Central Iron County Water Conservancy District

Capital Facilities Plan

March 2011

Report prepared by:

Stanley Consultants INC.

A Stanley Group Company
Engineering, Environmental and Construction Services - Worldwide

CENTRAL IRON COUNTY WATER CONSERVANCY DISTRICT

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Capital Facilities Plan and Impact Fee Analysis

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A. Executive Summary

The Central Iron County Water Conservancy District (CICWCD or District) proposes in this Capital Facilities Plan (CFP) an approach to water source development and treatment to benefit both retail and wholesale customers. This plan evaluates the Lake Powell Pipeline project as a secure and dependable source of water supply for all District customers for more than 50 years. This plan is structured in accordance with the Utah Impact Fees Act as shown in Utah Code Title 11, Chapter 36, Section 201.

This CFP was prepared to provide the District with (1) a plan for future water capital facilities that provides for the expansion and improvement of the District's public facilities and will detail the facilities to be acquired and constructed, and (2) a basis for the water impact fees assessed to the District's culinary water services as well as impact fees or other charges which may form the basis of future water supply contracts to Municipal Customers, and (3) communicate the long range objectives, needs and costs of water based upon expected population growth to those benefited by the District's facilities including Municipal Customers, retail customers, and other contract users.

The CFP's financial analysis section is divided into separate components. The first deals with CICWCD facilities that need be constructed to utilize local resources and provide for distribution of imported water, while the second analyzes the Lake Powell Pipeline (LPP) project features.

The CFP provides for the development of water sources and facilities needed to supply water through 2060. All facilities included in the Plan will be owned and operated by the District. Utah Code Section 11-36-102(12) allows the costs of facilities that "are owned or operated by or on behalf of a local political subdivision" to be included in an impact fee.

Iron County, and in particular the Cedar Valley, has experienced significant population growth in past years with this trend projected to continue over the next 50 years. The State of Utah Governor's Office of Planning and Budget (GOPB) Demographic and Economic Analysis Section is responsible for preparing population projections. Their latest projections are identified as the 2008 Baseline City Population Projections. Historically GOPB's projections for southwest Utah has been lower than what actually occurred. For comparison purposes another method of population projection was incorporated into this report utilizing population projections prepared by the District's wholesale municipal clients, Cedar City and Enoch. There is considerable difference in these projections. For example the projected population for the District's service area using the GOPB method for 2060 is 151,500 compared to 240,400 using the wholesale municipal client's method. It is anticipated the actual population increase that will occur somewhere between these two estimates. For planning purposes an average of the two methods would be utilized, recognizing each method as the upper and lower limits of the projections. The existing water supplies serving the Cedar Valley are currently being

utilized beyond their sustainable capacity demonstrated by the declining levels of groundwater in the local aquifer (USGS 2005). Water conservation initiatives and conversions of agricultural water to municipal and industrial uses will extend available resources, but will not address aquifer mining, nor meet the culinary water needs of the population through 2060. It is projected that additional sources of water ranging from 10,000 to 42,000 ac-ft will be required to meet the needs for users in the Cedar Valley.

The LPP was developed to address the long-term water needs for Washington, Kane and Iron Counties. The LPP is currently funded to proceed with conceptual design and includes provisions for deliveries of 20,000 acre-feet of untreated water to the CICWCD service area by 2020. The current plans for this water provide maximum flexibility of uses including a water supply for a new water treatment plant, and secondary water systems. It is recommended that Iron County (CICWCD) participate in this project, as well as explore all other potential new sources to assure meeting future demands. It is essential that one strongly consider the LPP as this project will never be able to be repeated due to the limitations on the water rights available from the Colorado River. This project is unique in that it brings together two other major water purveyors, Kane County Water Conservancy District and Washington County Water Conservancy District in a partnership with the State of Utah Division of Water Resources.

The CICWCD was created to fill the need for a regional water purveyor for the Cedar Valley. The District is charged to meet this obligation, provide basic sources, transmission/distribution, storage and treatment infrastructure, manage the water resources, provide fire protection and emergency water reserves, and to move water from sources to users. A water system master plan, along with a proposed schedule for construction, has been developed by the District and their constituents to address the demand requirements of the CICWCD service area through 2060.

The entire local water supply and imported water from the LPP will be fully utilized between the years of 2050 and 2060. To continue to provide for increased population growth a new source will need to be identified.

Proposed funding for the LPP would be accomplished through graduated user impact fee revenues over a 50 year re-payment period beginning in 2020. The pro-rata portion of the costs associated with participation in the “LPP – Lake Powell to St. George” segment have been included in the LPP impact fee schedule.

Funding for CICWCD capital projects is recommended through implementation of an impact fee. The funding for facility operations and maintenance would be through user fees. The majority of proposed CICWCD infrastructure needs are intended to address population and water demand growth. A graduated impact fee per connection will fund new growth based infrastructure through 2060.

B. Background

Southwestern Utah has experienced rapid growth over the last 30-years. Much of this growth has been focused in the St. George and greater Washington County area, which has experienced an average annual growth rate of about 6% (Lewis, 2005). Real estate values have dramatically increased in Washington County as a result of the increased population and demand for developable property in the area. During 2008-09 the growth dramatically decreased similar to other parts of the western United States, which was related to a major overall economic downturn. Iron County, due to its proximity to St. George and its location along the I-15 corridor, experienced an increase in growth as a result of "spill over" from Washington County as well as population increases resulting from internal growth.

Since its inception in 1997, the CICWCD has been preparing to fulfill its role as a regional water purveyor. The early years of the District were spent studying the available resources, developing plans to fully utilize the limited water resources and planning infrastructure needed to convey water supplies to the ever-expanding population base.

Iron County receives its water supply from a combination of surface water sources and groundwater aquifers within the Cedar Valley. These resources have provided for the County's water needs adequately in the past, but have been over-allocated and over-used for the past few decades. The current sustainable yield of available surface and ground water resources in the CICWCD service area is being exceeded by the expanding usage. This is evidenced in the Cedar Valley Aquifer by declining elevations of groundwater. This condition known as "mining", results in increased pumping depths and associated costs. This is a very important issue when considering future operation and maintenance costs for groundwater users. It is likely that many wells will need to be deepened to allow continued pumping.

In 2005, the USGS completed a study of the available water sources for the Cedar Valley in Iron County, to establish the dependable capacity of ground and surface water sources. They modeled six different scenarios to determine to most representative condition for sustainability. The total recharge of the Cedar Valley aquifer was estimated between 36,000 and 42,000 ac-ft/year, however, this USGS study noted that aquifer levels continue to decline, suggesting that the sustainable yield may be significantly less than this value.

Subsequent model calibrations of the groundwater model by USGS staff have resulted in a revised sustainable yield estimate for ground and surface water sources of 37,600 ac-ft/yr (DWRe, ca. 2005, USGS, 2005). This value has been adopted as the available assumed aquifer safe yield for the project area for the purposes of this study.

The Utah Governor's Office of Planning and Budget (GOPB) has projected that the annual population increase in Iron County will be approximately 3-4% through 2020 and will average approximately 2.7% through 2060. Based upon the GOPB projections, the population of Iron County is expected to double by about 2035. The two largest water retailers in CICWCD's service area, Cedar City and Enoch, have completed independent water system master plans for their respective service areas. Cedar City's "Water System Master Plan Update" dated June 2009 projects a population increase of over 100,000 by 2050 which represents an annual population increase of approximately

3.7%. Enoch City Water Master Plan Report dated December 2007 estimates a population increase of approximately 34,000 by 2039 which represents an annual population increase 8%.

The CICWCD is responsible for providing both culinary and secondary water to areas outside the municipal boundaries of Cedar City, Enoch and Kanarraville. It is projected that a large percentage of total Iron County growth will occur beyond the existing and annexed municipal boundaries but within the service area of the CICWCD. It has been determined that the existing CICWCD water system infrastructure is not currently capable of providing adequate source, transmission and storage to serve the expected increase in demand resulting from growth. The annexed areas are shown on **Figure 1**.

The purpose of this study is to identify the requirements for CICWCD culinary source, transmission, storage, and treatment facilities as well as a secondary water source and transmission needs to provide an adequate level of service through 2060. In order to provide equitable cost allocation of the proposed facilities improvements, the expected capital costs for system improvements and recommended funding alternatives are both identified and quantified.

C. Planning Period and Scope of Study

For the purposes of identifying and evaluating expected population and water demand projections, required system improvements to service these demands, and to develop a reasonable capital facilities planning schedule, the planning period extends to year 2060. This year corresponds with the GOPB population projections period and represents a 50-year planning period. The study area is defined as the service boundaries of the CICWCD. Refer to **Figure 1**.

The scope of this study includes developing population projections through the planning period, then using those projections to estimate water demands. Existing culinary and secondary source, transmission and storage facilities are next evaluated for capacity and remaining working service life to determine the need for replacement or upgrades to meet increases in demand. Additional facilities are then identified to integrate the LPP project through the planning period.

Several approaches were evaluated to determine the required facilities over the short and long term. This will allow the CICWCD to meet demand obligations, while providing operational flexibility needed to respond to changes in growth patterns and water use over the next 50 years. These approaches are summarized as follows:

- Converting irrigation waters to Municipal and Industrial (M&I) use.
- Implementation of conservation initiatives to extend water sources.
- Development of a regional secondary water system that utilizes water unsuitable for culinary use (high nitrate, total dissolved solids, flood water reclamation).
- Importation of additional source capacity.
- Construction of a single “centralized” water treatment facility.

The existing source, storage and transmission infrastructure in the incorporated areas of Cedar City, Enoch, and Kanarraville are not included in the scope of this study. It is understood that these facilities will remain under the ownership and operational control of the respective communities.

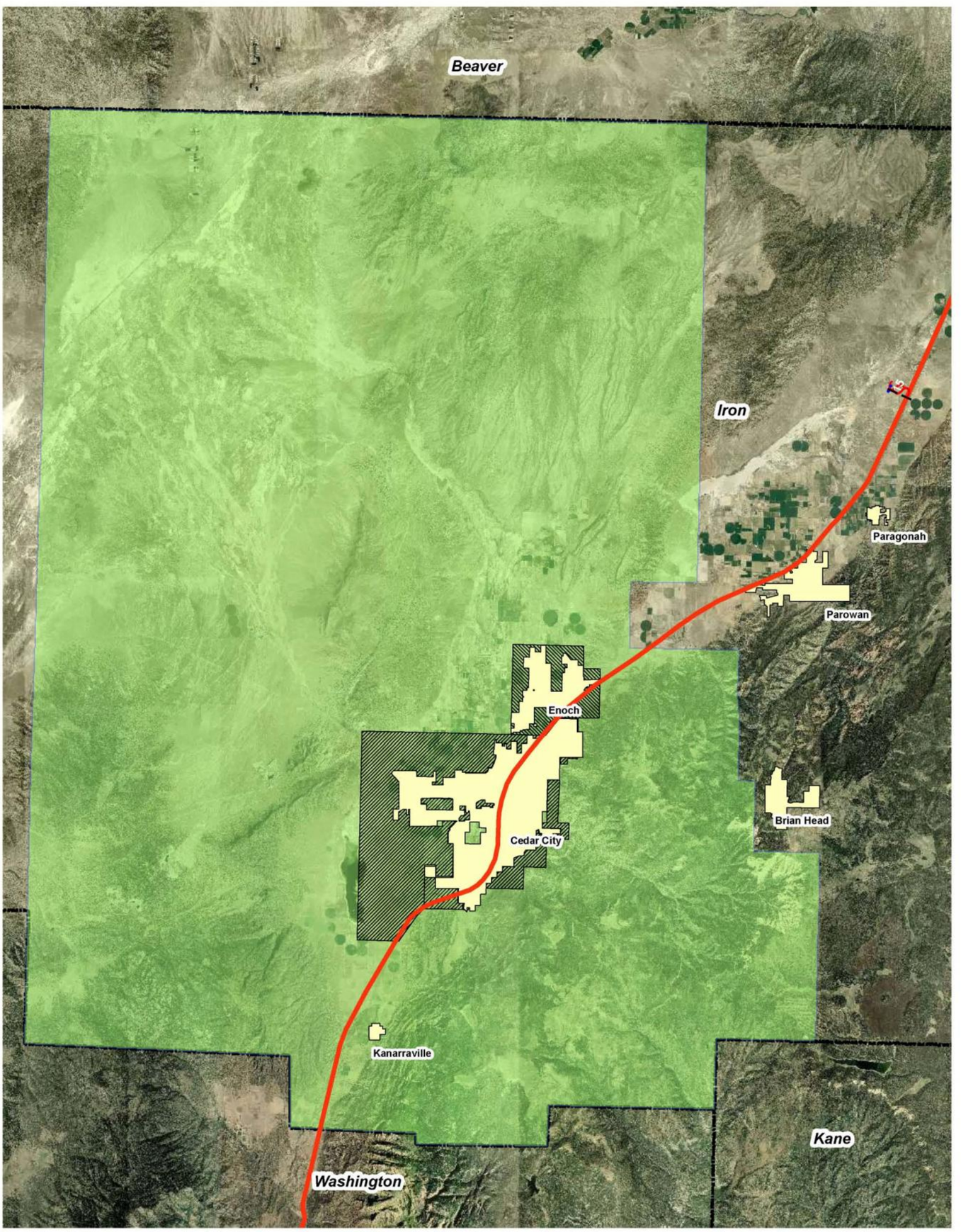

Figure 1 - CICWCD Service Area

Legend

I-15 | Municipalities | Enoch Annexation Declaration | Cedar City Annexation Declaration | CICWCD

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Kanarraville is included as part of the District's future demand and service area, however their infrastructure facilities will remain in their ownership and operational control, similar to Cedar City and Enoch. Kanarraville is located in a different hydrologic drainage basin (Central Virgin River) than the Cedar Valley, even though they are located within the CICWCD service area. Being located in separate watershed basins precludes transbasin diversions between the respective aquifers. Their respective location impacts the supply volume available and the associated value of water rights. Water rights in the Central Virgin River (Lower Colorado Basin), when available are generally 3 to 4 times more expensive than those in the Cedar Valley. As growth occurs, the District may consider supplying future demands from their existing Chekshani Cliffs pumps, with minimal requirements, excepting waterline connections.

Future regional capital improvements required to accommodate growth in these areas is addressed as part of this study. The mechanism for funding, ownership and operational control of future source, storage and transmission requirements for Cedar City, Enoch and Kanarraville has not been defined at this time. For the purposes of this study, it is assumed that regional source and storage facilities required to accommodate future growth in these communities, as well as CICWCD, will be provided, owned and operated by CICWCD. This will allow the gradual evolution toward an overall comprehensive water management plan that efficiently uses and manages the resources of the water basin.

The Demographic and Economic Analysis (DEA) section of the GOPB analyzes and provides economic and demographic data in order to enhance planning from a State Government perspective. The DEA population estimates are provided on a State-wide, County, and Sub-County basis and have been most recently updated in 2008. Their distributions were utilized in the evaluation of various sectors of Iron County and CICWCD.

D. Current Facilities and Resources

CEDAR CITY

Within its corporate limits, Cedar City currently serves a population of approximately 26,000 plus a seasonal population of approximately 7,000 Southern Utah University students. System infrastructure consists of culinary supply wells, developed springs, pipelines and storage reservoirs. The system serves approximately 4,500 residential connections, plus commercial and industrial customers. Current potable water system source capacity (wells and springs) is 9,273 gallons per minute (gpm). A total of 18,071,317 gallons of storage capacity has been developed (Water System Master Plan Update for Cedar City, Utah- June 2009).

In addition to potable water supply, Cedar City also has a secondary water supply consisting of one pipeline, two storage facilities, and two wells. The secondary system primarily supplies five connections including a cemetery, High Schools, golf course, baseball field and Southern Utah University.

ENOCH

Enoch presently serves a population of approximately 4,400. The Enoch culinary water system consists of five active wells, with a total production of 3,360 gpm and three tanks with a total storage volume of 4,250,000 gallons. The system serves approximately 860 residential customers. (Enoch City Master Plan-Dec. 2007)

KANARRAVILLE

Kanarraville serves a population of approximately 350. Their system consists of two active wells, with a total source capacity of 440 gpm and one tank with a capacity of 350,800 gallons. The current system serves approximately 160 residential customer connections.

CENTRAL IRON COUNTY WATER CONSERVANCY DISTRICT

The CICWCD is a relatively new utility provider with a system that consists of six active wells and two storage reservoirs. Refer to **Table 1** below. The initial system source, storage, and connecting transmission/distribution lines have been constructed or are under construction. **Figures 2** shows the existing and future infrastructure required.

TABLE 1: CICWCD Existing Facilities

Description	
Wells	**Capacity (gpm)**
Derby	1,300
Eagle Valley	125
District #1	800
Westslope	200
Northridge	250
Chekshani (outside Cedar Valley aquifer – Lower Colorado Basin)	225
Storage	**Capacity (MG)**
Three Peaks	1.0
Northridge	0.5
Chekshani	0.12
Westslope	0.25

GROUNDWATER AND SURFACE WATER SUPPLIES

The USGS completed a study of the available water sources for the Cedar Valley in Iron County, to establish the dependable capacity of ground and surface water sources (USGS, 2005). The majority of all water used in Iron County comes from sources in the Cedar Valley hydrogeologic system. This system is primarily fed by snowmelt and large precipitation events via Coal Creek and Shurtz Creeks. Coal Creek provides almost all surface water used for irrigation in the Cedar Basin and much of the recharge water for the underlying aquifers. The average annual discharge from Coal Creek is approximately 24,400 acre-feet (ac-ft), of which most is contributed to aquifer recharge. The total recharge of the Cedar Valley aquifer was estimated between 36,000 and 42,000 ac-ft/year(ac-ft/yr), however, the USGS study noted that aquifer levels continue to decline, suggesting that the sustainable yield may be significantly less than this value (USGS, 2005).

Subsequent model calibrations of the groundwater model by USGS staff have resulted in a revised sustainable yield estimate for ground and surface water sources of 37,600 ac-ft/yr (DWRe, ca. 2005, USGS, 2005). This value has been adopted as the available assumed aquifer safe yield for the project area for the purposes of this study.

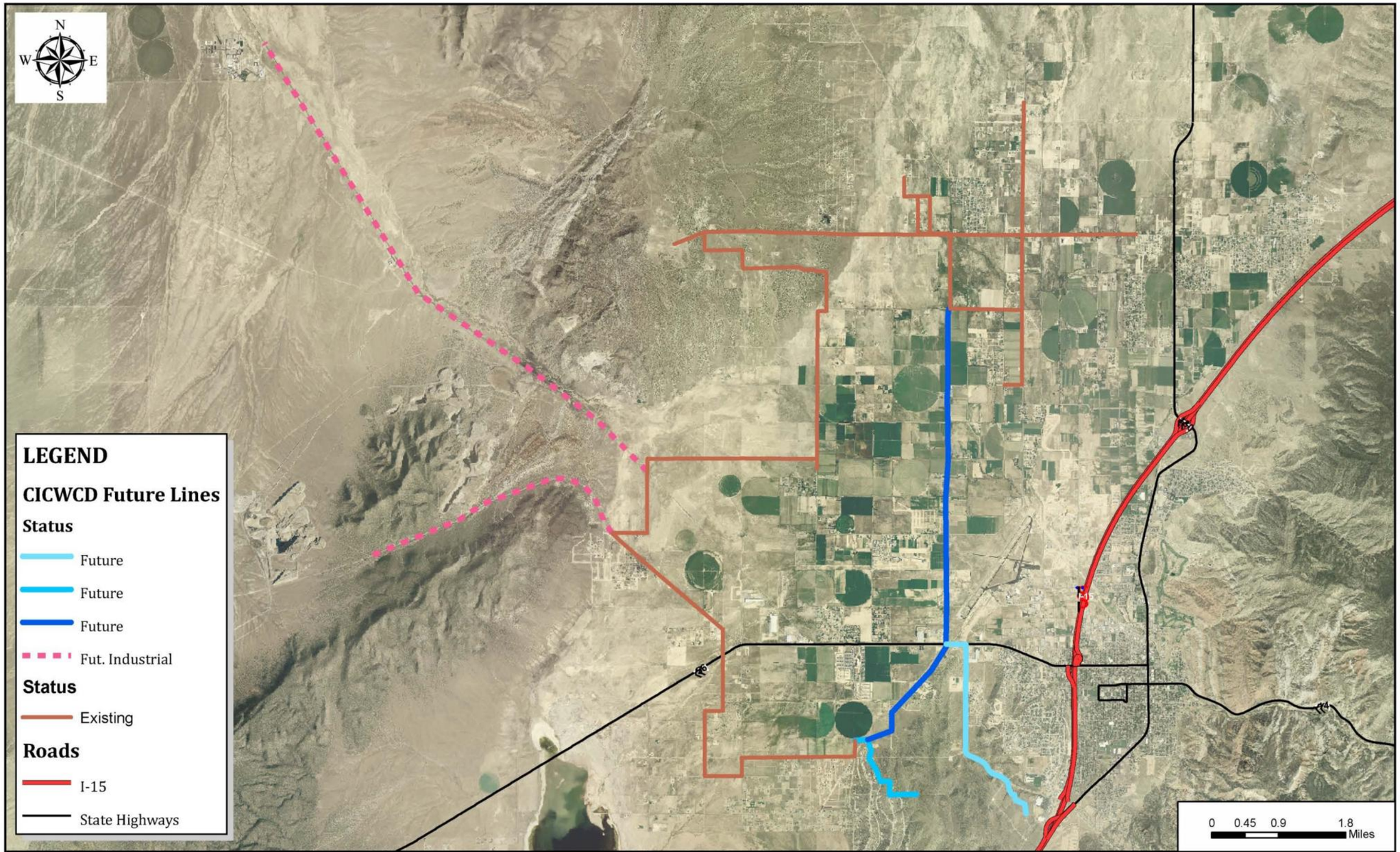


Figure 2 - Existing & Future Infrastructure

E. Water Demand and Supply Estimates

GROWTH PROJECTIONS

Two separate approaches were taken to estimate the future population within the District's service area.

1. The first method (CICWCD Growth Projections) involved the development of estimates of future growth within the service area of CICWCD are based upon projections developed by District participating entities (Cedar City and Enoch) and the GOPB. Both Cedar City and Enoch, the two largest constituents in CICWCD, have completed Water System Master Plans which projects a population increase of approximately 136,400 between 2010 and 2060. Enoch City estimates a population increase of approximately 32,350 between 2010 and 2039 when they will attain a full "build-out" condition. Current (2010) GOPB projections estimate a 2.7% Average Annual Rate of Change (AARC) in the balance of Iron County through 2060 which represent a population increase of approximately 29,000. For the purposes of planning infrastructure needs, a combination of Cedar City, Enoch City, and the balance of CICWCD (based upon GOPB), are used.
2. The second method (GOPB Projections) utilized the GOPB's latest Demographic and Economic Analysis estimates (2008 Baseline City Population Projections). The GOPB projections for the entirety of Iron County were reduced by 10% as an estimate of the population within the service area of the District.

Refer to **Table 2** for projected population estimates for the Central Iron County planning area. The planning period is from 2010 to 2060.

The "Balance of County Population" was developed using the GOPB projections for Iron County, reduced by the population of Cedar City and Enoch.

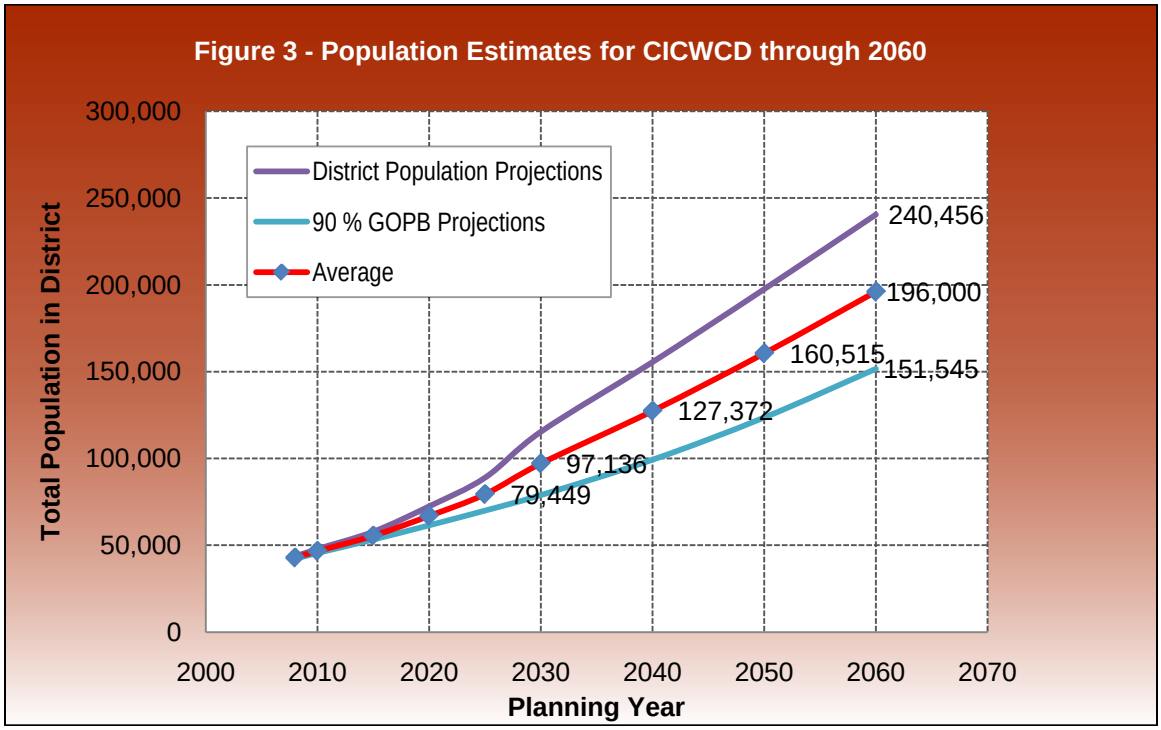
It was assumed the population growth within the balance of CICWCD service area boundaries are expected to be approximately 97% of the population growth of Iron County excluding Parowan and Paragonah.

TABLE 2: CICWCD Growth Projections						GOPB Projections	
Year	Cedar City Population[1]	Enoch City Population[2]	Balance of County Popoulation[3]	Balance of CICWCD Service Area[4]	**Total Population**	2008 GOPB Iron County[5]	90 % of Iron County
2010	29,961	6,500	11,743	11,391	**47,852**	50,601	**45,541**
2015	36,644	9,000	12,564	12,187	**57,831**	59,212	**53,291**
2020	44,566	12,500	15,854	15,378	**72,444**	68,315	**61,484**
2025	53,896	17,500	18,097	17,554	**88,950**	77,721	**69,949**
2030	69,663	26,000	20,340	19,730	**115,393**	87,644	**78,880**
2040	92,148	38,548	25,585	24,817	**155,513**	110,257	**99,231**
2050	128,078	38,548	31,844	30,889	**197,515**	137,240	**123,516**
2060	164,008	38,548	39,072	37,900	**240,456**	168,383	**151,545**

1. Cedar City Water System Master Plan Update, June 2009, Table ES-1
   2060 population assumes the same percentage growth for the 2040-2050 time period
2. Enoch City Water Master Plan, December 2007, Figure 19.
3. GOPB 2008 Baseline City Population Projections excluding Parowan and Paragonah (not included in total population)
4. Assumed 97% of Balance of County population within CICWCD based on GOPB population projections
5. GOPB 2008 Baseline City Population Projections

As one can see from **Table 2**, there is considerable difference in the results these two projection methods produce. It is assumed for the purposes of this report the actual population increase will occur somewhere between these two estimates. For planning purposes an average of the two methods was utilized (shown on **Figure 3** as the "red" line). The two methods are shown as the upper and lower limits of the projections.

The anticipated total population within Cedar City, Enoch and the service area of the CICWCD is shown in **Figure 3**. You will note, the average for the year 2060 is 196,000 people rather than 240,400 using the CICWCD growth projections or 151,500 using the GOPB method.



LEVEL OF SERVICE

The establishment of a level of service is a key element in the engineering for and the projection of water demands. A level of service is also another important figure in the calculation of impact fees since impact fees can only be collected to perpetuate the existing level of service to serve growth but cannot be collected to increase the existing level of service. The level of service is found in the State Division of Drinking Water's source requirements (R309-510). The level of service used for the planning of projects and calculation of impact fees in this analysis is based upon the Utah State Drinking Water Board minimum standards of 0.89 acre-feet (af) per residential unit or Equivalent Residential Unit (ERU). This is the standard unit of measure by which fees will ultimately be assessed. Impact fees may not be used to construct infrastructure that will increase the level of service for future development nor construct projects that will cure existing deficiencies.

The requirement of 0.89 af per ERU is further divided between indoor and outdoor demands. The indoor requirement is 0.45 af which is equivalent to 0.51 ERU. The outdoor requirement is 0.44 af, which equates to 0.49 ERU.

Because the infrastructure proposed in this CFP cannot meet the needs of the District Service Area through buildout, there is no concern that the projects are oversized in relation to the projected demands. This analysis ensures (1) a reasonable and equitable level of service is established, based upon current demands and population and State Drinking Water requirements, and (2) the District will not increase the level of service by overstating the per capita demands for water.

PROJECTED WATER DEMANDS

Projected water demands for the study area are based primarily upon increases in population and heavy industrial users along the industrial corridor which presently include Western Electrochemical Company (WECCO) and the Iron Mines, which are located along the rail corridor.

Industrial interests along the rail corridor are estimating a combined future need total of 7,000 ac-ft/yr.

Total water demand for Cedar City and the CICWCD service area is calculated as the product of per-capita usage and expected total population, adjusted for conversion of agricultural lands as well as water conservation initiatives over the planning period. The water demand for Enoch is calculated by dividing the population by the average persons per household and using the State's Equivalent Residential Connection (ERC) requirements (Enoch City Water System Master Plan, 2007). The current total M&I water demand for the planning area is approximately12,160 ac-ft/yr. It should be noted that the agriculture demand is estimated at 27,500 ac-ft/yr (DWRe, 2005). As noted earlier, the sustainable yield of the aquifer is estimated at 37,600 ac-ft/yr. The total demand for M&I and agriculture demands exceeds the sustainable yield of available sources by about 2,200 ac-ft/yr. This is evidenced by the continuing decline of the groundwater elevation in the area.

WATER CONSERVATION OFFSETS

In order to make the best use of limited water resources in the arid Intermountain West, the State of Utah Governor's Office and Division of Water Resources have taken a leadership role in promoting water conservation in Utah. The Utah Board of Water Resources currently requires implementation of water conservation initiatives as a condition for funding of major projects. The current requirement is a 25% per capita reduction in culinary and irrigation consumption by year 2050 using 1995 consumption rates as the baseline quantity. Including the required reduction the total per-capita M&I demand goal for 2050 is 0.270 ac-ft per year. (DWRe, 2003). It should be noted that the CICWCD area is currently using about 0.273 ac-ft/capita-yr which is less than the State-wide average of 0.360 ac-ft/capita-yr. This represents a decrease of 9% in Iron County since the State wide goal was implemented. For the purposes of this study it is assumed that the additional 16% State conservation goal will be realized and that progress toward that goal will be more or less linear over the project planning period to 2050.

TOTAL CICWCD WATER DEMAND ESTIMATES

Total water demand estimates for the CICWCD service area were developed to consider M&I only (no agriculture). This considers service to growth-related customers; residences, businesses and supporting infrastructure resulting from population growth. Total water demands over the planning period for M&I customers is indicated in **Table 3**.

It is expected that total M&I demand will increase from about 12,290 ac-ft/yr (current) to approximately 73,580 ac-ft/yr by 2060 using the CICWCD Growth Demand. This includes demands identified in both the Cedar City and Enoch City Water System Master Plans, demands for the balance of the County within the CICWCD service area, and demands for future heavy industrial users. The lower limit of the demand is shown as the GOPB Demand with Conservation. The 2060 lower demand is 41,752 ac-ft/yr, which is a 31,828 ac-ft/yr (73,580 – 41,752).difference.

TABLE 3 - CICWCD Water Demand Projections						GOPB Projections
Year	Cedar City Demand[1]	Enoch City Demand[2]	Balance of CICWCD Service Area[3-4]	Additional Heavy Industrial Demand[5]	**Total CICWCD Growth Demand**	**GOPB Demand with Conservation[6]**
	(AF)	(AF)		(AF)	(AF)	(AF)
2008	7,079	2,545	2,669	0	12,293	11,430
2010	7,684	2,668	3,079	500	13,931	12,808
2015	9,398	3,694	3,261	2,000	18,353	16,257
2020	11,425	5,131	4,030	3,500	24,087	19,614
2025	13,823	7,183	4,529	4,250	29,785	22,296
2030	17,866	10,672	5,009	5,000	38,548	25,027
2040	23,635	15,823	6,098	6,500	52,056	30,881
2050	32,854	15,823	7,336	7,000	63,013	36,336
2060	42,070	15,823	8,691	7,000	73,584	41,752

1. Water System Master Plan Update for Cedar City, June 2009
2. Enoch City Water Master Plan, December 2007, Figure 19.
3. GOPB 2008 Baseline City Population Projections
4. Obtained by multiplying 229 gal/capita/day (Cedar City Master Plan) by the population
5. Industrial Railway Corridor users
6. 90 % of GOPB 2008 Baseline plus Heavy Industry

Should the CICWCD elect, at some future time, to provide secondary or irrigation supply to the agricultural interests in the service area, total water demands upon the District will increase beyond levels shown in the previous paragraph. For the purposes of this study, agricultural demands will not be served by the CICWCD. The CICWCD will provide for only the additional demands resulting from M&I growth.

F. Projected Water Supply

The Cedar basin is essentially a hydrogeologic closed-basin, which means there are no significant outflows of water. All existing water sources are derived from groundwater sources through wells or springs. Groundwater sources in the Cedar Basin have been over appropriated and therefore are closed to any new water right appropriations. There are three available existing supplies within CICWCD boundaries to meet future demands: (1) existing developed water, (2) conversion of agriculture water to M&I, and (3) further development of existing water rights. Agriculture users are supplied by both groundwater and surface water. For the purpose of this report it is assumed that the agricultural demands will be met by existing supplies.

EXISTING DEVELOPED WATER

Since CICWCD is in its relative infancy as a water district, almost all of the existing developed water in the Cedar Basin area is comprised of municipal water supplies derived from groundwater sources mostly in Cedar City and Enoch with contributions from other smaller water companies. The total developed existing water supply consists of 11,360 ac-ft of potable water and 800 ac-ft of secondary water for a total of 12,100 ac-ft (MWH 2008).

CONVERSION OF AGRICULTURAL LANDS

It is anticipated that as population growth occurs, significant agricultural land and associated water right holdings within the annexed areas of Cedar City, Enoch and the CICWCD service area will be converted to municipal or industrial use. It is estimated that approximately 5,940 acres of agricultural land, within the annexation boundaries of both municipalities, will be converted to municipal and industrial use over the planning period.

The current irrigated agricultural acreage in the planning area is approximately 13,735 acres. Each acre of agricultural land is estimated as accounting for 4.08 ac-ft per year in demand at an approximate overall irrigation system efficiency of 53%. If converted to M&I use, it is expected that the final consumptive use factor will be 1.00, resulting in 4.08 ac-ft per year available source capacity for each acre of agricultural land converted to M&I use (MWH 2008).

As noted above, the Division of Water Rights (DWRi) has determined that the Cedar Basin has been over-appropriated. In 2005 the USGS completed a groundwater study for the Cedar basin and determined the safe yield of the aquifer to be 37,600 ac-ft/yr (USGS, 2005). This represents approximately 66% of the total appropriated groundwater rights for the basin. It is assumed that the DWRi will implement a groundwater management plan for the Cedar basin which will curtail water rights to the available yield of the aquifer.

Potentially, once the LPP project comes on line, a portion of the demand for groundwater could be shifted and supplied by that project. Additionally, all of the water provided by the LPP will not be depleted and will tend to increase the recharge to the aquifer, assisting in its recovery.

Because the timing of agricultural conversion will be related to factors not readily identifiable, it is assumed for the purposes of this report that conversion will occur linearly over the planning period.

DEVELOPMENT OF EXISTING GROUNDWATER RIGHTS

Development of existing groundwater rights includes rights that are currently held by primarily Cedar City and Enoch City, limited by the assumed sustainable yield discussed in the previous paragraph. **Table 4** shows the total supply available to CICWCD as the agricultural lands are converted into developed lands.

TABLE 4 - CICWCD Total Supply				
Year	Existing Supply (AF)	Agriculture Conversions[1] (AF)	Development of Existing Rights[2-3] (AF)	**Total Supply (AF)**
2008	12,160	0	0	**12,160**
2010	12,160	1,959	451	**14,570**
2015	12,160	3,918	903	**16,980**
2020	12,160	5,877	1,354	**19,390**
2025	12,160	7,836	1,805	**21,801**
2030	12,160	9,794	2,256	**24,211**
2040	12,160	11,753	2,708	**26,621**
2050	12,160	13,712	3,159	**29,031**
2060	12,160	15,671	3,610	**31,441**

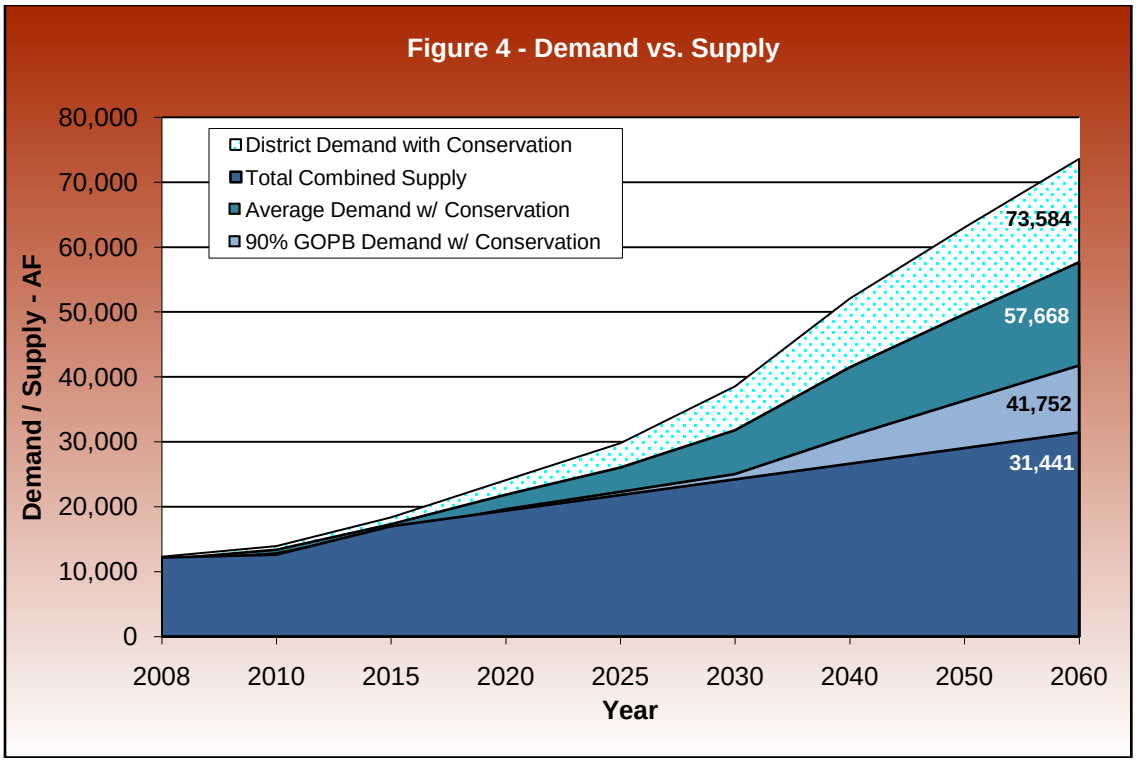
1. MWH, "Lake Powell Pipeline Study, Water Needs Assessment", August 2008
2. Div. of Water Resources Memorandum, June 20, 2008 "CICWCD Uplan Study 2008 Results"
3. Additional water rights that could be developed up to sustainable aquifer yield - 37,600 AF

G. Summary of Projected Water Demands and Supply

As noted earlier, the projected demand for future water supplies will be driven largely by the increasing population, with 7,000 ac-ft/yr ultimately required by heavy industry. These demands reflect conservation goals.

The supplies available to meet these increasing demands consist of the development of existing groundwater rights, constrained by the aquifer safe yield and conversion of the agricultural supplies as lands are converted to M&I uses.

Figure 4 shows the projected demand and the various supplies available in meeting increasing needs. The area shown in dark blue represents the demand based upon the District Growth Projections (max 73,584 ac-ft). The purple layer directly below the upper layer represents the demand in excess of the supply based upon 90% of the GOPB projections (max 41,752 ac-ft). Three lower levels represent the supplies available the existing supplies, conversion of agricultural water, and the development of groundwater rights. The area in the purple and dark blue are considered the supply deficit (shortage). These shortages represent a range of potential shortages based upon the two methods of developing the future growth projections and are representative of a high and low range of shortages. In order to supply both levels of future demands new sources are required. The amount of new sources required for the lower level is 10,311 ac-ft and the amount to satisfy the upper level of demand is 42,143 ac-ft.



H. Projected Facilities and Resource Requirements

EVALUATION OF ALTERNATIVES

Several alternatives were evaluated to determine the most feasible approach to satisfying the needs of the CICWCD through 2060. CICWCD has been very proactive in evaluating a variety of future water supply alternatives to satisfy the future water requirements. These alternatives do not include the West Desert due to associated uncertainties surrounding developing this water supply.

Based upon the level of uncertainty associated with the other alternative sources, it was concluded that development of surface water from the Colorado River would provide a dependable new source of water for the planning area. All alternatives associated with the Colorado River project divide overall infrastructure development requirements into two components: the LPP project from St. George to delivery in the Cedar Valley, and source development, transmission and distribution piping, and storage facilities serving CICWCD customers. Costs related to serving CICWCD customers are based on impact fee assessments to retail customers within the District boundary. Costs related to funding the LPP project costs are allocated primarily through impact fees for both CICWCD wholesale and retail customers.

The LPP project is based upon the importation of untreated water to the Cedar Valley. The preferred option is the development of a conventional water treatment plant (WTP) located in southwest Cedar City. The WTP provides a new treated supply for utilization in the existing culinary system. The WTP serves as the terminus of the LPP. Part of the infrastructure developed at this site is a small storage re-regulation reservoir to provide a constant water surface elevation for the intake pumps for the WTP. **Figure 5** shows the proposed layout.

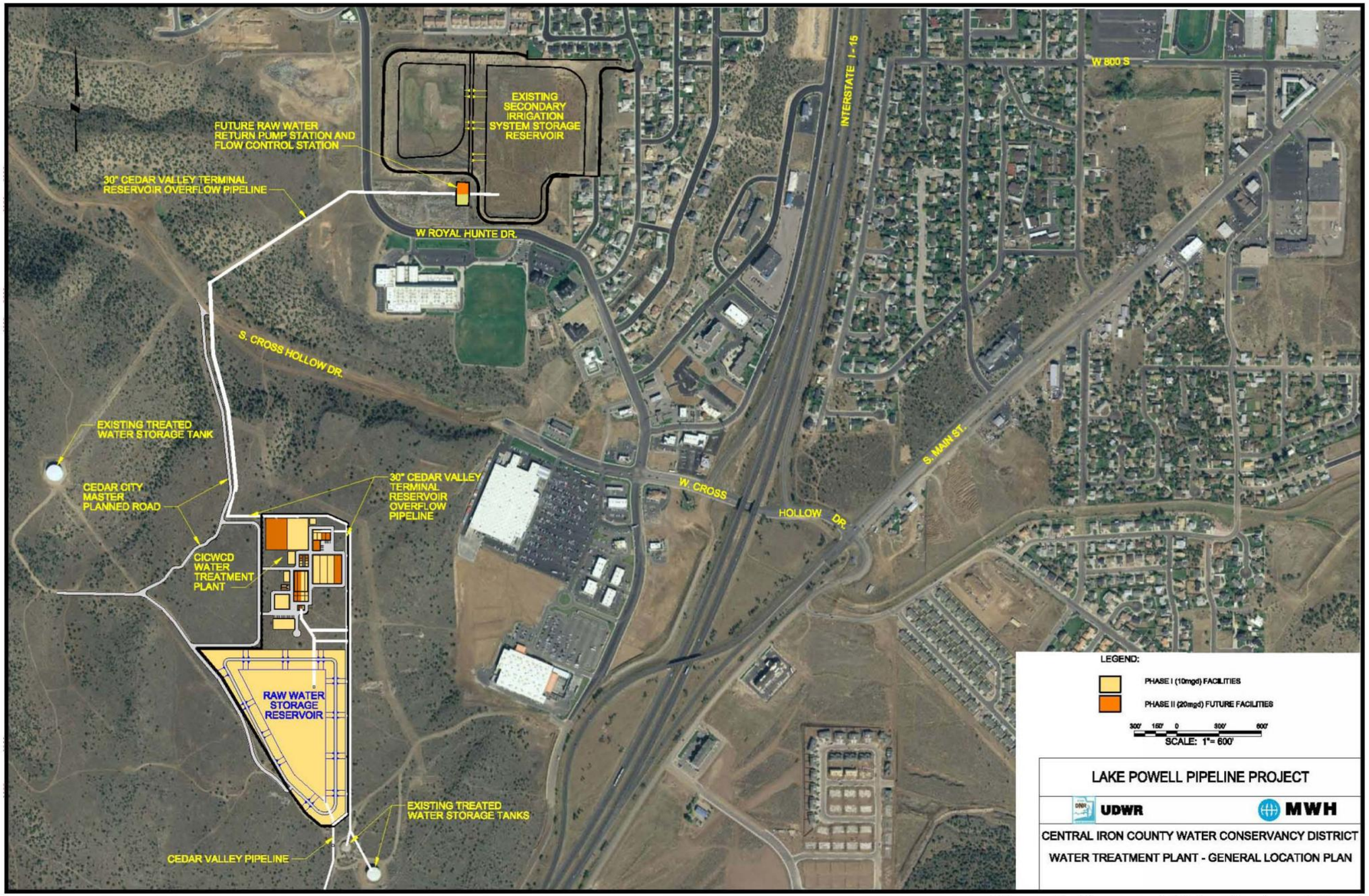


Figure 5 - Proposed Water Treatment Plant

Raw water storage is provided near the treatment facility to provide reserve capacity in the event of loss of delivery from the LPP. Distribution and storage facilities will be developed as customer needs increase over the planning period and are funded as part of CICWCD infrastructure costs. The LPP project costs include the water treatment facility. The LPP costs will be shared between the participants, primarily CICWCD, Cedar City and Enoch.

The LPP alternative provides the most certain overall approach to meeting the objectives of the CICWCD in providing dependable, cost-effective service to system customers over the planning period. For the purpose of this report this alternative has been carried forward for cost analysis.

The Lake Powell Pipeline

The proposed Lake Powell Pipeline project is intended to provide for long-term source requirements of Kane, Washington and Iron Counties by utilizing available portions of the Utah State allocation of Colorado River water. The CICWCD has the opportunity to participate in this project and secure delivery of 20,000 ac-ft/yr from Lake Powell to the Cedar Valley by participating in this State Water Resource Project. The other entities to receive water are Kane County Water Conservancy District (10,000 ac-ft/yr), and Washington County Water Conservancy District (70,000 ac-ft/yr). The Preliminary Opinion of Construction Cost (MWH January 2011) indicates to the Total Program Cost of the LPP project to be $1,163 M. The individual district costs are as follows: WCWCD - $732.0 M, CICWCD - $367.4 M and KCWCD - $64.1 M. The CICWCD will receive the benefit of an incremental facilities cost for the pipeline from Lake Powell to St. George, which consists of the majority of the overall pipeline length. The CICWCD will benefit by being able to increase its source capacity, redundancy and dependability.

The Lake Powell Pipeline project, as presently configured, is shown in **Figure 6**.

Participation in the Lake Powell project is time limited. The CICWCD has elected to participate in the project during study and pre-design phases to preserve the option of being included, thus allowing sufficient transmission capacity to meet their future needs. The incremental cost of increasing pipe sizes and capacity to serve the CICWCD at the projects inception will be dramatically less than the cost of a similar future project sized to provide for the needs of CICWCD alone.

A major issue associated with participation in this regional water supply project is largely related to the ability to utilize the resource immediately after it is available so that revenues can be applied to the capital indebtedness incurred by the project. It is recommended that the imported water be beneficially utilized as soon as it is available.

It is assumed, for the purposes of this report, the nominal share of total project delivery to the CICWCD system will be 20,000 ac-ft/yr of the total project delivery of 100,000 ac-ft/yr or 20%.

The anticipated schedule, as described in the enabling legislation, for the completion of the Lake Powell Pipeline features is 2020. The State of Utah Division of Water Rights has reassigned 13,245 ac-ft of previous applications on the Green River (tributary to the Colorado River) for use by CICWCD. This study is based upon the CICWCD acquiring and utilizing 20,000 ac-ft of water rights from the Colorado River to be supplied via the LPP. The difference of 6,755 ac-ft additional Colorado River water rights will need to be

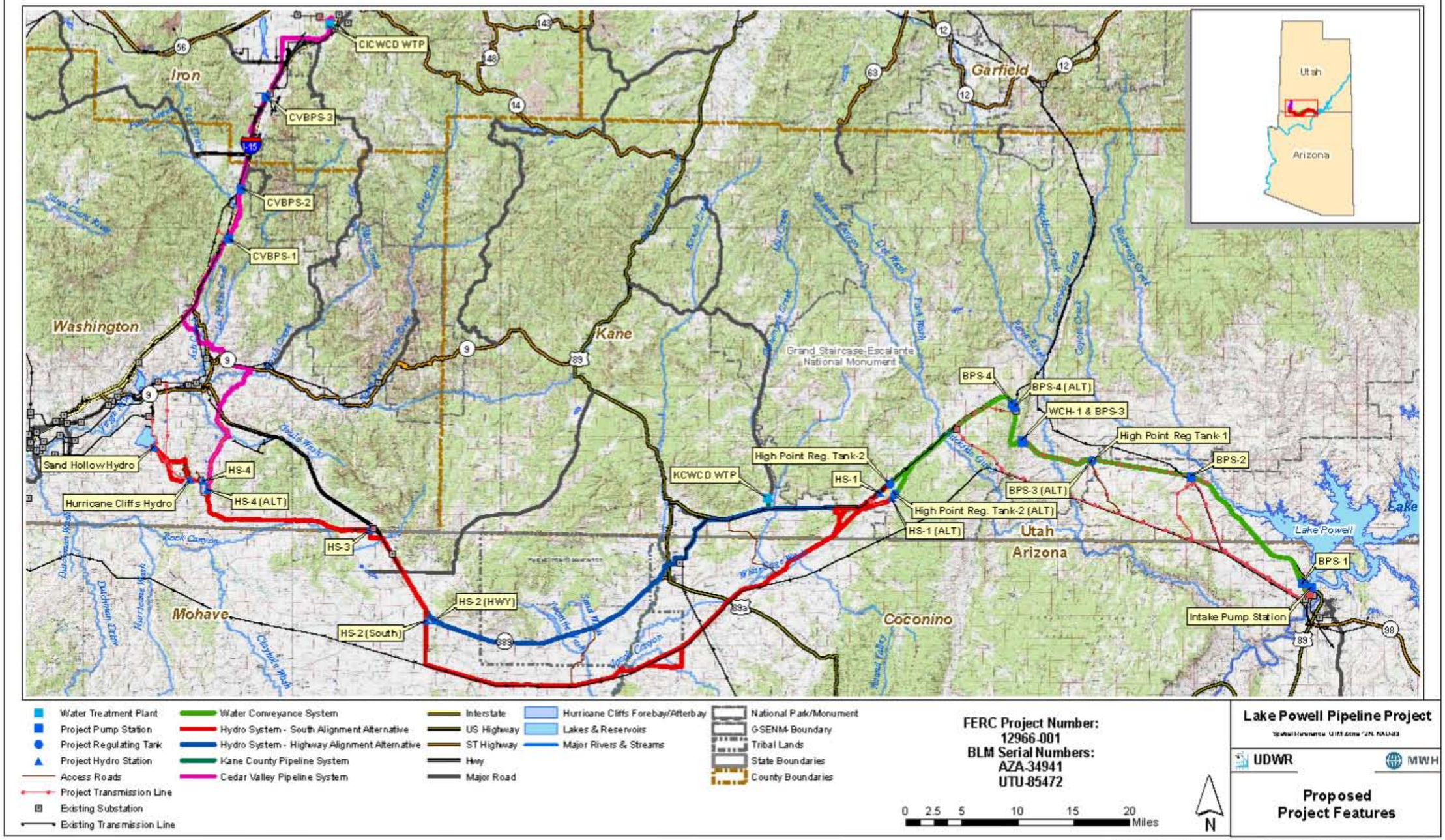


Figure 6 - Lake Powell Pipeline Project

applied for in future actions or purchased. This additional amount is well within the State of Utah's entitlement of the Colorado River flows.

Cedar City, Enoch, Kanarraville

It is expected that Cedar City, Enoch and Kanarraville will provide infrastructure improvements required to provide service to customers within their respective service areas, independent of the efforts of the CICWCD, for the immediate future. As major source and storage facilities needs arise, the CICWCD will construct the regional wells, tanks and pipelines to meet the respective community's needs. The CICWCD will then provide bulk water delivery to Cedar City, Enoch or Kanarraville or various independent water companies for subsequent delivery through individual customer service connections. The customer connections, metering and billing for service will continue to be maintained by each community.

Central Iron County Water Conservancy District

The available water sources within the CICWCD service area boundary have been utilized beyond their sustainable withdrawal rates for at least 30 years (USGS, 2005). The CICWCD is addressing the need to restore or enhance the ability of water sources in the planning area to provide for the needs of future customers. Importing 20,000 ac-ft/yr will provide return flows to the aquifer equal to the amount that is not depleted through evapo-transpiration.

The CICWCD's immediate needs are to provide core infrastructure with sufficient future capacity upon which a larger regional system serving the system's overall service area can be built. This core regional infrastructure will consist of the initial wells, storage reservoirs and distribution piping required to tie source and storage facilities to customer service connections. Over the past several years CICWCD has completed several infrastructure projects to provide for these needs. As the CICWCD customer base grows, additional source, storage and transmission/distribution piping will be required.

It is expected that growth will be distributed over a relatively wide area, and that infill development will correlate with this expansion.

Long-term improvements will include new storage facilities and interconnection of existing storage facilities. This interconnection will be important to allow more efficient use of water sources and to provide system redundancy and operational flexibility as the system customer base grows. As the source needs of Cedar City, Enoch, Kanarraville and some outlying development communities, plus industry, increase, the CICWCD should be prepared to provide bulk water to those entities through a developed regional system.

I. Projected Timetable for Construction of Required New Facilities and Resource Development

The projected timeline for construction of new facilities provided herein is based upon growth assumptions discussed previously. Current growth rates in southwestern Utah indicate that the GOPB average annual growth rates may be too low and that actual growth in the CICWCD service area will occur at a faster rate than projected. Total source and storage to be provided by the CICWCD through 2060 are indicated in

Figures 7 and 8 along with the proposed time table for placing new storage and source facilities in operation.

Over the past several years the CICWCD has been constructing their "back bone" infrastructure consisting of wells, pipelines and storage facilities. These elements include the Phase I, Phase II, and Phase III. The existing facilities are shown in **Figure 2**. This study considers the next reliable source to be the LPP and its 20,000 ac-ft/yr imported into the Cedar Valley. As presently scheduled, the LPP water supply is planned to be available by 2020.

Long-term improvements are primarily intended to address increases in population and industrial demands and the associated needs for additional storage. Based upon overall population projections, an additional 7.75 MG of storage capacity will be required to meet the needs of the planning area through 2060. This quantity of new storage, plus an additional 2.25 MG (total 10MG) will be provided at the new WTP with the two planned finished water reservoirs (5 MG each). The costs of the new tanks are associated with the overall LPP project.

II. FACILITY NEED PROJECTIONS

Source Development

Several initial design assumptions were made to develop the general requirements for new source and storage facilities. Existing culinary water wells in the study area range in approved capacity from 40 gpm to 2000 gpm. For planning purposes, it is recognized that well production may vary widely with location and developed depth. A nominal value of 1000 gpm was used to project the source capacity developed from each new well. It is assumed that this production rate is developed for an average of 8 hours per day over each year period, to allow for seasonal use fluctuations and to provide higher production capacity during peak use periods. Based upon these initial assumptions, each new well will be capable of providing approximately 538 acre-foot of source per year. Utah Division of Drinking Water (DDW) regulations require a peak day source capacity of 800 gallons per residential connection or ERC (Equivalent Residential Connection, for customers other than "residential"), and a total culinary source capacity of 0.45 ac-ft/yr-connection. Existing well capacities are treated similarly, in that total annual production is assumed to be based upon the well operating a rated capacity for 8 hours per day. This approach allows for full-time production to meet peak demand requirements, which is typically three times average demand.

For this report it is assumed that Cedar City and Enoch will continue to develop new sources up to their current water rights and all converted agricultural water will be utilized resulting from their water right dedication policy, within their annexation boundaries. It is also assumed that the State Engineer will implement a groundwater management plan curtailing water rights beyond the sustainable yield of the aquifer. This percentage varies for each entity and is accounted for in the converted agriculture water.

The LPP project includes the development of a WTP with a capacity of 20,000 ac-ft/ yr. This new treated supply will be available for all CICWCD customers. CICWCD will supply water to the retail customers within the District boundaries outside Cedar City and Enoch service areas. Additionally they will provide water to Enoch and Cedar City to meet demands beyond their water rights and converted agriculture water.

Enoch City

Enoch City currently owns 112 certified water rights totaling 2,480 ac-ft. The water requirement for build-out (Year 2039) is 15,823 ac-ft (Enoch City Water Master Plan, 2007). There are 1,728 acres of agriculture lands within the City's annexation boundary. At the State allotted conversion rate of 4 ac-ft per acre this equals 6,912 ac-ft of water. Approximately 10 percent of the converted water in the annexation boundary would not be available for conversion due to curtailment (MWH 2008). The total existing supply plus converted agricultural minus curtailment leaves a supply deficit of 7,276 ac-ft.

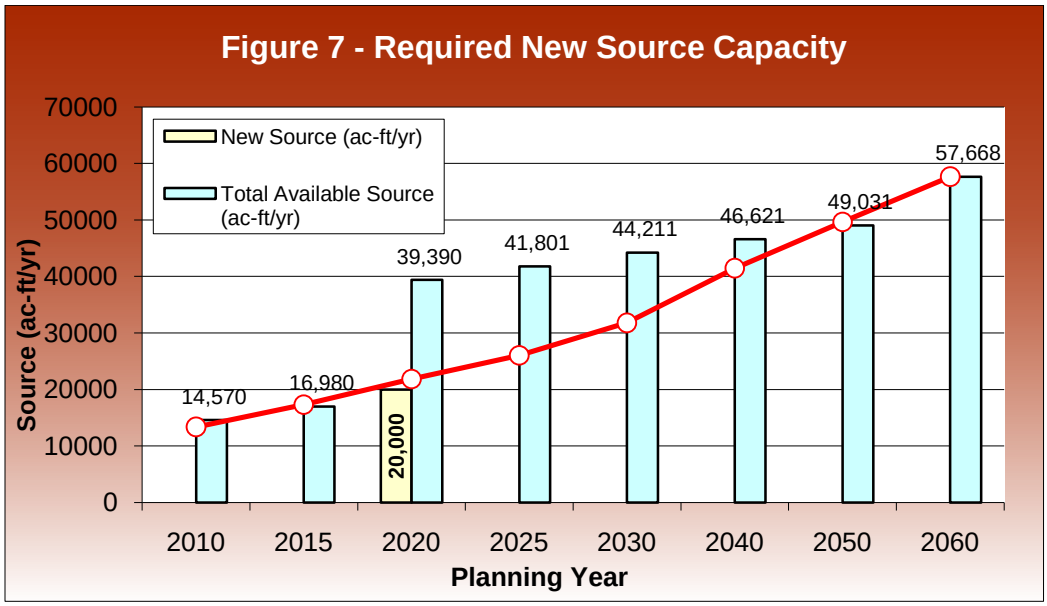
Cedar City

Cedar City currently owns 14,848 ac-ft of water rights. The water requirement for the planning period is 42,070 ac-ft of water ("Water System Master Plan Update for Cedar City, Utah", June 2009). There are 3,356 acres of agriculture lands within the City's annexation boundary. At the State allotted conversion rate of 4 ac-ft per acre this equals 13,424 ac-ft of water. Approximately 5 percent of the converted water in the annexation boundary would not be available for conversion due to curtailment (MWH 2008). The total existing supply plus converted agricultural minus curtailment leaves a supply deficit of 16,484 ac-ft.

CICWCD

CICWCD currently owns 1,500 ac-ft of water rights. The water requirement for the planning period within the District boundary outside of Cedar City and Enoch is 15,691 ac-ft. The total existing supply minus a curtailment of approximately 32 percent (MWH 2008) in CICWCD boundary leaves a supply deficit of 14,671 ac-ft.

For the purposes of analysis the report will utilize the average of the two growth methods described earlier. The timing of the source and storage development should coincide with the demands. By 2050 all available basin water and LPP water will be consumed by M&I uses, as shown on **Figure 7**. Additional imported water supplies, beyond LPP, will be required to meet the expanding demands. Options for providing a new source are very limited and will require further evaluations.



Storage

It is difficult to quantify storage requirements because the relative contributions of indoor, outdoor, fire storage and emergency reserves will depend upon the ultimate makeup of the individual areas served. A minimum of 400 gallons of storage per connection or ERC is required for indoor use only. Where secondary or reclaimed water sources are available, storage for irrigation supplies may not be required. If the culinary system is to provide for lawn irrigation, a value of 2,528 gallons per irrigated acre is required for the study area under DDW regulations.

Fire reserve requirements are dependent upon the type of construction, proximity to fire stations, and extent or type of commercial or industrial facilities in the area served. Typical fire reserve capacity is sufficient to provide two to three hours of fire- fighting capacity at a delivery rate of 1500 to 2000 gallons per minute, resulting in fire storage of between 180,000 and 360,000 gallons per reservoir. It is assumed that fire storage will account for 10% of new storage volume.

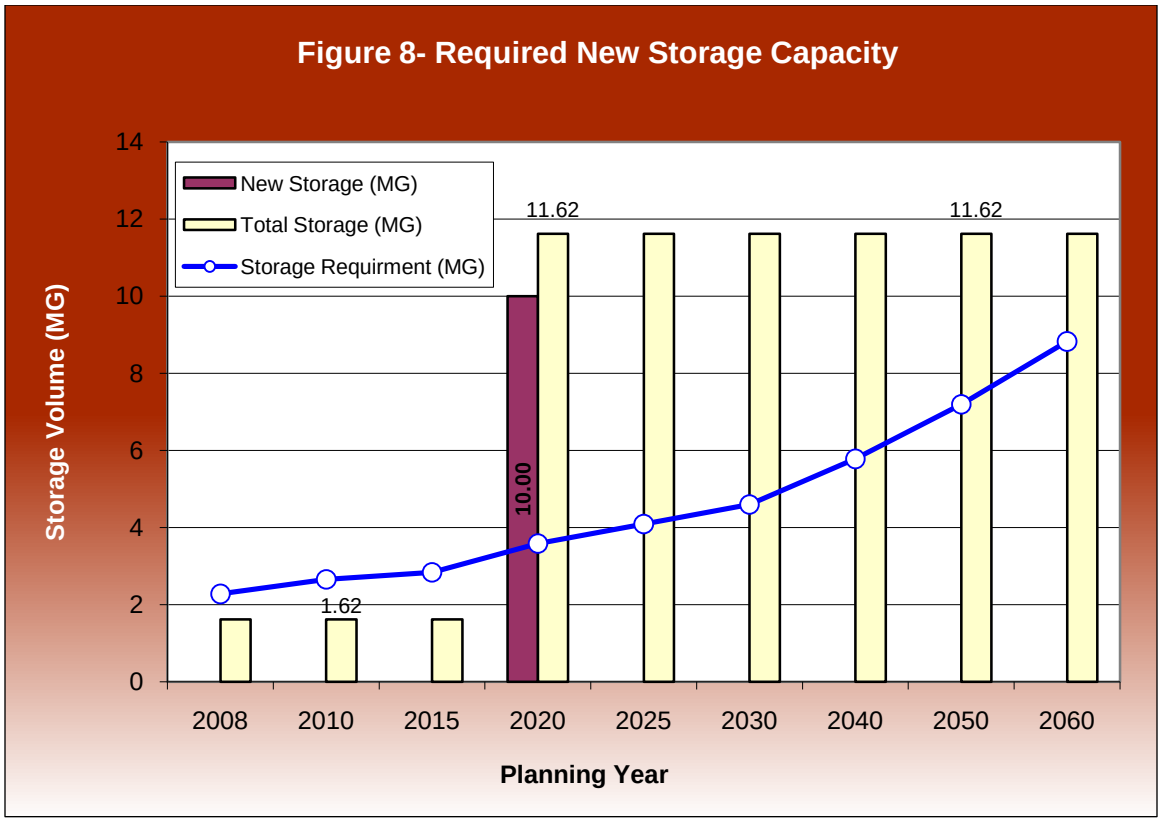
Emergency reserve storage varies with the needs of customers served (for example, hospitals or emergency services, water-critical industry, etc.) and system dependability or redundancy considerations. Emergency reserves are typically 10-20% of the total storage volume. It is assumed that emergency reserves will account for 15% of new storage volume.

System storage requirements are based upon population increase projections. For the purposes of this study, it is assumed that one residential connection serves 3.5 persons. Source requirements are calculated as 800 gallons per day per connection, or about 230 gallons per day per capita population. Storage requirements are estimated as approximately 650 gallons per residential connection. This value includes the DDW indoor storage requirement of 400 gallons per connection plus provisions for irrigating 0.10 acre per connection. It is recommended that future development include provisions limiting allowable irrigated acreage for each new lot to promote prudent use of available resources.

In addition to CICWCD storage requirements there will also need to be additional storage provided for wholesale water deliveries. Based upon DDW requirements, current per capita usage in the planning area, and fire and emergency storage assumptions indicated above, required new storage criteria is defined as follows:

CICWCD Storage: 815 gallons per ERC (650 gallons + 25% fire and emergency storage)

Based upon overall population projections, an additional 7.75 MG of storage capacity will be required to meet the needs of the planning area through 2060. This quantity of new storage, plus an additional 2.25 MG (total 10MG) will be provided at the new WTP with the two planned finished water reservoirs (5 MG each). The total storage capacity that will be provided by CICWCD is 11.62 MG. Therefore no additional storage will be required during the planning period. Refer to **Figure 8.**



In order to address the current shortfall in sustainable source and to keep new source and storage capacity above projected needs, it is recommended that the CICWCD review a facility improvements program on a five-year cycle. For the purposes of this study, new source and storage infrastructure will be scheduled as needed to meet growth and wholesale delivery demands. Refer to **Table 6** for a projected schedule of pipeline, meter stations, and source needs for the CICWCD through 2060.

Table 6: Schedule of Improvements (CICWCD)

Year	Pipeline				Source (AF)	Storage Tanks (MG)	Meter Stations
	12" (LF)	16" (LF)	24" (LF)	30" (LF)			
2010							
2015							
2020			9,470	44,480	6,775		4
2030							
2040							
2050							
2060							

J. Opinion of Probable Costs Associated with Required New Facilities and Resource Development

Several types of water supply, delivery and storage facilities have been identified as needed for the current and future needs of the CICWCD. Probable construction costs for each of these facilities are highly dependent upon fluctuations in market prices for labor, equipment and materials. These fluctuations cannot be predicted with any certainty, but long-term indices can be used to estimate inflation of construction costs over the planning period.

All cost estimates, except the LPP project costs which were prepared by MWH (Jan. 2011) presented in this report are Stanley Consultants' opinions of probable project, construction, and/or operation and maintenance costs. Cost estimates are made on the basis of our experience and represent our best judgment. We have no control over cost of labor, materials, equipment, contractor's methods, or over competitive bidding or market conditions. Therefore, we do not guarantee that proposals, bids, or actual construction costs will not vary from estimates of project costs, construction, and/or operation and maintenance costs presented. The Construction costs are based on an Engineering News Record Construction Cost Index (ENR-CCI) of September 2006. The estimates include inflation at an annual rate of 3.0%. Estimated project costs for each five year planning period is adjusted to account for inflation between the 2006 base year and the planning year.

Overall capital improvements costs for water supply, storage, metering and transmission/distribution facilities are divided into two components: 1) raw water supply, transmission and water treatment facilities associated with the Lake Powell Project providing benefit to all users in the basin; and 2) wells, piping and storage tanks associated with providing the needs for growth in the planning area. Because of the time-sensitive nature of the Lake Powell Project, it is expected that construction of capital facilities associated with providing a long-term source of treated water to the Cedar Basin will be substantially completed by 2020, but will need to begin construction between 2015 and 2020. The expected costs (based upon a December 2009 level adjusted for inflation) associated with the construction of the Lake Powell Pipeline Project are shown in **Table 7**.

Table 7: MWH Opinion of Probable Construction Costs -LPP 2009 Costs

Preliminary Engineering and Environmental Studies - Jan. 2011 - Sec. 9

Planning Year	Lake Intake*	Hydro Sys - East*	Pipeline Seg - #1	Pipeline Seg- #2	Booster Stations	WTP + Storage Facilities	Elec Trans Lines	Prog Costs 13.7%	Total (x$1000)
2010									
2015	$71,800	$77,400	$64,600	$43,200	$23,200	$32,900	$10,100	$44,200	**$367,400**
2020									
2030									
2040									
2050									
2060									

* CICWCD's proportionate share of LPP

Projected costs associated with construction of CICWCD culinary source, transmission and storage infrastructure have been developed for 5 year planning intervals. Itemized cost estimates for each planning period are included in the Appendix. Refer to **Table 8** for a summary CICWCD facilities project costs over the planning period.

Table 8: Opinion of Probable Construction Costs - CICWCD's Additional Water Facilities Required to Utilize and Distribute LPP Water

Planning Year	Pipelines	Meter Stations	Misc Mobilization	Appurtenances W Rights	Program	Contingency	Total (x $1000)
2010	$0	$0	$0	$0	$0	$0	$0
2015	$6,247	$490	$500	$31,604	$6,108	$5,826	**$50,775**
2020	$0	$0	$0	$0	$0	$0	$0
2025	$0	$0	$0	$0	$0	$0	$0
2030	$0	$0	$0	$0	$0	$0	$0
2035	$0	$0	$0	$0	$0	$0	$0
2040	$0	$0	$0	$0	$0	$0	$0
2045	$0	$0	$0	$0	$0	$0	$0
2050	$0	$0	$0	$0	$0	$0	$0
2060	$0	$0	$0	$0	$0	$0	$0

K. Funding Alternatives

IMPACT FEES

Summary of Impact Fee Statutory Requirements

The Utah State Code, Title 11, Chapter 36, Sections 1-5 (Impact Fees Act) includes current legislation regarding the implementation of Impact Fees by municipalities and special service districts. The key statutory requirements for implementation of Impact Fees by the CICIWCD are summarized as follows:

- A Capital Facilities Plan must be prepared as a condition of imposing an Impact Fee because the CICWCD will serve a population in excess of 5000. The CICWCD shall provide written notice of its intent to prepare a Capital Facilities Plan and provide such notice to:

  Iron County
  The Automated Geographic Reference Center (AGRC)
  Each City, Town or Community within the CICWCD service area
  Utah State Planning Coordinator

- The Capital Facilities Plan shall identify demands upon existing facilities caused by new development activity, and the means by which the CICWCD will meet those demands. An impact fee analysis shall be prepared to identify each component of the Capital Facilities Plan, whether that component will benefit existing or future customers, and the equitable distribution of benefits (Proportionate Share Analysis) of the component to existing and future customers.

- Provide a minimum 14 days public notice of the Capital Facilities Plan and make copies of the plan available for review by the public. Hold a public hearing in compliance with the requirements of notice and hearing

requirements defined by State Statute such that public comment on the plan can be heard.

- Impact fees may only be charged as a condition for development if those fees are a reasonable charge for the service provided. Impact fees may only recover the proportionate share of system improvements costs that can be reasonably attributed to development activity. Impact fees collected shall be kept in a separate interest-bearing account until expended on facilities improvements identified in the Capitol Facilities Plan. Impact fees are to be spent within six years of collection unless encumbered for a specific purpose.

- Impact fees must be adopted by a District resolution.

WATER USER CHARGES

Water user charges will be cover all operation and maintenance costs associated with the project. The water user fees will vary depending upon the stage of development and the level of facility usage. General estimates for annual operation and maintenance range between 1% and 2% of the capital costs.

WHOLESALE DELIVERY CHARGES

Wholesale delivery charges are not included in the proposed funding plan for the LPP or CICWCD capital infrastructure projects. It is expected that wholesale delivery charges will include variable costs associated with energy, operations and maintenance, metering facilities, administration of deliveries, contracts, billings, annual maintenance fees for water rights and related "cost of delivery" items. Wholesale delivery charges will be dependent upon the location of point of delivery. If servicing a particular delivery point entails major delivery infrastructure costs not included in part of the overall system master plan, the additional construction cost sharing arrangements or impact fee adjustments will need to be negotiated before being implemented.

Revenue from all sources should be evaluated at no greater than five year intervals to ensure that adequate revenue is available to implement infrastructure improvements and cover operations and administrative costs for each planning period.

L. Capital Facilities Finance Plan

The proposed capital facilities required to provide for the long term supply, storage, transmission, distribution, and metering needs of the study area are identified in **Table 6**. The expected capital costs associated with the LPP and CICWCD infrastructure projects are identified in **Tables 7 and 8**. In order to provide adequate revenue to finance these capital projects, it is proposed that impact fees revenues be utilized. The Lake Powell Project provides benefits to all users in the planning area and is proposed to be funded through impact fee assessments to new development within the CICWCD service area. The capital projects identified as are primarily intended to serve new growth in the District area outside of Cedar City and Enoch. These projects are to be funded through impact fee assessments to those users.

Assumptions used to develop the finance plan associated with the Lake Powell Project may be summarized as follows:

- Impact Fee Assessment Area: All residents within the current CICWCD boundary (Total Population in **Table 3**)
- 3.25 Persons per Equivalent Residential Connection (ERC)
- Interest Rate on Outstanding Loan Amount: 3.0%
- Graduated Fee Schedule with a $1,000 increase at 5 year intervals

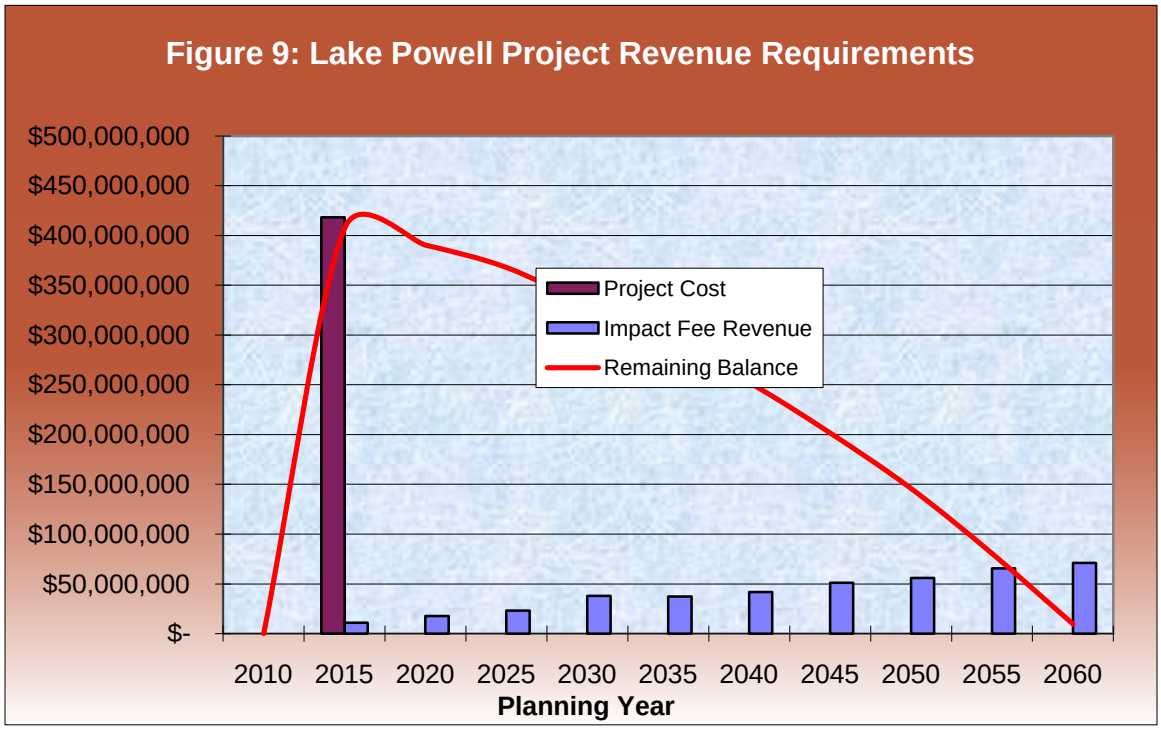
Based upon these assumptions, the required impact fees to finance the Lake Powell Project raw water supply, transmission and aquifer recharge facilities are summarized in Impact Fee Schedule and **Table 9**.

Table 9

LPP- Impact Fee Schedule		Ave. Annual Increase %
2010 Impact Fee	$ 3,000.00	
2015 Impact Fee	$ 4,000.00	5.59
2020 Impact Fee	$ 5,000.00	4.36
2025 Impact Fee	$ 6,000.00	3.58
2030 Impact Fee	$ 7,000.00	3.04
2035 Impact Fee	$ 8,000.00	2.64
2040 Impact Fee	$ 9,000.00	2.33
2045 Impact Fee	$ 10,000.00	2.09
2050 Impact Fee	$ 11,000.00	1.89
2055 Impact Fee	$ 12,000.00	1.73
2060 Impact Fee	$ 13,000.00	1.59
2065 Impact Fee	$ 14,000.00	1.47
2070 Impact Fee	$ 15,000.00	1.37

The revenue stream produced by the impact fees and the remaining outstanding balance to offset the indebtedness are shown in **Figure 9**.

Figure 9: Lake Powell Project Revenue Requirements



M. Conclusions and Recommendations

1. The Capital Facilities Plan provided herein should be reevaluated, updated and revised at periods not exceeding 5 year intervals. Source, storage, and transmission/distribution requirements can then be adjusted to account for future growth patterns, conservation initiatives, and demand requirements.

2. Additional study should be completed to evaluate an unidentified import water source requirement prior to 2050. Utilizing the projected growth rates the CICWCD will have consumed all available supplies, including the LPP, before 2060. As additional updates are completed for the Capital Facilities Plan this quantity should be further refined.

3. The Lake Powell Project is based upon an estimated need to provide 20,000 acre feet of raw water annually to the Cedar Valley. This volume is the projected additional supply needed to serve the planning area to 2050, and is based upon population growth assumptions. Actual growth rates may vary significantly from the projections made herein over the next 40 years, and it is expected that growth will likely continue beyond the end of the planning period. The Lake Powell Project will have a nominal design life of 100 years. It is recommended that requirements for additional source capacity be evaluated to consider design life of supply infrastructure and population/water supply demand growth over and beyond the planning period assumptions.

4. This study does not address water use revenue requirements. It is recommended that an additional study be prepared to identify costs and revenue requirements for water rights administration, cost of operation and maintenance, metering, billing and administrative costs. These costs are not included in the scope of this study.

5. There will be very little, if any, land acquisition requirements to construct and maintain the facilities identified in this study.

6. Due to the available land base within the CICWCD's service area, the ability to expand service beyond the annexation declaration boundaries of Enoch and Cedar City far exceeds the existing and future water supplies. A system-wide computer-based water system model should be developed to provide the District with a tool for evaluating and prioritizing the system capital facilities and infrastructure program. Such a tool allows prioritization of parcels to be served that would be the most economically beneficial.

7. Cost data provided herein reflect materials and installation costs based upon 2009 dollars. Material costs can escalate quickly during periods of shortage. Labor rates, inflation rates, and other variable costs will change over time. It is recommended that unit price data be periodically verified and revised to provide decision-makers with the best available information over time.

N. References

Ayers, Dennis, Iron County Assessor, personal communication RE: District 10 total tax valuation 10/4/06.

Boyle Engineering Corporation, "Lake Powell Pipeline Feasibility Study – Supplemental Analysis: Water Delivery to the Central Iron County Water Conservancy District", (September 2003).

Lewis Young Roberston & Burningham, Inc., "Capitol Facilities Plan and Impact Fee Analysis for Water Facilities, District and Retail Service Areas for Washington County Water Conservancy District, Washington County, Utah", (May 2005).

Stanley Consultants, Inc., "Water Supply Needs for Central Iron County Water Conservancy District – Needs Assessment Study", (May 2006).

US Geological Survey, Scientific Investigations Report 2005-5170, "Hydrology and Simulation of Ground-Water Flow in Cedar Valley, Iron County, Utah (2005).

Utah Division of Water Resources (DWRe), "A Water-Related Land Use Summary Report of the State of Utah", (March 1999).

Utah Division of Water Resources (DWRe), "Municipal and Industrial Water Use Data for the Central Iron County Water Conservancy District (undated draft ca. 2005).

Utah Division of Water Resources (DWRe), "Utah's M&I Water Conservation Plan – Investing in the Future", (July 2003).

Utah Division of Water Resources (DWRe), "Water Budget Report: Central Iron County Water Conservancy District", (ca. 2005).

Brown and Caldwell, "Water System Master Plan Update for Cedar City, Utah", (June 2009).

Nolte and Associates, Inc.", Enoch City Waster Master Plan Report", (December 2007).

MWH Americas, "Lake Powell Pipeline Study, Water Needs Assessment, Phase 1 Report – Final Draft" (August 2008)

MWH Americas, "Lake Powell Pipeline Study, Technical Memorandum 10.1 Appendix A – Draft" (June 2008)

MWH Americas, "Lake Powell Pipeline Phase II, Preliminary Engineering and Environmental Studies, Task 6, Conceptual Design Report, Section 10, Cost and Delivery Schedule" (December 2009)

MWH Americas, "Lake Powell Pipeline Phase II, Preliminary Engineering and Environmental Studies, Task 6, Conceptual Design Report, Final Draft, Section 9, Cost Estimate" (January 2011)

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