. • **Funding Use:** Design (includes environmental, legal, right of ways, etc.) and Construction.	Anticipate funding opportunity announcement (FOA) in spring 2020 Schedule: • Letter of Interest due April/July • Notification of Invitation to apply in late October/ early November • 1 year to submit complete application	Karen Fligger 202-564-2992 Jordan Dorfman 202-564-0614 https://www.federalregister.gov/documents/2017/01/10/2016-31828/notice-of-funding-availability-nofa-for-applications-for-credit-assistance-under-the-water
United States Bureau of Reclamation (USBR) Grants					
WaterSMART Water and Energy Efficiency Grants *Potential funding program for the project.*	USBR	Grant	• Eligible projects include projects that result in quantifiable and sustained water savings, increase renewable energy use and improve energy savings, and support broader water quality sustainability benefits. Does not cover reuse or recycled water implementation projects. Projects that benefit endangered and threatened species, support water sustainability benefits, or implement activities to address climate related impacts on water may apply. Requires a 50% cost share. Two funding limits: $300,000 (typically for projects completed within a year; and up to $1,000,000 (for projects to be completed in 3 years).*Total funding earmarked for Water Marketing and Water & Energy Efficiency Grants of $34 million for 2019.*	• 2019 FOA Posted: March 2018 • Due: May, 2018 • 2019 FOA Posted: January 2019 • Due: March 2019	Josh German 303-445-2839 https://www.grants.gov/web/grants/view-opportunity.html?oppId=290172

Program	Agency	Type	Description	Deadline	Contact Information
Drought Contingency Planning *Not applicable.*	USBR	Grant	• Provides grant funding to entities to support the development of a Drought Management Plan or to update an existing Drought Management Plan. Grant funding requires a 50/50 cost share. Funding up to $200,000. Sets an entity up for Drought Project FOA. • **Funding Use:** Drought Contingency Planning Document		Darion Mayhorn 303-445-3121
Drought Resiliency Projects *Potential funding program for the project.*	USBR	Grant	• Funding is for implementation projects building long-term resiliency to drought and reduce the need for emergency response actions that are identified in a Drought Contingency Plan. Projects eligible for funding should address at least one the following: serve to increase the reliability of water supply; improve water management; implement systems to facilitate voluntary water sales, transfers, or exchanges; and provide benefits for the environment are eligible. Types of projects include moving pipelines, small recycling, storage reservoir construction, and projects that increase flexibility in drought. Two Funding: Group 1 $300,000 (complete in 2 years); Group 2 $750,000 (complete in 3 years). • **Funding Use:** Implementation		Darion Mayhorn 303-445-3121
United States Department of Agriculture (USDA)					
Water and Waste Disposal Predevelopment Planning Grants in Utah *Not applicable - CICWCD does not meet population criteria. Included in case applicable to a community benefiting from project.*	Rural Develop.	Grants Loans	• This program assists low-income communities with initial planning and development of applications for USDA Rural Development Water and Waste Disposal direct loan/grant and loan guarantee programs. Requirements: – Population must be less than 10,000 people. – Median household income below the poverty line or less than 80% of the statewide non-metropolitan median household income. – Maximum grant amount of $30,000 or 75% of the predevelopment planning costs. 25% cost share from applicant or third-party sources. • **Funding Use:** Planning		Heath Price, Community Programs Director 801-524-4325 Pam Snedeger (435) 893-3349 https://www.rd.usda.gov/programs-services/water-waste-disposal-predevelopment-planning-grants/ut
Rural Water Loan Fund (RWLF) *Not applicable - Financing is too small in amount. Included in case applicable to a community benefiting from project.*	National Rural Water Association	Loan	• RWLF is a funding program specifically designed to meet the unique needs of small water and wastewater utilities. The RWLF provides low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. The RWLF was established through a grant from the USDA/Rural Utilities Service, and repaid funds used to replenish the fund and make new loans. Loan amounts may not exceed $100,000 or 75% of total project cost, whichever is less. Loan offers below market interest rate and maximum repayment period of 10 years. • **Funding Use:** Planning		nrwarwlf@nrwa.org 1-800-332-8715
Rural Utilities Service Offices *Project element specific – perhaps for pumping facilities. Low award amounts.*	Electric Program Energy Efficiency and Conservation Loan Program High Energy Cost Grant Program	Loan	• Provides financing for basic infrastructure including electricity, telecommunications and water/waste systems. The Electric Program offers loans and loan guarantees for generation, transmission, and distribution facilities serving rural areas. The Energy Efficiency and Conservation Loan Program expands the types of projects that can be supported by the Electric Program to include energy efficiency activities, including distributed generation for on or off grid renewable energy systems. The High Energy Cost Grant Program offers competitive grants for community energy facilities, including renewable energy systems and energy efficiency projects serving extremely high energy cost rural communities.		

Program	Agency	Type	Description	Deadline	Contact Information
Department of Energy					
Energy Efficiency Block Grants	Energy Efficiency and Renewable Energy	Loans, Grants or Incentives	Provides funds for energy efficiency and conservation programs and projects communitywide, as well as renewable energy installations on government buildings. This grant program is funded through the 2009 American Recovery and Reinvestment Act and its availability varies from year to year and, depending on the timing, this funding may or may not be available.		https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program
State					
State Drinking Water SRF Loan Program *Potential funding program for construction of the project.*	Utah DEQ - SRF Program Administered by Utah Division of Water Quality	Loan –	• Utah's DWSRF provides low interest loans to public water systems to finance the cost of infrastructure projects needed to achieve or maintain compliance with SDWA requirements in Utah. Projects funded through the SRF may receive funding from the following: (a) SRF Capitalization Grants; (b) SRF loan repayments; and (c) State matching funds. Currently projects are awarded funding based on readiness to proceed (based on current demand), however there is a foreseeable demand on the program through 2025 due to several large projects requesting funding. As monies are from both Federal and State sources - federal requirements apply including NEPA, A&E Procurement, AIS, Davis Bacon, and other requirements. Requires Engineering Report. • The Program can fund Planning, Design, and Construction. Planning and Design are Advances/Grants and Construction funds are provided as low Interest loans. • Scored and given a priority point. • Low interest 2-4%. • 20 year loan term (or life of project). • Up to 18 months prior to first repayment. Payment schedule is likely annual. • Origination fee of 1% (normally paid at closing – 1 time). • Debt service reserve account – Annual (at a min) deposits to an account in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board. Continue until the total amount in the debt service reserve fund is equal to the annual payment. • Capital Facilities Replacement Reserve account – 5% of agency's drinking water system's annual operating budget including debt service and depreciation until bond is redeemed. • No early pre-payment penalty. **Funding Use:** Construction or Design/ Construction	Ongoing	Michael Grange 801-536-0069 mgrange@utah.gov https://deq.utah.gov/drinking-water/state-revolving-fund-srf-drinking-water
State Drinking Water SRF - Planning and Design Advances *Potential funding program for the planning and design of the project.*	Utah DEQ - Program - Division of Water Quality	Grant	• Through the SRF Program, Utah's Division of Water Quality may provide advance funding for the Planning and Design of SRF applicable projects (especially to help smaller communities). As the project progresses from the Planning to the Design phase, the advances are rolled into the SRF Construction loan for repayment (in order to recapture the Planning/Design grants). Projects that do not proceed to design and/or construction are still required to repay the advance. • No match - however, if a match is provided, it demonstrates a strong community investment in the project under consideration. • **Funding Use:** Planning and Design	Ongoing	Michael Grange 801-536-0069 mgrange@utah.gov

Program	Agency	Type	Description	Deadline	Contact Information
Green Project Reserve (GPR)	Utah (DEQ) - Program Administered by Utah Water Quality Board and Division of Water Quality	Grant	• To the extent there are sufficient eligible project applications, not less than 20% of the SRF funds shall be for projects, or portions of projects, that include green infrastructure, water or energy efficiency improvements or other environmentally innovative activities. GPR projects must address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design and construction. Loan principal forgiveness is available for GPR projects with a forgiveness limit of 50% for construction costs and 75% for planning costs. • **Funding Use:** Construction and Planning	Ongoing	
Financial Assistance Program - Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund *Potential funding program for construction of the project.*	Utah Department of Natural Resources (Division of Water Resources)	Loan	• Three revolving construction loan programs (**Revolving Construction Fund, Cities Water Loan Fund** and **Conservation and Development Fund**). Funding is available for projects that conserve, protect, or more efficiently use present water supplies, develop new water, or provide flood control (e.g., agricultural projects, canal lining, flood control, dam construction, water facilities, etc.). Cities Water Loan Fund provides assistance to districts for the construction of municipal water projects. The Conservation and Development Fund helps finance large construction projects, e.g., dams and large municipal drinking water systems. To be eligible, the project cannot be routine operation and maintenance, not sponsored by a developer or private entity, and cannot be for a domestic water system where less than half of residents live in the service area year round. Funds cannot be used for construction of treatment facilities but can be used for infrastructure, storage, and land application). • Provides for zero to low-interest (around 3% or less) funding (loans or bonds) for water projects statewide. • Loan term is generally less than 25 years. • Requires a 15-25% cost share (match) from applicant. • Grants are only provided for dam repair projects. • Program is funded by the state of Utah (do not have to comply with federal compliance requirements including architecture and engineering (A&E) procurement, AIS, Davis Bacon, etc.). • **Funding Use:** Design and Implementation	Ongoing *(however, set application deadlines to prepare for Board Meeting)*	Todd Stonely 801-538-7277 Joel Williams 801-538-7249 https://water.utah.gov/funding.html
Permanent Community Impact Fund *Potential funding program for the project.* ***Perhaps pursue for planning and design phase?***	Permanent Community Impact Fund Board	Loans and Grants	• The Permanent CIB is a program which provides loans and/or grants to state agencies and subdivisions of the state which are or may be socially or economically impacted, directly or indirectly, by mineral resource development on federal lands. CIB can fund the following types of activities: planning, construction and maintenance of public facilities, and provision of public services. **Total participation in any given project will generally be limited to a maximum of $5,000,000 regardless of grant/loan mix**. Planning, study or design requests require 50% match (match cannot be donated labor or staff time; has to have a demonstrated value (e.g., real property)). • **Funding Use:** Planning, Design and Implementation (pending County)	Funding cycles by trimester: 1st Trimester - June 1 2nd Trimester - Oct. 1 3rd Trimester - Feb 1	Candace Powers, CIB Program Manager 801-468-0131 cpowers@utah.gov https://jobs.utah.gov/housing/cib/
Community Development Block Grants	Housing & Community Development	Grant	• The Community Development Block Grant program provides grants to Cities of <50,000 or Counties <200,000. • *Small Cities Program* is targeted to assist in developing viable communities by providing decent housing and a suitable living environment and expanding economic opportunities, principally for persons of low and moderate incomes. Grants range $25,000 to $200,000.		https://jobs.utah.gov/housing/community/cdbg/index.html
U-Save Energy Efficiency Fund	Governor's Office of Energy Development	Loan	• Finances energy efficiency improvements, including retrofits and new construction enhancements, for public buildings owned by school districts, cities, and counties.		Shawna Cuan scuan@utah.gov

Program	Agency	Type	Description	Deadline	Contact Information
Other					
Wattsmart Business Program	Rocky Mountain Power	Grant	• To provide planning and design advances to communities in need of assistance (e.g. when the cost of water or wastewater improvements increase rates above 1.4% modified adjusted gross income [MAGI]). These advances turn into grants and do not need to be repaid. • **Funding Use:** Planning and Design		
Private Equity Funding	Private Industry/ Company	Loan	• Ridgewood Infrastructure – private investment group that partners with public agencies to provide private equity funding for water and energy infrastructure in the United States. • Provides financing for planning, design and construction. Full or specific aspects of projects. • Project costs minimum is $50M-$200M; can fund CICWCD Project. • Loan term flexible –20-30-year note. • Repayment structure is flexible to fit CICWCD needs (semi-annual or annual); can repay interest only or interest and capital. • Interest rate is comparable to the market rate (8-10%). • No early payment penalty. • No strings or requirements (e.g., NEPA, federal requirements, etc.). • Ridgewood would be more involved in project design, construction, and potentially operations (could be P3 or hybrid). • Potential conflict with other funding sources due to private financing.		
Long Term Effort or Track Future Funding					
Water Infrastructure Restricted Account (WIRA)	State of Utah - Legislature/ Governor's Bonding Bill/Budget	Loan	• Pursuit of project financing via Governors special projects or legislative action (via local State Representative) such as: – SB281 – Water Infrastructure Restricted Account (WIRA) - Designated for financing the Bear River Project and the Lake Powell Pipeline Project; and for issuing revolving loans to repair and replace some existing federal water infrastructure. One time appropriation from the General Fund for $5 million has been placed in the account. Financed through bonds issued by the State for the development of waters of the Bear and Colorado Rivers. Administered by the Division of Water Resources.	Long-term pursuit but worth investigating if broader range of benefits – Discuss with State and/or legislative lobbyist.	
Special Appropriation Act Projects	EPA	Grant	• Difficult to secure.	Discuss with Federal Legislative Lobbyist as to feasibility	
America's Water Infrastructure Act 2018 Programs	EPA	Loans/ Grants	• H.R. 3387 Drinking Water System Improvement Act of 2017. Pending appropriations there maybe potential funding programs for the CICWCD Project.		

Table B.2 Funding Source Details

Program	Agency	Type	Description
Federal			
WIFIA	EPA	Loan	• Funding for Planning and Design (retroactive is okay) and Construction Activities. • Program provides for the reimbursement of incurred expenses. • Requires compliance with federal requirements (NEPA, AIS, Davis Bacon, etc.). • 49% of the eligible project costs; 51% match by agency (total federal funding < 80% of project cost). • Loan term is 35 years (or useful life of the project); Payments maybe deferred 5 years after substantial completion. • Single fixed interest rate set at closing. Rate is calculated by adding one basis point (0.01%) to the rate of securities of a similar maturity (based on the weighted-average life of the WIFIA Loan). • Customized repayment schedule to match anticipated revenues and expenses (typ. semi or annual installments). • Application fees apply (average $300,000-$700,000 pending reviews and legal negotiations). • Reserve requirement – 1 year. • Project completion in 5 years (preferred) up to 7 years. • Annual application cycle (April-July period).
WaterSMART Water and Energy Efficiency Grants	USBR	Grant	• Projects that result in quantifiable and sustained water savings, increase renewable energy use and improve energy savings, and support broader water quality sustainability benefits. • Two funding limits: $300,000 (typically for projects completed within a year or $1,000,000 (for projects to be completed in 3 years). • Match requirement of 75%.
Drought Resiliency Plans	USBR	Grant	• Funding to support the development of a Drought Management Plan or to update an existing Drought Management Plan. • Funding up to $200,000. • Match requirement of 50%.
Drought Resiliency Projects	USBR	Grant	• Funding for the implementation of projects that build long-term resiliency to drought/reduce the need for emergency response actions. Projects must be identified in a Drought Contingency Plan or similar. • Two Funding: Group 1 $300,000 (complete in 2 years); Group 2 $750,000 (complete in 3 years). • Match requirement of 75%.
Water & Waste Disposal Pre- development Planning Grants	USDA - Rural Develop.	Grant/ Loans	• Funding assistance for low-income communities for initial planning and development of applications for USDA Rural Development Water and Waste Disposal programs. • Population must be less than 10,000 people. • Median household income below the poverty line or less than 80% of the statewide non-metropolitan median household income. • Maximum grant amount of $30,000 or 75% of the predevelopment planning costs. • Match Requirement: 25% cost share from applicant or third-party sources.
Rural Water Loan Fund (RWLF)	USDA - National Rural Water Assoc.	Loan	• Program provides small water and wastewater utilities with low-cost loans for short-term repair costs, small capital projects, or pre-development costs associated with larger projects. • Maximum loan amounts $100,000 or 75% of total project cost, whichever is less. • Below market interest rate. • Maximum repayment period of 10 years.

Program	Agency	Type	Description
State			
State Drinking Water State Revolving Fund Loan Program (SRF)	Utah DEQ - Utah Division of Water Quality	Loan	• Funding for Planning, Design, and Construction activities for public water systems to finance the cost of infrastructure projects. • Requires compliance with federal requirements apply (NEPA, A&E Procurement, AIS, Davis Bacon, and others). • Interest rate varies 2-4% and based on community. • Loan term – 20-40 years or life of project (pending Disadvantaged Community etc.) rkempe@sbcglobal.net. • Up to 18 months prior to first repayment. Annual payment schedule. • One-time origination fee of 1% (normally paid at closing). • Debt service reserve account – Required to deposit in the amount of one-tenth of the annual payment on the bond(s) purchased by the Board until the amount in the reserve fund is equal to the annual payment. • Capital Facilities Replacement Reserve account – 5% of agency's drinking water system's annual operating budget including debt service and depreciation until bond is redeemed. • No early pre-payment penalty. • On-going application cycle.
State Drinking Water SRF - Planning and Design Advances	Utah (DEQ) - Division of Water Quality	Grant	• Advances (loan forgiveness) for Planning and Design activities of SRF applicable projects. As the project progresses from the Planning to the Design and eventually construction phase, the advances are rolled into the SRF Construction loan for repayment. • No Match – however, if a match is provided, it demonstrates a strong community investment in the project under consideration. • Projects that do not proceed to design and/or construction are still required to repay the advance.
Green Project Reserve (GPR)	Utah (DEQ) - Water Quality Board and Division of Water Quality	Grant	• SRF grant funding for projects that include green infrastructure, water or energy efficiency improvements or other environmentally innovative activities. GPR projects must address water or energy efficiency, mitigate stormwater runoff, or encourage sustainable project planning, design and construction. • Loan principal forgiveness of 50% for construction costs and 75% for planning costs. • Program capacity is 20% of total SRF funds.
Financial Assistance Program - Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund	Utah Department of Natural Resources (Division of Water Resources)	Loan	• The Revolving Construction Fund, Cities Water Loan Fund and Conservation and Development Fund provide loan funding for projects that conserve, protect, or more efficiently use present water supplies, develop new water, or provide flood control. Cities Water Loan Fund provides assistance to districts for the construction of municipal water projects. Conservation and Development Fund helps finance large construction projects, like dams and large municipal drinking water systems. • Public entity. • Provides for zero to low-interest (around 3% or less) funding. • Loan term: less than 25 years. • Requires a 15-25% cost share (match) from applicant. • Grants are only provided for dam repair projects. • State funds so does NOT have to comply with federal compliance requirements.
Permanent Community Impact Fund	Permanent Community Impact Fund Board	Loans and Grants	• Provides loans and/or grants to state agencies and subdivisions of the state, which are or may be socially or economically impacted, directly or indirectly, by mineral resource development on federal lands. • Types of activities: planning, construction and maintenance of public facilities, and provision of public services. • Maximum award of $5,000,000 regardless of grant/loan mix. • Planning, study or design requests require 50% match (match has to have a demonstrated value).
Community Development Block Grants	Housing & Community Development	Grant	• *Small Cities Program* is targeted to assist in developing viable communities by providing decent housing and a suitable living environment and expanding economic opportunities, principally for persons of low and moderate incomes. • Grants to Cities of <50,000 or Counties <200,000. • Grants range $25,000 to $200,000.

Program	Agency	Type	Description
Other			
Wattsmart Business Program	Rocky Mountain Power	Grant	• To provide planning and design advances to communities in need of assistance (e.g., when the cost of water or wastewater improvements increase rates above 1.4% MAGI). These advances turn into grants and do not need to be repaid.
Private Equity Funding	Private Industry/ Company	Loan	• Ridgewood Infrastructure – private investment group which partners with public agencies to provide private equity for water and energy infrastructure in the United States. • Provides financing for planning, design and construction. Full or specific aspects of projects. • Project costs minimum is $50M-$200M; can fund CICWCD Project. • Loan term flexible – 20-30-year note. • Repayment structure is flexible to fit CICWCD needs (semi-annual or annual); can repay interest only or interest and capital. • Interest rate is comparable to the market rate (8-10%). • No early payment penalty. • No strings or requirements (e.g. NEPA, federal requirements, etc.). • Ridgewood would be more involved in project design, construction and potentially operations (could be P3 or hybrid). • Potential conflict with other funding sources due to private financing.
Water Infrastructure Restricted Account (WIRA)	Utah Governor's/Legislature/ Bonding Bill/Budget	Loan	• Pursuit of project financing via Governors special projects or legislative action (via local State Representative) such as – *SB281 – Water Infrastructure Restricted Account (WIRA).*
Special Appropriation Act Projects	EPA	Grant	• Funds dedicated to project via a special appropriation. Difficult to secure.
America's Water Infrastructure Act 2018 Programs	EPA	Loans/ Grants	• Track to see what programs are funded through H.R. 3387 Drinking Water System Improvement Act of 2017. Pending appropriations there maybe potential funding programs for the CICWCD Project.