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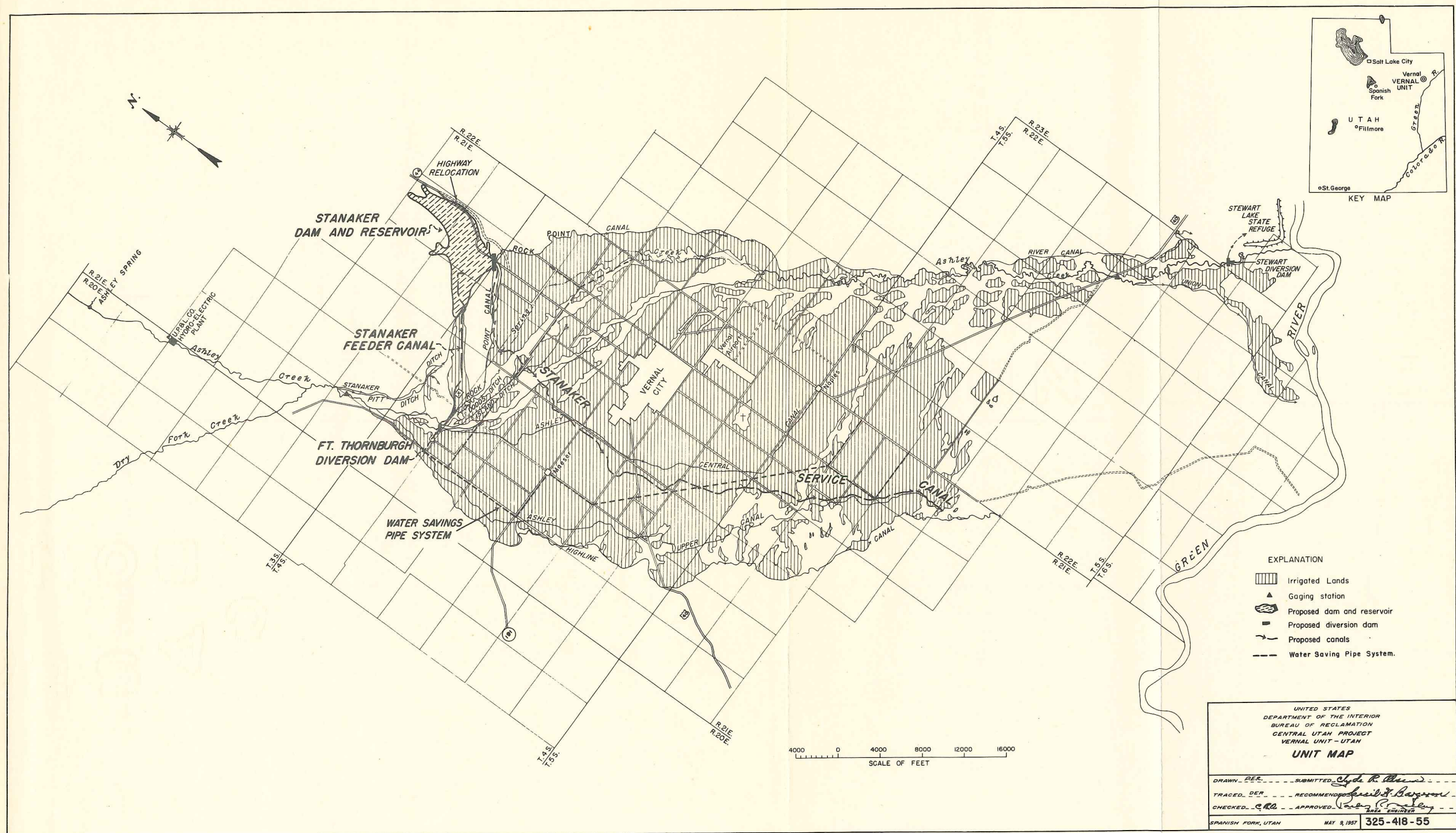
DEFINITE PLAN REPORT

APPENDIX C
DESIGNS AND ESTIMATES

May 1957

Prepared by Engineer Clyde R. Olsen
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Under direction of Parley R. Neeley, Area Engineer

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Chief, Design Branch, Division of Design and Construction,
under direction of
Wilford F. Peterson, Regional Engineer



Appendixes to the Vernal Unit Definite Plan Report have been issued in four volumes with the data grouped as shown below.

APPENDIX A
PROJECT LANDS
LAND DRAINAGE

APPENDIX B
WATER SUPPLY

APPENDIX C
DESIGNS AND ESTIMATES

APPENDIX D
AGRICULTURAL ECONOMY
FINANCIAL ANALYSIS

SUMMARY SHEETS

Vernal Unit--Central Utah Project

LOCATION: Northeast Utah in Ashley Valley of the Uinta Basin, approximately centered by Vernal, Utah.

AUTHORIZED: Initial phase of the Central Utah project, including the Vernal unit, authorized as a participating project with the Colorado River Storage project by the Act of April 11 1956 (70 Stat. 105).

PLAN

Through storage regulation and water exchanges, the Vernal unit will provide supplemental irrigation water for 14,781 acres of land and 1,500 acre-feet of water annually to supplement the municipal supplies of Vernal, Naples, and Maeser. The unit will also provide benefits to fish and wildlife and recreation. Excess flows of Ashley Creek will be diverted at the Ft. Thornburgh Diversion Dam into the Stanaker Feeder Canal and conveyed to the Stanaker Reservoir. Water stored in the reservoir will be released into the Stanaker Service Canal and delivered to existing irrigation canals and ditches. The water will in part replace Ashley Creek water, including releases from upstream reservoirs. Some of the replaced water will be used on lands above the Stanaker Service Canal and some will be diverted from Ashley Spring on Ashley Creek into the municipal pipeline. Land drains will be provided as needed and some sections of existing canals will be lined to prevent seepage. A pipe system will be constructed for stock-watering purposes during the nonirrigation season to save for unit storage and use water now lost through open canals. Recreational and fishing attractions will be provided at Stanaker Reservoir. Small tracts of land distributed among the unit area will be acquired and developed for upland game, and a pump and pipeline will be installed to deliver water from Green River to the Stewart Lake State Refuge. Repayment of reimbursable construction costs will be completed in 50 years, following a 3-year development period. Irrigation costs that are beyond the repayment ability of the irrigators will be paid from the Upper Colorado River Basin Fund.

SUMMARY SHEETS (Continued)

CONSTRUCTION COSTS

1/\$6,874,000

Stanaker Dam and Reservoir	\$3,870,000
Ft. Thornburgh Diversion Dam	200,000
Stanaker Service Canal	1,060,000
Stanaker Feeder Canal	570,000
Water Savings pipe system	340,000
Stanaker Canal laterals	40,000
Vernal area drainage system	675,000
Recreation	92,000
Fish and wildlife	27,000

1/ Estimated at January 1957 prices.

BENEFITS, ALLOCATIONS, AND REPAYMENT

Unit purpose	Benefits (annual)	Allocations (tentative)	
		Construction costs	Annual O.M. & R. costs
Irrigation	\$253,500	1/\$6,154,000	\$12,700
Municipal water	23,800	2/619,000	1,800
Recreation	14,200	3/92,000	7,100
Fish and wildlife	13,600	3/27,000	1,200
Total	305,100	2/6,892,000	22,800

1/ \$1,500,000 will be repaid by Vernal unit irrigators through the Upper Colorado River Basin Fund and the remaining \$4,654,000 will be paid from other revenues in the basin fund apportioned to Utah.

2/ Includes \$18,000 in interest during construction.

3/ Nonreimbursable

Average annual water costs per acre-foot

	Construction repayment	O.M. & R. costs
Irrigation water	\$1.65	\$0.70
Municipal water	1/	1.20

1/ Municipal water payment will increase from \$12.00 per acre-foot during first 10 years to \$22.13 during last 10 years of 50-year repayment period.

BENEFIT-COST RATIO

1.44 to 1

REPAYMENT ORGANIZATION

The Uintah Water Conservancy District has been organized in accordance with Utah State law and will contract with the United States for the repayment of irrigation and municipal water costs.

SUMMARY SHEETS (Continued)

IRRIGATION

<u>Irrigable area furnished supplemental water</u>		<u>Acres</u>
Class 1		3,286
Class 2		5,357
Class 3		5,801
Unclassified (town site)		337
Total		14,781
Elevation of farm lands (avg. feet msl)		5,300
Frost-free period (avg. days annually)		119
Effective precipitation (avg. inches annually)		3
Diversion requirement (avg. ac.-ft. annually)		51,700
Increase in water supply (avg. ac.-ft. annually)		18,000
Increased depletion of Colorado River from unit operation (avg. ac.-ft. annually)		11,800

UNIT WORKS

Stanaker Dam

Located on offstream Stanaker Draw, 3.5 miles north of Vernal.

Type	rolled earth-fill
Height above ground	140 ft.
Height above foundation	145 ft.
Volume of embankment	1,820,000 cu. yds.
Spillway capacity	(emergency only)
Outlet capacity (at res. elev. 5,472)	300 sec.-ft.

Stanaker Reservoir

Elevation at normal water surface (37,560 ac.-ft.)	5,516.2 ft.
Active storage capacity	33,200 ac.-ft.
Inactive storage capacity	4,360 ac.-ft.
Total storage capacity	37,560 ac.-ft.
Reservoir surcharge capacity above normal water surface elevation	2,170 ac.-ft.

Stanaker Feeder Canal

Length	3.1 miles
Capacity	400 sec.-ft.

Stanaker Service Canal

Length	11.8 miles
Capacity at head	300 sec.-ft.

Water Savings Pipe System

Length	17.3 miles
Capacity at head	289 gal. per min.

SUMMARY SHEETS (Continued)

HYDROLOGY

Ashley Creek at "Sign of the Maine" gage

Drainage area.	241 sq. mi.
Period of record	1940-56
Average runoff, 1940-56	92,800 ac.-ft.
Maximum annual runoff.	142,300 ac.-ft.
Minimum annual runoff.	52,400 ac.-ft.
Maximum daily discharge of record.	2,650 sec.-ft.
Minimum daily discharge of record.	14 sec.-ft.

Vernal

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DESIGNS AND ESTIMATES

CHAPTER I

GENERAL DESCRIPTION

Unit Features

The Vernal Unit of Central Utah Project has been planned to provide supplemental irrigation water for 14,781 acres of cultivated and pasture lands in Ashley Valley near Vernal, Utah. Major features of the unit contemplated for construction by the Federal Government include the off-stream storage facilities of Stanaker Dam and Reservoir, the Fort Thornburgh Diversion Dam, Stanaker Feeder Canal, Stanaker Service Canal and laterals, drains and a water savings pipe system.

Some rehabilitation work on existing irrigation systems will be done. The work will be done in part by the irrigation companies and in part by the Federal Government.

Sites of the unit works are within six miles of Vernal and can be readily reached over the local road net. U. S. Highway 40 passing through Vernal connects the area with rail heads at Heber, Utah, 130 miles to the west and Craig, Colorado, 120 miles to the east. With minor extensions of existing lines, power and telephone service will be adequate for construction needs. Permanent construction camps will not be required, as housing facilities for the workers can be obtained at communities in the vicinity of the work sites.

A description with a summary of data, cost estimate, and preliminary estimate drawing or design drawing of each major feature planned for construction by the Federal Government is contained in this appendix.

Designs and Estimates

The designs and cost estimates for all features of the Vernal Unit included in this appendix, excepting the recreational and fish and wildlife development facilities, have been prepared by or reviewed and approved in the office of the Assistant Commissioner and Chief Engineer, Denver, Colorado. During the collection of field data and preparation of designs, close liaison was maintained by the development office, Regional Office, and Assistant Commissioner and Chief Engineer's design staffs. The information and data used in the preparation of the designs and estimates were obtained from field surveys, investigation and studies conducted prior to and subsequent to the authorization of the Central Utah Project in March 1956. Detailed topography, location and geologic surveys, along with preliminary exploration by diamond drilling and materials investigations and testing were accomplished to obtain the preliminary designs and estimates.

Field trips by representatives of the Assistant Commissioner and Chief Engineer's office at appropriate times have been effective and saved considerable time and expense in the preparation of the Definite Plan Report.

Construction Costs

The cost estimates for the features of the unit have been based on January 1957 prices. The total cost of each pay item has been obtained by applying a unit price consistent with present-day construction prices for comparable work, to the estimated quantities, as shown on the Basic Estimate DC-1. Contingency factors varying from 15 percent to 27 percent have been used for the features. Appropriate amounts for construction facilities and other indirect costs have been included in the estimated cost for each identified property. The Basic Estimate DC-1 for each identified property in this appendix follows the narrative and summary data for the property. As shown on the Official Estimate Summary PF-1 on page 6 of this appendix, the estimated cost for the Vernal Unit is \$6,874,000.

Operation, Maintenance, and Replacement (Irrigation and Municipal Water Use)

General conditions

Unit Features

The Vernal Unit of Central Utah Project, which includes the proposed Stanaker Dam and reservoir, with a capacity of 37,560 acre-feet, will provide supplemental water for an irrigable area of 14,781 acres in Ashley Valley near Vernal, Utah. The system serving this land will consist of 11.8 miles of service canal, 1.6 miles of connecting laterals, 3.1 miles of feeder canal, 17.3 miles of pipeline and drainage system as determined necessary after the Vernal Unit is placed in operation. In addition to the proposed unit features the existing facilities of the individual irrigation companies presently serving the area will continue to be operated by their own Boards of Directors.

Through exchange agreements, the communities of Vernal, Maeser, and Naples will be provided with an annual average of 1,500 acre-feet of municipal water.

Labor

The labor market in the vicinity of the unit is generally considered good, and provides adequate supply except in periods of special construction, such as utilities passing through the area. Since this activity is not permanent to the area, wage scales are not expected to be high. It

is planned that the unit will be constructed by government contracts and then turned over to the Conservancy district for operation and maintenance of the features.

Service Facilities

Several commercial garages, machine shops, and welding shops are available to perform the general maintenance of equipment. It is considered desirable that a project of the Vernal Unit size should rent the greater part of its heavy equipment, fully maintained and operated. The exceptions would be trucks and pickups. Rental equipment is available at Vernal and Duchesne, Utah. General supplies are usually available in local stores. Major supplies will have to be brought in from Salt Lake City, Utah, or Denver, Colorado.

Private enterprise is expected to provide housing for all operation and maintenance personnel in the community of Vernal, Utah. No project housing will be required.

Operation and Maintenance Organization

It is planned that the features of the project will be operated as a unit under a central office. The organization will include the policy board of the Uintah Water Conservancy District, organized under the laws of the State of Utah.

There will be a district manager responsible to the district board who will direct all activities of the unit, excepting regulation of Ashley Creek which comes under the jurisdiction of the River Commissioner appointed by the State of Utah.

A water master will be headquartered at the central office, and under the direction of the district manager, will supervise activities in the field. The central office will consist of the manager and one clerk.

Annual Cost of Operation, Maintenance, and Replacement

The estimated annual cost of operation, maintenance, and replacement of unit features proposed for irrigation and Municipal water use is shown in the following table.

DESIGNS AND ESTIMATES

GENERAL DESCRIPTION

OPERATION, MAINTENANCE AND REPLACEMENT COST ESTIMATE

Price, January 1957

Conservancy District Operating Expense

Project Manager	\$4,300
Clerk	1,500
Office Rent	600
Director's Fees and Mileage	1,000
Utilities	300
Mileage 9,000 Miles at \$0.07	720
Miscellaneous Expense	1,000
	<u>\$9,420</u>

This expense to be paid by the conservancy district from taxation as provided by law.

Unit Operating ExpenseEstimated Personnel Requirements

1 - Project Manager	1,200
1 - Clerk	1,500
1 - Water master 2,300 hrs. x \$1.70 (incl. overtime)	3,910
Labor 1,000 hrs. at \$1.50	<u>1,500</u>
Total Annual Personnel Cost	<u>8,110</u>

Equipment (with operator except for truck & pickup)

$\frac{1}{2}$ cu. yd. Dragline 160 hrs. at \$10.	<u>2/1,600</u>
D-7 Tractor & carryall or dozer	
80 hrs. at \$10	<u>2/800</u>
Concrete mixer 40 hrs. at \$3.00	120
Weed spray equipment with labor,	
80 hrs. at \$5.00	<u>2/400</u>
Dump truck, 3,000 mi. at \$0.10	300
Pickup 12,000 miles at 8 cents	
12 mo. x 26 x 60	<u>2/960</u>
Road Patrol 30 hrs. at \$10	<u>2/300</u>
Farm tractor & loader, 120 hrs. at \$2.50	<u>2/300</u>
Miscellaneous equipment - lump	250
Total annual equipment cost	<u>\$5,030</u>
Materials (lump)	
(Steel, cement, paint, weed chemicals, etc.)	\$ 800

<u>1/</u> Two laborers for 60 working days
<u>2/</u> Contract for equipment

<u>Unit Operating Expense (cont'd.)</u>	
<u>Admin. & Office Expense</u>	
Office rent 12 mo. at \$50	\$600
Misc. expense	500
Total Admin. & Office Expense	\$1,100
TOTAL ANNUAL O & M COST	\$15,040
Replacement - Water Savings Pipe	
System Valves & Fittings	
\$8,000 (useful life 30 yrs.)	260
TOTAL ANNUAL O M & R COST	3/4/\$15,300 -

3/ This cost does not include the operation and maintenance costs of \$1.60 per acre on existing facilities, which are in good condition and will continue to operate under the existing Board of Directors.

4/ Equivalent to \$14,500 when adjusted to a long-term projected price level. Cost allocations to irrigation and municipal water are shown in Chapter II of Appendix D.

In addition to the foregoing annual costs pertaining to the irrigation and municipal water features of the unit, annual operation, maintenance, and replacement costs pertaining to recreational facilities have been estimated by the National Park Service at \$7,100 annually and similar costs pertaining to fish and wildlife facilities have been estimated by the Fish and Wildlife Service at \$1,200 annually.

The estimated annual unit costs for operation, maintenance and replacements are summarized in the following tabulation.

Reclamation facilities(cost adjusted to long-term price basis)	\$14,500
Recreational facilities	7,100 -
Fish and wildlife facilities	1,200 -
Total	<u>\$22,800</u>

Construction Schedule

The Vernal unit will be constructed over a period of 8 years. The estimated construction period and sequence of completion for each of the features is shown on the construction schedule on page 5.

The repayment contract with the Uintah Water Conservancy District will be negotiated and executed before construction begins.

LEGEND: Types of Activity

Preconstruction

Construction

LINE NO.	CLASS AND ACCOUNT	PROGRAM ITEM	QUANTITY	UNIT	ESTIMATED TOTAL (Jan. 1957 prices)	TOTAL TO JUNE 30,	FISCAL YEARS												BALANCE TO COMPLETE	ESTIMATED COMPLETION DATE	LINE NO.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Notes: 1/ Priced as of April 1, 1957.

Recommended: _____ (Date) _____
 (Operating Office Head)
 Recommended: _____ (Date) _____
 (Regional Director)
 Recommended: _____ (Date) _____
 (Chief, Div. of P C F)
 Approved: _____ (Date) _____
 (Commissioner)
 Revised: _____ (Date) _____

SHEET 1 OF 1 SHEETS

Form PF-2 UNITED STATES August 1955
 DEPARTMENT OF THE INTERIOR
 BUREAU OF RECLAMATION
CONTROL SCHEDULE
 FOR THE
CENTRAL UTAH PROJECT-VERNAL UNIT-UTAH
 PROJECT OR UNIT
 Spanish Fork Development May 17, 1957 4
 OFFICE DATE REGION
☐ GENERAL INVESTIGATIONS ☐ OPERATION & MAINTENANCE
☒ CONSTRUCTION ☐ OTHER

INTERIOR - RECLAMATION, SLC, UTAH

Project: Central Utah Project, Vernal Unit

Date of Estimate: May 1, 1957

Sheet 1 of 2

Prepared by: L. E. Perigo, Jr. Approved by: Parley R. Neeley

[illegible]

OFFICIAL
ESTIMATE

Project: Central Utah project, Vernal unit

Date of Estimate: May 1, 1957

Prepared by: L. E. Perigo, Jr. Approved by: Parley R. Neeley

Sheet 2 of 2

Cost Classification	DESCRIPTION	Quantity	Unit Cost	Total Estimate	Labor and materials by contractor	Materials and Supplies by Govt.	Labor by Government Forces	Service Facilities	Investigations, Engineering and Other Costs	Previous Official Estimate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	VERNAL UNIT									
01.01.	STANAKER DAM AND RESERVOIR			3,870,000	2,977,000	-	-	89,000	804,000	5,046,000
.30	Land and rights	904 ac.		163,800	126,000	-	-	3,800	34,000	
.31	Relocation of existing property-highway, utilities, canal			430,300	331,000	-	-	9,900	89,400	
.32	Clearing lands--reservoir			13,000	10,000	-	-	300	2,700	
.35	Dams--earth, crest length 2,400', 140' above streambed	37,560 a.f.		3,262,900	2,510,000	-	-	75,000	677,900	
02.01	FT. THORNBURGH DIVERSION DAM			200,000	155,000	-	-	4,000	41,000	234,000
.30	Land and rights			1,300	1,000	-	-	-	300	
.35	Dams--compacted earth fill, crest length 700', height above streambed 12', uncontrolled spillway			185,800	144,000	-	-	3,700	38,100	
.50	Roads, railroads, and bridges--access road	0.5 mi.		12,900	10,000	-	-	300	2,600	
05.01	STANAKER SERVICE CANAL			1,060,000	810,000	-	-	24,000	226,000	722,000
.30	Land and rights	120 ac.		40,500	31,000	-	-	900	8,600	
.31	Relocation of existing property--farm bridges, irrigation crossings			213,300	163,000	-	-	4,800	45,500	
.33	Structures and improvements--cattle guards, fences			52,400	40,000	-	-	1,200	11,200	
.36	Waterways--concrete lined and unlined canal	11.8 mi.		458,000	350,000	-	-	10,400	97,600	
.37	Canal structures--siphons, checks, turnouts			230,300	176,000	-	-	5,200	49,100	
.38	Canal protective works			65,500	50,000	-	-	1,500	14,000	
05.02	STANAKER FEEDER CANAL			570,000	436,000	-	-	13,000	121,000	305,000
.30	Land and rights	30 ac.		5,200	4,000	-	-	100	1,100	
.31	Relocation of existing property--bridges			56,200	43,000	-	-	1,300	11,900	
.36	Waterways--earth lined canal, concrete-lined canal, unlined canal; bottom widths 24', 10' and 6'.	3.1 mi.		253,800	194,000	-	-	5,900	53,900	
.37	Canal structures			248,300	190,000	-	-	5,600	52,700	
.38	Canal protective works			6,500	5,000	-	-	100	1,400	
05.03	WATER SAVINGS PIPE SYSTEM			340,000	261,000	-	-	8,000	71,000	
.30	Land and rights	21 ac.		5,200	4,000	-	-	100	1,100	
.36	Waterways--welded steel pipe system, capacity 432 g.p.m. to 50 g.p.m.	17.3 mi.		334,800	257,000	-	-	7,900	69,900	
06.01	STANAKER CANAL LATERALS			40,000	29,000	-	-	1,000	10,000	247,000
.30	Land and rights	5 ac.		2,700	2,000	-	-	-	700	
.33	Structures and improvements, fences	1.7 mi.		4,100	3,000	-	-	100	1,000	
.36	Waterways--earth laterals	1.6 mi.		8,300	6,000	-	-	200	2,100	
.37	Lateral structures			24,900	18,000	-	-	700	6,200	
07.01	VERNAL AREA DRAINAGE SYSTEM			675,000	520,000	-	-	15,000	140,000	384,000
.36	Waterways			675,000	520,000	-	-	15,000	140,000	
15.01	RECREATIONAL DEVELOPMENT			92,000	78,000	-	-	5,000	9,000	110,000
.33	Structures and improvements--boat landings and picnic areas			92,000	78,000	-	-	5,000	9,000	
15.11	FISH AND WILDLIFE			28,000	28,000	-	-	1,000	3,000	
.33	Structures and improvements			27,000	23,000	-	-	1,000	3,000	
	Total construction cost			6,874,000	5,289,000	-	-	160,000	1,425,000	7,048,000

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

The unit will supply supplemental water to 15,022 acres of land. The project was authorized by Act of April 11, 1956, Public Law 485, 84th Congress 2nd Session, as a participating project to the Colorado River Storage Project. Construction work has not been started.

BASIC ESTIMATE DC-1

VERNAL UNIT

PROJECT CENTRAL UTAH
Date of Estimate May 1, 1957
Prices as of January 1, 1957

Sheet 1 of 17 sheets

RECAPITULATION (Feasibility Estimate)

PREPARED: Spanish Fork Development Office
Spanish Fork, Utah

[illegible]

DESIGNS AND ESTIMATES

CHAPTER II

STANAKER DAM AND RESERVOIR

Purpose

The Stanaker Reservoir will be formed by the construction of Stanaker Dam in the mouth of Stanaker draw as shown on Drawing No. 325-418-38. This offstream reservoir will provide storage for water diverted from Ashley Creek through the Stanaker Feeder Canal. Water released from the reservoir through the Stanaker Service Canal will be used for irrigation of agricultural lands in Ashley Valley.

Description

The Stanaker dam site is located on an offstream site at the mouth of Stanaker Draw, about $3\frac{1}{2}$ miles north of Vernal, Utah, in Sec. 35, Township 3 South and in Sec. 2, Township 4 South, Range 21 East, Salt Lake Base and Meridian. The preliminary designs and estimates for Stanaker Dam provide for a rolled-earth-fill structure. The maximum height of the dam above stream bed will be 140 feet. It will have a crest length of 2,400 feet, and will create a reservoir with a capacity of 37,560 acre-feet at normal water surface elevation of 5,516.2 and inundate an area of approximately 840 acres. A surcharge capacity of 2,170 acre-feet is provided in the reservoir above the normal water surface for an inflow design flood having a peak of 10,500 second-feet and an 18 hour volume of 2,170 acre-feet. The maximum water surface elevation will be 5,518.8. The canal outlet of 240 second-feet capacity can evacuate the reservoir surcharge in $4\frac{1}{2}$ days through the Stanaker Service Canal and wasteway into Ashley Creek.

An emergency spillway is provided on the right abutment of the dam. The spillway is an uncontrolled section in the rock and is to be used only if two design floods should occur within the $4\frac{1}{2}$ day drawdown period of the first flood. No downstream channel or stilling basin is provided for the emergency spillway. The outlet works on the right abutment include a tunnel and provide for a 300 second-foot discharge at reservoir water surface elevation 5,472.

Improvements within the reservoir area which will require removal or relocating are 4 farmsteads, 1.5 miles of telephone line owned by the United States Forest Service, 1 mile of a 17.5 KV power line owned by the Utah Power and Light Company, 2 miles of a 7.2 KV distribution line owned by the Moon Lake Electric Association, Inc., and 2.5 miles of Utah Highway No. 44.

Detailed information concerning the dam and reservoir feature is contained in the summary of data, cost estimates, location map, and Feasibility Design Drawing No. 325-D-1 following this narrative.

Geology

The Stanaker reservoir site is a wide, flat-bottom valley eroded from the sandstones and shales of a minor anticlinal arch formed on the south flank of the Uinta Mountains. It consists of soft shales and poorly consolidated sandstone. The formation should be highly impervious.

The foundation of the damsite is composed of fine valley fill consisting of silt, clay, and sand, underlain by Aspen shale at a maximum depth of 90 feet. Eleven diamond drill holes were drilled in the dam site area for a total of 1,169 feet in 1944 and 1945. Fourteen additional holes were drilled in 1957. Very little loss of water resulted from percolation tests in the drill holes, indicating a tight material. All rock at the damsite dips downstream and strikes approximately N55° E. The strike is nearly parallel to the axis of the proposed dam. Bedding planes in the shale are too impervious to allow seepage and grouting should seal the joints in both the sandstone and shale. No evidence of faulting has been observed in the damsite area.

The spillway located on the right abutment will follow down the dip slope of the Frontier sandstone which is free of overburden and is sound rock even on the surface. The outlet works will consist of a tunnel through the right abutment.

Materials

Preliminary exploration for embankment materials for the dam were completed in 1944, and materials were tested from the borrow areas near the damsite. Impervious embankment materials in sufficient quantities for the dam are near the damsite. These impervious materials are generally of two types: medium sands with excess of silty and clay fines, and lean or silty clays of low compressibility, many of which are derived from weathered deposits of shale.

The pervious materials for the dam embankment are not as favorably located as the fine material. Two areas are known with suitable material. One is located 4,000 feet to the east on a mesa known as the Ridge Borrow area and is a stream terrace deposit of rounded silt, sand and gravel, and boulders up to 13 inches in diameter, ranging in depth from 2 to about 12 feet. Deposits along Ashley Creek $2\frac{1}{2}$ miles southwest

of the damsite have been opened for highway construction and believed entirely satisfactory for dam construction. They consist of silt, sand, gravel, and very well rounded cobbles. The long haul is the most serious problem to this area and may result in its being eliminated. Riprap and rock-fill may be obtained by quarrying from rock formations near the damsite.

Deposits of gravel along the Green River, near Jensen, Utah, have been tested and can produce suitable concrete aggregate. Jensen lies approximately 18 miles from the Stanaker damsite over well maintained roads. Most gravel deposits observed near Vernal on Ashley Creek will require processing and the limited amount of aggregate required to be produced may not justify the cost of installing a plant. Cement can be obtained from Devils Slide Cement Plant located near Henefer, Utah, east of Ogden, Utah.

Miscellaneous

No unusual design or construction problems are anticipated in the construction of a dam at the Stanaker draw site.

The nearest railheads to the Vernal unit are at Heber City, Utah, 130 miles to the west, and Craig, Colorado, 120 miles to the east, which have branch lines of the Denver and Rio Grande Western Railroad. The area of the unit is served by U.S. Highway No. 40 which is an asphalt all weather road, maintained by the Utah State Highway Department. Utah State Highway No. 44 running north from Vernal passes through the damsite area.

Electric power and telephone service can be made available at the dam site from the existing facilities. No construction camp will be required as Vernal and Jensen and several smaller towns are within convenient commuting distance of the dam site.

Right-of-way for the dam and reservoir will require acquisition of about 890 acres of private land and 240 acres of Federal and State owned lands.

Cost Estimates

Based on April 1, 1957, unit prices, the total estimated construction cost for Stanaker Dam and Reservoir is \$3,870,000, which includes contingencies, construction facilities, and other indirect costs. Quantities and unit costs for all items involved are contained in the Basic Estimate DC-1 of this appendix.

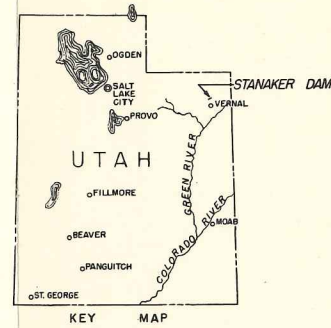
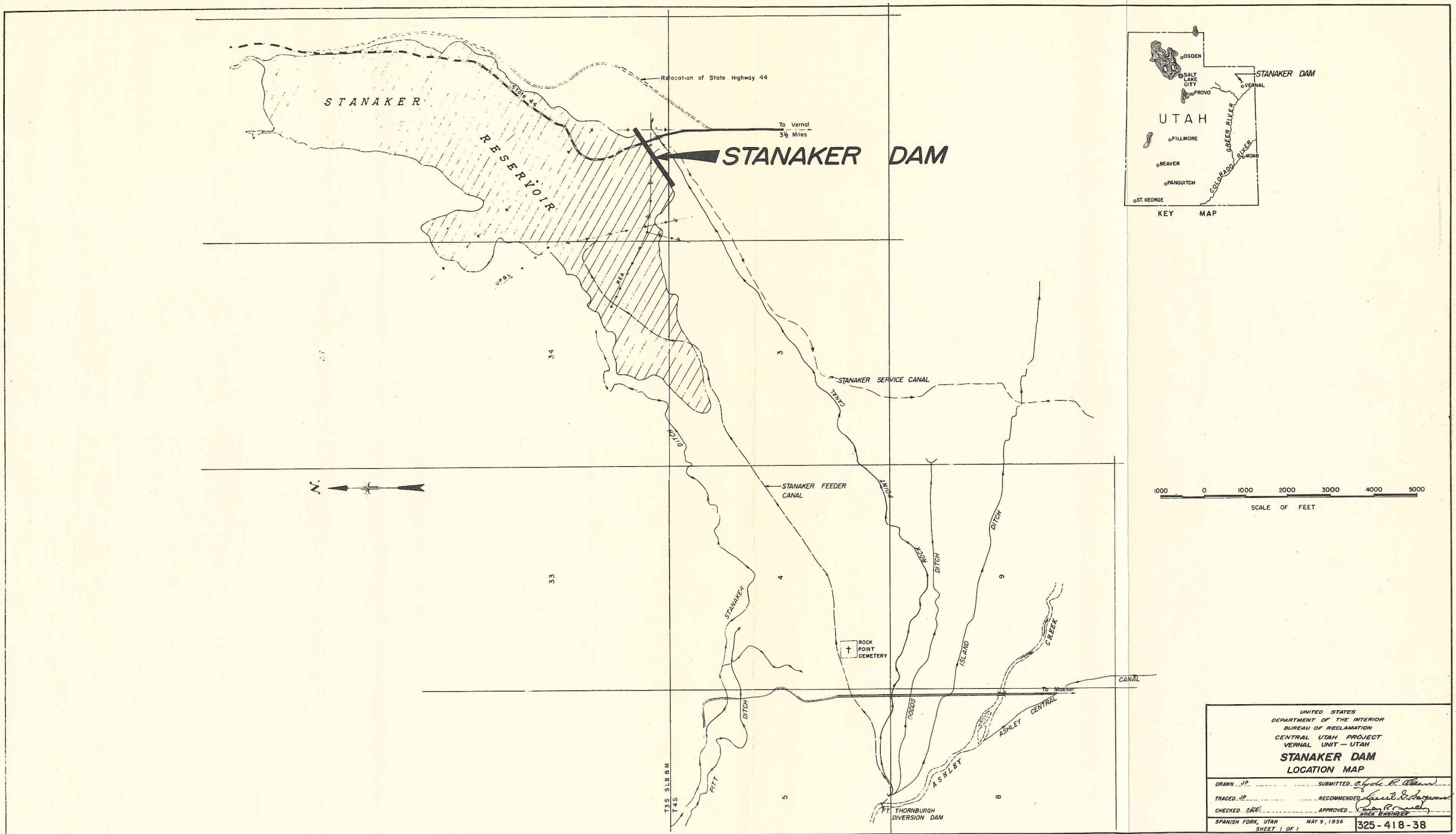
Summary of Design Data

Reservoir

Total storage capacity at normal water surface	
elevation 5,516.2	37,560 acre-feet
Active storage capacity	33,200 acre-feet
Minimum storage capacity at water surface	
elevation 5,451.4	4,360 acre-feet
Normal water surface area	840 acres
Outlet capacity at water surface	
elevation 5,472.0	300 c.f.s.
Elevation of crest of emergency spillway . . .	5,519 msl.
Elevation top of dam	5,525 msl.
Approximate height of dam above stream bed . .	140 feet
Length of crest of dam	2,400 feet
Total volume of dam	1,820,000 cubic yards

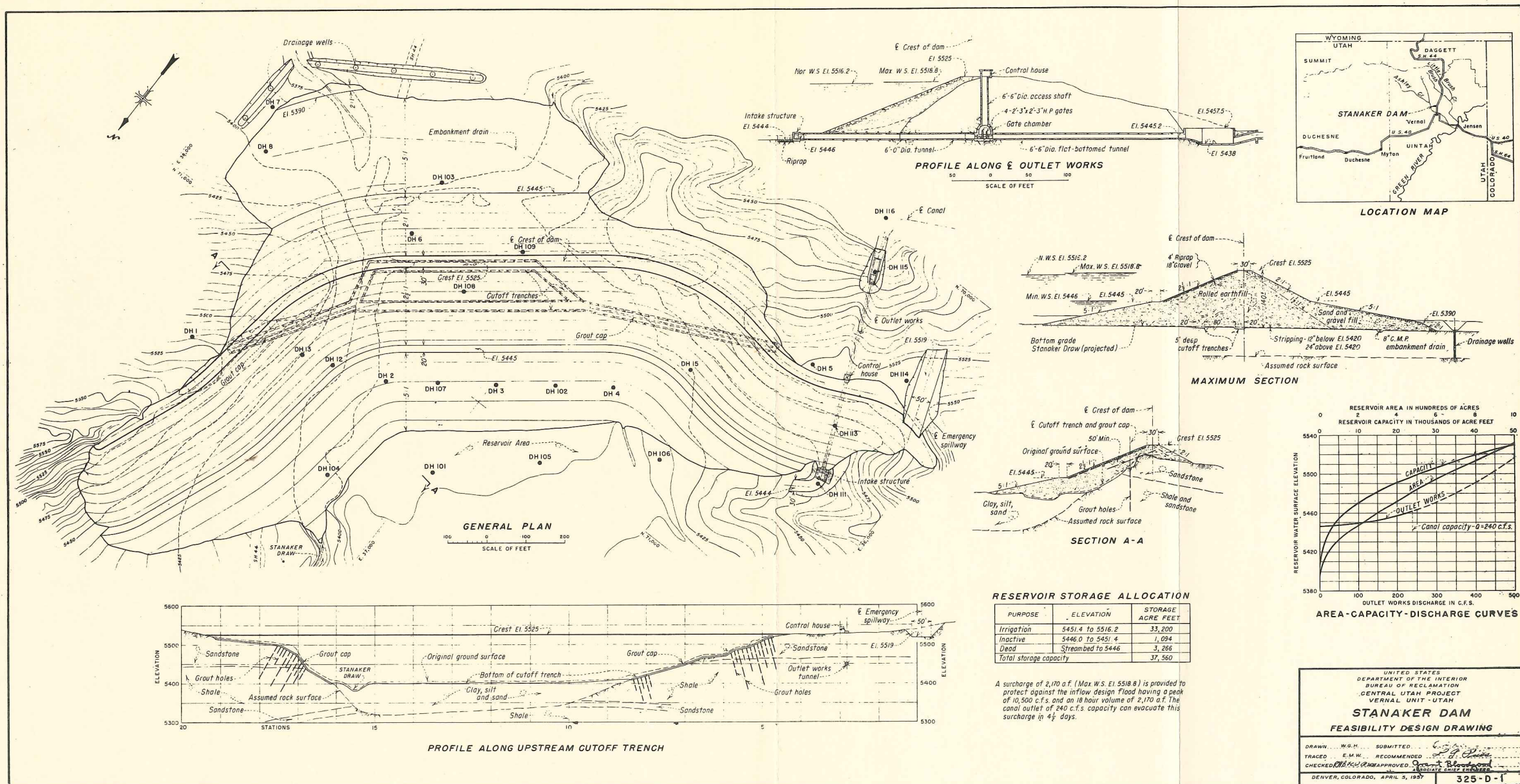
References

- Geology of Stanaker Dam Site, April 1945, Salt Lake City, Utah.
Technical Details, Project Planning Report. 4-8a.51.0, January 1949, Salt Lake City, Utah.
Laboratory Report on tests of Proposed Embankment Material for Stanaker Dam - Vernal Project, Utah - Earth Materials Laboratory Report No. EM-144, July 30, 1947, Denver, Colo.
Spillway Design Flood Study Stanaker Damsite, March 1947, Salt Lake City, Utah.
Preliminary Designs and Estimates - Stanaker Dam - March 1948, Rev. June 1948, Salt Lake City, Utah.
Letter from Commissioner's Office, Denver, Colorado, dated December 31, 1956, approving unit costs for items of dam.
Preliminary Geological Report of the Stanaker Dam and Reservoir Site - G-110, Region 4, Salt Lake City, Utah, March 1957.



UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION CENTRAL UTAH PROJECT VERNAL UNIT - UTAH	
STANAKER DAM LOCATION MAP	
DRAWN - J.P.	SUBMITTED - <i>Charles R. Allen</i>
TRACED - J.P.	RECOMMENDED - <i>Charles R. Allen</i>
CHECKED - <i>S.A.R.</i>	APPROVED - <i>John R. ...</i>
SPANISH FORK, UTAH SHEET 1 OF 1	MAY 9, 1956 325-418-38

INTERIOR - RECLAMATION, S.C. UTAH



INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

Prepared - Spanish Fork Development Office
Data for Dam - Assistant Commissioner and Chief Engineer's
Ltr. dated 4-23-57 -- Drawing 325-D-1.

BASIC ESTIMATE DC-1

RESERVOIRS AND DAMS

VERNAL UNIT
STANAKER DAM & RESERVOIR

Computed by: CRO
Checked by: PHC

PROJECT CENTRAL UTAH
Date of Estimate April 30, 1957
Prices as of April 1, 1957
Sheet 2 of 17 sheets
Property designation 01.01.30 & 31

PROPERTY CLASS	IDENTIFICATION	ACCOUNT	PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	Service CONTRACTS	INVEST'GNS ENGR'G AND GEN'L EXP.	TOTAL COST	TOTAL COST	TOTAL COST
					AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
01				RESERVOIRS AND DAMS																	
	01			STANAKER DAM AND RESERVOIR -- On Stanaker Draw, an offstream site about 3.5 miles North of Vernal, Utah. Reservoir storage 37,560 acre-feet at Max. water surface el. 5513.8 irrigation storage 33,200 acre-feet at normal water surface el. 5515.2. Dead and inactive storage 4,360 acre-feet at el. 5451.1. Feasibility estimate.												2,977,000	89,000	804,000	3,870,000		
		30		LAND AND RIGHTS -- Private and state land in the dam and reservoir area.											126,000						
			1	Acquisition of right-of-way	904	acres	100.00	90,400					100.00	90,400							
			2	Acquisition of improvements	Lump Sum		L.S.	14,600					L.S.	14,600							
				Subtotal				105,000						105,000							
				Contingencies 20% /										21,000							
				Field Cost -- 01.01.30										126,000							
		31		RELOCATION OF EXISTING PROPERTY -- Relocation of Utah State Highway #44 for 2 1/2 miles											331,000						
			1	Excavation, unclassified Sta. 0+00 to Sta 108+86	310,000	cy	.60	186,000					.60	186,000							
			2	Furnishing and installing 24" dia. corrugated metal pipe	960	lf	7.50	7,200					7.50	7,200							
			3	Excavation structures common	160	cy	1.50	240					1.50	240							
			4	Concrete in structures	80	cy	80.00	6,400					80.00	6,400							
			5	Furnishing and placing reinforcement steel	7,500	lbs	.20	1,500					.20	1,500							
			6	Compacted backfill	70	cy	4.00	280					4.00	280							
			7	Roadway base material (8 inches gravel)	6,900	cy	3.00	20,700					3.00	20,700							
			8	Roadway surface material (3" pit run gravel)	3,930	cy	2.50	9,825					2.50	9,825							
			9	Timber guard rail	16	mbm	350.00	5,600					350.00	5,600							
			10	Furnishing and handling cement	128	bbf	7.00	896					7.00	896							
				Subtotal				238,641						238,641							
				Contingencies 20% /										47,359							
				Field Cost -- Highway										286,000							
				UTILITIES -- Relocation of Utah Power and Light Co. 17 KV line 2-1/2 miles, Moon Lake Electric Associations 7.6 KV line, 2 miles, and 2 miles of U.S. Forest Service telephone line.																	
			11	Power lines	Lump Sum		LS	18,000					LS	18,000							
			12	Telephone	Lump Sum		LS	3,000					LS	3,000							
				Subtotal				21,000						21,000							
				Contingencies 20% /										4,000							
				Field Cost -- Utilities										25,000							
				ROCK POINT CANAL -- Relocation of 880 feet of canal covered by Stanaker Dam.																	
			13	Excavation for pipe	830	cy	.60	498					.60	498	14						
			14	Excavation for structure	25	cy	1.50	38					1.50	38							

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

BASIC ESTIMATE DC-1

RESERVOIRS AND DAMS

VERNAL UNIT
STANAKER DAM & RESERVOIR

PROJECT CENTRAL UTAH
Date of Estimate April 30, 1957
Prices as of April 1, 1957

Sheet 3 of 17 sheets
Property designation 01, 01, 31, 32 & 35

PROPERTY			PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	Service CONSTRUCTION FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT			AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
01				RESERVOIRS AND DAMS (Cont.)																	
	01			STANAKER DAM AND RESERVOIR (Cont.)																	
		31		RELOCATION OF EXISTING PROPERTY (Cont.)																	
				ROCK POINT CANAL (Cont.)																	
			15	Backfill	585	cy	.50	293					.50	293							
			16	Compacting backfill	132	cy	3.50	462					3.50	462							
			17	Furnishing and placing reinforcement steel	850	lbs	.18	153					.18	153							
			18	Concrete in structure	12	cy	80.00	960					80.00	960							
			19	Furnishing and handling cement	18	bb1	7.00	126					7.00	126							
			20	Riprap	14	cy	5.00	70					5.00	70							
			21	Furnishing and installing 36" dia. reinforced concrete precast pipe	880	lf	16.00	14,080					16.00	14,080							
				Subtotal				16,680						16,680							
				Contingencies 20%										3,320							
				Field Cost - Rock Point Canal										20,000							
				Field Cost 01,01,31										331,000							
		32		CLEARING LAND																	
			1	Reservoir clearing	Lump Sum		LS	10,000					LS	10,000	10,000						
		35		DAMS—Earth dam, height above stream bed 140 feet, crest length 2400 ft., crest elevation 5,525.0											2,510,000						
				DAM STRUCTURE																	
			1	Diversion and care of stream during construction and unwatering foundations	Lump Sum	LS	LS	20,000					LS	20,000							
			2	Excavation, stripping borrow pits	140,000	cy	0.35	49,000					0.35	49,000							
			3	Excavation, all classes, dam foundation	88,000	cy	0.55	48,400					0.55	48,400							
			4	Excavation, all classes, grout cap	425	cy	20.00	8,500					20.00	8,500							
			5	Excavation in reservoir borrow area and transportation to dam embankment	1,700,000	cy	0.45	765,000					0.45	765,000							
			6	Excavation in Ashley Creek borrow area and transportation to dam embankment	320,000	cy	0.75	240,000					0.75	240,000							
			7	Excavation, rock, in borrow pits and transportation to dam for riprap	56,000	cy	2.50	140,000					2.50	140,000							
			8	Earthfill in embankment	1,400,000	cy	0.18	252,000					0.18	252,000							
			9	Sand and gravel fill	310,000	cy	0.15	46,500					0.15	46,500							
			10	Riprap on upstream slope	74,000	cy	1.50	111,000					1.50	111,000							
			11	Furnishing and placing gravel bldg mat under riprap	28,000	cy	2.50	70,000					2.50	70,000							
			12	Drilling grout holes	5,000	lf	2.70	13,500					2.70	13,500							
			13	Pressure grouting	7,500	lf	2.50	18,750					2.50	18,750							
			14	Furnishing grout pipe and fittings	1,200	lb	0.80	960					0.80	960							
			15	Concrete in grout cap	425	cy	35.00	14,875					35.00	14,875							
			16	Furnishing and handling cement	2,500	bb1	6.50	16,250					6.50	16,250							

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

BASIC ESTIMATE DC-1

RESERVOIRS AND DAMS

VERNAL UNIT
STANAKER DAM & RESERVOIR

PROJECT CENTRAL UTAH
Date of Estimate April 30, 1957
Prices as of April 1, 1957

Sheet 4 of 17 sheets
Property designation 01.01.35

PROPERTY			PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE CONSTRUCTION FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTI- FICATION	ACCOUNT			AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
				2	3		4		5		6		7		8	9	10	11	12	13	14
01				RESERVOIRS AND DAMS (Cont.)																	
	01			STANAKER DAM AND RESERVOIR (Cont.)																	
		35		DAM (Cont.)																	
			17	Dam structure (Cont.)																	
				Constructing 8-inch perforated corrugated metal pipe embankment drain	1,100	lf	3.75	4,125					3.75	4,125							
			18	Special compaction	1,400	cy	3.00	4,200					3.00	4,200							
			19	Constructing drainage wells, 80-foot maximum depth, 55-foot average depth	390	lf	30.00	11,700					30.00	11,700							
				Subtotal				1,835,320						1,835,320							
				Contingencies (20% /)										364,680							
				Field Cost--DAM STRUCTURE										2,200,000							
			20	EMERGENCY SPILLWAY																	
				Excavation, open cut	7,200	cy	3.00	21,600					3.00	21,600							
				Contingencies (20% /)										3,400							
				Field Cost--EMERGENCY SPILLWAY										25,000							
			21	WILET WORKS																	
				Excavation, rock, open cut	5,110	cy	4.00	20,440					4.00	20,440							
			22	Excavation, all classes, tunnel and shaft	1,030	cy	55.00	56,650					55.00	56,650							
			23	Backfill	540	cy	1.00	540					1.00	540							
			24	Special compaction	340	cy	3.00	1,020					3.00	1,020							
			25	Riprap	180	cy	5.00	900					5.00	900							
			26	Gravel blanket	90	cy	4.00	360					4.00	360							
			27	Drilling drain holes	240	lf	3.50	840					3.50	840							
			28	Drilling grout holes	760	lf	2.50	1,900					2.50	1,900							
			29	Grouting	1,200	cf	2.50	3,000					2.50	3,000							
			30	Furnishing and installing 4-inch perforated pipe drains in gravel	220	lf	2.00	440					2.00	440							
			31	Furnishing and installing 4-inch drains with cemented joints	250	lf	1.75	438					1.75	438							
			32	Concrete in intake structure	23	cy	75.00	1,725					75.00	1,725							
			33	Concrete in conduit and cutoff collars	165	cy	55.00	9,075					55.00	9,075							
			34	Concrete in tunnel and shaft linings	340	cy	60.00	20,400					60.00	20,400							
			35	Concrete in gate chamber	120	cy	70.00	8,400					70.00	8,400							
			36	Concrete in control house	22	cy	100.00	2,200					100.00	2,200							
			37	Concrete in stilling basin and wave suppressor	257	cy	50.00	12,850					50.00	12,850							
			38	Furnishing and placing reinforcement	106,400	lb	0.17	18,088					0.17	18,088							
			39	Furnishing and handling cement	1,820	bb1	6.50	12,285					6.50	12,285							
			40	Furnishing and installing steel tunnel supports	36,100	lb	0.25	9,025					0.25	9,025							
			41	Installing electrical conduit and connectors	Lump Sum	ls	ls	5,000					ls	5,000							
			42	Furnishing and installing four 2-foot 3-inch by 2-foot 3-inch high-pressure gates	35,000	lb	1.15	40,250					1.15	40,250							
			43	Furnishing and installing gate controls	1,700	lb	2.00	3,400					2.00	3,400							
			44	Furnishing and installing reservoir level gage	2,250	lb	1.00	2,250					1.00	2,250							
			45	Furnishing and installing shaft metalwork	2,500	lb	0.70	1,750					0.70	1,750							

RESERVOIRS AND DAMS

17

DESIGNS AND ESTIMATES

CHAPTER III

FT. THORNBURGH DIVERSION DAM

Purpose

The Ft. Thornburgh Diversion Dam is to be located on Ashley Creek as shown on Drawing No. 325-418-36 and will divert water into Stanaker Feeder Canal for conveyance to Stanaker Reservoir for storage. The proposed dam will also replace an existing diversion dam and section of canal serving the Ashley Central and Rock Point Canals and the Island and Dodds ditches above an existing division structure which divides the flow during the irrigation season.

Description

The diversion dam site is in Section 5, Township 4 South, Range 21 East, Salt Lake Base and Meridian, approximately 4 miles northwest of Vernal, Utah. Preliminary designs of the dam as shown on Drawing 325-400-89 provide for a structure consisting of a compacted earth-fill dike with a rock-fill overflow weir and a timber sheet piling core with a reinforced concrete sluiceway and canal headworks on the left side of the weir section. The total discharge of the overflow weir section will be sufficient to pass the design flood of 3,400 second-feet. This design flood is based on a 50-year frequency study for Ashley Creek. The Canal headworks structure on the left side will divert a maximum flow of 680 second-feet, of which 280 second-feet will be turned to the existing canals and ditches and the remaining flow of 400 second-feet will flow through the Stanaker Feeder Canal to the reservoir. The compacted earth-fill dike will extend from the weir section of the dam approximately 370 feet laterally on the right side of the creek and 330 feet on the left side.

Geology

A preliminary geological examination of the site was completed in 1956. The foundation consists of river sands and gravels with an average diameter of about 4 inches extending to a depth of 28 feet. Bedrock of shale and very soft sandstones appear below the sands and gravels. The foundation is considered adequate for the low rock and concrete structure contemplated. Earth-fill material for the dikes can be obtained from the creek bed. The material is quite pervious and sheet piling will be required to seal off the subsurface flows at the overflow section of the dam and canal headworks.

Materials

Aggregates for concrete have not been tested from the immediate area, but acceptable aggregate has been tested from the Green River near Jensen, Utah. The Green River deposits will require a haul of approximately 20 miles over improved asphalt roads. Riprap can be obtained from the borrow areas near the Stanaker dam site or from other nearby areas by quarrying. Earth-fill for the dikes can be obtained from the area to be flooded above the diversion structure.

Miscellaneous

There are no unusual design and construction problems anticipated for the diversion works. The dam site is readily accessible from improved county roads passing within a half mile of the site on either side of the creek. The accessibility to rail heads is similar to that of the Stanaker Dam, as the only ones available are at Heber City, Utah, and Craig, Colorado. The site is on privately-owned land and will require purchase of a small acreage for right-of-way. Housing for construction workers can be obtained in Vernal or nearby communities. No permanent housing will be required as a part of the Vernal Unit.

Cost Estimates

Based on January 1957 unit prices, the total estimated construction cost of the Fort Thornburgh Diversion Dam is \$200,000, which includes contingencies, construction facilities, and other indirect costs. Quantities and unit costs for all items involved are contained in the Basic Estimate DC-1 for the feature.

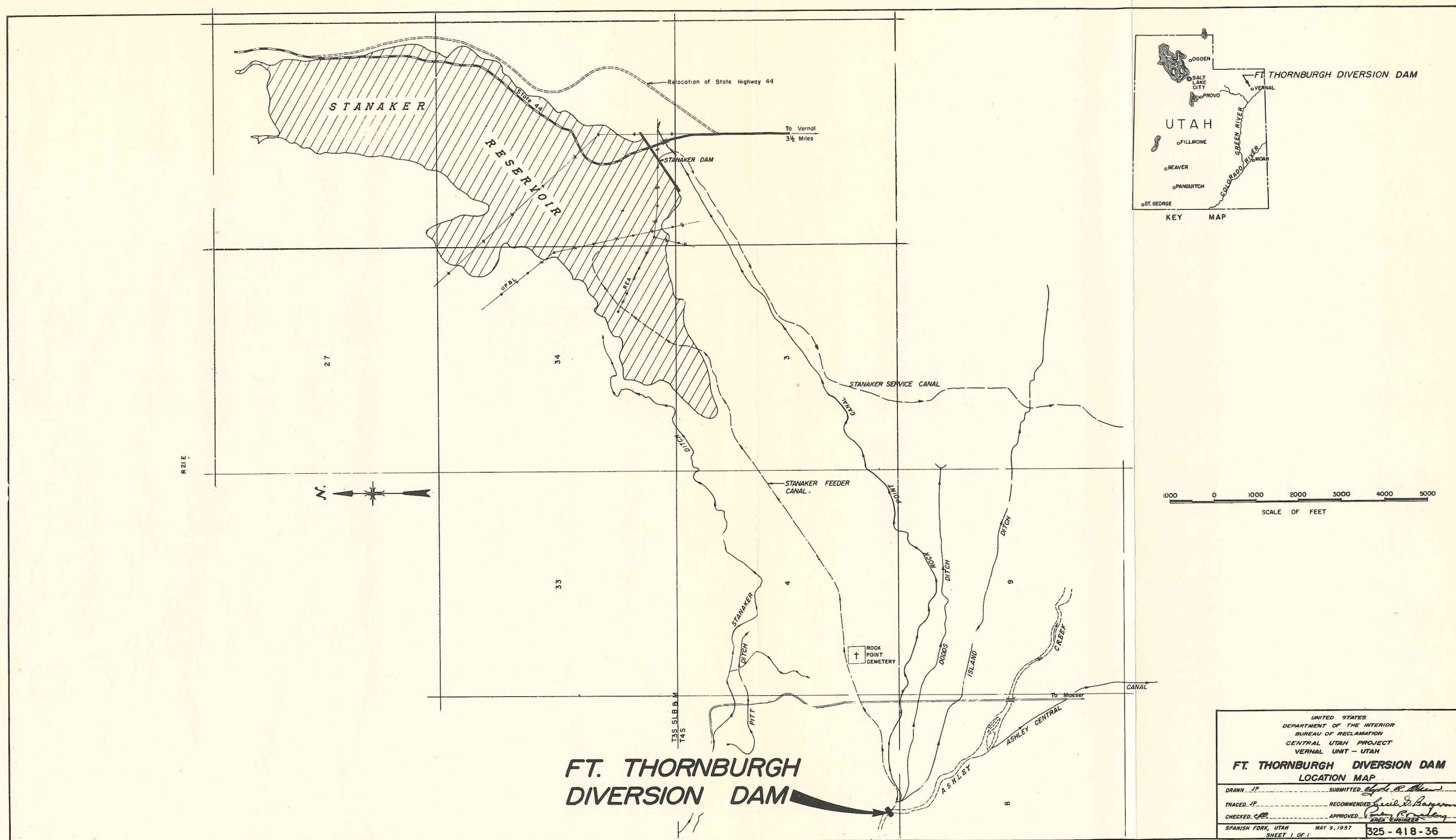
Summary of Design Data

Crest elevation of weir	5,606.0 msl
Crest length of weir	120 feet
Dike lengths	
Right side	370 feet
Left side	330 feet
Design flood, 50-year frequency	3,400 c.f.s.
Maximum water surface elevation	5,610.0 msl
Diversion capacity left side	680 c.f.s.
Estimated total construction cost	\$200,000

References

Preliminary Flood Frequency Study, Ashley Diversion Damsite, Salt Lake City, Utah. June 1950.

Preliminary feasibility design and estimate, Delegation No. 4-73, Salt Lake City, Utah, February 1957 transmitted to Assistant Commissioner and Chief Engineer's office and approved March 19, 1957.





BASIC ESTIMATE DC-1

DIVERSION DAMS

VERNAL UNIT
FORT THORNBURGH DIVERSION DAM

PROJECT CENTRAL UTAH
Date of Estimate January 1957
Prices as of January 1957

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. 1, PART 8, CHAPTER 8.8

Sheet 6 of 17 sheets
Property designation 02.01.30 & 35

PROPERTY CLASS	IDENTIFICATION	ACCOUNT	PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE OF CONSTRUCTION FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP.	TOTAL COST	TOTAL COST	TOTAL COST
					AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
02				DIVERSION DAMS																	
	01			FT. THORNBURGH DIVERSION DAM - Located on Ashley Creek about 4 miles northwest of Vernal, Utah. Would divert water from Ashley Creek into Stanaker Feeder canal, and existing Rock Point Diversion Preliminary estimate.												155,000	4,000	44,000	200,000		
		30		LAND AND RIGHTS - Land in area of dam and land for access road											1,000						
			1	Acquisition of rights-of-way	lump sum		1.8	850					1.8	850							
				Subtotal				850						850							
				Contingencies 15%										150							
				Field Cost 02.01.30										1,000							
		35		DAMS																	
				DAM AND SPILLWAY STRUCTURE - Compacted earth fill dam crest El. 5613.0, crest length 700 ft.; height above stream bed 12 ft.; uncontrolled rock fill weir spillway capacity 3,000 c.f.s. at El. 5610.0, weir length 120'; crest at El. 5606.0, headworks capacity 400 c.f.s. for Stanaker Feeder Canal controlled by a 20 ft. x 10 ft. radial gate and 280 c.f.s. for the Rock Point Diversion controlled by a 14 ft. x 10 ft. radial gate; sluiceway controlled by a 12 ft. x 11 ft. radial gate											144,000						
			1	Diversion and care of river during construction	lump sum		1.8	5,000					1.8	5,000							
			2	Excavation, common for rockfill diversion weir	4,200	cy	1.50	6,300					1.50	6,300							
			3	Excavation, common river channel	3,000	cy	.60	1,800					0.60	1,800							
			4	Excavation, common stripping under dike	650	cy	.60	390					0.60	390							
			5	Excavation, common structures	3,300	cy	1.50	4,950					1.50	4,950							
			6	Excavation, common Rock Pt. Diversion channel	1,000	cy	.60	600					0.60	600							
			7	Compacting embankment	2,200	cy	.30	660					0.30	660							
			8	Backfill about structures	1,050	cy	.50	525					0.50	525							
			9	Backfill for diversion weir	550	cy	.50	275					0.50	275							
			10	Compacting backfill	1,120	cy	3.50	3,920					3.50	3,920							
			11	Rockfill	2,150	cy	7.00	15,050					7.00	15,050							
			12	Gravel and sand bedding for rockfill	600	cy	6.00	3,600					6.00	3,600							
			13	Riprap	215	cy	8.00	1,720					8.00	1,720							
			14	Gravel bedding for riprap	90	cy	6.00	540					6.00	540							
			15	Concrete in walls, walkways, and wingwalls	205	cy	80.00	16,400					80.00	16,400							
			16	Concrete in floors and cutoffs	220	cy	60.00	13,200					60.00	13,200							
			17	Furnishing and placing reinforcement steel	51,000	lb.	0.18	9,180					0.18	9,180							
			18	Furnishing and handling cement	670	bbl	7.00	4,690					7.00	4,690							
			19	Gravel surfacing for dike	80	cy	6.00	480					6.00	480							
			20	Furnishing & installing radial gates & hoists	27,700	lbs	0.75	20,775					0.75	20,775							
			21	Furnishing & placing 9" rubber waterstop	180	l.f.	3.00	540					3.00	540							
			22	Furnishing & placing 1/2" elastic filler material	140	sq.ft.	1.50	210					1.50	210							

VERNAL UNIT
FORT THORNBURGH DIVERSION DAM

Sheet 7 of 17 sheets

Property designation 02.01.35 & 50

Property designation 02.01.35 & 50

24

DESIGNS AND ESTIMATES

CHAPTER IV

STANAKER FEEDER CANAL

Purpose

The Stanaker Feeder Canal will convey water from the Fort Thornburgh Diversion Dam on Ashley Creek to the off-stream Stanaker Reservoir as shown on Drawing No. 325-418-35 for storage and later release for irrigation uses in Ashley Valley.

Description

The canal will run in an easterly direction and have an overall length of 3.1 miles from the diversion dam to the storage reservoir. It will consist of 6,106 feet of earth-lined, 500 feet of concrete lined, 8,497 feet of unlined canal, and 739 feet of concrete drops. The capacity of the canal will be 400 second-feet. Near the reservoir three concrete control drops will be constructed in the feeder canal to convey the water to an elevation just above the maximum water surface elevation of the reservoir. Two concrete baffled-apron sections will be constructed to convey the water from the last drop into the reservoir when it is below maximum stage.

Adjacent to the headworks of the feeder canal and as a part of the diversion works there will be a headworks structure, having a capacity of 280 second-feet, for turning water into a section of an existing canal and division structure which serve the Ashley Central and Rock Point Canals and the Island and Dodds ditches. The flow will be measured through a parshall flume to be constructed in the existing canal section.

The major structures of the feeder canal will be constructed of reinforced concrete and precast concrete pipe. There will be irrigation crossing structures. Timber bridges will be constructed for county and farm road crossings. A modified parshall flume will be constructed in the canal near the headworks for measuring the flow. The lower bank of the canal will serve as a maintenance and operating road. Fencing will be provided along the canal right-of-way as required for public safety.

Geology

The canal will be located along the south flank of the Uinta Mountains. Auger test holes along the canal route disclose that the alluvium cover which is from 2 to 20 feet thick is underlaid with sandstone. The canal will require lining for the first half of its length to prevent excessive erosion and water losses by seepage.

Materials

Where the dominant fine sandy loams and silts from the canal excavation lack sufficient cohesiveness to be suitable material for unlined section or for a thick compacted lining, clayey materials from hillsides on the east and south of Stanaker Reservoir site will be available for blending with materials from the canal excavation for lining the canal. Materials from the canal excavation will be suitable in quality and sufficient in quantity for backfill required around the canal structures. Rock for riprap at the canal structures is available at the Stanaker Dam site.

Aggregates for concrete lining and structures may be obtained from tested deposits at Jensen, Utah, a distance of about 18 miles from the canal route.

Miscellaneous

Secondary roads in the area provide access to the canal route throughout its entire length. The nearest railheads are at Heber, Utah and Craig, Colorado. Truck lines serve the area and provide means of transporting construction materials and equipment to the work site. Electric power is available within the area. Housing for construction workers can be obtained in Vernal and nearby communities.

Cost Estimates

Based on January 1957 unit prices, the total estimated construction cost for the Stanaker Feeder Canal is \$570,000, which includes contingencies, construction facilities and other indirect costs. Quantities and unit costs for all items involved are contained in the Basic Estimate DC-1 and are included in the appendix following this narrative, along with the location map and the alignment and profile drawing for the feeder canal.

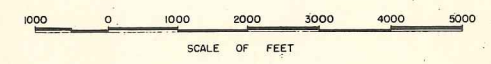
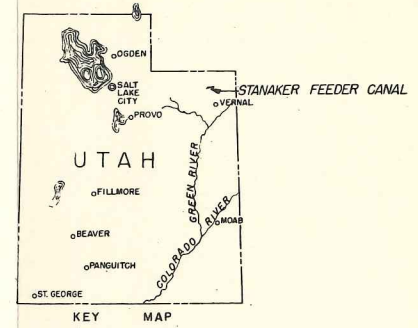
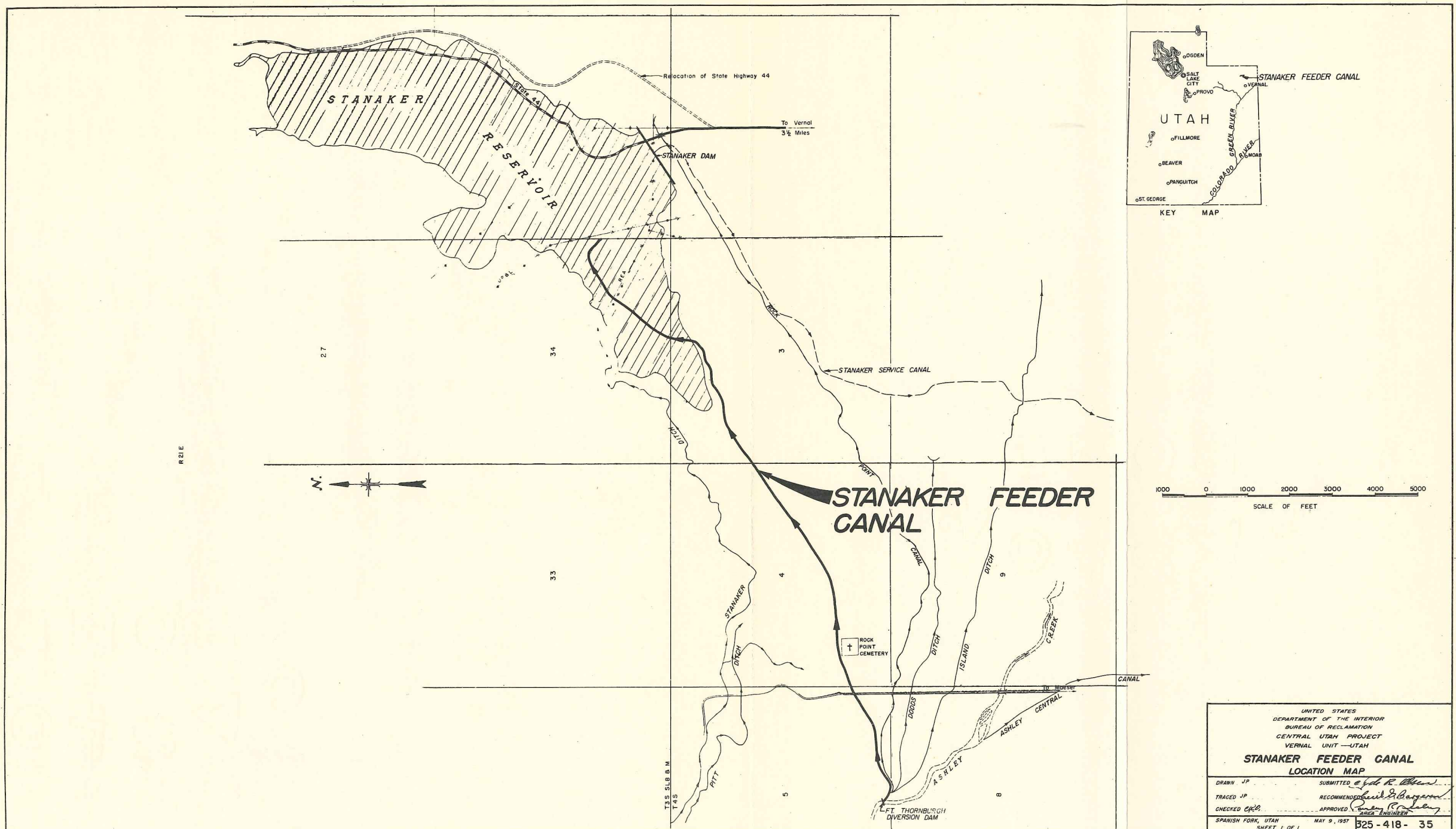
Summary of Design Data

Capacity of canal	400 cfs
Total length of canal	16,166 feet
Length of canal, earth lined	6,106 feet
Length of canal, concrete lined	500 feet
Length of unlined canal	8,497 feet
Length of concrete structures	1,063 feet
Total estimated construction cost	\$570,000

References

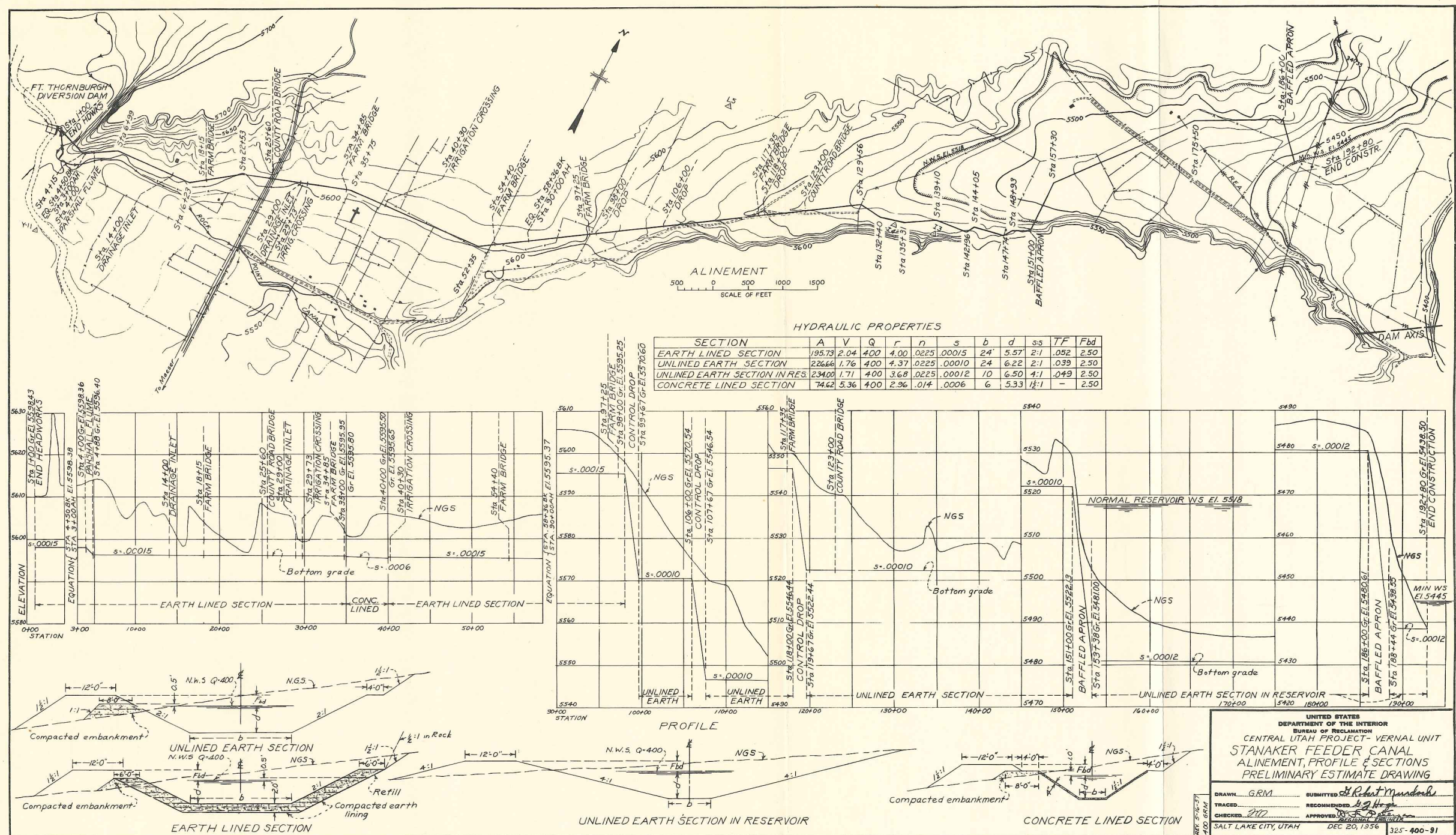
Reconnaissance Geology of the Stanaker Feeder Canal, Salt Lake City, Utah, January 1956.

Preliminary feasibility design and estimate, Stanaker Feeder Canal, Delegation No. 4-73, Salt Lake City, Utah, February 1957, approved by Assistant Commissioner and Chief Engineer March 19, 1957.



UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION CENTRAL UTAH PROJECT VERNAL UNIT — UTAH	
STANAKER FEEDER CANAL LOCATION MAP	
DRAWN <i>JP</i>	SUBMITTED <i>John R. Allen</i>
TRACED <i>JP</i>	RECOMMENDED <i>John R. Allen</i>
CHECKED <i>CKR</i>	APPROVED <i>John R. Allen</i>
SPANISH FORK, UTAH MAY 9, 1957 325-418- 35	
SHEET 1 OF 1	

INTERIOR — RECLAMATION, S.C. UTAH



UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
CENTRAL UTAH PROJECT - VERNAL UNIT
STANAKER FEEDER CANAL
ALIGNMENT, PROFILE & SECTIONS
PRELIMINARY ESTIMATE DRAWING

DRAWN: GRM
TRACED: [Signature]
CHECKED: [Signature]
SALT LAKE CITY, UTAH

SUBMITTED: [Signature]
RECOMMENDED: [Signature]
APPROVED: [Signature]
DEC 20, 1956

325-400-91

INTERIOR - RECLAMATION S.E.C. UTAH

CANALS AND CONDUITS

PROJECT CENTRAL UTAH
Date of Estimate January 1957
Prices as of January 1957
Sheet 13 of 17 sheets
Property designation 05.02.37

PROPERTY designation 05.02.37																						
PROPERTY				PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE CONSTRUCTION FACILITIES	INVESTIGATIONS ENTRY AND GENERAL EXP.	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT	AMOUNT			UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
05					CANALS AND CONDUITS (Cont.)																	
	02				STANAKER FEEDER CANAL (Cont.)																	
		37			CANAL STRUCTURES											190,000						
					PARSHALL FLUME - Throat Width 15 ft.																	
					Capacity 400 c.f.s.																	
			1		Excavation, rock for structure	1,726	cy	2.75	4,746					2.75	4,746							
			2		Backfill about structure	108	cy	.50	54					.50	54							
			3		Compacting backfill	73	cy	3.50	256					3.50	256							
			4		Concrete in structure	80	cy	80.00	6,400					80.00	6,400							
			5		Furnishing and placing reinforcement steel	3,000	lbs	.18	1,440					.18	1,440							
			6		Furnishing and handling cement	112	bbls	7.00	784					7.00	784							
			7		Riprap	53	cy	5.00	265					5.00	265							
			8		Gravel bedding	27	cy	4.00	108					4.00	108							
					Subtotal				11,053						11,053							
					Contingencies 15% /										1,647							
					Field Cost - PARSHALL FLUME										16,000							
					CONCRETE DROPS - 3 Required; width 20 ft.; capacity 400 c.f.s.; 24 ft. / drop																	
			9		Excavation, common for structures	4,500	cy	1.50	6,750					1.50	6,750							
			10		Backfill about structures	1,200	cy	.50	600					.50	600							
			11		Compacting backfill	600	cy	3.50	2,100					3.50	2,100							
			12		Concrete in structures	516	cy	80.00	41,280					80.00	41,280							
			13		Furnishing and placing reinforcement steel	61,800	lbs	.18	11,124					.18	11,124							
			14		Furnishing and handling cement	774	bbls	7.00	5,418					7.00	5,418							
			15		Riprap	255	cy	5.00	1,275					5.00	1,275							
			16		Gravel bedding	84	cy	4.00	336					4.00	336							
					Subtotal				68,883						68,883							
					Contingencies 15% /										12,117							
					Field Cost - CONCRETE DROPS										81,000							
					BAFFLED APRONS - 2 Required; Width 23 ft.; capacity 400 c.f.s.; 42 ft. / drop																	
			17		Excavation, common for structures	4,200	cy	1.50	6,300					1.50	6,300							
			18		Backfill about structures	2,100	cy	.50	1,050					.50	1,050							
			19		Compacting backfill	625	cy	3.50	2,188					3.50	2,188							
			20		Concrete in structures	580	cy	80.00	46,400					80.00	46,400							
			21		Furnishing and placing reinforcement steel	70,000	lbs.	.18	12,600					.18	12,600							
			22		Furnishing and handling cement	870	bbls	7.00	6,090					7.00	6,090							
			23		Riprap	582	cy	5.00	2,910					5.00	2,910							
			24		Gravel bedding	290	cy	4.00	1,160					4.00	1,160							
					Subtotal				78,698						78,698							
					Contingencies 15% /										13,302							
					Field Cost - BAFFLED APRONS										92,000							
																				</		

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X; PART 3, CHAPTER 8.8

CANALS AND CONDUITS

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DESIGNS AND ESTIMATES

CHAPTER V

STANAKER SERVICE CANAL

Purpose

The Stanaker Service Canal will convey irrigation water from the Stanaker Reservoir as shown on Drawing no. 325-418-37 to about 9,620 acres of irrigated lands below the canal and provide exchange water for an additional 5,402 acres above the canal.

Description

The Service Canal will begin at the outlet works of Stanaker Dam located 3.5 miles north of Vernal, Utah, and will extend about 11.8 miles in a southerly direction. The canal will serve lands in Ashley Valley near Vernal. The initial section of the canal, a short reach 199 feet long, will have a capacity of 300 second-feet. At the end of the reach the canal capacity will be reduced to 240 second-feet because of a lateral turnout. The capacity of the canal will decrease as it continues toward its lower end because of the irrigation turnouts. The terminus reach of the canal will have a capacity of 20 second-feet.

The outlet of Stanaker Dam will serve as a wasteway to draw off the reservoir surcharge for the design flood. The surcharge water will be carried by the Service Canal to Ashley Creek, where a wasteway structure will be provided for discharge of the flows into the creek. The main canal will cross under Ashley Creek as a siphon and discharge into open channel to serve the remaining canal below the creek.

The first 2,889 feet of the canal will have a concrete lining. From the downstream end of the concrete lining, where irrigation demands begin, the canal section has been designed for the normal water surface and bottom grade to be at the highest practicable elevations in order to deliver water to the adjacent lands. Profile and sections of the Canal are shown on Drawing no. 325-418-40.

Except at the upper end where it has concrete lining, the canal will be earth lined in some reaches and unlined in other reaches. An operating road will be provided along the embankment for the entire length of the canal.

A four stranded barbed wire fence will be constructed along the right-of-way boundaries of the canal. A two-lane, H-20 loading, timber highway bridge will be provided for crossing U. S. Highway 40. County road and farm bridges also will be constructed of timber. Farm turnouts will be of reinforced concrete and include provisions for measurement of water through them.

Geology

Ashley Valley lies on the south flank of the Uinta Mountains and is eroded into the beds of soft Mancos shale which were tilted and exposed during the rise of the anticline that forms the Uinta Mountains. The valley floor later covered in large part by coarse gravel and cobble has more recently been covered by a soil mantle of alluvial origin varying in depth from 0 to about 20 feet. It is in this soil mantle and coarse gravel and cobble layers that the Stanaker Service Canal will be constructed.

The gravel consists of water-borne, rounded to subangular quartzite boulders from the Uinta pre-Cambrian series in a sand matrix plus rocks from other formations exposed by earlier erosion. The soil mantle capping the gravel consists largely of alluvial deposits transported by numerous streams emerging from the south flank of the Uinta Mountains. It is composed of the finer materials, namely clays, silts, sand and gravels of the Uinta range.

Materials

The fine sandy loams and silts from the canal excavation will require additions of clayey materials and blending to provide sufficient cohesiveness to be suitable material for the thick compacted earth lining required for the canal where the excavation is in gravel and cobble. Clayey materials for the lining are available on the east and south side slopes of the basin forming Stanaker Reservoir site. Riprap can be obtained from the cobble excavation or from the available sources at the Stanaker Dam site.

Aggregates for concrete in the structures may be obtained from tested deposits at Jensen, Utah, a distance of about 15 miles from the Stanaker Service Canal.

Miscellaneous

Primary and secondary roads cross the area, making possible transportation of construction materials and equipment by trucks. Power and telephone facilities are available in the area. Housing for construction workers will be available in Vernal and nearby communities.

Cost Estimates

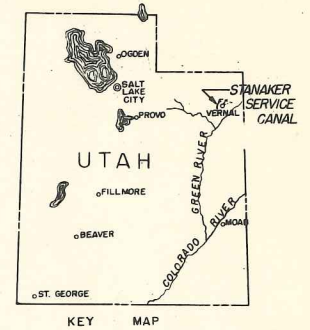
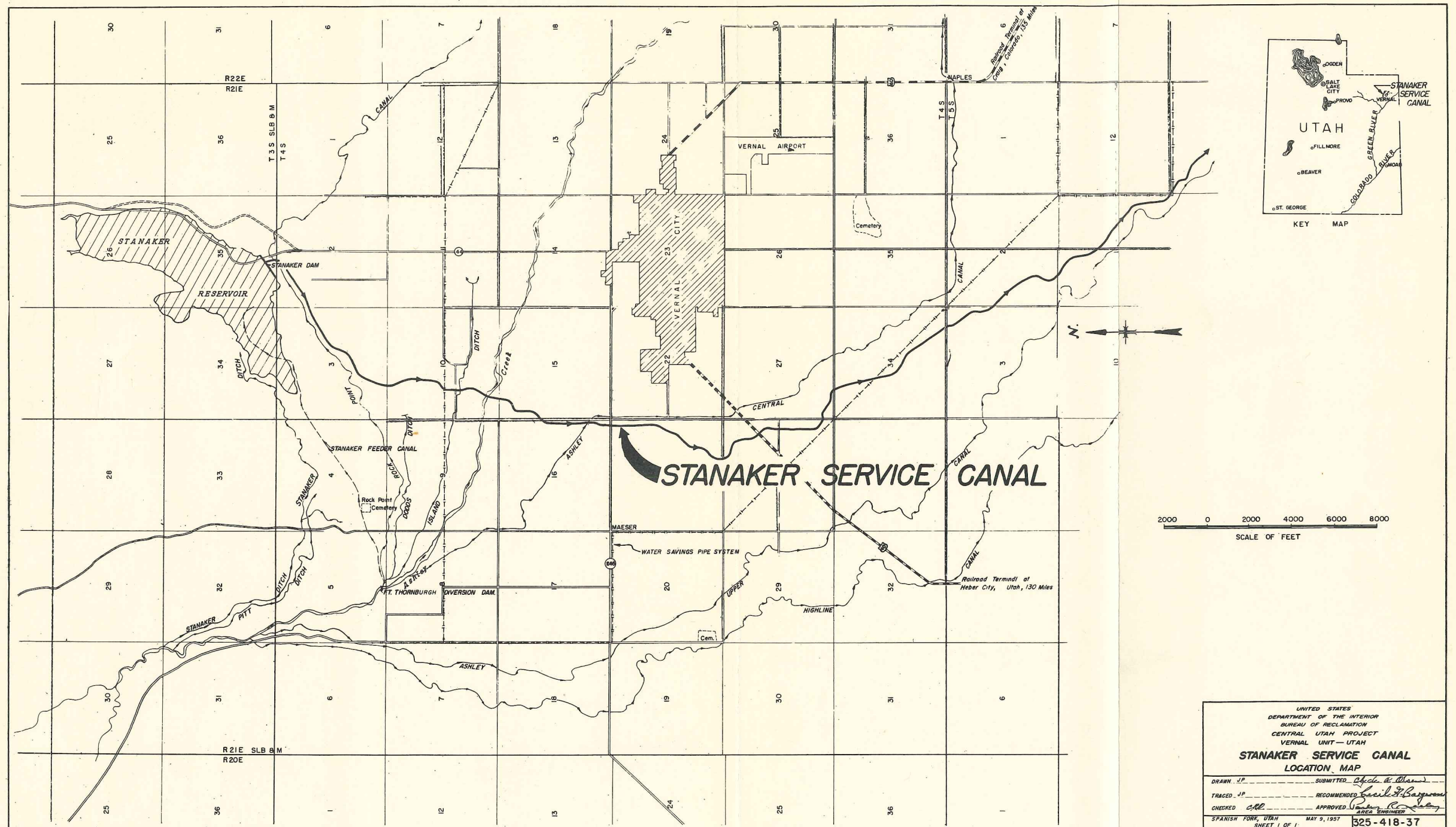
Based on January 1957 unit prices, the total estimated construction cost for the Stanaker Service Canal is \$1,060,000, which includes contingencies, construction facilities, and other indirect costs.

Summary of Design Data

Initial capacity	300	cfs
Ashley Creek siphon	210	cfs
Capacity below Ashley Creek siphon	210	cfs
Total length of canal	11.8	miles
Length of concrete lined canal	.51	miles
Length of earth lined canal	3.5	miles
Length of unlined canal	7.8	miles
Estimated total construction costs	\$1,060,000	

Reference

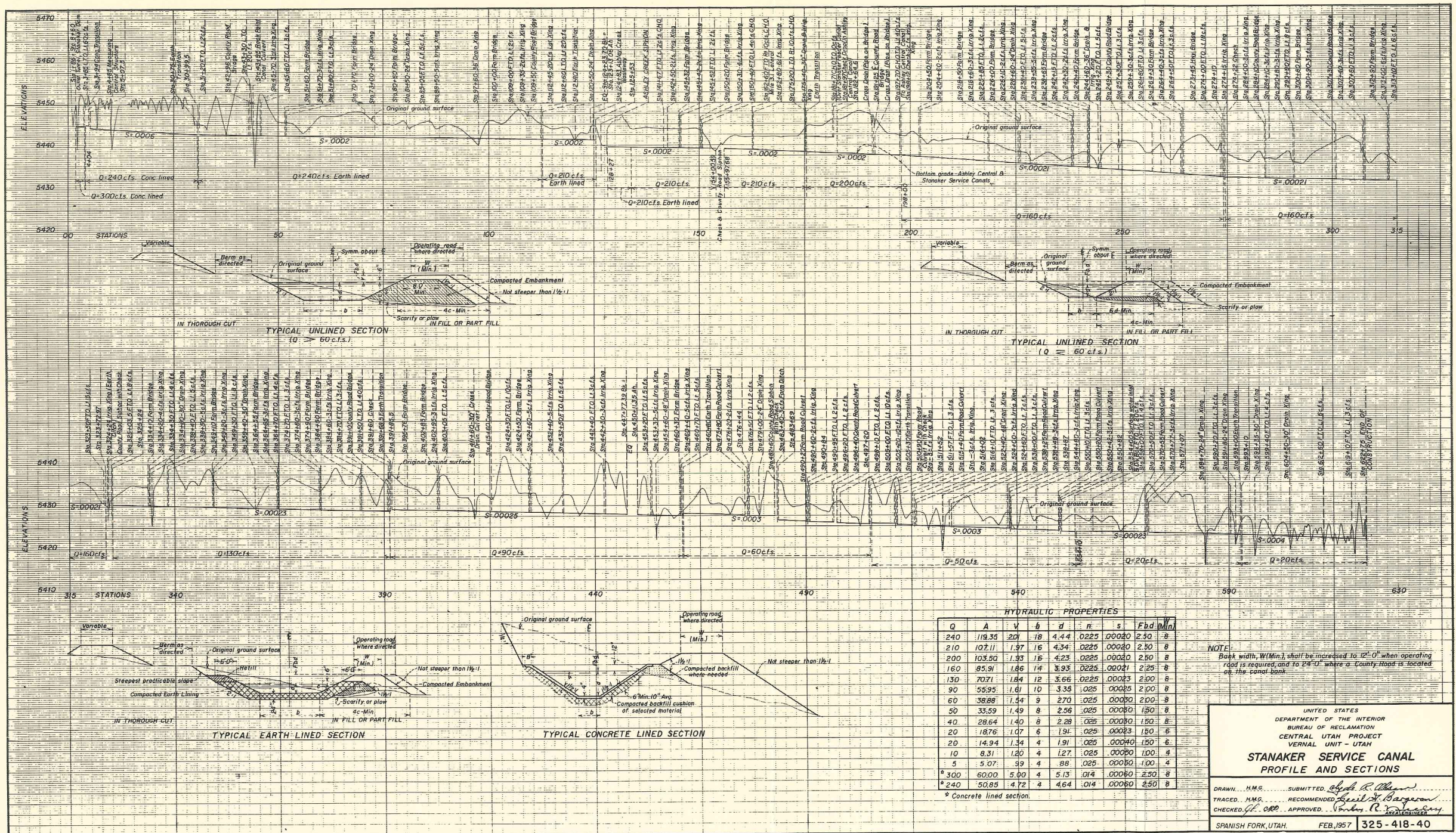
Preliminary feasibility design and estimate, Stanaker Service Canal, Delegation No. 4-73, Salt Lake City, Utah, February 1957 approved by the Assistant Commissioner and Chief Engineer, April 8, 1957, and April 25, 1957.



2000 0 2000 4000 6000 8000
SCALE OF FEET

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION CENTRAL UTAH PROJECT VERNAL UNIT — UTAH	
STANAKER SERVICE CANAL LOCATION MAP	
DRAWN <i>J.P.</i>	SUBMITTED <i>Edith A. Mason</i>
TRACED <i>J.P.</i>	RECOMMENDED <i>Lucile S. Baggett</i>
CHECKED <i>ALL</i>	APPROVED <i>Robert R. [Signature]</i>
SPANISH FORK, UTAH SHEET 1 OF 1	MAY 9, 1957 325-418-37

INTERIOR — RECLAMATION, U.S. UTAH



CANALS AND CONDUITS

VOL. X, PART 8, CHAPTER 8.8																						
PROPERTY				PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE CONSTRUCTION FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT	AMOUNT			UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES	
					2	3	4	5	6	7	8	9	10	11	12	13	14					
05	01				CANALS AND CONDUITS											810,000	24,000	226,000	1,060,000	1,060,000		
					STANAKER SERVICE CANAL - Includes 0.51 miles of concrete lined section and 11.3 miles earth canal varying in size from 300 c.f.s. to 20 c.f.s. The canal would begin at the end of the Stanaker Dam outlet works and flows in a general southerly direction through existing farm lands, passing one half mile west of Vernal, Utah. It would provide supplemental water to presently irrigated lands. The first 3.2 miles of the earth canal would have earth lining.																	
				30	LAND AND RIGHTS - Includes land along the center line of the canal varying in width from 100 to 60 ft.											31,000						
				1	Irrigated farm lands	75	acre	250.00	18,750				250.00	18,750								
				2	Irrigated pasture lands	20	acre	150.00	3,000				150.00	3,000								
				3	Non-irrigated pasture lands	15	acre	100.00	1,500				100.00	1,500								
				4	Residence and barnyard areas	10	acre	400.00	4,000				400.00	4,000								
					SUBTOTAL				27,250					27,250								
					Contingencies 15%									3,750								
					Field Cost 05.01.30									31,000								
				31	RELOCATION OF EXISTING PROPERTY - Farm and county road crossings and irrigation ditch crossings.											163,000						
					COUNTY ROAD BRIDGES																	
				1	Excavation for structures	1,040	c.y.	1.50	1,560				1.50	1,560								
				2	Backfill	870	c.y.	.50	435				.50	435								
				3	Compacting backfill	870	c.y.	3.50	3,045				3.50	3,045								
				4	Concrete in structures	65	c.y.	80.00	5,200				80.00	5,200								
				5	Furnishing and handling cement	98	bbf.	7.00	686				7.00	686								
				6	Furnishing and placing reinforcement steel	5,200	lbs.	.18	936				0.18	936								
				7	Furnishing and erecting timber in structures	91,500	fbm	.30	27,480				0.30	27,480								
					FARM ROAD BRIDGES																	
				8	Excavation for structures	1,100	c.y.	1.50	1,650				1.50	1,650								
				9	Backfill	1,430	c.y.	.50	715				.50	715								
				10	Compacting backfill	1,430	c.y.	3.50	5,005				3.50	5,005								
				11	Concrete in structures	120	c.y.	80.00	9,600				80.00	9,600								
				12	Furnishing and handling cement	180	bbf.	7.00	1,260				7.00	1,260								
				13	Furnishing and placing reinforcement steel	10,500	lbs.	.18	1,890				.18	1,890								
				14	Furnishing and erecting timber in structures	147,200	fbm	.30	44,160				0.30	44,160								
					COUNTY ROAD CULVERT																	
				15	Excavation for structures	140	c.y.	1.50	210				1.50	210								
				16	Backfill	180	c.y.	.50	90				.50	90								
				17	Compacting backfill	180	c.y.	3.50	630				3.50	630								
				18	60 in. dia. extra strength concrete culvert pipe	60	l.f.	32.00	1,920				32.00	1,920								
				19	Riprap	20	c.y.	5.00	100				5.00	100								
																38						

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

BASIC ESTIMATE DC-1

CANALS AND CONDUITS

VERNAL UNIT
STANAKER SERVICE CANAL

PROJECT CENTRAL UTAH
Date of Estimate January 29, 1957
Prices as of January 1, 1957
Sheet 9 of 17 sheets
Property designation 05.01.31 and 32

PROPERTY			PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	FIELD COST	SERVICE CONSTRUCTION	INVEST'GNS ENGR'G. AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT			AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS
				2	3	4		5		6		7		8	9	10	11	12	13	14		
05	01			STANAKER SERVICE CANAL (Cont.)																		
		31		RELOCATION OF EXISTING PROPERTY (Cont.)																		
				FARM ROAD CULVERTS																		
			20	Excavation for structures	560	c.y.	1.50	840					1.50	840								
			21	Backfill	870	c.y.	.50	435					.50	435								
			22	Compacting backfill	870	c.y.	3.50	3,045					3.50	3,045								
			23	60-in. dia. Std. strength culvert pipe Type B Joints	42	l.f.	40.00	1,680					40.00	1,680								
			24	54-in. dia. Std. strength culvert pipe Type B Joints	144	l.f.	30.00	4,320					30.00	4,320								
			25	36-in. dia. Std. strength culvert pipe Type B Joints	32	l.f.	16.00	512					16.00	512								
			26	Riprap	130	c.y.	5.00	650					5.00	650								
				IRRIGATION CROSSINGS - CONCRETE PIPE																		
			27	Excavation for structures	1,120	c.y.	1.50	1,680					1.50	1,680								
			28	Backfill	400	c.y.	.50	200					.50	200								
			29	Compacting backfill	400	c.y.	3.50	1,400					3.50	1,400								
			30	18 in. dia. Concrete pipe, Type B Joints	816	l.f.	6.00	4,896					6.00	4,896								
			31	18 in. dia. 7 1/2° precast bends	30	ea.	30.00	900					30.00	900								
			32	24 in. dia. Concrete pipe, Type B Joints	50	l.f.	12.00	600					12.00	600								
			33	24 in. dia. 7 1/2° precast bends	3	ea.	60.00	180					60.00	180								
			34	30 in. dia. Concrete pipe, Type B Joints	80	l.f.	17.00	1,360					17.00	1,360								
			35	30 in. dia. 7 1/2° precast bends	3	ea.	80.00	240					80.00	240								
			36	Riprap	20	c.y.	5.00	100					5.00	100								
			37	Concrete in structures	2	c.y.	80.00	160					80.00	160								
			38	Furnishing and handling cement	3	bbf.	7.00	21					7.00	21								
			39	Furnishing and placing reinforcement steel	200	lbs.	.18	36					.18	36								
				IRRIGATION CROSSINGS - STEEL PIPE																		
			40	Excavation for structures	250	c.y.	1.50	375					1.50	375								
			41	Backfill	180	c.y.	.50	90					.50	90								
			42	Compacting backfill	180	c.y.	3.50	630					3.50	630								
			43	Furnishing and placing 12-in. dia. 10 ga. W.S.P.As. Ctd. 26,200#	1,260	l.f.	5.50	6,930					5.50	6,930								
			44	Furnishing and placing 12-in. dia. 7 ga. W.S.P. As. Ctd. 3,300#	172	l.f.	7.00	1,204					7.00	1,204								
			45	Furn. & Placing 18-in. dia. 10 ga. W.S.P. As. Ctd. 13,000#	70	l.f.	8.50	595					8.50	595								
				SUBTOTAL				139,651						139,651								
				Contingencies 15% /										23,349								
				Field Cost 05.01.31										163,000								
		33		STRUCTURES AND IMPROVEMENTS											40,000							
			1	Furnishing and constructing cattle guards	12	ea.	500.00	6,000					500.00	6,000								
			2	Furnishing and erecting protective fences	200	l.f.	2.00	400					2.00	400								
			3	Furnishing and erecting right-of-way fences	20	mi.	1,100.00	22,000					1,100.00	22,000								
				SUBTOTAL				34,400						34,400								
				Contingencies 15% /										5,600								
				Field Cost 05.01.33										40,000								

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BASIC ESTIMATE DC-1

CANALS AND CONDUITS

VERNAL UNIT
STANAKER SERVICE CANAL

PROJECT CENTRAL UTAH
Date of Estimate January 29, 1957
Prices as of January 1, 1957
Sheet 10 of 17 sheets
Property designation 05.01.36 & 37

PROPERTY			PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP.	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTI- FICATION	ACCOUNT		AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
05	01		STANAKER SERVICE CANAL (Cont.)																	
		36	WATERWAYS																	
			CONCRETE LINED SECTION STA. 1/21 to Sta. 30/75																	
		1	Excavation rock for canal	25,000	c.y.	1.50	37,500					1.50	37,500							
		2	Preparing rock foundation for concrete lining	10,200	s.y.	1.50	15,300					1.50	15,300							
		3	Concrete in canal lining	943	c.y.	40.00	37,720					40.00	37,720							
		4	Furnishing and handling cement	1,415	bb1.	7.00	9,905					7.00	9,905							
		5	Furnishing and placing reinforcement steel	103,000	lb.	.18	18,540					.18	18,540							
		6	EARTH CANAL STA. 30/75 to STA. 622/75																	
		6	Excavation common for canal	320,000	c.y.	.30	96,000					.30	96,000							
		7	Filling abandoned part of Ashlay Central Canal	80,000	c.y.	.30	24,000					.30	24,000							
		8	Placing and compacting earth lining	68,000	c.y.	.50	34,000					.50	34,000							
		9	Blending earth lining materials	34,000	c.y.	.15	5,100					.15	5,100							
		10	Compacting embankments	36,000	c.y.	.25	9,000					.25	9,000							
		11	Excavation from stockpiles for embankments	10,000	c.y.	.20	2,000					.20	2,000							
		12	Overhaul	50,000	M.c.y.	.25	12,500					.25	12,500							
			SUBTOTAL				301,565						301,565							
			Contingencies 16% /										48,435							
			Field Cost 05.01.36										350,000							
		37	CANAL STRUCTURES - Includes Siphons, Checks & Turnouts																	
		1	Excavation for structures	9,400	c.y.	1.50	14,100					1.50	14,100							
		2	Backfill	7,400	c.y.	.50	3,700					.50	3,700							
		3	Compacting backfill	2,500	c.y.	3.50	8,750					3.50	8,750							
		4	Sand & gravel bedding for riprap	130	c.y.	4.00	520					4.00	520							
		5	Riprap	480	c.y.	5.00	2,400					5.00	2,400							
		6	Concrete in structures	510	c.y.	80.00	40,800					80.00	40,800							
		7	Furnishing and handling cement	870	bb1.	7.00	6,090					7.00	6,090							
		8	Furnishing and placing reinforcement steel	51,000	lb.	.18	9,180					.18	9,180							
		9	Furnishing and laying 15-in. dia. Conc. Pipe Type B Joints	590	l.f.	5.00	2,950					5.00	2,950							
		10	" " " 18-in. dia.	310	l.f.	6.00	1,860					6.00	1,860							
		11	" " " 24-in. dia. HC 50 Conc. pipe Type R	274	l.f.	15.00	4,110					15.00	4,110							
		12	" " " 30-in. dia.	240	l.f.	20.00	4,800					20.00	4,800							
		13	" " " 36-in.	34	l.f.	25.00	850					25.00	850							
		14	" " " 42-in.	134	l.f.	30.00	4,020					30.00	4,020							
		15	" " " 60-in.	90	l.f.	50.00	4,500					50.00	4,500							
		16	" " " 66-in.	225	l.f.	57.00	12,825					57.00	12,825							
		17	" " " 72-in.	120	l.f.	64.00	7,680					64.00	7,680							
		18	Fabricating bands in 30-in. dia. conc. pipe	2	ea.	150.00	300					150.00	300							
		19	" " " 42-in.	2	ea.	300.00	600					300.00	600							
		20	" " " 60-in.	2	ea.	500.00	1,000					500.00	1,000							
		21	" " " 66-in.	2	ea.	600.00	1,200					600.00	1,200							
		22	" " " 72-in.	2	ea.	700.00	1,400					700.00	1,400							
		23	Furnishing & installing 15-in. dia. C.I. slide gates	26	ea.	75.00	1,950					75.00	1,950							
		24	" " " 18-in.	12	ea.	100.00	1,200					100.00	1,200							
		25	" " " 24-in.	9	ea.	150.00	1,350					150.00	1,350							
		26	" " " 30-in.	1	ea.	200.00	200					200.00	200							
		27	" " " 36-in.	4	ea.	300.00	1,200					300.00	1,200							

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BASIC ESTIMATE DC-1

CANALS AND CONDUITS

VERNAL UNIT
STANAKER SERVICE CANAL

PROJECT CENTRAL UTAH
Date of Estimate January 29, 1957
Prices as of January 1, 1957
Sheet 11 of 17 sheets
Property description 05.01.37 & 38

PROPERTY CLASS	IDENTIFICATION	ACCOUNT	PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	Service CONSTRUCTION FACILITIES	INVEST'GNS ENGR'G. AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
					AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
				2	3		4		5		6		7		8	9	10	11	12	13	14
05	01			STANAKER SERVICE CANAL (Cont.)																	
			37	CANAL STRUCTURES (Cont.)																	
			28	Furnishing & installing 42-in. dia. C.I. slide gates	1	ea.	400.00	400					400.00	400							
			29	Furnishing & installing 24"x24" slide gates	38	ea.	140.00	5,320					140.00	5,320							
			30	" " " 30"x24"	10	ea.	160.00	1,600					160.00	1,600							
			31	" " " 36"x30"	2	ea.	180.00	360					180.00	360							
			32	" " " 36"x36"	3	ea.	210.00	630					210.00	630							
			33	" " " 60"x36"	2	ea.	300.00	600					300.00	600							
			34	" " " 60"x60"	1	ea.	500.00	500					500.00	500							
			35	Furnishing & installing miscellaneous metalwork	4,000	lb.	.75	3,000					.75	3,000							
			36	Furnishing & erecting timber in structures	4,200	fbm	.30	1,260					.30	1,260							
				SUBTOTAL				153,205						153,205							
				Contingencies										22,795							
				Field Cost 05.01.37										176,000							
			38	CANAL PROTECTIVE WORKS - Culverts & Wasteway											50,000						
			1	Excavation for structures	2,350	c.y.	1.50	3,525					1.50	3,525							
			2	Backfill	2,390	c.y.	.50	1,195					.50	1,195							
			3	Compacting backfill	2,300	c.y.	3.50	8,050					3.50	8,050							
			4	Concrete in structures	60	c.y.	80.00	4,800					80.00	4,800							
			5	Furnishing and handling cement	90	bbl.	7.00	630					7.00	630							
			6	Furnishing & placing reinforcement steel	6,000	lb.	.18	1,080					.18	1,080							
			7	Gravel bedding under riprap	37	c.y.	4.00	148					4.00	148							
			8	Riprap	155	c.y.	5.00	775					5.00	775							
			9	Furnishing & laying 24-in. dia. Conc. Pipe Type B	430	l.f.	8.00	3,440					8.00	3,440							
			10	" " " 30-in.	514	l.f.	12.00	6,168					12.00	6,168							
			11	" " " 36-in.	72	l.f.	16.00	1,152					16.00	1,152							
			12	" " " 48-in.	150	l.f.	22.00	3,300					22.00	3,300							
			13	Furnishing & placing 24-in. dia. Prec. Conc. transitions	12	ea.	140.00	1,680					140.00	1,680							
			14	" " " 30-in.	14	ea.	200.00	2,800					200.00	2,800							
			15	" " " 36-in.	2	ea.	280.00	560					280.00	560							
			16	" " " 48-in.	4	ea.	400.00	1,600					400.00	1,600							
			17	Furnishing & placing miscellaneous metalwork	290	lb.	.80	232					.80	232							
			18	Furnishing & installing radial gate & hoist	1,017	lb.	1.00	1,017					1.00	1,017							
			19	Furnishing & placing 30" dia. 7 Ga. steel pipe 100 lf	6,000	lb.	.30	1,800					.30	1,800							
				SUBTOTAL				43,952						43,952							
				Contingencies 15% /										6,058							
				Field Cost 05.01.38										50,000							
				SERVICE FACILITIES													(24,000)				
				PROJECT INVESTIGATIONS														(24,000)			
				DESIGN AND SPECIFICATIONS														(81,000)			
				CONSTRUCTION & ENGINEERING SUPERVISION														(105,000)			
				GENERAL SERVICES														(16,000)			
				05.01																	

DESIGNS AND ESTIMATES

CHAPTER VI

WATER SAVINGS PIPE SYSTEM

Purpose

The water savings pipe system will provide for conveying fall and winter water for livestock to the rural areas of Ashley, Glines, Naples and Davis in the vicinity of Vernal City in exchange for flows of Ashley Creek which are diverted to Stanaker Reservoir. The system will replace the present practice of dividing the nonirrigation season flow of Ashley Creek among the various irrigation canals for conveyance to places of livestock watering.

Description

The water savings pipe system will begin at an existing division structure that is located approximately 4 miles northwest of Vernal City on a 12-inch pipeline belonging to the City. Water for the system will be obtained from the 12-inch pipeline that begins at Ashley Spring and conveys water to the Vernal City area.

The system will be constructed of welded steel pipe, asphalt dipped and wrapped with a protective coating. The pipe will vary in size from an 8-inch to 4-inch outside diameter. The total required flow for the system will be carried from the division structure to Station 36/20 North of Vernal, where a turnout and lateral system for the Ashley area will take off. This lateral system will all be of 4-inch pipe. The main system will continue in a southerly direction with decreasing capacity to the end of the system. Pressure reducing valves will be installed along the system with an outlet pressure of 50 psi maximum to maintain static pressure on the pipe so that it will not exceed 100 psi at any point on the system.

The construction of sublaterals and individual service connections have not been included in the system. It is intended that such work will be handled by the district operating the pipeline.

Further details on location, profile and cost are shown on Drawings nos. 325-418-41 and 325-418-39.

Geology

The water savings pipe system will traverse the soil mantle and gravel and cobble layers which cover the Ashley Valley floor. The gravel

consists of water-borne, rounded to subangular quartzite boulders from the Uinta pre-Cambrian series in a sand matrix plus rocks from other formations exposed by earlier erosion. The soil mantle capping the gravels consists largely of alluvial deposits transported by the numerous streams emerging from the south flank of the Uinta Mountains. It is composed of the finer materials, namely silts, sands, clays, and gravels of the Uinta Mountains.

Materials

The finer materials of the water savings pipe system excavation will be suitable and in sufficient quantity for the backfill around the pipe and structures. No additional earth material will be required.

Aggregates for concrete in the pipeline structures may be obtained from tested deposits at Jensen, Utah, a distance of about 18 miles from the location of the system.

Miscellaneous

Primary and secondary roads cross the area, which will facilitate the transportation of construction materials and equipment. A large percentage of the construction will be along existing right-of-way of Uintah County roads. Electric power and telephone facilities are available in the area. Housing for construction workers will be available in Vernal and surrounding communities.

Cost Estimates

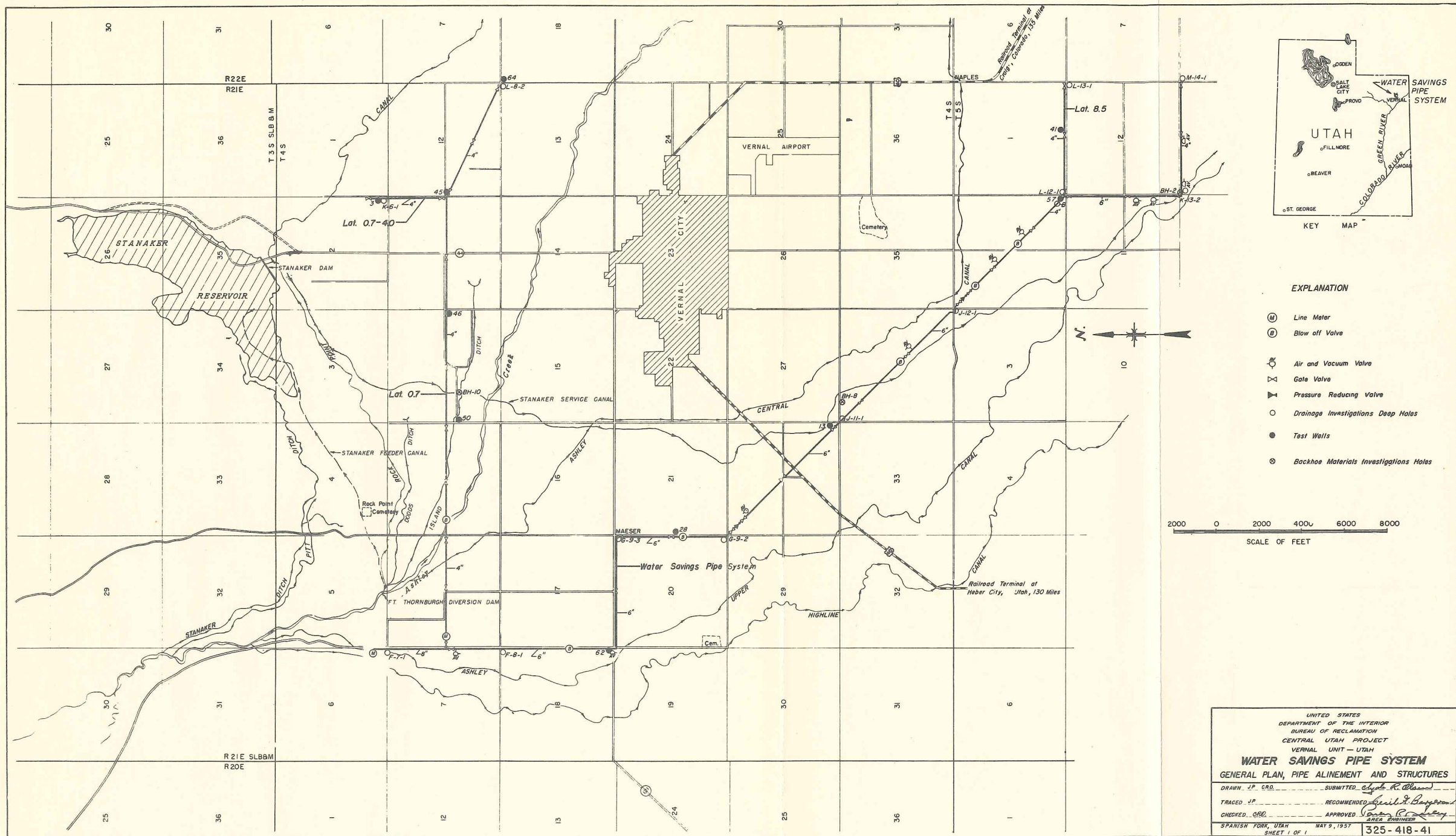
Based on January 1, 1957, unit prices, the total estimated construction cost for the water savings pipe system is \$340,000 which includes contingencies, construction facilities, and other indirect costs.

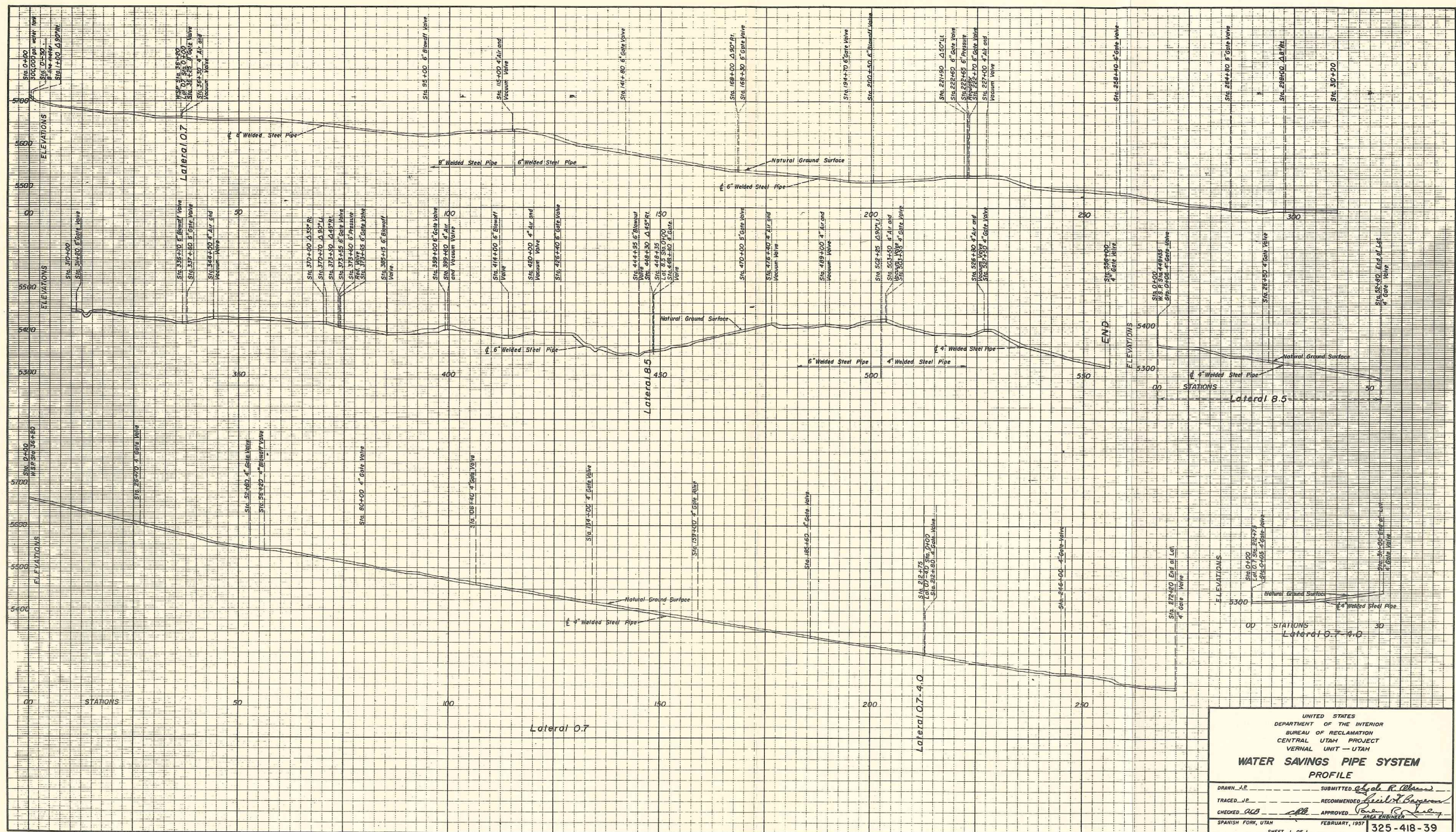
Summary of Design Data

Type - Welded steel pipe wrapped and dipped
Length - 91,200 feet
Capacity - 289 to 40 gpm
Head - Min. operating head at design capacity - 20 psi
Total estimated construction cost \$340,000

References

Preliminary feasibility design and estimate, water savings pipe system, Delegation 4-73A - Spanish Fork Development Office, revised by letter of March 14, 1957. Approved by the Assistant Commissioner and Chief Engineer, April 19, 1957.





UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF RECLAMATION CENTRAL UTAH PROJECT VERNAL UNIT - UTAH	
WATER SAVINGS PIPE SYSTEM PROFILE	
DRAWN BY	SUBMITTED <i>Charles R. Blum</i>
TRACED BY	RECOMMENDED <i>Frederick J. Bergeron</i>
CHECKED <i>WLB</i>	APPROVED <i>WLB</i>
SPANISH FORK, UTAH	FEBRUARY, 1957
SHEET 1 OF 1	325-418-39

INTERIOR - RECLAMATION, S.C. UTAH

INSTRUCTIONS FOR USE OF THIS
FORM ARE CONTAINED IN MANUAL
VOL. X, PART 8, CHAPTER 8.8

Prepared -- Spanish Fork Development Office - 1-25-57
Revised -- Spanish Fork Development Office - 3-11-57 C.R.O.
Revised -- Assistant Commissioner and Chief Engineer's
letter - April 19, 1957. -- C.R.O.

BASIC ESTIMATE DC-1

CANALS AND CONDUITS

VERNAL UNIT
WATER SAVING PIPE SYSTEM
Comp. by C.R.O. 1-24-57
Check by S.M.J. 1-25-57

PROJECT CENTRAL UTAH
Date of Estimate January 1957
Prices as of January 1957
Sheet 15 of 17 sheets
Property designation 05.03.30 & 35

PROPERTY			PAY ITEM	PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	SERVICE FACILITIES	INVEST'GNS ENGR'G AND GEN'L EXP	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT			AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY
				2	3		4		5		6		7		8	9	10	11	12	13	14
05				CANALS AND CONDUITS																	
	03			WATER SAVING PIPE SYSTEM -- A livestock winter watering system to serve Ashley Valley except for incorporated areas, the total approximate length of 17 miles of welded steel pipe, dipped and wrapped.												261,000	8,000	71,000	340,000		
		30		LAND AND LAND RIGHTS -- A right-of-way 10 feet wide for maintenance and construction											4,000						
		1		Acquisition of right-of-way	21	acres	150.00	3,150					150.00	3,150							
				Contingencies 20% /				850						850							
				Field Cost 05.03.30				4,000						4,000							
		36		WATERWAYS -- Welded steel pipe system of capacity 432 gpm to 50 gpm											257,000						
		1		Excavation for pipe -- All classes	27,000	cy	1.00	27,000					1.00	27,000							
		2		Backfill about pipe	27,000	cy	.40	10,800					.40	10,800							
		3		Consolidating backfill	9,650	cy	1.50	14,475					1.50	14,475							
		4		Furnishing and placing 8" O.D. 1h gage welded steel pipe	3,620	l.f.	2.40	8,688					2.40	8,688							
		5		Furnishing and placing 6" O.D. 1h gage welded steel pipe	33,730	l.f.	2.00	67,460					2.00	67,460							
		6		Furnishing and placing 4" O.D. 1h gage welded steel pipe	53,680	l.f.	1.25	67,100					1.25	67,100							
		7		Furnishing and installing 8" Line meter	1	ea.	650.00	650					650.00	650							
		8		Furnishing and installing 4" Line meter	1	ea.	500.00	500					500.00	500							
		9		Furnishing and installing 8" gate valve	1	ea.	150.00	150					150.00	150							
		10		Furnishing and installing 6" gate valve	11	ea.	90.00	990					90.00	990							
		11		Furnishing and installing 4" gate valve	23	ea.	60.00	1,380					60.00	1,380							
		12		Furnishing and installing 4" air valves	10	ea.	175.00	1,750					175.00	1,750							
		13		Furnishing and installing 4" Blowoff valves	6	ea.	150.00	900					150.00	900							
		14		Furnishing and placing pre-cast concrete access wells and covers,	44	ea.	200.00	8,800					200.00	8,800							
		15		Furnishing and installing 6" Pressure Regulating valves - 50 psi outlet.	2	ea.	1,500.00	3,000					1,500.00	3,000							
				Subtotal				213,643						213,643							
				Contingencies 20% /										43,357							
				Field Cost 05.03.30										257,000							
				SERVICE FACILITIES													(8,000)		(8,000)		
				PROJECT INVESTIGATIONS															(27,000)		
				DESIGN AND SPECIFICATIONS															(31,000)		
				CONSTRUCTION ENGINEERING AND SUPERVISION															(5,000)		
				GENERAL EXPENSE																	

DESIGNS AND ESTIMATES

CHAPTER VII

LATERALS AND DRAINS

Stanaker Canal Laterals

Purpose

The Stanaker canal lateral system will provide conveyance for irrigation water from the Stanaker Service Canal to the existing private canal systems crossed by the service canal. Several small laterals are provided to serve the adjacent land only where it is impractical to do so from the existing canals of the alinement of the service canal.

Description

The Stanaker canal laterals consist of approximately 1.63 miles of earth canals. These canals vary in capacity from 40 second-feet to 10 second-feet. These laterals are made up of 4 sections. The sections are (1) Ashley Central lateral of 10 second-feet to serve the Ashley Central canal from the Stanaker Service Canal. (2) Mile 3.1 lateral of 10 second-feet serves the area adjacent to the Ashley Central canal where the Stanaker Service Canal crosses the Central Canal. (3) Mile 3.7 lateral of 40-second feet capacity serves another reach of the Ashley Central Canal and adjacent lands. (4) Mile 7.41 lateral with a capacity of 40 second-feet serves the Ashley Central Canal as it turns eastward from following the roads south approximately paralleling the Stanaker Service Canal. No other lateral systems are contemplated for this area as the existing systems are adequate for the distribution of unit water.

Geology

The laterals will be in the alluvium mantle and gravel and cobble layers which cover the Ashley Valley floor. The gravel consists of water-borne, rounded to subangular quartzite boulders from the Uinta Pre-cambrian series in a sand matrix plus rocks from other formations exposed by earlier erosion. The soil mantle capping the gravel consists largely of alluvial deposits transported by the numerous streams emerging from the south flank of the Uinta Mountains. It is composed of the finer materials, namely sands, clays, silts, and gravels.

Materials

The fine silts, clays, and sands from the lateral excavations will require additions of clayey materials to provide sufficient cohesiveness

to be suitable for compacted earth lining were required in the system. Clayey materials can be obtained from the east and south side slopes of the Stanaker Reservoir site and blended with the materials of the lateral excavations for the linings. Riprap can be obtained from the source at Stanaker Dam site or from the excavation of the laterals when in the cobble level.

Aggregates for the concrete in the structures may be obtained from the tested deposits at Jensen, Utah, a distance of about 18 miles from the service area.

Miscellaneous

The complete lateral system will be readily accessible throughout the area from primary and secondary roads of the valley. Utilities are available in the area adjacent to the proposed laterals. Right-of-way problems are anticipated in the heavily developed areas. No unusual construction problems are anticipated in the development of the lateral system.

Cost Estimate

Based on January 1957 unit prices, the total estimated construction cost is \$40,000 which includes construction facilities and indirect costs.

Vernal Area Drainage System

The design of the Vernal area drainage system will be made after the unit has been in operation and the location of the drains can better be determined. Some portions of the existing canals would be earth-lined to eliminate excessive seepage losses.

LATERALS

PROPERTY				PROPERTY AND PAY ITEM DESCRIPTION	QUANTITY		LABOR AND MATERIALS BY CONTRACTOR		LABOR BY GOVERNMENT (FORCE ACCOUNT)		MATERIALS AND EQUIPMENT BY GOVERNMENT		FIELD COST COLS. 4, 5, & 6		FIELD COST	FIELD COST	Service CONSTRUCTION FACILITIES	INVEST'GNS ENRG. AND GEN'L EXP.	TOTAL COST	TOTAL COST	TOTAL COST
CLASS	IDENTIFICATION	ACCOUNT	PAY ITEM		AMOUNT	UNIT	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	UNIT COST	TOTAL COST	PROPERTY ACCOUNT	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	IDENTIFIED PROPERTY	PROPERTY CLASS	ALL CLASSES
1				2	3		4		5		6		7		8	9	10	11	12	13	14
06				LATERALS																	
	01			STANAKER CANAL LATERALS - 1.63 miles earth laterals varying from 40 c.f.s. to 5 c.f.s. Ashley Central Lateral, 10 cfs; Mile 3.1 Lateral 10 cfs; Mile 3.7 Lateral 40 cfs; and Mile 7.41 Lateral, 40 cfs.												29,000	1,000	10,000	40,000		
		30		LAND AND RIGHTS - Includes land along center line of canal varying from 50 ft. to 20 ft. wide.												2,000					
			1	Irrigated lands	5	Acre	250.00	1,250					250.00	1,250							
				Contingencies 60% ±										750							
				Field cost 06.01.30										2,000							
		33		STRUCTURES AND IMPROVEMENTS												3,000					
			1	Furnishing and erecting right-of-way fences	1.7	Mile	1500.00	2,550					1500.00	2,550							
				Contingencies 15% ±										450							
				Field cost 06.01.30										3,000							
		36		WATERWAYS - Earth Laterals 1.63 miles												6,000					
			1	Excavation for laterals	17,000	c.y.	.30	5,100					.30	5,100							
			2	Compacting embankments	1,000	c.y.	.25	250					.25	250							
				SUBTOTAL				5,350						5,350							
				Contingencies 15% ±										650							
				Field cost 06.01.36										6,000							
		37		LATERAL STRUCTURES												18,000					
			1	Excavation for structures	1,270	c.y.	1.50	1,905					1.50	1,905							
			2	Backfill	590	c.y.	.50	295					.50	295							
			3	Compacting backfill	510	c.y.	3.50	1,785					3.50	1,785							
			4	Riprap	50	c.y.	5.00	250					5.00	250							
			5	Concrete in structures	46	c.y.	80.00	3,680					80.00	3,680							
			6	Furnishing & handling cement	69	bb1.	7.00	483					7.00	483							
			7	Furnishing & placing reinforcement steel	4,600	lb.	.18	828					.18	828							
			8	Miscellaneous metal	594	lb.	.75	446					.75	446							
			9	24 in. dia. Precast conc. pipe Type B Joints	134	l.f.	12.00	2,208					12.00	2,208							
			10	36 in. dia. Precast conc. pipe Type B Joints	60	l.f.	22.00	1,320					22.00	1,320							
			11	42 in. dia. Precast conc. pipe Type P Joints	42	l.f.	35.00	1,470					35.00	1,470							
				SUBTOTAL				14,670						14,670							
				Contingencies 23% ±										3,330							
				Field cost 06.01.37										18,000							
				SERVICE FACILITIES													(1,000)				
				PROJECT INVESTIGATIONS														(1,000)			
				DESIGNS AND SPECIFICATIONS														(3,000)			
				CONSTRUCTION ENGINEERING & SUPERVISION														(5,000)			
				GENERAL SERVICES														(1,000)			

BASIC ESTIMATE DC-1

VERNAL UNIT
VERNAL AREA DRAINAGE SYSTEM

PROJECT CENTRAL UTAH
Date of Estimate May 6, 1957
Prices as of January 1, 1957
Sheet 17 of 17 sheets
Property Designation 07.01

DRAINS

[illegible]

DESIGNS AND ESTIMATES

CHAPTER VIII

RECREATIONAL AND FISH AND WILDLIFE DEVELOPMENT

Recreational Development (General Property)

Purpose

General property includes the facilities constructed with Federal funds to develop the unit recreational potential, in connection with the proposed storage reservoir at Stanaker Draw.

Description

Plans and estimates for the recreational development were prepared by the National Park Service and its report is contained in the Bureau of Reclamation Definite Plan Report. A brief description together with the estimated construction cost is included here. It is planned to provide recreational facilities at Stanaker Reservoir site. The plan of development is to be on a day-use principle, constructing boat landings and picnic areas. The area is approximately 4 to 5 miles from Vernal, Utah, thus overnight facilities will not be required. Administration of the facilities is recommended to be taken over by some local agency such as Vernal City or Uintah County. Usage by the public may be such as to make a permanent custodian desirable. The estimated Federal construction cost will be \$92,000, which includes contingencies, plans, surveys, and supervision of construction.

Fish and Wildlife Development

The plan of development for fish and wildlife prepared by the Fish and Wildlife Service for Vernal unit includes a program for upland game and improvement of Stewart Lake State Refuge. There is to be acquisition and development of areas for preservation of upland game. Improvement of the Stewart Lake State Refuge will include pumping facilities and pipeline to convey water to the lake from the Green River. Cost of the development for fish and wildlife is estimated to be \$27,000.