

ATTACHMENT G

Memorandum of Understanding

Respecting the Sacramento River Flood

Control Project

November 6, 1953

MEMORANDUM OF UNDERSTANDING
RESPECTING THE SACRAMENTO RIVER FLOOD CONTROL PROJECT

This Memorandum of Understanding entered into this 30th day of November, 1953, by and between the Corps of Engineers, U. S. Army, represented by the Division Engineer, South Pacific Division, Corps of Engineers, United States Army, hereinafter called the Corps, and the State of California, represented by its agency the Sacramento and San Joaquin Drainage District, acting by and through The Reclamation Board, hereinafter called the State,

W I T N E S S E T H :

That, whereas the United States represented by the Corps and the State are collaborating in the prosecution of a public improvement commonly known as the Sacramento River Flood Control Project; and

Whereas, for Federal budgetary and appropriation purposes the said Sacramento River Flood Control Project is prosecuted by the Corps under two separate and distinct subdivisions; namely, that portion adopted by the Federal Flood Control Acts approved 1 March 1917, 15 May 1928, 26 August 1937 and 18 August 1941, hereinafter called the "Old Project", and that portion adopted by the Federal Flood Control Acts approved 22 December 1944 and 17 May 1950, hereinafter called the "Major and Minor Tributaries Project"; and

Whereas, on 29 September 1952 representatives of the Chief of Engineers and the State of California, represented by the State

Reclamation Board and the State Engineer, agreed as to the position of the several agencies with respect to the "Old" Sacramento River Flood Control Project, the basic principles of which are incorporated herein; and

Whereas, under the laws of the State of California the State, acting by and through its Reclamation Board, may, in cooperation with the Corps, adopt and carry out any project plans and give assurances satisfactory to the Secretary of the Army of the United States that the State will provide the local cooperation on the project required by Federal law to be furnished by the State and local interests; and

Whereas, total expenditures on the Old Project to date amount to about \$125,000,000, of which approximately one-third has been expended by the United States and two-thirds by the State of California and other local interests; and

Whereas, under the laws of the State of California the Department of Public Works, Division of Water Resources of the State of California, acting by and through the State Engineer, has supervisory powers over the maintenance and operation of the works of the project, and has the direct obligation of maintaining and operating a major portion of such works; and

Whereas, a number of public districts and other local interests within the State are, pursuant to State law, responsible for the maintenance and operation, or for defraying the cost of maintenance and operation of such portions of the flood control works of the project as are within the boundaries or jurisdiction of such districts or local interests, subject, however, to the supervision of the State; and

Whereas, the State acting by and through its Reclamation Board has given to the United States, on behalf of the State and local interests, the assurances of local cooperation on the project required by Federal law, namely: That the State will provide without cost to the United States all lands, easements and rights of way; bear the expense of necessary highway, railroad and bridge alterations; hold and save the United States free from claims for damages resulting from construction of the works; and maintain and operate all works after completion; and

Whereas, Federal improvements constructed and authorized by the Congress, for construction by the Corps, on the Sacramento River, include, in addition to the Sacramento River Flood Control Project, a Navigation Project, both of which have been modified and enlarged from time to time by Federal legislation; and

Whereas, the construction and operation of Shasta Reservoir on the Sacramento River and other Federally authorized or proposed multi-purpose reservoirs on other streams within and without the Sacramento River Drainage Basin, not contemplated under the Sacramento River Flood Control Project, will materially alter the regimen of stream flow during both low and high water seasons and might adversely affect the stability of project river banks and levees and thereby increase the cost of the maintenance of flood control works; and

Whereas, it is considered advisable, necessary and expedient that the parties hereto arrive at an understanding regarding the project, and particularly concerning the respective obligations of the parties with reference thereto.

Now, Therefore, the parties hereto agree that the provisions hereof, under the following subject headings, represent

their mutual understanding, namely: 1. Items comprising the Old Sacramento River Flood Control Project; 2. Levee construction standards; 3. Costs of completion of the Old Project; 4. Respective responsibilities of the United States and the State with regard to the completion of construction and the operation and maintenance of the Old Project.

1. Items Comprising The Old Sacramento River Flood Control Project.

The following is a general description of the system of project works as the same have been authorized for construction by the Congress prior to December 22, 1944 (date of approval of Public Law 534, 78th Congress, 2d Session):

- (1) Levees along the Sacramento River below Chico Landing and on the lower reaches of American, Feather, Bear and Yuba Rivers and on numerous other intercepted streams, canals and sloughs.
- (2) Leveed by-passes through Yolo and Sutter basins along Butte Slough and leading from Moulton and Colusa Weirs.
- (3) The Moulton, Colusa, Tisdale, Fremont and Sacramento Weirs located on the Sacramento River for the purpose of discharging excess river channel flood flows into Butte Basin and the Sutter and Yolo By-passes.
- (4) Unleveed by-pass through Butte Basin.
- (5) The enlarged Sacramento River channel extending from the mouth of Cache Slough to Collinsville.
- (6) The Tisdale By-pass for conveyance of discharges over Tisdale Weir to Sutter By-pass, together with its levees.
- (7) The Sacramento By-pass for conveyance of discharges over Sacramento Weir to Yolo By-pass, together with its levees.
- (8) The Wadsworth Canal and East and West intercepting canals, together with their levees.
- (9) The Western Pacific Interceptor, the Natomas Cross Canal, the Natomas East Canal, and the Coon Creek Group Interceptor, together with their levees.

- (10) The levee adjacent to the east bank of Colusa Trough.
- (11) The Knights Landing Ridge Cut, together with the levees on both sides thereof.
- (12) The Cache Creek Settling Basin and its surrounding levees.
- (13) The primary clearing of by-passes and overflow channels.
- (14) Three major pumping plants adjacent to the east levee of Sutter By-pass.
- (15) Two major outfall structures, one from the lower end of Butte Basin to Sacramento River near Colusa, and the other from the lower end of Colusa Trough to Sacramento River near Knights Landing.
- (16) Appurtenant structures and gaging stations.
- (17) Alteration of existing bridges, railroads and highways.

The following tabulation enumerates specifically the project works and features under the subject headings (a) Levees, (b) Weirs, (c) Drainage Pumping Plants, (d) Channels and Canals, (e) By-passes, (f) Check Dams and Drains, (g) Bridges, and (h) Gaging Stations:

<u>(a) Levees</u>		<u>LOCATION</u>	<u>APPROX. LENGTH IN MILES</u>
<u>ITEM</u>	<u>STREAM OR CHANNEL</u>		
1	American River, left bank	Sacramento R. to Mayhew	11.3
2	American River, right bank	Sacramento R. to Swanston	5.9
3	Arcade Creek, left bank	Natomas E.Canal to Old Msvl.Rd.	2.1
4	Arcade Creek, right bank	Natomas E.Canal to Old Msvl.Rd.	2.0
5	Bear River, left bank	Feather R. to high ground	12.6
6	Bear River, right bank	Feather R. to high ground	14.2
7	Butte Sl. By-pass, R.Bk.	Butte Sl.Outfall Gates to Long Bridge	7.4
8	Cache Creek, left bank	Yolo By-pass to high ground	10.3
9	Cache Creek, right bank	Cache Cr.Set.Bsn.to high grnd.	9.5
10	Cache Cr.Set.Bsn. lt.bnk.	Cache Cr. to Yolo By-pass	2.3
11	Cache Cr.Set.Bsn. rt.bnk.	Cache Cr. to Yolo By-pass	4.7

(a) Levees (Cont'd.)

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>	<u>APPROX. LENGTH IN MILES</u>
12	Cache Slough, left bank	Steamboat Sl. to Maine Prairie	9.5
13	Cache Slough, right bank	Yolo By-pass to Ulatis Creek	4.6
14	Colusa By-pass, lt. bk.	Sacramento R. easterly	1.1
15	Colusa By-pass, rt. bk.	Sacramento R. easterly	1.0
16	Colusa Trough, lt. bk.	Knights Lndg. to high ground	37.8
17	Coon Cr. Gp. Intercept. rt. bank	Natomas Cross Canal to near Trowbridge	4.8
18	E. Intercept. Canal, lt. bk.	Wadsworth Canal to nr. Pease Sta.	3.0
19	Elk Slough, left bank	Sacramento R. to Sutter Sl.	9.2
20	Elk Slough, right bank	Sacramento R. to Sutter Sl.	9.2
21	Feather R. left bank	Sacramento R. to Honcut Cr.	41.3
22	Feather R. right bank	Sutter By-pass to Western Canal Headgate	44.3
23	Georgiana Sl. lt. bk.	Sacramento R. to Mckelumne R.	12.8
24	Georgiana Sl. rt. bk.	Sacramento R. to Mokelumne R.	11.9
25	Haas Slough, lt. bk.	Cache Sl. to near Millar	8.6
26	Haas Slough, rt. bk.	Cache Sl. to near Maine Prairie	4.8
27	Honcut Creek, lt. bk.	Feather R. to high ground	4.1
28	Knights Ldg. Rdg. Cut, lt bk.	Sycamore Sl. to Yolo By-pass	6.3
29	Knights Ldg. Rdg. Cut, rt. bk.	Sycamore Sl. to Yolo By-pass	6.4
30	Linda Cr., left bank	Natomas E. Canal to high ground	1.4
31	Lindsey Sl. left bank	Yolo By-pass to Dozier Sta.	7.0
32	Lindsey Sl. rt. bank	Yolo By-pass to high ground	6.1
33	Miner Slough, left bank	Sutter Sl. to Cache Sl.	8.3
34	Miner Slough, right bank	Sutter Sl. to Yolo By-pass	2.5
35	Moulton By-pass, lt. bk.	Sacramento R. easterly	2.0
36	Moulton By-pass, rt. bk.	Sacramento River easterly	0.3
37	Natomas Cross Canal, lt. bk.	Sacramento R. to Natomas E. Canal	5.2
38	Natomas Cross Canal, rt. bk.	Sacramento R. to Coon Cr. Gr. Inter.	5.3
39	Natomas E. Canal, lt. bk.	American R. to Linda Cr.	4.1
40	Natomas E. Canal, rt. bk.	American R. to Natomas Cross Canal	15.8
41	Nigger Jack Sl. lt. bk.	Feather R. to Yuba R.	3.1
42	Nigger Jack Sl. rt. bk.	Feather R. to high ground	6.5
43	North Dry Cr. lt. bk.	W. P. Interceptor to high ground	2.1
44	Putah Cr., left bank	Yolo By-pass to W. of Davis	9.4
45	Putah Cr. right bank	Yolo By-pass to W. of Davis	7.5
46	Sacramento By-pass, lt. bk.	Sacramento R. to Yolo By-pass	1.8
47	Sacramento By-pass, rt. bk.	Sacramento R. to Yolo By-pass	1.7
48	Sacramento R. left bank	Mayberry Sl. to Butte-Glenn Co. Line	164.1
49	Sacramento R. rt. bk.	Junction Point to Ord Ferry	163.5
50	South Dry Cr., lt. bk.	Bear R. to high ground	9.0
51	South Dry Cr., rt. bk.	Bear R. to high ground	1.6
52	Steamboat Sl., lt. bk.	Sacramento R. to Junct. Pt.	13.2
53	Steamboat Sl., rt. bk.	Sacramento R. to Junct. Pt.	11.9
54	Sutter By-pass, lt. bk.	High Ground near Lcng Bridge to Feather R.	23.4
55	Sutter By-pass, rt. bk.	Long Bridge to Sacramento R.	33.8
56	Sutter Sl. lt. bk.	Sacramento R. to Steamboat Sl.	6.9
57	Sutter Sl., rt. bk.	Sacramento R. to Steamboat Sl..	6.9

(a) Levees (Cont'd.)

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>	<u>APPROX. LENGTH IN MILES</u>
58	Threemile Sl., lt. bk.	Sacramento R. to San Joaquin R.	4.1
59	Threemile Sl., rt. bk.	Sacramento R. to San Joaquin R.	3.6
60	Tisdale By-pass, lt. bk.	Sacramento R. to Sutter By-pass	4.4
61	Tisdale By-pass, rt. bk.	Sacramento R. to Sutter By-pass	4.4
62	Ulatis Cr. rt. bk.	Cache Sl. to near Dozier Sta.	3.9
63	Wadsworth Canal, lt. bk.	Sutter By-pass to E. Intercept.Cl.	4.6
64	Wadsworth Canal, rt. bk.	Sutter By-pass to W. Intercept.Cl.	4.5
65	W. Intercept.Canal, rt. bk.	Wadsworth Cl. to Sutter Buttes	1.8
66	Western Pac.Intercep.,lt.bk.	Bear R. to N. Dry Creek	2.3
67	W.P.Intercept.rt. bk.	Bear R. to near Alicia Sta.	6.3
68	Willow Sl., lt. bk.	Yolo By-pass to near Merritt Sta.	8.0
69	Willow Sl., right bank	Yolo By-pass to near Merritt Sta.	7.9
70	Yankee Sl., lft bank	Bear R. to high ground	3.8
71	Yankee Sl., right bank	Bear R. to high ground	6.3
72	Yolo By-pass, lt. bk.	Fremont Weir to Miner Sl.	37.1
73	Yolo By-pass, rt. bk.	Fremont Weir intermittently to near Rio Vista	34.4
74	Yuba River, left bank	Feather R. to high ground	7.2
75	Yuba River, right bank	Feather R. to high ground	8.0
		Total length	<u>980.0</u>

(b) Weirs and Control Structures

<u>ITEM</u>	<u>STRUCTURE</u>	<u>LOCATION</u>
1	Moulton Weir	Lt.bk. Sacramento R. at River Mi. 159.0
2	Colusa Weir	Lt.bk. Sacramento R. at R. Mi. 146.5
3	Butte Sl. Outfall Gates	Lt.bk. Sacramento R. at R. Mi. 139.2
4	Tisdale Weir	Lt.bk. Sacramento R. at R. Mi. 129.4
5	Knights Ldg. Outfall Gates	Rt.bk. Sacramento R. at R. Mi. 89.5
6	Fremont Weir	Rt.bk. Sacramento R. at R. Mi. 82.3
7	Sacramento Weir	Rt.bk. Sacramento R. at R. Mi. 62.9

(c) Drainage Pumping Plants

<u>ITEM</u>	<u>PUMPING PLANT</u>	<u>LOCATION</u>
1	Sutter By-pass No. 1	Near Chandler
2	Sutter By-pass No. 2	At O'Banion Road
3	Sutter By-pass No. 3	Above mouth of Wadsworth Canal.

(d) Channels and Canals

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>	<u>LENGTH IN MILES</u>
1	American River	Sacramento River to Mayhew	8.8
2	Arcade Creek	Natomas E.Canal to Old Msvl.Rd.	2.1
3	Bear River	Feather R.to E.Bdry of S-S.J.D.D.	13.4
4	Cache Cr. and Cache Cr. Settling Basin	Yolo By-pass to high ground	10.4
5	Cache Slough	Yolo B-P to W.Bdry of S-S.J.D.D.	11.0
6	Coon Cr. Grp. Intercept.	Natomas Cross Cnl.to nr Trowbridge	4.8
7	E.Intercepting Canal	Wadsworth Canal to nr Pease Sta.	3.0
8	Elk Slough	Sacramento R. to Sutter Slough	9.2
9	Feather River	Sacramento R. to Western Cnl. Headgate	45.0
10	Georgiana Slough	Sacramento R. to Mokelumne R.	12.8
11	Haas Slough	Cache Sl.to W.Bdry.S-S.J.D.D.	2.9
12	Honcut Creek	Feather R.to E.Bdry.S-S.J.D.D.	4.1
13	Knights Lndg.Ridge Cut	Sycamore Sl. to Yolo By-pass	6.4
14	Linda Creek	Natomas E.Canal to Old Msvl.Rd.	1.4
15	Lindsey Slough	Yolo B.P.to W.Bdry.S-S.J.D.D.	6.7
16	Miner Slough	Sutter Sl. to Cache Sl.	8.3
17	Natomas Cross Canal	Sacramento R.to Natomas E.Canal	5.2
18	Natomas East Canal	American R.to Natomas Cross Cnl	15.8
19	Nigger Jack (Simmerly) Sl.	Feather R. to W.P.R.R.	1.7
20	North Dry Creek	W.P.Intercept.Canal to Old Marysville Road	2.1
21	Putah Creek	Yolo By-pass to Winters	17.2
22	Sacramento River	Collinsville to Crd Ferry	184.6
23	South Dry Creek	Bear R. to E.Bdry.S-S.J.D.D.	9.0
24	Steamboat Slough	Sacramento R.to Junction Pt.	13.2
25	Sutter Slough	Sacramento R.to Steamboat Sl.	6.9
26	Threemile Slough	Sacramento R.to San Joaquin R.	3.6
27	Ulatis Creek	Cache Sl.to W.Bdry.S-S.J.D.D.	1.5
28	Wadsworth Canal	Sutter By-pass to E. & W. Intercept. Canal	4.5
29	W. Intercepting Canal	Wadsworth Canal to Sutter Buttes	1.3
30	W.P.Interceptor Canal	Bear R. to near Alicia Sta.	6.3
31	Willow Slough	Point on Willow Sl. near Merritt Sta. on S.P.R.R. in Yolo Co.	
		to Yolo By-pass	8.0
32	Yankee Slough	Bear R.to E.Bdry.S-S.J.D.D.	6.3
33	Yuba River	Feather R.to Two Mi. E. of S-S.J.D.D.	8.0
		Total Length	<u>446.0</u>

(e) By-passes

<u>ITEM</u>	<u>BY-PASS</u>	<u>LOCATION</u>	<u>LENGTH IN MILES</u>	<u>AREA IN ACRES</u>
1	Butte Basin	Sacramento River to Butte Slough	33.0	110,000
2	Butte Slough	Butte Sl. Outfall Gts. to Long Brdg.	6.7	2,000
3	Sutter	Long Bridge to Sacramento R. at Verona & Fremont Weir	30.0	22,000
4	Colusa	Colusa Weir on Sacramento R. to Butte Basin	1.0	470
5	Tisdale	Tisdale Weir on Sacramento R. to Sutter By-pass	4.3	480
6	Yolo	Fremont Weir on Sacramento R. to Rio Vista	43.0	75,000
7	Sacramento	Sacramento Weir on Sacramento R. to Yolo By-pass	2.0	400
			<u>120.0</u>	<u>210,350</u>

(f) Check Dams and Drains

<u>ITEM</u>	<u>CHANNEL OR CANAL</u>	<u>LOCATION</u>
1	Borrow Pit, E.L. Sutter By-pass	0.7 mile below Wadsworth Canal
2	Borrow Pit, W.L. Sutter By-pass	Opposite mouth of Wadsworth Canal
3	Gilsizer Slough	Sutter By-pass, 2.5 miles S. of Tisdale By-pass
4	Willow Slough	Sutter By-pass near Chandler
5	Wadsworth Canal	South Butte Road
6	Collecting Canals and Seepage Ditches	Tributary to East side of Sutter By-pass

(g) Bridges

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>
1	Sutter By-pass E. levee borrow pit	Chandler
2	Sutter By-pass E. levee borrow pit	Sutter Causeway
3	Sutter By-pass E. levee borrow pit	One-half mi, N. of O'Banion Road
4	Sutter By-pass E. levee borrow pit	Bogue Road
5	Sutter By-pass E. levee borrow pit	Below mouth of Wadsworth Canal
6	Sutter By-pass E. levee borrow pit	Franklin Road
7	Sutter By-pass W. levee borrow pit	Karnak
8	Sutter By-pass W. levee borrow pit	McClatchy Road
9	Sutter By-pass W. levee borrow pit	Franklin Road
10	Tisdale B.P. S. levee borrow pit	Reclamation Road
11	Tisdale B.P. N. levee borrow pit	R.D. No. 1660 Pumping Plant Franklin Road
12	Wadsworth Canal	South Butte Road
13	Wadsworth Canal	Butte House Road
14	Wadsworth Canal	West of East Butte Road
15	East Intercepting Canal	East Butte Road
16	East Intercepting Canal	Township Road
17	East Intercepting Canal	East of Madison Road
18	East Intercepting Canal	East of Mallot Road
19	West Intercepting Canal	West of Cemetery Road
20	West Intercepting Canal	

(g) Bridges (Cont'd.)

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>
21	West Intercepting Canal	East of Butte Pass Road
22	West Intercepting Canal	West of Butte Pass Road
23	West Intercepting Canal	One-half mi. W. of Butte Pass Road
24	Collecting Canal	Sutter By-pass Pmpg. Plant #1
25	Collecting Canal	Marcuse and Sawtelle Roads
26	Collecting Canal	One mile S. of O'Banion Road near Sutter By-pass
27	Collecting Canal	One mile S. of O'Banion Rd. and one-half mile E. of Sutter By-pass
28	Collecting Canal	O'Banion Road
29	Collecting Canal	One mi. N. of Sutter By-pass Pumping Plant No. 2
30	Collecting Canal	One mile N. of Oswald Road
31	Collecting Canal	Bogue Road

(h) Gaging Stations

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>
1	Sacramento River	Keswick
2	Clear Creek	Near Igo
3	Cottonwood Creek	Near Cottonwood
4	Battle Creek	Near Cottonwood
5	Sacramento River	Iron Canyon
6	Sacramento River	Red Bluff
7	Antelope Creek	Near Red Bluff
8	Mill Creek	Near Los Molinos
9	Thomas Creek	Paskenta
10	Deer Creek	Near Vina
11	Sacramento River	Hamilton City
12	Chico Creek	Near Chico
13	Stony Creek	Near Hamilton City
14	Stony Creek	St. John
15	Sacramento River	Ord Ferry
16	Sacramento River	Butte City
17	Sacramento River	Gordon Pump
18	Sacramento River	Moulton Weir
19	Sacramento River	Colusa Weir
20	Sacramento River	Colusa
21	Sacramento River	Butte Slough Cutfall Gates
22	Sacramento River	Meridian
23	Sacramento River	Reclamation Dist. No. 70 Pump
24	Sacramento River	Tisdale Weir
25	Sacramento River	Tisdale
26	Sacramento River	Below Wilkins Slough
27	Sacramento River	Near Rough & Ready Bend
28	Sacramento River	Knights Landing

(h) Gaging Stations (Cont'd.)

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	<u>LOCATION</u>
29	Butte Creek	Near Chico
30	Butte Slough	Outfall Gates
31	Butte Slough	Mawson Bridge
32	Sutter By-pass	Long Bridge
33	Sutter By-pass	No. 3 Pumping Plant
34	Wadsworth Canal	Butte House Road
35	Sutter By-pass	No. 2 Pumping Plant
36	Tisdale By-pass	Reclamation Dist. No. 1660 Pump
37	Sutter By-pass	No. 1 Pumping Plant
38	Sutter By-pass	Reclamation Dist. No. 1500 Pump
39	Feather River	Five miles east of Oroville
40	Feather River	Oroville
41	Feather River	Near Gridley
42	Yuba River	Narrows Dam
43	Yuba River	Simpson Lane Bridge
44	Yuba River	Marysville
45	Feather River	Yuba City
46	Feather River	Below Shanghai Bend
47	Bear River	Near Wheatland
48	Feather River	Nicolaus
49	Sacramento River	West end Fremont Weir
50	Sacramento River	East end Fremont Weir
51	Sacramento River	Verona
52	Sacramento River	Pritchard Lake
53	Sacramento River	Sacramento Weir
54	Sacramento River	Opposite Sacramento Weir
55	Sacramento River	Second Bannon Slough
56	North Fork American River	Rattlesnake Bridge
57	South Fork American River	Coloma
58	American River	Folsom
59	American River	Fair Oaks
60	American River	H. Street Bridge
61	American River	Elvas
62	American River	Garden Highway
63	Sacramento River	I Street Bridge

The foregoing items (f) and (g) are pursuant to the provisions of portions of items (b), (c) and (d) of Section 8361 of the Water Code of the State of California, made part of the project for purpose of maintenance by the State, but said project items have not been specifically authorized by Congress. Also, only a portion of the gages in Item (h) has been authorized by Congress. Sections 8360 and 8361 read as follows:

"8360. On behalf of the State the Department of Public Works, acting by and through the State Engineer, has supervisory powers over the maintenance and operation of the flood control works of the Sacramento River Flood Control Project."

"8361. The department, acting by and through the State Engineer, shall maintain and operate on behalf of the State the following units or portions of the works of the Sacramento River Flood Control Project, and the cost of such maintenance and operation shall be defrayed by the State.

- "(a) The east levee of the Sutter By-pass north of Nelson Slough.
- "(b) The levees and channels of the Wadsworth Canal, Willow Slough Channel downstream from the Southern Pacific Railroad from Davis to Woodland except that portion of the north levee thereof lying within Reclamation District No. 2035, Putah Creek downstream from Winters, the intercepting canals draining into them, and all structures incidental thereto.
- "(c) The collecting canals, sumps, pumps and structures of the drainage system of Project No. 6 east of the Sutter By-pass.
- "(d) The by-pass channels of the Butte Slough By-pass, the Sutter By-pass, the Tisdale By-pass, the Yolo By-pass and the Sacramento By-pass with all cuts, canals, bridges, dams, and other structures and improvements contained therein and in the borrow pits thereof.
- "(e) The levees of the Sacramento By-pass.
- "(f) The channels and overflow channels of the Sacramento River and its tributaries within the Sacramento and San Joaquin Drainage District.
- "(g) The Knights Landing Ridge Cut flowage area.
- "(h) The flood relief channels controlled by the Moulton and Colusa Weirs and the training levees thereof.
- "(i) The levee on the left bank of the Sacramento River adjoining Butte Basin, from the Butte Slough outfall gates upstream to a point four miles northerly from the Moulton Weir, after completion.
- "(j) All weirs and relief structures.
- "(k) The west levee of the Yolo By-pass, extending from the west end of the Fremont Weir southerly to the Cache Creek Settling Basin and from Willow Slough Channel to Putah Creek and the east levee of the Yolo By-pass from Fremont Weir southerly two miles.

- "(l) The levee on the west bank of Feather River extending a distance of about two miles southerly from the Sutter-Butte Canal headgate.
- "(m) The levees of Cache Creek and the easterly and westerly levees of Cache Creek Settling Basin.
- "(n) The flowage area of Western Pacific Intercepting Canal extending northerly for a distance of five miles from Bear River."

The maintenance of all project works under the supervision of the State Engineer and in accordance with the foregoing Section 8360, except those enumerated in the foregoing Section 8361, is the responsibility and liability of local interests pursuant to Section 8370 of the Water Code, which reads as follows:

"8370. It is the responsibility, liability and duty of the reclamation districts, levee districts, protection districts, drainage districts, municipalities, and other public agencies within the Sacramento River Flood Control Project limits, to maintain and operate the works of the project within the boundaries or jurisdiction of such agencies, excepting only those works enumerated in Section 8361 and those for which provision for maintenance and operation is made by Federal Law."

Public Law 534, 78th Congress, 2d Session, and Public Law 516, 81st Congress, 2d Session, provide for the flattening of bypass levee slopes of the Sacramento River Flood Control Project; for the extension of the project to include the reclamation of Butte Basin; construction of two multi-purpose reservoirs on the Sacramento River and tributaries; and construction of levee and channel-improvement projects for flood control on nine minor tributary streams.

2. LEVEE CONSTRUCTION STANDARDS

The specifications for grade and section of the levees of the Sacramento River Flood Control Project are set forth in Senate Document No. 23, 69th Congress, 1st Session, (enacted by Public Law 391, 70th Congress) and in House Document 649, 78th Congress, 2d

The following tabulation, copied from House Document 649, 78th Congress, 2d Session, sets forth the specifications of Project levees sections:

	:	:	:	:	:
	:	Crown	:	River	:
	:	Width	:	Slope	:
<u>Present authorized river levees (Old Project)</u>	:	20 feet	:	1 on 3	:
	:		:	1 on 2	:
	:		:		:
<u>Proposed river levees (Major & Minor Tributaries Project)</u>	:	20 feet	:	1 on 3	:
	:		:	1 on 2	:
	:		:		:
<u>Present authorized by-pass levees (Old Project)</u>	:	20 feet	:	1 on 4	:
	:		:	1 on 2½	:
	:		:	5 or 6 feet	:
	:		:		:
<u>Proposed By-pass levees (Major & Minor Tributaries Project)</u>	:	20 feet	:	1 on 4	:
	:		:	1 on 3	:
	:		:		:

The "present" sections as set forth in the tabulations were those in effect prior to 1944, and the "proposed" sections are those authorized by the Flood Control Act of 1944. Standards both prior and subsequent to 1944 provide for the construction of a surfaced roadway suitable for access, patrol, and maintenance on all levees. Levee standards for the minor tributary stream projects proposed in H. D. 649 provide for the same slopes and freeboard as the river levees, but with narrower crown widths.

The following exceptions to the foregoing standards have been adopted to conform to special local conditions after conference among Federal, State, and local interests. These exceptions provide for a crown width of only 12 feet on the following sections of Project levees. The numbers refer to the items denoted in the tabulation setting forth Project levees segregated by stream or by-pass channels and their respective left and right banks.

	<u>Approximate length in miles</u>
(a) Items 10 and 11, levees within Cache Creek Settling Basin and levee adjacent to Sacramento Northern R. R. embankment	7.0
(b) Portion of Item 12, levee on left bank of Cache Slough on Peters Tract, classified as minor tributary levee	2.6
(c) Portion of Item 25, levee on left bank of Haas Slough, upstream from Duck Slough, classified as minor tributary levee	4.0
(d) Portion of Item 26, levee on right bank of Haas Slough on Peters Tract, classified as minor tributary levee	3.6
(e) Portions of Items 28 and 29, Knights Landing Ridge Cut levees between Sycamore Slough and the south line of Reclamation District No. 730	7.2
(f) Portion of Item 42, levee on Nigger Jack Slough adjacent to Western Pacific R. R. embankment	4.8
(g) Items No. 70 and 71, both levees of Yankee Slough, classified as a minor tributary	10.1
(h) Small portion of Item 73, levee extending westerly from southern end of Yolo By-pass along Watson Hollow Drain to high ground	1.7
(i) Item No. 67, west levee of the Western Pacific Interceptor along the W.P.R.R.	2.5
(j) Portion of Item No. 39, east levee of Natomas East Canal from Globe Station to Linda Creek	3.6
(k) Item No. 50, left bank South Fry Creek from 1.86 miles east of Bear River to high ground, including Grasshopper Creek levees.	<u>8.5</u>
	<u>55.6</u>

With reference to standards for by-pass levees as set forth in the table on page 14, the 2½:1 slopes were adopted during the early stages of the Project when practical considerations dictated a somewhat narrow base of levee to be placed with a floating clamshell dredge of limited reach. The standards were progressively

changed with changes in methods of construction and as proven necessary by destructive wave-wash on the steeper waterward slopes and severe slips resulting from saturation of the landward slopes. About 52 miles of Sutter By-pass levees were reconstructed or contracts awarded therefor, by the State or the United States, prior to the adoption of the Flood Control Act of 1944, with waterward slopes of 1 on 4 and landward slopes of 1 on 3. These section standards were subsequently specifically authorized by the 1944 Flood Control Act, and the further flattening is to be accomplished as a part of the Major & Minor Tributaries Project.

3. COSTS OF COMPLETION OF PROJECT WORKS

The cost to complete the works of the Old Sacramento River Flood Control Project may be divided into two classifications, (a) Federal Costs, and (b) State Costs (inclusive of costs of all local interests).

(a) Federal Costs

The District Engineer, Corps of Engineers, Sacramento District, has made a field survey of the Old Sacramento River Flood Control Project with the objective of determining the work required to complete the Project.

The findings of the survey with reference to the work required to complete the levee system and the cost thereof in which the State concurs, follows. Item numbers refer to items denoted in the tabulation setting forth project levees segregated by stream or by-pass channels and their respective left and right banks.

<u>Item</u>	<u>Stream or Channel</u>	
1	American River, left bank	\$ 18,654
2	American River, right bank	95,916
3	Arcade Creek, left bank	41,563
4	Arcade Creek, right bank	188,275
5	Bear River, left bank	72,869
6	Bear River, right bank	94,547
8	Cache Creek, left bank	572,001
9	Cache Creek, right bank	344,187
11	Cache Creek Settling Basin, right bank	28,614
12	Cache Slough, left bank	836,439
13	Cache Slough, right bank	189,124
16	Colusa Trough, left bank	1,006,748
17	Coon Creek Group Interceptor, right bank	129,505
19	Elk Slough, left bank	67,683
20	Elk Slough, right bank	171,085
21	Feather River, left bank	526,312
22	Feather River, right bank	672,749
25	Haas Slough, left bank	7,312
26	Haas Slough, right bank	128,555
28	Knights Landing Ridge Cut, left bank	76,612
29	Knights Landing Ridge Cut, right bank	84,728
30	Linda Creek, left bank	106,917
31	Lindsey Slough, left bank	263,795
32	Lindsey Slough, right bank	177,607
33	Miner Slough, left bank	202,149
34	Miner Slough, right bank	63,591

37	Natomas Cross Canal, left bank	130,907
38	Natomas Cross Canal, right bank	57,558
39	Natomas East Canal, left bank	304,703
40	Natomas East Canal, right bank	352,478
48	Sacramento River, left bank	4,210,210
49	Sacramento River, right bank	4,043,388
50	South Dry Creek, left bank	59,362
52	Steamboat Slough, left bank	943,946
53	Steamboat Slough, right bank	179,297
56	Sutter Slough, left bank	314,226
57	Sutter Slough, right bank	224,737
58	Threemile Slough, left bank	81,608
62	Ulatis Creek, right bank	114,075
70	Yankee Slough, left bank	16,383
71	Yankee Slough, right bank	59,363
73	Yolo By-pass, right bank	594,182
74	Yuba River, left bank	141,445
75	Yuba River, right bank	<u>89,595</u>
	Total Levee Costs	\$18,085,000

The survey by the Corps also disclosed that the primary clearing of by-passes and overflow channels, a Project construction obligation, has not been accomplished on areas aggregating about 4,800 acres segregated by overflow channel or by-pass and their respective areas and costs, including contingencies, engineering and overhead, are as follows:

<u>Overflow Channel or By-pass</u>	<u>Area in Acres</u>	<u>Cost</u>
Sacramento River	350	\$ 81,000
American River	95	16,000
Feather River	2,385	627,000
Bear River	570	250,000
Sutter By-pass	1,130	229,000
Yolo B y-pass	270	<u>47,000</u>
	4,800	\$ 1,250,000

The total Federal cost, as estimated and submitted by the Corps to complete the Federal portion of the Project work at construction prices prevailing as of June 30, 1951, may be summarized as follows:

Levees - including structures, patrol roads, bank protection, contingencies, engineering and overhead	\$ 18,085,000
Clearing by-pass and overflow channels	1,250,000
Dredging enlarged Sacramento River Channel below Cache Slough	200,000
Gaging Stations	<u>25,000</u>
Total Federal Costs	\$ 19,560,000

The locations and lengths of sections of by-pass levees with waterward and landward slopes steeper than 4 to 1 and 3 to 1 are as follows:

<u>Item</u>	<u>Location</u>	<u>Length in miles</u>
(1) Butte Slough By-pass, right bank		7.5
(2) Sutter By-pass, right bank south of Long Bridge		5.3
(3) Tisdale By-pass, right bank		4.4
(4) Tisdale By-pass, left bank		4.4
(5) Yolo By-pass, right bank, Fremont Weir South		12.2
(6) Yolo By-pass, right bank, near Millar Sta. to Lindsey Sl.		10.6
(7) Yolo By-pass, left bank, 2 mi. South of Fremont Weir to Miner Slough		31.0
(8) Sacramento By-pass, right bank		1.7
(9) Sacramento By-pass, left bank		<u>1.8</u>
Total		78.9

The widths of the Tisdale and Sacramento By-pass channels are sufficiently narrow that there is no hazard from wavewash to their respective levees aggregating 12.3 miles in length designated items (3), (4), (8) and (9). The southerly 19.1 miles of the levee on the left bank of Yolo By-pass under present plans would be incorporated with the works of the authorized Sacramento Ship Channel. However, with favorable consideration of these items, there would still remain 47.5 miles of by-pass levees requiring flattening of waterward slopes to 1 on 4 and landward slopes to 1 on 3, for which no provision has been made in the estimate submitted by the Corps since this work is authorized under the Major and Minor Tributaries Project.

(b) State Costs (inclusive of costs of all local interests)

In addition to the Federal costs, there will be substantial State costs involved in completion of the Project. The Reclamation Board of the State of California has prepared an estimate of such State costs as of June 30, 1951, in which the Corps concurs, including the acquisition of levee rights of way and borrow areas, flowage easements, and alteration of improvements incidental to the items of construction or improvement set forth in this memorandum.

The estimates of State costs with reference to the rights of way required to complete the levee system are as follows (Item numbers refer to items denoted in the tabulation setting forth project levees, segregated by stream or by-pass channels and their respective left and right banks):

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	
1	American River, left bank	\$ 1,440
2	American River, right bank	39,870
3	Arcade Creek, left bank	62,860
4	Arcade Creek, right bank	215,930
5	Bear River, left bank	6,860
6	Bear River, right bank	17,260
8	Cache Creek, left bank	137,530
9	Cache Creek, right bank	70,735
12	Cache Slough, left bank	85,105
13	Cache Slough, right bank	28,340
16	Colusa Trough, left bank	154,830
17	Coon Creek Group Interceptor, right bank	10,800
19	Elk Slough, left bank	4,780
20	Elk Slough, right bank	20,350
21	Feather River, left bank	18,140
22	Feather River, right bank	367,450
25	Haas Slough, left bank	700
26	Haas Slough, right bank	20,025
28	Knights Landing Ridge Cut, left bank	4,075
29	Knights Landing Ridge Cut, right bank	4,500
30	Linda Creek, left bank	132,045
31	Lindsey Slough, left bank	69,820
32	Lindsey Slough, right bank	6,470
33	Miner Slough, left bank	18,500
34	Miner Slough, right bank	4,000
37	Natomas Cross Canal, left bank	12,020

<u>ITEM</u>	<u>STREAM OR CHANNEL</u>	
38	Natomas Cross Canal, right bank	\$ 4,610
39	Natomas East Canal, left bank	184,640
40	Natomas East Canal, right bank	63,280
48	Sacramento River, left bank	1,489,790
49	Sacramento River, right bank	1,515,840
50	South Dry Creek, left bank	4,570
52	Steamboat Slough, left bank	72,840
53	Steamboat Slough, right bank	13,780
56	Sutter Slough, left bank	23,230
57	Sutter Slough, right bank	39,680
58	Threemile Slough, left bank	5,600
62	Ulatis Creek, right bank	15,470
70	Yankee Slough, left bank.	1,630
71	Yankee Slough, right bank	4,525
73	Yolo By-pass, right bank	163,850
74	Yuba River, left bank	36,170
75	Yuba River, right bank	<u>18.700</u>
	Total levee costs	\$ 5,172,640

In addition to costs of rights of way for levee construction, State costs also include provision for the acquisition of additional flowage easements, not heretofore acquired in overflow areas, and the alteration of existing bridges, railroads and highways across river channels and by-passes where such are below flood plane elevation or otherwise obstruct flood flows. These additional items and their respective costs, including contingencies, engineering and overhead, are estimated as follows:

Bridge, railroad and highway alterations	\$ 7,475,000
Flowage easements not yet acquired	2,112,000
Landside berm fills	130,000
Access to levee patrol roads, not yet constructed	15,000
Miscellaneous clearing, fence construction, etc.	<u>60,000</u>
 Total additional items	 9,792,000*
 Levee rights-of-way	 <u>5,173,000</u>
 Total State costs	 \$ 14,965,000

*A detailed statement has been furnished to the District Engineer, Sacramento District, with respect to the additional items.

These total costs of the State and local interests do not include continuing expenditures by the State and local interests on the maintenance of Project works estimated to be in excess of \$1,000,000 per year. Neither do they include the cost of acquisition of rights of way for flattening the slopes of 47.5 miles of sub-standard by-pass levees to waterward slopes of 1 on 4 and landward slopes of 1 on 3, for which no provision has been made in the estimate of Federal costs submitted by the Corps.

Summary of Costs to Complete Project

Work remaining to be performed by the Corps on the Old Sacramento River Flood Control Project, as determined by the Corps and concurred in by the State and listed in detail in this memorandum, comprises the reconstruction to adopted grade and section of 210 miles of levee, including miscellaneous structures; 46 miles of bank protection; 359 miles of levee patrol road; clearing 4,800 acres of by-pass and overflow channels; minor dredging of the enlarged Sacramento River Channel below Cache Slough; establishing gaging stations; all at an estimated Federal cost of \$19,560,000, based on prices as of June 30, 1951. The estimated State cost for acquisition of levee rights of way and borrow areas, flowage ease-

ments, and alteration of improvements incidental thereto as determined by the State and concurred in by the Corps, is \$14,965,000 as of June 30, 1951.

4. RESPECTIVE RESPONSIBILITIES OF THE UNITED STATES AND THE STATE WITH REGARD TO THE COMPLETION OF CONSTRUCTION AND THE OPERATION AND MAINTENANCE OF THE SACRAMENTO RIVER FLOOD CONTROL PROJECT.

Levee construction standards relative to the by-pass levees have been progressively changed from waterward and landward slopes of two and one-half to one, to waterward slopes of four to one and landward slopes of three to one, as proven necessary by destructive wavewash on the steeper waterward slopes and severe slips resulting from saturation of the landward slopes. About 52 miles of Sutter By-pass levees were so improved by the State or the United States prior to the adoption of the Flood Control Act of 1944 and the improved standards were subsequently specifically authorized by the 1944 Flood Control Act for by-pass levees. The total estimated Federal cost of \$19,560,000 to complete the project works does not include the cost of completion of 47.5 miles of by-pass levees to revised standards nor the cost of completion of the southerly 19.1 miles of the levee on the left bank of Yolo By-pass for use in the event the Sacramento Ship Canal is not constructed, since this work is included in the Major & Minor Tributaries Project.

In addition to the Sacramento River Flood Control Project, there is a navigation project on the Sacramento River and each has

been authorized by the Congress as a separate and distinct project. The Sacramento River Deep Water Channel Project has been authorized by the Congress and construction thereon commenced.

The construction and operation of Shasta Reservoir of the Central Valley Project on the Sacramento River and other Federally authorized or proposed multi-purpose reservoirs have altered, or will materially alter, the regimen of stream flow during both low and high water seasons and might adversely affect the stability of project river banks and levees and thereby increase the cost of maintenance of flood control works.

The United States has sole responsibility for the construction of all levees to grade and section, and for the construction of all other project works as such are itemized under subject heading numbered 3 herein, and for the construction, operation and maintenance of all works relating to the improvement of navigation within the area of the Old Sacramento River Flood Control Project.

The State fully recognizes and accepts its obligation to operate and maintain all completed project works and has given assurances of local cooperation required by federal law. Such assurances obligating the State are limited to:

- (a) Furnishing lands, easements and rights of way; bearing the expense of necessary highway, railroad and bridge alterations.
- (b) Holding and saving the United States free from claims for damages due to construction of the works.
- (c) The operation and maintenance of all the works, after completion, in accordance with regulations prescribed by the Secretary of the Army.

In conclusion, anything herein to the contrary notwithstanding, it is hereby agreed by the parties that the following represents the agreement of the parties with respect to the Sacramento River Flood Control Project (Old Project, so-called):

a. The State and the United States are in agreement as to the following:

1. The scope of the project;
2. The project standards;
3. The work to be done and the estimated cost thereof as of June 30, 1951;
4. The priority of the work will be determined by agreement between The Reclamation Board and the District Engineer, due consideration being given to the principle that in general the work, except strictly emergency work, be accomplished by beginning with the lower part of the project and working upstream.

Items 1, 2 and 3 are all as heretofore set forth herein.

b. The State accepts the fact that the flattening of certain by-pass levee slopes will be accomplished under the Major and Minor Tributaries Project, but urges that this work be expedited to the greatest extent practicable.

c. The State will continue to maintain locally constructed levees, including their contiguous waterway banks, which meet project standards, with or without patrol roads, and will accept for maintenance units of the project works as those units are satisfactorily completed.

d. In case any project works heretofore or hereafter accepted for maintenance by the State shall suffer damage or

deterioration due to the use of the river for functions other than flood control, such as for navigation or for the transportation of water as under the Central Valley Project, the State reserves any legal or equitable rights it may have, including the right to seek relief through judicial, legislative or administrative action.

e. Where works for navigation result in a shift in the channel or erosion of the opposing banks, corrective measures will be undertaken by the United States.

f. Pending completion and formal acceptance, it shall be the policy of the State to continue to perform normal maintenance to all project works.

g. The State recognizes that the Corps of Engineers interprets that the Federal obligation for the maintenance of the enlarged channel of Sacramento River below Cache Slough applies only to the navigation channel and that the maintenance of the remainder of the channel upon completion is a State obligation. However, the State reserves the right to request the future enactment by the Congress of legislation authorizing Federal maintenance of the entire channel in this reach of the Sacramento River. Further, The Reclamation Board is without State legislative authority to perform this maintenance, but upon failure to obtain such Federal enactment will seek State legislation to provide the required authority. Every effort will be made by The Reclamation Board to consummate the required Federal or State legislation prior to completion of this portion of the project.

In Witness Whereof, the respective parties hereto have

caused this Memorandum of Understanding to be executed as of the date first herein written.

THE UNITED STATES OF AMERICA

By V. F. Pearson
Division Engineer, South Pacific
Division Corps of Engineers, United States Army

THE STATE OF CALIFORNIA, acting by and through The Reclamation Board

By G. L. Howell President

By W. H. Holmes Secretary