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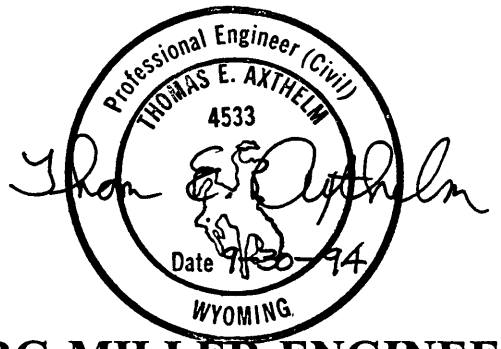
SIDON CANAL REHABILITATION PROJECT
LEVEL II PROJECT REPORT
EXECUTIVE SUMMARY

SEPTEMBER 30, 1994

FOR

WYOMING WATER DEVELOPMENT COMMISSION
HERSCHLER BUILDING
FOURTH FLOOR, WEST WING
CHEYENNE, WYOMING 82002

5979-PE



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EXECUTIVE SUMMARY

BACKGROUND INFORMATION

The Sidon Canal is located in Big Horn County, Wyoming with the headgate situated on the Shoshone River just over the County line in Park County. The canal also utilizes Bitter Creek as a supplemental supply. The canal serves adjudicated water rights for irrigating 12,061.81 acres located primarily in the vicinity of the Towns of Byron and Cowley. The canal was constructed in the early 1900's and the priority date for most of the water rights is 1900. Measured peak flows in the upper end of the canal are about 350 cubic feet per second (cfs). The canal is 35.5 miles long and it empties into a ravine which is tributary to Blue Wash.

The Sidon Canal is operated by the Sidon Irrigation District (the District), which has its office located in Cowley, Wyoming. The District submitted a funding request to the Wyoming Water Development Commission (WWDC) for the replacement of the Marchant Wash culvert. The WWDC deferred the funding request until a study could be done to evaluate the future needs of the entire canal. The WWDC then contracted with Inberg-Miller Engineers in the Spring of 1993 to perform a Level II Study of this canal. This paper summarizes the results of this study.

PRELIMINARY REPORTS

The District decided that they wanted to pursue funding for replacing the Marchant Wash culvert ahead of the completion of the remainder of the study. To accommodate this possibility, a report titled Interim Report for Marchant Wash Crossing was prepared dated October 15, 1993. The Economic Analysis/Ability to Pay portion of the study was also moved ahead to the Interim Report. The District later decided to wait for the entire study to be completed before requesting funding.

A report titled Sidon Canal Rehabilitation Project, Level II, Draft Rehabilitation Plan, was prepared dated January 28, 1994. This report includes detailed background information and an inventory of all the structures on the canal. The report lists 15 items to be considered for repairs or replacement. These items are:

1. Repair or replace headgates and/or weir wall at the Shoshone River Diversion
2. Repair concrete walls at the Bitter Creek Crossing
3. Replace the Gravel Cut Spill
4. Repair Sessions Backer
5. Repair Nations Backer
6. Replace the Backer at Mile 22.4
7. Repair Sage Creek Flume, replace one support foundation, and provide riprap erosion protection
8. Replace the culvert at Marchant Wash
9. Repair Robb Spill
10. Replace Cowley Backer
11. Modify Deaver Canal Tail Water Diversion and obtain water right
12. Replace Tail Water Flume
13. Replace riprap check structures
14. Storm water protection
15. Canal seepage

CONCEPTUAL DESIGNS

Based on the information presented in the Draft Report, the District selected structures for preparing conceptual designs and cost estimates in the Final Report. These structures are:

1. Shoshone River Headgate
2. Shoshone River Diversion Dam
3. Bitter Creek Crossing
4. Marchant Wash Crossing
5. Cowley Backer
6. Tail Water Chute

The District did not include Sage Creek Flume, because they had decided to pay for sandblasting, painting and epoxy-lining the flume themselves. This work has already been accomplished. However, after the first draft of the Final Report was submitted, the WWDC added Sage Creek Flume foundation repair to the list for conceptual design.

Conceptual designs and cost estimates for all of these structures are included in the Final Report. A brief explanation of each conceptual design and cost estimate is listed below:

1. Shoshone River Headgate - Replacing the existing headgate is a high priority item because of the deteriorating condition and the fact that the existing gate will not close entirely. The conceptual design, prepared by Lidstone and Anderson, incorporates rebuilding the headgate a few feet upstream for increased hydraulic efficiency. Also included is the replacement of the existing radial gate located in the weir wall below the headgates. The estimated cost is $217,789.

2. Shoshone River Diversion - A conceptual design for replacing the Shoshone River diversion structure was prepared by the firm of Lidstone and Anderson as a subconsultant specializing in river mechanics. The design incorporates removing the top section of the existing concrete weir wall and building a short weir wall a few feet upstream from the existing deteriorating wall. Also included is the replacement of the headgate structure and radial gates. The estimated total cost is $623,024. An economic analysis indicates that it would be better to wait to build a new weir wall, assuming that the existing weir wall will last at least 20 more years.

3. Bitter Creek Crossing - The proposed repairs to the Bitter Creek Crossing are patching of spalling concrete. The estimated cost is $9,590.

4. Marchant Wash Crossing - Conceptual designs and cost estimates for Marchant Wash Crossing include the options listed below:

   A. Replace the culvert conveying Marchant Wash under the canal with corrosion-resistant concrete pipe. Estimated cost $255,260.

   B. Replace the culvert conveying Marchant Wash under the canal with a less corrosion-resistant coated metal pipe. Estimated cost $169,240.

C. Construct an elevated steel pipe flume to convey the canal over Marchant Wash. Estimated cost $317,959.

D. Construct an inverted siphon to convey the canal under Marchant Wash. Estimated cost $163,911.

5. Cowley Backer - Conceptual design and cost estimate were prepared for two options to replace the Cowley Backer (check stucture), which is badly deteriorated. The flow in the canal is nearly divided in half at this structure. The options are listed below:

A. Replace the existing structure with a check structure and a drop inlet into a pipe. The replacement structure would be located downstream from the present location. A buried pipe would carry the diverted flow into the bottom of the adjacent ravine which conveys water for irrigation. Estimated cost $51,158.

B. Replace the existing structure with a similar structure at the same location. Estimated cost $37,243.

6. Tail Water Chute - A conceptual design was prepared for replacing the existing structure with a new rectangular inclined drop structure. Riprap grade control was included in the design to retard erosion in the receiving channel. Estimated cost $49,869.

7. Sage Creek Flume - A conceptual design and cost estimate was prepared for the replacement of the existing support foundations. Drilled piers were selected as a suitable method to resist migration downhill toward Sage Creek. Available soils data was limited, so soil properties were assumed for conceptual design. The conceptual design calls for two 7-foot diameter by 30-feet deep drilled piers at both supports. The estimated cost for replacing only the north foundation is

$157,221. The estimated cost for replacing both foundations is $229,984. In addition, the estimated cost for riprap erosion protection is $33,421.

FUNDING ANALYSIS

At this time, the District has not officially selected items of work for WWDC funding. Based on one District meeting and some further conversations with varying District members, we understand that the following is a likely grouping of projects for funding:

LOCATION	DESCRIPTION	ESTIMATED COST
Shoshone River Diversion	Replace headgates, weir wall and radial gate	$ 623,024
Bitter Creek Crossing	Concrete Repairs	$ 9,590
Marchant Wash Crossing	Construct inverted siphon	$ 163,911
Cowley Backer	Replace check structure and pipe the diverted flow	$ 51,158
Tail Water Chute	Replace structure	$ 49,869
Sage Creek Flume	Replace north pier foundation	$ 157,271
	Total...	$ 1,054,823

The proposed funding package from the WWDC is a 50 percent grant with the remaining 50 percent loaned at 4 percent interest. Assuming a 25-year loan, the payments would be $3,200.50 per year for each $50,000 borrowed. As of 1993, the District assesses 12,913.76 acres, so the increased annual cost per acre for each 50,000 borrowed is about $0.25. The funding for the improvements listed above would be as follows:

TOTAL PROJECT COST:	$1,054,823
50 PERCENT GRANT:	$527,412
50 PERCENT LOAN:	$527,412
TERM OF LOAN:	25 YEARS AT 4%
ANNUAL PAYMENT:	$33,760
ANNUAL ASSESSMENT INCREASE:	$2.61 PER ACRE

ABILITY TO PAY

As of 1993, the District's annual assessment is $9.00 per acre on 12,913.76 acres. This amounts to $116,224 per year. The District also receives miscellaneous other revenues. For the four-year period from 1989 through 1992, the total average income to the District was $153,247. The total average expenditures during this same period was $143,624 and the average cash assets were $321,151.

The District also receives oil royalty payments which are distributed to the members. In 1993 the oil royalty payment to the members was $10.37 per acres. This is $1.37 per acre more than the assessment to the members.

The water assessment was compared to other irrigation districts in the vicinity. The water assessment to thirteen other irrigation districts in the area range from $5.00 to $19.07 per acre, with an average of $9.91 per acre.

It is our opinion that the District could afford a modest increase to $10.00 per acre without assessing the impact of the oil royalty payment.

An assessment only about equivalent to the oil royalty may seem small compared to other irrigation districts with no offsetting royalty. However, this fact should be tempered with the consideration that the Sidon Irrigation District farmers could experience dramatic increases in out-of-pocket expenses if the oil royalties suddenly drop.

PERMITS

We contacted agencies that we thought might have some permitting authority for a project of this nature. These agencies were:

1. Army Corps of Engineers
2. Wyoming Department of Environmental Quality
3. Wyoming Game and Fish Department
4. State Board of Control
5. State Engineer's Office, Safety of Dams Division

We were informed that irrigation structures are exempt from Army Corps "404" permit requirements. The Wyoming Department of Environmental Quality does not normally require a "401" permit for this type of work unless a "404" permit is required. The Wyoming Game and Fish Department is interested in better access for fish and small boats, but they have no authority unless a "404" or "401" permit is required. The State Board of Control will probably not be involved, and the State Engineer's Office Safety of Dams Division will review the plans but not issue additional permits.

In summary, it appears that no additional permits will be necessary, but additional right-of-way will be needed for construction.