JOHNSON-FERMELIA Co. Inc.
CONSULTING ENGINEERS, ARCHITECTS AND SURVEYORS
LEVEL II - FEASIBILITY STUDY
PHASE II REPORT
BITTER CREEK TRIBUTARY FLOOD STUDY
ROCK SPRINGS, WYOMING
EXECUTIVE SUMMARY
SUBMITTED TO

WYOMING WATER DEVELOPMENT COMMISSION

In Association With
WESTERN WATER CONSULTANTS, INC.
And
WATTS & ASSOCIATES, INC.

NOVEMBER 1991

1515 Ninth Street
Rock Springs, Wyoming 82901
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EXECUTIVE SUMMARY
BITTER CREEK TRIBUTARIES STUDY
PHASE II

I. PROJECT STUDY AREA

The Study area includes the following tributaries to Bitter Creek and their watersheds in the Rock Springs Area:
1. White Mountain Tributaries
2. Dead Horse Canyon Creek
3. Killpecker Creek

II. LEVEL II - FEASIBILITY STUDY - PHASE 1A REPORT - BACKGROUND

A Level II Feasibility Study and Phase 1A Report were completed in March 1989 that addressed flooding and possible solutions thereof on the Bitter Creek tributaries referenced above. That study and report were completed pursuant to a contract with the Wyoming Water Development Commission dated June 24, 1988. The work embraced in this Study was authorized by Amendments No. Three and Four to that same contract. The work described herein has been completed in association with Western Water Consultants, Inc. (WWC) and Watts & Associates, Inc. (WAI). WWC performed hydrologic and hydraulic analyses and WAI economic analyses.

The Phase 1A Report identified a number of possible alternatives for flood control on each of the subject tributaries and provided insight and information on the economic feasibility that ultimately led to the selection of the features described in the Phase II Report. The alternatives that are described were selected on the basis of
the feasibility analysis that was performed in the Phase IA Study.

The selected alternatives, or project features were toured by personnel from the City of Rock Springs, the City Flood Control Committee and representatives of the Wyoming Water Development Commission. The City recommended moving the detention reservoir near Smith's Food King farther away from Foothill Boulevard at the suggestion of a City Councilman. The site was relocated to a parcel of ground of lower value than property fronting on Foothill Boulevard to reduce project costs.

The group of people that toured the sites referenced above also toured the site of a detention reservoir that was proposed on Bitter Creek East of Rock Springs.

The Phase IA Report also addressed flood control solutions on Sweetwater Creek, another tributary to Bitter Creek. However, private interests completed various flood control work on that creek and it was subsequently deleted from this Phase II Study by the Wyoming Water Development Commission.

An additional phase of work (Phase IB) was considered on the main channel of Bitter Creek; however it was deleted from JFCo.'s Contract. The Phase IB study was ultimately initiated by the U.S. Army Corps of Engineers, (C.O.E.). The C.O.E. undertook that portion of the study because Bitter Creek proper would qualify for Federal interest; or Federal funding for flood control works. The City of Rock Springs agreed with the C.O.E. pursuing the investigation on the main channel of Bitter Creek; however, the C.O.E. study was terminated when the construction of a large detention reservoir on
Bitter Creek east of Rock Springs was found to be infeasible. Subsequently the City of Rock Springs engaged JFCo. to complete another report addressing flood control improvement on the main stem of Bitter Creek through Rock Springs.

That report, the Level II, Bitter Creek Channel Improvement Study, was published in September, 1991. The information contained therein has bearing on the objectives and purposes of this Report. An evaluation of the overall flood problems in the Rock Springs area will require assessing the information in that report simultaneously with the Phase II Report.

III. PHASE II ANALYSIS

The work required and provided for in Amendments No. Three and Four to the Consultant's contract specified that the following work be completed for the selected alternatives on Dead Horse Canyon Creek and the White Mountain Tributaries:

1. Additional Mapping
2. Dambreak Analysis
3. Permitting and Land Acquisition/Easements
4. Economic Analysis

The Amendments specified that the following work be performed for Killpecker Creek:

1. Refinement of Hydrology and Flood Boundaries
2. Economic Analysis
3. Assessment of Federal Involvement

IV SUMMARY

The improved mapping and dambreak analysis resulted in refinement of the design and costs of the flood works on Dead
Horse Canyon Creek and White Mountain Tributaries. Also, a more detailed review of permitting easements and land acquisition was completed.

The refined hydrology on Killpecker Creek led to a better definition of flood boundaries and an improved economic analysis that not only defined the benefit cost ratio but allowed for a more accurate appraisal of the possibility of federal involvement in any possible solution to flooding on that tributary.

The following flood control features were evaluated on each of the subject tributaries:

A. Dead Horse Canyon Creek
   1. Detention Reservoir No. 2*
   2. Detention Reservoir No. 3*

B. White Mountain Tributaries
   Two Alternatives were examined on the White Mountain Tributaries, which are referred to as Alternates 1 and 2 below.
   Alternate 1
   1. Detention Reservoir No. 1*
   2. Detention Reservoir No. 2*
   3. Detention Reservoir No. 3*
   4. Detention Reservoir No. 4*
   Alternate 2
   1. Storm Water Channel
   2. Detention Reservoir No. 2*
   3. Detention Reservoir No. 3*
   4. Detention Reservoir No. 4*

* As identified in Level II Feasibility Study - Phase 1A Report

The benefit-cost ratios for Alternates #1 and #2 on the White Mountain Tributaries were not initially developed by using the upgraded mapping that was prepared for the dambreak
analysis. Furthermore, the analysis of flood damages was completed using data that included the flooding event in 1989 and maps of a much smaller scale. However, there were two flooding events in the summer of 1991 in that area that were not incorporated into the initial flood damage assessment. Therefore, additional hydrologic and hydraulic analysis was completed incorporating the use of better maps and information about the flood events of the summer of 1991 to accurately redefine flood boundaries. This was authorized by Amendment No. 5 to the consultants contract. These maps and information, together with additional data that was obtained from appropriate field reconnaissance and surveying, was used to recalculate flood control benefits and benefit-cost ratios for the White Mountain Tributaries.

Capital costs, flood control benefits, and benefit-cost ratios for the project works considered on each of the tributaries are presented in the following Table:

<table>
<thead>
<tr>
<th>TRIBUTARY</th>
<th>PROJECT CAPITAL COST</th>
<th>FLOOD CONTROL BENEFIT</th>
<th>BENEFIT-COST RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dead Horse Canyon Creek</td>
<td>$744,637</td>
<td>$3,281,400*</td>
<td>4.41</td>
</tr>
<tr>
<td>2. White Mountain Tributaries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alternate #1</td>
<td>$1,710,167</td>
<td>$20,900,000*</td>
<td>12.22</td>
</tr>
<tr>
<td>Alternate #2</td>
<td>$1,607,600</td>
<td>$20,900,000*</td>
<td>13.00</td>
</tr>
<tr>
<td>3. Killpecker Creek</td>
<td>$2,583,838**</td>
<td>$459,750***</td>
<td>.18</td>
</tr>
</tbody>
</table>

* Using 3.7 percent discount rate as required by State of Wyoming.
** From Phase 1A Report.
*** Applying federal discount rate of 8.75 percent.
V  
**FEDERAL INTEREST**

The hydrologic and economic analysis also examined the possibility of Federal interest in flood control projects on the three tributaries to Bitter Creek that were studied in the Phase II effort. A project that satisfies applicable COE criteria would be qualified to receive funding for construction from the United States Government. None of the projects examined qualify for Federal interest under the referenced COE criteria.

The following summary presents the reasons for which the projects do not meet the necessary criteria:

<table>
<thead>
<tr>
<th>Project</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dead Horse Canyon Creek</strong></td>
<td>Does not meet criteria for Federal interest considering the magnitude of the 10-year flooding event.</td>
</tr>
<tr>
<td><strong>White Mountain Tributaries:</strong></td>
<td></td>
</tr>
<tr>
<td>Alternate #1</td>
<td>Does not meet criteria for Federal interest based upon magnitude of 10-year flooding event.</td>
</tr>
<tr>
<td>Alternate #2</td>
<td>Does not meet criteria for Federal interest based upon magnitude of 10-year flooding event.</td>
</tr>
<tr>
<td><strong>Killpecker Creek</strong></td>
<td>Benefit-cost ratio, as compiled applying COE criteria of 0.18 is inadequate to warrant Federal interest in flood control improvements.</td>
</tr>
</tbody>
</table>