Volume 5

flood plain at Clear Lake 7.7 on gage

OPERATION AND MAINTENANCE MANUAL

FOR

MIDDLE CREEK - PART NO. 2 LEVEES AND CHANNEL IMPROVEMENT

MIDDLE CREEK PROJECT, CALIFORNIA

U. S. ARMY ENGINEER DISTRICT

CORPS OF ENGINEERS

SACRAMENTO, CALIFORNIA

2nd

MIDDLE CREEK - PART NO. 2
LEVEES AND CHANNEL IMPROVEMENT

EXHIBIT B

TITLE

File No.	
CC-4-4-36	Middle Creek and Drainage Slough, Levee Construction from Clear Lake to Bloody Island, in 15 sheets.
CC-4-4-38	Middle Creek, Upstream Project Modifications, in 2 sheets.
CC-4-4-39	Middle Creek and Drainage Slough from Clear Lake to Bloody Island Pump, First Stage Levee Construction, in 1 sheet.
CC-4-4-41	Middle Creek and Drainage Slough From Clear Lake to Bloody Island Pump, Stage II Levee Rehabilitation, in 1 sheet.
CC-4-4-42	Middle Creek and Drainage Slough from Clear Lake to Bloody Island Pump, Stage III, in 2 sheets.

DISPOSITION FORM

(AR 340-15)

OFFICE SYMBOL OR FILE REFERENCE	SUBJECT
SPKGD-L	Middle Creek Project - Revisions or Additions to Operation and Maintenance Manuals

TO Chief, Constr-Opns Div FROM Chief, Engineering Div DATE 6 June 1966 CMT 1

E. Jensen/gh/3333

1. Forwarded herewith for your records are three copies each of additions for operation and maintenance manuals for the Middle Creek Project, Part No. 1, Pumping Plant and Part No. 2, Levees and Channel Improvement. The revisions or additions were made to include more recent construction work performed since initial issuance of the manuals and should be attached to your copies of the respective manuals.

2. Copies of the additions or revisions have been furnished the State Reclamation Board and the State Department of Water Resources.

E. J.

for A. GOMEZ
Chief, Engineering Division

2 Incl. (in trip)
1. Copies of Rev or Add Part No. 1
2. Copies of Rev or Add Part No. 2

cc: Design
Levees

SECURITY CLASSIFICATION (If any)

DISPOSITION FORM

FILE NO. SPKGD-L	SUBJECT Middle Creek Project, California - Operation and Maintenance Manual for Middle Creek - Part No. 2 - Levees and Channel Improvement

TO Chief, Const-Opns Div FROM Chief, Engr Div DATE 13 Sept 1961 COMMENT NO. 1
E. Jensen/124/11

1. Forwarded herewith for your records is one copy of an operation and maintenance manual entitled, "Middle Creek - Part No. 2, Levees and Channel Improvement."

2. Copies of the subject manual have been furnished the Division Engineer, the State Reclamation Board and the State Department of Water Resources.

1 Incl
O&M Manual

F. KOCHIS
Chief, Engineering Division

cc: Design
Levees & Channels

DISPOSITION FORM

SECURITY CLASSIFICATION (If any)

FILE NO.	SUBJECT
SPKCD-L	Middle Creek Project, California - Operation and Maintenance Manual for Middle Creek - Part No. 2 - Levees and Channel Improvement

TO	FROM	DATE	COMMENT NO. 1
Chief, Const-Opns Div	Chief, Engr Div	13 Sept 1961 E. Jensen/124/11	

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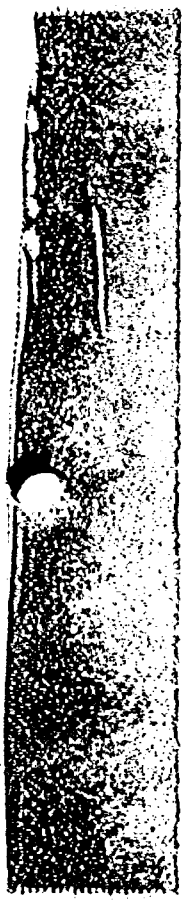
O&M Manual

F. KOCHIS
Chief, Engineering Division

cc: Design
Levees & Channels

CORPS OF ENGINEERS
U. S. ARMY



OPERATION AND MAINTENANCE MANUAL
FOR
MIDDLE CREEK - PART NO. 2
LEVEES AND CHANNEL IMPROVEMENT
MIDDLE CREEK PROJECT, CALIFORNIA

U. S. Army Engineer District, Sacramento
Corps of Engineers
Sacramento, California
August 1961

OPERATION AND MAINTENANCE MANUAL
MIDDLE CREEK PART NO. 2
LEVEES AND CHANNEL IMPROVEMENT

MIDDLE CREEK PROJECT, CALIFORNIA

LOCATION	ADDITION OR REVISION	DATE
Paragraph 1-05 c.	Add Contract No. 61-4	Jun 1966
Paragraph 1-05 d.	Add Contract No. 64-7	Jun 1966
Paragraph 1-05 e.	Add Contract no. 65-22	Jun 1966
Exhibit B	Add Drawings CC-4-4-36, CC-4-4-38, CC-4-4-41, and CC-4-4-42	Jun 1966
Exhibit F	Add copy of transfer letter dated 8 Dec 1959	25 Mar 2010
Exhibit F	Add copy of letter of refusal to accept dated 15 Dec 1959	25 Mar 2010
Exhibit F	Add copy of recognition letter dated 1 Mar 1960	25 Mar 2010
Exhibit F	Add copy of Memo for Record dated 13 Apr 1960	25 Mar 2010
Paragraph 1-05	Add subparagraph f	Nov 2010
Exhibit B	Add plan sheets G-1, C-1 – C-3 (4 sheets)	Nov 2010
Exhibit F	Add copy of letter of transfer dated 24 Nov 2010	25 May 2011

OPERATION AND MAINTENANCE MANUAL
MIDDLE CREEK - PART NO. 2
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MIDDLE CREEK PROJECT, CALIFORNIA

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MIDDLE CREEK PROJECT, CALIFORNIA

SECTION I

INTRODUCTION

1-01. Authorization. The Middle Creek Project was authorized by the Flood Control Act of 1954, approved 3 September 1954, Section 203 of which reads in part as follows:

> "Sacramento River Basin . . . . the project of flood protection for Middle Creek, California is hereby authorized in accordance with the recommendations of the Chief of Engineers in House Document Number 367, Eighty-first Congress . . . ."

Authorizing legislation by the State of California is contained in Section 12656.5 of the State Water Code and was enacted under the California Statutes of 1955.

1-02. Location. The Middle Creek Project levees and channel improvement as covered by this manual lies north of Clear Lake in Lake County, California. The only community in the project area is the town of Upper Lake, situated about 3-1/2 miles north of Clear Lake. Principal elements of the project include a new or improved left bank levee along Middle Creek from Clear Lake upstream about 3.87 miles to the mouth of Scott Creek; thence levees along both banks of Middle Creek from that point for about 3.12 miles to high ground; a levee along the left bank of Scott Creek from its mouth for about 1.34 miles to high ground; levees along both banks of Clover Creek from its mouth upstream about 0.2 miles to the town of Upper Lake; thence a levee along the left bank of Clover Creek from a point near the junction of Clover and Alley Creeks upstream about 0.35 miles to high ground; a levee along Alley and Poge Creeks from its junction with Clover Creek upstream about 0.83 miles to high ground; and a diversion structure and channel for diverting excess flood flows from Clover to Middle Creek north of the town of Upper Lake. A pumping plant (Bloody Island) located on the left bank of Middle Creek about 0.78 miles downstream from the junction of Scott and Middle Creeks is covered under another Operation and Maintenance Manual entitled "Middle Creek - Part No. 1, Pumping Plant, Middle Creek Project, California." The project location is indicated on the location map of Exhibit A-1, inclosed herewith. "Middle Creek - Part No. 2," as covered in this manual, includes that part of the Middle Creek levees and channels that lie upstream from the Bloody Island Pumping Plant.

1-03. Description of the Project Works. Middle Creek is one of the principal tributaries to Clear Lake and enters the Lake at its northern end. Scott and Clover Creeks are tributaries of Middle Creek, draining

areas to the west and east, respectively. Alley and Poge Creeks are tributaries of Clover Creek. The total area drained by Middle Creek and its tributaries amounts to approximately 200 square miles, varying in elevation from about 1,300 to 4,800 feet. The project works covered by this manual include the following:

a. The left bank levee and channel of Middle Creek from the Bloody Island Pumping Plant upstream to the junction of Scott and Middle Creeks a distance of about 0.78 miles.

b. Levees along both banks and the improved channel of Middle Creek from the mouth of Scott Creek to high ground, a distance of about 3.12 miles. Also the cleared channel of Middle Creek from the upstream end of the levees to a point about 0.78 miles farther upstream.

c. The left bank levee of Scott Creek from its mouth to a point about 1.38 miles upstream.

d. Both levees along Clover Creek from its mouth upstream 0.2 miles to the town of Upper Lake. Also the left bank levee of Clover Creek from the Diversion Structure upstream 0.35 miles to high ground.

e. The right bank levee of Alley and Poge Creek from the Diversion Structure upstream about 0.83 miles to high ground.

f. The Diversion Structure and Channel with levees along both banks that extend for a distance of about 0.76 miles.

g. The channel of Clover Creek from the diversion structure downstream to the State Highway Bridge No. 20 crossing.

1.04. Protection Provided. The project work was designed to protect 4,000 acres of agricultural land, the town of Upper Lake, State Highway No. 20 and several County roads that traverse the project area. On Middle Creek the project design flow is 27,000 cubic feet per second from Clear Lake to the mouth of Scott Creek, 19,000 c.f.s. from Scott Creek to the mouth of Clover Creek, 21,500 c.f.s. from Clover Creek to the Clover Creek Diversion Channel and 12,500 c.f.s. to the upper end of the project. The project design flow for Scott Creek is 11,000 c.f.s. On Clover Creek from the diversion structure to its mouth the project design flow is 500 c.f.s. Upstream from the diversion structure to Alley Creek the project design flow is 8,500 c.f.s. and upstream of Alley Creek it is 5,000 c.f.s. On the diversion channel the project design flow is 8,000 c.f.s. On Alley Creek the project design flow is 2,800 c.f.s. A freeboard of 3 feet has been provided on all levees within the project. On Middle Creek the grade of the adopted flood plane varies from elevation 1332.7 at the Bloody Island Pumping Plant to 1379.2 at the upper end of the levee. On Scott Creek the grade of the adopted flood plane profile varies from elevation 1336.2 at the

lower end to elevation 1339.6 at the upper end. For the upper portion of Clover Creek the adopted flood plane profile varies from elevation 1364.6 at the diversion structure to elevation 1370.6 at the upper end. On the Diversion Channel the grade of the adopted flood plane profile varies from elevation 1360.2 at its lower end to 1364.6 at the diversion structure on the upper end. On Alley and Poge Creek the grade of the adopted flood plane profile varies from elevation at the lower end to 1377.2 at the upper end of the project. All elevations are referred to U.S.G.S. datum.

1-05. Construction Data and Contractor. Construction contracts required by the Corps of Engineers to construct levees for the middle Creek Project and to provide channel improvement were as follows:

a. Emergency levee repairs along the left bank of Middle Creek and right banks of Clover and Alley Creeks was accomplished under Contract No. DA-04-167-CIVENG-59-26 during the period from 11 August 1958 to 20 September 1958.

b. Levee construction and channel improvement on Middle Creek and tributaries from the Bloody Island Pumping Plant upstream to high ground was accomplished under Contract No. DA-04-167-CIVENG-59-72 by Ferry Brothers, contractor, during the period from 8 December 1958 to 24 November 1959.

c. Levee construction on Middle Creek and Drainage Slough from Clear Lake to the Bloody Island Pumping Plant and upstream modifications were accomplished under Contract No. DA-04-167-CIVENG-61-4 by Eugene Luhr & Co. During the period from 8 August 1960 to 3 December 1963. Specification No. 2666. Drawings No. CC-4-4-36, CC-4-4-38 and CC-4-4-39.

d. Levee rehabilitation – Stage II Middle Creek and Drainage Slough from Clear Lake to the Bloody Island Pumping Plant was accomplished under Contract No. DA-04-167-CIVENG-64-7 by J.W. Richards, Contractor, during the period from 22 August 1963 to 10 December 1963. Specification No. 2969. Drawing No. CC-4-4-41.

e. Levee rehabilitation – Stage III Middle Creek and Drainage Slough from Clear Lake to the Bloody Island Pumping Plant was accomplished under Contract No. DA-04-167-CIVENG-65-22 by J.W. Richards, Contractor, during the period from 20 August 1964 to 10 November 1964. Specification No. 3124. Drawing No. CC-4-4-42.

f. PL 84-99 rehabilitation levee repairs to the right bank levee of Middle Creek, under Contract No. W91238-04-D-0029 (Task Order No. 4) by DD-M Leasing Company, was completed on November 21, 2007. The repair is located between coordinates 39.15561^{o}N, -122.91567^{o}W and 39.15487^{o}N, -122.91582^{o}W NAD83. Specifications: P.L. 84-99 CY 2007 Levee Repairs. Drawings: “PL 84-99 Levee Rehabilitation Repairs, CY2007 Order 3-5 Sites, Maintenance Area 17, Lake County, California”, as-built.

1-06. Flood Flows. For purposes of this manual, the term “flood” or “high water period” shall refer to flows when the water surface reaches or exceeds the following:

a. A reading of 12.0 on the gage located on the left bank of Scott Creek a short distance upstream from the State Highway No. 29 bridge.

b. A reading of 10.0 on the gage on the right bank of Middle Creek located a short distance upstream from a county bridge at Station M 292+70.

c. A reading of 7.0 on the gage on the right bank of the Diversion Channel just upstream from the diversion structure.

SECTION II

LOCAL COOPERATION REQUIREMENTS

2-01. Requirements of Local Cooperation. In House Document 367, 81st Congress, the Chief of Engineers recommended construction of the Middle Creek Project provided that local interests give satisfactory assurances to the Secretary of the Army that they will: (a) provide free of cost to the United States all necessary rights-of-way; (b) hold and save the United States free from damage claims due to construction; (c) after completion, maintain and operate the levees, channels and appurtenant works under rules and regulations prescribed by the Secretary of the Army.

Legislation authorizing participation by the State of California in the project was enacted under the California Statutes of 1955, Ch. 1949, and is cited in Section 12656.5 of the State Water Code, which is quoted in part as follows:

> "The project for flood protection on Middle Creek, California is hereby authorized and adopted substantially in accordance with the recommendation of the Chief of Engineers in House Document numbered 367, Eighty-first Congress, and adopted and authorized by the act of Congress approved August 17, 1954 . . . ."

2-02. Assurances Provided by Local Interests. The State of California by legislation enacted in 1955 has agreed to furnish the required cooperation. Section 12657 of the State Water Code states:

> "Except as otherwise provided in Chapters 1 and 2 of this part, the Reclamation Board shall give assurances satisfactory to the Secretary of War that the local cooperation, required by Section 3 of the act of Congress approved December 22, 1944 (Public numbered 534, Seventy-eighth Congress, Second Session), and Section 2 of the act of Congress approved August 18, 1941 (Public numbered 228, Seventy-eighth Congress, First Session), will be furnished by the State in connection with the flood control projects authorized and adopted in Sections 12648, 12650, 12651, 12652, 12654, and 12656.5 and on any flood control projects on any stream flowing into or in the Sacramento Valley or .the San Joaquin Valley hereinafter approved and authorized by Congress".

Formal assurances were furnished the District Engineer by the State Reclamation Board by letter dated 7 August 1957.

2-03. Acceptance by the State Reclamation Board. Responsibility for operating and maintaining the completed works upstream from the Bloody Island Pumping Plant was officially accepted by the Reclamation Board of the State of California by letter dated 9 August 1960, as shown on the attached letter of acceptance, EXHIBIT F.

SECTION III

MAINTENANCE AND OPERATION - GENERAL PROCEDURE

3-01. Reference to Approved Regulations. This manual is submitted in accordance with provisions of Title 33 - Navigation and Navigable Waters, Chapter II, Corps of Engineers, Department of the Army, Part 208 - Flood Control Regulations, Maintenance and Operation of Flood Control Works, approved by the Secretary of the Army, 9 August 1944, a copy of which is included as EXHIBIT A, Sheets 1 and 2.

3-02. Intent of Regulations. The general intent of the regulations approved by the Secretary of the Army is stated in paragraph 208.10(a)(1) as follows: "The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits."

The principal mission of the Corps of Engineers, during flood emergencies, is to insure that flood control works are properly operated and maintained and offer technical advice to enable local interests to obtain maximum flood protection. All other matters become secondary and will yield precedence to the accomplishment of the above-stated missions. During flood periods local interests maintain close liaison with the office of the District Engineer, Corps of Engineers. However, in the event it is evident that all available county and local resources are insufficient to cope with the situation and the necessity for an emergency proclamation is anticipated, requests for State assistance in flood fighting should properly be made direct to the Division of Water Resources, which is the State agency designated by the Directors of Public Works, to receive requests from local agencies for assistance in flood fighting. This agency is authorized to request Federal assistance from the Corps of Engineers when State and local resources are insufficient to cope with the situation. Therefore, it is desired to emphasize that requests for Federal assistance in flood fighting should be made only when it is evident that County, State and/or other local equipment and manpower will be exhausted and local resources are insufficient to cope with the flood emergency situation.

3-03. Purpose of this Manual. In view of the large number of local flood protection projects authorized by Congress and the repetitious nature of regulations to govern maintenance and operation of each individual project, and in order that local interests may be fully aware of the extent of the obligations assumed by them in furnishing assurances of local cooperation for projects to be constructed in the future, the general regulations described above were established by the Secretary of the Army. The general regulations approved by the Secretary of the Army, August 1944, were intended to be sufficiently broad in scope and general in nature as to be applicable to all flood-protect-projects for which such regulations are required by law.

Section 208.10(a)(10) of the regulations read as follows: "The War Department will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations." This manual has, therefore, been prepared to furnish local interests with information on a major unit of the project works and advise as to the details of the operation and maintenance requirements applicable to this particular unit, to state procedure required by the Department of the Army, and to indicate satisfactory methods of flood-fighting operations and emergency repairs. The project works are to be maintained and operated in accordance with the Flood Control Regulations referred to above and interpretations thereof contained herein.

3-04. Definitions. As used hereinafter, the term "Superintendent" shall be defined to mean the person appointed by the local agency to be directly in charge of an organization which will be fully responsible for the continuous operation and inspection of the project works; the term "District Engineer" shall be defined to mean the District Engineer of the Sacramento District, Corps of Engineers, U. S. Army, or his authorized representative. The term "right bank" or "left bank" shall be defined to mean the right or left bank or side, respectively, of a stream or channel when facing downstream.

3-05. General Provisions of Regulations. In addition to that quoted in paragraph 3-02 above, the general provisions of the Flood Control Regulations, contained in paragraphs 208.10 (a)(2) to 208.10 (a)(9), both inclusive, are quoted as follows:

> "(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of War, as required by law, shall appoint a permanent committee consisting of, or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of an organization responsible for the efficient operation and maintenance of all structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.
>
> (3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.
>
> (4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the

project works shall be permitted upon the rights-of-way of the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any features of the works without prior determination by the District Engineer of the War Department or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer, or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the works.

(6) It shall be the duty of the Superintendent* to submit a semi-annual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representative shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary, shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods."

*In this case the "Superintendent" will be the State Department of Water Resources.

3-06. Assistance to be Furnished by the District Engineer. The District Engineer will:

a. Furnish to local interests "As Constructed" drawings of the project works at the time they are transferred.

b. Make periodic inspections of the project works and notify local interests of any repairs or maintenance measures which the District Engineer deems necessary in addition to the measures taken by local interests.

c. Submit to the Office, Chief of Engineers, all cases of non-compliance with full details thereof for determination of corrective measures to be taken.

d. Make prior determination that any proposed encroachment, improvement, excavation, or construction within the right-of-way, or alteration of the project works, will not adversely affect the functioning of the protective facilities, and to furnish local interests with an approval thereof in writing.

e. Assist local interests as may be practicable, in their duties of ascertaining storm developments having flood-producing potentialities, assembling flood-fighting forces and materials, and initiating and carrying out flood-fighting operations.

3-07. Responsibilities of the Superintendent. In line with the provisions of the Flood Control Regulations, the general duties of the Superintendent include the following:

a. Training of Key Personnel. Key personnel shall be trained in order that regular 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. The Superintendent should have available the names, addresses, and telephone numbers of all his key men and a reasonable number of substitutes. These key men should, in turn, have similar data on all of the men who will assist them in the discharge of their duties. The organization of key men should include the following:

(1) An assistant to act in the place of the Superintendent in case of his absence or indisposition.

(2) Sector foremen in sufficient number to lead maintenance patrol work of the levee, inspect the channel, and operate the gate structures properly during flood periods. High qualities of leadership and responsibility are necessary for these positions.

b. Files and Records. The Superintendent shall maintain a file of reports, records, and drawings concerning the project works, readily available at all times to the District Engineer.

c. Encroachment or Trespass on Right-of-Way. In accordance with the provisions of Flood Control Regulations 208.10(a)(4), no encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted on the rights-of-way for the protective facilities. The Superintendent will, therefore, cause notices to be posted at conspicuous places along the project right-of-way directing public attention to this regulation. The Superintendent shall arrange for the prosecution of offenders under local ordinances and report action taken to the State Reclamation Board.

d. Permits for Right-of-Entry or Use of Portion of Right-of-Way. Permits for temporary right-of-entry or use of portions of the right-of-way shall not be issued withour prior determination by the State Reclamation Board sufficiently in advance of issuance to permit adequate study and consideration and determination of conditions to be embodied in the permit document. Executed copies, in triplicate, of the permit document as issued shall be furnished the State Reclamation Board. See EXHIBIT G for sample permit of right-of-entry.

e. Permits for Improvements or Construction within the Project Right-of-Way. All requests for permits for construction of any improvements of any nature within the limits of the project right-of-way shall be referred to the District Engineer through the State Reclamation Board for determination that such construction will not adversely affect the stability, safety, and functioning of the protective facilities, and for definition of conditions under which permit should be granted. These conditions will include, among others, the following items:

(1) That all work shall be performed:

(a) In accordance with standard engineering practice and in accordance with plans and specifications approved by the District Engineer or his authorized representative; drawings or prints of proposed improvements or alterations to the existing flood control works must be submitted for approval to the State Reclamation Board sufficiently in advance of the proposed construction to permit adequate study and consideration of the work.

(b) To the satisfaction of the District Engineer.

(2) After completion of the work, "As Constructed" drawings or prints, in duplicate, showing such improvements as finally constructed shall be furnished the District Engineer.

f. Coordination of local Activities. In accordance with the provisions of Flood Control Regulations, paragraph 208.10(a)(9), the Superintendent will, during periods of flood flow, coordinate the functions of all agencies, both public and private, that are connected with the protective works. Arrangements shall be made with the local law enforcement agencies, street departments, and railroad and utility companies for developing a coordinated flood-fighting program; and an outline of this program shall be filed with the District Engineer.

g. Inspection.

(1) Flood Control Regulations, paragraph 208.10(b)(1), are quoted in part as follows:

"(b) Levees (1) Maintenance . . . Periodic inspections shall be made by the Superintendent to insure that . . .maintenance measures are being effectively carried out . . .Such inspections shall be made immediately following each major high water period, and otherwise at intervals not exceeding 90 days and such intermediate times as may be necessary to insure the best possible care of the levee."

(2) For sake of uniformity, and to the extent practicable, the dates of inspection shall be as follows: 1 November, 1 May, and immediately following each flood flow in excess of a reading of 12.0 on the gage located on the left bank of Scott Creek, 10.0 on the gage located on the right bank of Middle Creek and 7.0 on the gage located on the right bank of the Diversion Channel. These gages are maintained by the State Department of Water Resources.

(3) The check lists and instructions shown in EXHIBIT E, sheets 1 to 9, inclusive, are to be explicitly followed in each inspection to insure that no features of the protective system are overlooked. Check lists locally typed or printed in conformity with sheets 2, 4, and 6, shall have printed on the reverse side the applicable instructions shown on sheets 3, 5, and 9, EXHIBIT E. Carbon

copy of the inspector's original field notes as recorded on the check list shall be transmitted to the District Engineer immediately following each inspection, and one copy included as an inclosure to the semi-annual report as provided in paragraph 3-07(i)(1) of this manual.

h. Maintenance.

(1) Flood . Control Regulations paragraph 208.10(b)(1) are quoted in part as follows:

"(b)(1) Maintenance. The Superintendent shall provide at all times such maintenance as may be required to insure servicability of the structures in time of flood. Measures shall be taken to . . . exterminate burrowing animals, and to provide for . . . removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces . . . . . Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent."

(2) Full responsibility for making the repairs and the methods used is placed on the Superintendent, but the experience and facilities of the District Engineer will be available to him for advice and consultation.

(3) All repairs shall be made in accordance with standard engineering practice, to line and grade and in accordance with details shown on the construction drawings for the project works, copies of which are included in EXHIBIT B. No change or alteration shall be made in any feature of the project works without prior determination by the District Engineer that such alteration will not adversely affect the stability and functioning of the protective facilities. Plans and specifications of all changes or alterations that may be proposed by the Superintendent shall be submitted to the District Engineer for investigation and approval befcre prosecution of the work."

i. Reports.

(1) Semi-Annual Report. In accordance with the provisions of the Flood Control Regulations, paragraph 208.10(a)(6), the Superintendent* shall submit within a 10-day period

following 1 December and 1 June of each year, a semi-annual report to the District Engineer covering inspection, maintenance, and operation of the protective works. This report will present a statement of:

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

(b) Flood behavior of the protective works, and flood-fighting activities during the period.

(c) Prosecutions for encroachment or trespass.

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

(e) Permits issued for improvements or construction within the project right-of-way.

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

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

A suggested form for submission of the semi-annual report is included as EXHIBIT D, sheets 1 and 2.

*In this case the "Superintendent" shall be the State Department of Water Resources.

3-08. Inspection Procedure. Since the enactment of State Legislation of Chapter 1528, Statutes of 1947, the Department of Water Resources, State of California, has made semi-annual inspections of all levees of authorized flood control projects in the Sacramento-San Joaquin drainage basin pursuant to the Federal Regulations of 16 August 1944 (Title 33), and reports its findings to the local agency, the State Reclamation Board and the Sacramento District, Corps of Engineers, U. S. Army. This activity, initiated pursuant to Section 208.10(a) of the Federal Regulations, has in effect provided for transfer from the local agencies to the State Department of Water Resources the obligation of compliance with Sections 8371, 8372, and 8373 of the Water Code of the State of California. These sections of the Code require the local responsible agencies to submit a report to the State Department of Water Resources on or before 1 June of each year on the condition of the levees within their jurisdiction. Supervisory powers and duties of the Department are applicable to all works of the Sacramento River Flood Control Project maintained and operated by the local agencies without regard to status of completion, or expenditure of Federal funds on the construction of such works.

The following procedure is used in inspecting the levees of the responsible maintaining agency:

Personnel of the State Department of Water Resources make a detailed inspection in the spring and fall of each year and make a report on any required maintenance. The inspection objectives are to determine if the following items, which are a condensation of Federal Regulations, are being adhered to:

a. That all brush, trees and wild growth other than sod are removed from the levee crown and slopes.

b. That all weeds, grass and debris on the levee have been burned during the appropriate season, where not dangerous or impractical.

c. That all grass and weeds on the levee have been mowed where removal by burning is dangerous or impracticable. This applies only on peat levees or where burning would constitute a hazard to improvements.

d. That all burrowing animals have been exterminated.

e. That all caves, sloughs, burrows, holes, slips or other damaged portions of the levee have been repaired.

f. That all irrigation and drainage structures through the levee are in good working condition.

g. That no revetment work or riprap have been displaced, washed out or removed.

h. That the crown of the levee is well shaped and maintained and that unauthorized vehicular travel is restricted.

i. That stock grazing on the levee is restricted to conditions and seasons when the levee would not be seriously scarred or otherwise damaged thereby.

j. That encroachments are not being erected on the levee which would hinder travel by authorized patrol vehicles.

k. Prevent the erection of structures on, additions to, or alterations of, the levee unless authorized by permit from the State Reclamation Board.

Following this detailed inspection a joint field inspection is made with representatives of the responsible maintaining agency and the State Department of Water Resources to review and discuss the inspection report.

Upon completion of the fall inspection the State Department of Water Resources publishes an annual report entitled, "Status of Project Levee Maintenance" which indicates the degree of proficiency attained by each obligated local agency in providing required maintenance.

SECTION IV

FEATURES OF THE PROJECT SUBJECT TO FLOOD CONTROL REGULATIONS

4-01. Project Works. Construction along Middle, Scott, Clover, Alley, and Poge Creeks, as covered by this manual, consist of setback and enlargement of the locally constructed levees to project standards; channel improvement by enlargement of the channel to the extent necessary to lower the channel and to obtain borrow material for levee construction and channel clearing; a diversion structure; a diversion channel with levees from Clover Creek to Middle Creek; stone protection at various locations; irrigation structures and drainage structures from the Bloody Island Pumping Plant upstream to high ground along Middle, Scott, Clover, Alley, and Poge Creeks. For further details see the drawings of EXHIBIT B.

4-02. Levees.

a. Description. For location and description of levees covered in this manual, see paragraphs 1-02 and 1-03. Levees have been built to adopted grade and section by new construction with a riverside berm of variable width of 30 feet or better, waterside slope of 1 on 3 and landside slope of 1 on 2. The levees have a crown width of 12 feet except where a public road traverses the levee, in which case the crown width varies from 14 to 30 feet. The patrol road surfacing consists of 4 inches of crushed mineral aggregate 10 feet in width. Access ramps, turnouts and turnarounds are also surfaced. For more complete detail of items included in construction of the project levees, refer to the "As Constructed" drawings of EXHIBIT B. Regulations regarding inspection, maintenance and operation will be found in paragraphs 4-02 b, 4-02 c, and 4-02 d of this manual.

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (b)(1), are quoted in part as follows:

"(b) Levees - (1) Maintenance . . Periodic inspection shall be made by the Superintendent . . . to be certain that

(i) No unusual settlement, sloughing, or material loss of grade of levee cross section has taken place;

(ii) No caving has occurred on either the landside or the riverside of the levee which might affect the stability of the levee section;

(iii) No seepage, saturated areas, or sand boils are occurring;

(iv) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;

(v) Drains through the levees and gates on said drains are in good working condition;

(vi) No revetment work or riprap has been displaced, washed out, or removed;

(vii) No action is being taken, such as burning grass and weeds, during inappropriate seasons, which will retard or destroy the growth of sod; (see Note (a) at end of subparagraphs (1)).

(viii) Access roads to and on the levee are being properly maintained;

(ix) Cattle guards and gates are in good condition:

(x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

(xi) There is no unauthorized grazing or vehicular traffic on the levees;

(xii) Encroachments are not being made on the levee right-of-way which might endanger the structure or hinder its proper and efficient functioning during times of emergency. Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days; and such intermediate times as may be necessary to insure the best possible care of the levee . . . ."

Note (a)

Since the growth of sod on the slopes of the levees of this project is not practicable and as the nature of the levee growth warrants burning thereof to facilitate inspection, the provisions of subparagraph b (1) of the regulations inconsistent therewith shall not apply. In place of item (vii), therefore, the following shall be observed:

Weeds, grasses and debris on the levee shall be burned during appropriate seasons, where not dangerous or impracticable, in order to permit the detection of cracks, holes, burrows, slips, and other damage and to permit the detection and extermination of burrowing animals and that grass and weeds on levee slopes be mowed where removal by burning is dangerous or impracticable, such as on peat levees or where burning would constitute a hazard.

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

(a) Aggradation or degradation of the stream bed along the toe.

(b) Settlement of levee fill.

(c) Erosion of levee slopes, both sides of levees.

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

(e) Condition of access roads and roadway on levee.

c. Maintenance.

(1) Repairs to Levee Embankment. Methods used for repair or reconstruction of the levee fill will depend on the extent of the damage section. If of small extent, the most suitable method will be to bring the levee back to line and grade by a fill made in 6-inch layers of earth free from brush, roots, sod or other unsuitable material. If of larger extent, the fill should be made in the same manner as the original construction, of selected material from borrow pits approved for the project, placed in uniform layers of loose material and not more than 6 inches in depth and compacted in accordance with the specifications under which the work was completed or compacted according to approved construction practices. The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the levees in time of flood.

(2) Depredations of Burrowing Animals. Dens and runways

formed within the levee by burrowing animals are frequently the causes of levee failures during flood stages. Burrowing animals such as muskrats, ground hogs, ground squirrels, moles and gophers, found in the levee should be exterminated. The dens and runways should be opened up and thoroughly compacted as they are backfilled. Levees kept properly cleared are not seriously menanced by burrowing animals as they prefer areas where a protective cover, such as high grass, weeds, and brush, is found. Several methods of extermination are found effective, such as trapping, baiting, and poison gases, depending on the type of animal present and the time of year the work is done. Advice concerning the best methods in each locality can be obtained from the County Agricultural Agent.

(3) Access Roads. Access roads to the levees shall be maintained in such condition that they will be accessible at all times to trucks used to transport equipment and supplies for maintenance of flood-fighting.

(4) Burning. Along reaches of the levee where the practice of burning weeds, grasses and debris is conducted, extra precaution shall be taken to prevent fires from reaching asphaltic covered pipes and wooden structures. Prior to the time fires are started, all weeds, grasses and combustible materials shall be removed for a distance of at least 3 feet from pipes and structures that are susceptible to burning. Wet sacks or water sprays should be made available to workmen to prevent fires from reaching inflammable structures.

d. Operation.

(1) Pertinent Requirements of the Code of Federal Regulations Flood Control Regulations, paragraph 208.10(b)(2) are quoted in part as follows:

"(2) Operation. During flood periods, the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope to be certain that:

"(i) There are no indications of slides or sloughs developing:

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee exist which may be overtopped:

(iv) No other conditions exist which might endanger the structures.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section."

(2) It shall be the duty of the local agency responsible for maintenance to keep in contact with the State Department of Water Resources Flood Operation Center during all periods of flood danger, and maintain a patrol of the project works in their area during periods of flood in excess of a reading of 12.0 on the gage located on the left bank of Scott Creek, 10.0 on the gage located on the right bank of Middle Creek, and 7.0 on the gage located on the right bank of the Diversion Channel, as referred to in paragraph 1-06 of this manual.

The Flood Operations Center is responsible for data collection and issuance of a joint forecast with the U. S. Weather Bureau and coordinates with the Sacramento District Engineer, and other agencies to keep appraised of the current situation in accordance with terms of the Memorandum of Understanding dated 1 November 1956, between the Division Engineer, U. S. Army Engineer Division, South Pacific, and the Director, Department of Water Resources, State of California, for cooperative action during flood emergencies.

4-03. Channels and Floodways.

a. Description.

(1) Middle Creek. As shown on the drawings of EXHIBIT B, excavation of the Middle Creek channel started in the vicinity of the Bloody Island Pumping Plant and progressed upstream with varying widths to the upstream end of the Middle Creek Levee near Station M 326+83. The channel was cleared of vegetation continuing upstream to Station M 368+00. For further details and location of stations see drawings of EXHIBIT B.

(2) Scott Creek. Channel improvement on Scott Creek from its junction with Middle Creek to the upper end of the project levee consisted principally of clearing in the channel and channel enlargement incidental to removal of borrow for levee construction. At a few

locations degrading of the channel was accomplished to remove restrictions and to improve channel alignment.

(3) Clover, Alley and Poge Creeks. The Clover, Alley and Poge Creek channels were improved by clearing and excavation to reduce velocities and straighten the channel. It is noted that the channel of Clover Creek between the diversion structure and the head of levee work near the State Highway No. 20 bridge will have to be maintained to retain its design capacity of 500 cubic feet per second although no work was done in this reach.

(4) Diversion Channel. A diversion channel between Clover Creek and Middle Creek was constructed to carry 8,000 cubic feet per second and outlet works designed to limit the flow down the existing Clover Creek channel to 500 cubic feet per second. The Diversion Channel has a bottom width of about 115 feet, side slopes of 1 on 2, berms of 30 feet and levees on both sides for a length of about 4,000 feet. For further details see drawings of EXHIBIT B. Regulations regarding inspection, maintenance and operation of channels and floodways will be found in paragraphs 4-03b, 4-03c and 4-03d of this manual.

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (g)(1) are quoted in part as follows:

"(g) Channels and floodways . . .(1) Maintenance. Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds, and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections and deflection dikes and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections . . ."

(2) The purpose of the flood-flow channels inspection is to insure that conditions which affect the channel capacity will remain the same, as far as possible, as those considered in the design assumptions and that no new conditions develop that may affect the stability of the project structures. At each inspection required by Paragraph 208.10 (g)(1) of the Flood Control Regulations, particular attention will, therefore, be given the following:

(a) Location, extent and size of vegetal growth.

(b) Unauthorized operations within the flood-flow channel right-of-way, such as excavations, buildings, and other structures, levees, bank protection, or training dikes.

(c) Rubbish and industrial waste disposal.

(d) Changes in the channel bed such as aggradation or degradation, which would interfere with free-flow from side drainage structures or induce local meanders that would scour the banks.

(e) Operations of any nature upstream from the project that would affect flow conditions within the limits of the flood control project.

(f) Condition of project structure.

1. Channel walls;

a. Deviation from alignment and grade.

b. Development of cracks and spalls.

c. Mechanical injuries.

2. Fencing.

a. Injuries to posts, fencing or barbed wire.

b. Damage to galvanizing.

3. Earth fills:

a. Settlement.

b. Erosion of both slopes.

c. Excessive seepage or saturation area back of fills.

d. Condition of bank protection - concrete or stone blanket.

4. Right-of-way:

a. Presence of dumped refuse.

b. Encroachment or trespass.

(3) No excavation in the channels within the limits of this unit will be permitted unless an excavation permit has been approved by the State Reclamation Board.

(4) If any work is done to improve flow conditions in the channels of this project or the Diversion Channel, it should be coordinated with the District Engineer to insure that proper provisions are made for channel alignment and capacity to conform to the existing project.

(5) The intent of these inspections is to disclose all conditions which in any way affect the stability of the structures and their functioning for the control of floods. Each inspection report should note and comment on any repair measures that have been taken since the last inspection. In making these inspections, the check sheets included as EXHIBIT E, shall be explicitly followed.

c. Maintenance.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10

(g)(1) are quoted in part as follows: ". . .Immediate steps will be taken to remedy any adverse conditions disclosed by such inspection . . ."

(2) Shoaling or aggradation at the inlets or outlets of side drainage structures may render them inoperative. It is, therefore, imperative that all drains be kept open and unobstructed at all times.

(3) Dumped rock or other suitable types of protection should be placed at locations found by experience to be critical trouble points, with a view to stabilizing the channel alignment and preserving the general uniformity of the bank lines.

(4) Sediment and debris plugs or other obstructions should be removed from the channel to prevent any tendency for the flows to be deflected within the channel. The heavy material likely to accumulate in the new channel at the mouths of tributaries should be removed to keep the channel clear.

(5) The channel and right-of-way shall be kept reasonably clear of debris, refuse matter, or industrial wastes.

(6) Weeds and other vegetal growth in the channel shall be cut in advance of the flood season and together with all debris, removed from the channel.

(7) All eroded concrete shall be repaired as soon as any reinforcing steel is exposed or erosion approaches a depth of 4 inches. For this purpose, it is recommended that the repair be made by thoroughly cleaning the surface by sandblasting and building up the section with pneumatically placed Portland cement mortar. All evidence of settlement, uplift, or failure of concrete structures shall be referred to the State Engineer for analysis and remedial measures.

(8) All damage to fencing, whether resulting from accidental or willfull injuries or from corrosion, shall be promptly repaired with new material in order to maintain satisfactory protection to the public.

d. Operation.

(1) Pertinent Requirements of the Code of Federal Regulations, paragraph 208.10 (g)(2) are quoted in part as follows:

"(g) Channels and floodways (2) Operation. Both banks of the channel shall be patrolled during periods of high water . . .Appropriate measures shall be taken to prevent the formation of jams . . .of debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter all snags and other debris shall be removed and all damage to . . .walls, drainage outlets or other flood control structures repaired."

4-04. Drainage and Irrigation Structures.

a. Description. Drainage and irrigation structures which extend through the levees are listed as follows:

Levee Mile	Size of Pipe	Gate	Other Description	Feet Below Crown
			Unit No. 1 - Left Bank Middle Creek	
0.17	4" steel		Siphon Breaker in pipe well L.S.	3.0
0.37	8" steel		" " " " " "	3.0
0.54	8" steel		" " " " " "	3.0
0.62	8" steel		" " " " " "	3.0
0.83	8" steel		" " " " " "	3.0
2.26	2 - 36" CMP	W.S.		9.0
2.35	42" CMP	W.S.		10.0
3.99	24" CMP	W.S.	Pump L.S.	12.4
4.18	2 - 42" CMP		Bloody Island Pumping Plant	20.2
			Unit No. 2 - Right Bank Middle Creek	
0.13	4" steel			3.0
0.13	42" CMP	W.S.		11.5
0.23	36" CMP	W.S.		7.6
0.38	42" CMP	W.S.		7.7
0.47	42" CMP	W.S.		7.0
0.54	36" CMP	W.S.		9.0
1.08	36" CMP	W.S.		7.3
1.22	30" CMP	W.S.	Riser unit W.S., Pump L.S.	17.8
2.93	24" CMP	W.S.		12.0
			Unit No. 3 - Left Bank Scott Creek	
0.41	6" steel		Siphon Breaker - ends plugged	2.0
0.55	42" CMP	W.S.		23.0
0.60	1-1/2" steel			1.5

Levee Mile	Size of Pipe	Gate	Other Description	Feet Below Crown
			Unit No. 3 (Cont'd)	
0.79	24" CMP	W.S.		10.0
0.90	36" CMP		Plugged with concrete	10.0
0.94	42" CMP	W.S.		16.5
1.01	24" CMP	W.S.		14.0
1.02	6" steel	W.S.	Siphon Breaker in pipe well L.S.	2.5
1.09	24" CMP	W.S.		12.5
1.25	4 - 36" CMP	W.S.		15.2
			Unit No. 4 - Right Bank Diversion Channel, Alley, and Poge Creeks	
0.14	2 - 42" CMP	W.S.		12.0
0.77	24" CMP	W.S.		13.8
1.21	24" CMP	W.S.		13.0
			Unit No. 5 - Left Bank Clover Creek and Diversion Channel	
0.31	6 - 36" CMP		Clover Creek Outlet Structure	15.0

Note on abbreviations:

CMP = Corrugated Metal Pipe
W.S.= Waterside
L.S.= Landside

b. Inspection.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (d)(1), are quoted in part as follows:

"(d) Drainage Structures (1) Maintenance. Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on drainage structures shall be examined, oiled and trial operated at least once every 90 days . . . . . Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap and headwalls are in good condition:

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

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

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections."

(2) At each inspection required by paragraph 4-02 (b)(2) of the Standard Manual, the following items, if applicable, shall be particularly noted:

(a) Debris or other obstructions to flow.

(b) Condition of pipes and gates.

(c) Damage or settlement of pipe.

(d) Condition of concrete-cracks, spall, erosion.

c. Maintenance.

(1) All eroded concrete shall be repaired as soon as erosion reaches a depth of 4 inches or any reinforcing steel is exposed. For this purpose it is recommended that the repair be made by thoroughly cleaning the surface by sandblasting and building up the concrete to its original section with pneumatically-placed Portland cement mortar. All evidences of settlement, uplift, or failure of concrete structures should be referred to the State Engineer for analysis and recommendation of remedial measures.

(2) If the inspection shows that the automatic drainage structures have been jammed in an open position by debris or other obstructions, they shall be thoroughly cleaned so that they swing freely to a true closure. If any parts of the gates have been damaged or broken, they shall be replaced by new parts.

(3) Compliance with the provisions prescribed above pertaining to drainage structures is essential for proper maintenance of the levee system covered by this manual.

Levee failures caused by neglected drainage structures are of common occurrence; it is, therefore, of utmost importance that these structures always be kept in perfect working condition in accordance with the regulations.

(4) Care should be taken not to bury any of the side drainage inlets in the event that it becomes necessary to fill any of the levee. Plans for the maintenance of drainage facilities at any such points should be submitted to the State Reclamation Board for approval before such work is started.

d. Operation.

(1) Pertinent Regulations of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (d)(2) are quoted in part as follows:

"(2) Operation. Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and objects which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed . . .All drainage structures in the levee shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse conditions."

(2) The outlets of side drainage structures inundate at relatively low river states. They should, therefore, be inspected at the first sign of a rise in the river to make certain that the gates are not jammed in an open position and thus allow flood waters to enter behind the levee.

4-05. Miscellaneous Facilities.

a. Description. Miscellaneous structures or facilities which were constructed as a part of, or existed in conjuction with, the protective works, and which might affect their functioning, include the following:

(1) Bridges. The following bridges cross channels within the project:

Stream Crossing	Location
Middle Creek	State Hwy. No. 20 upstream from junction of Middle Creek and Clover Creek (new)
Middle Creek	First bridge upstream from Diversion Channel (new)
Middle Creek	Second bridge upstream from Diversion Channel (new)
Middle Creek	Third bridge upstream from Diversion Channel
Clover Creek	Near junction of Clover and Middle Creeks State Hwy. No. 20
Clover Creek	First bridge upstream from State Hwy. No. 20
Clover Creek	Second bridge upstream from State Hwy. No. 20
Clover Creek	Third bridge upstream from State Hwy. No. 20.
Diversion Channel	Lake Pillsbury Road Bridge
Alley Creek	Pitney Lane Bridge
Scott Creek	Near junction of Scott and Middle Creeks.
Scott Creek	State Hwy. No. 29

(2) Utility Relocations. Because of the nature of the construction of utilities by local interests, records of utility relocations are not available.

(3) Hydrologic Facilities. The following gages are located within the project and are to be maintained by the State Department of Water Resources:

(a) A continuous water stage recorder and staff gage on the left bank of Scott Creek a short distance upstream from State Hwy. No. 29 bridge.

(b) A continuous water stage recorder and staff gage on the right bank of Middle Creek a short distance upstream from a County Bridge at Station M 292+70.

(c) A continuous water stage recorder and staff gage on the right bank of the Diversion Channel upstream from the diversion structure.

b. Inspection and Maintenance.

(1) Pertinent Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (h) (1) are quoted in part as follows:

"(h) Miscellaneous Facilities. (1) Maintenance. Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall

be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be replaced without delay . . "

(2) Inspection of the miscellaneous facilities shall be made at the same time that the inspection of the other features of the project are made, and shall be reported on check list No. 3, sheet No. 4 of EXHIBIT E.

(3) The interest of the Corps of Engineers and the responsibility of the local interests in the existing highway and railroad bridges is confined to their effect on the safety and functioning of the flood control channel, but any conditions noted in the inspections that may affect them in any way should, as a matter of courtesy, be brought to the attention of the agencies maintaining and operating them. If the inspection of any miscellaneous structure, either existent or constructed in the future under permit, discloses any condition that indicates the probability of failure during periods of high water, the Superintendent shall address a letter to the owner of the structure, quoting this manual as authority and inviting attention to the conditions observed and requesting that immediate steps be taken to correct them. A copy of such letter shall be forwarded to the District Engineer for his information. A report on the action taken by the owner shall be submitted to the District Engineer to accompany the next semi-annual report. A suggested report is included as EXHIBIT D of this manual.

(4) The purpose of maintenance work is to insure continuous satisfactory operation of equipment. It is, therefore, important in such work that all possible causes of future trouble be found and corrected. Particular attention should be given to minor weaknesses which may be an indication of future trouble.

c. Operation.

(1) Requirements of the Code of Federal Regulations. Flood Control Regulations, paragraph 208.10 (h)(2) is quoted as follows:

"(2) Operation. Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. These facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor."

SECTION V

SUGGESTED METHODS OF COMBATING FLOOD CONDITIONS

5-01. Methods Suggested. Most of the methods described herein have been developed during years of experience with the various problems that often come up during periods of high water, and they are not intended to restrict the Superintendent, or others concerned, to a rigid set of rules for every condition that may arise. The remarks are primarily concerned with the earthen portions of the levee system. If problems not covered by these suggestions arise, where the Superintendent is in doubt as to the procedure to be taken, he will be expected to consult the State Department of Water Resources, and follow standard engineering practices in meeting the situation. It should be noted that it is much better to be over-prepared for a "flood fight" than to find at the last moment that preparations were incomplete or unsatisfactory. Confidence of the protected persons and firms is a valuable asset that should not be carelessly lost through inefficient operation of the protection system in time of emergency.

5-02. Earthen Levees. An earthen levee is in danger whenever there is water against it. This danger is directly proportional to the height of the water, the duration of the flood stage, and the intensity of either the current or wave action. The danger is inversely proportional to the cross-sectional area of the levee, the levee's height, and the degree of maintenance. A well constructed levee of proper section should, if maintained and not overtopped, will hold throughout any major flood. However, a serious accident may result in a break. Foundation troubles result in sand boils or a sinking levee, and the local use of unsatisfactory materials causes slides and sloughs. However, such threatened failures can be met if prompt action is taken and proper methods of treatment are used. Wave wash is to be expected whenever the levee is exposed to a wide stretch of open water and is serious if permitted to continue over a considerable length of time.

5-03. Premeditated Damage. The Superintendent should continually guard against premeditated damage to the levee. In the event of an extraordinary flood requiring a fight over long stretches of levee on both sides of the river, there is a natural temptation to relieve the strain by premeditated breaking of the opposite levee.

5-04. Security. Personnel of the Corps of Engineers, whether military or civilian, are not vested with any civil police authority in the performance of their engineering duties, and they will not attempt to exercise any such authority. The responsibility for protecting flood control works against sabotage, acts of depredation, or other unlawful acts rests with the local interests through local and State Governmental agencies.

5-05. Inspection of Flood Control Works. Immediately upon receipt of information that a high water is imminent, the Superintendent should form a skeleton organization, capable of quick expansion, and assign individuals

(Sector Foremen) to have charge of definite sections of levees. As his initial activity, each Sector Foreman should go over his entire sector and parts of adjacent sectors, making a detailed inspection, particularly with reference to the following matters:

a. Sector limits; ascertain that the dividing line between sectors is plainly determined and, if necessary, marked.

b. Condition of new levees and recent repairs.

c. Condition of culverts, flap gates, and sluice gates.

d. Transportation facilities; roads, rail and water communications.

e. Material supply; quantity, location, and condition.

f. Communications; locate and check all necessary telephones in the sector.

5-06. Preliminary Repair Work. After the initial inspection has been made, each Sector Foreman should recruit a labor crew and provide it with tools such as shovels, axes, wheelbarrows, etc. In addition, bulldozers, scrapers, trucks, etc., should be located and made ready for use in case of emergency. Then immediate action should be taken to perform the following work:

a. Fill up holes or washes in the levee crown, slopes, and landside berms. Where new construction has been completed during the year, rain washes and deep gullies may have developed. While the levee is new, preparations should be made in advance to combat wave wash along the exposed reaches.

b. Repair gaps where road crossings have been worn down and the levee is below grade. In filling the road crossings, it may be necessary to obtain material from landside borrow pits, in which case excavation for the material should be kept at least 50 feet from the toe of levee. Any filling done in this connection should be tamped in place and, if in an exposed reach, subject to wave wash, the new section should be faced with bags of sand.

c. Repair and close all flap gates on culverts and see that they are seated properly before they are covered with flood waters.

d. Ascertain that all roads to and along the levee are in a good state of repair. The Superintendent should obtain assistance from the county road forces to have all roads put in first-class condition.

e. Locate necessary tools and materials (sacks, sandbags, brush, lumber, lights, etc.), and distribute and store the same at points where active maintenance is anticipated.

f. Check and obtain repair of all telephone lines necessary for operation, obtain lists of all team forces, motorboats, motor cars, and truck transportation that can be made available.

g. Make thorough arrangements with reliable citizens of the community for the supply transportation, subsistence, and shelter for the necessary labor.

h. Communicate directly with owners of all stock pastured on the levee and direct that all stock be removed from the levee right-of-way. Cut all fences crossing the levee that do not have gates provided.

i. Investigate all drainage ditches on the landside of the levee and open these drains when obstructions exist. Prepare to cut the necessary seep drainage ditches; however, no attempt should be made to drain the levee slope until actual seepage takes place.

j. Remove all dynamite and explosives of any kind from the vicinity of the levee.

5-07. Disaster Relief. It is the responsibility of local, state, municipal authorities, supported by and/or working in connection with the American Red Cross to adopt measures for the relief of flood disaster victims. Relief measures can be undertaken by the Department of the Army through its Army Area Commander under existing Army Regulations, but such measures will be undertaken only as a last resort, in extreme cases and under compelling circumstances where local resources are clearly inadequate to cope with the situation.

5-08. Flood Fight. After the above preliminary organization and precautions have been completed, the "flood fight" itself commences. The methods of combating various defects in the earthen levee described in the following paragraphs have been proved effective during many years of use by the Department of the Army.

a. Drainage of Slopes. This work can be done economically while awaiting developments and will serve to make the levees more efficient. Crews should be organized to cut seep drains at all places on the levee and berm when seepage appears. The drains should be V-shaped, no deeper than necessary, and never more than 6" deep. Care must be taken not to cut the sod unnecessarily. In all instances, drains should be cut straight down the levee slope or nearly so. Near the toe of the slope the small drains should be Y'd together and led into larger drains, which, in general, should lead straight across the landside berm into the landside pits or nearest natural or artificial drain.

b. Sand Boils. These danger spots are serious if discharging material. The common method of controlling sand boils consists of walling up a watertight sack ring around the boil up to a height necessary to reduce the velocity of flow to a point at which material is no longer

discharged from the boil. See EXHIBIT C, plate 1. The sack ring around the boil should be large enough to protect the defective area immediately surrounding the boil. If several boils of sufficient force to displace sand are observed a sack sublevee may be built around the entire nest of boils, rising to such a height that none of the boils will discharge with enough force to displace sand.

c. Wave Wash. The Superintendent and Sector Foremen should study the levee beforehand to determine the possibility of wave wash. All such reaches will be located well in advance and for use in emergency, a reserve supply of filled sacks and rolls of cotton bagging will be kept on board flats. If the slope is well sodded, a storm of an hours duration should cause very little damage. During periods of high wind and high water, ample labor should stand by and experienced personnel should observe where the washouts are beginning by sounding or by actually wading along the submerged slope. Sections of cotton bagging should be placed over the washed areas, as shown on EXHIBIT C, plate 3. As an alternative, filled sacks should be placed in the cut in an effective manner and as soon as possible. The filled sacks should be laid in sections of sufficient length to give protection well above the anticipated rise. Bagging so laid must be thoroughly weighted down to be effective. Plate 2, EXHIBIT C shows a movable type of wave wash protection, also used with good results. Its advantage is that it can rapidly be built at any convenient place and easily set in place on the job.

d. Scours. A careful observation should be made of the riverside of the levee at all localities where a current of more than two feet per second is observed, or where the profiles show a high water slope of two feet per mile or greater. Trouble may be looked for at the ends of old levee dikes, road-crossing ramps, old traverses, and places where pipes, sewers and other structures penetrate the levee. If any sign of scour is observed in the pits or at the ends of the dikes, soundings should be taken to observe the amount and progress of the scour. The approved method of construction to check scour in the pits, on the slopes, or at the ends of dikes will be to construct deflection dikes using brush, treetops, or lumber, driving stakes and wiring together, and filling in between with brush and filled sacks or stone.

e. Caving Bank Protection. As protection against active caving of riverbanks, rock-filled cribs are very effective if properly placed. Cribs are usually 14 by 14 feet in plan by 10 to 14 inches in inside depth. The cribs are constructed on a double thickness of 1" x 4" x 14' lumber, equivalent to 2" x 4" pieces, lapped rail fence fashion at all corners and intersections. They are divided into four compartments of about equal area by two perpendicular cross walls constructed in the same manner as the side walls. The floors and covers are built up of double 1" x 4" boards spaced about 9" center-to-center. Under the floor and perpendicular to the direction of the floor boards are five equally spaced pairs of 1" x 4" boards spaced about 3 feet center-to-center. On top of the cover, perpendicular to

the direction of the cover boards, are three pairs of top boards, one over each of the side walls and one over the central division wall. All intersections are nailed with one 20d nail. The compartments are filled with rock before covering. Each wall intersection of the fabricated cribs is securely fastened by a loop of No. 9 wire. See EXHIBIT C, plate 4.

5-09. Topping. Immediate consideration should be given the grade line of each levee section by comparison of existing grades with those shown on the drawings, EXHIBIT B. If any reaches show a grade below the previous highest water, emergency topping should be undertaken at once to such a grade as may be established by the District Engineers, U. S. Engineer Office, Sacramento, California, as follows:

a. Sack Topping. Sack topping may be used to raise the crown of the levee about three feet. The sacks should be laid stretcherwise or along the levee for the first layer, crosswise for the second layer, and so on. Sacks should be lapped at least 1/3 either way and well mauled into place. When properly sacked and tamped, one sack will give about three to four inches of topping. If gravel is available, it should be used for the front facing so as to avoid washing out.

b. Lumber and Sack Topping. This is the most commonly used method of raising low reaches in emergencies. In putting on this topping, as well as other topping, a careful line of levels should be run and grade stakes set in advance. 2" x 4" x 6' stakes should then be driven on the riverside of the crown six feet apart, and 1" x 12" boards nailed to the landside of the stakes. This wall, backed with a single tier of sacks, will hold out at least one foot of water. If a second foot is necessary, the layers of sacks will have to be increased in number and reinforced. The stakes should be driven three feet in the ground, and should project out three feet, thus providing, in extreme cases, a three-foot topping if properly braced behind with sacks and earth. In some instances, it may be practicable to back up the planking with tamped earth obtained in the vicinity in lieu of the sacks shown in the drawing, EXHIBIT C, plate 5.

5-10. Transportation. Instances where it is necessary to send equipment over roads that are impassable due to mud or sand, their passage may be provided by the use of a plank road or by means of steel or wire mats. Telephone communication should be provided along dangerous stretches of the levee when travel or other satisfactory means of communication cannot be maintained.

5-11. Use of Government Plant. The District Engineer is authorized to use or loan Government property and plant in cases of emergency where life is in danger and there is no opportunity to secure prior authority for such use. The authority also extends to saving of property where no suitable private equipment is available, provided that such use is without detriment to the Government.

EXHIBIT A

FEDERAL FLOOD CONTROL REGULATIONS

TITLE 33—NAVIGATION AND NAVIGABLE WATERS

Chapter II—Corps of Engineers, War Department

PART 208—FLOOD CONTROL REGULATIONS

MAINTENANCE AND OPERATION OF FLOOD CONTROL WORKS

Pursuant to the provisions of section 3 of the Act of Congress approved June 22, 1936, as amended and supplemented (49 Stat. 1571; 50 Stat. 877; and 55 Stat. 638; 33 U. S. C. 701c; 701c-1), the following regulations are hereby prescribed to govern the maintenance and operation of flood control works:

§ 208.10 *Local flood protection works; maintenance and operation of structures and facilities*—(a) *General.* (1) The structures and facilities constructed by the United States for local flood protection shall be continuously maintained in such a manner and operated at such times and for such periods as may be necessary to obtain the maximum benefits.

(2) The State, political subdivision thereof, or other responsible local agency, which furnished assurance that it will maintain and operate flood control works in accordance with regulations prescribed by the Secretary of War, as required by law, shall appoint a permanent committee consisting of or headed by an official hereinafter called the "Superintendent," who shall be responsible for the development and maintenance of, and directly in charge of, an organization responsible for the efficient operation and maintenance of all of the structures and facilities during flood periods and for continuous inspection and maintenance of the project works during periods of low water, all without cost to the United States.

(3) A reserve supply of materials needed during a flood emergency shall be kept on hand at all times.

(4) No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.

(5) No improvement shall be passed over, under, or through the walls, levees, improved channels or floodways, nor shall any excavation or construction be permitted within the limits of the project right-of-way, nor shall any change be made in any feature of the works without prior determination by the District Engineer of the War Department or his authorized representative that such improvement, excavation, construction, or alteration will not adversely affect the functioning of the protective facilities. Such improvements or alterations as may be found to be desirable and permissible under the above determination shall be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice shall be obtained from the District Engineer or, if otherwise obtained, shall be submitted for his approval. Drawings or prints showing such improvements or alterations as finally constructed shall be furnished the District Engineer after completion of the work.

(6) It shall be the duty of the superintendent to submit a semiannual report to the District Engineer covering inspection, maintenance, and operation of the protective works.

(7) The District Engineer or his authorized representatives shall have access at all times to all portions of the protective works.

(8) Maintenance measures or repairs which the District Engineer deems necessary shall be promptly taken or made.

(9) Appropriate measures shall be taken by local authorities to insure that the activities of all local organizations operating public or private facilities connected with the protective works are coordinated with those of the Superintendent's organization during flood periods.

(10) The War Department will furnish local interests with an Operation and Maintenance Manual for each completed project, or separate useful part thereof, to assist them in carrying out their obligations under these regulations.

(b) *Levees*—(1) *Maintenance.* The Superintendent shall provide at all times such maintenance as may be required to insure serviceability of the structures in time of flood. Measures shall be taken to promote the growth of sod, exterminate burrowing animals, and to provide for routine mowing of the grass and weeds, removal of wild growth and drift deposits, and repair of damage caused by erosion or other forces. Where practicable, measures shall be taken to retard bank erosion by planting of willows or other suitable growth on areas riverward of the levees. Periodic inspections shall be made by the Superintendent to insure that the above maintenance measures are being effectively carried out and, further, to be certain that:

(i) No unusual settlement, sloughing, or material loss of grade or levee cross section has taken place;

(ii) No caving has occurred on either the land side or the river side of the levee which might affect the stability of the levee section;

(iii) No seepage, saturated areas, or sand boils are occurring;

(iv) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged;

(v) Drains through the levees and gates on said drains are in good working condition;

(vi) No revetment work or riprap has been displaced, washed out, or removed;

(vii) No action is being taken; such as burning grass and weeds during inappropriate seasons, which will retard or destroy the growth of sod;

(viii) Access roads to and on the levee are being properly maintained;

(ix) Cattle guards and gates are in good condition;

(x) Crown of levee is shaped so as to drain readily, and roadway thereon, if any, is well shaped and maintained;

(xi) There is no unauthorized grazing or vehicular traffic on the levees;

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

Such inspections shall be made immediately prior to the beginning of the flood season; immediately following each major high water period, and otherwise at intervals not exceeding 90 days, and such intermediate times as may be necessary to insure the best possible care of the levee. Immediate steps will be taken to correct dangerous conditions disclosed by such inspections. Regular maintenance repair measures shall be accomplished during the appropriate season as scheduled by the Superintendent.

(2) *Operation.* During flood periods the levee shall be patrolled continuously to locate possible sand boils or unusual wetness of the landward slope and to be certain that:

(i) There are no indications of slides or sloughs developing;

(ii) Wave wash or scouring action is not occurring;

(iii) No low reaches of levee exist which may be overtopped;

(iv) No other conditions exist which might endanger the structure.

Appropriate advance measures will be taken to insure the availability of adequate labor and materials to meet all contingencies. Immediate steps will be taken to control any condition which endangers the levee and to repair the damaged section.

(c) *Flood walls.*—(1) *Maintenance.* Periodic inspections shall be made by the Superintendent to be certain that:

(i) No seepage, saturated areas, or sand boils are occurring;

(ii) No undue settlement has occurred which affects the stability of the wall or its water tightness;

(iii) No trees exist, the roots of which might extend under the wall and offer accelerated seepage paths;

(iv) The concrete has not undergone cracking, chipping, or breaking to an extent which might affect the stability of the wall or its water tightness;

(v) There are no encroachments upon the right-of-way which might endanger the structure or hinder its functioning in time of flood;

(vi) Care is being exercised to prevent accumulation of trash and debris adjacent to walls, and to insure that no fires are being built near them;

(vii) No bank caving conditions exist riverward of the wall which might endanger its stability;

(viii) Toe drainage systems and pressure relief wells are in good working condition, and that such facilities are not becoming clogged.

Such inspections shall be made immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days. Measures to eliminate encroachments and effect repairs found necessary by such inspections shall be undertaken immediately. All repairs shall be accomplished by methods acceptable in standard engineering practice.

(2) *Operation.* Continuous patrol of the wall shall be maintained during flood periods to locate possible leakage at monolith joints or seepage underneath the wall. Floating plant or boats will not be allowed to lie against or tie up to the wall. Should it become necessary during a flood emergency to pass anchor cables over the wall, adequate measures shall be taken to protect the concrete and construction joints. Immediate steps shall be taken to correct any condition which endangers the stability of the wall.

(d) *Drainage structures*—(1) *Maintenance.* Adequate measures shall be taken to insure that inlet and outlet channels are kept open and that trash, drift, or debris is not allowed to accumulate near drainage structures. Flap gates and manually operated gates and valves on

drainage structures shall be examined, oiled, and trial operated at least once every 90 days. Where drainage structures are provided with stop log or other emergency closures, the condition of the equipment and its housing shall be inspected regularly and a trial installation of the emergency closure shall be made at least once each year. Periodic inspections shall be made by the Superintendent to be certain that:

(i) Pipes, gates, operating mechanism, riprap, and headwalls are in good condition;

(ii) Inlet and outlet channels are open;

(iii) Care is being exercised to prevent the accumulation of trash and debris near the structures and that no fires are being built near bituminous coated pipes;

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

Immediate steps will be taken to repair damage, replace missing or broken parts, or remedy adverse conditions disclosed by such inspections.

(2) *Operation.* Whenever high water conditions impend, all gates will be inspected a short time before water reaches the invert of the pipe and any object which might prevent closure of the gate shall be removed. Automatic gates shall be closely observed until it has been ascertained that they are securely closed. Manually operated gates and valves shall be closed as necessary to prevent inflow of flood water. All drainage structures in levees shall be inspected frequently during floods to ascertain whether seepage is taking place along the lines of their contact with the embankment. Immediate steps shall be taken to correct any adverse condition.

(e) *Closure structures*—(1) *Maintenance.* Closure structures for traffic openings shall be inspected by the superintendent every 90 days to be certain that:

(i) No parts are missing;

(ii) Metal parts are adequately covered with paint;

(iii) All movable parts are in satisfactory working order,

(iv) Proper closure can be made promptly when necessary;

(v) Sufficient materials are on hand for the erection of sand bag closures and that the location of such materials will be readily accessible in times of emergency.

Tools and parts shall not be removed for other use. Trial erections of one or more closure structures shall be made once each year, alternating the structures chosen so that each gate will be erected at least once in each 3-year period. Trial erection of all closure structures shall be made whenever a change is made in key operating personnel. Where railroad operation makes trial erection of a closure structure infeasible, rigorous inspection and drill of operating personnel may be substituted therefor. Trial erection of sand bag closures is not required. Closure materials will be carefully checked prior to and following flood periods, and damaged or missing parts shall be repaired or replaced immediately.

(2) *Operation.* Erection of each movable closure shall be started in sufficient time to permit completion before flood waters reach the top of the structure sill. Information regarding the proper method of erecting each individual closure structure, together with an estimate of the time required by an experienced crew to complete its erection will be given in the Operation and Maintenance Manual which will be furnished local interests upon completion of the project. Closure structures will be inspected frequently during flood periods to ascertain that no undue leakage is occurring and that drains provided to care for ordinary leakage are functioning properly. Boats or floating plant shall not be allowed to tie up to closure structures or to discharge passengers or cargo over them.

(f) *Pumping plants*—(1) *Maintenance.* Pumping plants shall be inspected by the Superintendent at intervals not to exceed 30 days during flood seasons and 90 days during off-flood seasons to insure that all equipment is in order for instant use. At regular intervals, proper measures shall be taken to provide for cleaning plant, buildings, and equipment, repainting as necessary, and lubricating all machinery Adequate supplies of lubricants for all types of machines, fuel for gasoline or diesel powered equipment, and flash lights or lanterns for emergency lighting shall be kept on hand at all times. Telephone service shall be maintained at pumping plants. All equipment, including switch gear, transformers, motors, pumps, valves, and gates shall be trial operated and checked at least once every 90 days. Megger tests of all insulation shall be made whenever wiring has been subjected to undue dampness and otherwise at intervals not to exceed one year. A record shall be kept showing the results of such tests. Wiring disclosed to be in an unsatisfactory condition by such tests shall be brought to a satisfactory condition or shall be promptly replaced. Diesel and gasoline engines shall be started at such intervals and allowed to run for such length of time as may be necessary to insure their serviceability in times of emergency. Only skilled electricians and mechanics shall be employed on tests and repairs. Operating personnel for the plant shall be present during tests. Any equipment removed from the station for repair or replacement shall be returned or replaced as soon as practicable and shall be trial operated after reinstallation. Repairs requiring removal of equipment from the plant shall be made during off-flood seasons insofar as practicable.

(2) *Operation.* Competent operators shall be on duty at pumping plants whenever it appears that necessity for pump operation is imminent. The operator shall thoroughly inspect, trial operate, and place in readiness all plant equipment. The operator shall be familiar with the equipment manufacturers' instructions and drawings and with the "Operating Instructions" for each station. The equipment shall be operated in accordance with the above-mentioned "Operating Instructions" and care shall be exercised that proper lubrication is being supplied all equipment, and that no overheating, undue vibration or noise is occurring. Immediately upon final recession of flood waters, the pumping station shall be thoroughly cleaned, pump house sumps flushed, and equipment thoroughly inspected, oiled and greased. A record or log of pumping plant operation shall be kept for each station, a copy of which shall be furnished the District Engineer following each flood.

(g) *Channels and floodways* — (1) *Maintenance.* Periodic inspections of improved channels and floodways shall be made by the Superintendent to be certain that:

(i) The channel or floodway is clear of debris, weeds, and wild growth;

(ii) The channel or floodway is not being restricted by the depositing of waste materials, building of unauthorized structures or other encroachments;

(iii) The capacity of the channel or floodway is not being reduced by the formation of shoals;

(iv) Banks are not being damaged by rain or wave wash, and that no sloughing of banks has occurred;

(v) Riprap sections and deflection dikes and walls are in good condition;

(vi) Approach and egress channels adjacent to the improved channel or floodway are sufficiently clear of obstructions and debris to permit proper functioning of the project works.

Such inspections shall be made prior to the beginning of the flood season and otherwise at intervals not to exceed 90 days. Immediate steps will be taken to remedy any adverse conditions disclosed by such inspections. Measures will be taken by the Superintendent to promote the growth of grass on bank slopes and earth deflection dikes. The Superintendent shall provide for periodic repair and cleaning of debris basins, check dams, and related structures as may be necessary.

(2) *Operation.* Both banks of the channel shall be patrolled during periods of high water, and measures shall be taken to protect those reaches being attacked by the current or by wave wash. Appropriate measures shall be taken to prevent the formation of jams of ice or debris. Large objects which become lodged against the bank shall be removed. The improved channel or floodway shall be thoroughly inspected immediately following each major high water period. As soon as practicable thereafter, all snags and other debris shall be removed and all damage to banks, riprap, deflection dikes and walls, drainage outlets, or other flood control structures repaired.

(h) *Miscellaneous facilities* — (1) *Maintenance.* Miscellaneous structures and facilities constructed as a part of the protective works and other structures and facilities which function as a part of, or affect the efficient functioning of the protective works, shall be periodically inspected by the Superintendent and appropriate maintenance measures taken. Damaged or unserviceable parts shall be repaired or replaced without delay. Areas used for ponding in connection with pumping plants or for temporary storage of interior run-off during flood periods shall not be allowed to become filled with silt, debris, or dumped material. The Superintendent shall take proper steps to prevent restriction of bridge openings and, where practicable, shall provide for temporary raising during floods of bridges which restrict channel capacities during high flows.

(2) *Operation.* Miscellaneous facilities shall be operated to prevent or reduce flooding during periods of high water. Those facilities constructed as a part of the protective works shall not be used for purposes other than flood protection without approval of the District Engineer unless designed therefor. (49 Stat. 1571, 50 Stat. 877; and 55 Stat. 638; 33 U.S.C. 701c; 701c-1) (Regs. 9 August 1944, CE SPEWP)

[SEAL] J. A. ULIO,
Major General,
The Adjutant General.

[F. R. Doc. 44-12285; Filed, August 16, 1944; 9:44 a. m.]

EXHIBIT "A" Sheet 2 of 2

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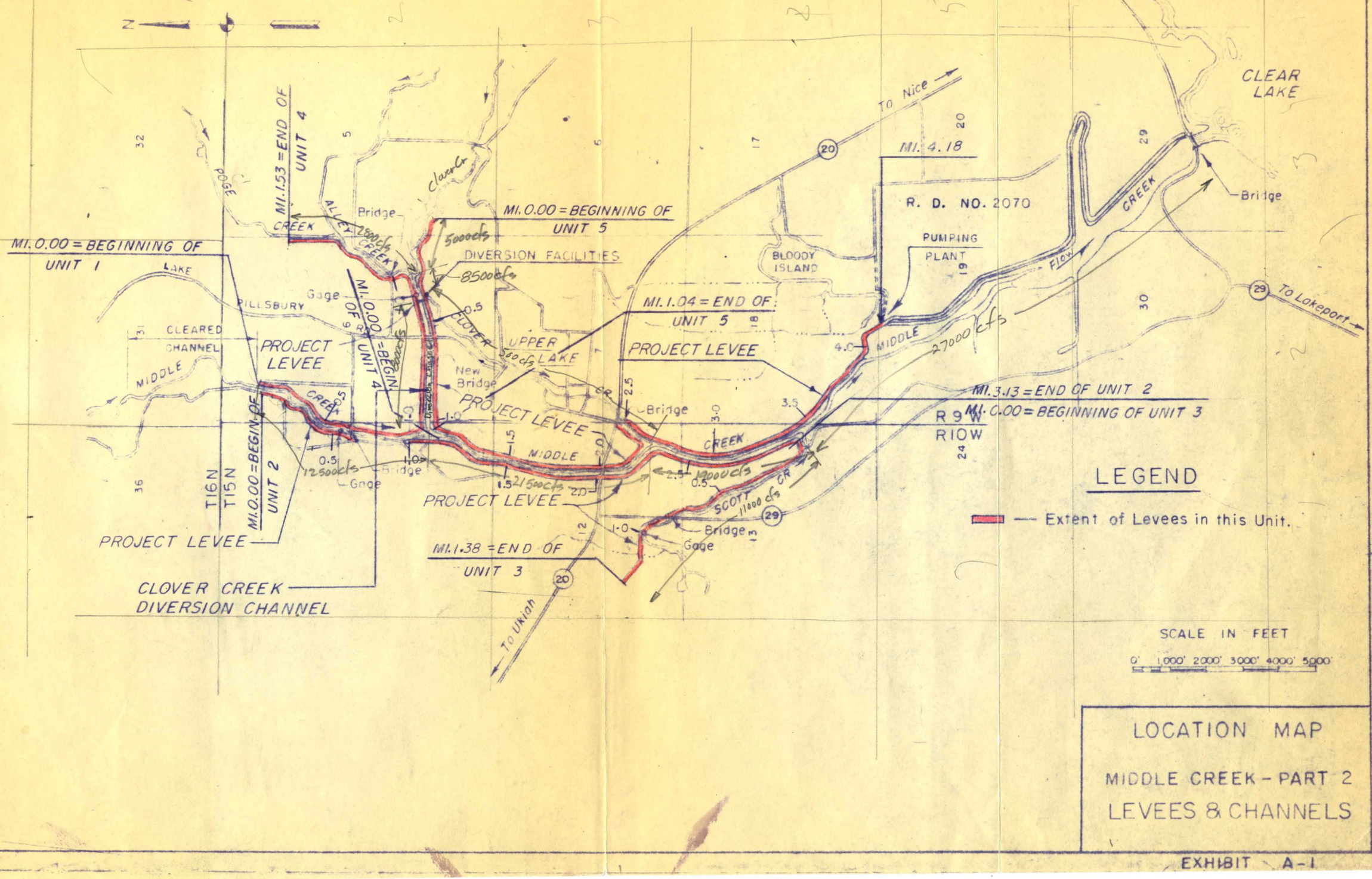


LOCATION MAP

MIDDLE CREEK - PART 2
LEVEES & CHANNELS

EXHIBIT A-1

EXHIBIT B

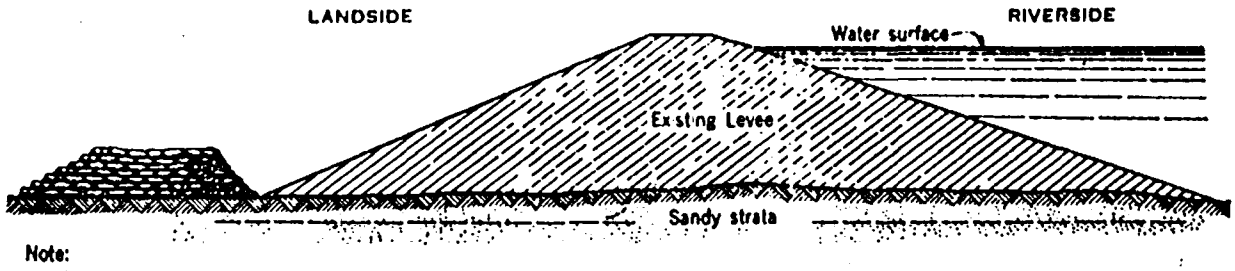
"AS CONSTRUCTED"
DRAWINGS

(See separate folder for the following drawings:)

File No.	Title
CC-4-30	Emergency Levee Repairs – Middle Creek and Alley Creeks in 2 sheets.
CC-4-4-29	Middle Creek Project – Levee Construction and Channel Improvement from Clear Lake to High Ground (29 sheets) sheets 1 to 11 inclusive; 13 to 21 , inclusive; 26 and 28 to 35, inclusive.
CC-4-4-36	Middle Creek and Drainage Slough, Levee Construction from Clear Lake to Bloody Island, in 15 sheets.
CC-4-4-38	Middle Creek, Upstream Project Modifications, in 2 sheets.
CC-4-4-39	Middle Creek and Drainage Slough from Clear Lake to Bloody Island Pump, First Stage Levee Construction, in 1 sheet.
CC-4-4-41	Middle Creek and Drainage Slough from Clear Lake to Bloody Island Pump, Stage II Levee Rehabilitation, in 1 sheet.
CC-4-4-42	Middle Creek and Drainage Slough from Clear Lake to Bloody Island Pump, Stage III, in 2 sheets.
None	PL 84-99 Levee Rehabilitation Repairs CY2007 Order 3-5 Sites, Maintenance Area 17, Lake County, California, in 4 sheets.

EXHIBIT C

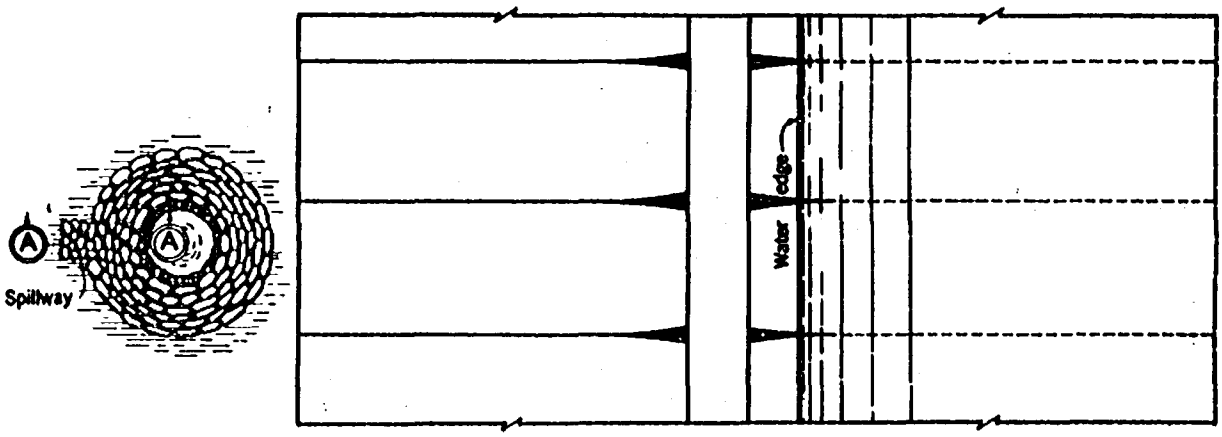
PLATES OF SUGGESTED FLOOD FIGHTING METHODS



Note:
Bottom width to be no ess than 1| times height.
Be sure to clear sand discharge.
Tie into levee if boil is near toe.

ELEVATION

SECTION A-A



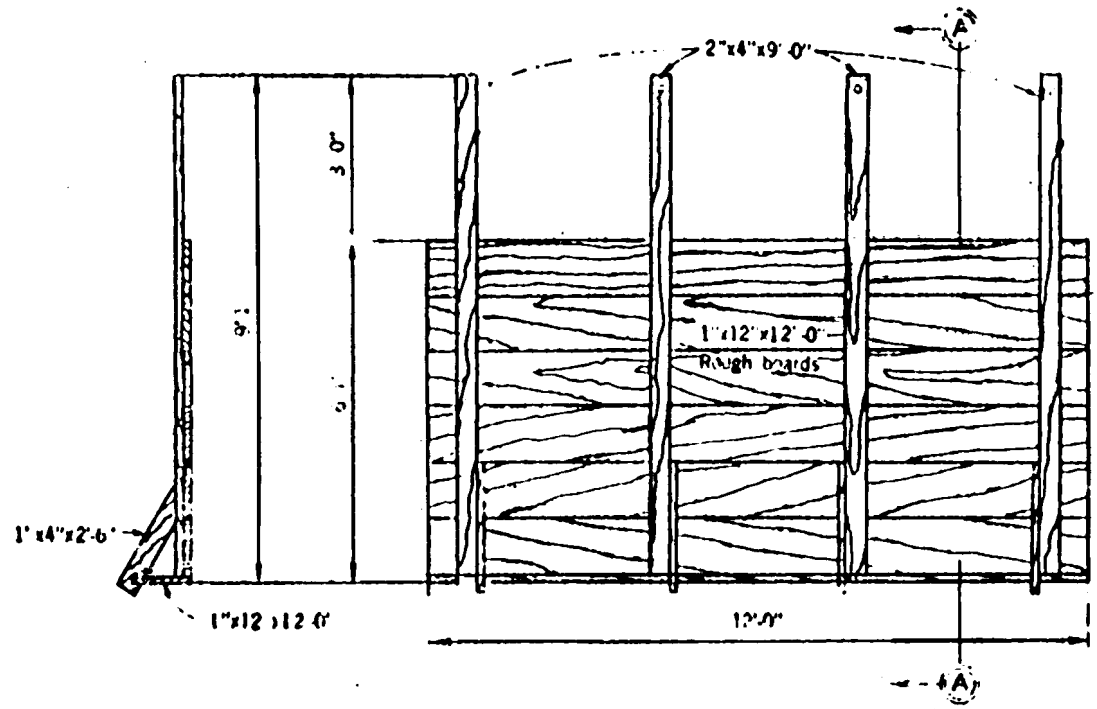
PLAN

Note:
Do not sack boil which does not put out material.
Height of sack loop or ring should be only sufficient to create enough head to slow down flow through boil so that no more material is displaced and boi uns clear.
Never attempt to completely stop flow through boil.

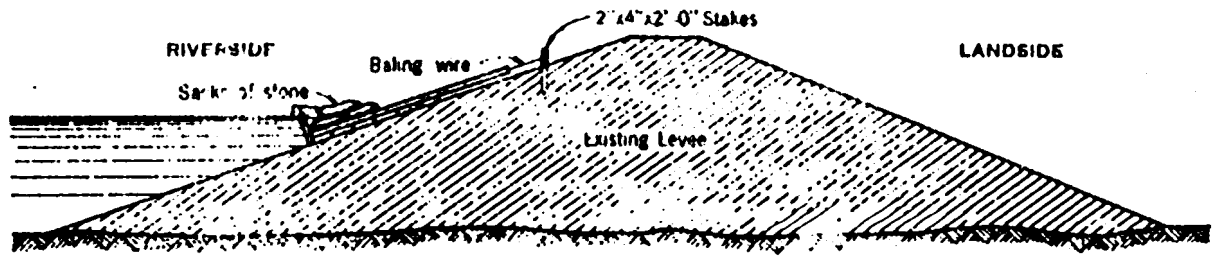
MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

CONTROL OF SAND BOILS

U.S. ENGINEER OFFICE, SACRAMENTO, CALIF.
MAY, 1946



SECTION A-A PLAN



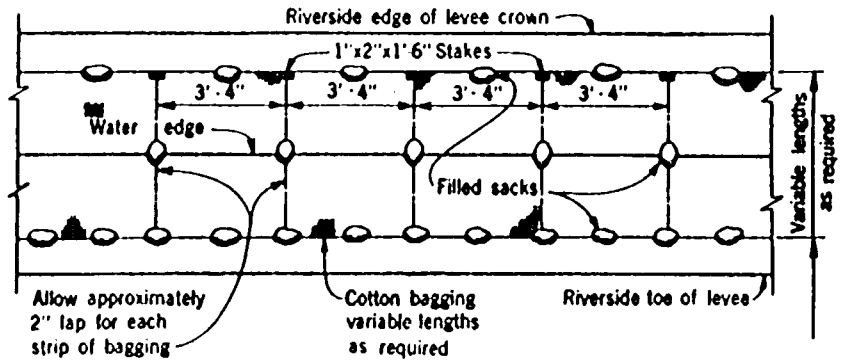
SECTION

BILL OF MATERIAL FOR 100 FEET
LUMBER
56 pieces 1"x12"x12'-0"
32 pieces 1"x4"x2'-6"
32 pieces 2"x4"x9'-0"
• 32 pieces 2"x4"x2'-0"
• (Sharpened)
WIRE
200' baling wire
NAILS
4 lbs.-8d nails

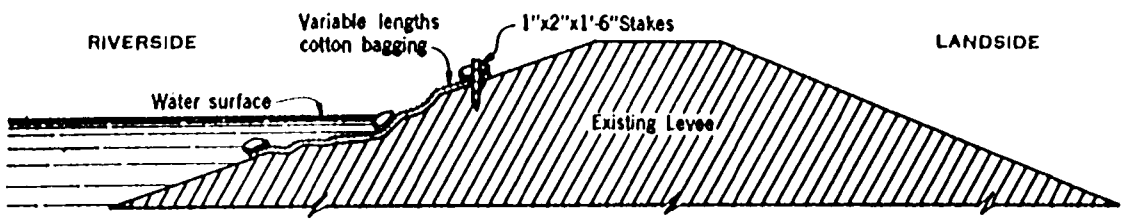
MIDDLE CREEK, CALIFORNIA FLOOD CONTROL PROJECT

MOVABLE WAVE WASH PROTECTION

U.S ENGINEER OFFICE, SACRAMENTO, CALIF.
MAY, 1946



PLAN



SECTION

Note:

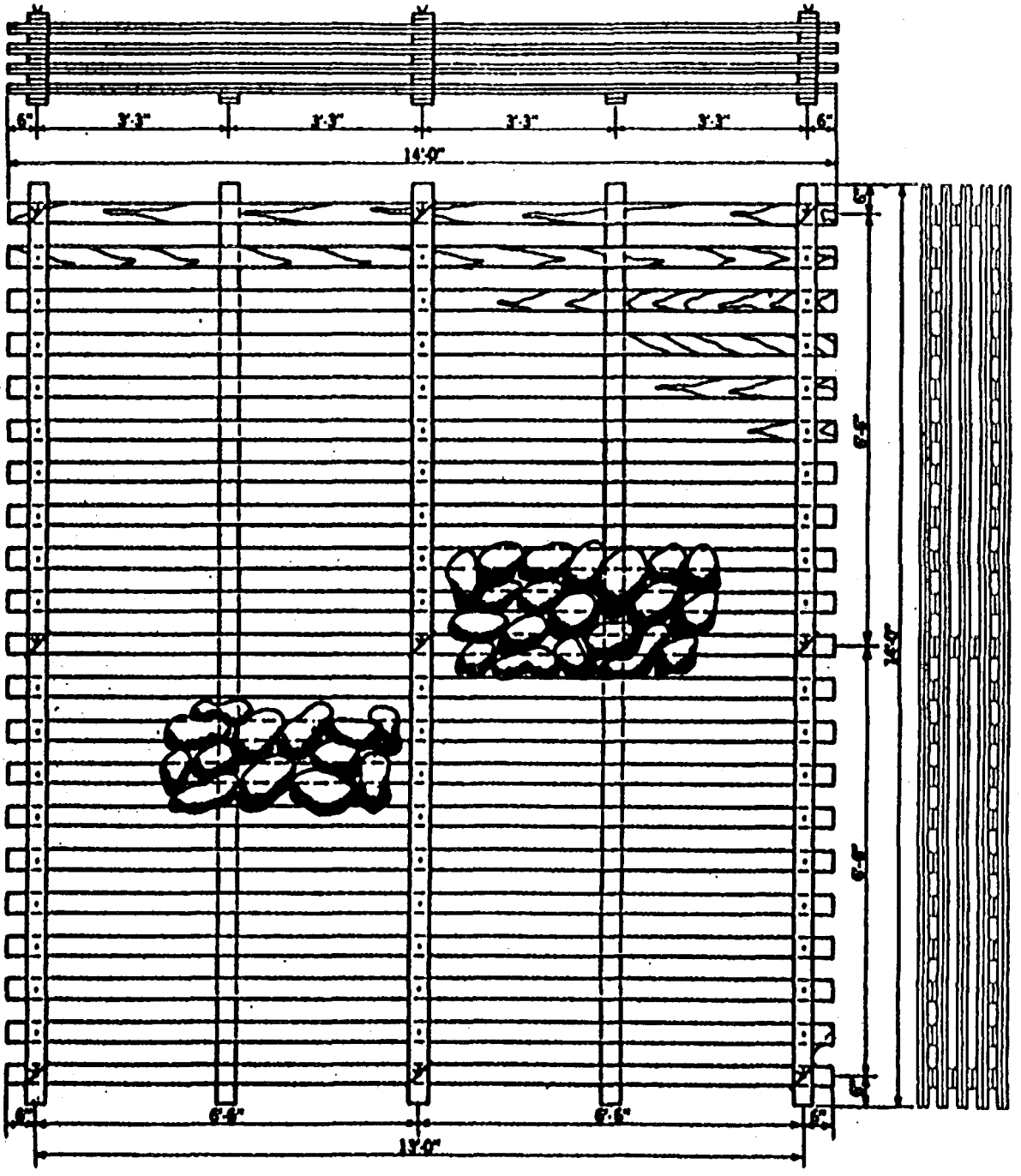
Lay lengths as required of cotton bagging approximately parallel with levee slope and across damaged section. Weight top and edges of bagging with filled sacks as shown above. The filled sacks should be wired or tied to each strip before laying in place. Stake the corners of each strip above water surface. Where cotton bagging is not available burlap sacking may be substituted.

MATERIAL REQUIRED FOR 100 LINEAR FEET OF LEVEE
LUMBER
* 30 Stakes 1"x2"x1'-6" * (Sharpened)
SANDBAGS
120 sand bags Cotton bagging as required

MIDDLE CREEK, CALIFORNIA FLOOD CONTROL PROJECT

WAVE WASH PROTECTION

U.S. ENGINEER OFFICE, SACRAMENTO, CALIF.
MAY, 1946



Note:
Cribs constructed of double thickness of 1"x4"x14'-0" lumber. Nail all intersections with 1-20d nail. Each intersection of nails securely fastened by a loop of No. 9 wire, tightly twisted.

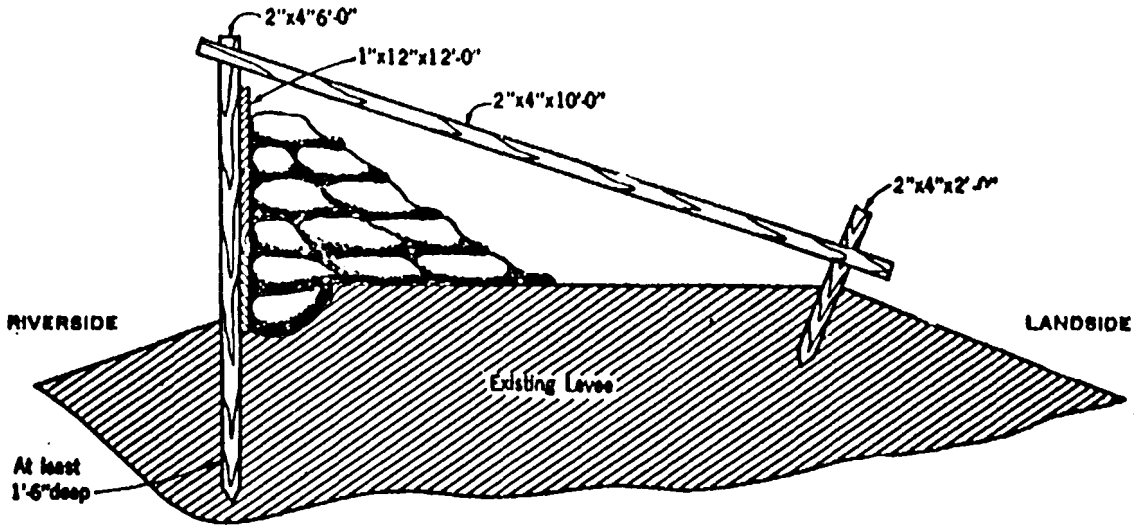
BILL OF MATERIAL FOR ONE CRIB 13'-0"
LUMBER
130 pieces 1"x4"x14'-0"
WIRE
30' No. 9 wire
NAILS
12½ lbs.-20d nails

MIDDLE CREEK, CALIFORNIA FLOOD CONTROL PROJECT

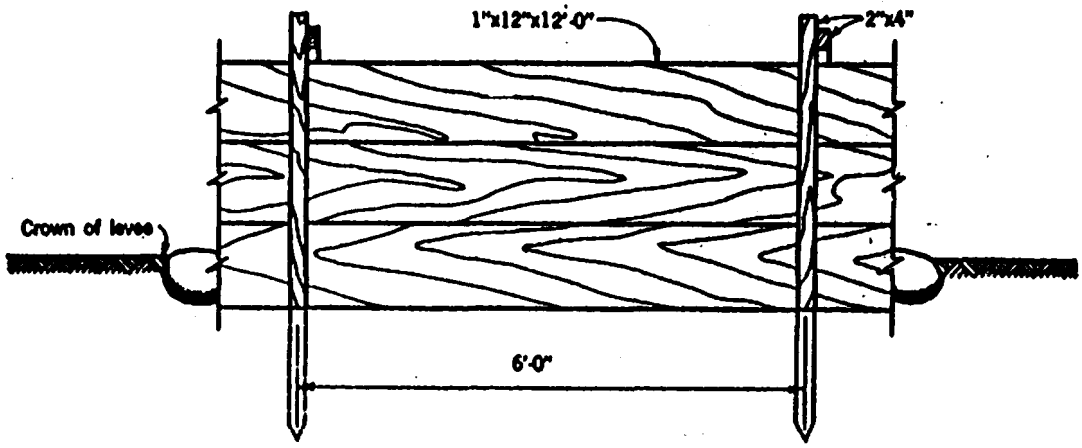
CAVING BANK PROTECTION

U.S. ENGINEER OFFICE, SACRAMENTO, CALIF.
MAY, 1946

EXHIBIT "E" PLATE 4



SECTION



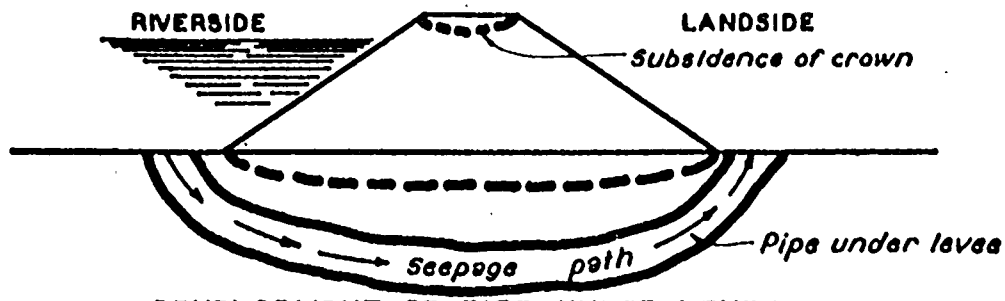
FRONT ELEVATION

BILL OF MATERIAL FOR 100 LINEAR FEET OF LEVEE
LUMBER
25 pieces 1"x12"x12'-0" 17 pieces 2"x4"x10'-0" * 17 pieces 2"x4"x6'-0" * 17 pieces 2"x4"x2'-0" * (Sharpened)
NAILS
1 lb. -8d nails 2 lbs.-16d nails
SANDBAGS
1100 bags

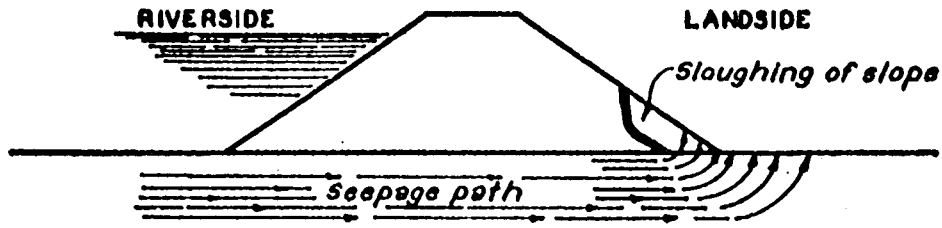
MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

LUMBER AND SACK TOPPING

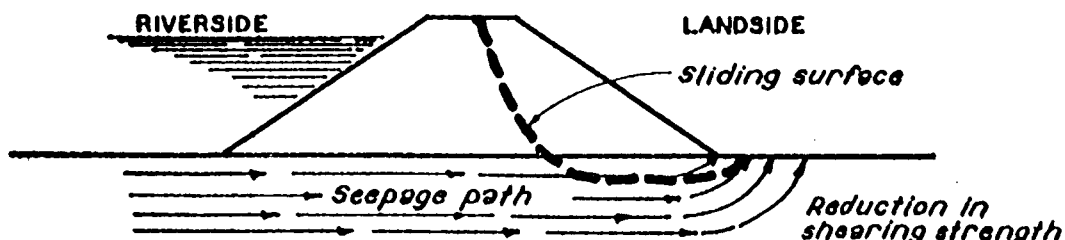
U. S. ENGINEER OFFICE, SACRAMENTO, CALIF.
MAY, 1946



DEVELOPMENT OF PIPE UNDER LEVEE
FIG. 1



SLOUGHING OF LANDSLIDE SLOPE DUE TO RAVELLING AND UNDERCUTTING OF TOE
FIG. 2



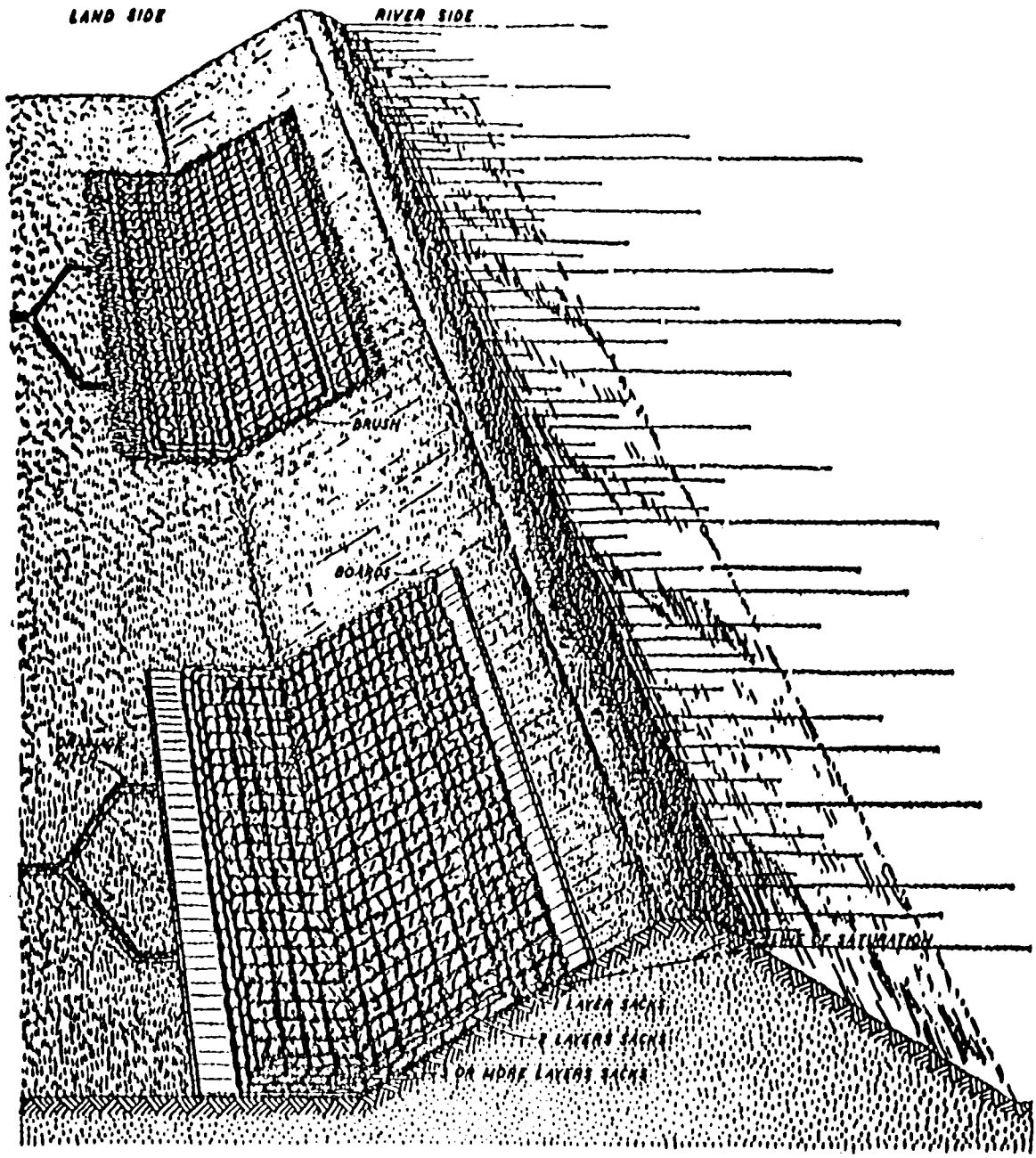
DEVELOPMENT OF SHEAR SLIDE
FIG. 3

MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

EFFECTS OF SAND BOILS ON LEVEE

U.S. CORPS OF ENGINEERS, SACRAMENTO, CALIF.

EXHIBIT C PLATE 6

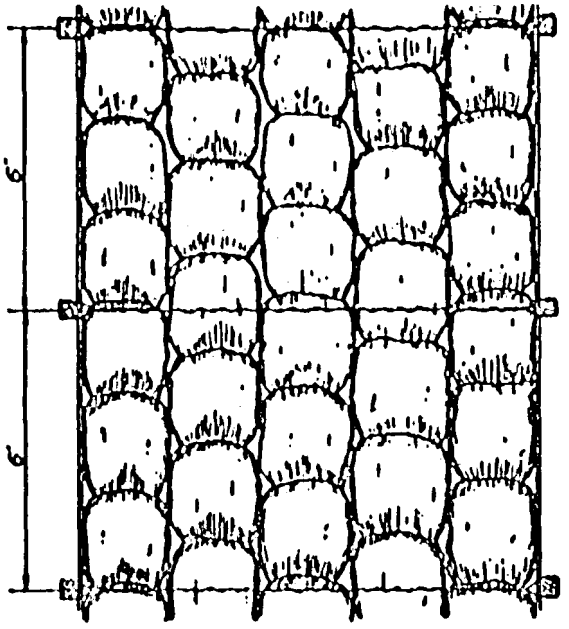


MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

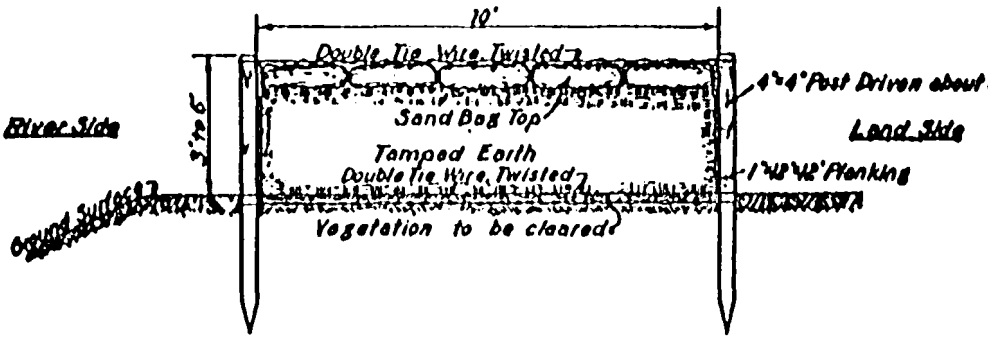
BRUSHING AND SACKING THE LANDSIDE SLOPE

U.S. CORPS OF ENGINEERS, SACRAMENTO, CALIF.

EXHIBIT O PLATE 7



PLAN



END ELEVATION

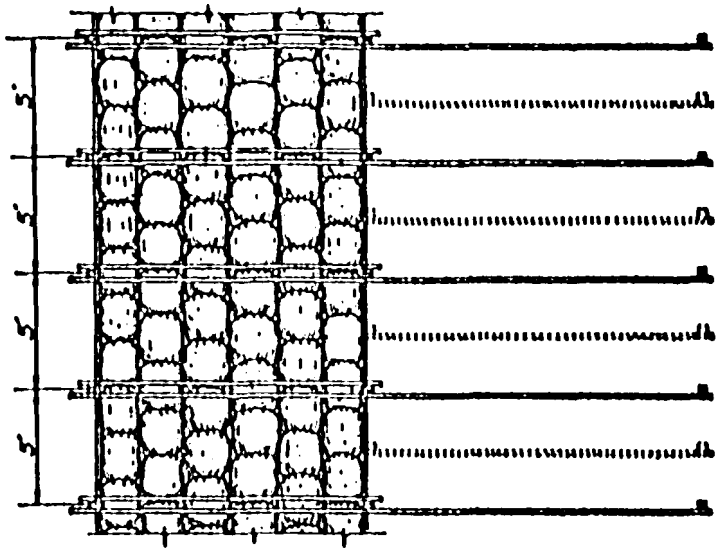
MATERIAL REQUIRED FOR 100 LINEAR FEET OF LEVEE		
4 FT. HIGH	5 FT HIGH	6 FT HIGH
34 pieces 4"x4"x7'(sharpened) 1122 board feet 67 pieces 1"x12"x12' 25 lbs. wire #12 gage 13 lbs. 10d nails 400 sand bags 148 cu. yds. earth	34 pieces 4"x4"x8'(sharpened) 1371 board feet 84 pieces 1"x12"x12' 25 lbs. wire #12 gage 15 lbs. 10d nails 600 sand bags 188 cu. yds. earth	34 pieces 4"x4"x9'(sharpened) 1608 board feet 100 pieces 1"x12"x12' 25 lbs. wire #12 gage 17 lbs. 10d nails 600 sand bags 222 cu. yds. earth

MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

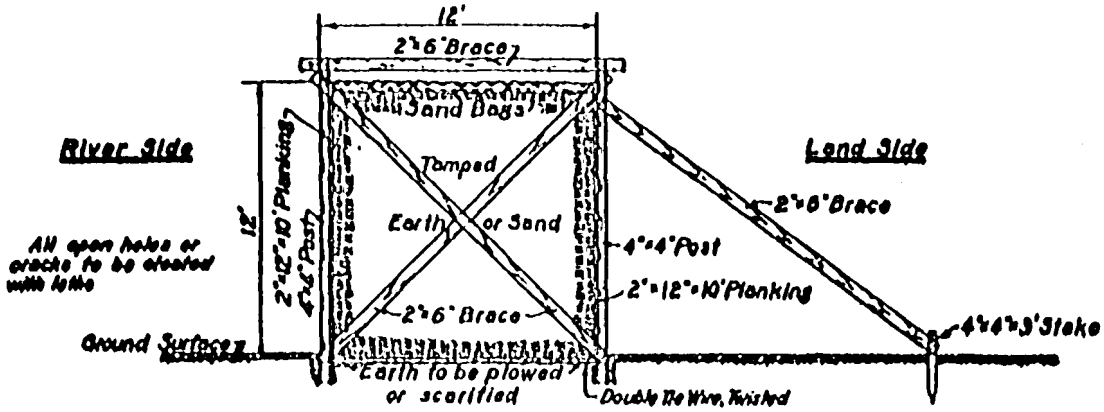
3-6FT. MUD BOX LEVEE CONSTRUCTION DETAILS

U.S. CORPS OF ENGINEERS, SACRAMENTO, CALIF.

EXHIBIT O PLATE 8



PLAN



END ELEVATION

MATERIAL REQUIRED FOR 100 LINEAR FEET OF LEVEE			
LUMBER	SAND BAGS	NAILS	EARTH or SAND
40 Posts 4"x4"x14' 240 Planks 2"x12"x10' 80 Braces 2"x6"x14' 60 Braces 2"x6"x10' #20 Stakes 4"x4"x3' 6 bundles lath	700	120 lbs-20d 4 lbs-3d fine WIRE 20 lbs-9 gage	834 cu yds
Total Lumber 6987 board feet			

ADDITIONAL MATERIAL FOR BRACING BACK SIDE IN BETWEEN BENTS			
LUMBER	SAND BAGS	NAILS	EARTH or SAND
20 Posts 4"x4"x14' 20 Braces 2"x6"x10' #20 Stakes 4"x4"x3'		6lbs-20d	
Total Lumber 613 board feet			

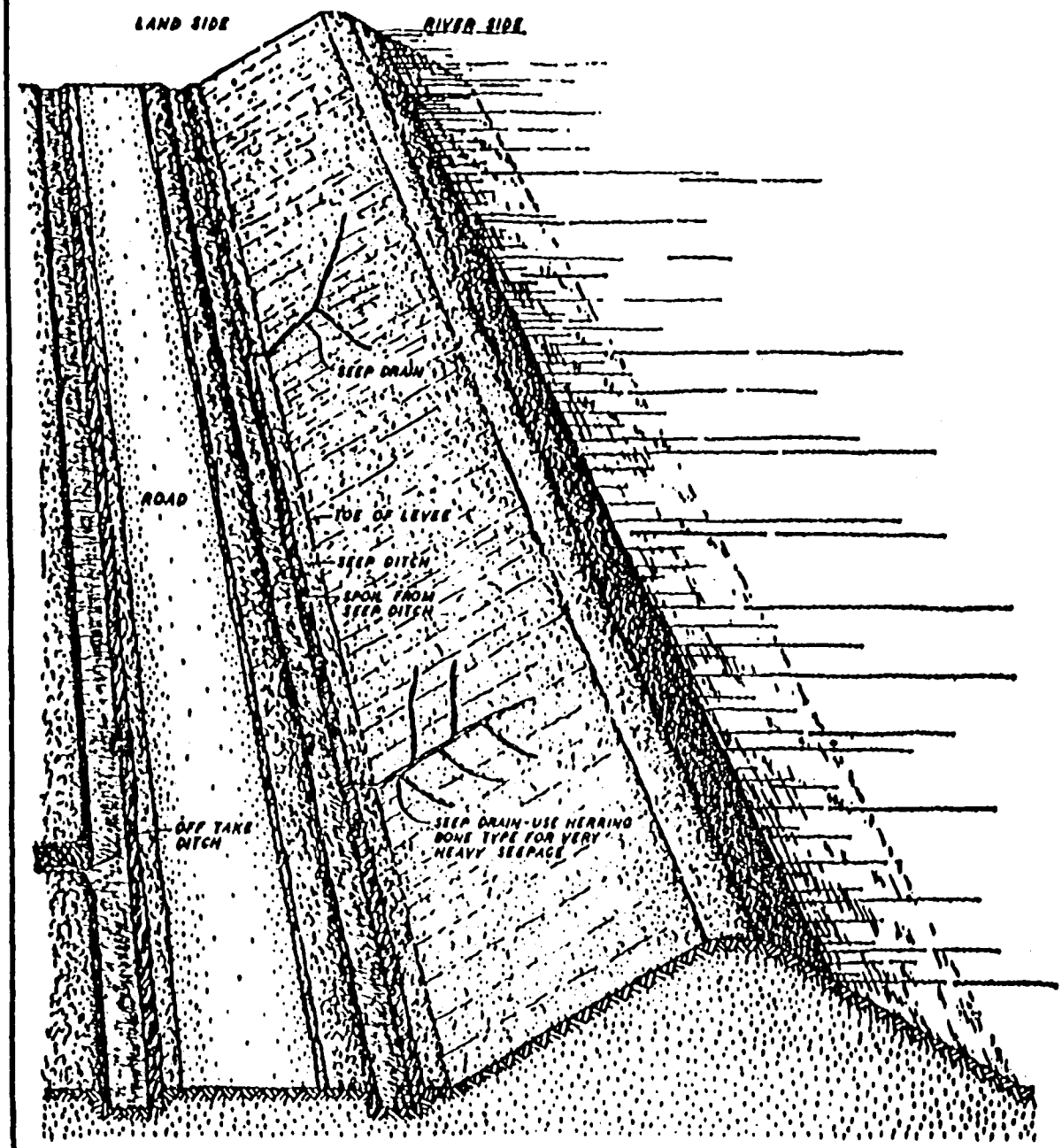
Sharpened

MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

MUD BOX BULKHEAD LEVEE CONSTRUCTION DETAILS

U.S. CORPS OF ENGINEERS, SACRAMENTO, CALIF.

EXHIBIT C PLATE 9



MIDDLE CREEK, CALIFORNIA
FLOOD CONTROL PROJECT

METHOD OF DRAINING LEVEE SLOPE

U.S. CORPS OF ENGINEERS, SACRAMENTO, CALIF.

EXHIBIT C PLATE 10

EXHIBIT D

SUGGESTED SEMI-ANNUAL REPORT FORM

TO: The District Engineer
Sacramento District
Corps of Engineers
1209 - 8th Street
Sacramento, California

(1 May 19__)
(1 Nov 19__)

Dear Sir:

The semi-annual report for the period (1 May 19__ to 31 October 19__) (1 November 19__ to 30 April 19__) Middle Creek Project Levee and Channel Improvements, Lake County, is as follows:

a. The physical condition of the protective works is indicated by the inspector's report, copies of which are inclosed, and may be summarized as follows:

(Superintendent's summary of conditions)

It is our intention to perform the following maintenance work in order to repair or correct the conditions indicated:

(Outline the anticipated maintenance operations for the following 6 months).

b. During this report period, major high water periods (water surface in Scott Creek reached or exceeded the readings of 12.0; Middle Creek 10.0; or the Diversion Channel 7.0) occurred on the following dates:

Dates	Maximum Elevation
_____	_____
_____	_____
_____	_____

EXHIBIT D
Sheet 1 of 2

Comments on the behavior of the protective works during such high water periods are as follows:
(Superintendent's log of flood observations)

During the high water stages when the water level reached a height of _____, on the gage or excess thereof (dates)_____, it was necessary to organize and carry out flood operations as follows:

(See Maintenance Manual for Middle Creek - Part No. 2)

c. The inspections have indicated (no) or (the following) encroachments or trespasses upon the project right-of-way.

d. (no) (_____) permits have been issued for (the following) improvements or construction within the project right-of-way.

Executed copies of the permit documents issued are transmitted for your files.

e. The status of maintenance measures, indicated in the previous semi-annual report as being required or as suggested by the representatives of the District Engineer, is as follows:

(Statement of maintenance operations, item by item with percent completion).

f. The fiscal statement of the Superintendent's operations for the current report period is as follows:

	Labor	Material	Equipment	Overhead	Total
1. Inspection					
2. Maintenance					
3. Flood fighting operations					
TOTAL					

Respectfully submitted,

_____
Superintendent of Works

EXHIBIT D
Sheet 2 of 2

EXHIBIT E

SUGGESTED CHECK LISTS OF LEVEES, CHANNELS AND STRUCTURES

For definition of "flood" or "high water period" see paragraph 1-06 of this manual

CHECK LIST NO. 2

MIDDLE CREEK PROJECT

LEVEES AND CHANNEL IMPROVEMENT

Inspector's Report Sheet No._____ Inspector _____

Date _____ Superintendent _____

Item	Remarks
(a) Location by Station	
(b) Settlement, sloughing, or loss of grade	
(c) Erosion of both levee slopes	
(d) Condition of roadways, including ramps	
(e) Evidence of seepage	
(f) Condition of farm gates and fencing	
(g) Maintenance measures taken since last inspection	
(h) Comments	

INSTRUCTIONS FOR COMPLETING SHEET 2, EXHIBIT E
(To be printed on back of sheet 2)

Item (a) Indicate levee station of observation, obtained by pacing from Nearest reference point; indicate right or left bank.

Item (b) If sufficient settlement of earthwork 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 the new slope. Note areas where erosion or gullying of the section has occurred.

Item (c) If sufficient erosion or gullying of back face or back toe of levee has taken place to be noticeable by visual inspection, indicate area affected and depth.

Item (d) Note any natural change in any section of roadway or ramps. Indicate any inadequacy in surface drainage system.

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

Item (f) Indicate the serviceability of all farm gates across the embankments and roadway, and indicate if repainting is required.

Item (g) Indicate maintenance measures that have been performed since last inspection and their condition at the time of this inspection.

Item (h) Record opinion, if any, of contributory causes for conditions observed and also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion, and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LIST NO. 3

MIDDLE CREEK PROJECT
LEVEES AND CHANNEL IMPROVEMENT

Inspector's Report Sheet No. ____ Inspector _____

Date _____ Superintendent _____

Item	Remarks
(a) Name of channel and location by stations	
(b) Vegetal growth in channel	
(c) Debris and refuse in channel	
(d) New construction within right-of-way	
(e) Extent of aggradation or degradation	
(f) Condition of riprapped section	
(g) Condition of bridges	
(h) Measures taken since last inspection	
(i) Comments	

INSTRUCTIONS FOR COMPLETING SHEET 4, EXHIBIT E
(To be printed on back of Sheet 4)

Item (a) Indicate station of observation obtained by pacing from nearest reference point.

Item (b) Note nature, extent, and size of vegetal growth within the limits of flood flow channel.

Item (c) Note nature and extent of debris and refuse that might cause clogging of the conduits of the irrigation intake works, fouling of the tainter gates, or the bridges over the channel.

Item (d) Report any construction along the diversion channel or above the diversion channel or above the diversion works that has come to the attention of the inspector and that might affect the functioning of the project.

Item (e) Indicate any change in grade or alignment of the channels, either by deposition of sediment or scour, that is noticeable by visual inspection. Estimate amount and extent.

Item (f) Indicate any change that has taken place in the riprap such as disintegration of the rock, erosion, or movement of the rock. Note the presence of vegetal growth through the riprap.

Item (g) Note any damage or settlement of the footings of the bridges. Indicate condition of wooden structures and if repainting is required. Indicate condition of bridge approaches, headwalls, and other appurtenances.

Item (h) Indicate maintenance measures that have been performed since the last inspection and their condition at time of this inspection.

Item (i) Record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.

NOTE: One copy of the Inspector's Report is to be mailed to the District Engineer immediately on completion and one copy is to be attached to and submitted with the Superintendent's semi-annual report.

CHECK LI[illegible]NO. 4

DRAINAGE AND IRRIGATION STRUCTURES
MIDDLE CREEK PROJECT

Inspector's Report Sheet No. _____ Inspector _____

Date _____ Superintendent _____

(a) Location by Levee Mileage	(b) Bank	(c) Debris or Other Obstruction to Flow	(d) Damage or Settlement of Pipe or Conduit	(e) Condition of concrete Headwall or Invert Paving	(f) Condition of Right-of-Way Adjacent to Structure	(g) Repair Measures Taken Since Last Inspection	(h) Comments
	Unit No. 1 - Left Bank of Middle Creek						
0.17	Left						
0.37	"						
0.54	"						
0.62	"						
0.83	"						
2.26	"						
2.35	"						
3.99	"						
4.18	"						
	Unit No. 2 - Right Bank of Middle Creek						
0.13	Right						
0.13	"						
0.23	"						
0.38	"						

EXHIBIT E
Sheet 6 of 9

CHECK LIST No. 4

DRAINAGE AND IRRIGATION STRUCTURES
MIDDLE CREEK PROJECT

Inspector's Report Sheet No. _____ Inspector _____

Date _____ Superintendent _____

(a) Location by Levee Mileage	(b) Bank	(c) Debris or Other Obstruction to Flow	(d) Damage or Settlement of Pipe or Conduit	(e) Condition of Concrete Headwall or Invert Paving	(f) Condition of Right-of-Way Adjacent to Structure	(g) Repair Measures Taken Since Last Inspection	(h) Comments
Unit No. 2 - Right Bank of Middle Creek, Cont'd.							
0.47	Right						
0.54	"						
1.08	"						
1.22	"						
2.93	"						
Unit No. 3 - Left Bank of Scott Creek							
0.41	Left						
0.55	"						
0.60	"						
0.79	"						
0.90	"						
0.94	"						
1.01	"						
1.02	"						
1.09	"						
1.25	"						

CHECK LIST NO. 4

DRAINAGE AND IRRIGATION STRUCTURES
MIDDLE CREEK PROJECT

Inspector's Report Sheet No. _____ Inspector _____

Date _____ Superintendent _____

(a) Location by Levee Mileage	(b) Bank	(c) Debris or Other Obstruction to Flow	(d) Damage or Settlement of Pipe or Conduit	(e) Condition of Concrete Headwall or Invert Paving	(f) Condition of Right-of-Way Adjacent to Structure	(g) Repair Measures Taken Since Last Inspection	(h) Comments
		Unit No. 4 - Right Bank Diversion Channel, Alley and Poge Creeks					
0.14	Right						
0.77	"						
1.21	"						
		Unit No. 5 - Left Bank of Clover Creek and Diversion Channel					
0.31	Left						

EXHIBIT E
Sheet 8 of 9

INSTRUCTIONS FOR COMPLETING SHEETS 6, 7 and 8, EXHIBIT E
(To be printed on back of sheets 6, 7 and 8)

(1) Enter station of all structures under Column (a) for check list.

(2) Inspect inlet, barrel, and outlet for accumulation of sediment, rubbish, and vegetal matter. Note condition under Column (c).

(3) If any settlement or damage to the pipe, barrel, or invert of the drain has occurred, estimate the location and amount. Note particularly if any backfill has come into the pipe or been disturbed. Record observations under Column (d).

(4) Inspect the concrete portions of the structures for evidence of settlement, cracks, "pop-outs", spaces, abrasive wear, or other deterioration. Record conditions under Column (e).

(5) Inspect backfill area adjacent to structure for eveidence of erosion caused by overflow of the drainage structure and note conditions in Column (f).

(6) Under Column (g) indicate physical measures that have been taken to correct conditions reported in last inspection, and their condition at time of this inspection.

(7) Under Column (h) record opinion, if any, of contributory causes for conditions observed, also any observations not covered under other columns.

(8) A copy of the inspector's report is to be mailed to the District Engineer immediately on completion, and a record copy shall be attached to the Superintendent's semi-annual report.

EXHIBIT F

LETTER OF ACCEPTANCE BY
THE STATE RECLAMATION BOARD

8 DEC 1959

SPKKO-P

Middle Creek
Flood Control Project

The Reclamation Board
State of California
1215 "O" Street
Sacramento 14, California

Gentlemen:

Reference is made to the joint inspection made on 29 October 1959 of flood control work pertaining to a portion of the Middle Creek Flood Control Project prior to acceptance of the contract work and transfer upon completion to the State of California for operation and maintenance.

The portion of the required work referred to above, consisting of levee construction and channel improvement upstream from Bloody Island Pumping Plant, is completed in accordance with Specification 2491, Contract No. DA-04-167-CIVENG-59-72 and Drawing No. CC-4-4-29.

The levee construction and channel improvement work described above now meets the requirements of the project. Therefore, said levee sections and channel improvements are hereby transferred to the State of California for operation and maintenance.

The maintenance work required under the provisions of the Middle Creek Flood Control Project shall be performed in accordance with existing Flood Control Regulations, inclosed herewith, which have been prescribed by the Secretary of the Army pursuant to Section 3 of the Act of Congress, approved 22 June 1936. As provided under Paragraph 208.10(10) of these regulations, an Operation and Maintenance Manual covering the work under this portion of the Middle Creek Flood Control Project is in process of preparation and will be furnished to you upon completion.

Middle Creek
Part No. 2
Exhibit F

8 DEC 1959 LHK:pnp

SPKKO-P
The Reclamation Board

A copy of this letter is being transmitted to the State Department of Water Resources.

Sincerely yours,

1 Incl
F.C. Reg.

H. A. MORRIS
Colonel, CE
District Engineer

Copy furnished:
Dept Water Resources
23rd & "R" Sts.
Sacto, California

O.C.E. w/o incl
S.P.D. w/o incl

cc: Engr Divn, Levee & Channels Sec w/o incl
Northern Area Ofc w/o incl

OPERATIONS

Concurrences
Originator: LHK
Date: 12/7/59
Dist. Engr. 3
Asst. D.E. (A)
Asst. D.E. (O) 2
Exec. Asst.
Cmptr.
Ops.
Engrg
R. E.
Prsnl.
Legal
Supply

Middle Creek Part No. 2 Exhibit F

EDMUND G. BROWN
GOVERNOR

THE RECLAMATION BOARD
OF THE
STATE OF CALIFORNIA
1215 O STREET
SACRAMENTO 14, CALIFORNIA
TELEPHONE: HI 5-4711

December 15, 1959

District Engineer
Sacramento District
Corps of Engineers, U. S. Army
P. O. Box 1739
Sacramento 8, California

Dear Sir:

Reference is made to your letter of December 8, 1959, SPKKO-P, transferring certain portions of the Middle Creek Project to the State of California for operation and maintenance.

This agency has operated upon the assumption that the Middle Creek Project would be constructed as a single unit in one large construction contract and that the completed project would be turned over to the State upon the completion of such a contract. All of our negotiations with local interests to secure assurances for the operation and maintenance of this particular project have been premised upon this assumption. Under these unusual circumstances, neither this agency nor the County of Lake is presently prepared to accept anything less than the entire completed project.

Sincerely yours,

A. N. MURRAY
General Manager and Chief Engineer

RSJ:fmb

cc: Department of Water Resources

Middle Creek Part No 2
Exhibit F

LHK:pnp

1 MAR 1960

SPKKO-C

The Reclamation Board
State of California
1215 "O" Street
Sacramento 14, California

Gentlemen:

Reference is made to your letter of 15 December 1959, referring to letter from this office dated 8 December 1959, transferring the completed portion of the Middle Creek Flood Control Project to the State of California for operation and maintenance.

Your desire to have the entire Project completed before acceptance for operation and maintenance is recognized. We have recently been advised that the Chief of Engineers has approved the plan for completion of the Middle Creek Project to provide the full degree and extent of flood control protection originally authorized, i.e., the project will be completed substantially as originally conceived. However, the Corps of Engineers has neither authority nor funds for performing maintenance on the Project, and a means must be provided for protecting the Federal and State investment in the flood control work now complete. It must be presumed that the assurances furnished by the State regarding maintenance and operation after completion apply in this case as it has in other projects. Accordingly, it is our belief that the State of California is obligated to accomplish operation and maintenance of the completed portion of the Project until the remaining work is completed.

A copy of this letter is being transmitted to the State Department of Water Resources.

Sincerely yours,

H. A. MORRIS
Colonel, CE
District Engineer

Copy furnished:
Dept Water Res.
SoPacDivn

cc: Engr Divn-Lev & Channels Sect
Northern Area Office

OPERATIONS BRANCH

Concurrences
Origination LHK
Date: 2/29/60
Dist. Engr. 3 Mar
Asst. D.E. (A)
Asst. D.E. (O) 2 Mar
Exec. Asst.
Chief
Deputy
Area
Mgmt
Property Office
Service Contrn Opns
Engr'g
R. E.
Prsnl.
Legal
Supply

Middle Creek
Part No. 2
Exhibit F

LK File Middle Creek CCL/jo

SPKED-L 13 April 1960

MEMO FOR RECORD

SUBJECT: Middle Creek Project, Meeting with Local Interests Regarding Erosion Damage Repairs

1. Representatives of the District office and the State met with local interests on this date for the purpose of reviewing damages to subject project due to the first season's flood flows, and for considering methods of accomplishment of repairs. The meeting was requested by letter dated 29 March 1960 from the Lake County Board of Supervisors. The following were in attendance:

Mr. Dugger	Supervisor Lake County
Mr. Hamilton	" " "
Mr. N. Hansen	F.C. Mgr., Lake County
Mr. A. Beatty	Mb. Commissioner, Lake County
Mr. M. Murray	State Reclamation Board
Mr. C. Werner	State Water Resources
Mr. J. Burns	" " "
Mr. R. Thompson	Sacramento District
Mr. W. Jewett	" "
Mr. J. Brooks	" "
Mr. C. Lee	" "

2. On 7 April 1960, the above mentioned District personnel had visited the project and had inspected the damaged areas. (See Memo for Record by the undersigned dated 7 April 1960).

3. The conferees traveled over the project and observed the damaged areas. Mr. Hansen requested advice on maintenance procedures in regards to the washed out channel banks and damaged rock protection. It was suggested that the washed out spots be filled with stream gravel, then revetted with quarry rock. The bank-run gravel would act as a filter material. It was suggested that the few areas of damaged stone protection be supplemented with additional rock.

4. After inspection of the site the party assembled in the town hall and Mr. Hansen pointed out their main problem was one of finance. Their maintenance zone has only $8,000 budgeted for the year. Local interests are very pleased with the project, and this past winter was the first year they were not flooded. Mr. Hansen was particularly concerned with the damaged areas at the upper end of Middle Creek, those on Clover Creek and the damaged drainage structures. He considers that the foregoing damages are outside the scope of normal maintenance, and that assistance is needed to correct the damaged areas. No commitment was made by District personnel, however, Mr. Hansen was told by Mr. Thompson that he

Middle Creek Part No. 2 Exhibit F

would be advised within a few days as to what action this office would take. The State people were asked if they were going to replace the gaging weir upstream from the County Road on Middle Creek, and the reply was in the negative. Local interests will use the broken concrete for riprap.

5. It is recommended that corrective work on the upper end of Middle Creek, on Clover Creek and the repair of four damaged structures be included in the contract work proposed for the lower end of Middle Creek project, which is scheduled for accomplishment with Fiscal Year 1961 funds. The basis for such action is that the erosion is either threatening the safety of levees and structures or is eroding away valuable agricultural lands. The work proposed and cost estimate thereof, is as follows:

Clover Creek

1,600 lineal feet, bank sloping and rock protection including structure protection.	$12,000

Middle Creek

2,500 lineal feet, bank sloping and rock protection including structure protection.	$9,000
Stone protection at two structures station M270+00± and station A16+00± (100 lineal feet each structure).	2,500
	$44,500
Contingencies 20%	8,900
	$53,400
Engr., and O.H.12 1/2%	6,600
	$60,000

cc: Kochis
Design
Constr-Opns (Thompson) (Jewett)
Prog Devel
Estimating
Civ Design
Levees & Channels (Orig)

JACK BROOKS

R. H. THOMPSON

C. C. LEE

Middle Creek
Part No. 2
Exhibit F

C
O
P
Y

C
O
P
Y

THE RECLAMATION BOARD
OF THE
STATE OF CALIFORNIA

August 9, 1960

District Engineer
Sacramento District
U. S. Corps of Engineers
P. O. Box 1739
Sacramento, California

Dear Sir:

Reference is made to your letter of July 8, 1959, concerning the transfer to the State of the levee construction and channel improvement on the Middle Creek Flood Control Project from Bloody Island Pumping Plant upstream.

The Reclamation Board at its meeting of August 3, 1960, formally accepted this levee section for operation and maintenance.

Sincerely yours,

/s/ A. N. Murray
A. N. MURRAY
General Manager and Chief Engineer

EXHIBIT F
Sheet 1 of 1

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

NOV 2 4 2010

Flood Protection and Navigation Section

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

Dear Mr. Punia:

The U.S. Army Corps of Engineers has completed a portion of work under PL 84-99, Flood Control and Coastal Emergencies (FCCE) (33 U.S.C. 701n) (69 Stat. 186) for emergency management activities. Repairs were made to rehabilitate various sites within Maintenance Area 17. Additional information about the repair and location of the sites may be found in the document titled, "Project Information Report for Public Law (P.L.) 84-99 Levee Rehabilitation, Maintenance Area 17 (Final)", dated April 13, 2007.

The rehabilitation work meets the requirements of the existing Operation and Maintenance Manual (O&M) and enclosed revisions. The subject flood damage reduction project is considered complete as of the date of this letter. The repairs were completed under Contract Number W91238-06-D-0029, Task Order Number 4. As-constructed drawings and revisions to the Operation and Maintenance Manual are enclosed. The Central Valley Flood Protection Board shall continue to operate and maintain the completed Rehabilitation Effort as part of the project.

If you have any questions regarding this project, please contact Ms. Paige Caldwell (916) 557-6919 or Ms. Christy Jones (916) 557-7107, Readiness Section. If you have any questions regarding this transfer, please contact Mr. Ryan Larson at (916) 557-7568 or Mr. Robert Murakami at (916) 557-6738, Flood Protection and Navigation Section.

A copy of this letter is being furnished to Maintenance Area 17, P.O. Box 40, Sutter, CA 95982.

Sincerely,

William J. Leady, P.E.
Colonel, U.S. Army
District Commander

Enclosure

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Flood Protection and Navigation Section

cc: CESPK-CO-E (Jones)

MURAKAMI
LARSON
NAGY
CALDWELL
OLSEN
MAHONEY
FAUSTINO
MULLINS
LEADY

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EXHIBIT G

SAMPLE PERMIT
FOR
USE OF RIGHT-OF-ENTRY

EXHIBIT
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.

The construction, installation and maintenance of the structure or major construction, the cost of inspection thereof by the grantor and/or the United States shall be paid by the applicant.

Grantee agrees that it will not use the area or facilities covered by this permit, or permit such area to be used, for any purpose other than is specifically covered by this permit.

(Use these spaces for special conditions applicable to this permit.)

_____

_____

THIS PERMIT SHALL NOT BE VALID UNTIL APPROVED BY THE DISTRICT ENGINEER, CORPS OF ENGINEERS, U. S. ARMY, OR HIS AUTHORIZED REPRESENTATIVE.

Signature (Grantor) (Title) (Date)

Terms of this permit are hereby accepted

Approved:

Signature (Grantee) (Date)

(Date)

District Engineer

REGULATIONS GOVERNING ISSUANCE OF PERMITS FOR USE OF RIGHTS-OF-WAY FOR FLOOD PROTECTION PROJECTS

As the flood protection works and rights-of-way are owned by the Local Interests and will be operated and maintained by them in accordance with the Regulations of the Secretary of the Army, and issuance of any permits to use any part of the rights-of-way will be handled by the Local Interests, with the restriction that no such permit may be issued without the approval of the District Engineer, as stated in paragraph No. 208.10, (a) General, (5) of the Regulations, a copy of which is attached hereto.

Applications for use of the rights-of-way should be addressed to The City or Levee Commission having jurisdiction over the local flood protection project. The City or Levee Commission will then forward the application to the District Engineer, Corps of Engineers, Sacramento, California, with its recommendation, with reasons for such recommendation. It is suggested that the application and recommendations be forwarded with a draft copy of the permit, in order that all objectionable features may be eliminated prior to its proffer to the applicant as this may prevent misunderstandings and arguments. If for any reason it is desired to forward the permit itself without this intervening step, five copies of the proposed permit should be included on which is stated the exact use of the rights-of-way, for which permission is being requested, together with any condition or restriction of the permit. The permit should be signed by the applicant and an official of the Local Interests. A drawing, sketch or detail plans as may be required to show the exact location, nature of work and proposed method of construction should be attached to each copy of permit. If the permit is approved by the District Engineer, three copies will be returned. This will enable each party concerned to have a copy of the approved permit.

In any case where a permit is requested for any purpose which might cause disfigurement or damage to the flood protection rights-of-way or structure in its erection, use, or removal, it is suggested that the applicant be required to post a bond of sufficient amount to protect the Local Interests from any cost of repair or removal, and to guarantee faithful performance of the permit conditions. In such cases the permit should state the amount and conditions of the bond.

In cases involving major construction or other work which may directly affect the flood protection structure, it will be necessary that the United States inspect the work and the Local Interests may also desire to inspect it. As stated in the permit form, such inspection will be at the expense of the grantee, and this should be called to his attention. Except in cases of known financial security, arrangements should be made with the grantee for an advance deposit or bond to cover such costs.

There is attached hereto a copy of a permit form which has been successfully used by a number of cities and levee committees.