

BOULDER IRRIGATION & WATER DEVELOPMENT
COMPANY

S P E C I F I C A T I O N S

INFORMATION FOR BIDDERS

NAME OF PROJECT:

WATER COMPANY: **BOULDER IRRIGATION & DEVELOPMENT CO., INC.**

President's Name **Ivan Lyman**

Secretary's Name **Richard V. Griffin**

ENGINEER: **Soil Conservation Service**

BIDS TO BE OPENED:

To be constructed by the Boulder Irrig. & Development Co.

MAIL BIDS TO:

PLANS AVAILABLE — \$10 Charge —
FROM:

Force Account

MAJOR ITEMS OF WORK:
(See Bid Schedule for Detail)

Gravity Sprinkler System and Small Storage Pond

Note: The Water Company has entered into a repayment contract with the Utah Water and Power Board and the succesful bidder will enter into a construction contract with the Water Company for the work.

September 1966

INVITATION TO BID

To Intended Bidder:

The Water Company whose name appears on the page marked "Information to Bidders" invites your bid to contract for performing work and furnishing materials for the construction of a water conservation project.

1. Bids will be received and opened at the place and time as indicated in the "Information to Bidders."
2. Bids shall be submitted in a sealed envelope which is marked on the outside "Sealed Bid." The date of the opening shall also be shown on the envelope. If submitted by mail, the sealed envelope containing the bid shall be enclosed in a mailing envelope. Bids shall be submitted on form "Bid Proposal" accompanying the specifications and shall be properly executed as indicated thereon.
3. The bid is to be accompanied by a bid bond in the form of a certified check, cashier's check or bid bond drawn in the name of the Water Company as defined herein in the amount of 5% of the total bid price. All checks or bonds received with the bids will be retained until the final signing and approval of the contract or the rejection of all bids, then they will be returned to the proper parties.
4. The Bidder, who is awarded this construction contract, will be required to execute the form of contract provided by the Water & Power Board and furnish a 100% Performance and Payment Bond to the Water Company.
5. The right is reserved, as the interests of the Water Company and the Utah Water & Power Board may require, to reject any and all bids, to waive any informality in bids received, and to accept or reject any or all items of any bid, unless such bid is qualified by specific limitation. The decision of the Water Company as to the Bidder selected for this construction contract will be conclusive.
6. Copies of plans, specifications, information to bidders, forms of contract, performance bonds, proposal and bid schedule, and other papers pertaining thereto may be obtained at the office of the Utah Water & Power Board, State Capitol Building; from the Water Company; or from the Engineer. A deposit charge of 10.00 will be made for each set of documents and will be refunded on return of the documents in good condition.
7. Bidders are required to carefully examine the contract, plans, and specifications, visit the site of the work, and fully inform themselves as to all conditions and matters which can in any way affect the work or cost thereof. Should

a Bidder find discrepancies in or omission from any plans or documents or have any questions pertaining thereto, he should contact the Engineer for clarification prior to submitting any bid.

8. This project is a cooperative effort between the Water Company and the Utah Water & Power Board in which each shall pay an agreed percentage of the total construction cost. Utah Water & Power Board will pay its share directly to the Water Company. The relationship of the Water Company to construction contractor is similar to the usual owner-contractor with the exception that the Utah Water & Power Board exercises final control on technical phases of the work by virtue of its financial interest in the project.

The contract documents shall not be construed as creating any contractual relation between any successful bidder and the Utah Water & Power Board.

BID PROPOSAL

To the Water Company:

The undersigned states and warrants that he has carefully examined the plans, specifications, form of contract, form of bond, instructions and other contract papers relating to the construction for which this proposal is made, and that he has examined the site of the work and has given attention to and carefully considered all of the matters which affect the nature and the cost of construction and its several parts.

If this proposal as given on the attached Bid Schedule is accepted, the undersigned will, within ten days after notice thereof, in writing, by the Water Company, furnish a bond in accordance with the form of bond herewith attached, for the full amount of the total contract price correctly computed from the unit prices bid, and executed in favor of the Water Company by, surety, whose address is..... and will sign and execute the accompanying form of construction contract.

.....
Name of Bidder, Construction Contractor

.....
Signature of Representative

.....
Position of Representative

.....
Address

Date:.....

SOUTH BOULDER SPRINKLER SYSTEM
 BID SCHEDULE A
 CONSTRUCTION OF SPRINKLER SYSTEM

Item No.	Item of Work	Quantity	Unit	Unit Price	Amount
1	Clearing and Stripping	3	Ac		
2	Construct Reservoir Outlet Works	1	Job	Lump Sum	
3	Construct Reservoir Inlet and Spillway Structure	1	Job	Lump Sum	
4	Excavation, Common				
	a. Reservoir Site	5,000	Cu Yd		
	b. Canal Relocation	2,000	Cu Yd		
5	Compacted Earth Fill (Reservoir)	10,000	Cu Yd		
6	Install Pipeline (Sprinkler System)				
	a. 20"	1,440	LF		
	b. 18"	3,680	LF		
	c. 16"	1,800	LF		
	d. 10-3/4"	280	LF		
	e. 8-5/8"	3,600	LF		
	f. 6-5/8"	2,120	LF		
	g. 4-1/2"	1,160	LF		
7	Construct Dissipators	3	Cu Yd		

Bid Schedule Notes:

- a. The quantities listed in the bid schedule are estimates only.
- b. In case of error in the extension of prices, the unit price will govern.
- c. The quantities of each item on the bid, as finally ascertained at the close of the contract, will determine the total payments to accrue under the contract.

SOUTH BOULDER SPRINKLER SYSTEM

BID SCHEDULE B
SPRINKLER SYSTEM MAIN LINE MATERIALS

Item No.	Item of Work	Quantity	Unit	Unit Price	Amount
1	Furnishing Steel Pipe				
	a. 20" diameter, 10 gage	1440	LF	_____	_____
	b. 18" diameter, 12 gage	3680	LF	_____	_____
	c. 16" diameter, 12 gage	1800	LF	_____	_____
	d. 10-3/4" diameter, 12 gage	280	LF	_____	_____
	e. 8-5/8" diameter, 14 gage	3600	LF	_____	_____
	f. 6-5/8" diameter, 14 gage	2120	LF	_____	_____
	g. 4-1/2" diameter, 14 gage	1160	LF	_____	_____
2	Furnishing Fittings				
	a. Flow meters				
	1 - 20"	1	Each	_____	_____
	2 - 18"	1	Each	_____	_____
	3 - 10"	1	Each	_____	_____
	4 - 8"	2	Each	_____	_____
	b. 8" Gate Valve	2	Each	_____	_____
	c. Riser Valve				
	1 - 4" x 22"	150	Each	_____	_____
	2 - 3" x 22"	9	Each	_____	_____
3	Furnishing 24" x 3' Concrete Pipe	7	Each	_____	_____

Bid Schedule Notes:

- a. The quantities listed in the bid schedule are estimates only.
- b. In case of error in the extension of price, the unit price will govern.
- c. The quantities of each item on the bid, as finally ascertained at the close of the contract, will determine the total payments to accrue under the contract.

BID BOND

Date Bond Executed.....

Principal.....

Surety.....

Sum of Bond..... Date of Bid.....

KNOW ALL MEN BY THESE PRESENTS, That we, the PRINCIPAL and SURETY above named, are held and firmly bound unto the Water Company herein known as the obligee, in the sum of the amount stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THE OBLIGATION IS SUCH, that whereas the principal has submitted the accompanying bid, dated as shown above, for

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal shall execute a contract and give bond to be approved by the obligee for the faithful performance thereof within ten days after being notified in writing of such contract to the principal, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, the above - bounded parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

INDIVIDUAL OR PARTNERSHIP PRINCIPAL	Corporate Principal	
	Business Address	
	By	Affix Corporate Seal
	Title	
	Corporate Surety	
	Business Address	
Note: If cash, certified or cashier's check is used in lieu of bid bond, a certificate from an approved surety company guaranteeing execution of a full performance bond must accompany bid.	By	Affix Corporate Seal
	Title Attorney-in-Fact	

STATE OF UTAH }
County of Salt Lake } ss.

Salt Lake City, Utah

....., being first duly sworn, on oath deposes and says that he is the Attorney-in-Fact of the above-named Surety Company, and that he is duly authorized to execute and deliver the foregoing obligations; that said company is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings, and obligations.

Subscribed and sworn to before me
this.....day of....., 19.....

Attorney-in-Fact

My Commission Expires -----

Notary Public

men, farmers, merchants, and any other person or persons who supply the principal or any of the subcontractors of the principal with labor, work, material, ranch or farm products, provisions, goods, and supplies of any kind including tools, machinery, and equipment to the extent of their use and depreciation on this contract; and shall pay all just debts incurred therefor in carrying on such work and all insurance premiums, including compensation and all other kinds of insurance applicable to said work; then this obligation shall be null and void, otherwise it shall remain in full force and effect. It is further expressly understood that as part of the consideration for the acceptance of this bond by said Obligee that said Surety does hereby waive any and all defense which it may have against the enforcement of this bond by reason of any provisions herein contained in excess of the provisions as provided for by the laws of this State.

IN WITNESS WHEREOF, the Principal and Surety have caused these presents to be duly signed and sealed, this day of....., 19.....

WITNESS:

.....
.....
.....
Principal

By.....

WITNESS:

.....
.....
Surety

By.....

Attorney-in-Fact

STATE OF UTAH }
County of } ss.

....., being first duly sworn on oath, deposes and says, that he is the Attorney-in-Fact of the.....

.....
and that he is duly authorized to execute and deliver the foregoing obligation, that said Company is authorized to execute the same, and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings, and obligations.

Subscribed and sworn to before me this.....day of....., 19.....

.....
Notary Public

My Commission Expires:.....

Approved as to form:

.....
Attorney General

C O N T R A C T

THIS AGREEMENT, entered into this.....day of....., 19.....,
by and between.....
hereinafter called the "Water Company," first party, and
.....
hereinafter called the Construction Contractor, second party,

WITNESSETH: That for and in consideration of payments hereinafter mentioned to be made by the Water Company, the Construction Contractor agrees to furnish all labor and equipment; to furnish and deliver all materials not specifically mentioned as being furnished by the Water Company, and to perform all work in construction of a Water & Power Board water conservation project in
..... County, described or known as

for the approximate sum of.....Dollars (\$.....).

The Construction Contractor further covenants and agrees that all of said work and labor shall be performed in the most workmanlike manner and in strict conformity with the plans and specifications. The said plans and technical specifications, notice to bidders, information to bidders, proposal and bid schedule, general provisions, and contract bond are hereby made a part of this agreement as fully and to the same effect as if the same had been set forth at length.

The Construction Contractor shall commence work on or before the.....
day of, 19.....; shall pursue the work with diligence, and shall complete it on or before the.....day of....., 19.....

Time shall be considered the essence of this contract and if the Contractor, without fault of the Water Company, shall have failed to complete the said performance as required under this Contract by the time above set forth, the Construction Contractor shall forfeit as liquidated damages to the Water Company the sum ofDollars per day for each and every calendar day that said performance shall remain incomplete.

The Water Company shall pay to the Construction Contractor for the performance of work in accordance with the unit prices bid on the bid schedule, a copy of which is hereby attached and made a part hereto. Partial payments shall be made in accordance with Paragraphs 38 and 39 of the General Conditions on the basis

of estimates prepared by the Engineer. 10% of each approved estimate shall be withheld by the Water Company pending final approval of the completed work by the Engineer and the Utah Water & Power Board.

Final payment, including the 10% withheld on partial payments shall be made within days after final approval of work and after Conditions of the specifications have been satisfied, or as follows:

.....
.....
.....

IN WITNESS WHEREOF, the parties have subscribed their names through their proper officers thereunto duly authorized as of the day and year first above written.

.....
Witness

.....
Water Company

.....
Witness

By.....
President

.....
Contractor

By.....

GENERAL CONDITIONS OF THE CONTRACT

UTAH WATER & POWER BOARD

DRAFT OF JANUARY, 1960

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UTAH WATER & POWER BOARD

Draft of January, 1960

DEFINITIONS

1. BOARD, as used in these specifications and contract documents, means the UTAH WATER AND POWER BOARD, an agency of the State of Utah.

2. WATER COMPANY means the irrigation company, water company, or other non-profit organization whose name appears on the first page of these specifications and who has entered into a repayment contract with the UTAH WATER AND POWER BOARD, acting for the State of Utah, for the construction of the project as defined in the accompanying plan and specifications.

3. CONSTRUCTION CONTRACTOR means a person or firm who enters into a contract with the Water Company, as defined above, for the performance of construction of all or part of the work items listed in the accompanying bid schedule. The Construction Contractor is required to comply with all general and special conditions of the specifications, and all technical specifications which are applicable to the construction contract. The Construction Contractor will furnish performance and payment bonds acceptable to the Water Company and the Utah Water and Power Board.

4. ENGINEER means an engineer employed by the UTAH WATER AND POWER BOARD or an engineer designated by it who is responsible for laying out and supervising the construction in accordance with the plans and specification. The construction of the project performed by the Water Company, Construction Contractor, or any representative thereof will be subject to the approval and final control by the UTAH WATER AND POWER BOARD.

5. INSPECTOR means a person acting for the Board under the direction of the Engineer.

SCOPE — PLANS — SPECIFICATIONS

6. SCOPE OF WORK: The work to be performed under this contract is described in the Technical Specifications and consists of furnishing all plant equipment, materials, supplies, and labor, if necessary; and performing all work as required by the contract in strict accordance with the specifications, schedules, and drawings, all of which are made a part hereof. Detail drawings may be furnished by the supervising Engineer from time to time during construction in explanation of said drawings. The work shall be complete and any item not expressly called for in the specifications, or not shown on the drawings which is obviously necessary for complete and proper construction to carry out the contract in good faith, shall be furnished by the Contractor at no increase in cost of the contract.

7. PLANS AND SPECIFICATIONS: These specifications and plans attached are hereby made a part of the construction contract and all construction will be in accordance thereto. A list of drawings is given in the technical specifications.

Such specifications can be used by the Water Company to obtain bids from the Construction Contractors. The invitation to bid, information to bidders, and bid proposal, set forth with the specifications are to be used for that purpose and the Construction Contractors will comply with conditions thereon.

The Contractor shall keep on the work a copy of the drawings and specifications and shall at all times give the Engineer access thereto.

Anything mentioned in the specifications and not shown on the drawings, or shown on the drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between drawings and specifications, the specifications shall govern.

8. **BASE LINE AND GRADES:** The Contractor shall lay out his work from base lines and grades established by the Engineer and shall be responsible for all measurements in connection therewith. The Contractor shall, at his own expense, furnish all stakes, templates, and labor that may be required in setting and cutting or laying out any part of the work. The Contractor will be responsible for the proper execution of the work to such lines and grades as may be established or indicated by the Engineer in charge, and all stakes or other marks thus established shall be preserved by him until their removal is authorized by the Engineer. The Engineer will furnish all location and limit marks reasonably necessary for the conduct of the work. Any grade or alignment stakes set by the Engineer and not preserved by the Contractor shall be replaced at the expense of the Contractor.

RELATIONSHIPS

9. **AUTHORITY OF ENGINEER:** All work shall be done under the general supervision of the Engineer. The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, rate of progress of work, interpretation of drawings and specifications, and all questions as to the acceptable fulfillment of the contract on the part of the Contractor. All claims of the Contractor or subcontractors shall be presented to the Engineer for decision, and all decisions of the Engineer shall be final except in cases where time and/or financial considerations are involved which shall be subject to arbitration.

10. **CONSTRUCTION CONTRACTORS:** The Water Company shall notify the Board in writing of the names of all construction contractors proposed for the work, the extent of the work to be done by each, and the general terms and conditions of each proposed construction contract. The report shall be accompanied by the contract agreement between the Water Company and the Construction Contractor and the performance and payment bond of the Construction Contractor. If, for sufficient reasons, at any time during the progress of the work the Board determines that any Construction Contractor is incompetent and undesirable, it will notify the Water Company accordingly and the Water Company will take immediate steps for cancellation of such Construction Contract. The Water Company may let all or part of the Construction Contract to one or more construction contractors. The Construction Contractor may not sublet more than 50% of the construction contract. Nothing contained in the contract shall create any contract relation between any construction contractor and the Board.

11. **INSPECTION:** The Board will have an inspector on the job who will work under the direction of the Engineer.

12. SUPERINTENDENCE BY CONTRACTOR: The Contractor shall give his personal superintendence to the work or have a competent foreman or superintendent on the work at all times during progress with authority to act for him. Subcontractors shall each be bound by this specification also.

13. SUSPENSION OF WORK: The Engineer in charge may order the Contractor to suspend all or any part of the work for such period of time as may be determined by him to be necessary or desirable, in order that the work may be protected and proper progress assured. Unless such suspension unreasonably delays the progress of the work and causes additional expense or loss to the Construction Contractor, no increase in the contract price will be allowed. In case of suspension of all or any part of the work for an unreasonable length of time which causes additional expense or loss not due to the fault of the Contractor, the Board shall make an equitable adjustment in the contract price and modify the contract accordingly. An equitable extension of time for the completion of the work, in the event of any such suspension, will be allowed the Contractor; provided, however, that the suspension was not due to the fault or negligence of the Contractor.

14. DISPUTE: All questions of dispute under this contract not resolved by the Engineer shall be submitted to arbitration at the request of either party to the dispute. There shall be three arbitrators; one to be named in writing by each party, and the third chosen by the two arbitrators so selected. A demand for arbitration shall be directed in writing to the Board who shall promptly notify the other party in writing. The arbitrators shall act with promptness. The decision of any two shall be binding on both parties to the contract. The decision of the arbitrators upon any question submitted to arbitration upon this contract shall be a condition precedent to any right of legal action. The decision of the arbitrators may be filed in court to carry it into effect. The compensation for the arbitrators will be fixed by the Board and the Contractor before the arbitrators are engaged. Parties to this contract shall pay the arbitrators selected by it. Compensation for the third arbitrator shall be paid jointly and equally by the two parties to the contract.

15. MATERIALS TO BE FURNISHED BY THE CONTRACTOR: The cost of hauling, storage, and handling all of the materials required to be furnished for the Contract shall be included in the unit price bid in the schedule for the work for which the materials are required.

In the case of sand and gravel to be used for concrete construction, the Contractor shall notify the Engineer in writing the sources of the available material and secure source approval in writing prior to placing order for delivery of this material to the job site.

16. PROTECTION AND STORAGE OF MATERIAL: The Contractor shall take care to protect and preserve all materials, supplies, and equipment of every description. All reasonable requests of the Engineer to enclose or specifically protect such property shall be complied with.

Operations and storage by the Contractor shall not infringe on private lands or rights of way, and any storage space or right-of-way not expressly stated by the Engineer as to be open and free for operation by the Contractor must be provided by the Contractor to avoid infringements. Protection of any private or public property such as bridges, roads, curbs, buildings, etc., shall be guaranteed by the Contractor in the performance of the work of the contract.

MATERIALS AND WORKMANSHIP

17. **MANUFACTURER'S DIRECTIONS:** Manufactured articles, material, and equipment shall be applied and conditioned as directed by the manufacturer unless herein specified to the contrary.

18. **REJECTION OF MATERIALS:** All materials which do not conform to the requirements of the Contract Document, are not equal to samples approved by the Engineer, or are in any way unsatisfactory or unsuited to the purpose for which they are intended shall be rejected. Any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness, or any other cause shall be removed within ten days after written notice is given by the Engineer, and the work shall be re-executed by the Contractor. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance of any part of it.

Should the Contractor fail to remove rejected work or materials within ten days after written notice to do so, the Board may remove them and may store the materials and charge the Contractor for any cost in connection therewith.

19. **CUTTING AND PATCHING:** The Contractor shall do all necessary cutting and patching of the work that may be required to properly receive the work of the various trades or as required by the Drawings and Specifications to complete the structure. He shall restore all such cut or patched work as directed by the Engineer. Cutting of existing structure that shall endanger the work, adjacent property, workmen, or the public shall not be done unless approved by the Engineer and under his direction.

20. **CLEAN UP:** The Contractor shall remove all temporary structures, rubbish, and waste materials resulting from his operation or caused by his employees, and shall remove all surplus materials from the project site and from all public and private property, leaving the site smooth, clean, and true to line and grade.

LEGAL RESPONSIBILITY AND SAFETY

21. **INSURANCE:** The Contractor shall execute and carry insurance policies with a reliable Surety and Insurance Company to cover Public Liability to an amount of \$50,000 and \$100,000 and for Property Damage to an amount of \$50,000.

22. **PERFORMANCE AND PAYMENT BOND:** The Construction Contractor, at the time of his execution of the construction contract, shall furnish bond in the sum equal to the contract amount to guarantee performance of all work connected with the project in accordance with the plans and specifications and for the full payment of all labor and material. The form of the bond shall be as the Board may prescribe.

23. **EASEMENTS:** Rights-of-way, and/or easements, have been secured for work sites, borrow and disposal areas, and for such trails and roadways considered necessary for ingress and egress to the work site. The right to enter, remove, alter, or otherwise make use of adjacent property, roads, utility lines, fences, and improvements not included within the rights-of-way provided, shall be the sole responsibility of the Contractor.

24. **FENCES:** Where construction included in the contract crosses existing

fences requiring their removal, the Contractor shall remove same and install temporary fences during the construction. Permanent repair of the fences shall be considered the Contractor's responsibility and shall be included in the bid price for the item of work listed in the schedule.

25. LAWS: The Contractor shall give all notices and comply with all Federal, State, and local laws in any manner affecting the work and shall indemnify and save harmless the Board against any claim or liability arising from or based on the violation of any such law whether by himself or his employees.

26. WATER AND ELECTRICITY: The Contractor shall provide and maintain at his own expense an adequate supply of water suitable for construction purposes. Electric power and other utilities will also be furnished by the Contractor at his expense.

27. LIGHTING REQUIREMENTS: Work carried on between the hours of sunset and sunrise shall be done only upon the approval of the Engineer. Construction areas shall be adequately lighted to provide safe working conditions while work is in progress. The lighting plan shall be acceptable to the Engineer.

28. SAFETY REQUIREMENTS: The Contractor shall put into execution and vigorously prosecute a definite systematic plan of accident prevention which will infuse the element of safety into each phase of all work operation. Safety and convenience of the public shall be provided for.

29. SANITARY PROVISIONS: The Contractor shall provide and maintain such sanitary accommodations for use of his employees as may be necessary to comply with the requirements and regulations of the local and State Departments of Health and as directed by the Engineer.

PROGRESS AND COMPLETION

30. NOTICE TO PROCEED: Written notice to proceed with the work shall be given to the Contractor who shall begin and prosecute the work with diligence thereafter with such force as to secure the completion of the work within the time stated in the Contract.

Where possible, the completion date will be set as a specific calendar date. Where the completion date is set as a number of calendar days, computation of the contract time shall commence on the seventh day following the date of mailing by regular mail of the Notice to Proceed and every calendar day following, except as herein provided, shall be counted as a working day.

31. SCHEDULE OF COMPLETION: The Contractor shall submit, at such times as may reasonably be requested by the Engineer, schedules which shall show the order in which the Contractor proposes to carry on the work with dates at which the Contractor will start the several parts of the work and estimated dates of completion of the several parts.

32. CHANGES AND EXTRA WORK: The Engineer may, at any time by a written order, and without notice to sureties, make changes in the drawings and/or the specifications of this contract and the general scope thereof. If such changes cause an increase or decrease in the amount due under this contract or in the time required for its performance, an equitable adjustment shall be made and the contract shall be modified in writing accordingly.

Such alterations or changes shall not be considered as a waiver of any conditions of the contract, nor to invalidate any of the provisions thereof, provided, however, that if demand is made in writing by either party to the contract, a supplemental agreement acceptable to both parties will be necessary before any alterations are made which involves any one of the following:

(a) An extension or shortening of the length of the project of more than 25%.

(b) An increase or decrease of more than 25% of the total cost of the work calculated from the original proposal quantities at the unit contract prices.

(c) A substantial change in the nature of the design or in the type of construction which materially increases or decreases the cost of performing any item of the work.

Within the limits specified above, the Contractor shall furnish and perform such quantities as are required to complete the construction as specified and intended, be they more or less than the quantities scheduled. Payment shall be made on the actual quantities involved but only on the items listed in the bid schedule.

33. **LIQUIDATED DAMAGES:** If the work is not complete on or before the date fixed for its completion by the terms of the contract or any extension thereof, the Construction Contractor shall pay to the Water Company the fixed and agreed liquidated damages as set forth in the construction contract for each and every calendar day until the work is completed.

34. **EXTENSION OF TIME:** A delay beyond the Contractor's control occasioned by an act of God, or act or omission on the part of the Board or by strikes, lockouts, fire, etc., may entitle the Contractor to an extension of time in which to complete the work as determined by the Engineer, provided, however, that the Contractor shall immediately give written notice to the Engineer of the cause of such delay.

35. **USE OF COMPLETED PORTIONS:** The Water Company have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding that the time for completing the entire work or such portions may not have expired; but such taking possession and use shall not be deemed an acceptance of any work not completed in accordance with the Contract Documents. If such prior use increases the cost of or delays the completion of uncompleted work or causes refinishing of completed work, the Contractor shall be entitled to such extra compensation, or extension of time or both, as the Engineer may determine.

MEASUREMENT AND PAYMENT

36. **UNIT PRICES:** Payments will be made on the basis of unit prices bid by the Contractor or the Subcontractor and the Contractor shall within ten days of receipt of notice to proceed, submit a complete breakdown of the Contract amount showing the value assigned to each part of the work. Upon approval of the breakdown of unit prices by the Board, such breakdown shall be used as the basis for all requests for payment.

37. **PAYMENTS TO CONTRACTOR:** All payments due to be paid by the Utah Water & Power Board under the terms of this contract shall be made to the Water Company as herein defined, Payments due to the Construction Contractor will be made by the Water Company in accordance with the terms of the construction contract.

38. PARTIAL PAYMENTS: Partial payments will be made in accordance with the terms of the contract. In every case, payment shall be made on the basis of partial estimates of completion of the items of work done, which estimates shall be made by the Engineer designated by the Board. Ten percent of the above estimates will be withheld during the life of the construction.

Final payment including the 10% withheld, will be made by the Utah Water and Power Board to the Water Company when final acceptance has been made by the Board and when the Contractor has satisfied the Board that all payments have been made to suppliers for labor, equipment and materials.

39. REQUESTS FOR PAYMENT: The Water Company may submit periodically, but not more than once each month, a request for payment for work done and materials installed. No payment will be made for materials delivered and stored at the site. The Engineer shall jointly certify with the Water Company as to work completed.

40. PAYMENT FOR UNCORRECTED WORK: Should the Engineer direct the Contractor not to correct work that has been damaged or that was not performed in accordance with the Contract Documents, an equitable deduction from the Contract Amount shall be made to compensate the Board for the uncorrected work.

41. PAYMENTS FOR EXTRA WORK: Written notice of claims for payments for extra work shall be given by the Contractor within ten days after receipt of instruction from the Engineer to proceed with the extra work and also before any work is commenced, except in emergency endangering life or property. No claim shall be valid unless so made. In all cases, the Contractor's itemized estimate showing all labor and material shall be submitted to the Engineer.

42. RELEASE OF LIENS: The Contractor shall deliver to the Board a complete release and waiver of all liens arising out of this Contract before the retained percentage or before the final Request for Payment is paid.

43. ACCEPTANCE AND FINAL PAYMENT: When the Contractor shall have completed the work in accordance with the terms of the Contract Documents, the Engineer shall certify his acceptance to the Board and his approval of the Contractor's final Request for Payment which shall be the Contract amount plus all approved additions less all approved deductions and less previous payments made. The Contractor shall furnish evidence that he has fully paid all debts for labor, materials, and equipment incurred in connection with the work, following which the Board shall accept the work and release the Contractor except as to the conditions of the Performance Bond, any legal rights of the Board required guarantees, and Correction of Faulty Work after Final Payment, and shall authorize payment of the Contractor's final Request for Payment. The Contractor must allow sufficient time between the time of completion of the work and approval of the final Request for Payment for the Engineer to assemble and check the necessary data.

44. CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT: The approval of the final Request for Payment by the Engineer and the making of the final payment by the Board to the Water Company shall not relieve the Contractor of responsibility for faulty materials or workmanship. The Board shall promptly give

notice of faulty materials or workmanship and the Contractor shall promptly replace any such defects discovered within one year from the date of written acceptance of the work. The Engineer shall decide all questions arising under this paragraph, and all such decisions shall be subject to arbitration.

5. One 20-inch diameter ARMCO model 101-C flat back gate or equal with 3½ foot frame, 4 feet of 1-1/8" diameter bronze stem (for oil seal), 40 feet of 1-1/8" diameter steel gate stem with countersunk rivet head stem splices, and an H-14 Handweel lift with bronze lift nut.
6. One gate stem casing, consisting of 40 feet of 2-inch diameter galvanized steel pipe with ARMCO Oil Seal or equal at one end and a tee with short nipple and cap for filling pipe with oil at the other end.
7. 42 linear feet of 4-inch steel air vent pipe, with two 45° bends, one 90° bend, and one "U" bend.
8. Two cutoff collars totalling approximately 3.4 cubic yards of reinforced concrete.

2.2 Specifications:

Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961. Part 2.3, Excavation, and Part 3, Structures, shall apply, except for the metal work. The metal work shall comply with the following specifications:

1. Quality of Materials:

Unless otherwise specified, materials shall conform to the requirements of Materials Specification 117, Structural Metal, SCS-NEH-20, dated ~~10-3-63~~ ¹⁰⁻³⁻⁶³. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit. Galvanizing shall conform to the requirements of Material Specification 119, Galvanizing, SCS-NEH-20, dated ~~10-3-63~~ ¹⁰⁻³⁻⁶³.

2. Fabrication:

Fabrication of structural steel shall conform to the requirements of Section 1.23 of the "Specification for the design, fabrication, and erection of structural steel for buildings (Riveted, Bolted and Arc-Welded Construction)," American Institute of Steel Construction.

3. Erection:

The frame of metal structure shall be carried up true and plumb. Temporary bracing shall be placed wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation

Special Specifications

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of equipment. Such bracing shall be left in place as long as may be necessary for safety.

As erection progresses, the work shall be securely bolted up, or welded, to resist all dead load, wind, and erection stresses. The contractor shall furnish such fitting up bolts, nuts, and washers as may be required.

No riveting or welding shall be done until as much of the structure as will be stiffened thereby has been properly aligned.

All field welding shall be done in conformance to the requirements for shop fabrication, except those that expressly apply to shop conditions only.

2.3 Measurement and Payment:

Payment will be made at the contract price on a lump sum basis, for the completed job, as shown on the drawings, and as set forth in the bid schedule. Such payment will constitute full compensation for all labor, materials, equipment, tools, and all other items necessary and incidental to the completion of the work.

BID ITEM NO. 3 - CONSTRUCT RESERVOIR INLET AND SPILLWAY STRUCTURE:

3.1 Scope:

This item of work includes the construction of the reinforced concrete inlet and spillway structure, the furnishing and installation of the 20-inch diameter inlet pipe and dissipator and the furnishing and installation of the 24"x24" ARMCO Model 5-00 gate, or equal, all in accordance with the plans and these specifications.

3.2 Specifications:

Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961, Part 2.3, Excavation, and Part 3, Structures, shall apply.

3.3 Measurement and Payment:

Payment will be made at the contract price, on a lump sum basis, for the completed job, as set forth in the bid schedule. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Special Specifications

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BID ITEM NO. 4 - EXCAVATION, COMMON:

4.1 Scope:

This item of work consists of excavation and finishing the reservoir impounding area cutoff trench, and the section of the canal that is to be relocated, to lines and grades as shown on the plans and as will be staked in the field.

4.2 Specifications:

Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961, Part 2, Excavation, shall apply.

4.3 Measurement and Payment:

The volume of excavation will be measured within the specified limits and computed to the nearest cubic yard by methods of average cross sectional end area. Measurement for payment will be made to the neat lines and grades as staked in the field. Payment will be made at the contract unit price set forth in the bid schedule. Such payment will constitute full compensation for all labor, material, equipment and all other items necessary and incidental to the performance of the work.

BID ITEM NO. 5 - COMPACTED EARTH FILL (RESERVOIR):

5.1 Scope:

This item of work consists of constructing a compacted earth fill reservoir embankment as shown on the drawings.

5.2 Specifications:

Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961, Part 4, Earth Embankment, shall apply.

5.3 Measurement and Payment:

Measurement of earth fill will be within specified boundaries, or limits of embankment and core trench, and computed to the nearest cubic yard by methods of average cross sectional end area. The quantity of earth fill will be measured as the computed volume of fill placed between the measured surface of the specified excavations and the specified neat lines of the fill surface.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UTAH AREA NO. 4
In Cooperation With
Canyon Land Soil Conservation District

SPECIAL SPECIFICATIONS

FOR
CONSTRUCTION OF A
GRAVITY SPRINKLER SYSTEM
SOUTH BOULDER SPRINKLER GROUP
BOULDER, UTAH

Location:

This project is located due south of the town of Boulder, Garfield County, Utah, as shown on the location map of Sheet 1 of 2 sheets.

Drawings and Standard Specifications:

Drawings titled South Boulder Sprinkler Group Regulation Reservoir sheets 1 through 2, the sprinkler system layout plan, Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961, Construction Specifications for Irrigation Pipe Lines, Steel or Corrugated Metal, USDA, SCS, Utah, January 1, 1961, Material Specification 117, Structural Metal, S.C.S.-West, dated 11-5-64 and Material Specification 119, Galvanizing, SCS-West, dated 11-5-64 are made a part of these specifications and all provisions thereof shall apply, except as modified in these Special Specifications.

BID ITEM NO. 1 - CLEARING AND STRIPPING:

1.1 Scope

This item of work consists of the clearing and stripping of the Reservoir impounding area, dam site and borrow areas, by removal and disposal of trees, snags, roots, logs, stumps, shrubs, grass, rubbish, and other organic or unsuitable material.

1.2 Marking:

The limits of the areas to be cleared and stripped will be marked by means of stakes, flags, tree marking or other suitable methods.

Special Specifications

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1.3 Specifications:

All stumps, roots and root clusters having a diameter of one inch or larger shall be grubbed out to a depth of at least two feet below subgrade elevation for concrete structures, and one foot below the ground surface at embankment sites and other designated areas.

Top soil shall be stock piled adjacent to the site in locations which will not interfere with construction operations. After construction at the reservoir site is completed, the top soil shall be spread on designated areas for seedbed preparation.

All vegetative materials or trash removed from the cleared and stripped areas shall be burned or buried at locations approved by the Engineer or otherwise removed from the site.

1.4 Measurement and Payment:

The cleared and stripped areas will be measured to the nearest 0.1 acre within the areas staked. Payment for clearing and stripping will be made at the contract unit price set forth in the bid schedule, and shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

BID ITEM NO. 2 - CONSTRUCT RESERVOIR OUTLET WORKS:

2.1 Scope:

This item of work consists of the installation of 85 feet of 20 inch diameter steel pipe outlet conduit and the furnishing and installation of:

1. A concrete inlet structure consisting of approximately 3.4 cubic yards of reinforced concrete.
2. An inlet screen consisting of approximately 31.5 feet of 2"x2"x5/16" angle iron, 67.0 feet of 1"x1"x3/16" angle iron, and 7½' x 12½' 4 mesh per inch screen.
3. Three reinforced concrete gate stem pedestals, containing a total of about 0.7 cubic yards of concrete, complete with adjustable gate stem guides and air vent holders.
4. One gate control structure, consisting of about 0.5 cubic yards of reinforced concrete, complete with gate stem supports and air vent holders.

Special Specifications

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Payment will be made at the contract price per cubic yard as set forth in the bid schedule. The payment for compacted earth fill shall constitute full compensation for all labor, materials, equipment, transportation, tools, and all other items necessary and incidental to the completion of this item of work.

BID ITEM NO. 6 - INSTALLING PIPELINE (SPRINKLER SYSTEM):

6.1 Scope:

This item of work shall consist of clearing, excavating and backfilling the trench and installing the steel pipe, complete with the fittings and appurtenances, (risers, valves, drain valves, anchor blocks, gate valves, water meters, and gate valve and water meter wells), as specified on the drawings. The pipe, fittings and appurtenances will be delivered at the job site under another contract.

6.2 Specifications:

Construction Specifications for Irrigation Pipelines Steel or Corrugated Metal, USDA, SCS, Utah, January 1, 1961, and the enclosed "Specifications for Welding Steel Pipe 2-3/8" OD to 42" OD, Inclusive" shall apply.

6.3 Measurement and Payment:

The quantity of each type and size of pipe will be determined to the nearest one foot by measurement of the laid length of pipe along the center line of the pipe. Payment for each type and size of pipe will be made at the contract unit price, as set forth in the bid schedule, for installing this type and size of pipe. Such payment will constitute full compensation for installing the pipe including the necessary fittings, and all other items (sprinkler risers, drain valves, anchor blocks, drain valves, gate valves, flow meters, gate valves and meter wells) necessary and incidental to the completion of the work.

BID ITEM NO. 7 - CONSTRUCT DISSIPATORS:

7.1 Scope:

This item of work includes the ^{construction} placing of reinforced concrete dissipators at the end of the steel branch lines in the fields of Flora Marchant and the Hansen Brothers.

Special Specifications

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7.2 Specifications:

Construction Specifications for Regulating Reservoirs, USDA, SCS, Utah, January 1, 1961, Part 3, Structures, shall apply.

7.3 Measurement and Payment:

Measurement of the reinforced concrete will be to the neat lines shown on the drawings, and the volume of concrete will be computed to the nearest 0.1 cubic yard. Payment will be made at the contract price per cubic yard as set forth in the bid schedule. This payment for reinforced concrete shall constitute full compensation for all labor, materials, equipment, transportation, excavation and backfill, tools, forms, false work, bracing and all other items necessary and incidental to the completion of this item of work.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

UTAH AREA NO. 4

In Cooperation With Canyonlands Soil Conservation District

SPECIAL SPECIFICATIONS
FOR FURNISHING SPRINKLER SYSTEM MAIN LINE MATERIALS
FOR GRAVITY SPRINKLER SYSTEM
SOUTH BOULDER SPRINKLER GROUP, BOULDER, UTAH

B

LOCATION:

This project is located due south of the town of Boulder, Garfield County, Utah, as shown on the location map of Sheet 1 of 2 sheets.

SCOPE:

These specifications cover the furnishing of the materials listed in the Bid Schedule for construction of a sprinkler system main line in accordance with the layout plan titled "Sprinkler System Layout, Boulder Irrigation and Development Company, South Boulder Project" and drawings titled "Regulatory Reservoir Design, South Boulder Sprinkler Group" sheets 1 and 2. The materials listed are to be delivered in good condition at the job site at the locations specified by the designated representative of the Boulder Irrigation and Development Company.

BID ITEM NO. 1 - FURNISHING STEEL PIPE:

1.1 Scope:

This item shall consist of furnishing steel pipe and couplers, to be used as the main line for the sprinkler system.

1.2 Specifications:

The steel pipe shall be furnished in the sizes and gages specified, shall have "0" ring type rubber gasket joints and shall have an 8-pound (minimum) asbestos felt wrap applied in compliance with the attached "Specifications for Welding Steel Pipe 2-3/8" O.D. to 42" O.D. Inclusive, Including Coating and Wrapping". There shall not be any asphalt or other unacceptable coating on the inside of the pipe. The gages shown are minimum; if any substitution is necessary, the substitute shall be of heavier gage and shall have the approval of the engineer.

The pipe furnished shall conform to the requirements of the attached "Specifications for Welding Steel Pipe 2-3/8" O.D. to 42" O.D. Inclusive, Including Coating and Wrapping" and Federal Specification

Special Specifications

-2-

WW-P-406, ASTM Designation A 134, ASTM Designation A 135, or ASTM Designation A 139.

Care shall be exercised during transportation and handling to prevent bending, denting, abrasion of the coating and wrapping, or other injury to the pipe. All abrasion of the coating and wrapping shall be repaired in accordance with the pipe manufacturer's written recommendations and approved by the engineer or his representative before it will be acceptable. Pipe containing bends or dents shall be rejected unless approved by the engineer or his representative for use prior to installation.

Pipe and fittings shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification for pipe shall include the manufacturer's certified statement of result of typical hydrostatic pressure tests, weld strength tests and weight of zinc coating tests, as applicable to the type of pipe furnished.

1.3 Measurement and Payment:

The quantity of each type and size of pipe will be determined to the nearest one foot by measurement of the furnished pipe before installation. Payment for each type and size of pipe will be made at the contract unit price; as set forth in the bid schedule, for that type and size of pipe. Such payment will constitute full compensation for furnishing and transporting the pipe to the job site.

BID ITEM NO. 2 - FURNISHING FITTINGS:

2.1 Scope:

This item shall consist of furnishing flow meters, gate valves, riser valves, and drain valves as listed in the bid schedule.

2.2 Specifications:

Forged flanges, Fittings and Valves shall conform to the requirements of ASTM Designation A 181 for the specified grades and materials.

The materials certification for fittings shall include the manufacturer's certified statement of results of typical malleability tests, and aerostatic or hydrostatic pressure tests.

Special Specifications

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2.3 Measurement and Payment:

The unit of measure for fittings will be the number of each size, type and model designation. Payment will be made at the contract price for each type, size and model as set forth in the bid schedule. Such payment will constitute full compensation for furnishing and transporting the above specified fittings to the job site.

BID ITEM NO. 3 - FURNISHING CONCRETE PIPE:

3.1 Scope:

This item of work shall consist of furnishing 7 - 24" x 3' pieces of concrete pipe to be used for meter and valve wells.

3.2 Specifications:

Non-reinforced concrete irrigation or drainage pipe, without rubber gaskets shall conform to the requirements of ASTM Designation C 118.

3.3 Measurement and Payment:

The unit of measure for the concrete pipe will be the number of pipe lengths. Payment will be made at the contract price for each pipe length, as set forth in the bid schedule. Such payment will constitute full compensation for furnishing and transporting the pipe to the job site.

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Emerson and L.W. Peterson

Acres owned	<u>240</u>
Acres presently irrigated <i>peaks</i>	<u>70</u>
Acres to be Irrigated (peak season)	<u>105</u>
Acres, Addl. to be irrigated (off S.)	<u>45</u>
Total acres to be irrigated	<u>150</u>

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	<u>*5551</u>	<u>5551</u>	<u>5551</u>	<u>5551</u>	<u>5551</u>	<u>_____</u>
Acres Peak Season	<u>54</u>	<u>26</u>	<u>25</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Acres Addl. Sp. & Fall	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>23</u>	<u>22</u>	<u>_____</u>
Crop	<u>Grass</u>	<u>AIF</u>	<u>AIF</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Daily Cons. Use (peak)	<u>.23</u>	<u>.26</u>	<u>.26</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Irr. cycle--days	<u>7 1/2</u>	<u>10 1/2</u>	<u>10 1/2</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler spacing	<u>40'</u>	<u>40'</u>	<u>40'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral spacing	<u>52-60</u>	<u>58-60</u>	<u>54-58</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. at valve	<u>28-37</u>	<u>38</u>	<u>34</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. average	<u>25-30</u>	<u>36</u>	<u>33</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler Capacity	<u>5.0-5.75</u>	<u>8.9</u>	<u>8.2</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Nozzle size	<u>3/16</u>	<u>3/16 x 1/8</u>	<u>3/16 x 1/8</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Perc. rate per hr.	<u>.23</u>	<u>.37</u>	<u>.37</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Hours per set	<u>11 1/2</u>	<u>11 1/2</u>	<u>11 1/2</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Applic. per set	<u>2.65</u>	<u>4.2</u>	<u>4.2</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe length	<u>700'</u>	<u>900'</u>	<u>900'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. sprinklers	<u>** 72</u>	<u>23</u>	<u>23</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe size	<u>3"</u>	<u>4"</u>	<u>4"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. lateral lines	<u>4</u>	<u>1</u>	<u>1</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. riser valve	<u>60</u>	<u>21</u>	<u>21</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Riser valve size	<u>4" x 22"</u>	<u>✓</u>	<u>✓</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
TOTAL WATER GPM	<u>377</u>	<u>205</u>	<u>188</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

Total water owned and available

Primary Class A, 700 GPM
Class C 70 GPM

- * See attached sheet
 ** 4 Spk. Heads part circle
 Laterals to be rotated
 and spk. heads shifted
 each cycle.

Total 770 GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Petersons

Acres owned _____
 Acres presently irrigated _____
 Acres to be Irrigated (peak season) _____
 Acres, Addl. to be irrigated (off S.) _____
 Total acres to be irrigated _____

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	<u>OneA</u>	<u>OneB</u>	<u>OneC</u>	<u>OneD</u>	_____	_____
Acres Peak Season	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	_____	_____
Acres Addl. Sp. & Fall	_____	_____	_____	_____	_____	_____
Crop	<u>Grass</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Daily Cons. Use (peak)	<u>.23"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Irr. cycle--days	<u>7½</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Sprinkler spacing	<u>40'</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Lateral spacing	<u>52'</u>	<u>54'</u>	<u>58'</u>	<u>60'</u>	_____	_____
Op. pres. at valve psi	<u>27</u>	<u>30</u>	<u>34</u>	<u>37</u>	_____	_____
Op. pres. average "	<u>25</u>	<u>27</u>	<u>30</u>	<u>33</u>	_____	_____
Sprinkler Capacity GPM	<u>5</u>	<u>5.2</u>	<u>5.5</u>	<u>5.75</u>	_____	_____
Nozzle size	<u>3/16"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Perc. rate per hr.	<u>.23"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Hours per set	<u>11½</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Applic. per set	<u>2.65"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Lateral pipe length	<u>700'</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
No. sprinklers	<u>18</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Lateral pipe size	<u>3"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
No. lateral lines	<u>1</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
No. riser valve	<u>15</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
Riser valve size	<u>4" X 22"</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	_____	_____
TOTAL GMP	<u>90</u>	<u>94</u>	<u>99</u>	<u>104</u>	_____	_____
Total water owned and available					Primary Class A. _____ GPM	_____ GPM
					Class C _____ GPM	_____ GPM
					Total _____ GPM	_____ GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Ivan Lyman

Acres owned	<u>230</u>
Acres presently irrigated	<u>70</u>
Acres to be Irrigated (peak season)	<u>117</u>
Acres, Addl. to be irrigated (off S.)	<u>50</u>
Total acres to be irrigated	<u>167</u>

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	<u>5551</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>_____</u>
Acres Peak Season	<u>40</u>	<u>45</u>	<u>32</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Acres Addl. Sp. & Fall	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>50</u>	<u>_____</u>	<u>_____</u>
Crop	<u>AIF</u>	<u>AIF</u>	<u>Grass</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Daily Cons. Use (peak)	<u>.26"</u>	<u>.26"</u>	<u>.23"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Irr. cycle--days	<u>9½</u>	<u>10½</u>	<u>10½</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler spacing	<u>40'</u>	<u>40'</u>	<u>40'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral spacing	<u>60'</u>	<u>60'</u>	<u>60'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. at valve psi	<u>40</u>	<u>40</u>	<u>36</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. average psi	<u>32</u>	<u>40</u>	<u>36</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler Capacity GPM	<u>8.2</u>	<u>9.5</u>	<u>6</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Nozzle size	<u>.33"</u>	<u>.38"</u>	<u>.24"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Perc. rate per hr.	<u>11½</u>	<u>11</u>	<u>11</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Hours per set	<u>3.8"</u>	<u>4.2"</u>	<u>2.65"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Applic. per set	<u>720'</u>	<u>1500'</u>	<u>1500'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe length	<u>36</u>	<u>38</u>	<u>38</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. sprinklers	<u>4"</u>	<u>4"</u>	<u>4"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe size	<u>2</u>	<u>1</u>	<u>1</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. lateral lines	<u>38</u>	<u>21</u>	<u>15</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. riser valve	<u>4" X 22"</u>	<u>✓</u>	<u>✓</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Riser valve size	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
	<u>295</u>	<u>360</u>	<u>228</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

Total water owned and available

Primary Class A. 810 GPM

Class C 80 GPM

Total 890 GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Ivan Lyman

Acres owned	<u>230</u>
Acres presently irrigated	<u>70</u>
Acres to be Irrigated (peak season)	<u>117</u>
Acres, Addl. to be irrigated (off S.)	<u>50</u>
Total acres to be irrigated	<u>167</u>

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	<u>5551</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>_____</u>
Acres Peak Season	<u>40</u>	<u>45</u>	<u>32</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Acres Addl. Sp. & Fall	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>50</u>	<u>_____</u>	<u>_____</u>
Crop	<u>AIF</u>	<u>AIF</u>	<u>Grass</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Daily Cons. Use (peak)	<u>.26"</u>	<u>.26"</u>	<u>.23"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Irr. cycle--days	<u>9½</u>	<u>10½</u>	<u>10½</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler spacing	<u>40'</u>	<u>40'</u>	<u>40'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral spacing	<u>60'</u>	<u>60'</u>	<u>60'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. at valve <i>psi</i>	<u>40</u>	<u>40</u>	<u>36</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Op. pres. average <i>psi</i>	<u>32</u>	<u>40</u>	<u>36</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Sprinkler Capacity <i>GPM</i>	<u>8.2</u>	<u>9.5</u>	<u>6</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Nozzle size	<u>.33"</u>	<u>.38"</u>	<u>.24"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Perc. rate per hr.	<u>11½</u>	<u>11</u>	<u>11</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Hours per set	<u>3.8"</u>	<u>4.2"</u>	<u>2.65"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Applic. per set	<u>720'</u>	<u>1500'</u>	<u>1500'</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe length	<u>36</u>	<u>38</u>	<u>38</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. sprinklers	<u>4"</u>	<u>4"</u>	<u>4"</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Lateral pipe size	<u>2</u>	<u>1</u>	<u>1</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. lateral lines	<u>38</u>	<u>21</u>	<u>15</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
No. riser valve	<u>4" X 22"</u>	<u>✓</u>	<u>✓</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
Riser valve size	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>
	<u>295</u>	<u>360</u>	<u>228</u>	<u>_____</u>	<u>_____</u>	<u>_____</u>

Total water owned and available

Primary Class A. 810 GPMClass C 80 GPM

Total

890 GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Flora Marchant

Acres owned	<u>140</u>
Acres presently irrigated	<u>60</u>
Acres to be Irrigated (peak season)	<u>75</u>
Acres, Addl. to be irrigated (off S.)	<u>5</u>
Total acres to be irrigated	<u>80</u>

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	_____	_____	_____	_____	_____	_____
Acres Peak Season	_____	_____	_____	_____	_____	_____
Acres Addl. Sp. & Fall	_____	_____	_____	_____	_____	_____
Crop	_____	_____	_____	_____	_____	_____
Daily Cons. Use (peak)	_____	_____	_____	_____	_____	_____
Irr. cycle--days	_____	_____	_____	_____	_____	_____
Sprinkler spacing	_____	_____	_____	_____	_____	_____
Lateral spacing	_____	_____	_____	_____	_____	_____
Op. pres. at valve	_____	_____	_____	_____	_____	_____
Op. pres. average	_____	_____	_____	_____	_____	_____
Sprinkler Capacity	_____	_____	_____	_____	_____	_____
Nozzle size	_____	_____	_____	_____	_____	_____
Perc. rate per hr.	_____	_____	_____	_____	_____	_____
Hours per set	_____	_____	_____	_____	_____	_____
Applic. per set	_____	_____	_____	_____	_____	_____
Lateral pipe length	_____	_____	_____	_____	_____	_____
No. sprinklers	_____	_____	_____	_____	_____	_____
Lateral pipe size	_____	_____	_____	_____	_____	_____
No. lateral lines	_____	_____	_____	_____	_____	_____
No. riser valve	_____	_____	_____	_____	_____	_____
Riser valve size	_____	_____	_____	_____	_____	_____

Total water owned and available	Primary Class A.	<u>700</u>	GPM
	Class C	<u>70</u>	GPM
	Total	<u>170</u>	GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Hansen Brothers

Acres owned	<u>200</u>
Acres presently irrigated	<u>100</u>
Acres to be Irrigated (peak season)	<u>125</u>
Acres, Addl. to be irrigated (off S.)	<u>125</u>
Total acres to be irrigated	<u>125</u>

FIELDS BY NUMBER AND SPECS

	One	Two	Three	Four	Five	Six
Soil Type	_____	_____	_____	_____	_____	_____
Acres Peak Season	_____	_____	_____	_____	_____	_____
Acres Addl. Sp. & Fall	_____	_____	_____	_____	_____	_____
Crop	_____	_____	_____	_____	_____	_____
Daily Cons. Use (peak)	_____	_____	_____	_____	_____	_____
Irr. cycle--days	_____	_____	_____	_____	_____	_____
Sprinkler spacing	_____	_____	_____	_____	_____	_____
Lateral spacing	_____	_____	_____	_____	_____	_____
Op. pres. at valve	_____	_____	_____	_____	_____	_____
Op. pres. average	_____	_____	_____	_____	_____	_____
Sprinkler Capacity	_____	_____	_____	_____	_____	_____
Nozzle size	_____	_____	_____	_____	_____	_____
Perc. rate per hr.	_____	_____	_____	_____	_____	_____
Hours per set	_____	_____	_____	_____	_____	_____
Applic. per set	_____	_____	_____	_____	_____	_____
Lateral pipe length	_____	_____	_____	_____	_____	_____
No. sprinklers	_____	_____	_____	_____	_____	_____
Lateral pipe size	_____	_____	_____	_____	_____	_____
No. lateral lines	_____	_____	_____	_____	_____	_____
No. riser valve	_____	_____	_____	_____	_____	_____
Riser valve size	_____	_____	_____	_____	_____	_____

Total water owned and available

Primary Class A. 1044 GPM
 Class C 104 GPM
 Total 1148 GPM

BOULDER IRRIGATION AND DEVELOPMENT COMPANY

1966

SPRINKLER SYSTEM LAYOUT

NAME Leland Haws

Acres owned	<u>160</u>
Acres presently irrigated peak	<u>60</u>
Acres to be Irrigated (peak season)	<u>95</u>
Acres, Addl. to be irrigated (off S.)	<u>36</u>
Total acres to be irrigated	<u>131</u>

THE STATE OF COLORADO

FIELDS BY NUMBER AND TYPE

	One	Two	Three	Four	Five	Six
Soil Type	<u>SSS</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>
Acres Peak Season	<u>28</u>	<u>20</u>	<u>27</u>			<u>70</u>
Acres Addl. Sp. & Fall				<u>18</u>	<u>18</u>	
Crop	<u>AIF</u>	<u>Grass</u>	<u>AIF</u>			<u>AIF</u>
Daily Cons. Use (peak)	<u>.26</u>	<u>.23</u>	<u>.26</u>			<u>.26</u>
Irr. cycle--days	<u>9 1/2</u>	<u>7 1/2</u>	<u>10 1/2</u>			<u>7</u>
Sprinkler spacing	<u>40</u>	<u>40</u>	<u>40</u>			<u>40</u>
Lateral spacing	<u>60</u>	<u>60</u>	<u>60</u>			<u>56</u>
Op. pres. at valve	<u>40</u>	<u>35</u>				<u>39-42</u>
Op. pres. average	<u>32</u>	<u>32</u>	<u>32</u>			<u>30</u>
Sprinkler Capacity	<u>8.2</u>	<u>5.75</u>	<u>5.75</u>			<u>6.2</u>
Nozzle size	<u>3/16</u>	<u>3/16</u>	<u>3/16</u>			<u>3/16</u>
Perc. rate per hr.	<u>37</u>	<u>23</u>	<u>37</u>			<u>27</u>
Hours per set	<u>11 1/2</u>	<u>11 1/2</u>	<u>11 1/2</u>			<u>11</u>
Applic. per set	<u>3.8"</u>	<u>2.65"</u>	<u>4.2"</u>			<u>2.0"</u>
Lateral pipe length	<u>540'</u>	<u>940'</u>	<u>940'</u>			<u>1120'</u>
No. sprinklers	<u>28</u>	<u>24</u>	<u>24</u>			<u>28</u>
Lateral pipe size	<u>4"</u>	<u>4"</u>	<u>4"</u>			<u>3"</u>
No. lateral lines	<u>2</u>	<u>1</u>	<u>1</u>			<u>2</u>
No. riser valve	<u>38</u>	<u>15</u>	<u>21</u>			<u>9</u>
Riser valve size	<u>4" x 22"</u>	<u>✓</u>	<u>✓</u>			<u>3" x 22"</u>

Total water owned and available

Primary Class A	<u>700</u> GPM
Class C	<u>70</u> GPM
Total	<u>770</u> GPM

* 2 heads part circle, see Field marked 1B. Operator is instructed to use pressure Reg. valve or lay lateral on diagonal and gradually straighten as moved to the south.

MATERIAL SPECIFICATION

119. GALVANIZING

1. SCOPE

This specification covers the quality of zinc coatings applied to iron and steel products by the hot-dip process (galvanizing). This specification applies only to those products not covered in other material specifications.

2. QUALITY OF ZINC

The zinc used for coating shall be prime western spelter conforming to the requirements of ASTM Designation B 6.

3. QUALITY OF COATING

Zinc coatings shall conform to the requirements of the following specifications for the established classes of materials or, where applicable, the specified classes of coatings.

- a. Zinc coatings on products fabricated from rolled, pressed and forged steel shapes, plates, bars and strip shall conform to the requirements of ASTM Designation A 123;
- b. Zinc coatings on iron and steel hardware shall conform to the requirements of ASTM Designation A 153;
- c. Zinc coatings on assembled steel products shall conform to the requirements of ASTM Designation A 386.

4. INSPECTION, TESTING AND CERTIFICATION

Zinc coatings shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification shall include the manufacturer's certified statement of results of typical weight of zinc coating tests.

MATERIAL SPECIFICATION

117. STRUCTURAL METAL

1. SCOPE

This specification covers the quality of structural steel, structural iron and structural aluminum.

2. STRUCTURAL STEEL AND IRON

Unless otherwise specified, structural steel and iron products shall conform to the requirements of the following specifications:

- a. Structural carbon steel plates, shapes and bars shall conform to the requirements of Federal Specification QQ-S-741;
- b. Structural quality, hot-rolled carbon steel sheets shall conform to the requirements of Federal Specification QQ-S-699;
- c. Low carbon steel sheets and strips shall conform to the requirements of Federal Specification QQ-S-698.
- d. Zinc coated carbon steel sheets shall conform to the requirements of Federal Specification QQ-S-775;
- e. Steel castings shall conform to the requirements of Federal Specification QQ-S-681 for the specified classes of castings.
- f. Grey iron castings shall conform to the requirements of Federal Specification QQ-I-652 for the specified grades of castings.
- g. Malleable iron castings shall conform to the requirements of Federal Specification QQ-I-666 for the specified grades of castings.

3. STRUCTURAL ALUMINUM

Structural aluminum products shall conform to the requirements of ASTM Designation B 308 and the specifications included therein for the specified types and alloys.

(117-1)

4. BOLTS

Bolts shall conform to the requirements of Federal Specification FF-B-575 for the specified types, lengths and threads.

5. RIVETS

Unless otherwise specified, steel rivets shall conform to the requirements of ASTM Designation A 141.

6. WELDING ELECTRODES

Steel welding electrodes shall conform to the requirements of ASTM Designation A 233 except that they shall be uniformly and heavily coated (not washed) and shall be of such a nature that the coating will not chip or peel while being used with the maximum amperage specified by the manufacturer. Bare electrodes shall be used to weld metal that is to be galvanized. Aluminum welding electrodes shall conform to the requirements of ASTM Designation B 285 for the specified classification.

7. INSPECTION, TESTING AND CERTIFICATION

Structural metals shall be inspected and tested by the methods prescribed in the specifications cited herein. The material certification shall include the manufacturer's certified copy of typical inspection records of examinations and tests.

CONSTRUCTION SPECIFICATIONS
FOR
IRRIGATION PIPELINES
Steel or Corrugated Metal

1 CLEARING

Clear all brush, trees, rocks, etc., from the centerline and remove from the work area. Remove all large trees within 15 feet of the pipeline that have root systems which constitute a hazard to the pipeline.

2 EXCAVATION

2.1 Trench Excavation

Excavate the trench to grade with straight sides and with a minimum of six inches clearance on each side of the pipe. When trench is excavated in soils containing rock or other hard materials which might damage pipe or coating material, excavate slightly deeper than required and then fill to grade with fine earth or sand. Bring any over-excavation to grade by tamped earth. Remove any water entering the trench and allow the trench to dry until firm before any pipe is placed.

2.2 Structure Excavation

Structure excavation consists of the removal of all materials encountered or involved in the excavation and subgrade preparation for the placing of structures. Keep the excavated area dewatered until the structure is placed. Make all excavations of sufficient size to permit the placing of the full width, length and depth of the structure(s).

3 FURNISHING AND INSTALLING PIPE

3.1 General

Place the pipe fittings and appurtenances to the line and grade shown on the drawings. Install the diameter, kind, length, gage, finish or coating, class, type or grade as shown on the drawings. The fittings and appurtenances include diaphragms, anti-seep collars, baffle walls, risers, elbows, tees, etc. Unless otherwise specified herein or shown on the drawings, install the pipe in accordance with manufacturer's recommendations.

3.2 Bedding

Mold the bottom of the trench or excavation to fit the outer circumference of the pipe in such a manner that the depth of the molded bed is a minimum of one-tenth (0.1) the outside diameter of the pipe below the level of the bottom of the trench before the molding, and the pipe bears against solid undisturbed ground or compacted earth for its entire length.

2 - IrrPipe, Stl or Corr Utah

3.3 Handling and Placing

Handle coated pipe so as to prevent abrasion of the coating during transportation, handling, and placing. Do not drop pipe from cars or trucks nor allow the pipe to roll down skids without proper restraining ropes. Carefully lower pipe into the trench by the use of tripods or A-frame and chain blocks or by a crane or hoist.

3.4 Joints and Connections

Install special field joints according to the manufacturers recommendation. Construct all connections to withstand the working pressure of the pipeline and leave the inside free of any obstruction which would materially reduce the pipeline capacity.

If field joints are welded, take special care to avoid burning the protective coating. After the joints are welded, cover them with a high-quality asphalt or coal-tar enamel or a cement mortar of the same quality as applied to the pipe by the manufacturer. Apply sufficient coats to give at least the same thickness of protective covering as is on the balance of the pipe. Allow each coat to dry before the next coat is applied and lap and bond the coating onto the existing coating on the pipe. If the pipe has a wrapped coating, apply joint wrapping in such a manner as to provide a continuous uniform protection over the entire pipeline. Repair all abrasions of the coating similarly.

3.5 Testing

Fill the pipeline with water, taking care to bleed air and prevent water hammer. When the line is full, close the valves slowly to build up working pressure. Repair all visible leaks.

4 BACKFILLING

4.1 Trench Backfilling

After the pipe is laid in the trench, cover the pipe with earth, except at the field joints. Leave these uncovered until the field pressure test has been completed. Use earth to surround and cover the pipe for approximately six inches that is free of stones or clods which might injure the pipe coating. Place all backfill in such a manner as to insure thorough consolidation without injury to the pipe or its coating.

4.2 Structure Backfilling

Do not place the backfill around concrete structures for a period of three days after the last pour is made. Place and thoroughly compact the backfill by hand to the density of the original or surrounding materials. Do not use heavy equipment to backfill around structures.

5 STRUCTURES

Construct or install structures to the lines, grades, and dimensions specified or shown on the drawings. Install the kind, size, strength, amount, class, grade, or type of material as specified or shown on the drawings.

CONSTRUCTION SPECIFICATIONS
FOR
REGULATING RESERVOIRS

1 SITE PREPARATION

1.1 Clearing and Grubbing

Clear all brush, trees, stumps and rubbish from the storage area to the maximum high water line.

1.1b Stripping

Strip the base area of earth embankment, borrow area and spillway of all brush, trees, roots, stumps, rubbish and vegetal matter. Strip at least four inches deep. Dispose of all material from the stripping operation so as not to leave any unsightly piles of rubbish or vegetal matter.

2 EXCAVATION

2.1 Unsuitable Material

Remove spongy, organic or other unsuitable material from the foundation.

2.2 Cutoff Trench and Emergency Spillway

Excavate cutoff trench and emergency spillway to planned lines and grades. Use only suitable material in the embankment.

2.3 Structural Excavation

Excavate for structures two feet wider than the outside lines of the structures to provide ample room for forms bracing and compacting backfill. Excavate floors and footings to the neat lines. If the soil to be excavated is firm enough, it may be used as the outside form for small structures, in which case excavate to the neat lines.

Replace over-excavated material with compacted material. Suitable materials from excavation may be used as backfill or fill material.

3 STRUCTURES

3.1 Concrete

Cement: Use Type IIA Portland Cement unless otherwise specified.

Water: Use clean water free from impurities. Unless otherwise specified, use no more than seven (7) gallons of water for each bag of cement.

Aggregates: Use aggregates composed of clean, hard, durable uncoated particles free from lumps of clay, soft or flaky particles, loam, caliche, organic matter, or other harmful substances.

For fine aggregates, use a well-graded concrete sand with at least 95 percent by weight passing a No. 4 sieve and not more than 5 percent passing a No. 200 sieve.

Use coarse aggregates which are well-graded, having a maximum size not larger than one-half the thickness of the lining, and which have no more than 5 percent that will pass a No. 4 sieve.

Pit-run aggregates may be used if the maximum size particles do not exceed the coarse aggregate size specified above; if not more than 3 percent (by weight) will pass a No. 200 sieve; and if not less than one-third nor more than two-thirds of the material (by weight) is a well-graded sand that will pass a No. 4 sieve.

Proportioning and Mixing: Use at least 5.5 bags of cement for each cubic yard of concrete. Use proportions of sand, gravel, cement, and water such as to produce a workable mix of the consistency needed for the method of placement used and which will produce a dense, durable concrete.

Forms: Build forms to the lines, shape and dimensions shown on the plans. Use surfaced lumber free from defects. Brace and tie the forms to prevent movement. Leave the forms in place until the structure will support the design load.

Placing Concrete: Before placing concrete, fasten all embedded items firmly and securely.

Place concrete as near as possible to its final position and rod or tamp thoroughly around embedded items and into corners.

Finishing and Curing: Finish all unformed surfaces with a wood float and dress all edges.

Keep concrete in a moist condition for at least seven (7) days. Curing compound may be used in place of wet curing.

3.2 Pipe

Use pipe that equals or exceeds specifications for: (1) Concrete - ASTM C-118, (2) Welded Steel - AWWA C202-49, and (3) Corrugated Metal - Federal Specifications QQ-C-806a.

Place pipe on firm, smooth bedding free from stones, saturated earth, organic material or other objectionable bedding.

Compact the backfill thoroughly under the haunches and around the pipe. Allow no equipment to cross the pipe until there is sufficient backfill to support the load.

3.3 Gates

Install gates according to the manufacturer's recommendations for the particular types used. Unless otherwise specified, use slide gates with positive seating.

4 EARTH EMBANKMENT

4.1 Quality of Materials

Use approved soil materials for the earth fill portion of the dam, including the fill around the outlet conduit and in the cutoff trench. Use material free of brush, roots, sod or other perishable or compressible debris.

Remove stones larger than 5-inch diameter; except in the downstream toe, stones less than 8-inch diameter will be allowed.

4.2 Placement of Materials

Spread the materials uniformly, by means of tractor-drawn scrapers, in layers approximately six-inches thick before compaction. Spread the first course of fill material over the foundation in a thin layer such that the combined thickness of this layer and the scarified surface of the foundation is less than six inches.

Distribute the materials such that the embankment will be free from lenses, pockets, streaks, or layers differing appreciably in texture from the surrounding material.

Place the uncompacted fill material in a direction parallel to the main axis of the dam and keep it approximately level during construction.

Route equipment so that at least two-thirds of the surface of each lift is traversed by loaded scrapers traveling in a direction parallel to the axis of the dam.

Scarify any rolled surface too smooth for proper bond before placing the next layer.

Unless otherwise specified in special specifications or on a drawing, the top width shall be at least 10 feet wide and the side slopes no steeper than 3:1 upstream and 2:1 downstream.

4.3 Moisture Control

Keep the moisture of the foundation and the fill material near the optimum for compaction. Avoid excessive dryness and excessive wetness. Fine-textured soils are near optimum moisture when a compact, durable ball can be formed by squeezing a handful of the moist soil.

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A ball that will not shatter when dropped about two feet onto a hard surface contains too much moisture. Sandy soils are near optimum moisture if they tend to ball under hand-squeezing pressure.

4.4 Compaction

Sheepsfoot or pneumatic rollers are the best kind of compaction equipment. However, unless otherwise specified, fills may be compacted by rubber tired tractors, loaded scrapers, or loaded trucks if routed so that at least two-thirds of the surface of each layer is traversed by the wheels of the equipment, traveling parallel to the centerline of the canal or ditch. Compact each layer until rubber tired equipment does not leave appreciable tracks or indentations.

5 RIPRAP

5.1 Materials

Where shown on drawings or otherwise specified, use riprap materials of sound, dense, well-graded, durable rock or gravel of the size given in the special specifications.

5.2 Placement of Materials

Place riprap in such a manner as to insure the rock and/or gravel are uniformly distributed so as to provide a dense, uniform layer.

Boulder, Utah

Sept. 29, 1966

Mr. Gerald W. Stoker

Area Engineer
Cedar City, Utah.

Dear Mr. Stoker:

Enclosed are plans and Specs.
for the regulatory reservoir which
you requested by letter dated Aug. 30
1966. Will you process this as
soon as you can. Let me know
soon as we are nearly ready to
start on this Project.

Yours Truly

Ivan Lyman