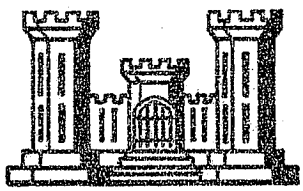
MERCED COUNTY STREAM GROUP

MAINTENANCE MANUAL

BURNS DAM AND RESERVOIR



SACRAMENTO DISTRICT

CORPS OF ENGINEERS

U. S. ARMY

SACRAMENTO, CALIFORNIA

MAINTENANCE MANUAL
BURNS CREEK PROJECT
MERCED COUNTY STREAMS, CALIFORNIA

Prepared in the Sacramento District
Corps of Engineers, U. S. Army
Sacramento, California, dated _____

Approved by the Chief of Engineers _____ 195___

E. D. File _____

REVISIONS

Date	New pages or exhibits	Date approved by C. of E.

MAINTENANCE MANUAL
BURNS CREEK PROJECT
MERCED COUNTY STREAMS, CALIFORNIA

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EXHIBITS

MAINTENANCE MANUAL
BURNS CREEK PROJECT
MERCED COUNTY STREAMS, CALIFORNIA

1. Authorization. - The Burns Creek project, comprising Burns Dam and Reservoir, was authorized as a unit of the plan of improvement for flood protection on streams in the Merced County Stream Group in San Joaquin Valley, California, by the Flood Control Act approved 22 December, 1944. The authorization was based upon a report entitled "Merced County Streams, California," printed as House Document No. 473, Seventy-eighth Congress, second session.

2. Purpose and Description of this Manual. - This manual will serve as a guide in the maintenance of the Burns Creek Project. The manual is divided into the following two parts:

Part A - Location and Description of Project

Part B - Maintenance - Burns Dam and Reservoir

PART A

LOCATION AND DESCRIPTION

1. Project Location. - The Burns Dam and Reservoir is located about 13 miles northeast from the city of Merced in central California. The project location is shown on Exhibit No. B-1. The dam extends across Burns Creek near the foothill line about 12 miles northeast from the town of Le Grand. Burns Creek rises in the lower Sierra Nevada foothills and flows westerly to join Bear Creek on the valley floor about 5 miles below the dam. Below the confluence, as Bear Creek it continues on a westerly course passing immediately north of the city of Merced to its junction with San Joaquin River.

2. Project Description. - The project works covered by this manual include the following:

a. An earthfill dam about 4,074 feet long with a crest width of 20 feet and a maximum height of 53 feet.

b. Five earthfill dikes with a total crest length of 4,764 feet, crest width of 20 feet and a maximum height of 11 feet.

c. An ungated unlined outlet works located near the right abutment of the dam consists of a reinforced concrete double barrel conduit having a capacity of 1,800 c.f.s. at gross pool elevation of 300.0.

d. A concrete spillway located through the ridge near the right abutment of the dam consists essentially of a control weir with a crest length of 40 feet, a discharge chute with training walls and a flip bucket for the purpose of projecting flows away from the downstream end of the spillway chute.

3. Protection Provided. - The project controls the flood water runoff from an area of about 74 square miles of foothill and mountain drainage. The entire capacity of 7,000 acre-feet will be available for flood control at all times. The project design flood has a peak inflow of 6,500 c.f.s. and a volume of 20,000 acre-feet.

4. Construction History. - The construction was accomplished under a single contract, copies of which are on file in the office of the District Engineer, Sacramento District, Corps of Engineers, Sacramento, California. Pertinent contract data are as follows:

a. Outlet works, Main Dam, Dikes and Spillway

Contractor - M. J. B. Construction Co.
Contract No. W-04-167-eng-1727
Work Started /s/ 15 July 1949
Work Completed 10 January 1950

PART B

MAINTENANCE - BURNS DAM & RESERVOIR

1. Purpose and Intent of this Manual. - The purpose of this manual is to furnish personnel of the District Office with information on the project works as to the details of maintenance requirements of the Burns Dam and Appurtenances. The general intent of the procedures contained herein is to insure that the structures and facilities shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain maximum benefits.

2. Definitions. - As used hereinafter the terms "Operations Division" and "Engineering Division" shall refer to organizations within the Sacramento District Office, Corps of Engineers, U. S. Army. "Flood Season" is considered to be the period between 1 November and 30 April.

3. Duties of the Operations Division. - All inspection, maintenance and operation of the dam and appurtenances, except the gage recorders, will be under the jurisdiction of the Operations Division. The general duties of this division shall include the following:

a. Training of Key Personnel. - Key personnel will be trained in order that regular inspection and maintenance work may be performed efficiently and to insure that unexpected problems related to flood control may be handled in an expeditious and orderly manner. They shall become familiar with the provisions of this manual, the construction specifications and "As Constructed" drawings.

b. Inspection and Maintenance. - Periodic inspections shall be made by the Chief of the Operations Division or his authorized representative in order to determine maintenance measures required to insure serviceability of the works in time of flood. Such inspections shall be made immediately prior to the beginning of the flood season, immediately following each major high water period and such intermediate times as may be necessary, but at intervals not to exceed 90 days. Immediate steps shall be taken to correct dangerous conditions disclosed by such inspections and regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Chief of the Division. All repairs shall be made in accordance with standard engineering practice, to line and grade and in accordance with details shown on construction drawings for the project works, copies of which are both included in Exhibit B-5. The check lists shown on Exhibit B-2 shall be used in each inspection to insure that no features of the protective system are overlooked. Items requiring maintenance shall be noted thereon.

c. Files and Records. - The Chief of the Division shall establish a file of all reports and records concerning the project works.

d. Encroachment or Trespass on Right-of-Way. - There shall be no encroachment or trespass which will adversely affect the efficient operation or maintenance of the project. The Chief of the Division shall,

therefore, cause notices to be posted at conspicuous places along the project right-of-way directing public attention to this requirement and he shall arrange for the prosecution of offenders and report actions taken to the District Engineer.

e. Permit for Right-of-Entry or Use of Portion of Right-of-Way. All requests for permits for temporary right-of-entry or use of portions of the Government owned rights-of-way shall be carefully reviewed to determine that such use will not adversely affect the safety and functioning of the project structures, or maintenance and flood fighting operations. A sample permit form is attached as Exhibit B-3.

f. Reports. - The Chief of the Division shall submit within a 10-day period following 1 July, of each year, a report to the District Engineer covering inspection, maintenance, and operation of the Burns Dam and Appurtenances, and it shall contain a statement of:

(1) The physical condition of the protective works as summarized from the logs of inspection.

(2) Flood behavior of the protective works.

(3) Flood fighting activities during the flood season.

(4) Prosecutions for encroachment or trespass.

(5) Permits issued for right-of-entry or use of right-of-way.

(6) Maintenance measures taken; nature, date of construction and date of removal of temporary repairs, date of permanent repairs.

(7) Fiscal statement of cost of maintenance and operation for the period.

4. Duties of the Engineering Division. - The operation and maintenance of the stage recorder will be under the jurisdiction of the Engineering Division. In addition to maintaining and operating the stage recorder, the Chief of the Division shall maintain a continuous record of stage in the Burns Reservoir, outflow from the reservoir through the conduits, and any flow over the spillway structure. Such records shall be made available to the Chief of the Operations Division for inclusion in the annual report and for the official files of the project. Exhibit B-6 contains copies of the rating curves for the outlet works and spillway together with the area-capacity curve for the reservoir.

5. Project Works. - The flood control works covered by this manual are known as the Burns Dam and Reservoir Project, and consist of a main dam, five dikes, an uncontrolled outlet, a spillway and miscellaneous facilities. The various items of the project are discussed in more detail in the following paragraphs.

6. Main Dam and Dikes

a. General. - The main dam and dike sections are similar. They consist of a compacted impervious fill constructed from homogeneous material borrowed from areas adjacent to the dam. Both upstream and downstream slopes are 3 horizontal to 1 vertical. Crown width is 20 feet. The crest elevation is 319.5. The main dam and dikes are located as shown on sheet 2 of Exhibit B-5.

b. Description Main Dam and Dikes. - The embankment section starts at station 121+00 and extends easterly 4,074 feet to station 161+74; the maximum height is 53 feet. The embankment is adapted to the topography by means of four curves and tangents. The downstream toe is protected against backwater between stations 125+60 and 131+50 by a 1.5 foot blanket of 3-inch plus cobbles placed on a 9-inch layer of gravel. The toe protection extends from elevation 273.0 to the valley floor and for a distance of 12-feet downstream. A ramp at station 133+45 provides access to the 20 foot wide, 5 inch thick gravel road which traverses the crest of the dam throughout its length. Five dikes placed in natural saddles complete the reservoir closure and are located between the following stations: 14+27 to 21+18, 32+79 to 42+83, 43+19 to 61+39, 65+15 to 74+74 and 165+26 to 168+16.

c. Inspection and Maintenance - Main Dam and Dikes. -

(1) Periodic inspections shall be made by the Chief of the Operations Division or his authorized representative to insure that:

(a) No unusual settlement, sloughing or materials loss of grade or embankment cross section has taken place.

(b) No caving has occurred on either the landside or reservoir side of the embankment which might affect the stability of the section.

(c) No seepage, saturated areas, or sand boils are occurring.

(d) No revetment work or riprap has been displaced, washed out or removed.

(e) There is no unauthorized grazing or vehicular traffic on the embankments.

(f) Encroachments are not being made on the embankment right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency.

(g) Crown of embankment is shaped so as to drain readily and roadway thereon is well shaped and maintained.

(2) To insure the taking of such maintenance measures as will be required for proper functioning of the embankment section, the following items shall be specifically covered in each inspection:

(a) Settlement, sloughing or material loss of grade or embankment cross section.

(b) Erosion of embankment slopes.

(c) Presence of seepage, saturated areas, or sand boils back of levee.

(d) Condition of toe protection and riprap.

(3) Maintenance methods to be used for repair or reconstruction of embankment fill shall depend on the extent of the damaged section. If of small extent, the most suitable method will be to bring the embankment back to line and grade by a fill made in 6-inch layers of coarse granular material, such as sand and gravel. If of larger extent, the fill shall be made in the same manner as the original construction with homogeneous material from borrow pits approved for the project, and placed in uniform horizontal layers not more than 6 inches in depth and compacted to a density equal to that of the original embankment section.

(4) Burrowing animals found in the embankments shall be exterminated. The dens and runways shall be opened up, then thoroughly compacted as they are backfilled. Extermination by trapping and poisoning are usually effective. Advice concerning the best methods of extermination in each locality can be obtained from the county agricultural agent.

(5) Embankments shall be kept cleared of growths of long grass and brush.

(6) Access roads and ramps shall be properly maintained so that ordinary maintenance work and flood fighting operations will not be obstructed.

(7) Gages

(a) The automatic recording gages shall be inspected by the Engineering Division at least once in each

30 day period during the flood season. Particular attention shall be given to the following items:

1. Check that clock is running and rewind if necessary.

2. Check that pen is marking and refill ink reservoir if necessary.

3. Check that paper is feeding smoothly through instrument and replace feed roll as necessary.

4. Check operation of float by turning float wheel back and forth.

5. Read outside and inside gages and note readings and day and hour of inspection on chart.

6. Check functioning of inlets to stilling well and clean if necessary.

7. Check accumulation of silt in stilling well and clean if necessary.

8. Each automatic recording gage shall be cleaned, lubricated according to manufacturer's instructions, and overhauled, if necessary, at least once a year, preferably during the month of October, immediately prior to the flood season. Each staff gage shall be cleaned of adhering mud or stain which would interfere with their legibility as often as required.

(b) At the time of each regular inspection by the Operations Division, the following is to be noted:

1. Damage or settlement of stilling wells.

2. Condition of riprap around stilling wells, if any.

3. Condition of recorder houses.

4. Condition of staff gages - any slippage or displacement.

(c) Gage house shall be kept in good repair and repainted as necessary. Any adverse conditions disclosed by the inspections shall be corrected immediately and all the gaging facilities kept in the best possible condition.

(8) Right-of-Way Fence and Gates.

(a) Fence. - The right-of-way fence shall be periodically inspected to make certain that:

1. The line posts are in reasonably good alignment.

2. There are no sagging or broken barbed wire strands.

3. All corner posts and braces are firm in their concrete settings.

4. All line posts have firm ground bearings.

5. Line posts have not pulled loose from ground bearings, in grade recessions, from stress, and that counter-stress weights are in place.

Any adverse conditions disclosed by the inspections shall be corrected immediately and the entire fence maintained in the best possible condition. All painted posts shall be repainted as necessary to insure their protection and serviceability. All posts requiring painting shall be thoroughly cleaned before applying paint. All paint shall be brush applied.

(b) Gates. - If upon inspection, it is found that the tubular steel gates, posts, or braces have been damaged or broken, they shall immediately be repaired and maintained in good operating condition. If any fastening chains and locks are missing they shall immediately be replaced. Keys to locks shall be kept readily available at the area office to permit ready passage through the gates for all authorized travel.

d. Flood Emergency Inspection.

(1) During flood periods, the dam and dike shall be patrolled continually to locate possible sand boils or unusual wetness of the landward slope and to take appropriate corrective measures for the following conditions:

(a) Indications of slides or sloughs developing.

(b) Wave wash or scouring action.

(c) Low reaches of embankment exist which may be overtopped.

(d) Other conditions exist which might endanger the structure.

(e) Inadequate labor and materials to meet all contingencies. Immediate steps shall be taken to control any condition which endangers the embankment and to repair the damaged section.

(2) It shall be the duty of the Chief of Operations or his authorized representatives to maintain a continual patrol of the project works during all periods of flood flow during which the water stage in the reservoir reaches elevation 300.0 or in excess thereof, and to maintain a store of supplies and equipment available for emergency flood-fighting operations and emergency repairs. In this connection, it is suggested that a copy of the latest revised "Flood Emergency Manual" be consulted for suggested methods of combating flood conditions. Operating personnel assigned to the project shall immediately dispatch a message, by the most rapid means of communication available, to the Chief of the Operations Division whenever the water surface reaches the flood stage indicated above, and also keep him advised at frequent intervals of project conditions until reservoir stage recedes to a safe level.

7. Outlet Structures.

a. General. - Outlet structures in the project consist of an uncontrolled outlet structure and a reservoir spillway.

b. Description.

(1) Uncontrolled Outlet Structure. - This structure is located at station 124+70 of the project base line. Details of the outlet structure are shown on sheet 10, 11, and 12 of Exhibit B-5. Principal features of the outlet works consist of an unlined approach channel; reinforced concrete intake, conduit through the dam, and jump basin; and an unlined exit channel. The unlined approach channel is trapezoidal with a 12 foot bottom width, 1 on 3 side slopes with a maximum depth of 10 feet. The invert grade is 2 6.0. The channel, 1,630 feet in length, extends from an upstream point in the original channel of Burns Creek, downstream to the intake section. The reinforced concrete intake is a rectangular structure 10.5 feet wide and 56 feet long, extending from the inlet channel section to the bellmouthed entrance of the conduit. The invert elevation is 266.0.0. The top of the vertical side walls slope

upward from elevation 267.0, at the upstream end, to 285.0 at the face of the headwall. A flow guiding partition wall, 1 foot thick and 40.72 feet long is placed along the longitudinal centerline. The top of the partition wall slopes upward from elevation 267.0 at the downstream end to 280.0 at the bellmouthed entrance headwall. A 1.5 foot thick blanket of one-man-stone, placed on a 1-foot layer of 3- inch minus gravel, extends around the intake structure for a width of 10 feet. A double 6-foot by 4.75-foot concrete conduit extends 271.0 feet through the embankment from the bellmouthed entrance to the exit into the jump basin. The conduit consists of 14 sections with collars and rubber water stops provided at each section. Exit invert elevation is 265.0. The conduit discharges into a concrete jump basin consisting of a 38 foot long ramp and a 44 foot long by 25 foot wide stilling basin. The ramp varies in width from 10.5 feet at the conduit exit, to 20 feet at the stilling basin and slopes from invert elevation 265.0, at conduit exit to 258.0, the apron elevation of the stilling basin. The stilling basin is provided with baffle blocks and an end sill 3.5 feet high. The guide walls of the jump basin have a top elevation of 273.0 and connect with wing walls 39.5 feet long with the same top elevation. A 4 foot high, 4 strand, barbed wire fence strung on steel posts installed at 10-foot centers on the basin walls, serves as a safety guard for the structure. A drainage system for the basin is provided by 6 inch VC pipe perforated drains which discharge into the basin. A 50 foot long trapezoidal section with a 20-foot bottom width provides an exit channel for the jump basin. The channel is lined with one-man-stone placed on a filter blanket. The filter blanket consists of a 12-inch layer of 3 inch minus gravel. A section 4 feet long at the end of the jump basin is protected by a layer of one-man-stone 7.5 feet thick, placed on the filter blanket. The one-man-stone layer then reduces in thickness at a uniform rate, to 4.0 feet thick in a distance of 3.5 feet and again reduces in thickness at a uniform rate from 4.0 feet thick to 2.0 feet thick at the downstream end of the lined channel section that ends 50 feet downstream from end of stilling basin. Side slopes are 3 on 1. An unlined, trapezoidal outlet channel 20 feet wide and 200 feet long discharges into the creek bed.

(2) Reservoir Spillway. - The spillway is located through the ridge near the right abutment of the dam, at station 120+00 of the dam traverse. This facility include an approach channel, a spillway control section, and an exit channel. Details are shown on sheets 13, 14, and

15 of Exhibit B-5. The trapezoidal approach channel has a variable bottom width which is 40 feet wide at the downstream end, invert elevation of 299.0 and side slopes warped from 1 on 3.25 to 1 on 2 at the downstream end of the approach channel. The invert and side slopes are protected with one-man-stone placed on a 78-foot distance, extending from the downstream end of the channel at station 9+22, upsteam to station 10+00. The spillway control section consists of a broad-crested weir, chute, and flip bucket. The spillway crest length is 40 feet. The 50-foot long weir approach apron is 3.0 feet thick and varies in elevation from 299.0 at the entrance to 300.0 at the crest.

Concrete side walls extend to elevation 319.5 which corresponds to the crest elevation of the dam, and concrete cut-off walls are provided upstream. The spillway chute is a reinforced concrete slab varying in thickness from 1.75 feet at station 10+00 to 1.0 foot at station 11+25 constructed on a .333 slope. The chute is 75 feet long and 40 feet wide with concrete side walls 8 feet high. A flip bucket constructed with a radius of 20 feet and lip elevation of 275.0 is provided at the end of the chute. A cut-off wall is provided across the end of the bucket. Side walls are cantilevered off the bucket. Return walls are provided extending down to elevation 265.0. A drainage system is provided under the invert slab of the chute by means of 6-inch VC perforated pipe drains which discharge into the basin. Derrick stone is placed at the end of the structure, extending 17.05 feet downstream. The exit channel is constructed on a .006 slope with a bottom width of 40 feet, side slopes of 1 on 3, and a length of approximately 795 feet. A safety fence is provided along the top of the spillway structure walls. The 4-foot-high fence consists of 4 strands of barbed wire strung on steel posts. The posts are set and grouted into pipe sleeves embedded in the concrete walls, at 10-foot centers.

c. Inspection and Maintenance.

(1) Adequate measures shall be taken by the Chief of Operations Division or his representative to insure that the inlet channel, outlet channel, outlet conduit and spillway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

(a) Care is being exercised to prevent the accumulation of trash near the structures.

(b) Erosion is not occurring adjacent to the structures which might endanger its water tightness or stability.

(c) Safety guard fences are in good condition. Immediate steps shall be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(d) Condition of riprap or stone blankets adjacent to outlet structures.

(2) At each inspection required by paragraph 3-b of this report, the following items, if applicable, shall be particularly noted:

(a) Damage or settlement of concrete conduit.

(b) Erosion of embankment slopes.

(c) Presence of seepage, saturated areas, or sand boils back of levee.

(d) Condition of toe protection and riprap.

(3) All concrete shall be repaired as soon as any reinforcing steel is exposed. The repair shall be made by thoroughly cleaning the surface, by chipping or sand blasting, and building up the concrete to its original section. For this purpose, the use of pneumatically placed Portland cement mortar is considered satisfactory. All evidence of settlement, uplift of failure of concrete structures should be referred to the Engineering Division for analysis and recommendation of remedial action.

8. Reservoir.

a. General. - The reservoir contains approximately 670 acres of pasture and grazing land.

b. Description. - The reservoir contains the area below gross pool, elevation 300.0, and extends approximately 2 miles upstream from the dam impounding the flow of Burns Creek. The land is very sparsely wooded and largely used for grazing livestock.

c. Inspection and Maintenance. -

(1) Periodic inspections shall be made by the Chief of the Operations Division, or his authorized representative, of the reservoir area to insure that:

(a) No new wooden buildings or other structures of floatable construction are erected.

(b) No felled trees, logs or other floatable debris is left within the reservoir limits.

(c) No wooden fences or corrals are built.

(d) All wire fences are stabilized by using a minimum of four steel posts to one wooden post.

9. Access Road.

a. General. - Burns Dam may be reached by an improved road which turns off from the "Old Merced Falls Road", a county road, about 3 miles north of the junction of the county road and State Highway No. 140. This latter junction is about 6 miles north-east of the town of Planada.

b. Inspection and Maintenance.

(1) Adequate measures shall be taken by the Chief of the Operations Division or his authorized representative to properly maintain the access roads so that flood emergency operations will not be delayed or obstructed. Immediate steps will be taken to repair damage or remedy adverse conditions disclosed by inspections. Periodic inspections shall be made to be certain that:

(a) Roadway surfaces are reasonably well graded and in conditions to sustain emergency travel. Surfaces shall be firm, smooth, stable and free from large rocks or cobbles. Ruts, low areas or spots where gravel surfacing has been displaced shall be filled to original grade with clean, well-graded gravel or crushed rock.

(b) Shoulders have not been so badly eroded that the full width of the roadway is impaired.

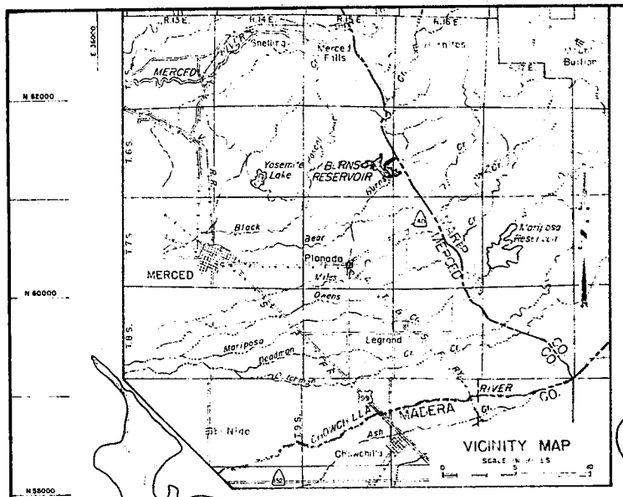
(c) Cattle guards are in good condition.

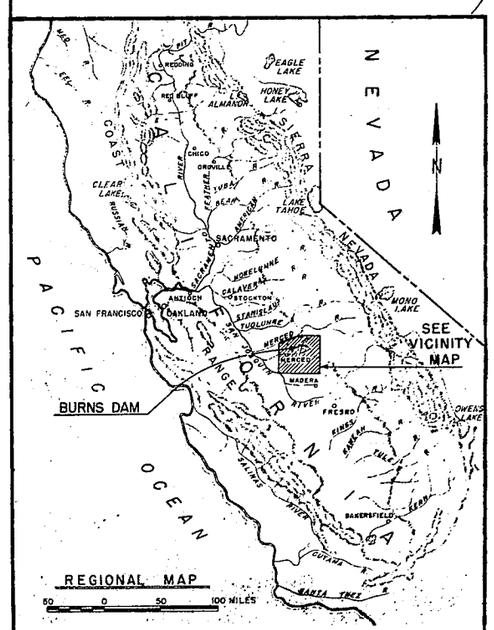
(d) Fence connections to gates are taut and that barbed wire strands are not broken.

(e) Gates are in good operating condition, free swinging and locked.

(2) At least once a year, or as required for protection and serviceability, all painted cattle-guard metalwork shall be re-painted. Painted surfaces shall be thoroughly cleaned before applying paint. All paint shall be brush applied.

(3) Gates. Damaged or broken tubular steel gates, posts or braces shall be repaired immediately. Keys to locks shall be kept readily available at the area office to permit ready passage through the gates for all authorized travel.





DIKE

DIKES
Crest El. 3195

SPILLWAY
Crest El. 300.0

MAIN DAM
Crest El. 319.5

℄ OUTLET WORKS

DIKE

GRAPHIC SCALE
1 IN. = 600 FT.
800 300 0 600 1200 1800 FEET

GROSS POOL
EL 300.0

N

NOTE:

SEA LEVEL DATUM OF 1929.
LOCAL PLANE COORDINATES.
TRUE AZIMUTH NORTH EQUALS 180°-07' AT STATION "800"
CONTOUR INTERVAL 5 FEET.

REVISION	DATE:	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
OFFICE OF THE DISTRICT ENGINEER
SACRAMENTO CALIFORNIA

DRAWN BY: G.M.K.
TRACED BY: G.M.K.
CHECKED BY: G.B.B.
SUBMITTED BY: Chief Section
APPROVED: Chief Engineering Division
APPR'D: DATE: FEBRUARY, 1949
LOCAL DESIGN BRANCH
APPROVED FOR THE DISTRICT ENGINEER: Colonel, Corps of Engineers U.S.A.
DATE: FEBRUARY, 1949

MERCED COUNTY STREAMS, CALIFORNIA
BURNS CREEK PROJECT
BURNS CREEK

RESERVOIR MAP

SCALE: AS SHOWN
SPEC. NO.
DRAWING NUMBER
ME-3-20-56
SHEET 1 OF 1

PLATE I

EXHIBIT B-2
CHECK LIST NO. 1
Embankments - Main Dam and Dikes

Inspector's Report Sheet No. _____ Date _____

Item	Remarks
(a) Location by station.	
(b) Settlement, sloughing or loss of grade.	
(c) Condition of weed or brush growth on slopes.	
(d) Condition of roadways including ramps.	
(e) Evidence of seepage.	
(f) Condition of upstream and downstream toes.	
(g) Condition of fences and gates.	
(h) Corrective action taken since last inspection.	
(i) Comments.	

Instructions for completing sheet 1, Exhibit B-2

(a) Show station of observation obtained by pacing from nearest referenced point. (Except as otherwise noted below.)

(b) If sufficient settlement of earth work has taken place to be noticeable by visual observation, indicate amount of settlement in tenths of a foot. If sloughing has caused a change in slope of the embankment sections, determine new slope. Note areas where erosion or gullying of the section has occurred.

(c) Note condition of weed and brush growth, inappropriate burning of same, and evidence of unauthorized grazing.

(d) Note any material change in grade and section of roadway. Indicate any inadequacy in surface drainage system.

(e) Indicate any evidence of seepage through the embankment.

(f) Indicate any evidence of gullying parallel with toes and dislocation of rock.

(g) Note condition of right-of-way fence and gates. Indicate if there is any damage to posts and braces, or any excessively sagging or broken wire strands. For location of any adverse condition found, give the approximate station number of the embankment, if applicable, stating whether it is upstream or downstream. (Viz. station 143+50 downstream.) Indicate if any painted posts require repainting. Indicate the serviceability of the gates in the right-of-way fence at stations 148+17 on crown of embankment and double gate at station 148+17 downstream. Note any damage to gate posts, braces, and gate panels. Note if fastening chains and locks are in place.

EXHIBIT B-2
CHECK LIST NO. 2
Outlet Works and Recorder Stations

Inspector's Report Sheet No. _____ Date _____

Item	Remarks
(a) Name of structure and location.	
(b) Debris or obstructions to flow.	
(c) Damage or settlement of conduit or structure.	
(d) Condition of concrete.	
(e) Condition of unlined approach and return channels.	
(f) Condition of stone protection.	
(g) Condition of gaging facilities.	
(h) Corrective action taken since last inspection.	
(i) Comments.	

Instructions for completing sheet 3, Exhibit B-2

(a) Indicate type of structure and enter centerline station. This sheet is intended for use during inspections of the Uncontrolled Outlet Works, the spillway and gage recording stations.

(b) Inspect the conduit and the intake and outlet channel sections for accumulations of sediment, rubbish and vegetal matter, and note any adverse condition found.

(c) Record any settlement of the conduit or of the spillway sill and wasteway structures.

(d) Indicate condition of concrete and record evidence of cracks, "pop-outs", spalls and abrasive wear. Note condition of expansion joints.

(e) Note condition of approach and return channels and indicate any changes in grade or alignment caused by either sediment or scouring action and any presence of debris or drift that might damage or clog the outlet works.

(f) Note condition of stone blanket protection and indicate such changes as disintegration of rock, erosion or movement and the presence of vegetal growth through the blanket.

(g) Note the condition of recording gage facilities in respect to: Serviceability of inlet pipes and strainers for the stilling well, any settlement of concrete base, all bolted connections, functioning of automatic recorder and float system and accumulation of silt in the stilling well.

EXHIBIT B-2
CHECK LIST NO. 3
Reservoir and Access Roads

Inspector's Report Sheet No. _____ Date _____

Item	Remarks
Reservoir	
(a) Location.	
(b) Presence of wooden buildings or other structures of floatable nature.	
(c) Presence of felled trees, logs or other floatable debris.	
(d) Presence of wooden fence.	
(e) Condition of wire fences.	
Access Roads	
(f) Location	
(g) Roadway surface	
(h) Shoulders	
(i) Cattle guards	
(j) Gates & connecting fences	
(k) Corrective action taken since last inspection	
(l) Comments	

EXHIBIT B-3

PERMIT

_____

(Name of Levee Commission or City)

_____

(Location)

Permission is hereby granted to:

_____ _____

(Name of Firm or Individual) (Address)

TO: (Describe in these spaces the proposal, including kind and type of construction, purpose intended, location by stationing. Indicate passageway provided by means of gates, etc. Use separate sheets if necessary, identifying each by reference herein.)

_____

_____

_____

_____

Provided That:

Upon termination or expiration of this permit (whether by voluntary relinquishment by the grantee, by revocation by the grantor or otherwise) the grantee shall remove all structures, improvements, or appurtenances which may have been erected or constructed under this permit, and shall repair or replace any portion of the flood protection structure or right-of-way which may have been damaged by his operations (including grading and seeding, or sodding, if necessary), to the satisfaction of the grantor.

The structure or operation for which this permit is issued shall be maintained by the grantee in such manner as shall not injure or damage the flood protection structure, or interfere with its operation and maintenance in accordance with regulations of the Secretary of the Army.

The structure or operation covered by this permit may be damaged, removed or destroyed by the grantor in time of flood emergency if such action is determined by the grantor to be necessary in order to preserve life or property or prevent damage or impairment to the use or safety of the flood protection structure, and the grantor shall not be liable to the grantee for such damage or destruction.

Unless otherwise specifically provided herein, this permit may be cancelled at any time by the grantor upon 10 days written notice mailed to the address shown above. During such 10 day period, (or such other period as may be provided herein), the grantee will be permitted to remove any property or improvements installed under this permit, and to repair or replace any damage to the flood protection right-of-way or structures resulting from his use or operations. At the end of such period, the grantor shall have the right to possess and dispose of any such property or improvements remaining upon its right-of-way, and may proceed to repair or replace any such damage, and the grantee herein shall be liable to the grantor for the full cost of such repairs or replacements.

_____ _____ _____ _____

Signature (Grantee) (Date) (Date)

District Engineer

EXHIBIT B-4

INDEX OF DRAWINGS

Burns Creek Project - Drawing No. ME-3-114-59

Title	Sheet No.
Reservoir Map	1 of 18
General Plan, Elevation and Sections	2 of 18
Areal Geology - Location of Exploration Holes	3 of 18
Logs of Shafts and Drill Holes	4 of 18
Logs of Failing Drill Holes	5 of 18
Logs of Trenches	6 of 18
Daily Hydrographs	7 of 18
Plan of Borrow and Waste Areas	8 of 18
Borrow Area No. 1 and Spillway Channel Logs of Exploration Holes	9 of 18
Outlet Structure - Plans and Sections	10 of 18
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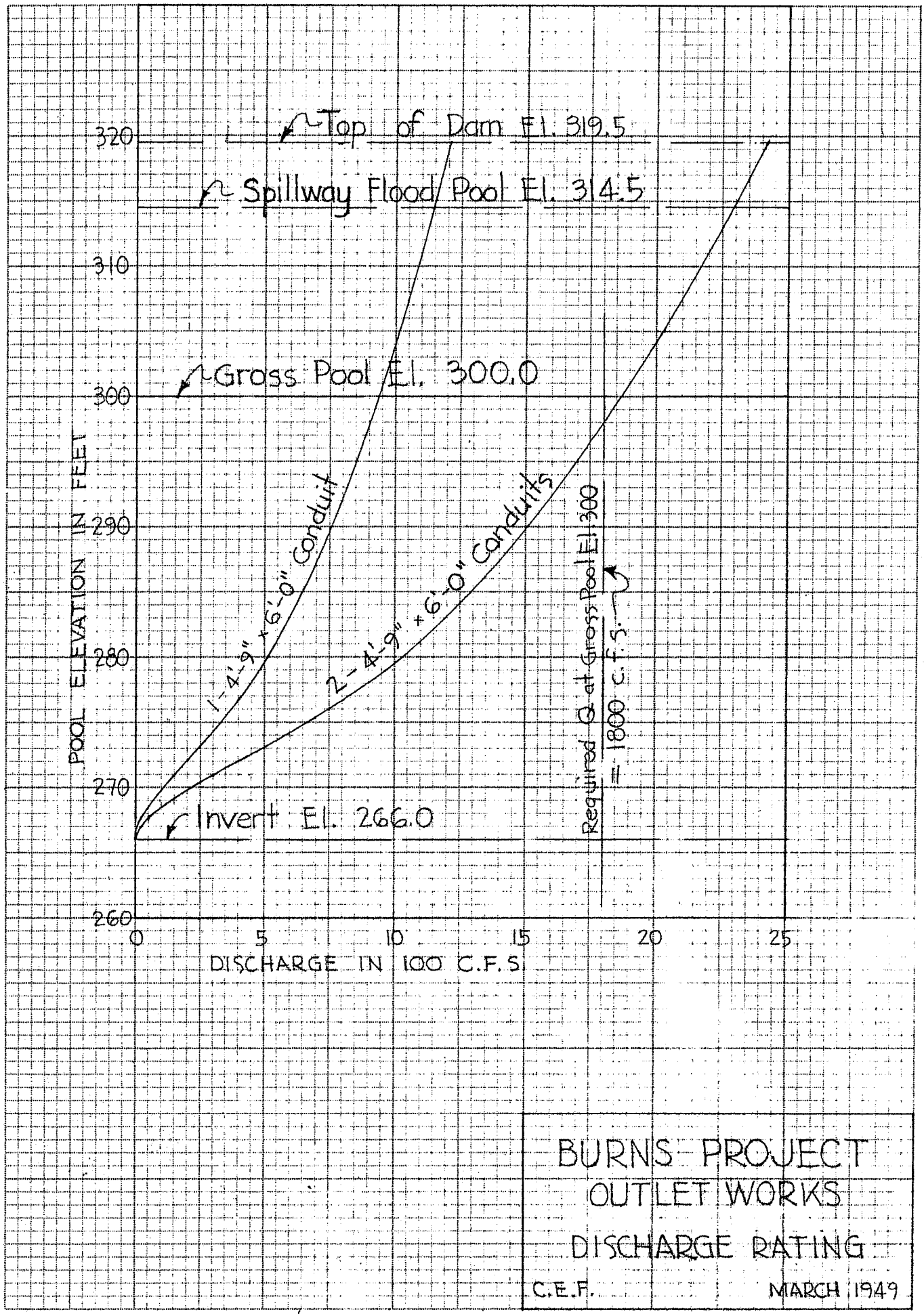
Construction Area - Steel Fence Details	18 of 18



BURNS PROJECT
OUTLET WORKS
DISCHARGE RATING

C.E.F. MARCH 1949

EXHIBIT B-6-1

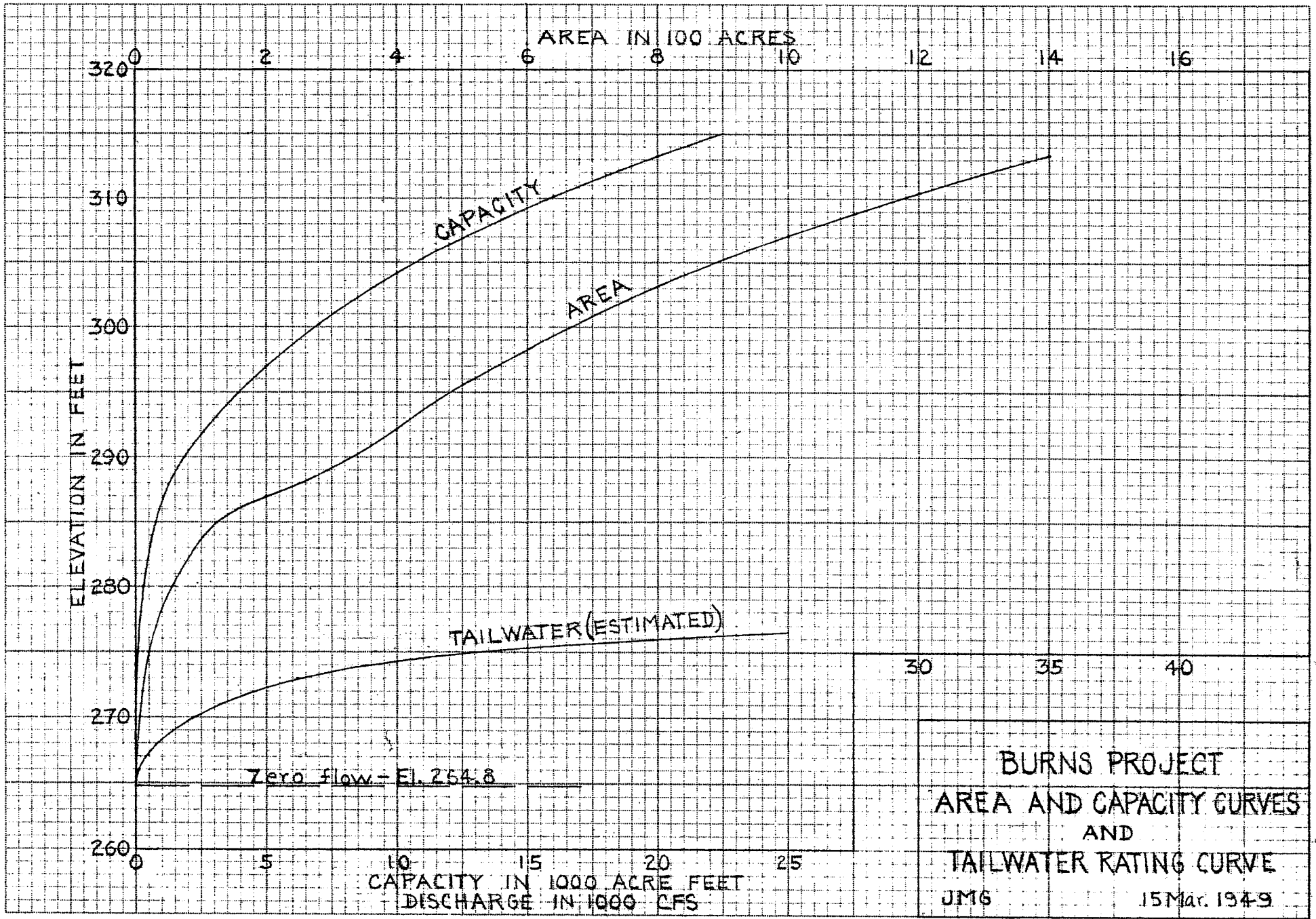

AREA IN 100 ACRES
0
2
4
6
8
10
12
14
16
320
310
300
290
280
270
260
ELEVATION IN FEET
CAPACITY
AREA
TAILWATER (ESTIMATED)
Zero flow - El. 254.8
0
5
10
15
20
25
30
35
40
CAPACITY IN 1000 ACRE FEET
DISCHARGE IN 1000 CFS
BURNS PROJECT
AREA AND CAPACITY CURVES
AND
TAILWATER RATING CURVE
JMG
15 Mar. 1949

EXHIBIT B-6-3

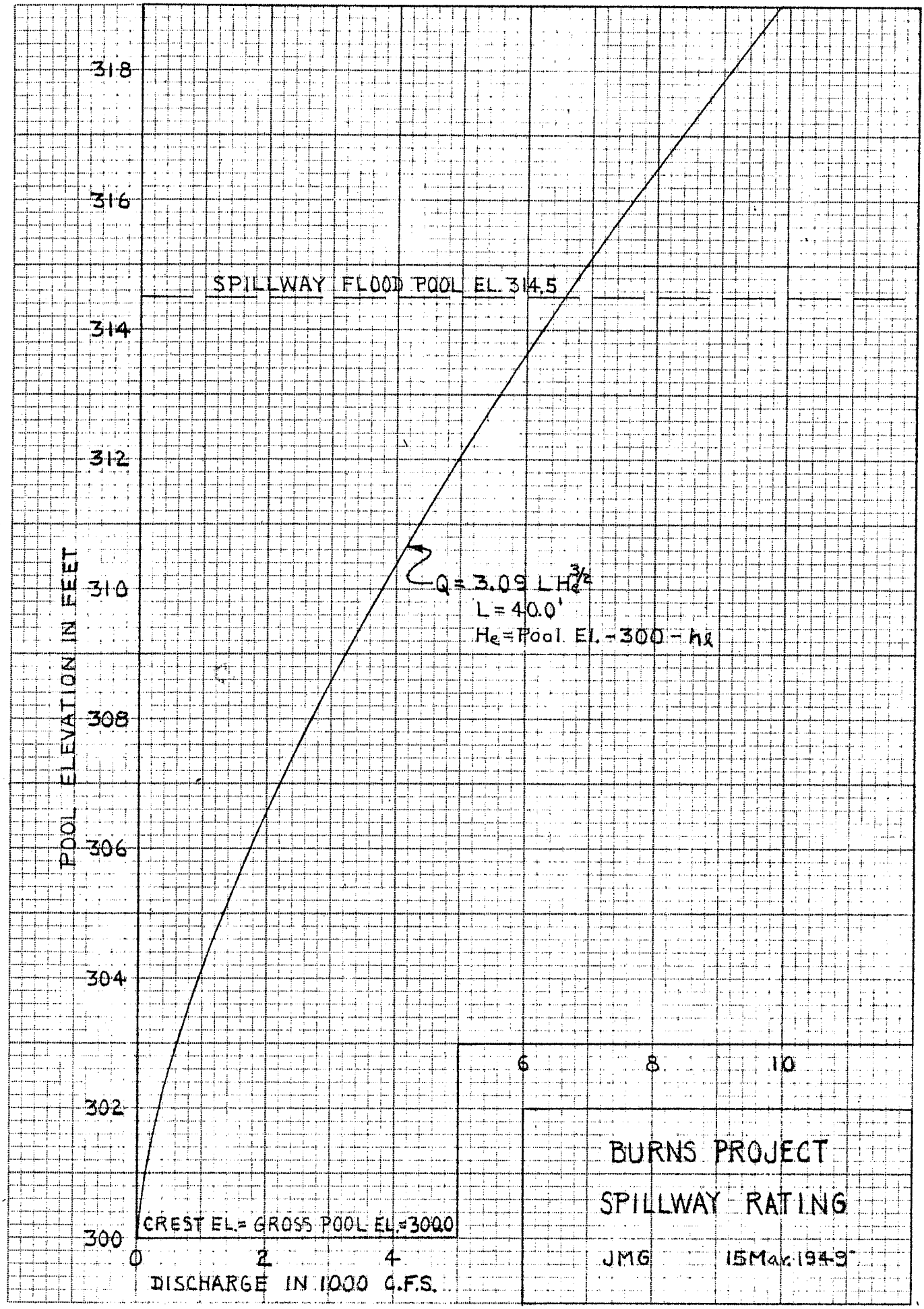

318
316
314
312
310
308
306
304
302
300
POOL ELEVATION IN FEET
SPILLWAY FLOOD POOL EL. 314.5
Q = 3.09 L He 3/2
L = 40.0'
He = Pool El. - 300 - hl
CREST EL. = GROSS POOL EL. = 300.0
0
2
4
6
8
10
DISCHARGE IN 1000 C.F.S.
BURNS PROJECT
SPILLWAY RATING
JMG
15 Mar. 1949

EXHIBIT B-6-2