Town of Sinclair Water Supply Master Plan
Level I Project

Summary Report

Prepared for:

Wyoming Water Development Commission
Cheyenne, Wyoming

Prepared by:

States West Water Resources Corporation
Cheyenne, Wyoming

with:

Water Engineers
Colorado
Town of Sinclair Water Supply Master Plan Level I Project

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In association with:

McLaughlin Water Engineers
Denver, Colorado

June 1995
I. Introduction
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A. General
This report presents the findings of a Level I reconnaissance investigation to develop a water supply master plan for the Town of Sinclair. This investigation was conducted for the Town of Sinclair under the direction and funding of the Wyoming Water Development Commission by States West Water Resources Corporation. The investigation also dealt with the City of Rawlins’ Ft. Steele raw water system. The possibility of regional water systems to serve both communities was investigated.

B. Background
The Town of Sinclair has an unusual situation in that the water system is owned by the Town, but is operated by the Sinclair Refinery. A contract executed in 1967 defines the terms of the arrangement. This contract, while restrictive, is also ambiguous in some of the terms. Any alternatives pursued as a result of this study will necessitate re-negotiation of this contract.

Sinclair System
The Sinclair water supply system consists of several components with varying capacities. This section will outline the operation of the system.

The river intake consists of a concrete structure located on the river bank with trash racks and screens. The water is conducted from the intake to the treatment facilities by two 12 inch pipelines. These pipelines conduct water to the intake pumps which lift the water to the clarifier. The clarifier is an accelerator upflow solids contact unit manufactured by Infilco. The unit is used for both clarification and softening. The pre-treated water then passes by gravity to the treated storage tank which has 770,000 gallons of storage. This unit is also used for additional clarification. High lift pumps then pump the water through two 12 inch pipelines to the refinery. The pipes reduce to 10 inches within the refinery. The capacity of this portion of the system is approximately 1,900 gpm.

One of the pipelines connects to booster pumps located at the refinery. The booster pumps deliver water to the two pressure filters located near the elevated storage tank. The pressure filters have a maximum rated capacity of 1,000 gpm.
The water then can either feed into the distribution system or into the overhead storage tank.

**Rawlins’ Ft. Steele System**

This system consists of a river intake and pump station located at Ft. Steele with two delivery pipelines to Rawlins with a booster pump station at Sinclair. The system originally fed into the distribution system. When the new WTP was built, the Thayer pump station was built to boost the water to the plant. However, excessive maintenance problems with the two pipelines led to the end of pumping to Rawlins. More recently, one of the pipelines was reactivated to deliver treated water from Rawlins to the Burns Truck Stop as well as a back-up supply for Sinclair. The pipelines are very old and in poor condition.

**C. Problems**

**Town of Sinclair**

The Town of Sinclair has indicated that several problems exist with the Town’s water system. These problems include the following:

1. The Town’s 75,000 gallon elevated steel water tank is in poor condition. The tank was built in 1924 and has been experiencing problems for over 30 years. The last inspection in 1992 indicated the tank was in very poor condition. The tank replacement is the Town’s top priority.

2. The Town experiences low pressures in various areas of the town. This is due to the height and location of the storage tank as well as inadequate distribution in some locations. This problem should be addressed in conjunction with the storage tank.

3. The existing water filtration plant does not always meet water quality standards. The plant is over 70 years old and cannot meet turbidity standards without very high quality water from the pre-treatment system.

4. The existing treatment plant building has almost no value.
City of Rawlins

The City of Rawlins' Ft. Steele pump station and pipeline are out of operation due to excessive pipeline maintenance. The City is interested in reactivating the system to utilize the Ft. Steele water right. The City also has interest in treated water service to east Rawlins and possibly Sinclair.

Purpose of this Study

The purpose of this study is to develop a water supply master plan for the Town of Sinclair. As part of its water resource planning program, the WWDC provides a service to municipalities, districts, and other entities to assist in planning for future water supply systems and improvements to existing systems. The master plans authorized by the WWDC serve as a framework for the entities to establish project priorities and perform financial planning to meet those priorities. Master plan investigations generally do not collect new primary-source data, but compile existing information, use the information to develop project alternatives, and make recommendations for a proposed course of action.

The Master Plan is designed to be a working document that will provide the residents with a summary of the problems and potential solutions. The goal of the Master Plan is to provide the citizens of Sinclair a singular source to assist them in making choices regarding future water supply alternatives.

The Rawlins' Ft. Steele system is also investigated in this study because of the potential for regionalization with Sinclair. The intent of the study was to develop alternatives for Rawlins to re-activate this portion of their water supply system.

The Study Steps

The Town of Sinclair Water Supply Master Plan Level I reconnaissance study progressed through several steps. Although the WWDC's scope of services defined objectives of the study, a scoping meeting held at the beginning of the project allowed input to add or modify project alternatives and goals.

The initial part of the Sinclair study undertook several tasks simultaneously: 1) determination of water supply and water needs, 2) storage tank sizing and location, 3) distribution system analyses, and 4) water treatment analyses. As a Level I study, little original source information was collected. Instead, secondary sources of published and unpublished information were used.
The next step was to evaluate water supply alternatives that would address the problems. The alternatives evaluated include: 1) alternatives which would solve only Sinclair’s problems, 2) alternatives which would solve only Rawlins’ problems, and 3) alternatives which would solve both communities’ problems with a regional approach. Reconnaissance level alternative evaluations were performed to allow comparison of the alternatives.
II. Summary
II. Summary

A. Water Supply and Water Needs
The Town of Sinclair owns water rights which are reliable and sufficient. A 35-year design population of 625 was used for projection purposes. Based upon historic water usage rates and the population projections, design flows were estimated.

B. Storage Tank
Storage tank size, type, and location were investigated for the Town of Sinclair. The optimum size of tank would be 250,000 to 300,000 gallons, depending upon the water supply alternative. The recommended tank type and location is a buried concrete tank located on the bluffs approximately one mile west of town. A 12-inch pipeline would be needed to carry the water to town. The estimated cost of the tank and pipeline is $630,000 for the 300,000 gallon tank.

C. Distribution System Analyses
The existing distribution system is relatively old but has useful life remaining. The system was modeled using CYBERNET to simulate improvements to incorporate new storage and improved distribution and pressures. The cost of the distribution system improvements varies from $75,000 to $85,000, depending upon the alternative.

D. Water Treatment
The existing steel pressure filters have served Sinclair for many more years than would normally be expected from packaged filter units such as these. It is reasonable to expect that they will require significant increasing maintenance to keep them in service in the near future. In addition, while they were an acceptable technology for less stringent water quality requirements, they are not capable of producing a consistent product water to comply with the new particulate requirements of the recent update to the Safe Drinking Water Act. For these primary reasons, it was concluded that improvements to the potable water treatment system were necessary.
It is recommended that the existing pressure filters be replaced with gravity multimedia filters of concrete construction. The improvements under this scenario would include a new clearwell to provide for adequate chlorine contact time and reserve backwash water. Finished water pumping would be from the new clearwell directly into the distribution system.

E. Ft. Steele Water Supply System

The existing Ft. Steele water supply system is out of operation due to excessive maintenance costs. The water right of 1.3 mgd with priority date of 1900 is reliable and valuable. Rawlins has strong interests in maintaining this water right.

F. Alternative Analyses

A large number of alternatives were considered with more detailed analyses performed on the more favorable alternatives. The alternatives fell into three categories. These included alternatives to solve only Sinclair’s problems, alternatives to solve only Rawlins’ problems, and combined alternatives with regional approach. The three categories of alternatives are listed below. Only those alternatives which were analyzed are summarized. The table on page VIII-3 summarizes the size, location, and costs of the components of each alternative.

Alternatives for the Town of Sinclair’s Problems

Alternative 1

This alternative would include a 300,000 gallon buried concrete storage tank west of town, 12-inch pipeline to town from the tank, in-town distribution system improvements, and a new 500,000 gallon per day water filtration plant located in town with clear well and pump station. The estimated cost for this alternative was $1,600,000.

Alternative 2

This alternative would include a 300,000 gallon buried concrete storage tank west of town, 12-inch pipeline to town from the tank, and in-town improvements. A new 500,000 gallon per day water filtration plant located at the river would be constructed with a pump station and new 8-inch pipeline to town. The estimated cost for this alternative was $2,800,000.
<table>
<thead>
<tr>
<th>Alternative</th>
<th>Benefits</th>
<th>Sinclair Improvements</th>
<th>Rawlins Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Storage Tank</td>
<td>WTP</td>
<td>In-Town Improvements</td>
</tr>
<tr>
<td>1</td>
<td>Sinclair 0.3 MG</td>
<td>0.5 MGD</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Sinclair 0.3 MG</td>
<td>0.5 MGD At River</td>
<td>Yes</td>
</tr>
<tr>
<td>2A</td>
<td>Sinclair 0.25 MG</td>
<td>1.5 MGD At River</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Sinclair 0.25 MG</td>
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<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Rawlins -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Both 0.25 MG</td>
<td>1.8 MGD</td>
<td>Yes</td>
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<tr>
<td>7</td>
<td>Both 0.25 MG</td>
<td>-</td>
<td>-</td>
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<tr>
<td>11</td>
<td>Both 0.25 MG</td>
<td>1.5 MGD</td>
<td>Yes</td>
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<tr>
<td>7A &amp; 7B</td>
<td>Both 0.25 MG</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>12A &amp; 12B</td>
<td>Both 0.25 MG</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>13A &amp; 13B</td>
<td>Both 0.25 MG</td>
<td>-</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Alternative 2A

This alternative would be similar to Alternative 2 except that the water filtration plant located at the river would be sized at 1,500,000 gallons per day. One of the existing pipelines from the river to town would be used for treated water. The estimated cost of this alternative was $1,900,000.

Alternative 10

This alternative utilizes treated water from Rawlins to meet Sinclair’s needs. A 12-inch pipeline from Rawlins would supply water. A 250,000 gallon storage tank, 12-inch pipeline from the tank to town, and in-town improvements would be constructed. This alternative has an estimated cost of $2,450,000.

Alternatives for The City of Rawlins' Problems

Alternative 3

This alternative involves a new river intake and pump station for 1.3 mgd located near the Sinclair golf course. A 12-inch pipeline would conduct water to the existing Thayer pump station in Rawlins, where it would be boosted to the WTP. A 12-mgd pre-treatment plant would be constructed for all water supplies. A treated water pipeline would be constructed to serve East Rawlins. The estimated costs are $9,400,000.

Combined Alternatives for Both Communities

Alternative 6

This combined system would include a river intake near the Sinclair golf course, a full WTP for 1.8 mgd, and a pump station to pump through a 12-inch pipeline. Treated water would be delivered to Sinclair with the remainder of the water pumped on to Rawlins. A 250,000 gallon storage tank, connecting pipeline, and in-town improvements would be constructed at Sinclair. The estimated cost is $7,125,000.

Alternative 7

This combined system would include a river intake near the golf course, pump station, and 12-inch pipeline for 1.8 mgd to the Thayer pump station. The raw water would be boosted to the WTP where a 12 mgd pre-treatment plant would be constructed. A 12-inch treated water pipeline from Rawlins to Sinclair would be
constructed. At Sinclair, a storage tank and in-town improvements would be constructed. The estimated cost for this alternative is $11,000,000.

**Alternative 11**

This alternative would incorporate a combined river intake with the remainder of the system separate. The Rawlins portion would be the same as Alternative 3. The Sinclair portion would be similar to Alternative 2A. The estimated costs for this alternative would be $12,000,000.

**Alternatives 7A and 7B**

These combined alternatives involve a river intake near the Sinclair golf course, pump station, and pipeline to the Thayer pump station. Fire flows could be delivered to the refinery with this alternative. A 12-inch treated water pipeline from Rawlins to Sinclair would be constructed. At Sinclair, a 250,000 gallon storage tank, 12-inch pipeline to town, and in-town improvements would be made. The total estimated costs range from $7,925,000 to $7,975,000.

**Alternatives 13A and 13B**

These alternatives are similar to 7A and 7B except that the intake location would be at Ft. Steele. The total estimated costs range from $8,350,000 to $8,650,000.

**Alternatives 12A and 12B**

These alternatives involve pumping from the North Platte River upstream of Sage Creek through a pipeline into the existing Sage Creek pipeline. The remainder of the treated water delivery system to Sinclair, storage tank, and in-town improvements would be similar to the previous alternatives. The total estimated costs range from $8,175,000 to $8,300,000.

**G. Rawlins Preferred Alternative**

The City of Rawlins expressed preference for Alternative 3 with the addition of the storage tank west of Sinclair. The project to be preliminarily designed in Phase II will consist of the following components, as shown on the drawing on page VIII-7:

1. A river intake and pump station located either near the Sinclair golf course or at the existing intake location at Ft. Steele.
2. A pipeline from the river intake and pump station to the Thayer Pump Station. The pipeline would follow the existing pipeline route and easement where possible. This section of pipeline could be either high pressure pipe with no intermediate booster pump station at Sinclair or lower pressure pipe with the booster station.

3. The Thayer Pump Station would be utilized to pump the water to the pond at the existing water treatment plant. A portion of the pipeline would be replaced north of the water treatment plant.

4. A pre-treatment plant would be investigated to be located at the existing water treatment plant. The plant would have the capacity to treat all raw water sources with ultimate capacity of 12 MGD.

5. A treated water pipeline from the Rawlins distribution system would be extended through East Rawlins and on to the proposed water storage tank west of Sinclair.

6. A storage tank located approximately one mile west of Sinclair would be investigated. The size of the tank would be determined from the proposed service areas.
# Rawlins Project

**Preferred Alternative - Total Project Costs**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation of Final Designs and Specifications</td>
<td>$650,000</td>
</tr>
<tr>
<td>Permitting and Mitigation</td>
<td>$75,000</td>
</tr>
<tr>
<td>Legal Fees</td>
<td>$50,000</td>
</tr>
<tr>
<td>Acquisition of Access and Rights-of-Way</td>
<td>$100,000</td>
</tr>
</tbody>
</table>

## Cost of Project Components

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intake &amp; Pump Station</td>
<td>$300,000</td>
</tr>
<tr>
<td>Raw Water Pipeline</td>
<td>$2,775,000</td>
</tr>
<tr>
<td>Booster Pump Station</td>
<td>$100,000</td>
</tr>
<tr>
<td>RR Crossings</td>
<td>$90,000</td>
</tr>
<tr>
<td>Pre-Treatment System</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Treated Water Pipeline</td>
<td>$1,150,000</td>
</tr>
<tr>
<td>Control System</td>
<td>$20,000</td>
</tr>
<tr>
<td>Storage Tank</td>
<td>$260,000</td>
</tr>
</tbody>
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</table>

Construction Cost Subtotal #1: $7,695,000

10% Engineering = CCS#1 x 10%: $769,500

Subtotal #2: $8,464,500

15% Contingency = Subtotal #2 x 15%: $1,269,675

Construction Cost Total: $9,734,175

Project Cost Total: $10,609,175

Use Cost: $10,600,000