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EXECUTIVE SUMMARY

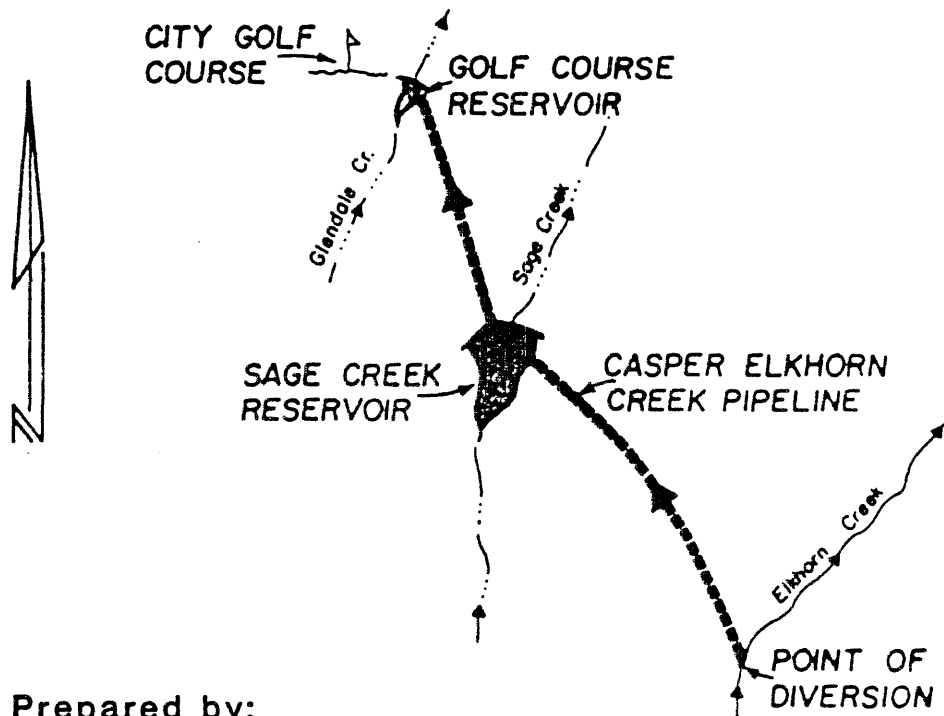
CASPER RAW WATER SUPPLY SYSTEM

Level II - Conceptual Design Report

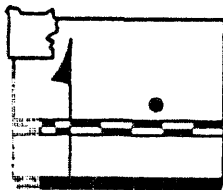
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October, 1988

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ECONOMICS • WATER PLANNING • IMPACT ASSESSMENTS

EXECUTIVE SUMMARY

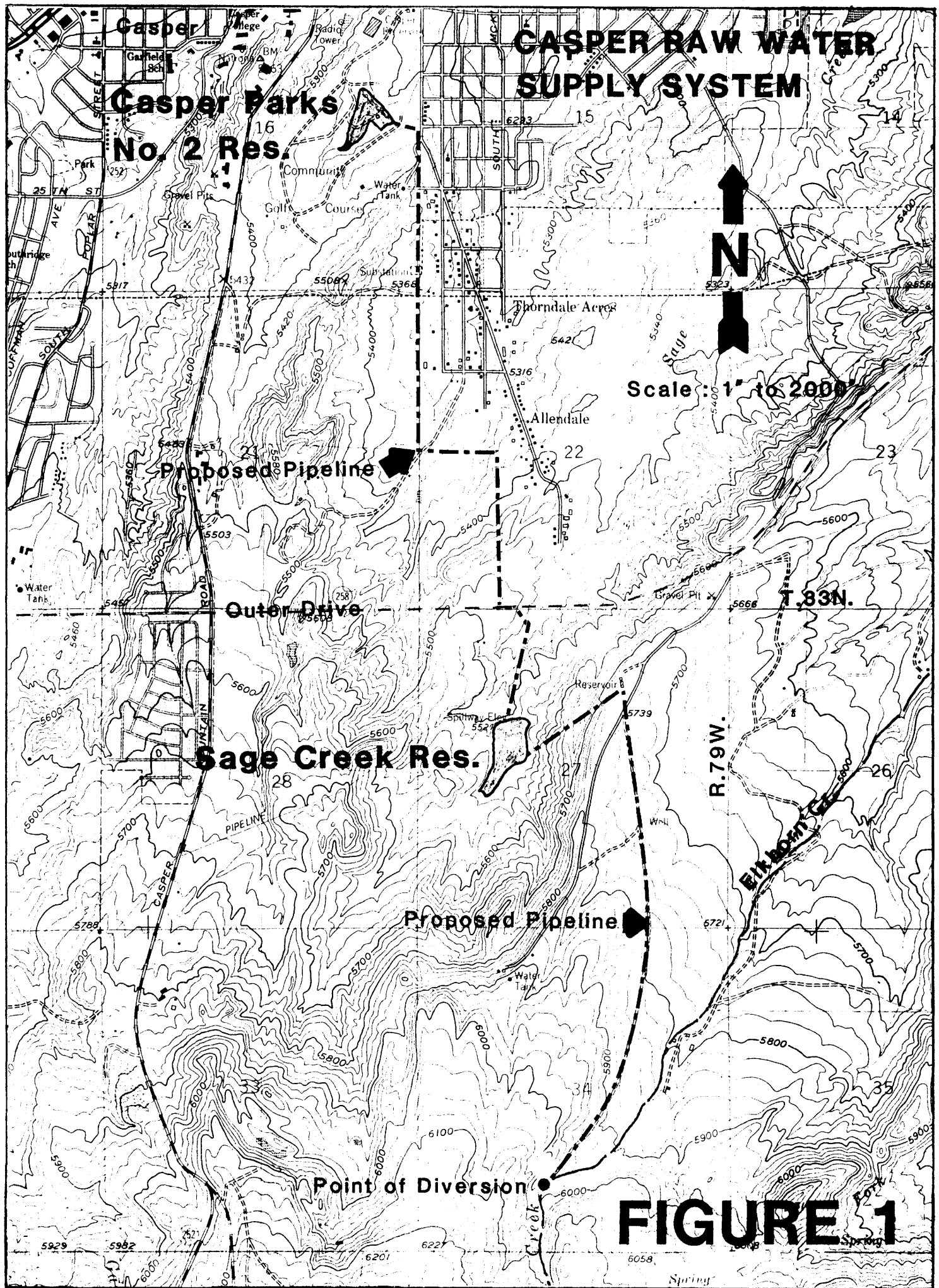
Introduction

The Casper Raw Water Supply System was constructed in the late 1800's and early 1900's as an additional source of potable water for the City of Casper. This supply system was converted to irrigational use in the 1920's and has been in operation since that time. This water is currently used to irrigate the Municipal Golf Course. The extent of the supply system is shown on Figure 1.

The source of water for the supply system is direct flow diversion from Elkhorn Creek and natural runoff captured in Sage Creek Reservoir. Both of these creeks are tributaries of the North Platte River. Together, these two sources are capable of providing an estimated 60 million gallons of water required annually to maintain the Municipal Golf Course. The City of Casper shares the earliest priority water right on Elkhorn Creek. The permit for Sage Creek Reservoir was obtained in 1906 and represents a very early storage right on a tributary of the North Platte River.

In the Preliminary Design Report prepared by HNTB (Howard, Needles, Tammen and Bergendoff) for the City of Casper, the condition of the supply system was investigated. The findings indicated that because of the deteriorated condition of the system components, the system should either be reconstructed or abandoned. Because of these findings, the City of Casper approached the WWDC (Wyoming Water Development Commission) to request a Level II Conceptual Design Report that would address the concerns expressed in the Preliminary Report.

For purposes of this Level II Report, the results of the preliminary investigation regarding the condition of the pipelines were relied upon and no further investigation conducted. Substantial geotechnical investigation of the Sage Creek Dam was performed together with a hydrological analysis of the Sage Creek drainage basin. Sufficient field data was gathered to enable a detailed cost estimate for rehabilitation of the supply system. A summary of the results of this Level II Report follows.



Summary of Level II Report Findings

The Casper Raw Water Supply System consists of a diversion structure located on the upper reaches of Elkhorn Creek, a pipeline from this point to Sage Creek Reservoir, and a pipeline from this reservoir to the Casper Parks No. 2 Reservoir located on the Municipal Golf Course. A pump station is located here that distributes the raw water through the golf course irrigation system. The pipelines and Sage Creek Reservoir, which comprise the limits of the Supply System for the purpose of this Level II Report, are in need of replacement and repair, respectively (See Figure 1.).

The pipelines, which were constructed of steel and cast iron, have badly deteriorated because of the corrosive nature of the soils they are buried in. Rehabilitation of these pipelines is not possible. Total replacement is the only alternative.

The results of the geotechnical investigation of the embankment at Sage Creek Reservoir indicate that modifications are necessary to ensure a safe structure. These modifications consist of riprapping the upstream face and installing a drainage blanket and toe drain on the downstream side. Some fill placement will be necessary to provide a constant crest elevation. It was determined that seepage under and through the embankment was insufficient to warrant construction of a cutoff trench. Collection and discharge of the seepage away from the toe of the dam, though, is recommended as the best solution to providing a stable structure.

The hydrologic analysis of the Sage Creek drainage basin resulted in selection of the 500 year storm event as the governing criteria for design. It was found that the configuration of the existing spillway would be sufficient to pass the design storm with adequate freeboard, but due to the congestion of the spillway because of trees and brush, reconstruction and rehabilitation of this feature of Sage Creek dam is necessary to provide the required capacity. In addition, the emergency spillway channel is in need of stabilization. Discharge through the emergency spillway has caused erosion that should be corrected.

The question of ownership of the lands which the supply system occupy was addressed in the Level II Report. An easement of record exists for a major portion of the system. However, it appears a small portion of the system is not covered by any easement of record. But because the system has been in use for over 70 years, it is possible that an easement has been established.

The results of the economic analysis indicate that with the participation of the State of Wyoming, through the WWDC, it would be economically beneficial for the City of Casper to rehabilitate the Raw Water Supply System. The estimated cost of rehabilitation is \$1,437,631 (See Table 1).

The City's portion of this capital cost would be 50% or \$718,815 of the total estimated cost. Using an interest rate of 4% and a repayment period of 50 years, a yearly payment of \$33,460 would result. The alternative to rehabilitation is abandonment of the supply system and purchase of treated water from the CBPU (Casper Board of Public Utilities). An initial tap fee of \$250,000 would be assessed to the City of Casper together with an estimated cost of \$92,000 necessary to breach Sage Creek dam and reclaim the reservoir site. In addition, the current annual cost of purchasing an equal amount of treated water for irrigation use at the golf course would be \$55,200. It is important to remember that this annual cost will be subject to inflation, whereas the annual cost associated with rehabilitation would be fixed. It is acknowledged that annual operating costs for the rehabilitated raw water supply system would be slightly higher than purchasing treated water from the CBPU.

TABLE 1 - COST ESTIMATE

Prepared By Worthington, Lenhart, Carpenter & Johnson, Inc.

The cost estimate for the Casper Raw Water Supply System is divided into two parts; 1. Replacement of the Casper Elkhorn Creek Pipeline, and 2. Cost to Rehabilitate the Sage Creek Reservoir.

1. Cost Estimate for Replacement of the Casper Elkhorn Creek Pipeline.

Item No.	Description	Estimated Quantity	Cost Per Each	Total Cost
1.	8" dia. CL 150 PVC Water Line	10,930 L.F.	\$ 14.75/L.F.	\$161,217.50
2.	8" Gate Valves	10 EA.	750.00 EA.	7,500.00
3.	8"x4" Blowoff Assemblies	4 EA.	1,457.00 EA.	5,828.00
4.	Air/Vac Assemblies, 8"	4 EA.	2,063.00 EA.	8,252.00
5.	Misc. Pipe Fittings, 8"	Lump Sum	4,000.00 LS	4,000.00
6.	Diversion Structure	Lump Sum	35,800.00 LS	35,800.00
7.	Meter Vault	2 EA.	14,877.25 EA.	29,754.50
8.	Concrete Energy Dissipator	2 EA.	1,500.00 EA.	3,000.00
9.	10" CL 150 PVC Waterline	12,790 L.F.	20.00/L.F.	255,800.00
10.	Signal Wire	12,790 L.F.	0.25/L.F.	3,197.50
11.	10" Gate Valves	12 EA.	1,000.00 EA.	12,000.00
12.	10"x4" Blowoff Assemblies	9 EA.	1,707.00 EA.	15,363.00
13.	Air/Vac. Assemblies, 10"	9 EA.	2,063.00 EA.	18,567.00
14.	Misc. Pipe Fittings, 10"	Lump Sum	5,000.00 LS	5,000.00

15.	Connect to Existing Golf Course Piping	Lump Sum	3,000.00 LS	3,000.00
16.	16" Check valve	1 EA.	2,500.00 EA.	2,500.00
17.	Horizontal Bore	200 L.F.	150.00/L.F.	30,000.00
18.	Water Services	5 EA.	500.00 EA.	2,500.00
19.	Intake Structure at Casper City Res.	Lump Sum	46,000.00 LS	46,000.00
20.	Alternative 1., Access Roadway Reconstruction	Lump Sum	25,900.00 LS	25,900.00
20A.	Alternative 2., Access Acquisition and Roadway Con- struction, Sage Crk. Res. to Outer Drive	Lump Sum	50,080.00 LS	50,080.00
21.	Right-of-way Aquisition	11 Acres	2,000.00/Acre	22,000.00
22.	Revegetation	24,000 L.F.	2.00/L.F.	<u>48,000.00</u>

Estimated Pipeline Cost, Sub-total	\$745,179.50
Construction Engineering, 10%	\$ 74,518.00
Construction Contingency, 15%	<u>\$111,777.00</u>
Total Estimated Pipeline Cost	<u>\$931,474.50</u>

Estimated Pipeline Cost with Item 20A

Estimated Pipeline Cost, Sub-total	\$769,359.50
Construction Engineering, 10%	\$ 76,935.00
Construction Contingency, 15%	<u>\$115,404.00</u>
Total Estimated Pipeline Cost	<u>(\$961,699.50)</u>

2. Cost Estimate for Rehabilitation of the Sage Creek Reservoir.

Item No.	Description	Estimated Quantity	Cost Per Each	Total Cost
1.	Riprap	5510 T.	\$ 25.21/T.	\$138,907.10
2.	Bedding	3860 T.	18.20/T.	70,252.00
3.	Toe Drain	3400 T.	15.81/T.	53,754.00
4.	Drainage Blanket	3850 T.	18.20/T.	70,070.00
5.	Drainage Support Fabric	1278 Sq.Yd.	3.75/Sq.Yd.	4,792.50
6.	Site Grading, Clearing and Grubbing	Lump Sum	10,000.00 LS	10,000.00
7.	Fill Placement	12,000 Cu.Yd.	2.50/Cu.Yd.	30,000.00
8.	Revegetation	9 Acres	750.00/Ac.	6,750.00
9.	Reconstruct Emergency Spillway Structure	Lump Sum	18,000.00 LS	<u>18,000.00</u>
Estimated Reservoir Cost, Sub-total				\$405,525.60
Construction Engineering, 10 %				\$ 40,252.56
Construction Contingency, 15 %				<u>\$ 60,378.84</u>
Total Estimated Reservoir Cost				<u><u>\$506,157.00</u></u>

Total Estimated Cost, Casper Raw Water Supply System \$1,437,631.50

(With Item 20A.) (1,467,856.50)

This cost represents an accurate accounting of all Project components, and is intended to provide the WWDC and Project Sponsor with the information they need to pursue funding for this Project.

Conclusions and Recommendations

Rehabilitation of the Casper Raw Water Supply System is the preferred alternative, should the State of Wyoming elect to participate by providing the necessary funding. In addition, two valuable water rights will be maintained in their present state. Should rehabilitation be chosen as the acceptable alternative by the Project Sponsor and the WWDC, and approval granted by the State Legislature, rehabilitation of the supply system would be possible in one construction season.