

Crockett Pressurized Irrigation Master Plan



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Prepared For:

**CROCKETT
AVENUE IRRIGATION
& DISTRIBUTION, INC**

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1 EXECUTIVE SUMMARY

1.1 Background

Utah is the third fastest growing state behind Idaho and Nevada. By 2065, the population of Utah is projected to be over 5.8 million people. That is nearly double our existing population. Nearly 2 million people of that growth is expected to occur along the Wasatch Front. Of that growth, 54% is predicted to come from within the state. 46% is expected to come from migration.

Cache County's population is projected to nearly double to 235,000 people in 2065. **A doubling in population will result in twice as much water needed for residential purposes.** "Where will this water come from?" "How will it get to those who need it?" and "When will we need to do something about it?" These are serious questions that are being asked by community leaders and staff, the agricultural community, academia, and the Utah Division of Water Resources.

With Utah being the second driest state, water is a precious resource. Our pioneer forefathers immediately began to capture and control this resource upon their arrival to the valley in the 1850s. Since that time, the agricultural community has operated and maintained the canals and ditches that were created to meet the needs of the area. At that time, needs were primarily agricultural to support those that lived in the area. Over the years, **water needs have changed due to the increasing population demand and decreasing agricultural requirements.**

Preparing for the changes that lie ahead in the state is critical. There is significant pressure to manage water resources to accommodate the additional 2 million people along the Wasatch Front. Leaders in Cache County need to prepare today, so water will be available to provide for the additional 113,000 people coming to the valley in the future. **It is imperative that Cache County protect its needed water resources and water rights for use here locally.**

Crockett Avenue Irrigation and Distribution, Inc. (Crockett) was one of the original companies formed to capture and distribute water to the valley. The company consists of 10 canal companies that own water rights in the Logan River. Traditionally, the water was delivered to agricultural users, but as growth has occurred, **many of the agricultural areas have developed and the water is no longer being used to irrigate the developed land.**

Although Crockett operates independently from the local municipalities, its service area covers land within three city boundaries (Logan City, North Logan City, and Hyde Park City) in addition to county-owned land. The service area is shown in **Figure 1-1.**

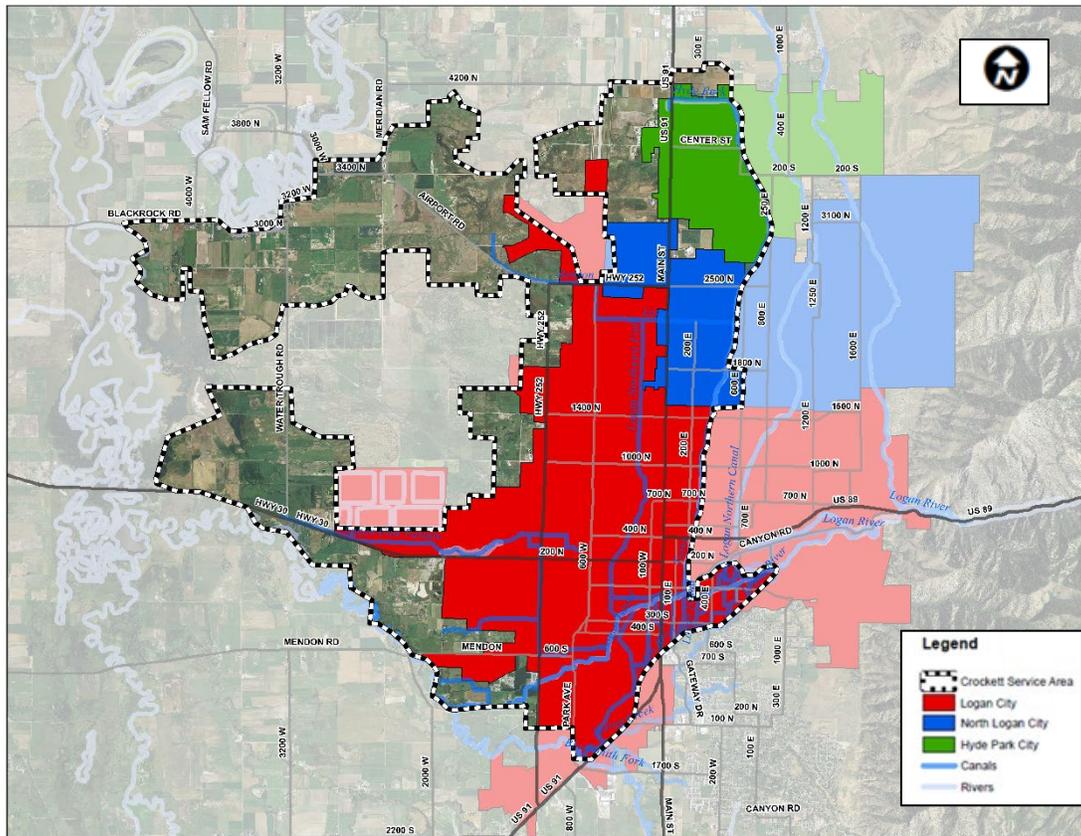


FIGURE 1-1 - CROCKETT OVERVIEW MAP

The service area includes land west of the Logan North Field Canal and Hyde Park Canal (Twin Canals) to approximately the western city boundaries of the three cities. In addition, the projects to improve the Crockett System may affect Utah State University (USU) and the Utah Water Research Laboratory (UWRL) which also have ties to the Logan River, the source of Crockett’s water.

1.2 Water Challenges

Crockett and the cities within the Crockett service area face many water related challenges in the near future.

- **Limited Water Resources** - The water resources in Utah are limited, specifically in the Wasatch Front and Cache County. Cache County’s population will nearly double by 2065 and the population along the Wasatch Front will increase by 2 million people. Competition for water resources exists now and will increase in the future.
- **Culinary Water System Upgrades** - The use of the culinary water for outdoor watering puts very large demands on the city culinary water systems. Expensive culinary system upgrades such as new wells, larger pipes, water treatment plants and new storage facilities will be required to serve future growth.
- **Inability to Put Irrigation Water Rights to Use** - Water, once used for agricultural irrigation in the Crockett service area, is no longer being utilized. This is because many homeowners elect to use

pressurized culinary water for their yards because it is convenient and always available. Not using the irrigation water could result in the water rights being reassigned outside the county to meet the demand for water in other areas of the state.

- **Deteriorating Canals and Ditches** - The river diversion and earth lined canals and ditches that were constructed in the 1800s to distribute the water are deteriorating and will need to be replaced and or improved in the immediate future. It is estimated that 5,100 acre-feet of water are lost each year to seepage from the canals. The continued deterioration also reduces the capacity to deliver the water shareholders rely upon for irrigation of crops, lawns and gardens.

1.3 Study Purpose

With these water challenges identified, and the need to address them in the immediate future, Crockett determined that it was important to investigate alternatives to address these and other challenges and determine which alternative provides the greatest long-term benefits. The alternatives evaluated in this report are:

- **Do Nothing** - Maintain the existing water resource practices
- **Pressurize the Canal Network** - Pipe and pressurize the existing Crockett canal network along the main canal alignments
- **Build a Complete Pressure Irrigation (PI) System** - Build a complete PI system that delivers water to each property in the service area

Separate from this report is the alternative for Crockett to reconstruct its existing distribution system including the river diversion and conveyance structures to continue providing existing levels of service to existing shareholders in the irrigation companies it serves. The costs and details of reconstruction are not included in this report. Reconstruction would not address all the water challenges listed above such as fully using irrigation water rights to protect them in the future and creating a method of using water rights as land is converted from agricultural to municipal purposes. Reconstruction costs of the existing Crockett infrastructure would largely be borne by the shareholders since they would be the primary beneficiaries.

1.4 Study

Crockett hired J-U-B ENGINEERS, Inc. (J-U-B) and Franson Civil Engineers (FCE) to evaluate the alternatives and recommend an alternative that would provide the greatest overall benefits to the stakeholders. Financial analysis of the alternatives was completed by EFG Consulting (EFG) in coordination with J-U-B and FCE.

J-U-B and FCE formed a Technical Advisory Committee (TAC) to gather critical information, address stakeholder needs and regularly update stakeholders about the evaluation progress. The TAC included staff and political representatives from Crockett, each member irrigation company, Logan City, North Logan City, Hyde Park City, the Cache Water District (District), USU, and the UWRL.

Members of the TAC discussed the benefits of potentially pressurizing the irrigation system and shared various concerns and comments throughout the evaluation process. Many of those benefits, concerns

and comments are addressed in this report with responses and potential solutions. Other benefits issues and concerns are acknowledged in this report, but are outside the scope of this report and will be addressed as further studies or design are completed.

1.5 Quantified Benefits

The analysis determined that the most beneficial alternative was to build a complete PI system. A complete PI system would provide many quantifiable benefits.

- **Culinary Benefits** - The culinary water systems will not need to add as much future infrastructure for increased source, distribution or storage demand. This benefit is approximately \$50 million in today's dollars.
 - **Stormwater Benefits** - Many of the irrigation canals would be available to convey additional stormwater reducing the amount of stormwater infrastructure that the cities would need. This benefit is approximately \$46 million in today's dollars.
 - **Sanitary Sewer Treatment Benefits** - Logan City would see a reduced amount of infiltration that enters the sewer collection system. Sewer treatment plant operation and maintenance costs would be reduced because of reduced flow. \$0.9 million is the calculated sanitary yearly sewer benefit.
 - **Reduced Well Pumping Benefits** - The water being used to water lawns in the Crockett service area would not need to be pumped from culinary wells which will create power savings. \$130,000 would be saved annually now by reducing pumping of culinary water if a PI system were installed and \$359,000 would be saved annually at build out.
- Conserved Water Benefit** - Valuable water will be conserved by piping the irrigation system. The value of the conserved water over a 50-year period is \$63.75 million in today's dollars.

1.6 Other Benefits

There are many other benefits that result from a complete PI system that are not quantified in this report. These benefits include:

- **Urban Trails** – Pressurizing the irrigation system may allow more space for trails to be constructed along canal rights of way.
- **Surplus Irrigation Water** – Water rights will be protected from transfer to the Wasatch Front by utilizing surplus water saved through system efficiencies.
 - Water usage can be verified through meters used on the PI system.
 - Water used in PI systems can be accounted for in a community 40-year water rights plan. This provides long-term protection to water rights.
 - Water that has not been used to irrigate land converted to residential use would immediately be put back to beneficial use.
- **Safety** - Enclosed irrigation systems are safer than traditional open systems.
- **Funding** - Grant opportunities for secondary water systems are more available than for culinary water systems.

- **Flexibility** - There will be more flexibility of irrigation times for PI systems. There is also flexibility on how water is applied to the land. This allows users more control over when and how they irrigate.
- **Reliability of water service to users and USU** – Currently the canals require a base flow (carrier water) to deliver any water for irrigation use. Pressurized irrigation does not require carrier water to irrigate. This allows all the water to be used for irrigation or other beneficial uses and will allow water to stay in First Dam which will provide for less restrictions and more available water when demand is high.
- **Increased Land Value** – Land with pressurized irrigation for agricultural and landscape irrigation purposes is of higher property value than land that uses gravity irrigation or culinary water for irrigation.
- **Removal of Crockett Diversion** – The Crockett diversion is aging and will need to be replaced if the Do Nothing Alternative is selected. Construction of a complete PI system will remove the need for a new Crockett diversion structure.

1.7 Challenges

While there are many benefits from a complete PI system, there are also challenges. During the TAC meetings and review of alternatives, challenges identified include:

- **Irrigation Change** - PI may change irrigation practices which may come at some additional expense or inconvenience to some users.
- **River Management Change** - A PI system may change the flows along certain stretches of the river. Some stretches may see more flow and others may see less.
- **Capital Costs** - Implementing the PI system comes with large costs. Total benefits from the system out-weigh the costs, but they will not be realized immediately.
- **Collaboration** - This project will require increased interaction between irrigation companies, municipalities, and other water stakeholders.
- **Administration** - Billing for water usage may be quite challenging due to the complexity of different users and potentially different water rates (shareholders v. non-shareholders, future connections and different communities).
- **Community-wide Impacts/Benefits** - Benefits through reduced costs for culinary water, stormwater and sewer will be community wide. However, pressure irrigation benefits will only be provided in the Crockett service area. Finding a balance so that all who receive benefit pay a fair and proportionate cost.
- **Education** - Sharing the report information with all that are impacted will be an extensive effort.
- **Water Table** - Reduced seepage may impact downstream water resources including local water tables. This may benefit those who experience basement flooding, but impact those who use the seepage for localized irrigation benefit.
- **Maintenance** - Empty canals that are used for stormwater, may require increased maintenance due to trash or vegetation. There will also be maintenance of a pressurized system. These items will come at some cost.
- **Aesthetics** - Open canals can provide visual benefit to adjacent property owners. If the irrigation water is piped, then a dry open channel is all that will remain.

- **Cross Connection** - Having a pressure irrigation system may result in irrigation water being introduced to the culinary system if someone were to make an illegal connection between the culinary and pressure irrigation systems.
- **Road Repair** - Roads will need to be cut and patched if a new secondary water system is constructed
- **Changing Utility Rates** - Rate increases could occur for culinary water, sewer and stormwater utilities to defer implementation costs of the pressurized irrigation system.

1.8 Project Costs / Benefit Ratio

Costs were calculated for design, construction, operation, and maintenance of a complete PI system based on the following assumptions:

- Equalization storage would be provided by First Dam in cooperation with USU and the UWRL which would allow the system to function without any pumps
- Pipe lines would primarily be installed in existing roadways throughout the service area
- Irrigation service would be provided and required to be connected to each culinary water user's property in the service area
- Connection to an existing sprinkler system or a hose bib would be provided
- Office staff, field staff, and equipment resources would be needed to operate the system
- Repayment of lost power generation costs at First Dam.
- Reduced culinary water sales by municipalities

Design and construction costs were estimated to be \$87 million in today's dollars and projected to be \$101 million in five years when construction could begin if the system is constructed. Economic benefits were calculated to be between \$107 million and \$216 million in today's dollars. This results in a benefit-to-cost ratio range of 1.22 to 2.46. Based upon the analysis completed for this study, the Complete PI System Alternative is feasible over the long term.

1.9 Recommendations

The Crockett System is aging and experiencing signs of deterioration. At some point in the near future significant repairs to the diversion and canal infrastructure will be needed to keep the system operational. If only essential repairs are made, they will not address all the water challenges identified by the TAC and the costs will be primarily borne by the shareholders. If a PI system were implemented across the entire Crockett service area, the water challenges would be addressed more fully and project costs could be shared across all beneficiaries including Crockett shareholders, Logan, North Logan, Hyde Park and north-eastern Cache County residents. For these reasons it is recommended that the exploration of a complete PI system for Crockett be continued by following the Project Development Path shown here.

Infrastructure projects must follow a project development path in order to be realized. The path consists of eight steps from Assessment to Long-Term Maintenance and Operations. This report worked through the two initial steps along the path, Assessment and Identify Needs. The remaining six steps along the path will need to be sequentially addressed to complete a project. The following recommendations focus on the funding, planning, and environmental steps of the path.

- **Begin Planning Funding Mechanisms** – Secure funding through a continued cost share agreement with stakeholders, grants or a combination of both to prepare an environmental document.
- **Continue Investigation of the Complete PI System Alternative** - Continue planning for a complete PI system. This planning should include preparation of an environmental document to further understand the project and its impacts and solutions. If the environmental process continues to show the project is beneficial, the project should move forward to design and construction.
- **Expand Public Outreach and Information Dissemination** - Converting the existing Crockett system into a PI system is feasible and beneficial to all stakeholders. Begin informing the public and local stakeholders about the report findings. Then start the environmental process, organize an inter-local cooperative agency, and complete the design and construction of the PI system. This process is expected to take five to seven years to complete.
- **Collaborate to Form Needed Partnering Through Agreements** - Implementation of the system will require agreements between the irrigation companies, municipalities, USU and the District. The details of these agreements would be finalized as the process progresses through the environmental and design steps.

A joint effort between the irrigation companies and municipalities could include an inter-local cooperative between the municipalities with a governing board of the new PI system having members from the irrigation companies that own the shares, the municipalities that will be partial owners of the distribution system, and the District. A governing board of this type provides a balance of power between those who own the water rights and those that own or may own the distribution infrastructure.

Project Development Path



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