State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 132-64

THE CALIFORNIA STATE WATER PROJECT IN 1964

JUNE 1964

HUGO FISHER
Administrator
The Resources Agency of California

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
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THE EMBLEM OF THE STATE WATER PROJECT

The cover of this publication introduces the emblem of the State Water Project, the symbol that will be used to identify features of the project.

In black and white on this report, the emblem when used on structures of the State Water Project depicts the water distribution system of the project in tourquoise blue on a golden California.

Below the map, the stylistic SWP monogram (for State Water Project) symbolizes the engineering achievements of Californians in the conservation of water.

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STATE OF CALIFORNIA—RESOURCES AGENCY

WILLIAM E. WARNE, *Director*

DEPARTMENT OF WATER RESOURCES
P. O. BOX 388
SACRAMENTO

June 1, 1964

Honorable Edmund G. Brown, Governor,
and Members of the Legislature
of the State of California

Gentlemen:

I have the honor to transmit herewith Bulletin No. 132-64, entitled "The California State Water Project in 1964." This is the official report on construction, operation, financing, and management of the State Water Project. The report is for the information of the State Legislature, the California Water Resources Development Finance Committee, project water and power users, the investors, and the public.

In transmitting to you this second comprehensive annual bulletin, it is my pleasure again to report that work is proceeding on schedule.

Sincerely yours,

William E. Warne

Director

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
EDMUND G. BROWN, Governor
HUGO FISHER, Administrator, The Resources Agency of California

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AQUEDUCT
CASTAIC RESERVOIR
CEDAR SPRINGS RESERVOIR
LOS ANGELES
PERRIS RESERVOIR
SAN DIEGO

PREFACE

This report is the second in an annual series on California's State Water Project.

The period of time covered by this report is from generally April 1, 1963 to April 1, 1964, although in some areas developments after April 1, 1964, are reported. In other areas, to allow time for the large amount of computational work, the cutoff date was earlier than April 1, 1964.

The report commences with a review of the present status of the project and of the important events during the past year, including the water supply contracting program. The status of that program on December 31, 1963, is the basis for the physical works described in the report. Construction costs of the works also are given, as are anticipated operation and maintenance costs and costs of power for pumping. Revenues are estimated from repayment of capital and from operation and maintenance charges. Estimates of revenues from sale of project-generated power also are given although this subject is under active negotiation and is not resolved.

The report gives attention to the financial program. Described in some detail are both the manner in which capital costs will be financed and the program of meeting bond service requirements from project revenues.

Next year's bulletin will report important progress on final sizing of southern portions of the California Aqueduct and on the power sales program. Future reports also will gradulally change in emphasis from financing to construction and finally to operation and maintenance.

CHAPTER I. THE CALIFORNIA STATE WATER PROJECT IN 1964

California is engaged in an unprecedented water development program. It must go beyond the usual in order to satisfy its burgeoning cities, its growing industries and its thriving agriculture.

California is now the most populous State in the nation, with over 18,000,000 inhabitants. It is growing at the rate of 600,000 persons each year. It has for years outstripped all other states in the annual value of its farm products, with the 1963 California total $3,400,000,000. Its area under irrigation is now approaching 9,000,000 acres.

Population growth, urbanization and industrial development have advanced at particularly rapid rates in the southern portion of the State. Water is required to sustain this growing population and dynamic economy, and much of the water must be transported from afar.

The main water problem in California is that nature has not provided the right amounts in the right places at the right times. More than 70 percent of the water of California originates in the northern third of the State, while 77 percent of the water need is in the southern two-thirds.

An average of 29,000,000 acre-feet of water annually flows unused to the ocean from the streams of California's North Coastal region. This is more than the net use in the

entire State. In Southern California, on the other hand, unused stream runoff is practically nonexistent. Southern California has had a drought for the past 20 years, broken only twice by substantial amounts of annual rainfall.

The historical solution to California's major water problem has been one of conserving the sporadic annual and cyclical stream runoff in surface storage reservoirs and transporting the regulated supplies to places of need. In many areas, such supplies supplement ground water pumped for overlying lands.

The problem of supplying water is not the only one. Many water projects must, in addition to delivering water, provide also for flood control, salinity control and drainage.

California has long been conscious of the need for an orderly and reasonable solution to these problems. People in state government and others recognized after the end of World War II that the State would continue to grow at an unprecedented rate, even after the impetus of war-time conditions had ceased to be a factor. In 1947, the Legislature directed that the water resources of the State be studied and evaluated and that a plan be formulated for the orderly development of these water resources to meet the State's ultimate water requirements for beneficial purposes. This led to "The California Water Plan,"[1/] which was formally adopted by the

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1/ Department of Water Resources, Bulletin No. 3, "The California Water Plan," dated May 1957.

Legislature in 1959 as the recommended guide for all interests in the future development of the State's water resources.[2/]

In adopting this plan, the State made no effort to pre-empt the field of construction of water projects. The plan anticipated that private interests and local, state and federal agencies would build those units that fall within the limits of their responsibilities.

By the end of 1963, the Bureau of Reclamation of the United States Department of the Interior had expended $855,000,000 for constructing the federal Central Valley Project alone. It plans to expend $585,000,000 more for the presently authorized works of this project and is investigating further additions to the project. The U. S. Army, Corps of Engineers has constructed flood control and multiple-purpose projects throughout the State and plans to continue in this work. Its expenditures for multiple-purpose facilities in California totaled $230,000,000 at the end of 1963.

Local agencies have played a major role in the water development of the State and will probably continue to do so. Most of the current major construction and advanced planning of local water projects are concentrated in a band across the State opposite and north of San Francisco Bay. South of this

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2/ Part 1.5 (commencing at Section 10004) of Division 6 of the Water Code.

band, local waters have been rather fully developed to support agriculture and to accommodate the earlier impact of the growth of population. To the north, water demands have temporarily stabilized after early growth, leaving undeveloped supplies.

Water development in California is progressing northward as the population fills the State. Interbasin and transregional projects are necessary to reach farther and farther for supplemental water for the southerly areas that have grown beyond their local supplies.

California has taken a leading role in the coordination of its own comprehensive water development. Californians decided that the State itself must finance and build a number of major projects which involve large scale conservation and transportation of water and which are outside the purview of other agencies. In 1959, the Legislature enacted the California Water Resources Development Bond Act,[3/] also known and commonly referred to as the Burns-Porter Act, to provide funds to assist in the construction of a State Water Resources Development System. The Burns-Porter Act was adopted by the people in the general election of November 8, 1960. It

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3/ Chapter 8 (commencing at Section 12930) of Part 6 of Division 6 of the Water Code.

authorized the issuance of $1,750,000,000 of general obligation bonds of the State for the construction of the initial works of this system, identified as the "State Water Facilities," as set forth in Water Code Section 12934(d), and of certain additional facilities to the extent provided in Section 12938. The State Water Project referred to in this bulletin consists of the State Water Facilities and one additional project conservation facility and is described in Chapter III.

With the total funds provided by the Burns-Porter Act for financing construction and with the distribution of demands for water as projected, it was estimated by the department that the authorized works could be sized so as to conserve and distribute 4,000,000 acre-feet annually. Under that formulation of the State Water Project, the 4,000,000 acre-feet would be sufficient to satisfy and sustain existing and future supplemental demands for water in the then contemplated service areas of the project for about thirty years, or until the year 1990. The water supply contracting program has made substantial changes in the assumed distribution of demands. In addition, the United States Supreme Court's decree in Arizona v. California[4/] has increased the need for water in Southern California.

4/ 84 S. Ct. 755 (1964).

On December 31, 1963, the initial phase of the water supply contracting program was completed. This unprecedented effort began three and one-half years earlier with the initiation of negotiations resulting in the execution of the prototype water supply contract with The Metropolitan Water District of Southern California, on November 4, 1960. Under the initial phase of the program, 30 agencies were established as the initial water supply contractors of the project. These agencies are located in all major project service areas originally contemplated. They contracted for maximum annual entitlements totaling 3,468,000 acre-feet or 86.7 percent of the 4,000,000 acre-foot minimum project yield.

The 30 agencies are organized in the State Water Service Contractors Council, and meet regularly with the Department of Water Resources. Twenty-four meetings have been held since July 1961. The council is an effective instrument for exchange of information among the contractors and between the contractors and the department.

As will be described in Chapter V, the California Water Commission played an important role in the water supply contracting program through approving periodic revision of allocations of water among service areas of the State. These allocations appear in the department's water rights applications. In addition, the Commission assisted materially in the department's right-of-way acquisition program by approving a number of condemnation actions. These are discussed in Chapter IV.

The completion of the initial phase of the water supply contracting program permitted redetermination of the scope and sizes of physical works of the State Water Project. It showed that more of the minimum project yield will be distributed in the more southerly service areas of the State than was originally contemplated. While it was originally estimated that 1,800,000 acre-feet would be delivered annually to Southern California, current projections are about 2,300,000 acre-feet annually.

The financial program as discussed in Bulletin No. 132-63 contemplates that revenue bonds, supported by contracts for sale of Oroville and Thermalito power generation, will be utilized to supplement the funds provided by the Burns-Porter Act.

In separate decisions, the California Supreme Court upheld the authority of the State to issue the Burns-Porter bonds and of the department to issue revenue bonds under the provisions of the Water Code governing the Central Valley Project.5/

Bond anticipation notes of $50,000,000 were sold in November 1963, while awaiting the Supreme Court decision with respect to revenue bonds. This was the first time in the

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5/ Warne v. Harkness, 60 Adv. Cal. 566 (1963) and California Water Resources Development Finance Committee v. Betts, 60 Adv. Cal. 582 (1963).

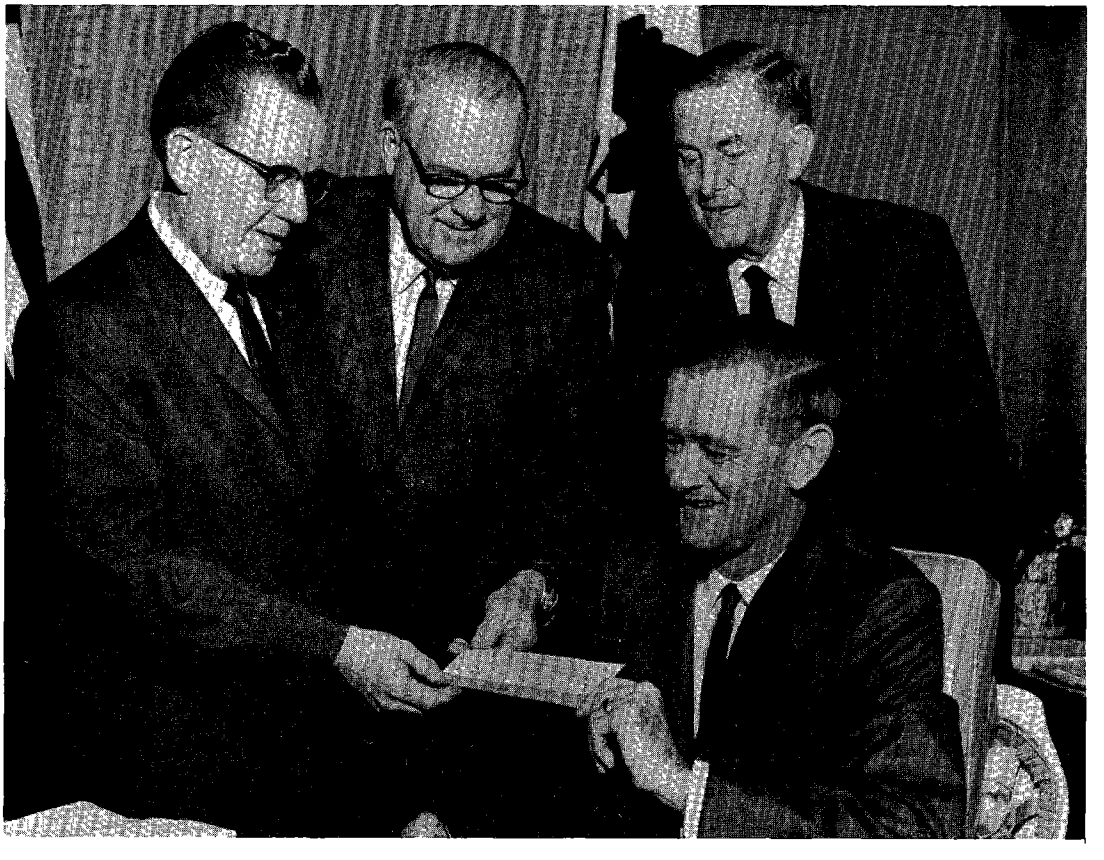
history of financing by the State of California that this type of short-term borrowing had been employed.

The sale of the first general obligation bonds authorized by the Burns-Porter Act took place on February 18, 1964. The Series A total sold was $100,000,000. Series B general obligation bonds in the total amount of $50,000,000 were sold on May 5, 1964. Favorable interest rates were received on the sale of the notes and the Series A and B bonds, demonstrating faith in the financial community in the State as a whole and in the State Water Project.

Marketing of bonds under the Burns-Porter Act is administered by the California Water Resources Development Finance Committee. This consists of Edmund G. Brown, Governor and Chairman of the committee; Hale Champion, Director of Finance and Vice Chairman; Bert A. Betts, State Treasurer and member; Alan Cranston, State Controller and member; and William E. Warne, Director of Water Resources and Secretary. John E. Hunt, Financial Adviser of the department is Assistant Secretary. Following its organizing meeting on January 25, 1962 the committee has held eight meetings, the most recent of which was on March 20, 1964. The committee's business has included consideration and adoption of necessary resolutions relating to authorization of the aforesaid sale of bond anticipation notes and general obligation bonds. The committee

has also reviewed and approved the financial reports it is required to submit annually to the Legislature pursuant to Section 12939 of the Water Code and Section 16725 of the Government Code, respectively.

The utility that is the State Water Project has been established on an operating basis. From the beginning of project operation in June 1962 through 1963, more than $2,300,000 of gross utility revenues have been received from water supply contractors. In addition a total of $18,450,000 has been received from the Federal Government as reimbursement



State Treasurer Bert A. Betts (seated) shows check for $100,000,000 from first sale of Water Bonds to (left to right) Assemblyman Carley V. Porter and Senator Hugh M. Burns, authors of the Burns-Porter Act, and Director of Water Resources William E. Warne (February 18, 1964).

for costs allocable to flood control benefits of Oroville Dam and Reservoir.

On May 20, 1963 the Utility Committee was established within the department by order of the Director of Water Resources, with membership as listed at the beginning of this report. Its purpose is to analyze and review major decisions affecting policy and operations of the "Utility" of the State Water Project. In its six meetings, it has considered such matters as acquisition of the Pacific Gas and Electric Company's Big Bend Powerplant, that will be flooded by Oroville Reservoir, and appointment of a subcommittee to recommend the capital costs incurred prior to December 31, 1962 that should be repaid by water supply contractors.

Study and preliminary design of the project control system is underway and the activation of major operation and maintenance is beginning. The first of about 800 new employees, the plant superintendent at San Luis, will be on the job in the fall of 1964. A comprehensive training program for the new operation and maintenance staff is being developed and the dates of employment of the new personnel make allowance for such training. Locations and layouts of operation and maintenance facilities are being studied. Supply and equipment lists are being compiled. Manuals for operation and maintenance are being prepared.

Design and construction of the State Water Project continues on schedule. In 1963, the department began to feel the full impact of the massive construction program required to meet initial delivery dates as set forth in executed water supply contracts. By the end of the year, a total of $382,270,771 in construction contracts had been awarded. This value includes contracts awarded by the department for state facilities and by the Bureau of Reclamation for the Joint-Use Facilities of the San Luis Division.

Bids for construction work have been made by many of the nation's large contracting companies. The total of bids accepted for both State and Bureau of Reclamation construction contracts since the beginning of the project is five percent less than the total of the engineers' estimates.

There are a number of crucial decisions and actions regarding the State Water Project which must be made in 1964.

Many facilities are still in various stages of formulation and sizing. Certain features cannot be finally sized until the entire minimum project yield has been committed. The Delta Facilities and the San Joaquin Drainage Facilities are currently under intensive study, in cooperation with agencies of the Federal Government and with local agencies, and no final decisions have been reached with respect to the natures of the projects and agencies that will construct the components of each. The contracts for the sale of power and

energy generated in the Oroville Division must be negotiated and executed as soon as possible to realize the full revenue and financing potential from this feature of the project.

The most critical of the above items is the final sizing of the California Aqueduct downstream from the Joint-Use Facilities. Final reach capacities must be set during the summer or early fall of 1964 if project deliveries are to commence in the San Joaquin Valley and Southern California at the times specified in water supply contracts. Therefore, the portion of the minimum project yield remaining uncommitted as of December 31, 1963, must be put under contract as soon as possible. Since requests to date for this water far exceed the remaining portion, it would seem that resolution of this problem would involve mainly negotiation and execution of amendments to existing contracts to increase the respective maximum annual entitlements and to effect other essential changes.

However, there is another element in the problem of aqueduct sizing. This is the effect of the aforesaid decree by the United States Supreme Court in the case Arizona v. California. As indicated above, the Burns-Porter Act was designed to finance a 4,000,000-acre-foot project sufficient to accommodate growth of water needs in its service areas until 1990. This was predicated upon the continued availability of 5,362,000 acre-feet of water per year from the Colorado River,

corresponding to the diversion capability of presently constructed works. The Supreme Court decision allocates 4,400,000 acre-feet per year to California as long as 7,500,000 acre-feet is available annually to the Lower Basin States below Lee Ferry on the Colorado River.

Of this certain loss amounting to 962,000 acre-feet, 662,000 acre-feet will be deducted from the supply of Metropolitan Water District of Southern California, one of the State's water supply contractors. The decision leaves to the Secretary of the Interior the allocation of any annual supplies that may be less than 7,500,000 acre-feet. Taking into account possible depletions due to future projects on the Colorado River, the decision could reduce California's supply to as little as 3,500,000 acre-feet annually by the year 2000.

Recognizing this serious impact upon California and the fact that the court decree does not provide for Arizona's full needs, the Secretary of the Interior has advanced a new approach to solve the water problems of the Southwest. In August 1963, Secretary Udall released his "Pacific Southwest Water Plan" calling for a regional plan of development and suggesting joint-use of portions of the California Aqueduct. Hearings on the bills to authorize this proposal or the rival Central Arizona Project were commenced in the Senate Interior Committee in April 1964. It now appears that the issues cannot be resolved in time for authorization in 1964.

With respect to sizing the critical reaches of the State Water Project, the clock will not stand still. The capacities of the Tehachapi Tunnels, the vital link in service to Southern California, must be sized during the summer of 1964 in order to meet the State's contractual water delivery obligations. Thus it seems prudent to provide capacity in the California Aqueduct of the State Water Project to compensate for a certain loss in the project service area in order that the needs thereof until 1990 may be satisfied. Any greater losses after allowance for any other supplemental supplies can then be provided by the Pacific Southwest Water Plan or alternative regional plan when one is authorized. The department is studying requests which have been received to make increases in the minimum project yield.

CHAPTER II. HISTORY OF THE STATE WATER PROJECT

The first report of this series, Bulletin No. 132-63, included a history of the State Water Project up to about April 1, 1963. In this chapter a continuation of that chronicle is presented. Information is given regarding the important legislative, judicial, and administrative actions that have influenced the course of the State Water Project. The status and important events in the water contracting program are indicated. The period of time covered is from generally April 1, 1963 to April 1, 1964, though for certain elements it varies.

General Project History

A number of activities during the past year affected a major portion of the project as compared to actions confined to specific facilities which are considered in a later section of this chapter. This section discusses those events which had a more general effect on the project as a whole.

Actions by the California Legislature

Several actions of the Legislature during the 1963 General Session were concerned with the State Water Project, either directly or indirectly.

The State General Obligation Bond Law was modified by Senate Bill 537[1] which amended Sections 16723, 16736 and 16753 of the Government Code to provide among other things:

1. Limitation on the total amount of bond anticipation notes that may be issued in anticipation of the sale of bonds to the total amount of unsold bonds, rather than the total amount of bonds authorized.

2. That interest on bond anticipation notes shall be payable from any appropriation made for that purpose, rather than from bond sale proceeds.

3. Removal of the $100,000 limit on the required deposit of 0.5 percent of the par value of bonds offered which must be submitted when bidding on general obligation bonds.

The basis for state payments to school districts with increased enrollments resulting from project construction activities was clarified by Senate Bill 938[2] which amended Sections 18301, 18302, 18303, 18903, and 19001 of the Education Code to provide that present provisions of the Education Code affording special current school support allowances for project-connected pupils and related special construction apportionments

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1/ Calif. Stats. of 1963, Ch. 1443, p. 2990.

2/ Calif. Stats. of 1963, Ch. 2164, p. 4532.

are applicable to joint federal-state projects as well as those undertaken by the Department of Water Resources. The act also provides that funds received directly by the school district from the Federal Government for such school support or construction allowance shall be subtracted from funds otherwise due the district from the State.

The use of progress payments by the department in the purchase of specially manufactured equipment was established as a proper procedure by Assembly Bill 937[3/] which amended the State Purchasing Act.

The issuance of revenue bonds was opposed by Senate Resolution 84. This matter was later clarified by the California Supreme Court as discussed below.

Judicial Actions

A number of actions by the courts since April 1963 will have important effects on the State Water Project.

The June 1963 decision of the United States Supreme Court in the case of Arizona v. California redefined the rights of California to the waters of the Colorado River and may ultimately affect the magnitude of the required minimum project yield of the State Water Project and the size of the California Aqueduct. This decision and its consequences were discussed in Chapter I.

3/ Calif. Stats. of 1963, Ch. 1555, p. 3140.

Also as mentioned in Chapter I, two cases were of major importance to the financing of the State Water Project. Both involved petitions for writs of mandamus filed in the original jurisdiction of the California Supreme Court. In one, entitled Warne v. Harkness, 60 Adv. Cal. 566 (1963), the court upheld the authority of the department to issue revenue bonds under the provisions of the Water Code governing the Central Valley Project for the costs of construction of power facilities in the Oroville Division of the State Water Project. In the other, California Water Resources Development Finance Committee v. Betts, 60 Adv. Cal. 582 (1963), a companion case to the first, the decision supported the authority of the committee to include certain waiver provisions in bonds proposed to be issued under the authority of the California Water Resources Development Bond Act. The results in both cases fully supported the department's financing program for the State Water Project as developed and set forth in Bulletin No. 132-63. The decision in the Warne v. Harkness case made use of the waiver unnecessary.

Water Supply Contracting Program

The department's water supply contracting program consists essentially of two phases. One could be called the "initial phase" and the other the "option phase." In both phases, actions of the California Water Commission in amending quantities of water designated for use in various areas of the State, as specified in the department's water rights applications

for the project, were important considerations. These actions are discussed in Chapter V.

Initial Phase. The critical initial phase of the water contracting program was completed on December 31, 1963. Contractors existing on that date have a qualified "option right" to elect to become entitled to a proportionate share of that part of the 4,000,000 acre-foot minimum project yield not then under contract. Twenty-one contracts were signed between April 1 and December 31, 1963, bringing the total number of contracts for a firm supply of contract water to 30, and the maximum annual entitlements of all contractors to 3,468,000 acre-feet or about 87 percent of the minimum project yield. The distribution of this quantity of water among contractors is discussed in Chapter VI.

One of the most significant events in completion of the agricultural water contracting program in the San Joaquin Valley was the announcement by the Director of Water Resources in April 1963 of the "surplus water" and "surcharge credit" proposals. These were approved in September 1963, by the

Governor.[4] Provisions incorporating them were included in the contract with Kern County Water Agency executed on November 5, 1963. This was the first contract that provided for substantial deliveries of water from the State Water Project for agricultural use. Recognition of the "surplus water" and "surcharge credit" principles was a major consideration in drafting Amendment No. 1 to the previously executed contracts, which amendments were subsequently approved by a majority of the water supply contractors.

The surplus water program provides that water available from the project in excess of annual entitlements in any year will first be offered for sale to contractors for agricultural or ground water replenishment purposes. The charge for such water will be at rates determined for the variable annual operation and maintenance components of the Delta Water

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4/ Memorandum by the Director of Water Resources dated September 7, 1963, entitled, "Water Supply Contract with Kern County Water Agency," transmitting and requesting approval of: (1) the preliminary edition of Bulletin No. 119-8, "Feasibility of Serving the Kern County Water Agency from the State Water Project," (2) an updated financial analysis including the effect of agricultural contracts, "Financing Program for the State Water Project September 1963," and (3) "Draft of Water Supply Contract between the State of California, Department of Water Resources, and the Kern County Water Agency." The memorandum was approved by the Administrator of The Resources Agency of California, and the Governor of the State of California on September 7, 1963.

Charge and the Transportation Charge. Contracts for delivery of such water may be made for more than one year but availability depends upon the State's first satisfying the annual entitlements of all contractors. The overall effect of the program is to reduce the unit cost of water for agricultural and ground water replenishment purposes, since the cost of project water delivered under annual entitlements and the cost of surplus water are averaged. It is estimated that surplus water will be available on an irrigation demand pattern until about 1981, and the right to buy limited quantities of such water at a preferential price will assist agricultural contractors during the critical early years when their payments for distribution systems are expected to be heaviest.

The surcharge credit program also will provide financial aid to agricultural water users by providing, in effect, for return to contractors of all or part of the surcharge collected by them for the use of project water on excess lands. This surcharge credit is to be used to reduce the cost of water for agricultural use on other than excess land.

A request by the Legislature that repayment requirements for surplus water be liberalized and that financial relief be provided to agricultural water contractors was fulfilled by the successful conclusion of the surplus water and the surcharge credit programs. Assembly Concurrent Resolution 93[5]

5/ Calif. Stats. of 1963, Res. Ch. 171, p. 4965.

had requested the department to negotiate amendments to existing contracts for water supplies, or otherwise obtain the consent of the contracting parties, to provide that the sale of surplus water for agricultural use or ground water replenishment is not required to return to the State the largest net revenues practicable nor to be covered by contracts limited to one-year terms. It further requested the department to negotiate contract amendments, or otherwise obtain consent of contractors, to provide that the required surcharge may be applied so as to reduce the water charges for agricultural use on nonexcess land by a uniform rate per acre-foot, not to exceed two dollars ($2).

Option Phase. The option phase of the water supply contracting program was initiated on January 3, 1964. On that date, the department by letter advised each of the 30 contractors of its proportionate share of the 532,000 acre-feet of the 4,000,000 acre-foot minimum project yield that was not under contract. The letters asked each of the contractors if they wished to have their entitlement increased under the option provision and also if they wished to have their entitlement increased further under a provision allowing each to request all or part of the water not optioned. Both the option provision and the request provision are pursuant to Article 8 of the contracts. They were requested to answer by March 1, 1964 if possible. By April 1, 1964, 25 contractors had replied to

these letters. A discussion of these replies is given in Chapter VI.

History of Individual Facilities

A number of events occurring since April 1963 were significant to the definition, formulation, or further development of individual facilities of the State Water Project. Those events or actions representing significant progress toward completion of a facility are recorded in the discussion which follows.

Upper Feather Division

The authorized projects in this division, presently five in number, all located in Plumas County, and comprised of dam and reservoir developments, are being constructed primarily to help meet the growing need for recreation opportunities in the Upper Feather River area. In two cases, water also is supplied to meet the agricultural and urban water requirements of nearby service areas.

Frenchman Dam and Reservoir was the first of the units to be constructed to supply water for irrigation and recreation use, and initial construction was completed in 1961. During 1963 the initial onshore recreation facilities were completed in accordance with a previously prepared plan[6/] and served the

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6/ Department of Water Resources, "A Plan for the Development and Operation of Recreation Facilities at Frenchman Reservoir," dated March 1961.

unprecedented number of visitors who have made use of the reservoir and the surrounding area.

The basis for the allocation of the costs of the Frenchman Project to the two purposes of irrigation and recreation was established by use of the separable costs-remaining benefits method and was approved by the Director in April 1964.[7/]

Antelope Valley Project was formulated to supply water for recreation and fish and wildlife purposes. The construction of the dam was completed in 1963, and construction of the initial recreation facilities[8/] is now in progress.

In January 1964, a plan for Grizzly Valley Dam and Reservoir was completed and the facilities were authorized for construction.[9/] The authorizing document specifies an earthfill dam creating a reservoir which will store about 83,000 acre-feet of water for domestic and municipal use, for recreation, and for downstream fisheries enhancement. Incorporation at a later date of an agricultural water supply as a project purpose is not precluded.

7/ Department of Water Resources Memorandum, to William E. Warne, et al, from Carl A. Werner, "Frenchman Project, Cost Allocation," dated November 29, 1963, approved April 6, 1964.

8/ Department of Water Resources, "A Plan for the Recreation Development of Antelope Valley Reservoir," dated March 1962.

9/ Department of Water Resources, Project Order No. 6, dated January 7, 1964.

South Bay Aqueduct

The South Bay Aqueduct diverts water from the California Aqueduct for delivery in Alameda and Santa Clara Counties. Construction is under way with some reaches completed and deliveries being made. Significant actions by the department since April 1963 are discussed below.

Airpoint Dam and Reservoir were deleted as features of the South Bay Aqueduct in August 1963, and the aqueduct was extended to a terminal point in Santa Clara County near Penitencia Creek.[10/]

In March 1964 Del Valle Dam and Reservoir construction was rescheduled for completion in 1966.[11/] A minimum of one-year delay was considered essential to provide for further investigation of subsurface geologic problems prior to advertising for construction of the dam, previously scheduled for April 1964. This conclusion was supported by the Earth Dams Consulting Board in their February 1964 report.[12/]

10/ Department of Water Resources, Project Order No. 5, dated August 19, 1963.

11/ Department of Water Resources Memorandum to W. E. Warne, et al, from C. A. McCullough, "Delay in Completion of Del Valle Reservoir," dated March 9, 1964, approved March 11, 1964.

12/ Letter to Mr. Alfred R. Golze', Chief Engineer, Department of Water Resources, from Earth Dams Consulting Board, dated February 5, 1964.

Oroville Division

The facilities of the Oroville Division are in various stages of design and construction, and notable progress has been made since April 1963.

In July 1963, the Butte County Superior Court fixed at $526,904 the value of the dredger tailing lands which supply the fill material for most of the Oroville Dam embankment. This amount is considerably less than the valuation that had been placed on the material by the Natomas Company. The company has appealed the decision to the District Court of Appeal, Third District.

A major problem in the construction of Oroville Dam involves the Feather River Railway, a small line owned by the Georgia-Pacific Lumber Company, part of which will be submerged by the waters of Oroville Reservoir. Issues now pending before the California Supreme Court; the United States District Court, Northern District California; and the Interstate Commerce Commission, may resolve this problem.

Modification and enlargement of the penstock intake structure for Oroville Powerplant resulted from analyses of model studies and of the requirements for water temperature control. These analyses as well as changes recommended by the Oroville Dam Consulting Board served as the bases for revised designs providing increased intake capacity and a modification of the mehanical operating system of the intake structure. The

revised plans were approved by the Oroville Dam Consulting Board in September 1963.[13] Further design changes were made in December 1963 as a result of adverse foundation conditions which were revealed during the foundation excavation by the contractor. Design modifications to provide a more flexible structure were approved by the Oroville Dam Consulting Board in February 1964.[14]

The design of the spillway for Oroville Dam was revised after hydraulic model studies and economic studies indicated that improved hydraulic characteristics and savings in construction cost could be achieved. The spillway design previously included an overpour structure 130 feet in length controlled by radial gates and five low-level flood control outlets each 27 feet wide by 34 feet high. The revised design provides an ungated spillway with a fixed crest 1,730 feet in length and a low-level flood control outlet with seven radial gates each 20 feet wide by 33 feet high. The change in spillway design required the crest of the dam to be raised from elevation 915 feet to elevation 922 feet. The revised design was approved by the Oroville Dam Consulting Board in September 1963.[15]

13/ Letter to Alfred R. Golze', Chief Engineer, Department of Water Resources, from Oroville Dam Consulting Board, dated September 20, 1963.

14/ Letter to Alfred R. Golze', Chief Engineer, Department of Water Resources, from Oroville Dam Consulting Board, dated February 8, 1964.

15/ Letter to Alfred R. Golze', Chief Engineer, Department of Water Resources, from Oroville Dam Consulting Board, dated September 20, 1963.

In April, 1964 it was decided to schedule all of the motor-generator units at the Oroville and Thermalito Powerplants for installation at the same time.[16] Previously consideration had been given to delaying the installation of two units at Oroville and one unit at Thermalito. The possibility of savings in capital cost by delaying the installation of some of the units had arisen following early discussions with the California Power Pool Companies which indicated that only 400,000 of the total 710,000 kilowatts of dependable power capacity could be absorbed in Northern California during the early years of its availability. Further analysis showed, however, that the approximately 310,000 kilowatts of surplus power could be sold in any of several alternative power markets at a price which would guarantee revenues in excess of the savings that might be expected from the delay in installation. This analysis, as well as other operational advantages, supported the decision to include all generators and motor-generators in the initial installation contract.

In January 1964, the department received approval of an amendment to the license issued by the Federal Power Commission for the Oroville power development. The amendment, originally filed on April 17, 1962, was approved by a Federal Power

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16/ Department of Water Resources Memorandum, William E. Warne to Alfred R. Golze', Advertisement for Bids on Generators and Motor Generators at Oroville and Thermalito Dams, dated April 7, 1964.

Commission order effective December 31, 1963.[17] The license for Project No. 2100, Oroville Division, State Water Facilities, was amended to: change the type of dam for the Oroville development from a concrete gravity to a zoned fill-type; change the Oroville Powerhouse from one of conventional type to an underground powerhouse; increase the Oroville installed capacity from 440,000 kilowatts to 612,000 kilowatts of which 216,000 kilowatts are in pump-turbines; change the Thermalito development from two regulating reservoirs with no power installation to a forebay and a regulating afterbay with a powerplant having an installed capacity of 92,000 kilowatts of which 60,200 kilowatts are in pump-turbines; increase the total horsepower installation for Oroville-Thermalito from 587,000 horsepower to 939,000 horsepower; extend the period of construction from seven years to 12 years; and modify other less significant items of the license.

Emphasizing the goal to deliver water from the State Water Project at the lowest possible cost the Governor in a directive[18] instructed the Department of Water Resources to

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17/ Federal Power Commission Project No. 2100, "Order Amending License (Major)," issued January 22, 1964.

18/ State of California, Governor's Office, Letter to The Honorable William E. Warne, Director, Department of Water Resources, from Edmund G. Brown, Governor, Re: Order Concerning the Transmission of Power Generated by the Oroville and Thermalito Facilities and the Use Thereof, dated April 3, 1964.

continue as rapidly as possible its exhaustive investigation of marketing and transmitting power generated at Oroville and Thermalito. The directive also instructed the department to report its findings to the Governor, the Administrator of the Resources Agency, the California Water Commission, and the California Legislature before any lands are purchased for right-of-way, any final designs are prepared or physical construction undertaken to transmit such power. The final report on this subject is to be submitted not later than March 15, 1965. In response to the Governor's directive the department expanded its studies by initiating a three-phase program of investigation of transmission facilities for conveyance of Oroville-Thermalito power to the Delta Pumping Plant. The first two phases will provide data necessary for right-of-way acquisition and for final design. The third phase will comprise final design and acquisition of right-of-way, but will be undertaken only after evaluation of the first and second phases of the study. The investigation will provide data necessary for negotiation for disposal of Oroville-Thermalito power through other agencies or for construction of transmission facilities by the department if such action should be indicated to be more feasible.

Assembly Concurrent Resolution 16[19] requested the department to investigate and to report to the Legislature on or before February 15, 1964, on all possible means of disposing

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19/ Calif. Stats. of 1963, Res. Ch. 54, p. 4746.

of hydroelectric power to be generated at Oroville Dam and Reservoir so that maximum benefits may accrue. In response to the Legislature's request, a report[20] was prepared and transmitted to the Legislature. The report discusses, among other things, the marketing program to November 30, 1963. Marketing activities from November 30, 1963 to January 31, 1964, were discussed in the letter of transmittal.

During 1963, an Oroville newspaperman criticised what he called improper construction practices and excessive costs in connection with the Oroville facilities. These allegations were the subject of investigations by subcommittees of both the California Water Commission and the State Senate Fact Finding Committee on Water Resources. The Senate Subcommittee exonerated the department.[21] It found that construction safety, quality control, economics and progress were satisfactory and followed accepted engineering practices. The subcommittee of the California Water Commission made an independent survey and presented similar conclusions.[22] Department officials

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20/ Department of Water Resources, "Power in the State Water Project, Quarterly Progress Report for Period Ending November 30, 1963."

21/ Report of Subcommittee of the State Senate Fact Finding Committee on Water Resources, "Oroville Dam Investigation," submitted March 11, 1964.

22/ California Water Commission Memorandum to Ralph M. Brody from Messrs. King, Jennings and Paulson, "Progress in Construction of Oroville Dam," dated March 3, 1964.

testified before the Senate Subcommittee on the department's organization and on the planning, design and construction procedures developed to assure a safe and economical project.[23]

California Aqueduct

Significant actions contributing to progress toward completion of the California Aqueduct are presented below.

Approval was given by the Chief Engineer in December 1963[24] for design and construction of the Delta Pumping Plant so as to accommodate offpeak operation with flows varying from zero to 10,000 cubic feet per second within one hour.

A department study of recreation potentials on the west side of the San Joaquin Valley was requested by Senate Resolution 54.[25] The resolution directed the Department of Water Resources, in cooperation with the Department of Fish and Game, the Department of Parks and Recreation, and the Bureau of

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23/ Department of Water Resources, "State Water Project Design and Construction," dated February 1964.

24/ Department of Water Resources, Division of Operations, Memorandum, Division Engineer to Chief Engineer, "Offpeak Operation of North San Joaquin Division of the California Aqueduct," dated December 23, 1963, approved December 31, 1963.

25/ 1963 Calif. Senate Journal, p. 2936.

Reclamation, Department of the Interior, to evaluate the 26 water based recreation potentials included in the report "California's West Side Program,"[26] which was submitted to the Legislature by the Administrator of The Resources Agency. The resolution requested that the department report on this subject before the fifth legislative day of the 1965 Regular Session. The work is being accomplished through the joint efforts of the Departments of Water Resources, Fish and Game, and Parks and Recreation with the Bureau of Reclamation participating in studies in the area of the joint-use San Luis facilities. An advisory committee composed of representatives of counties and state agencies having a direct interest in recreation development along the California Aqueduct is providing recommendations on water based recreation potentials. The result of this cooperative evaluation will be published in a report being prepared by the Department of Water Resources.

A reduction in capital costs repayable by Coastal Division contractors resulted from administrative action taken by the department in September 1963. The department concluded that the Coastal Division of the California Aqueduct was authorized for construction on June 12, 1959.[27] It determined

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26/ The Resources Agency of California, The West Side Freeway and Aqueduct Recreation Development Committee, "California's West Side Program, Recreation, Land and Water Use Study," dated December 1962.

27/ Department of Water Resources, Opinion of Chief Counsel No. 63-5, dated September 26, 1963.

further that it was proper to charge water supply contractors to be served from that division for costs incurred after June 30, 1959. This resulted in revision of the previously allocated capital costs to those contractors, which had included costs beginning in 1952.

A decision to use electric-drive pumps at the Tehachapi Pumping Plant was announced by the Director on May 19, 1964. Consideration had been given to possible use of direct steam turbine drive at the Tehachapi Pumping Plant as well as electric motor drive. In accordance with the recommendation presented in a report[28] prepared by the Fluor Corporation, Ltd. of Los Angeles, the department will give no further consideration to steam turbine drive at the Tehachapi Plant. This report concludes that the electric motor drive is the more economical and that other factors also favor this method. Some of these factors are: (1) the possible reduction in future power costs due to the development and use of power from nuclear generation; (2) the economic advantage of the electric system over the steam system under possible use of a series of lifts rather than one lift; and (3) the fact that operating personnel for the steam system could not be interchanged with other plants.

28/ Department of Water Resources, "Engineering Evaluation of Electric Motor and Steam Turbine Drive for Tehachapi Pumping Plant," prepared by the Fluor Corporation, Ltd., dated March 1964.

The Tehachapi Crossing Consulting Board recommended in January 1964 that the department give no further study to (1) a Pastoria Canyon route for the California Aqueduct, and (2) an underground pumping plant for the Tehachapi lift. Studies of the most feasible Tehachapi pumping system have included consideration of both single and multilift pumping plants located on both the Pastoria Canyon and the Ridge routes. In their review of the several alternative plans, the Tehachapi Crossing Consulting Board made certain recommendations as to the future direction of the studies.[29/] Proposals by the Board for major changes in the studies included the recommendation that no further comparative studies be made of an alignment on the Pastoria Canyon route. This alignment was considered by the Board to have no economic advantage and to be more hazardous from a seismic standpoint. The Board also recommended the abandonment of further studies of an underground pumping plant in favor of a surface plant, except as a possibility for the second lift of a two-lift system.

In February 1963, the department, with concurrence by The Metropolitan Water District of Southern California, fixed the elevation of the hydraulic gradient at the north portal of

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29/ Letter to Alfred R. Golze', Chief Engineer, Department of Water Resources, from Tehachapi Crossing Consulting Board, dated January 10, 1964.

Tehachapi Tunnel No. 1 at approximately 3,165 feet above sea level.[30]

The department report on East Branch alternative alignments in the Antelope Valley-Mojave Desert area in the vicinity of Palmdale was released to the East Branch water contractors in September 1963.[31] The studies were made in response to a request by The Metropolitan Water District of Southern California that alignments farther removed from the San Andreas Fault than the adopted alignment shown in Bulletin No. 132-63 be considered. Studies of three proposed alignments were made, but no significant advantages from the standpoint of seismic conditions were revealed. All three alternative alignments were more costly than the original alignment, and the report reaffirmed the adopted alignment.

In December 1963 the department completed an analysis of the relative merits of alternative arrangements for serving water to the Southern California contractors including timing

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30/ "Memorandum of Understanding Regarding Elevation and Alignment of Tehachapi Crossing, State Water Facilities," dated February 8, 1963; signed by Robert A. Skinner, General Manager and Chief Engineer, The Metropolitan Water District of Southern California; and Alfred R. Golze', Chief Engineer, Department of Water Resources.

31/ Department of Water Resources, "Summary Report of Engineering Investigations of East Branch Aqueduct Alternative Alignments in Antelope-Mojave Desert Area, California Aqueduct Project," dated September 1963.

of constructing the East Branch Aqueduct.[32] The water supply contracts of agencies to be served from the East Branch provided for a period of negotiation between June 30 and December 31, 1963 among those contractors and the department to seek agreement on the timing of construction. The Metropolitan Water District of Southern California had proposed a delay in completion of that branch until 1985, while nine other contractors requested completion in 1972. The department's report indicated that from the standpoint of all of those concerned, it would be less costly to adhere to the earlier completion date than to delay construction. The scheduling of completion of construction of the East Branch Division by 1972 was announced by the department in February 1964.[33] This decision was in accordance with provisions of the aforesaid contracts which provide that in the absence of a mutual agreement by the contractors, the department shall establish a construction schedule which will best serve the interests of all such contractors. The decision also was in accordance with the request by the Legislature contained in Assembly Concurrent Resolution 67[34] which directed the department, in the event that the

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32/ Office report with limited distribution to concerned agencies, "Alternative Capacities of the California Aqueduct and Local Distribution Systems in Southern California," dated December 1963.

33/ By letter signed by the Director, dated February 14, 1964, to each of the eleven affected water supply agencies.

34/ Calif. Stats. of 1963, Res. Ch. 152, p. 4937.

State and the contractors did not reach agreement, to set the timing of the construction of the East Branch Aqueduct so that water deliveries shall be initiated no later than 1972.

In September 1963, the decision was made to increase the capacity of Castaic Reservoir from 100,000 acre-feet to 350,000 acre-feet in order to utilize the optimum capability of the site in providing terminal storage for regulatory and emergency requirements.[35/]

The department applied to the Federal Power Commission for a preliminary permit relating to possible power recovery plants along the California Aqueduct in November 1963.[36/] The Federal Power Commission assigned Project No. 2426 to the application. The department applied for the preliminary permit in order to secure and maintain priority for a license while procuring data and performing acts necessary to perfect an application for such license.

San Joaquin Drainage Facilities

The Legislature's concern over disposal of possible poor quality return waters from areas served by the California Aqueduct and from other areas was expressed in Senate Concurrent

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35/ Department of Water Resources, "Position Paper Regarding the size of Castaic Reservoir," dated August 30, 1963, approved September 7, 1963.

36/ Department of Water Resources, "Application to Federal Power Commission for Preliminary Permit for California Aqueduct," dated November 1, 1963.

Resolution 27[37] which requested the department to complete its San Joaquin Valley Drainage Investigation at the earliest possible time, to prepare a comprehensive report on facilities for removing drainage water from the San Joaquin Valley, and to report thereon to the Legislature not later than the fifth legislative day of the 1965 Regular Session. The resolution specified certain matters to be studied, including the purposes for which the facilities should be built, ways and means of coordinating with the United States, alternative means of routing and disposal, the nature of the facilities, including staging and capacities, the costs and benefits, feasibility, and ways and means of equitably recovering the costs. Finally, the resolution requested the department in preparing the report to carry out the directives contained in Assembly Concurrent Resolution 92[38] of the 1961 session, and Water Code Sections 12230 to 12233.[39]

In response to Senate Concurrent Resolution 27 the department has joined with the Bureau of Reclamation to form a Task Force Committee to coordinate the San Luis Interceptor Drain Studies and the San Joaquin Valley Master Drain Program and if possible to formulate a plan for joint use of drainage

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37/ Calif. Stats. of 1963, Res. Ch. 119, p. 4892.

38/ Calif. Stats. of 1961, Res. Ch. 214, p. 5006.

39/ Relating to avoidance of further degradation of the quality of water in the San Joaquin River below its junction with the Merced River.

facilities that might be constructed in the San Joaquin Valley. Studies have been made of alternative drainage facilities. The best of these plans are being studied further. Various methods of cost allocation and the evaluation of benefits are being studied. Possible legislation to form a master district is being studied as a means of equitably recovering the cost of construction and operation. A number of public meetings have been held in the San Joaquin Valley, in Sacramento and in the Bay Area to discuss plans for drainage facilities. A report is being prepared for submission to the Legislature in accordance with the resolution.

Local Projects

The Davis-Grunsky Act provides for allocation and administration of loans and grants from the $130,000,000 provided in the Burns-Porter Act for local projects. A number of bills passed by the 1963 Legislature[40/] amended the Davis-Grunsky Act in the following ways:

1. Authorized the making of loans and grants to assist public agencies in financing the construction of water projects that are primarily for recreation or fish and wildlife enhancement purposes.

40/ Calif. Stats. of 1963, Ch. 53, p. 678; Ch. 82, p. 707; Ch. 769, p. 1801; Ch. 908, p. 2154; Ch. 1075, p. 2538; and Ch. 2023, p. 4147.

2. Authorized additional grants for the construction of initial water supply and sanitary facilities for recreation.

3. Increased the maximum amount which the department may grant toward the recreation and fish and wildlife enhancement costs of a project from $300,000 to $400,000.

4. Exempted public agencies having elective governing bodies from the requirement that elections be held on contracts relating to proposed grants.

5. Permitted the deferment of interest payments on construction loans during a development period not to exceed 10 years.

6. Provided a new interest rate formula based upon average interest rates payable on state general obligation bonds.

7. Provided that a county assessor or county engineer may supply supporting material concerning the ability of a public agency to repay a loan and to finance its proposed project from other sources.

8. Authorized the department to make feasibility report loans in an amount up to two percent of the estimated project cost, or $50,000 whichever is less.

9. Provided that the potential future growth and development of each project area shall be taken

into consideration in calculating benefits for the determination of the economic justification of a proposed project, and that public health, safety and welfare shall be considered in determining the need for the project.

10. Provided that for grants, the determination of the economic justification of a proposed project may be limited to the project's recreation and fish and wildlife enhancement functions.

11. Authorized the department, subject to the prior approval of the California Water Commission, to participate as a partner with local public agencies in projects that are primarily for domestic, municipal, agricultural, industrial, recreational, or fish and wildlife enhancement. Authorized the department to expend $1,000,000 for participation in each project without first obtaining special legislative authorization.

Additional Facilities

In September 1963, the department released a preview report[41] on additional conservation facilities of the State Water Resources Development System. An Upper Eel River

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41/ Department of Water Resources, "Preview of Bulletin No. 136, North Coastal Area Investigation," dated September 1963.

development plan which would divert water from the Middle Fork Eel River via Clear Lake and Lake Berryessa to the Sacramento-San Joaquin Delta was indicated as a probable choice for initial development in place of a Middle Fork Eel River diversion from the Upper Eel River Basin via Stony Creek or Thomes Creek which was previously contemplated.

In March 1964, the Upper Eel River Development was authorized[42/] by the department to be added as additional facilities to the State Water Resources Development System and the California State Water Project and as an additional unit to the state Central Valley Project. The Upper Eel River Development, as so authorized, consists of Spencer and Franciscan Dams, Spencer Reservoir, and Dos Rios Dam and Reservoir on the Middle Fork Eel River in Mendocino County; and associated conveyance features to deliver the conserved water supplies to local areas and to the Sacramento River Basin either, (1) via pumped diversion to the upper main stem Eel River with subsequent gravity diversion via Clear Lake, Soda Creek, Putah Creek, and Lake Berryessa to the Sacramento River, or (2) via gravity diversion to Thomes or Stony Creeks with the inclusion of elements of the Glenn Reservoir Complex.

42/ Department of Water Resources, Project Order No. 7, dated March 9, 1964.

In answer[43] to an inquiry by the Board of Engineers for Rivers and Harbors, the department expressed its interest in contracting with the United States Army Corps of Engineers for future municipal and industrial water supplies from the proposed Marysville Dam and Reservoir under the federal Water Supply Act of 1958.[44] If obtainable in this manner, such supplies would involve no expenditure of funds by the State and interest payments on that portion of the cost allocated to future municipal and industrial use would be deferred ten years after completion of the project. The water thus made available could reduce the scope of future state construction of additional or supplemental water conservation facilities necessary to meet local needs and to augment the supply of water in the Sacramento-San Joaquin Delta.

43/ By letter dated February 25, 1964 from the Director of Water Resources to General Arthur H. Frye, Jr., Division Engineer, U. S. Army Engineer Division, South Pacific, Corps of Engineers, acting as the agent for the Board of Engineers for Rivers and Harbors in obtaining comments of Region 2 of the Bureau of Reclamation and the State of California concerning the desirability of recommending authorization of the Marysville Dam and Reservoir.

44/ 72 Stat. 319, 43 U.S.C. Sec. 390(b).

CHAPTER III. DESCRIPTION OF WORKS

This chapter presents a brief description of the individual features of the State Water Project as of the beginning of 1964. A number of features are subject to change as planning and design studies are completed and as water supply contracts are amended. The works described in this chapter are the bases for the cost estimates presented in Chapter XI. A general location map of the State Water Project is shown on Plate 1. Appendix A entitled, "State Water Project Statistics," presents brief summary descriptions of the physical features.

Feather River Facilities

The Feather River Facilities include the Upper Feather Division and the Oroville Division.

Upper Feather Division

This division consists of the following five units: Frenchman, Antelope Valley, Grizzly Valley, Dixie Refuge, and Abbey Bridge Dams and Reservoirs. All are located in Plumas County, as shown on Plate 1.

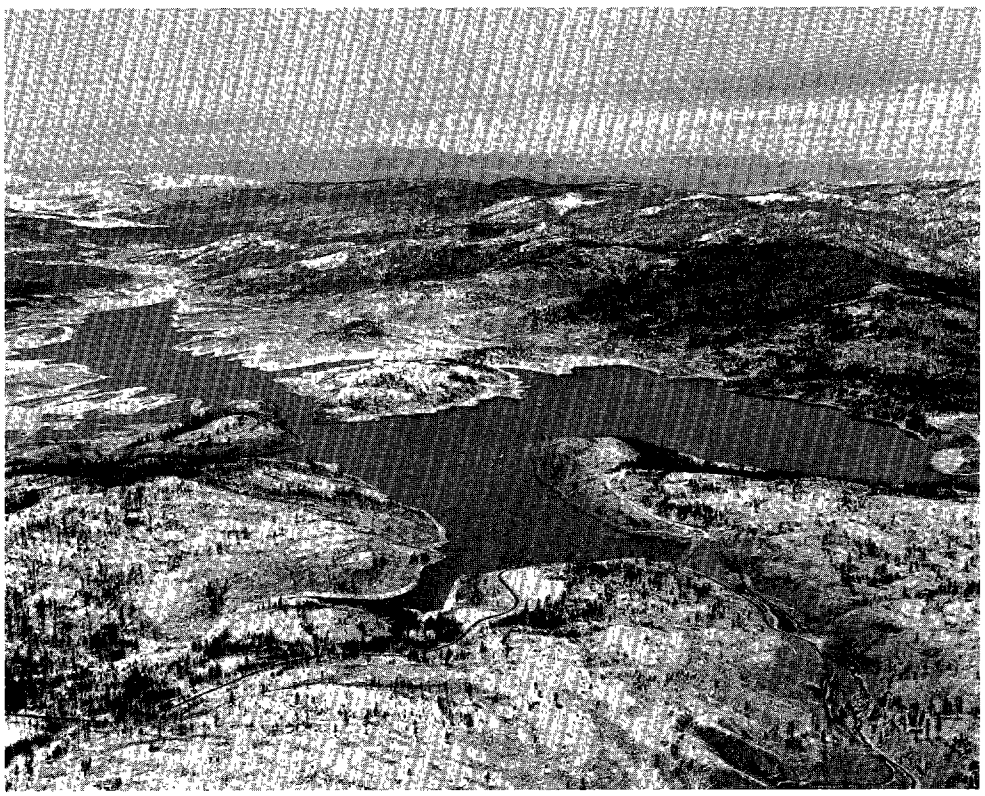
Frenchman Dam is an earthfill structure, completed in 1961, which is 128 feet high, with an ungated, concrete-lined spillway. It is located on Little Last Chance Creek about 30 miles northeast of Portola. The reservoir, with a storage capacity of 55,400 acre-feet, regulates the water of Little

Last Chance Creek for downstream irrigation use and forms the basis for enhancement of an outdoor recreation area. Surface area of the reservoir is 1,580 acres and the shore line is 21 miles.

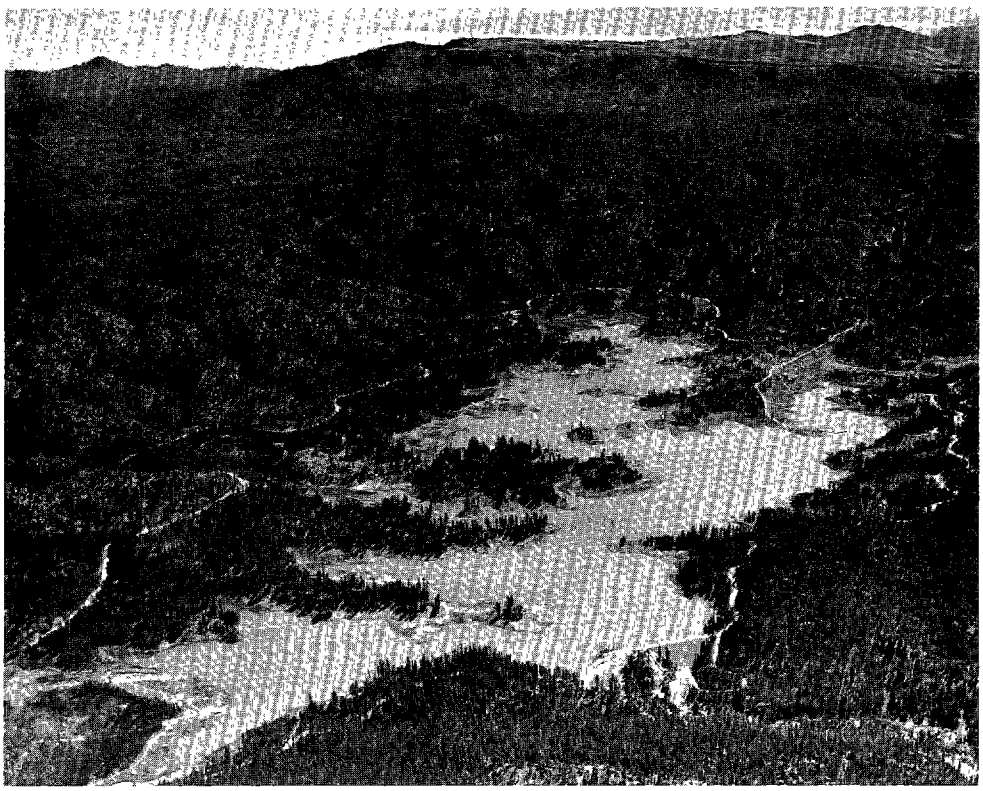
Antelope Valley Dam, under construction in 1963, is an earthfill structure 105 feet high. The reservoir will store 22,500 acre-feet of water to be used entirely for recreation and fish and wildlife purposes. The reservoir will have a surface area of 930 acres and a shore line of 15 miles. The dam is located on Indian Creek about 25 miles northeast of Crescent Mills.

Grizzly Valley Dam, to be under construction in 1964, will impound a reservoir with a storage capacity of about 83,000 acre-feet to be used for recreation, fish and wildlife, and domestic water supply purposes. The reservoir will have a surface area of about 4,000 acres and a shore line of 35 miles. The damsite is located on Big Grizzly Creek about 10 miles north of Portola. The Grizzly Valley unit may, in the future, include conveyance works from the dam to Portola.

Dixie Refuge Dam, construction of which is not yet scheduled, will impound a reservoir with a storage capacity of about 16,000 acre-feet to be used for recreation and fish and wildlife purposes. The reservoir will have a surface area of about 900 acres and a shore line of 15 miles. The damsite is located on Last Chance Creek about 30 miles east of Crescent Mills.



Frenchman Dam and Reservoir
(Upper Feather River Division)



Antelope Valley Dam and Reservoir
(Upper Feather River Division)

Abbey Bridge Dam, construction of which is not yet scheduled, will impound a reservoir with a storage capacity of about 11,000 acre-feet for recreation and fish and wildlife purposes. The reservoir will have a surface area of about 540 acres and a shore line of 11 miles. The damsite is located on Red Clover Creek about 24 miles east of Crescent Mills.

Oroville Division

The Oroville Division includes the following major units: Oroville Dam and Reservoir, Oroville Powerplant, Thermalito Diversion Dam, Thermalito Power Canal, Thermalito Forebay, Thermalito Powerplant, Thermalito Afterbay, Fish Barrier Dam, Fish Ladder and Feather River Hatchery. Features of the Oroville Division are shown on Plate 2.

Oroville Dam, which is under construction, is located about four miles northeast of the City of Oroville. The dam will be an embankment structure with impervious rolled-fill core and graded gravel shell approximately 747.5 feet in height with a crest length of 5,600 feet. The change in height, from 735 feet shown in Bulletin No. 132-63, has resulted from adjustment of the crest elevation of the embankment, necessitated by spillway design, and from deeper foundation excavation than formerly contemplated. The reduction of crest length, from 6,800 feet shown in Bulletin No. 132-63, is due to changes in spillway design and to omission of the spillway from the new crest length of 5,600 feet, given above.

The reservoir will have a surface area of 15,500 acres, a shore line of 167 miles, and a storage capacity of 3,484,000 acre-feet at normal pool elevation of 900 feet above sea level.

Oroville Spillway, construction of which is to be commenced in 1965, will be located in a saddle on the right abutment of the dam. It will consist of a low-level flood control outlet with seven 20 foot by 33 foot radial gates and an ungated auxiliary spillway with a fixed crest 1,730 feet long at elevation 901.0 feet. A concrete-lined chute will conduct water from the gated outlets to the river.

Two auxiliary earthfill dams will be located at low points on the rim of the reservoir. The Bidwell Canyon Dam, on the south rim, will have a crest length of 1,900 feet and a maximum height of 42 feet above natural ground. Parish Camp Dam, located on the northwest rim, will have a crest length of 260 feet and a maximum height of 32 feet above natural ground. The changes in heights and crest lengths from values in Bulletin No. 132-63 are the result of raising the crest elevations and modifying the designs of the structures.

Oroville Powerplant, construction and fabrication of equipment for which is under way, will be located underground in the left abutment of the dam. Two circular penstock tunnels, leading from intakes on the left abutment at an elevation of approximately 605 feet, immediately adjacent to the upstream toe, will convey water to the powerplant. After passing through the turbines, the water will be conveyed through two tailrace

tunnels discharging into the present river channel at the downstream toe of the dam.

Oroville Powerplant is designed for pumped storage operation. The powerplant will have six units with a nameplate generating capacity of 644,000 kilowatts. Three of the units will be reversible. The increase in capacity from the value of 600,000 kilowatts, given in Bulletin No. 132-63, is required to provide machine capacity to accommodate part of the increase in dependable capacity of the Oroville and Thermalito Powerplants from 685,000 kilowatts to 710,000 kilowatts as discussed in Chapter XII.

Thermalito Diversion Dam, which is under construction, will be located immediately northeast of Oroville. It will maintain tailwater at the Oroville Powerplant and will divert water into the Thermalito Power Canal serving the Thermalito Powerplant. The diversion dam will be a concrete gravity structure 133 feet high with a crest length of 1,280 feet. The dam will have a gated spillway controlled by 14 centrally located 40 foot by 23 foot radial gates. The outlet works will provide for a downstream release of 400 cubic feet per second for preservation of fish life in the Feather River. The reservoir will have a surface area of 330 acres, a storage capacity of 13,500 acre-feet, and a shore line of 10 miles.

Thermalito Power Canal, construction of which is scheduled to begin in 1965, will convey water from Thermalito Diversion Dam to Thermalito Forebay and will have a capacity

sufficient to handle the discharge from the Oroville Powerplant. The canal will be concrete-lined and will be designed to permit flow in either direction to allow the return of water stored in Thermalito Afterbay to Oroville Powerplant during the pumping cycle of the pumped storage operation.

Thermalito Forebay, construction of which is scheduled to commence in 1965, will have a gross capacity of 11,400 acre-feet impounded by an earthfill dam 65 feet high. The forebay dam will provide head for Thermalito Powerplant, and the forebay will function essentially as an extension of Thermalito Power Canal. Surface area of the forebay will be about 600 acres and the shore line will be about nine miles long.

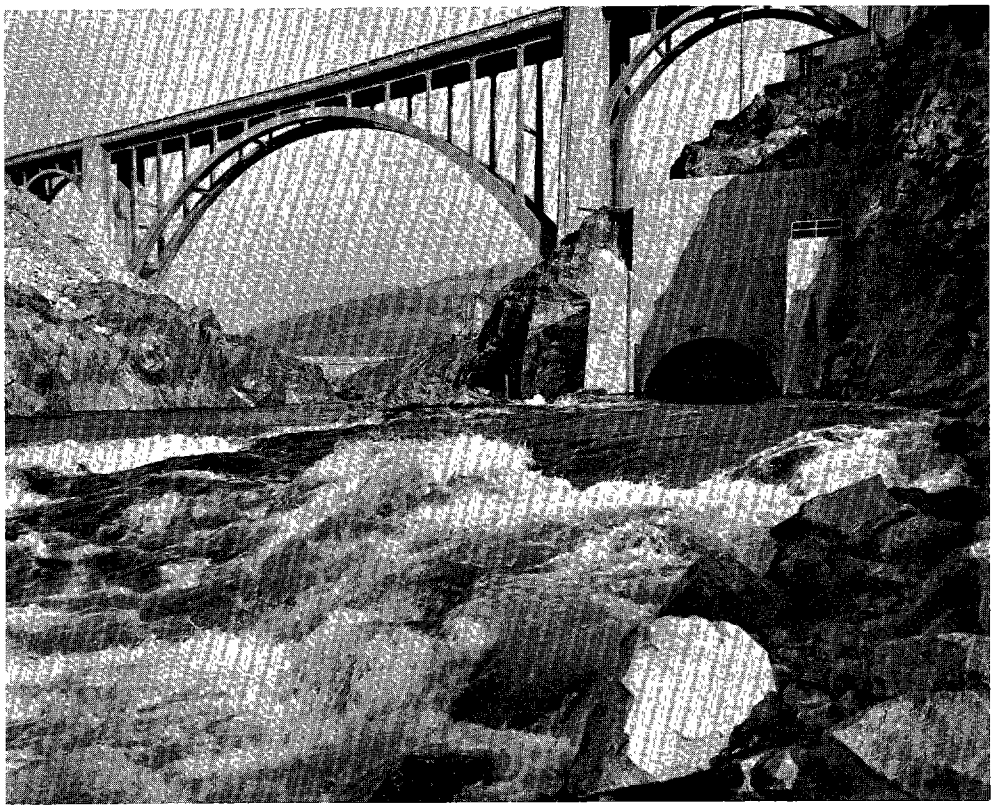
Thermalito Powerplant, construction of which is scheduled to be started in 1964, will contain one Kaplan turbine unit and three pump-turbines with a total nameplate generating capacity of 115,000 kilowatts. The increase in capacity from 98,000 kilowatts, as given in Bulletin No. 132-63, results from the increase in dependable capacity of the Oroville and Thermalito Powerplants mentioned in connection with Oroville Powerplant. This plant will operate on the same schedule as Oroville Powerplant and will pass essentially the same flows. A tailrace channel will connect the powerplant with Thermalito Afterbay.

Thermalito Afterbay, construction of which is scheduled to begin in 1965, will be formed by an earthfill dam 30 feet

high and about six miles long. It will have an ultimate storage capacity of 57,500 acre-feet and an active storage capacity of 35,000 acre-feet initially and 45,000 acre-feet ultimately. The water surface area will be about 4,500 acres and the shore line will be about 26 miles long. Outlet structures will serve the existing Western and Sutter-Butte Canals. Discharge to the original channel of the Feather River will be regulated at the river outlet.

The Fish Barrier Dam, completed in 1964, is located in the Feather River a short distance below Thermalito Diversion Dam. It is a concrete gravity structure with a maximum height of 63.5 feet and a crest length of 600 feet. Its function is to divert migrating salmon and steelhead into the Fish Ladder that will lead to the Feather River Hatchery. It is now part of the Interim Fish Facility by which fish are drugged and conveyed by truck to the Feather River upstream from Oroville Dam while that dam is under construction and before the hatchery is completed. From October 1, 1963, when partial operation of the Interim Fish Facility began, through May 1964, 1,844 king salmon and steelhead were handled by this facility. The rate has increased substantially since full operation of these facilities commenced on about May 1, 1964.

The Feather River Hatchery will be located on the right bank of the river. The primary purpose of the hatchery will be to maintain the existing salmon and steelhead runs by serving as a substitute for the spawning areas disturbed by



Diversion Tunnel
(Oroville Division)

Fish Barrier Dam
(Oroville Division)

project construction. The hatchery will have a capacity of about 20,000,000 eggs.

North Bay Aqueduct

The North Bay Aqueduct includes the works necessary to divert water from the Sacramento-San Joaquin Delta and convey it some 32 miles across Solano County to a terminus located in the Napa Valley. The aqueduct will include about three miles of intake channel, 20 miles of canal, eight miles of pipeline, and two pumping plants. The North Bay Aqueduct is shown on Plate 3.

The aqueduct will divert from Lindsey Slough in the Delta. An improved, unlined Calhoun Cut will convey water about three miles from Lindsey Slough to Calhoun Pumping Plant. The pumping plant will lift water from elevation zero to elevation 20 feet and will have a capacity of about 138 cubic feet per second. The aqueduct from Calhoun Pumping Plant will extend about 20 miles in unlined canal to the Cordelia Pumping Plant. Construction at this reach will be delayed as explained in Chapter IV.

Cordelia Pumping Plant will lift water to elevation about 370 feet at the head of Jameson Canyon. The plant will have a total capacity of 57 cubic feet per second. Water will be conveyed through Jameson Canyon in pipeline about eight miles to a terminus in the Napa Valley. Construction at this reach is scheduled to commence in 1966.

The reduction in capacities of the Calhoun and Cordelia Pumping Plants from 380 and 290 cubic feet per second, respectively, as shown in Bulletin No. 132-63, reflect the lesser quantities of water contracted for by the two North Bay water supply contractors then assumed for the earlier report. Portions of the North Bay Aqueduct are in the advanced planning stage and the sizes and types of facilities and other details will undoubtedly be changed before final design is initiated.

South Bay Aqueduct

The South Bay Aqueduct, shown on Plate 3, includes those facilities necessary to divert water from Bethany Reservoir of the California Aqueduct and convey it through Livermore Valley to the vincinity of Penitencia Creek on the east side of the Santa Clara Valley near San Jose. The overall length of aqueduct will be 44 miles, which includes 11.5 miles of concrete-lined canal, 1.6 miles of tunnel, 30.6 miles of steel and concrete pipeline, two pumping plants, and an offstream flood control and regulatory storage reservoir in the Arroyo Del Valle. The capacity of the aqueduct in the various reaches will range from 363 to 184 cubic feet per second.

The physical units and capacities of the South Bay Aqueduct and the aqueduct reaches thereof utilized as a basis for allocating transportation costs among water supply contractors are defined. Except for Del Valle Reservoir and related facilities, the features are completed or under construction.

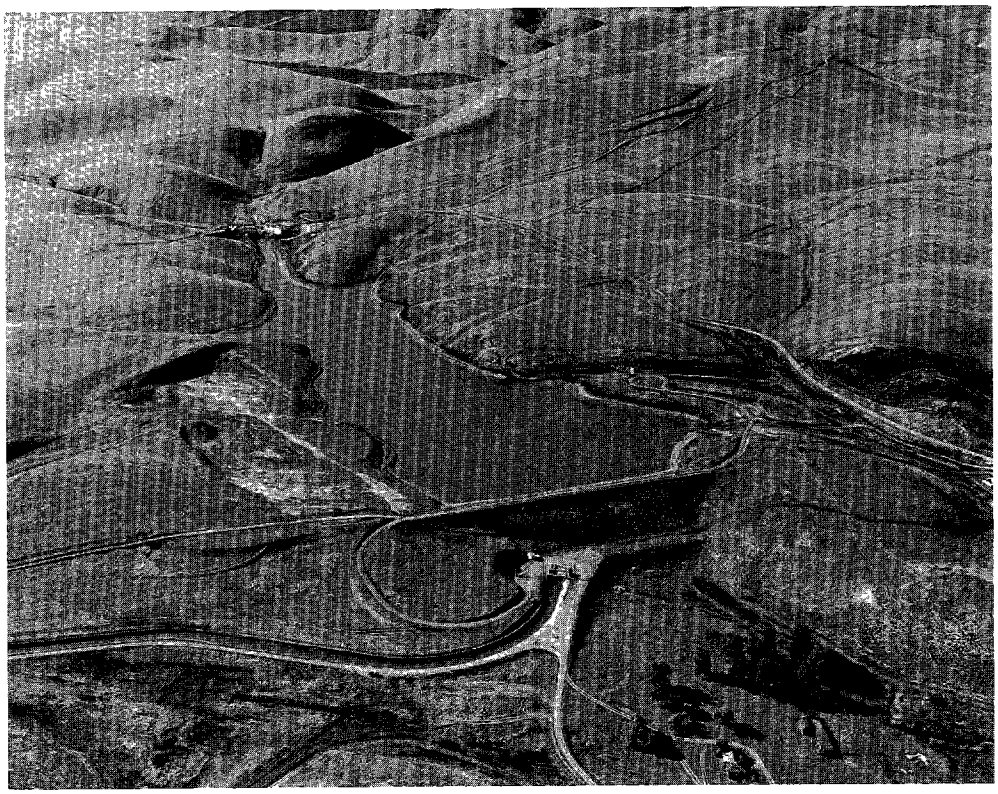
Therefore, this aqueduct system is described by aqueduct reaches in the following sections.

Bethany Reservoir to Altamont Turnout

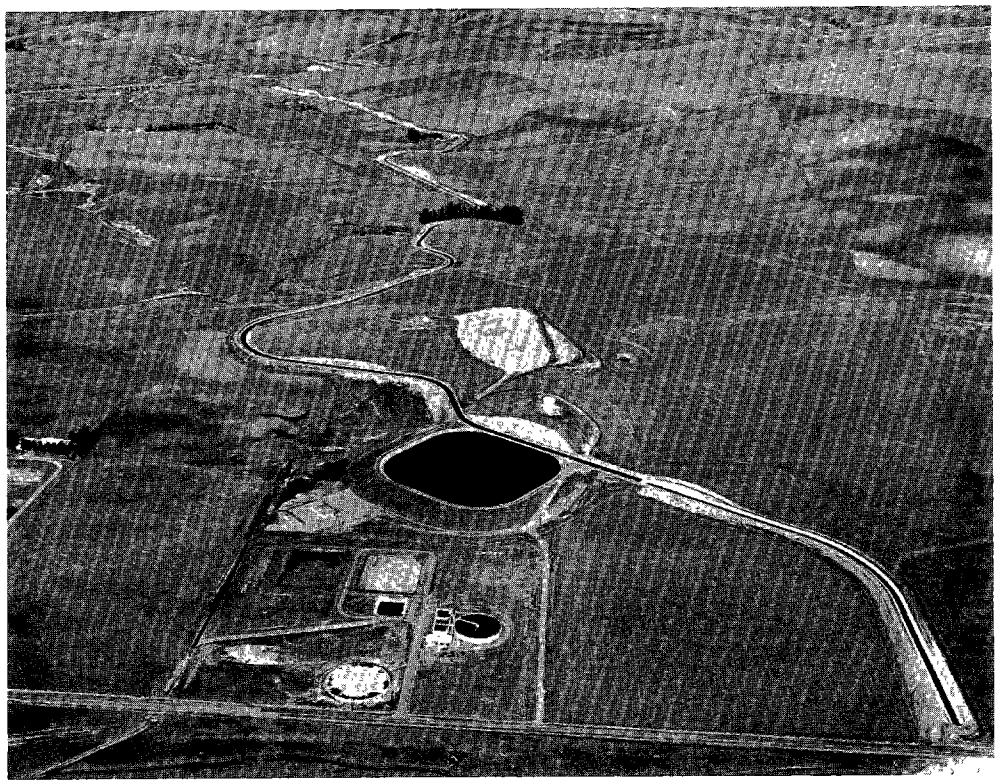
Water is presently being supplied to Bethany Forebay by the Interim Intake Canal and the Forebay Pumping Plant. The Interim Intake Canal is a temporary, largely unlined canal two miles long with a capacity of 150 cubic feet per second, which conveys water from the Delta-Mendota Canal of the federal Central Valley Project to the Forebay Pumping Plant. The latter is an outdoor, temporary plant which will have five pump units with a total capacity of 150 cubic feet per second to lift water from the Interim Canal into Bethany Reservoir.

Water supplied to Bethany Forebay by either the Forebay Pumping Plant or by the California Aqueduct will be lifted by the South Bay Pumping Plant about 600 feet to a surge tank at the head of Brushy Creek Pipeline.

The aqueduct from the surge tank to the Altamont Turnout will have a capacity of 300 cubic feet per second and consists of Brushy Creek Pipeline, a double-barrel concrete pipeline 2.5 miles long; the Dyer Canal, a concrete-lined canal two miles long; and approximately two miles of the Altamont Pipeline, a single concrete pipeline about 2.5 miles in total length.



Bethany Reservoir
(South Bay Aqueduct)



Patterson Reservoir
(South Bay Aqueduct)

Altamont Turnout Through Patterson Reservoir

This reach consists of about 0.5 mile of the Altamont Pipeline; a two-mile portion of the Livermore Valley Canal, a concrete-lined canal nine miles in total length; and Patterson Reservoir, a small regulatory and emergency reservoir with a capacity of 100 acre-feet. The capacity of the conveyance features is 300 cubic feet per second.

Patterson Reservoir to Del Valle Branch

This reach includes the conveyance facilities from Patterson Reservoir to the junction with the Del Valle Branch Pipeline, which will connect the aqueduct with Del Valle Reservoir. This reach will include the remaining seven miles of the Livermore Valley Canal and 2.3 miles of the Del Valle Siphon, both with a capacity of 300 cubic feet per second.

Del Valle Branch Through Del Valle Reservoir

Del Valle Branch Pipeline will convey water a distance of about two miles from the main route of the South Bay Aqueduct to Del Valle Reservoir for regulatory storage. Releases from the reservoir to meet delivery demands will also be made through the pipeline. Del Valle Pumping Plant will be required at different reservoir stages either to pump aqueduct-supplied water into storage or to make releases from storage. Both the pumping plant and the pipeline will have a capacity of 120 cubic feet per second.

Del Valle Dam will be an earthfill structure 220 feet high with a crest length of 900 feet. Del Valle Reservoir will provide 74,000 acre-feet of storage. Of this amount, 35,000 acre-feet will be allocated for flood control storage, 29,000 acre-feet for regulation of South Bay Aqueduct flows and 10,000 acre-feet provided for dead storage. One thousand acre-feet of the flood control pool can also be utilized for regulatory storage during certain portions of the year. With 40,000 acre-feet in storage (the sum of regulation and dead storage), the reservoir will have a water surface area of 715 acres and a shore line length of 16 miles.

Del Valle Branch to South Livermore Turnout

This reach will consist of a 0.6-mile-long section of Del Valle Siphon with a capacity of 363 cubic feet per second.

South Livermore Turnout to Vallecitos Turnout

This reach will include a 0.7-mile-long section of Del Valle Siphon; La Costa Tunnel, a concrete-lined structure about 0.9-mile-long; and a 1.7-mile section of the Sunol Pipeline. The capacity of the reach will be 305 cubic feet per second.

Vallecitos Turnout to Alameda-Bayside Turnout

This reach will include the remaining 5.3-mile-long section of Sunol Pipeline; Mission Tunnel, a concrete-lined tunnel about 0.6-mile-long; and a 0.5-mile portion of the

Santa Clara Pipeline. Capacity of the reach will be 255 cubic feet per second.

Alameda-Bayside Turnout to Santa Clara Terminus

This reach will include the remaining 12.5 miles of the Santa Clara Pipeline, a concrete pipe with a capacity of 184 cubic feet per second. The reach extends southerly to a terminal point near Penitencia Creek approximately five miles northeast of San Jose.

Delta Facilities

Advance planning for the Delta Facilities is currently under way. In August 1961, at the invitation of the Department of Water Resources, the U. S. Army, Corps of Engineers and the Bureau of Reclamation joined with the department in an Interagency Delta Committee. This committee has as its objectives the resolution of differences among standards of the member agencies and the reaching of agreements on mutually acceptable works in the Delta and criteria for operation thereof. Viewpoints of other governmental and local groups have been obtained.

The committee first developed planning objectives for a joint state-federal Delta plan. Next it classified the numerous plans which had been advanced for solving Delta problems among the following concepts:

1. Hydraulic barriers
2. Physical barriers

3. Delta waterway control works

4. Peripheral canal around the Delta

On March 1 and April 19, 1963, the California Water Commission and the department held joint public meetings for the purpose of receiving public comments on plans presented in Bulletin No. 76.[1/] During these meetings, the Bureau of Reclamation first advanced the concept of a peripheral canal. In May 1963, the California Water Commission recommended that the department give full consideration and study to this plan.

The department has adjusted its planning studies to consider recommendations made by the California Water Commission. Present studies indicate that the facility finally selected will be either a Delta Peripheral Canal or a modification of one of the Delta facility plans shown in Bulletin No. 76.

The department has also adjusted its planning schedule to coincide with recommendations of the Interagency Delta Committee. This schedule provides for the committee to select the most desirable concept as a basis for the recommended Delta facility plan in the summer of 1964, preparation of a draft of joint report on this plan by September 1964 and release of the final report by January 1965. Between September 1964 and January 1965 hearings on the draft of the joint report will be held by the California Water Commission.

1/ Department of Water Resources, Preliminary Edition, Bulletin No. 76, "Delta Water Facilities," dated December 1960.

For the purposes of cost estimates included in Chapter XI, the "Typical Alternative Delta Water Project" described in Bulletin No. 76 has been utilized. This illustrative project also formed the basis for the costs reported in Bulletin No. 132-63 and is described on pages 68 and 69 of that report.

Concurrently other advance planning work closely related to the activities of the Interagency Delta Committee is in progress. Among these investigations is the Delta Fish and Wildlife Protection Study by the Departments of Fish and Game and Water Resources. The following matters are being considered:

1. The effect of a Delta facility upon fish and wildlife resources of the area.

2. Changes in any project facilities or operation of such facilities required to protect fish and wildlife.

3. Means of compensating for any adverse effect on fish and wildlife that might result from the project facilities.

4. Practical means of enhancing fish and wildlife resources through a Delta facility.

To date the study group has identified 30 fish and wildlife problems to examine in detail; has made surveys to ascertain habits and ecology of the Delta's fish population; and has

constructed and tested certain prototype fish passage and guidance facilities. This work is scheduled for completion in Fiscal Year 1966-67.

California Aqueduct

The California Aqueduct extends 444 miles from the Sacramento-San Joaquin Delta to Perris Reservoir in Southern California. This facility is divided into eight divisions; the North San Joaquin, San Luis, South San Joaquin, Tehachapi, Antelope, East Branch, West Branch, and Coastal Divisions. The location of each division is shown on Sheets 1 through 6 of Plate 4. The total length of these components is 560 miles.

North San Joaquin Division

The North San Joaquin Division includes those units required for the conveyance of water from Italian Slough in the Delta to San Luis Forebay. Principal features of the division include about 66 miles of intake channel and lined canal, a fish protective facility, the Delta Pumping Plant, and Bethany Reservoir.

An unlined intake channel, which is under construction, will be about three miles long and will convey water from Italian Slough to the Delta Pumping Plant. Facilities to protect fish life, by preventing them from being drawn into the pumping plant, will be constructed at the beginning of the intake channel. The Delta Fish and Wildlife Protection Study, described above, will be helpful in designing these facilities.

The Delta Pumping Plant, to be under construction in 1964, will be located northwest of Tracy and will lift the water from sea level to an elevation of about 244 feet. It will be an indoor-type plant. The substructure will be of mass-concrete construction with heavy reinforcement, and the superstructure will be of rigid frame reinforced concrete construction. The plant will house 11 pumping units with an aggregate capacity of about 10,300 cubic feet per second. Nine large pump units will each have a discharge capacity of about 1,070 cubic feet per second and a motor horsepower of 34,500. Two smaller pumping units will each have a discharge capacity of about 350 cubic feet per second and a motor horsepower of 11,300. There will be five discharge lines, each approximately 15 feet in diameter and about 1,000 feet long. Major power switching and transformingfacilities will also be included.

From the pump discharge lines, a concrete-lined canal with a capacity of 10,300 cubic feet per second will convey water about one mile to Bethany Reservoir.

Bethany Reservoir was designed to serve initially as the forebay for the South Bay Pumping Plant of the South Bay Aqueduct and is now serving that purpose. The reservoir will be enlarged when required to serve the additional function of water transportation in lieu of canal through the new reservoir area. Dikes, to be constructed beginning in 1965, will be extended southerly from Bethany Dam and will form the additional portion of the conveyance reservoir. This facility will

be joined to the existing forebay reservoir by an interconnecting channel. Under this condition, the maximum operating water surface elevation of the reservoir will be about 243 feet. At this elevation the reservoir will have a capacity of about 4,200 acre-feet, a water surface area of about 130 acres, and a shore line length of about four miles.

The aqueduct from Bethany Reservoir to San Luis Forebay, which is partially under construction, will be a concrete-lined canal having a capacity of 10,000 cubic feet per second and a length of approximately 62 miles. Appurtenant to the canal will be numerous control structures, utility crossings, fencing, and maintenance roads and facilities.

San Luis Division

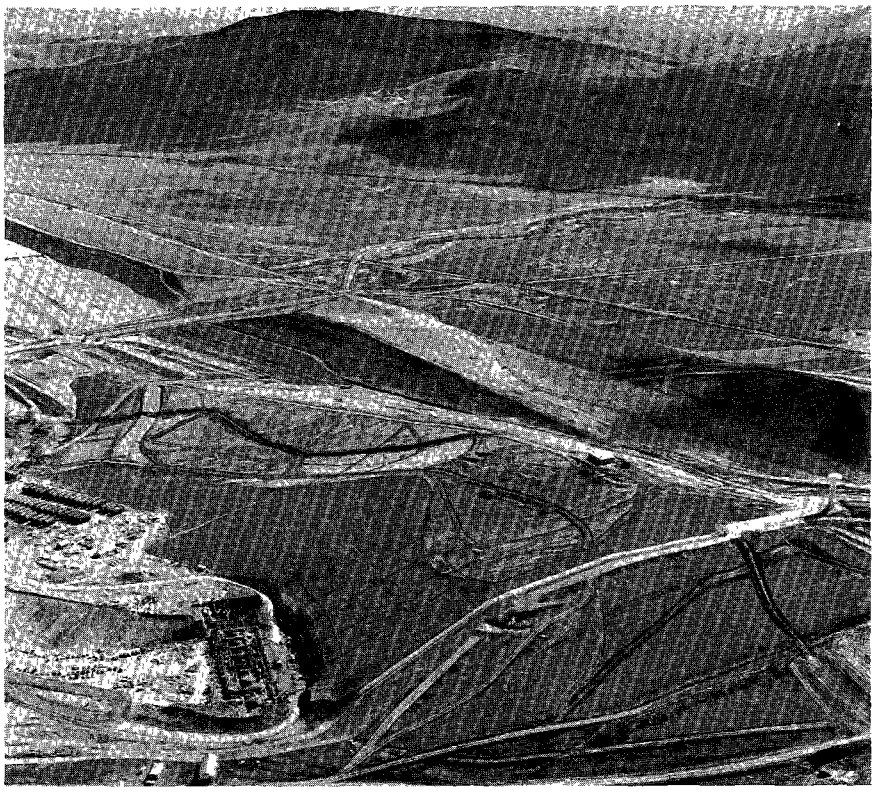
The San Luis Division contains the state-federal joint-use facilities located between San Luis Forebay and Kettleman City. Included are the San Luis Forebay Dam and Reservoir, San Luis Pumping-Generating Plant, San Luis Dam and Reservoir, Mile 18 Pumping Plant, and 103 miles of aqueduct from the forebay to Kettleman City. The joint-use facilities are being designed and constructed by the Bureau of Reclamation.

San Luis Forebay consists of a dam and reservoir under construction immediately below San Luis Dam. The reservoir, with a gross capacity of about 54,000 acre-feet at water surface elevation 225, will serve as a pumping-generating regulation

pool and as a gravity diversion pool for flows entering the San Luis Canal. Active storage in the reservoir and the first reach of the aqueduct (Reach 3 of the California Aqueduct) will be operated as a unit for pumping-generating use. The capacity of this unit will be 20,000 acre-feet between normal operating elevations of 217 and 225 feet above sea level. This regulatory storage serves Mile 18 Pumping Plant as well as the San Luis pumping-generating facilities. The dam will be an earthfill structure requiring about 3,000,000 cubic yards of material and will have a height of 70 feet and a crest length of 10,000 feet.

The substructure and eight indoor pumping units of the San Luis Pumping-Generating Plant, under construction and fabrication, respectively, will have a total pumping capability of about 11,000 cubic feet per second and will lift water from San Luis Forebay through a maximum static head of about 320 feet into San Luis Reservoir. When water stored in the reservoir is required to meet delivery demands, it will be released through the plant and will generate electric power. Under conditions of maximum head, release of the maximum discharge of 13,100 cubic feet per second will produce the nameplate generating capacity of about 424,000 kilowatts.

San Luis Dam, which is under construction, will be a 75,000,000-cubic-yard earthfill structure 320 feet high, with a crest length of about 17,000 feet. The reservoir will have a



San Luis Pumping Plant Under Construction,
Looking South-West,
April 2, 1964 (San Luis Division)

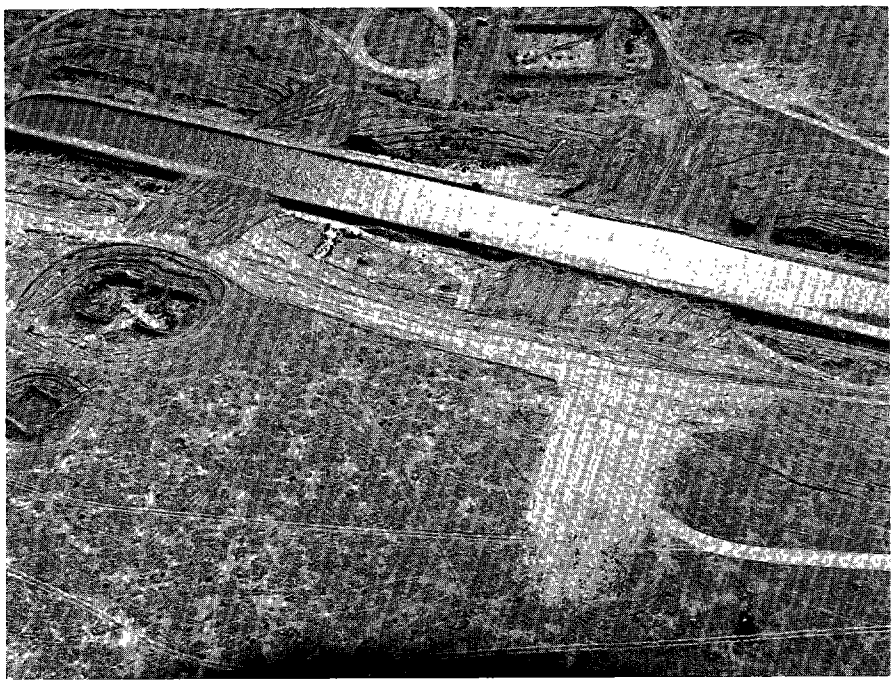
Crossing of California Aqueduct and Westside Freeway,
Looking South, April 2, 1964 (San Luis Division)

gross storage capacity of 2,100,000 acre-feet under normal operating conditions, with a corresponding maximum water surface elevation of 544 feet. The State's share of this capacity will be 1,100,000 acre-feet. At this elevation the reservoir will have a surface area of 13,300 acres and shore line length of about 41 miles. The minimum operating level will be at elevation 326 feet. The inactive storage capacity at this elevation will be about 80,000 acre-feet and the reservoir surface area will be about 4,000 acres. The reservoir is about three miles wide from the end of the canal in the North San Joaquin Division to the inlet of the San Luis Canal.

Mile 18 Pumping Plant, under construction and fabrication, will be an indoor type and will raise the water about 120 feet. Six pumping units will be installed to provide the required 13,100 cubic feet per second maximum flow.

San Luis Canal, partially under construction, will convey water from San Luis Forebay to Kettleman City, a total distance of about 103 miles. It will be a concrete-lined trapezoidal canal. The reach from San Luis Forebay to Mile 18 Pumping Plant will be about 14 miles in length and will have a capacity of 13,100 cubic feet per second. The reach from Mile 18 Pumping Plant to Kettleman City will be about 89 miles long and will have a capacity decreasing from 13,100 to 8,350 cubic feet per second, of which the State's share will decrease from 7,100 to 7,000 cubic feet per second.

Excavation For Mile 18 Pumping Plant,
April 2, 1964 (San Luis Division)



Prototype Canal Section in Subsidence Area,
November 7, 1963 (San Luis Division)

South San Joaquin Division

The South San Joaquin Division includes those facilities required for the conveyance of water from Kettleman City to the Tehachapi Pumping Plant. It will be constructed between 1964 and 1970. In addition to about 120 miles of concrete-lined canal, this reach includes Buena Vista Pumping Plant, Wheeler Ridge Pumping Plant I, and Wheeler Ridge Pumping Plant II. From Kettleman City to Buena Vista Pumping Plant there will be about 79 miles of concrete-lined canal with a capacity decreasing from about 7,344 cubic feet per second to 4,338 cubic feet per second. Bulletin No. 132-63 stated that the capacities for this division would decrease from 6,800 to 3,800 cubic feet per second. The increases from those values are due to the greater quantities of water to be transported to Southern California pursuant to the water supply contracts. This same fact causes the capacities of other reaches of the South San Joaquin Division to be increased.

The pumping lift at the Buena Vista Pumping Plant will be about 206 feet. The six pumping units will have a combined capacity of about 4,338 cubic feet per second. The canal will follow a route near the 500-foot elevation contour above sea level from Buena Vista Hills to the base of Wheeler Ridge.

Wheeler Ridge Pumping Plant I will lift the water about 233 feet. The six pump units will have a combined capacity

of about 3,722 cubic feet per second. The canal from the pumping plant will follow the 725-foot elevation contour along the base of Wheeler Ridge to a gap at the eastern end of the ridge.

The six pumping units at the Wheeler Ridge Pumping Plant II will lift water about 520 feet. The plant will have a capacity of about 3,720 cubic feet per second. The canal from the plant will follow a route near the 1,240-foot elevation contour from Wheeler Ridge to the Tehachapi Mountains east of Pastoria Creek.

Tehachapi Division

This division consists of a single reach about 10 miles long, including the Tehachapi Pumping Plant and the aqueduct crossing of the Tehachapi Mountains to the inlet of the Cottonwood Powerplant penstocks located downstream from the south portal of the Tehachapi Tunnels. It will be constructed between 1964 and 1971.

The Tehachapi Pumping Plant will be located at the north base of the Tehachapi Mountains at the mouth of Pastoria Creek. The pumps will raise the water to an elevation of 3,165 feet above sea level[2/] through one, two or three lifts.

2/ Estimates of capital and operation and maintenance costs in Chapter XI were based on a hydraulic gradient elevation of 3,173 feet at the north portal of the tunnels. This elevation represents the maximum of a range of values, based on a nominal elevation of 3,165 feet, which reflects conservative estimates of friction values for the tunnels.

For the following discussion and for cost estimates in Chapter XI, a single lift is assumed. The pumping units will have a total capacity of about 3,442 cubic feet per second. The capacity of this division has been increased from the value of 2,742 cubic feet per second given in Bulletin No. 132-63 to reflect the larger quantities of water contracted for in Southern California than previously assumed. Present designs indicate that 12 pump units will be installed. The operating head for the pumping plant will be 1,951 feet, requiring an installed capacity of 702,800 horsepower. The plant's four parallel discharge lines will be 7,600 feet in length and will each be 11 feet in diameter.

The aqueduct from the discharge lines of the Tehachapi Pumping Plant will consist of a surge chamber 70 feet in diameter, four successive concrete-lined tunnels, two single-barrel cast-in-place pipelines, one multibarrel prestressed concrete or steel pipe siphon, and an open afterbay. The tunnels are numbered 1 through 4 beginning with the northernmost. Tunnels No. 1, 2 and 3, with a total length of 16,625 feet, will have finished diameters of 20 feet and Tunnel No. 4, with a total length of about 25,100 feet, will have a finished internal diameter of 17 feet. The cast-in-place pipeline between Tunnels No. 1 and 2, with a total length of about 201 feet, will have the same diameter as the adjacent tunnels or 20 feet. The prestressed concrete or steel pipe siphon between Tunnels No. 2 and 3, with a total

length of about 2,500 feet, will be triple-barreled pipelines, each being about 14 feet in diameter. The cast-in-place pipeline between Tunnels No. 3 and 4, with a total length of about 365 feet, will have a transition from 20 feet to 17 feet in diameter. The open afterbay, with a total length of about 3,520 feet, will be a concrete-lined canal structure

Antelope Division

This division includes those portions of the aqueduct system from the Tehachapi Afterbay to the junction of the East and West Branches near Fairmont. Principal features included are Cottonwood Powerplant and about 23 miles of canal and pipeline. Construction of initial facilities will take place between 1966 and 1970.

Two pipe conduits, 4,320 feet in length and 15 feet in diameter, will be installed between the Tehachapi Afterbay and the Cottonwood Powerplant penstocks.

The Cottonwood Powerplant will have a static head of about 119 feet. When operating at the design discharge of about 3,348 cubic feet per second, the two generating units will produce 27,500 kilowatts. The penstock will consist of two pipelines, each of which will be 200 feet in length and 15 feet in diameter. The tailrace will be a concrete-lined trapezoidal canal, approximately two miles in length.

The reach from the Cottonwood Powerplant to the junction of the East and West Branches near Fairmont will

consist of about 19 miles of concrete-lined canal and 1,000 feet of pipeline. The pipeline will be a two-barrel installation, with each barrel 16.0 feet in diameter.

East Branch Division

The East Branch of the aqueduct will extend about 118 miles from the junction of the East and West Branches to Perris Reservoir in Riverside County. Principal features of the division are Cedar Springs Reservoir, Perris Reservoir, about 79 miles of canal, 33 miles of siphon, four miles of tunnel, one pumping plant, and two powerplants. It will be constructed between 1966 and 1971.

The aqueduct from the junction of the East and West Branches to the Pearblossom Pumping Plant will consist of about 40 miles of concrete-lined canal and siphons with the capacity decreasing from about 1,842 cubic feet per second at the West Branch Junction to 1,802 at the Pearblossom Pumping Plant. The increase in capacity from the value of 1,500 cubic feet per second, given in Bulletin No. 132-63, is the net effect of the following two principal changes: (1) transfer of assumed delivery of a portion of the entitlement of The Metropolitan Water District of Southern California from the East Branch to the West Branch, and (2) increase of capacity to convey through the East Branch all of the assumed increase in entitlements of Southern California contractors under the water supply contract option provisions, as described in Chapter VI.

Pearblossom Pumping Plant will have six pumping units which will lift water about 545 feet to an elevation of about 3,480 above sea level. From the pumping plant the aqueduct, with a design flow of about 1,800 cubic feet per second and consisting of 44 miles of canal and pipeline, will cross the Mojave River by siphon and will discharge into Cedar Springs Reservoir.

Cedar Springs Dam will be located on the west fork of the Mojave River at the north base of the San Bernardino Mountains. It will be an earthfill structure 280 feet high and, with a normal surface elevation of 3,445 feet, will impound about 200,000 acre-feet of water. The reservoir will have a crest length of 2,500 feet, a water surface area of 1,630 acres, and a shore line length of 22 miles. Cedar Springs Reservoir will regulate essentially uniform inflow so as to meet peaking demands of contractors and will serve for conveyance of water in lieu of about two miles of aqueduct.

The aqueduct from Cedar Springs Reservoir to the Devil Canyon power development will consist of about four miles of pressure tunnel with a capacity of about 1,631 cubic feet per second. Devil Canyon Powerplant No. 1 will be located below the South Portal of the San Bernardino Tunnel and will develop about 1,075 feet of static head. When operating at the design capacity of about 1,622 cubic feet per second, the plant will generate 121,000 kilowatts.

Devil Canyon Powerplant No. 2 will be located below Devil Canyon Powerplant No. 1 at the south base of the San Bernardino Mountains and will develop about 594 feet of static head. When operating at the design capacity of about 1,622 cubic feet per second, the plant will generate 68,000 kilowatts.

The reach from Devil Canyon Powerplant No. 2 to Mill Avenue will consist of eight miles of pipeline with a design capacity of about 998 cubic feet per second. The reach between Mill Avenue and Perris Reservoir, a distance of 19 miles, will be designed for approximately 925 cubic feet per second.

Perris Reservoir will be located southeast of Riverside in a wide valley surrounded by the Bernasconi Hills, adjacent to the Colorado River Aqueduct. An earthfill dam with a crest length of 11,450 feet and a height of 120 feet will impound about 100,000 acre-feet of water. The reservoir will have a water surface area of 2,080 acres and a shore line length of eight miles. It will perform the same functions as Cedar Springs Reservoir.

West Branch Division

This division, to be constructed between 1966 and 1971, includes those portions of the aqueduct system from the junction with the East Branch to Castaic Reservoir near Newhall. The design capacity throughout the division is about 1,500 cubic

feet per second. Principal features in the division include the West Branch Pumping Plant, 13 miles of aqueduct, Ruby Powerplant, Castaic Powerplant, and Castaic Dam and Reservoir.[3/] The Ruby and Castaic Powerplants replace three power recovery plants described in Bulletin No. 132-63. The increase in capacity from 1,200 cubic feet per second given in that bulletin results primarily from greater deliveries to The Metropolitan Water District through the West Branch than previously assumed.

The West Branch Pumping Plant will be located at the head of the West Branch Aqueduct near Fairmont. The delivery capacity of the plant will be 1,501 cubic feet per second through a static head of 249 feet. Four pump units with a total installed capacity of 50,100 horsepower will pump through two discharge lines, each 10.5 feet in diameter and about 625 feet long. A small forebay of 200-acre-foot capacity will be located on the aqueduct beyond the pump lift to balance the aqueduct flows. The aqueduct will extend from the West Branch Pumping Plant southward through Portal Ridge and down Elizabeth Lake Canyon to Castaic Reservoir, supplying water for power production at the two powerplants en route. The conveyance

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3/ In this report a West Branch alignment in Elizabeth Lake Canyon is assumed. Both that route and a Piru Creek route are still being studied to establish the final alignment. Future analyses will be based upon the route that is finally selected.

features will include four tunnels, 14 and 15 feet in diameter, with a total length of 3.4 miles, and 9.6 miles of pipeline ranging in diameter from 9.5 feet to 12.5 feet.

Ruby Powerplant will develop a static head of 1,042 feet and when operating at design capacity, will generate 104,000 kilowatts. The penstocks will be nine feet in diameter and about 5,800 feet in length.

Castaic Powerplant will develop a static head of 650 feet and will generate 67,000 kilowatts. The penstocks will be nine feet in diameter and about 3,000 feet in length.

Castaic Reservoir, located on Castaic Creek below its junction with Elizabeth Lake Canyon, will serve as the terminal reservoir for the West Branch Aqueduct. With a normal water surface elevation of 1,510 feet the reservoir will have a gross capacity of 350,000 acre-feet, a surface area of 2,600 acres, and a shore line length of 34 miles. The bases for the decision to increase the capacity from 100,000 acre-feet, as shown in Bulletin No. 132-64, are discussed in Chapter II. The dam will be of earthfill construction requiring approximately 35,000,000 cubic yards of embankment material. Its maximum height above streambed will be 325 feet, and its crest length will be 4,800 feet.

Coastal Division

This division includes those portions of the aqueduct system from the junction with the California Aqueduct near

Avenal Gap in the San Joaquin Valley to a terminal structure at the Santa Maria River near the San Luis Obispo-Santa Barbara County line. Overall length of the Coastal Division will be about 100 miles. Principal features include Avenal Pumping Plant, Pyramid Pumping Plant, Sawtooth Pumping Plant, Polonio Pumping Plant, San Luis Obispo Powerplant, about 100 miles of canal and pipeline. Construction to the intake of Pyramid Pumping Plant is scheduled to commence in 1966. Beyond that point, construction of the aqueduct will not be started until about 1975 unless parties to the Coastal Division water supply contracts agree on a change.

Avenal Pumping Plant will be located in the Avenal Gap area of Kings County and will lift water from the main aqueduct through a head of about 173 feet. Water will be conveyed from the California Aqueduct to the pumping plant through three miles of intake channel. The channel and the pumping plant will have a capacity of about 329 cubic feet per second. The reduction of capacity from 500 cubic feet per second, given in Bulletin No. 132-63, is due to smaller quantities of water being contracted for than previously assumed.

Pyramid Pumping Plant will be located in Kern County about one mile southwest of the Devil's Den Oil Field, will have a design capacity of about 115 cubic feet per second, and will lift the water through a static head of about 436 feet.

Sawtooth Pumping Plant will be located at the northern base of Sawtooth Ridge in Kern County and will lift

the water through a static head of about 331 feet. Capacity of the plant will be 115 cubic feet per second. The aqueduct from Avenal Pumping Plant to Polonio Pumping Plant will include about 25 miles of concrete-lined canal and pipeline.

Polonio (Temblor) Pumping Plant, located at the base of the Temblor Range in Kern County, will accomplish the final lift of water out of the San Joaquin Valley. The pumping plant will have a capacity of about 115 cubic feet per second and will lift water through a static head of about 810 feet.

From this plant the water will be conveyed to San Luis Obispo Powerplant which will be located about four miles southeast of the City of San Luis Obispo. When operating at the design capacity of 114 cubic feet per second, the plant's single operating unit will generate 5,400 kilowatts. The static head in this power drop will be about 694 feet.

From Polonio Pumping Plant to the Santa Maria Terminus the aqueduct will consist of about 75 miles of pipeline. The capacity en route will decrease from about 115 cubic feet per second to about 91 cubic feet per second. The aqueduct will terminate at the Santa Maria River.

San Joaquin Drainage Facilities

The San Joaquin Drainage Facilities would be a master drainage project to meet needs for drainage in the San Joaquin Valley. Of the several alternatives under consideration in the

current advance planning investigations, the facility chosen as the basis of cost estimates for this report would have capacity to meet the drainage requirements of the federal San Luis Unit of the Central Valley Project and of the remaining portion of the San Joaquin Valley.

This facility would include a canal with compacted earth lining or concrete lining where required beginning at a point about 15 miles south of Bakersfield and discharging in the Delta approximately 288 miles to the north. The capacity would increase from 30 cubic feet per second at the beginning to 230 cubic feet per second at a regulatory reservoir with an active storage capacity of 43,000 acre-feet located near Sand Ridge in Kings County, just north of the Kern County line. Capacity would increase to 380 cubic feet per second at two pumping plants located a few miles north of the reservoir. These plants would lift the drainage water about 35 feet to the crest of the Kings River alluvial fan. A 250 cubic feet per second drainage requirement in the federal San Luis service area, plus additional requirements from other service areas along the route, would increase the capacity to a maximum of 1,100 cubic feet per second at a point near Tracy about 25 miles south of the Delta. The drainage water would be discharged into the Sacramento-San Joaquin Delta in the vicinity of the Antioch Bridge. If experience should dictate, the drain will be extended to the west.

The location of the San Joaquin Drainage Facilities, basic to the cost estimates of this report, is shown on Sheets 1 through 3 of Plate 4. This location and the above discription of works are tentative, pending completion of project formulation and advance planning studies.

Upper Eel River Development

The Upper Eel River Development, authorized by Project Order No. 7 as an additional conservation facility of the State Water Project, is described in that order as summarized in Chapter II. The development would consist of two reservoirs on the Middle Fork of the Eel River and associated conveyance features to deliver the conserved water supplies to local areas and to the Sacramento River Basin by one of two routes. One alternative would be via Clear Lake and Lake Berryessa to the Sacramento River, and the other would be via Thomes or Stony Creek and the Glenn Reservoir Complex. Selection of the diversion route and determination of the specific project units will be made during an advance planning program commencing in Fiscal Year 1964-65.

As a basis for estimated project costs presented in Chapter XI, the alternative route via Glenn Reservoir has been selected. This project would make available up to 800,000 acre-feet of new annual yield to the Sacramento-San Joaquin Delta. The Upper Eel River Development so defined conforms with the "Middle Fork Eel River Facilities" described in pages 80 through 82 of Bulletin No. 132-63.

Local Projects

The Davis-Grunsky Act authorizes state financial assistance by grants, loans, or both to public agencies for local water projects. State loans are authorized to agencies for the construction of needed local projects and for the preparation of feasibility reports on such projects. State grants are authorized for construction costs allocated to the enhancement of fish and wildlife, recreation, and initial water supply and sanitary facilities. Direct state participation in local projects is also authorized under certain conditions.

Applications for loans or grants which have been approved as of April 1, 1964, total $10,345,800, including a loan of $1,260,000 to the South Sutter Water District authorized by special act of the Legislature in 1959. Approved applications, in addition to the 10 reported on pages 84 and 85 of Bulletin No. 132-63, are as follows:

1. A $537,000 recreation grant to Helix Irrigation District for its Chet Harritt Project in San Diego County.

2. A $700,000 recreation grant to Browns Valley Irrigation District for its Virginia Ranch Project in Yuba County.

Reconciliation With Bulletin No. 132-63

Set forth below is a summary and, in some cases, an elaboration of discussions presented previously in this chapter

regarding comparisons of transportation system capacities assumed in this report with those shown in Bulletin No. 132-63.

Changes of aqueduct capacities are the major alterations of the State Water Project since publication of Bulletin No. 132-63. Other than a general reduction in the scope of the North Bay Aqueduct, such changes are directly caused by the general shift of entitlements to project water toward the southern portion of the State and by a redistribution of assumed deliveries in that area. These changes are discussed in Chapter VI.

The key conveyance capacities for the aqueduct systems as reported in Bulletin No. 132-63 compared with those for this report are as follows:

Facility	Bulletin No. 132-63	Bulletin No. 132-64
	(in cubic feet per second)	
North Bay Aqueduct at Calhoun Pumping Plant	380	138
South Bay Aqueduct at South Bay Pumping Plant	300	300
California Aqueduct at:		
Delta Pumping Plant	10,300	10,300
Head of San Luis Canal	7,100	7,100
Pyramid Pumping Plant	117	115
Tehachapi Pumping Plant	2,742	3,442
Head of East Branch	1,510	1,842
West Branch Pumping Plant	1,197	1,501

Of particular significance are the capacities of the California Aqueduct. The Burns-Porter Act provides that the minimum capacity from the Delta to San Luis Reservoir will be 10,000 cubic feet per second. This capacity is still sufficient to transport the increased deliveries to service areas downstream from San Luis Reservoir.

The present design capacities of the aqueduct through the San Luis Division are set forth in the agreement signed between the State and the United States on December 30, 1961. This agreement establishes the State's rights to use of such capacity as 7,100 cubic feet per second immediately downstream from San Luis Forebay, decreasing to 7,000 cubic feet per second at Kettleman City. In Bulletin No. 132-63, the required conveyance capacities at these points were estimated to be 7,002 and 6,810 cubic feet per second, respectively. With the increased deliveries south of San Luis Reservoir and with agricultural contractors diverting from within the San Luis Division, the corresponding capacities required in this report are 7,605 and 7,345 cubic feet per second, respectively.

The apparent deficiencies of 505 and 345 cubic feet per second, in the upstream and downstream reaches of the San Luis Division represent 6.6 and 4.7 percent of the respective state capacities. Inherent design allowances may be such that the additional conveyance can be accommodated. If under actual operating conditions it develops that the aqueduct as constructed

cannot transport the additional requirement, then capacity must be provided in a future facility. This could be accomplished in the next transportation project needed to satisfy increases in water demands continuing after 1990.

The general increases in estimated capacities in reaches downstream from Kettleman City to the bifurcation of the East and West Branch Divisions are caused by the increase in deliveries to Southern California. These increases more than offset the reduction in required capacity due to lesser deliveries to the San Joaquin Valley at an agricultural peaking rate.

As stated above, the changes in estimated capacities of the East and West Branch Divisions of the California Aqueduct reflect two major considerations: (1) a shift in distribution of entitlements of The Metropolitan Water District of Southern California from the East to the West Branch, and (2) the capacity for distributing additional water to be provided under Article 8 of the water supply contracts within the Southern California area.

During the compilation of Bulletin No. 132-63, it was assumed that The Metropolitan Water District would request approximately one-half of its entitlement from each branch. Since that time, and in accordance with Article 10(b) of the contract, the district has requested conveyance capacities sufficient to have its entire maximum annual entitlement delivered

from the West Branch and the minimum capacity in the East Branch allowed under the contract. The latter would permit delivery of 545,000 acre-feet annually. These requests are contained in the District's Resolution No. 6338.

This report is based on the maximum annual delivery of 1,500,000 acre-feet to Metropolitan. Capacities were assumed to deliver the minimum of 545,000 acre-feet from the East Branch and the remainder of 955,000 acre-feet from the West Branch. This shifted annual delivery capability of about 175,000 acre-feet from the East Branch to the West Branch as compared to Bulletin No. 132-63 assumptions.

Attendant with the increased deliveries projected from the West Branch, the design capacity of Castaic Reservoir has been increased from 100,000 acre-feet to 350,000 acre-feet.

With regard to changes in the capacity of the East Branch as presented in Bulletin No. 132-63, the above-described shift in entitlements of The Metropolitan Water District from the East to the West Branches has been more than offset by the assumed distribution of additional water provided under Article 8. In this report, capacity has been provided in the East Branch to convey to Perris Reservoir the entire quantity of additional water assumed available to Southern California. By letter dated February 14, 1964, The Metropolitan Water District notified the department that additional water available

to the district should be delivered by way of the West Branch. Further, under latest indications from East Branch water supply contractors, most of the additional water for them will be delivered upstream from Cedar Springs Reservoir.

CHAPTER IV. CONSTRUCTION OF THE STATE WATER PROJECT

Construction of the State Water Project is on schedule. Floods in the Feather River held up work on Diversion Tunnel No. 1 and on the Fish Barrier Dam of the Oroville Division. The tunnel was completed in time, however, to convey winter flows around the site of Oroville Dam, thus permitting work to proceed on the embankment as planned. The Fish Barrier Dam was not completed on schedule, but alternative arrangements were made with the Department of Fish and Game for fish handling, and the delay will not affect any other construction contract.

The design, right-of-way acquisition, and construction programs of the department felt the full impact in 1963 of the heavy workload required to keep construction of the project on schedule.

Design

Plans and specifications for 24 major construction contracts for the State Water Project were completed during 1963. At the end of that year design work was well advanced on 23 additional contracts scheduled for award in 1964.

Right-of-Way Acquisition

Right-of-way expenditures for the State Water Project in 1963 were $5,100,000, or about seven percent of the estimated total cost of rights-of-way for the entire project. These total costs will amount to about $70,000,000 exclusive of those in connection with the San Joaquin Drainage Facilities, the Delta Facilities and the Upper Eel River Development, the formulation of which is not completed. Total expenditures through 1963 were about $16,900,000 or about 24 percent of the estimated total. As of the end of 1963, 824 parcels had been acquired constituting about 22 percent of the 3,754 parcels estimated to be required.

During 1963, 26 condemnation actions were approved by the California Water Commission and filed in appropriate Superior Courts. As a result of these actions, 122 parcels were acquired or possession obtained during the year. During 1963, 29 relocation agreements were executed. These provided for the relocation of state highways, county roads, irrigation canals, power transmission lines, communication facilities, and petroleum and natural gas pipelines. Two hundred and seventy-six private property entry agreements were negotiated, 40 mining claims were appraised, and 250 graves were identified preparatory to removal from the Oroville Reservoir area.

Construction

Almost $69,000,000 for construction of the State Water Project was expended by the State in 1963, as compared with $15,500,000 in 1962. This increase reflects progress payments to contractors under the large contracts awarded in both years. Awarded during 1963 were new contracts totaling almost $194,000,000, relating to the Upper Feather and Oroville Divisions, the South Bay Aqueduct, and the California Aqueduct. This includes awards of major contracts by the Bureau of Reclamation for the San Luis Division. The comparable value for 1962 was $132,000,000. The above values are in terms of contract amounts and payments to contractors only as contrasted with capital costs described in Chapter XI and summarized in Table 29. The latter include costs of surveys and engineering studies, design, right-of-way acquisition and other activities.

As of the end of 1963, $382,270,771 in state and major federal construction contracts had been completed or awarded. Table 1 presents a summary description of all such contracts awarded to the end of 1963, together with the final cost or bid amount, the date started and the date completed or the approximate percentage of the work completed as of about February 1, 1964.

During 1963, the department awarded 16 major contracts for construction of the State Water Project. The

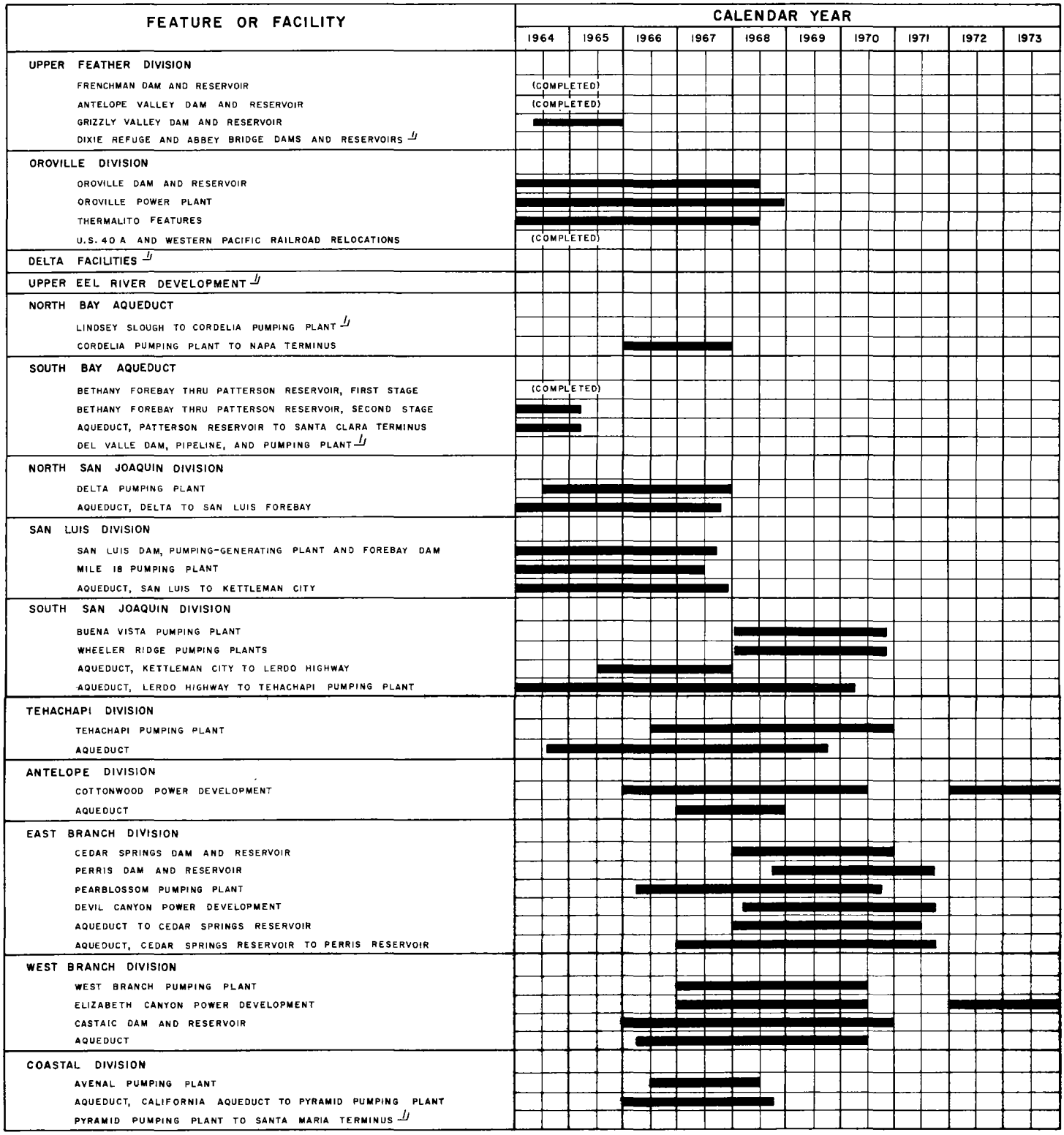
aggregate of all the bids accepted on these contracts was approximately 15 percent less than the engineers' estimates. During the same year, the Bureau of Reclamation awarded nine contracts for the construction of joint-use facilities in the San Luis Division. The total of the successful bids on these contracts was about one and one-half percent more than the engineers' estimates. The Division of Right-of-Way Acquisition awarded one contract for relocation of Highway 152 around San Luis Reservoir, the bid for which was about 17 percent less than the estimate. The total of successful bids on all of the foregoing contracts was about four and one-half percent less than the engineers' estimates. The total of all bids upon which contracts have been awarded since the beginning of project construction is eight percent less than the sum of the engineers' estimates.

Appendix B entitled, "Advance Notice on Bids for Construction and Equipment," presents a summary of the calls for bids expected to be issued during 1964 and the first half of 1965. By the end of June 1965, portions of the final conduit sections of the California Aqueduct will be under contract. These will include substantially all of the North San Joaquin Division, a 30-mile reach of the South San Joaquin Division, and Tunnels No. 3 and 4 of the Tehachapi Division.

A generalized construction schedule for the State Water Project is shown graphically on Figure 1. The timing of work shown thereon is primarily geared to meet the water

FIGURE I

STATE WATER PROJECT
GENERALIZED CONSTRUCTION SCHEDULE



1/ CONSTRUCTION SCHEDULE NOT YET ESTABLISHED.

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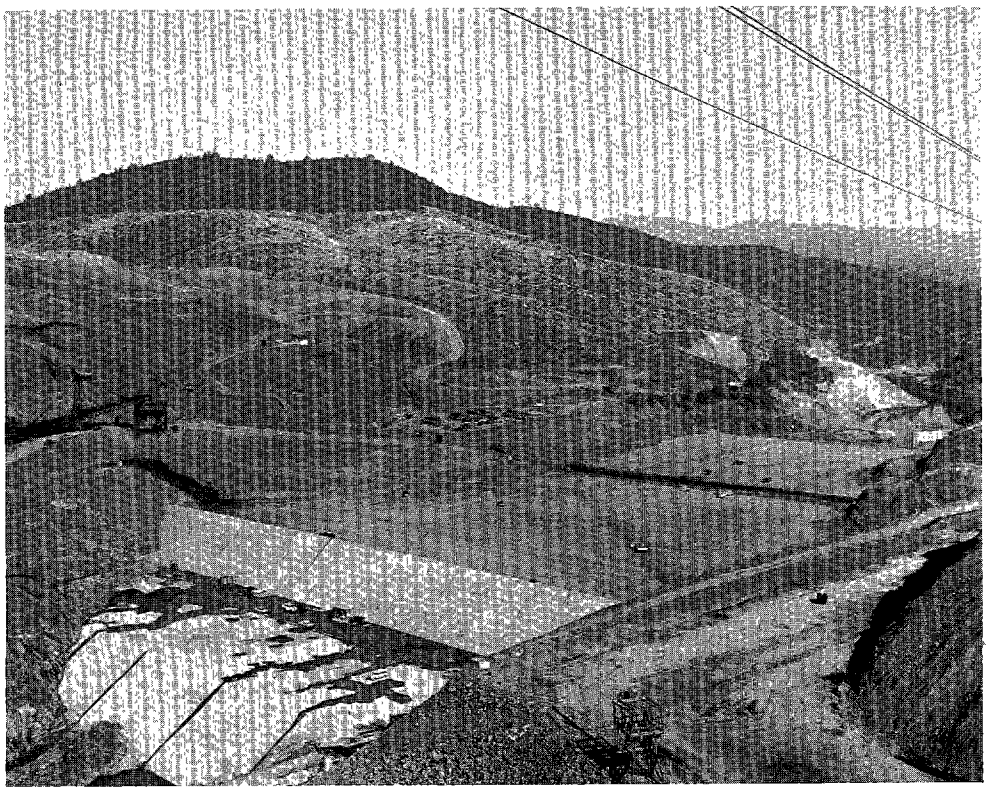
deliveries specified in executed water supply contracts. The Oroville Division of the Feather River Facilities is scheduled primarily for flood control and power generation. For features such as the Delta Facilities, the San Joaquin Drainage Facilities and the Upper Eel River Development, project formulation has not been completed and construction schedules have not been set. The construction status of each facility listed in Figure 1, for which a construction schedule has been established, is discussed in the following sections.

Feather River Facilities

In the Upper Feather Division, construction of Frenchman Dam and Reservoir is complete and storage of water began in the fall of 1961. Construction of Antelope Dam and Reservoir is essentially complete, and water is expected to be stored during the spring of 1964. Grizzly Valley Dam and Reservoir is scheduled for completion by the end of 1965.

In the Oroville Division, relocation of U. S. Highway 40A and the Western Pacific Railroad around the reservoir site are now complete. The relocation of county roads and utilities from the reservoir area still remains to be accomplished. Portions of the Oroville to Quincy County Road relocation are now under construction. The 3.8 mile section from Forbestown Road to Middle Fork Feather River Bridge is planned for completion in the spring of 1965. Construction of the Middle Fork Feather River Bridge began in February 1963 and is also scheduled to be completed in the spring of 1965.

Oroville Dam Core Block, Looking Downstream,
August 29, 1963 (Oroville Division)



Embankment Being Placed Above Completed Core Block,
February 10, 1964 (Oroville Division)

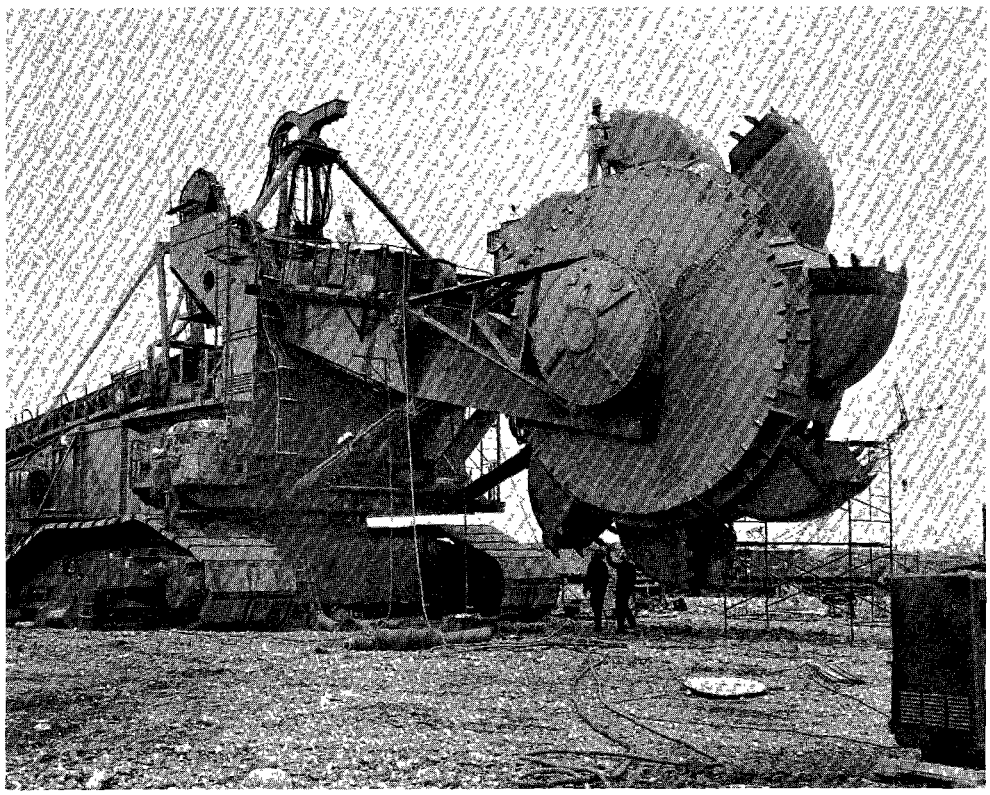
Construction of Oroville Dam is well under way. Diversion Tunnel No. 1 was completed in December 1963, and is now routing the Feather River around the dam. Diversion Tunnel No. 2 is under construction and completion is scheduled for the fall of 1964. The concrete core block portion of the dam was completed in December 1963, and embankment material is now being placed.

Excavation of the underground powerplant machine hall and appurtenances commenced in the summer of 1963. Construction contracts for the spillway and reservoir site clearing are planned to be initiated during 1965. All of the Thermalito features will be under construction by 1966.

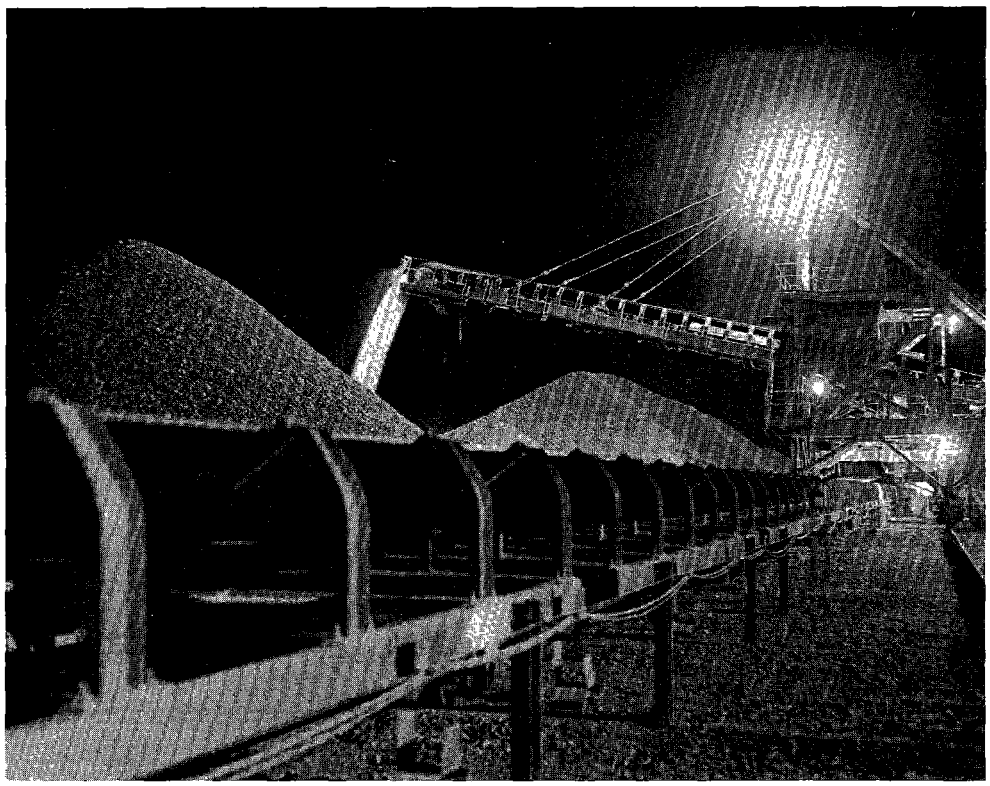
As stated above the Fish Barrier Dam was under construction during 1963. Subsequently this facility and the Fish Ladder were completed and placed in operation on an interim basis.

North Bay Aqueduct

Actual construction of the reach of the North Bay Aqueduct, from Cordelia Pumping Plant to Napa Terminus, is scheduled to be commenced in 1966 and completed in 1967. This will permit interim delivery to Napa County, beginning in 1968, of project water transported to Cordelia through the Cache Slough Pipeline of the City of Vallejo or of water that may be purchased at Cordelia from the Putah-South Canal of the federal Solano Project. The special provisions of executed water supply



Bucket Wheel Excavator Used to Dig the Material
For the Pervious Part of the Oroville Dam Embankment
(Oroville Division)



Stacker, Conveyor Belt and Stockpile At
Oroville Dam (Oroville Division)

contracts provide that construction of the remainder of the aqueduct, from the Delta to Cordelia Pumping Plant will not be commenced until 1975, or at an earlier date if mutually agreed upon by the contracting parties. It is herein assumed that construction will commence so as to permit the delivery of project water beginning in 1980 in accordance with the schedules of annual entitlements shown in the water supply contracts with Napa and Solano Counties.

South Bay Aqueduct

The first stage of construction of the South Bay Aqueduct from the Interim Intake Canal to Patterson Reservoir was completed in 1962. Construction of the second stage is now under way. The last reach of conduit leading to Santa Clara Terminus will be under contract early in 1964, with completion scheduled for early 1965. The construction of Del Valle Dam, Pipeline, and Pumping Plant, assumed in this report to be completed in 1967, is a tentative schedule pending further exploration of the foundation for the dam and re-evaluation of the design of that structure, as described in Chapter II.

California Aqueduct

Construction of the California Aqueduct commenced in 1959. This work was on the initial stage of Bethany Reservoir of the North San Joaquin Division, which was completed in 1961.

Large scale construction of the California Aqueduct began in 1963. Contracts in progress include the Delta Pumping Plant Intake Channel; the San Luis Dam, Pumping-Generating Plant and Forebay Dam; Reaches 1 and 2 of the San Luis Canal (Reaches 3 and 4 of the California Aqueduct shown on Plate 4); and the Mile 18 Pumping Plant. In 1966 all major construction contracts in the North San Joaquin and San Luis Divisions will be under way, with construction scheduled to be completed by 1968. Canal construction in the South San Joaquin Division and tunnel construction through the Tehachapi Mountains will start in 1965. Construction is scheduled so that deliveries to water supply contractors can commence in 1968 for those in the

Excavation For Delta Pumping Plant and Intake Canal, November 7, 1963 (North San Joaquin Division)

San Joaquin Valley, 1971 for those in Southern California to take delivery from the West Branch, and 1972 for those in Southern California to receive water from the East Branch.

The construction of the Coastal Division will be accomplished in two stages. The initial reach to the Pyramid Pumping Plant will be completed to deliver water to water supply contractors in the San Joaquin Valley in 1968. In the water supply contracts with the two Central Coastal Area agencies, construction of the Coastal Division downstream from the intake of Pyramid Pumping Plant is scheduled to commence in 1975, permitting water deliveries in 1980. However, these dates may be advanced or delayed upon mutual agreement by the concerned parties.

CHAPTER V. WATER SUPPLY

The water supply available to the State Water Project originates chiefly in the mountains enclosing the Sacramento Valley, with lesser amounts coming from the mountains east of the San Joaquin Valley and from the floors of the valleys themselves. Much of the runoff from these sources is already diverted directly or stored for beneficial use under water rights that date in some cases back to the early mining days more than a century ago. Other portions will be needed for growth of the economies of the areas in which the water originates and of the valleys below. The State Water Project will share with the federal Central Valley Project water supplies not required for those purposes.

This chapter first briefly discusses the recent developments regarding the department's water rights applications. It concludes with a discussion of hydrologic studies recently completed, which indicate the department's best present estimates of water supplies that will be available in the future for diversion and storage by project conservation facilities.

Water Rights

There are two main areas of activity that pertain to water rights for the State Water Project. The first concerns the obtaining of permits under applications before

the State Water Rights Board. The second is related to the first and involves negotiation of agreements with owners of existing water rights to define the manner in which the project will be operated so as not to interfere with such rights or to compensate for any interference that may occur.

Applications for Project Water Rights

Water rights applications for the State Water Project were filed by the Department of Water Resources and its predecessors in furtherance of a general or coordinated plan pursuant to Water Code Section 10500 and held in trust by the California Water Commission or its forerunners. These are commonly known as "state applications." The Commission has assigned all or parts of 14 of these to the department for purposes of the project. They cover storage of water at Frenchman, Antelope Valley, and Grizzly Valley Reservoirs in the Upper Feather River area; storage and power generation at Oroville Dam and Reservoir; diversion from the Feather River below Oroville Dam, and diversion from the Sacramento-San Joaquin Delta through the North Bay, South Bay and California Aqueducts for direct use or offstream storage. Descriptions of these applications with the exception of Application No. 21443 may be found in Bulletin No. 132-63. That application is briefly described subsequently in this section.

Several events have occurred since publication of Bulletin No. 132-63 with respect to the water rights applications for the project.

Upon the request of the department, and to further the completion of the water supply contracting program, the California Water Commission approved several changes in allocations of water among service areas of the State as specified in the water rights applications pertaining to the main storage and diversion facilities at and below Oroville Dam. The commission made certain of these changes on June 7 and November 22, 1963. These were changes in addition to those made by the commission on March 1, 1963, which were described in Bulletin No. 132-63.

With the completion of the first phase of the water supply contracting program, described in Chapter II, there remained on December 31, 1963, 532,000 acre-feet of the minimum project yield uncontracted and subject to pre-emption by the contractors under the option clause of the contracts. On February 7, 1964, the commission placed the sum of the uncontracted amount in a pool from which withdrawals may be made in accordance with the option provision until the end of the option period on September 30, 1964. Water under contract as of December 31, 1963, was affirmed as allocated to the areas of use specified by the contracts. The commission also agreed that after September 30, 1964, no restriction whatsoever would be placed on the place of use of any water for which no option had been exercised.

The following table indicates the original allocations of water among the six service areas of the State and the manner in which the February 7 action of the commission revised that allocation.

Service area	Original allocations in acre-feet	Allocations as amended by California Water Commission in acre-feet[1]
Feather River	275,000	38,500
North Bay	225,000	67,000
South Bay	225,000	188,000
San Joaquin Valley	1,475,000	1,182,500
Central Coastal	150,000	75,000
Southern California	1,800,000	1,917,000
Unallocated pool	0	532,000
Reserve for losses[2]	-	150,000
TOTALS	4,150,000	4,150,000

The department is now proceeding to complete the principal applications referred to above. Maps are being prepared to describe the service areas so as to include the territories of agencies with which the department has water

1/ Actions on March 1, June 7, and November 22, 1963 and February 7, 1964.

2/ Not specified by commission on February 7, 1964.

supply contracts. The latest descriptions of physical works to be constructed will be included. It is now planned to complete this process by the fall of 1964. Following this, if the State Water Rights Board concurs in the completeness of the applications, it will be able to advertise them and schedule hearings. Assuming that the Board proceeds in this manner, hearings should commence in 1965.

A hearing was held by the State Water Rights Board on January 7, 1964 regarding Application Nos. 16951 and 20117 pertaining to storage in Antelope Valley Reservoir. It adopted an order on March 18, 1964 approving the applications and directing the issuance of permits.

On April 3, 1964, the California Water Commission assigned to the department State Application Nos. 16950 and 21443 for Grizzly Valley Reservoir on Big Grizzly Creek, a tributary of the Middle Fork Feather River. The latter was a supplementary application for storage of 34,000 acre-feet, which when added to the original 49,000 acre-feet under Application No. 16950, brought the total to the planned reservoir capacity of 83,000 acre-feet. The department is presently completing these applications.

Negotiation of Water Rights Agreements

In connection with the hearing by the State Water Rights Board on the department's applications for storage at Antelope Reservoir, described above, the department conducted

negotiations to settle protests against those applications. Agreement was reached with a number of water users in the Indian and Genesee Valleys, with the Joint Water Districts Board (Richvale Irrigation District, Sutter Extension Water District, Biggs-West Gridley Water District and Butte Water District) and with Pacific Gas and Electric Company.

The department is continuing discussions with existing users of water along the Feather River to seek agreements in determination of their water rights. Most conferences have been with officials of the Joint Water Districts Board, representing the districts which collectively use more than half of the water presently diverted from the river.

Discussions with organizations in the Sacramento-San Joaquin Delta on subjects that include water rights agreements were commenced on May 24, 1963. Officials of the Bureau of Reclamation have participated. Meetings have been held with members of the San Joaquin County Delta Water Users Committee and with representatives of the Contra Costa County Water District. Representatives of the Contra Costa County Water Agency have participated as observers in several of the conferences. These discussions are continuing.

The negotiations have not yet progressed to the stage where it has been possible to define the forms of agreement. However, it appears that agreements resulting from the

discussions described above may be tripartite documents among the department, the Bureau of Reclamation and the individual water right owners.

Estimates of Future Water Supplies

The inflow to the Sacramento-San Joaquin Delta reflects the cumulative effects of all hydrologic phenomena and economic developments occurring within the tributary basin. Changes in conditions, such as increasing water use for urban or agricultural purposes, necessarily will be reflected in the pattern, quantity, and quality of the inflow to the Delta. These in turn will partially determine the characteristics of the supply that can be regulated by conservation facilities of the State Water Project or exported directly from the Delta by transportation facilities of that project.

The remainder of this chapter briefly describes the methods and assumptions utilized to estimate the quantities of water that will be required to sustain economic growth of the basin tributary to the Delta. These quantities will cause a gradual diminution or depletion of waters available to the State Water Project. The estimated remaining water supplies and the estimates of entitlements to project water, developed in Chapter VI, are used as input to the operation studies, described in Chapter VII, by which the water yield of the project is estimated.

Basic Methods

The basic steps followed in estimating future depletions of the water supplies available at the Delta involved the following:

1. A determination of the present land and water use in the areas tributary to the Delta.

2. A classification of the lands as to their suitability for future development or use.

3. An estimate of future population growth.

4. An estimate of the future rate of irrigation development in the area.

5. Unit water use estimates of urban populations and agricultural areas.

6. Estimates of total water use and their logical sources of supply. It was assumed that sufficient quantities of good quality ground water will be available within the Sacramento River Basin so that no additional imports beyond those presently contemplated by the Bureau of Reclamation will be necessary.

7. Analysis of the effect upon streamflow of the above water uses, considering consumptive use, return flows, and ground water operations.

In determining the present and future water requirements and their effects upon streamflow, the area tributary to the Delta was divided into 18 subareas, based largely upon boundaries of major drainage areas and points of significant change in the characters of major streams. Estimates were made of population, urban acreage, irrigable acreage, irrigated acreage, consumptive use of applied water, and applied water for each of these subareas.

The population estimates for the areas tributary to the Delta were based upon previous demographic studies by the department for major regions and counties of the State to the year 2020. The estimates of population within each of the subareas were derived by proration of the data from the earlier studies. From the population estimates, future urban areas were derived by means of population densities per acre.

In order to estimate the agricultural water demands in areas tributary to the Delta, the long-term 1960-2020 market prospects for the major irrigated crops in California were first projected. Estimates of the future yields per acre of these crops and over the same time period were next developed. The application of future yields to the California market demand resulted in the derivation of a total acreage requirement for the State for the various crops. In turn, estimates of the future irrigated crop patterns for each of the 18 subareas were made. To assist in these projections for each

area, data on available irrigable land, historical land use trends, and the percentage each area had contributed in the past to statewide crop acreages were studied. Additional elements were the comparative economic advantages of particular areas in growing and marketing certain crops.

Estimates of future water requirements for urban and agricultural purposes were made by multiplying the population projections by per capita water use values and the future acreages of various crops by respective unit consumptive use of applied water values.

To these estimates were added quantities of water for miscellaneous developments such as isolated industrial plants, public institutions, airports, parks, scattered small residential areas, and others. It is anticipated that there will be in addition to normal agricultural consumptive use, a water requirement for maintenance of salt balance in certain agricultural areas in the San Joaquin Valley. Reservoir evaporation will also have to be supplied from surface runoff.

Table 2 presents a summary of the estimated present and future annual water requirements for all of the foregoing uses in the Delta and tributary areas at the midpoint of each decade until 2015. The last line indicates the estimated increases in water requirements decade by decade as compared to 1960 requirements. For purposes of the operation studies described in Chapter VII, the increasing requirements were projected by approximate methods from 2015 to 2035.

Estimated Future Delta Water Supplies

The estimates of future water requirements described above were next subjected to hydrologic analysis to approximate the manner in which they might be met from existing or projected surface water supply projects and ground water. The future surface water supply systems under construction or proposed, which were assumed to be available in whole or part for local use in the Delta watershed or for export therefrom, were the Sacramento Valley Canals, Marysville Reservoir, Oroville Reservoir, Auburn Reservoir, Folsom South Canal, East Side Project (initial phase), Delta Facilities, North Bay Aqueduct, South Bay Aqueduct, California Aqueduct, and federal San Luis Unit. These facilities were assumed to be operated in a normal fashion to meet the local and export demands, with Delta inflows being depleted by reservoir operation and with surface streamflow below irrigated areas augmented at times by return flows.

Within each of the 18 subareas those new water requirements in addition to the present water uses, which could not be supplied from the foregoing surface water facilities, were assumed to be met from ground water, particularly within the Sacramento Valley. Since data pertaining to ground water and its use within that valley are limited, a major assumption had to be made as to what effect future ground water development would have on Delta inflows. It was

assumed that upstream winter flows would be depleted by the amount of increase in water requirements assumed to be met from ground water pumping plus the surface drainage from ground water assumed to augment flows during the irrigation season. Thus, Delta inflows were reduced by the increase in water requirements and surface drainage during the nonirrigation season and increased by surface drainage due to ground water pumping during the irrigation season.

The monthly inflows to the Delta resulting from the depletions estimated as described above for 2035 conditions, are shown in Table 3. These and similar data for key locations upstream from the Delta were used in the project operation studies described in Chapter VII.

CHAPTER VI. ENTITLEMENTS TO PROJECT WATER

Long-term water supply contracts with thirty agencies had been executed by December 31, 1963. These committed 3,468,000 acre-feet of the estimated minimum project yield of 4,000,000 acre-feet per year. This chapter presents a summary of these contracts and describes the present status of proposed amendments to increase the various maximum annual entitlements under the option provisions. It also describes the distribution of the minimum project yield that was assumed for analyses in this report.

The water supply contracts as executed followed the Contracting Principles adopted and announced by Governor Edmund G. Brown on January 20, 1960. These constituted the basis for the prototype contract with The Metropolitan Water District of Southern California executed on November 4, 1960. The last 25 contracts signed incorporated the "Standard Provisions for Water Supply Contract" which were based on the prototype contract and approved on August 3, 1962. These important documents are described in Chapter X of Bulletin No. 132-63.

The contractors for a water supply from the State Water Project are located throughout much of the State in all of the originally contemplated service areas of the project.

Within the boundaries of these agencies are contained approximately 23 percent of the gross area of the State, 63 percent of the total assessed valuation (1960), and 62 percent of the total population of the State (1960). Descriptive data relating to these agencies and their contracts are summarized in Table 4. The general location of each entity is shown on Plate 5.

Options to Increase Maximum Annual Entitlements

Article 8 of the water supply contracts, provides a procedure to be followed if all of the 4,000,000-acre-foot minimum project yield was not committed under contracts by December 31, 1963. There is first an "option provision" the pertinent language of which is as follows:

> ".....the Agency may elect to become entitled to the uncontracted for portion of the minimum project yield in or up to an amount which bears the same ratio to such uncontracted for portion as the Agency's maximum annual entitlement bears to the total of the maximum annual entitlements of all contractors as of that date: Provided, That such option may be exercised only to the extent that the water involved can be put to beneficial use within a reasonable period of time....."

The other part of the procedure is contained in the "request provision" which is set forth as follows:

> ".....If the full amount of such uncontracted for portion of the minimum project yield is not preempted by the Agency under this option and by other contractors through the exercise of similar options on or before September 30, 1964, the Agency may request that it become entitled to any amount of such water not so preempted ..... The State shall approve such request only to the extent that the water involved can be put to beneficial use within a reasonable period of time....."

As indicated in Chapter II, by April 1, 1964, 20 of the 30 long-term contractors had indicated their desires under the foregoing provisions of the contract. Fifteen had elected to have their maximum annual entitlements increased for a total of 456,200 acre-feet. Five other contractors, with proportionate shares totalling 46,700 acre-feet, had elected to receive no option water. The remaining ten contractors had either stated that they had not yet reached a decision or had not replied to the department's January 3, 1964 letter, mentioned in Chapter II. These agencies together had shares totalling only 29,100 acre-feet or seven-tenths of one percent of the minimum project yield.

By April 1, 1964, nine contractors had also indicated a desire to contract for additional water under the request provision in the event it is still available on September 30, 1964. These requests total 438,450 acre-feet.

Table 5 summarizes for each service area of the project the existing maximum annual entitlements of contractors, the shares of the minimum project yield remaining uncommitted as of December 31, 1963, to which the contractors are entitled under the option provision, and the expressions received up to April 1, 1964, under both the option and request provisions.

Estimated Distribution of Minimum Project Yield

The initiation of cost estimates for the analyses summarized in this report had to be commenced on about January 1, 1964. At that time, the eventual disposition of the 532,000 acre-feet of uncommitted project yield was estimated by project service area as shown in the second column of Table 6. These cost estimates were based on the assumptions that aqueduct capacity to convey those additional quantities of water would be provided from the Delta to the following strategic points:

Service area	Points on aqueducts to which additional capacity was provided
North Bay	Napa Terminus of the North Bay Aqueduct
South Bay	Alameda-Bayside Turnout of the South Bay Aqueduct
San Joaquin Valley	Two-thirds at intake to Buena Vista Pumping Plant of the California Aqueduct One-third at intake to Wheeler Ridge Pumping Plant No. 1 of the California Aqueduct
Southern California	Perris Reservoir of the California Aqueduct

Annual Entitlements to Project Water

Each contractor's annual entitlements to project water, are specified in "Table A" of its contract. In most cases, these build up to the maximum annual entitlement by approximately 1990. Exceptions are Plumas County Flood Control and Water Conservation District, which reaches its maximum annual entitlement in 2015; the three agencies in the South Bay Area, which reach their maxima in 1994; and San Bernardino Valley Municipal Water District which reaches its maximum in 1991. Table 7 presents a summary of the annual values contained in each contract, together with an estimated growth of demands for additional water to be provided pursuant to Article 8. One of the criteria which the department will utilize in evaluating elections and requests for additional water is that it must be put to beneficial use by 1990. Therefore, it has been assumed for Table 7 that demands for additional water will increase at a linear rate to full utilization in the year 1990 for each project service area.

CHAPTER VII. PROJECT WATER YIELD

Yield of the State Water Project is determined by the relationships among water demands, available water supplies, and operational capability of the project facilities. Project yields for certain future conditions of development were estimated by comprehensive operation studies, utilizing the available water supplies discussed in Chapter V and monthly water demands developed from annual entitlements of contractors and assumed distribution of uncontracted supplies set forth in Chapter VI. These estimates represent the quantities of water that can be made available on a firm annual basis to municipal and industrial users, and on a full irrigation supply basis during an equivalent of six years of the seven-year critical drought period for agricultural users.

The following discussion covers the assumptions and criteria for the operation of the major project conservation facilities and a summary of the estimates of project yield.

Assumptions and Criteria for Operation Studies

Operation studies of the initial project conservation facilities to develop the project yield were based on assumptions and estimates concerning the amounts, times and patterns of flow in the basin tributary to the Delta. Certain physical criteria dictate the methods of operation of the various reservoirs and power and pumping plants. The major assumptions and criteria used in the project operation studies are discussed in the following sections.

Delta Pooling Program

Much of the water to meet State Water Project demands will be obtained from surplus waters in the Delta through the use of Oroville and San Luis Reservoirs. As indicated in Chapter V, it is anticipated that quantities of surplus water will gradually diminish as local upstream developments reduce inflows to the Delta. This would cause the yield of the project also to decrease except for additional project conservation facilities.

The Delta Pooling Program has been included in the water supply contracts to cope with reduction of Delta inflows. As depletions of inflow occur, the department will provide additional project conservation facilities to sustain the project diversions. These may be either in the Sacramento River Basin or in the North Coastal area. The costs of these facilities together with costs of the initial conservation works will be repaid by water supply contractors under the Delta Water Charge. Similarly the costs of supplemental conservation facilities required to meet future water demands in excess of 4,000,000 acre-feet will be repaid by all customers of the state project.

From the standpoint of operational assumptions the Delta Pooling Program requires that the yield of State Water Project from waters of the Central Valley always be taken after local upstream requirements have been satisfied. Additional

conservation facilities must be available for use when it is forecasted that the total project demand will exceed the project yield.

May 16, 1960 Agreement

In determining the yield of the State Water Project from waters tributary to the Delta and the timing of additional project conservation features needed to maintain the project water supply of 4,000,000 acre-feet, the "May 16, 1960 Agreement"[1/] must be considered. This provides, in part, that if future depletions of inflow to the Delta are such that the sum of the yields of the federal Central Valley Project and the State Water Project are less than 13,560,000 acre-feet,[2/] the shortage will be shared in proportions of 9.55 for the Federal Government and 4.01 for the State. This ratio was assumed when operation studies indicated that such shortages could be anticipated.

In addition, the agreement indicates the need to develop mutually acceptable operational criteria and plans that will produce the maximum accomplishment of the federal Central

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1/ "Agreement Between the United States of America and the Department of Water Resources of the State of California for the Coordinated Operation of the Federal Central Valley Project and the State Feather River and Delta Diversion Projects," dated May 16, 1960.

2/ Runoff from the Sacramento and San Joaquin River Basins are estimated to average about 34,000,000 acre-feet per year and from other areas directly tributary to the Delta, if there were no diversions and storage upstream, ("Bulletin No. 1, Water Resources of California," State Water Resources Board, 1951).

Valley Project and of the State Water Project. Negotiations toward this end are in progress.

Operation Studies

The dependable yield of the State Water Project was evaluated by operation studies using streamflow records covering the 30 years from 1922 through 1951. This period included the most severe drought of record, from 1928 through 1934. There were a sufficient number of wet years preceding and following the drought years to insure that the storage reservoirs would be full both at the beginning and at the end of the operational period. The period also included the two driest years of record, 1924 and 1931.

Pursuant to Article 18(a) of the water supply contracts, the yield studies were based on reductions of agricultural water deliveries during the critical years. It was assumed that deliveries of annual entitlements would be reduced by 50 percent in any one dry year or by a total of 100 percent in any series of seven consecutive dry years.

Estimated Operational Losses

Annual losses in the project transportation and conservation facilities will average about 282,000 acre-feet by 1980. Losses in the transportation facilities consist of canal seepage and evaporation from water surfaces, while losses in conservation facilities will consist entirely of evaporation.

Evaporation losses were estimated largely from evaporation records and seepage losses were evaluated from operational experience of the Bureau of Reclamation and others.

The tabulation below summarizes the average annual losses used in the development of the project yield.

Facility	Estimated annual operational losses in acre-feet		
	Evaporation	Seepage	Totals
Oroville Reservoir	40,300		40,300
Del Valle Reservoir	3,500		3,500
San Luis Reservoir	35,000 3/		35,000 3/
Castaic Reservoir	13,100		13,100
Cedar Springs Reservoir	8,200		8,200
Perris Reservoir	10,500		10,500
Canals			
North Bay Aqueduct	400	2,400	2,800
South Bay Aqueduct	200	1,000	1,200
California Aqueduct	25,100	142,400	167,500
TOTALS	136,300	145,800	282,100

Estimates of the total annual quantities of water to be conveyed through each pumping plant, including both the annual entitlements shown in Table 6 and losses, are given in Appendix C. Table 8 summarizes total annual entitlements for each aqueduct and adds annual operational losses in the transportation facilities to obtain total annual diversions to be made from the Delta. Transportation system losses are taken from the above table for each facility when its operation is scheduled to commence, with 15,000 acre-feet of California Aqueduct losses being assigned to conservation leaving a net of 152,500 acre-feet for transportation. These estimated

3/ Assumed state share.

losses are greater than the value of 150,000 acre-feet per year given in the department's water rights applications and described in Chapter V, because more water will be conveyed through the transportation facilities than would be indicated by the distribution of water among service areas in those applications.

Operational Criteria

Operational criteria were chosen for facilities of the Oroville Division so as to produce a dependable power capacity of 710,000 kilowatts and at the same time to maximize the contribution of Oroville Reservoir to the water yield of the project. This was accomplished by using the pumped storage plan for firming the power capacity. Water previously released was assumed to be pumped back into Oroville Reservoir from Thermalito Afterbay in offpeak periods when power is available at minimum cost. Water was assumed to be released through Oroville and Thermalito Powerplants for power generation during the onpeak periods when the value of power is greatest.

In this way a large portion of the water used for power production may be held to meet water demands in dry years and reservoir heads available for power generation may be maximized. Oroville Reservoir was operated under criteria which resulted in the water surface's being drawn down to the

minimum power pool elevation of about 733 feet, with a storage of 1,504,000 acre-feet, at the end of the critical drought period.

It was assumed that the Delta facilities would be in operation and that sufficient outflow would be available from unregulated stream discharge or released from State Water Project and Central Valley Project storage to maintain acceptable water quality in the Delta and at the Delta Pumping Plant.

The Delta Pumping Plant was assumed to be operated on a combination onpeak-offpeak schedule, with the offpeak operation used as much as possible to reduce costs. At the San Luis Pumping-Generating Plant, water was assumed to be pumped into storage in San Luis Reservoir during the offpeak periods when water supplies available in the Delta exceeded demands from the California Aqueduct south of that reservoir. Offpeak operation of this plant will be possible because of the availability of storage in San Luis Forebay. Pumping at these plants will be at a maximum when large quantities of water are available in the Delta. Available water was assumed to be pumped into San Luis Reservoir as required to meet each year's project water demands and to provide carryover storage for dry years. A minimum recreation pool of 80,000 acre-feet was maintained. All other project pumping plants were assumed to be restricted to offpeak pumping to the extent possible during the early years, with a gradual change to unrestricted, or around-the-clock, pumping as water demands dictate.

Summary of Project Yields

Detailed operation studies of facilities of the State Water Project were performed incorporating the estimates of future water supplies and entitlements described in Chapters V and VI, respectively, and the operational criteria previously discussed. A comprehensive procedure programmed for an electronic computer was utilized. This method permits the study of coordinated operation of the State Water Project conservation facilities and all of the present and authorized federal water conservation facilities in the Central Valley. These studies indicate that the yield of the initial state project conservation facilities will satisfy project water demands until about the 1980's.[4/] At that time, an additional project conservation facility, now designated as the Upper Eel River Development, will be needed. This facility will have to develop a maximum of about 700,000 acre-feet annually to meet the sum of maximum annual entitlements of all contractors and operational losses, amounting to about 4,190,000 acre-feet, as developments within the watershed tributary to the Delta deplete water supplies available to the project. Table 8 shows

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4/ There is a likelihood, of course, of other projects being added by the federal agencies or the State which would affect the total demand of water for export from the Delta before and after 1980. These speculative demands are not included here, though they may and probably will require earlier construction of additional facilities.

the portions of the total project demands at the Delta made available by the initial project conservation facilities and by the additional facility.

The project operation studies mentioned above, covering the most critical drought period of record, 1928 through 1934, indicate that a 50 percent deficiency in irrigation supply would have been sustained with a recurrence of runoff conditions similar to those in 1931 and 1934, if the project had been fully developed at the beginning of that period. Since the entire yield of initial conservation facilities will not be required to meet project water requirements until the 1980's, no deficiency in irrigation water supply is expected to occur before that time. Thereafter, deficiencies could occur only under conditions as severe as a critical dry year like 1924 or a critically dry period such as that mentioned above. Such a dry period has occurred only once in about 70 years of record. The possibility of a reduction in yield would be lessened with importation of water from the North Coastal area because surplus yield would be available for a number of years. All of the foregoing factors indicate that there is little expectation that a deficiency in irrigation supply will occur.

CHAPTER VIII. PLANS FOR PROJECT OPERATION AND MAINTENANCE

Important elements of plans for operation and maintenance of water and power facilities of the project are described in this chapter. Hydroelectric power production and marketing and sources of power for project pumping are also discussed. This information is utilized in estimating operation and maintenance costs for Chapter XI.

Operation for Water Supply

Project operations must supply the annual entitlements of the contractors on delivery schedules that will meet their respective demands in a dependable and efficient manner. The quality of the water delivered by the project should conform to the objectives set forth in the water supply contracts.

General Operational Procedures

The procedures to be followed in delivering water to project customers in the respective service areas will vary. Entitlements of those in Plumas County will be met by releases from Frenchman and Grizzly Valley Reservoirs either directly into natural stream channels for rediversion by the contractors or, in the case of the latter reservoir, into a conduit. Entitlements in the Feather River Service Area will be supplied almost entirely by releases into the Feather River from facilities of the Oroville Division.

The Sacramento-San Joaquin Delta will be the point of diversion for conveyance of water to the San Francisco Bay Area, the San Joaquin Valley, the Central Coastal Area, and Southern California. Surplus water flowing into the Delta, supplemented by releases from Oroville Reservoir, will be diverted from the Delta by the North Bay, South Bay and California Aqueducts. Peaking requirements in the North Bay Service Area will be met by direct deliveries through the aqueduct without project storage. The fluctuations in demand from the South Bay Aqueduct will be met by storage in Del Valle Reservoir, allowing the South Bay Pumping Plant to pump from the California Aqueduct at nearly a constant rate throughout the year. As indicated in previous chapters, water will be pumped from the Delta into the California Aqueduct throughout the year, utilizing San Luis Reservoir to store water during the high runoff, low demand months. The water so stored will be released during periods of peak downstream demand to supplement diversions from the Delta.

The service areas in the San Joaquin Valley will be served by canal without storage facilities in the service areas. The State's share of the San Luis Canal and the California Aqueduct to the south will be operated to convey all water required to meet the peak monthly demands of these service areas.

Contractors in the Central Coastal service area will be supplied from the Coastal Aqueduct at a constant rate. They will supplement this supply from local sources which they are expected to develop.

The fluctuations in the demands of the Southern California service area will be accommodated by using the storage to be provided in Castaic, Cedar Springs, and Perris Reservoirs. These reservoirs will have sufficient capacity to allow the Tehachapi Pumping Plant and the portions of capacities in upstream plants, used to supply Southern California, to be operated at a constant rate throughout the year. They also will provide emergency storage to permit continuous service to many of the contractors during unforeseen aqueduct outages. The California Aqueduct will have a reserve capacity of 7.5 percent of the continuous flow requirement for Southern California as an allowance for refilling these reservoirs after emergency use and to compensate for scheduled outages for maintenance, repair or replacement of the transportation facilities. This is an increase over the net annual value of six percent that was used in Bulletin No. 132-63.

Method of Control

A unique plan of operation and control system is being developed because of the complexity and magnitude of the State Water Project. This system will involve remote monitoring and remote control of major project features. For example,

offpeak operation of the pumping plants along the California Aqueduct, mentioned in Chapter VII and later in this chapter, requires remote simultaneous changes in settings of canal check gates to change the rates of flow rapidly. In addition, it is necessary to provide a means of isolating the effects of a possible break in the canal by quickly closing check gates upstream and downstream therefrom.

Under the contemplated control plan, powerplant operation, reservoir operation, aqueduct checks and pumping plants will be monitored and controlled from remote locations.

The department has employed the consulting firm of Daniel, Mann, Johnson, and Mendenhall for assistance and guidance in the development of a prototype control system on the South Bay Aqueduct. In the design of this system, operational requirements were established from analyses of the functions required of each type of facility. Control concepts for each facility were developed. Finally, a control system structure, showing the arrangement of the control system equipment and the data transfer links, was formulated. Specifications are being prepared for procurement and installation of equipment that will comprise the prototype system.

This control system will be operated for the first two years to collect data which will be analyzed and evaluated. An operational control plan will be developed for the entire State Water Project based on these evaluations.

Negotiation of San Luis Operating Agreement

The San Luis Agreement[1] provides for construction of the Joint-Use Facilities of the San Luis Unit by the Bureau of Reclamation, for the sharing of costs of construction between the department and the Bureau, and provides for operation of the the joint-use facilities by the department. In the fall of 1961, after the San Luis Agreement had been negotiated and while formal signature was pending, work was initiated by the two parties aimed at formulating a detailed operation agreement. Negotiations toward this agreement are in progress. The agreement will include (a) detailed criteria for state operation of the joint-use facilities and closely related federal facilities, such as turnouts, (b) formulae for sharing of operation and maintenance costs, and (c) provision for coordinated operation of the federal Central Valley Project and State Water Project pursuant to the May 16, 1960 Agreement[2] and the San Luis Agreement.

Water Quality Management

The department is developing the necessary operational criteria, standards, and techniques to meet the water quality objectives of the water service contracts. Methods for monitoring and reporting of the quality of delivered water are being developed. Efforts are being made to perfect techniques for

1/ "Agreement Between the United States of America and the Department of Water Resources of the State of California for the Construction and Operation of the Joint-Use Facilities of the San Luis Unit," dated December 30, 1961.

2/ See reference in Chapter VII.

forecasting future water quality conditions. Criteria are being formulated for taking operational action to achieve control of water quality.

To determine water quality conditions that would have prevailed had there been no modification by the State Water Project, the department is presently conducting preproject water quality surveys of surface waters. These will permit evaluation of the project's effects, if any, on such waters. The recently completed "Sacramento River Water Pollution Survey," and the current "Delta and Suisun Bay Pollution Investigation" are two of the comprehensive types of water quality investigations that are providing necessary data.

In order that good water quality control practices for the State Water Project may be formulated, the department is studying operational techniques of major water service agencies which are supplying water for human consumption.

Operation and Maintenance Organization

The personnel, equipment, supplies, and facilities required to carry out effectively the planned operation and maintenance of the State Water Project are being programmed after study of methods of operation and maintenance used by other large water and power projects. Tentative operation and maintenance plans have been formulated based on the unique features of the State Water Project.

The acquisition of equipment and supplies and the hiring of personnel are being programmed consistent with the current schedule of construction completion dates. A further consideration is the training required for key operating personnel in the early stages of operation and for the transfer of trained personnel to units activated in the latter years of the 1965 to 1972 period. This program is the basis of estimates of operation and maintenance costs presented in Chapter XI.

Project Electric Power Production and Supply

The power generation and power requirements associated with operation of the State Water Project are of large magnitude and are major factors affecting the cost of water. Studies and negotiations are being carried on in cooperation with representatives of California public and private utility systems and with federal agencies to attain realization of the lowest cost of water practicable through coordination of project power operations with those of other power systems.

Ultimately more than 12 billion kilowatt-hours of energy will be consumed annually in pumping and nearly 6 billion kilowatt-hours annually will be generated in project hydroelectric plants. The total installed capacity in all the project generating plants will be 1,374,000 kilowatts while the aggregate demand of all the pumping plants will be 2,000,000 kilowatts.

Hydroelectric Power Production

Power will be generated when water is released from storage in Oroville Reservoir, Thermalito Forebay and San Luis Reservoir and by power recovery generating plants located at drops along the California Aqueduct.

Oroville and Thermalito Powerplants will operate together on essentially the same schedules. Each will have conventional turbine generator units which will generate during onpeak hours. They will have reversible pump-turbine and motor-generator units which will generate power onpeak and in combination will pump water back into Oroville Reservoir during offpeak hours. The combined Oroville-Thermalito dependable capacity is estimated to be 710,000 kilowatts with average and minimum (dry-year) energy outputs estimated at 42 and 34 percent, respectively. The combined average annual energy output is estimated at 2,578,000,000 kilowatt-hours. The offpeak pump-back operation of the two plants is estimated to require 630,000,000 kilowatt-hours annually.

The efficiency of the pumping-generating operation will be such that approximately two-thirds of the energy consumed in pumping will be recovered. The cost of the energy consumed in pumping will be recovered many times over because the pump-back operation makes possible an increase of approximately 50 percent in dependable capacity, which means generation of power of a value much higher than the energy used in offpeak pumping. This operation also will increase water yield by about 100,000 acre-feet.

The capacities of the aqueduct power recovery plants are related to the aqueduct capacities required to accomplish the scheduled water deliveries. This results in continuous operation of these plants unless special facilities are provided to permit peaking operations. Such peaking operations at the power recovery plants would require forebays, afterbays, and additional penstock and machine capacity. Economic analyses of forebays and afterbays at the sites of the San Luis Obispo, Devil Canyon, Cottonwood, Ruby and Castaic Powerplants are not yet completed. It is assumed for this report, therefore, that generation at these plants will be on the basis of continuous "run-of-the-aqueduct" operation.

Since publication of Bulletin No. 132-63, several changes have been made in the San Luis Pumping-Generating Plant and the aqueduct power recovery plants. The Elizabeth Lake Canyon alignment of the West Branch Division in Southern California, used in this report, assumes the Ruby and Castaic Powerplants instead of the three Elizabeth Canyon power recovery plants described in Bulletin No. 132-63. Installed capacities of the Devil Canyon Powerplants were increased to reflect the larger quantities of water now estimated to be delivered at Perris Reservoir. Other changes in the San Luis Pumping-Generating Plant and the power recovery plants have resulted from design refinements.

The presently proposed installed capacity and output of the San Luis Pumping-Generating Plant and the power recovery plants along the aqueduct are shown in the following tabulation:

Powerplant	1992 installed generating capacity, in kilowatts	1992 annual energy generation, in millions of kilowatt-hours
San Luis[3/]	222,100	123
Cottonwood	27,500	215
Ruby	104,000	903
Castaic	67,000	548
Devil Canyon No. 1	121,000	905
Devil Canyon No. 2	68,000	512
San Luis Obispo	5,400	43

Disposition of Project Power

The capabilities of the Oroville and Thermalito Powerplants are such that the outputs of these plants can best be used to supply large utility systems with peaking power. Such systems also can supply the offpeak energy needed for the pump-back operation. It is planned to sell the entire output of the Oroville-Thermalito power facilities as it becomes available. Initial generation will commence between July 1967 and February 1968 depending upon streamflow conditions in the Feather River following closure of the diversion tunnels at Oroville Dam in early 1967.

3/ Estimated State's share; size based on USBR's invitation to bid (No. DS 6040).

Negotiations are under way for sale of the power to be generated at the Oroville-Thermalito power facilities. The most active of these negotiations have developed from proposed principles submitted by the California Power Pool Companies (Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas and Electric Company) under which these companies would purchase all power generated at project hydroelectric plants and would sell to the department all power required for pumping at the several project pumping plants. The department currently is discussing with Pacific Gas and Electric Company arrangements under which that company might purchase the Oroville-Thermalito output and provide energy for the pump-back operation.

The State's estimated share of power and energy generated at the San Luis Pumping-Generating Plant is assumed, in this report, to be used to offset purchases of capacity and energy at the Mile 18, Buena Vista, and Wheeler Ridge I and II Pumping Plants.

In this report, it is assumed that the output of the Cottonwood, Ruby and Castaic Powerplants would be fed back to nearby pumping plants and used to reduce the amount of pumping energy which otherwise would be required from other sources. Devil Canyon Powerplants No. 1 and 2 are located below Cedar Springs Reservoir and their output is not dependent solely on operation of upstream pumping plants. Accordingly,

generation at these two plants is assumed to be delivered into local utility systems, with water releases being in accordance with aqueduct requirements below Cedar Springs Reservoir.

San Luis Obispo Powerplant is a small plant relatively isolated from the pumping plants of the Coastal Division. Its output is assumed in this report as being delivered into local utility systems.

Power Requirements for Project Pumping

In the early years, with the contemplated initial offpeak operation of the aqueduct pumping plants and San Luis Pumping-Generating Plant, there will be relatively high offpeak power demands, or capacity requirements, and low onpeak demands. This situation will change gradually as water deliveries increase; that is, pumping will be required on a more nearly continuous basis as demands for water increase and larger amounts of onpeak power are needed. The Delta Pumping Plant and San Luis Pumping-Generating Plant have their maximum power use in the winter. The power requirements of the Mile 18, Buena Vista and Wheeler Ridge Pumping Plants will be at their maxima in the summer. Consequently some diversity will exist between the power requirements of these two groups of plants.

The estimated annual power demands for the Delta Pumping Plant and the San Luis Pumping-Generating Plant are based on the detailed project operation studies described in

Chapter VII. Annual demands of other pumping plants were estimated on the basis of the buildup of water deliveries and aqueduct losses discussed in Chapters VI and VII. The estimated annual power demands, or capacity requirements, of all pumping plants are shown in Table 9. This table also shows power capacity requirements for the pump-back operation of the Oroville-Thermalito facilities.

The estimated annual electric energy requirements by individual pumping plants are shown in Table 10. These requirements include the pumping energy for the Oroville-Thermalito and San Luis Pumping-Generating Plant operations as well as for aqueduct pumping. The energy requirements for San Luis pumping are the department's current estimates of the State's share of the energy required for pumping water based on the detailed operation studies previously discussed. The significant increases in power requirements in 1968 and 1971 reflect the start of water deliveries first to the San Joaquin Valley and then to Southern California in those years.

Sources of Power for Pumping

The project energy requirements shown on Table 10 are more than double the total energy generation shown in Table 11, and as discussed above, are assumed to be met only in small part by project generation.

Possible sources of pumping power being considered include: public and private utility systems; the federal Central Valley Project; surplus firm or nonfirm power from the Pacific Northwest that may become available to California over the proposed extra-high voltage electrical intertie; power recovery plants on the California Aqueduct, itself; and thermal powerplants either of the conventional or nuclear type that may be constructed in the future specifically to serve the pumping plants. It may be advantageous to utilize power from these different sources in various amounts and combinations at different times, depending upon costs, availability, and water delivery requirements. An engineering firm, The Fluor Corporation, Ltd., has been retained to investigate alternative sources of energy and to recommend the most economical and reliable source or sources for operation of the project. The final report of The Fluor Corporation on its study will be completed in September 1964.

As referred to previously in this chapter, the California Power Pool Companies have submitted proposed principles under which they would sell pumping energy for all project requirements. The department has always considered the private utilities of the State to be a possible source of energy for project pumping. The proposal of the California Power Pool Companies will be explored more fully in the future.

The department has applied to the Bureau of Reclamation for an allocation of Central Valley Project power. Power from this source, though limited in amount available, is low in cost. Central Valley Project power is now being used for operation of the pumping plants serving the South Bay Aqueduct.

For the purposes of this report, pending results of The Fluor Corporation investigation, it is assumed that energy for pumping will be purchased from privately-owned utility systems with deliveries being made at high voltages to department-owned switchyards at each plant.

CHAPTER IX. PROJECT OPERATIONS

This chapter comprises the first published report of operation of the State Water Project. It covers two calendar years, 1962 and 1963.

Water Operations

The operable units during 1962 and 1963 were Frenchman Dam and Reservoir and the first two reaches of the South Bay Aqueduct.

Frenchman Dam and Reservoir

In the operation of Frenchman Dam and Reservoir a minimum recreation pool of 21,500 acre-feet at an elevation 28 feet below the spillway crest is provided. The 33,900 acre-feet of storage space, between the recreation pool and the spillway, is operated to provide regulated irrigation releases.

Frenchman Dam was completed on October 18, 1961. Very little inflow to the reservoir occurred during the fall and early winter, but runoff during March 1962 was sufficient to fill the 1,835 acre-feet of dead storage below the elevation of the outlet. This made it possible to release water right entitlements through the outlet works by March 29, 1962.

In 1962, a temporary agreement with Little Last Chance Creek water users provided for regulating water entering the reservoir under their water right entitlements. In exchange for this regulation, 30 percent of the stored water was assigned to the State. During the year inflow to the reservoir totaled 23,199 acre-feet. Water stored in the reservoir included all flow in excess of: (1) prior water right entitlements to the natural flow of Little Last Chance Creek, stipulated for the temporary agreement, and (2) a release for fishery maintenance. At the end of calendar year 1962 11,900 acre-feet remained in storage.

An interim water delivery contract with the Last Chance Creek Water District was executed on March 22, 1963. Under this contract, $14,000 was paid to the State by the district for regulation and delivery of 11,000 acre-feet of water on a schedule furnished by the district. This quantity included both local water rights water and project water. The contract replaced the agreement of 1962 for furnishing of prior right entitlements. Releases for fishery maintenance were made after the end of the irrigation season. Inflow to the reservoir in 1963 amounted to 37,538 acre-feet and at the end of the calendar year, 34,966 acre-feet remained in storage.

Table 12 presents monthly operation data for Frenchman Reservoir for 1962 and 1963.

A water quality sampling program was established during 1962 in both Frenchman Reservoir and downstream to monitor water quality conditions related to the maintenance of a satisfactory fishery and recreational environment. The effect of expected decomposition of organic material in this newly filled reservoir is being monitored. To date, no conditions deleterious to the fishery or to recreation have been detected. The reservoir has exhibited variations of both thermal stratification and dissolved oxygen concentration which are considered normal for a lake of its type and location.

During the first recreation season, 1962, fishermen and other recreationists spent an estimated 30,000 visitor days at Frenchman Reservoir. The fishing during that season, and especially during the last month, was probably the best in the nation. During the 1963 season between 65,000 and 105,000 visitor days were spent at the reservoir. The fishing remained excellent and boating and water skiing increased.

South Bay Aqueduct

The operable portion of the South Bay Aqueduct consists of interim facilities and initial permanent features extending from the Delta-Mendota Canal of the federal Central Valley Project to Patterson Reservoir. Operation of these works was commenced on May 10, 1962.

Water was purchased in 1962 from the Bureau of Reclamation at the Delta-Mendota Canal under "Contract for Temporary Water Service," Department of Water Resources Contract No. 551963, for agricultural use executed on March 1, 1962, and Contract No. 552023, for municipal and industrial use, executed on June 7, 1962. Purchases from the Bureau in 1963 were under temporary Contracts Nos. 552581 and 552580, for irrigation and for municipal and industrial use, respectively, executed on February 21, 1963.

Water was delivered to Alameda County Water District and Zone 7 of the Alameda County Flood Control and Water Conservation District at two locations. The first was at the Altamont Turnout, located at the downstream end of Reach 1 of the South Bay Aqueduct shown on Plate 3. Water discharged into Altamont Creek at that point was conveyed in that natural channel for rediversion and percolation by Zone 7 and by the Alameda County Water District. The second turnout was at Patterson Reservoir where deliveries were made to the Zone 7 water treatment plant.

In 1962, 9,704 acre-feet of water were purchased from the Bureau of Reclamation. The measured deliveries at Altamont Turnout were 8,553 acre-feet and at Patterson Reservoir 353 acre-feet. An additional nine acre-feet of water in 1962 were provided in the Livermore Valley Canal for use by the contractor constructing the portion of that canal beyond Patterson Reservoir.

The Delta-Mendota Canal was shutdown for routine maintenance from November 30, 1962 until January 17, 1963. During this period no releases were made into the South Bay Aqueduct by the Bureau. Deliveries to project customers were supplied from storage in Bethany and Patterson Reservoirs.

Water purchased from the Bureau of Reclamation in 1963 amounted to 13,211 acre-feet. The measured deliveries at Altamont Turnout and Patterson Reservoir were 11,728 and 917 acre-feet respectively. Four acre-feet were supplied to the contractor for construction of the Livermore Valley Canal in Reach 3.

Table 13 summarizes the monthly water deliveries to the two contracting agencies for 1962 and 1963. A further subdivision as to the type of use is also included in the table.

A water sampling program has been initiated to provide continuous monitoring of the mineral quality of water delivered through the South Bay Aqueduct. Results of this sampling program are indicated by the 1963 monthly and annual average concentrations of total dissolved solids presented in Table 12.

The water quality objectives set forth in Article 19 of the water supply contracts are not applicable while the State is utilizing the interim facilities to divert water from the Delta-Mendota Canal. Results of the water quality monitoring program indicate, however, that the water delivered during 1963 substantially met those objectives.

For a short period in 1963, while Patterson Reservoir was undergoing repair, a combination of physical, chemical, and biological factors caused fluctuations of the hydrogen ion concentration of delivered water to such an extent that measured values of pH rose higher than desirable in a raw water supply. These fluctuations in no way rendered the delivered water unusable, but did at times require modifications in the normal treatment process until normal operational practices were resumed in the aqueduct and reservoir. This characteristic of water is not covered by the contractual water quality objective.

Power Operations

During 1962 and 1963, the only operating facility involving power operations was the South Bay Pumping Plant with its associated Forebay Pumping Plant. Pumping power was obtained from the Bureau of Reclamation under Contract No. 551569, executed December 8, 1961. In addition, a small amount of power was supplied by the Pacific Gas and Electric Company for station service, under Contract No. 552471 executed January 16, 1963.

Power for the two plants is wheeled to South Bay Pumping Plant, at 60,000 volts, by the Pacific Gas and Electric Company. Service is taken at 4,160 volts and metered at a single point. Table 12 shows the power consumption during 1962 and 1963 for these facilities.

CHAPTER X. PROJECT MAINTENANCE

This chapter covers activities during calendar years 1962 and 1963.

Maintenance of the State Water Project during 1962 and 1963 was limited to the two completed projects, Frenchman Dam and Reservoir and the first two reaches of the South Bay Aqueduct.

Frenchman Dam and Reservoir

Maintenance and repair of Frenchman Dam and Reservoir during 1962 and 1963 included generally routine activities. Improvements and modifications were made in the control structure and stilling basin below the reservoir. The gaging stations on Little Last Chance Creek were maintained. Minor improvements to the electrical system were made. Storms produced unprecedented local flooding on January 31 and February 1, 1963, which washed out three 72-inch culverts at the Little Last Chance Creek crossing and two 72-inch culverts at the Galeppi Creek crossing of the road around Frenchman Reservoir. This damage, caused by trash and drift choking the culvert entrances, was repaired in the period July through October at a cost of approximately $63,000. The original culverts were replaced with concrete headwalls. At Little Last Chance Creek a steel column barrier was placed about 100 feet upstream to intercept future floating trash.

South Bay Aqueduct

Routine preventive maintenance of the reservoirs and conduits was performed. Down drains were installed in canal embankments to improve road drainage. Water was drained from the Livermore Valley Canal and accumulated silt was removed.

Patterson Reservoir was drained in March 1963 to repair the concrete apron below the inlet weir. The reservoir was returned to service in September. Drilling exploration showed that slippage of the concrete slab, noted during routine inspections, was caused by loss of subgrade material from beneath the slab. Repairs, at a cost of approximately $26,000, were made during August and September. The repairs were made by placing backfill material and grout beneath the slab through holes drilled in the slab.

Erosion, due principally to wave action, required the repair of about 300 feet of the right bank of the Interim Canal. Repairs were made by placing rock rip-rap at a cost of about $1,300. This work was completed December 30, 1963.

Routine cleaning and maintenance of the South Bay Pumping Plant and the Forebay Pumping Plant were performed by operating personnel. A preventive maintenance program for the electrical machinery and apparatus was carried out under a contract with Bockmon and Womble Electric Company of Stockton.

Major electrical and mechanical repairs to the 15-second-foot and 30-second-foot pumps were performed under contracts, Bockmon and Womble Electric Company and with Wismer and Becker

Electrical Contractors of Sacramento. In both cases shafts of the pumps failed and other difficulties were experienced. The 15-second-foot pump was out of service from June 26, 1963, until September 19, 1963 and again from November 5, 1963 until November 14, 1963. The 30-second-foot pump was out of service from November 1, 1963, until January 1, 1964. Costs of the repairs were approximately $50,000. A board of investigation reviewed the situation and the matter is to be taken up with the manufacturer.

Inspections for Dam Safety

Inspections of project dams were made by the Office of Supervision of Dams for Safety, pursuant to Division 3 of the Water Code as follows:

Bethany Forebay Dam	December 30, 1963
Frenchman Dam	February 20, 1964
Antelope Dam	February 20, 1964

CHAPTER XI. PROJECT COSTS

This chapter discusses the capital costs of the facilities of the State Water Project described in Chapter III and annual operating costs under current plans for project operation as set forth in Chapter VIII. The costs incurred through calendar year 1963 are based upon the accounting records of the department, referred to in Appendix D, entitled "Utility Financial Statements." Future annual expenditures from calendar year 1964 through the end of the project repayment period are estimated. This chapter also describes the estimated federal participation in the various costs and the manner in which the State costs are subdivided among reimbursable and nonreimbursable functions of the State Water Project.

Composition of Capital Costs

Capital costs include all costs incurred for construction of and furnishing of equipment for facilities of the project between the date on which construction of the particular facility was authorized and the various dates on which the features thereof attain operational status. Features will generally be considered operational for accounting purposes at the beginning of the year following the year in which construction of the feature is completed. On that date, capital costs will be terminated and operational costs will be commenced. Capital costs also include the initial costs

of electro-mechanical units of pumping and power recovery plants, or additional barrels of pipelines and penstocks, the installations of which may be staged within the operational period.

The total estimated capital costs by physical features are summarized in Appendix A, entitled "State Water Project Statistics." Table 14 summarizes the annual capital expenditures for the State Water Project. As of the end of the calendar year 1963, costs of about $248,000,000 had been incurred. The composition of the estimated remaining capital cost of about $2,030,000,000 is shown in that table and described in the following sections.

Surveys and Engineering Studies

Several features of the State Water Project are still in the formulation phase and require studies prior to preparation of final designs. These include the Delta Facilities; the San Joaquin Drainage Facilities; Dixie Refuge and Abbey Bridge Dams and Reservoirs of the Upper Feather Division; and the Upper Eel River Development. Other surveys and engineering studies of general application to design are required, such as those investigating seepage from streams of the Sacramento Valley, and water pollution in the Delta and Suisun Bay. The estimates of future capital expenditures for the project include about $6,400,000 to cover the expense of surveys and engineering studies.

Design, Right-of-Way, and Construction

These items include costs for:

1. Construction including labor, materials, supplies, utilities, and services during construction.

2. Lands, easements, and rights-of-way.

3. Railroad, roads, utility and other relocations.

4. Clearing and preparing project land.

5. Special works and services provided during construction, such as (a) those necessary for the protection of public health and safety, and (b) purchases and transportation of water for preconsolidation of aqueduct foundations in subsidence areas.

6. Preservation of fish and wildlife.

7. Design costs, including allocated departmental general expense. These costs range from 5 to 10 percent of "field costs" [items (1) through (6)] depending upon the type of feature being designed.

8. Construction supervision, including allocated departmental general expense and design support during construction. These costs generally range from 7 to 15 percent of field costs depending upon the type and size of the construction contract.

As indicated above, items (1) through (6) are described as field costs. For contracts covering work under construction these costs are based on bid data. For work to be done under future contracts, field costs in this report are based upon preliminary designs and upon unit prices generally prevailing in January 1964. In both cases, allowances are included for contingencies during the construction period which generally range between 15 and 20 percent.

Table 14 shows these categories of future capital costs under three major classifications. Respective estimated costs are: design, $74,300,000; rights-of-way acquisition and relocations, $136,900,000, and construction, $1,468,300,000; totaling about $1,679,500,000.

Local Impact Aid

Pursuant to the Byrne Act,[1/] payments are made to local governments, for the temporarily increased municipal costs directly attributable to the influx of construction workers. Such payments are now being made to the Cities of Oroville and Los Banos. Similar payments will be made in the future to Butte County and other areas. The estimated costs of this kind total about $1,900,000.

1/ Part 7 (commencing with Section 12950) of Division 6 of the Water Code.

Preoperating Expense

Costs of an operational nature which are incurred prior to completion of the construction periods of the various project features, are included in the capital costs of such features. These are of two types:

1. General project operating costs which are incurred for the project as a whole, including such costs as negotiating repayment contracts and operational agreements and developing project-wide operational plans and procedures.

2. Direct operating costs, which are incurred for a particular facility to insure its being operational at the end of the construction period, such as salaries of operation and maintenance trainees and electric power to bring water surfaces to operational levels.

Future general operating costs which will be capitalized are estimated to total about $29,200,000, while capitalized direct operating costs are estimated to amount to about $10,600,000.

Local Projects

Under the Burns-Porter Act, $130,000,000 was reserved for provision of water development facilities for local areas pursuant to the Davis-Grunsky Act.[2/] Approximately

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2/ Chapter 6 (commencing with Section 12880) of Part 6 of Division 6 of the Water Code.

$3,500,000 was expended by the end of 1963. The estimated future annual disbursements for loans, grants, and administrative costs of the program are shown on Table 14.

State Contributions for the San Luis Division

The San Luis Division of the California Aqueduct is a joint-use facility being constructed by the Bureau of Reclamation, and financed in part by the State. In accordance with the federal-state agreement of December 30, 1961, the Bureau of Reclamation will pay 45 percent and the State will pay 55 percent of the construction costs. The joint costs to be shared are specified as only those costs incurred after July 1, 1959. The total cost of the joint-use facilities is estimated to be about $400,000,000, of which about $220,000,000 will be paid by the State. Accounting for the money the State has already advanced, or received credit for, it will have to pay about $175,600,000 in 1964 and subsequent years.

Composition of Annual Operating Costs

Annual operating costs include all costs incurred for project features once they have been put in an operational status. As indicated above, the first costs of electromechanical units or stages of pipelines having several barrels, which may be installed or constructed within the operational period, are excluded from operating costs.

Table 15 summarizes the actual and estimated annual operating costs for the State Water Project. The bases for these costs are described in the following sections.

General Operating Expense

General operating costs are for various programs concerning the operation and maintenance of the State Water Project as a whole which are not directly assignable to any specific facility or aqueduct reach. Such programs include the following:

1. Water supply contract negotiation and administration.

2. Power contract negotiation and administration.

3. Financing and repayment studies for the project.

4. Formulation of operation and maintenance management criteria.

5. Operational studies to prepare project operation plans.

6. Special continuing investigations and activities concerning the project such as obtaining water rights, data collection and analysis, and report preparation.

These costs are estimated to level off at about $5,100,000 annually under conditions of substantially full project utilization.

Operation and Maintenance Supervision

Operation and maintenance supervision costs will be those incurred by the operation and maintenance organization referred to in Chapter VIII, which will not be directly assignable to any specific facility or aqueduct reach but will be associated with a particular group of such works. These annual costs will level off at about $800,000.

Salaries

This category includes the costs for personnel directly involved in operating and maintaining the various features of the State Water Project. The annual costs shown in Table 15 are based on estimates of the required personnel at field locations, except those needed for facilities currently under formulation. For such facilities, including the Delta Facilities, San Joaquin Drainage Facilities, and the Upper Eel River Development, the estimated annual costs of operation and maintenance personnel are based on approximate percentages applied to the total capital cost of each facility.

The estimates of personnel requirements are preliminary and subject to adjustment.

Salary ranges for operation and maintenance personnel have been tentatively estimated on the basis of analyses of job requirements and comparisons with salaries of existing state civil service classifications. The estimated costs

reflect salaries at the top of the pay grades assumed. Basic salary costs have been increased by an allowance of 60 percent to cover costs of retirement contributions, standard personnel allowances such as travel expenses, and indirect charges.

As shown in Table 15, the estimated annual costs of salaries reach a level of about $2,300,000 for operating personnel and $7,600,000 for maintenance personnel.

Materials, Supplies and Equipment

This category includes the cost of materials, supplies, and equipment required for the annual maintenance of the State Water Project.

For electro-mechanical units, these costs are assumed to be a function of installed capacities. Quantities and costs are based on Bureau of Reclamation experience. Such costs for reservoirs and aqueducts are estimated as a function of maintenance personnel requirements and are based on state and bureau experience in related work.

Under full operation of the facilities, these costs will total about $1,400,000 per year.

Costs of Power and Energy for Pumping

Table 15 presents costs of pumping power and energy, as elements of total operating costs, for all plants of the State Water Project except those in the Oroville Division. As discussed in Chapters XII and XIII, cost of

energy for the pump-back operation at the Oroville-Thermalito Plants is treated in this report only to the extent it influences net revenues from those facilities. These net revenues affect the Delta Water Charge and costs allocable to power and hence the costs to be repaid under Water Bond financing.

Column 6 of Table 15 shows the total cost of power and energy at all plants (except those of the Oroville Division) derived as outlined below. Column 7 shows the credits applicable to pumping costs by reason of generation at the San Luis Pumping-Generating Plant and the aqueduct power recovery plants. Derivation of these credits also is described below.

Basic unit power and energy costs for pumping at the Delta and at plants farther south, for which totals are shown in Column 6 of Table 15, are the same as those shown on pages 145 and 146 of Bulletin No. 132-63 except that allowance has been made for initial offpeak operation of the Delta Pumping Plant. These basic costs, which assume delivery at each pumping plant at motor voltage, were based on estimates furnished by privately-owned utilities serving the area in which each plant is located. The basic unit costs were reduced for this report by nine percent to reflect delivery at transmission voltages on the basis of state ownership of pumping plant substations as used in capital cost estimates appearing in this report.

Column 7 of Table 15 shows as "revenues" the estimated value of generation at the San Luis Pumping-Generating Plant and aqueduct power recovery plants. As discussed in Chapter VIII, power and energy at these plants is assumed in this report to be either delivered to aqueduct pumping plants or sold to privately-owned utility systems in the area of the recovery plants. Energy generated at San Luis Pumping-Generating, Cottonwood, Ruby and Castaic plants is assumed to have a value, taking into account transmission costs and losses, equal to the cost of other energy used for pumping at appropriate aqueduct plants. Generation at Devil Canyon No. 1 and No. 2 and San Luis Obispo Powerplants is assumed to have the same values as those reflected in Bulletin No. 132-63. The approximate effect of these computations, which are totaled in Table 15, is to credit against the operating costs of the various aqueduct reaches the value of the generation at upstream powerplants with the exception of generation at San Luis Pumping-Generating Plant, the value of which is credited against conservation charges.

As shown in Table 15, with full operation of the project, the gross annual costs of pumping power total approximately four times the total of all other annual operating costs of the project, which will amount to about $21,100,000. When the gross pumping costs are reduced by "revenues" from power recovery plants, the estimated maximum annual net expenditure

for pumping power is approximately $60,000,000 or three-fourths of the total annual operating cost of the project.

Replacement Costs

This category includes the costs of replacing those facilities or major items of equipment, such as pumps, generators, and valves, which are expected to require replacement before the end of the project repayment period. Estimates of such costs are based upon practical operating experience of the Bureau of Reclamation and various public utilities. The annual values presented in Table 15 are the totals of deposits in sinking funds which, at interest, will provide sufficient moneys to replace each item at the end of its economic life.

Such annual deposits are estimated to be about $3,900,000 under full project utilization.

Federal Contributions

Several features of the State Water Project relate to purposes for which the Federal Government has financial responsibility or is assumed to have such responsibility in the future. The actual and estimated annual contributions by federal agencies are shown in Table 16.

Oroville Dam and Reservoir

By contract dated March 8, 1962, the Federal Government agreed to contribute for flood control benefits from Oroville Dam and Reservoir an amount equal to 22 percent

of the capital cost, exclusive of power features, but not to exceed $85,000,000. Federal administrative costs and interest on the federal investment during construction are to be deducted from this value to obtain the maximum net contribution. It is presently estimated that the federal contribution, including the capitalized value of related annual operating costs, will be about $69,000,000.

Del Valle Dam and Reservoir

A federal contribution for flood control benefits of Del Valle Dam and Reservoir of the South Bay Aqueduct has been authorized.3/ The amount of the federal contribution assumed in this report has been based on the provisions of the draft of the contract, currently being reviewed by the Chief of Engineers. The draft provides for a contribution equal to 30.7 percent of the actual costs of the dam and reservoir, including federal administrative costs during construction. Being considered in the negotiations is an exclusion from federal contributions of any costs incurred prior to October 14, 1958, the date on which the department's project order was signed, designating Del Valle Reservoir as a part of the South Bay Aqueduct facilities. The contract specifies a limit of

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3/ Section 203 of the Flood Control Act of 1962, 76 Stat. 1173, authorizes a contribution substantially in accordance with the plans and subject to the conditions set forth in the report of the Chief of Engineers in Senate Document 128, 87th Congress, Second Session

$4,080,000 on the total federal contribution. It also provides, however, that a contribution in the amount of $776,000 would be made for the capitalized value of related annual operating costs, bringing the total to about $4,900,000.

Delta Facilities

The Delta Facilities are still in the advance planning stage, and no formal negotiations regarding their actual construction and financing have been undertaken with the federal agencies. The "Typical Alternative Delta Water Project," which was assumed as the basis for this report, would provide significant flood control benefits. On the basis of the State's allocation and the estimated capital costs of the particular facilities assumed for this report, as a minimum these benefits would justify a federal contribution of about $11,000,000. Estimates of annual operating costs related to flood control are excluded from this analysis.

San Luis Division

In accordance with the federal-state agreement of December 30, 1961, the State will operate the Joint-Use Facilities of the San Luis Unit and the Federal Government will contribute its share of operating costs. The formulae for the allocation of annual operation costs are currently being negotiated with the Bureau of Reclamation. For purposes of cost analyses included in this report, such operating costs,

exclusive of pumping power and energy, are allocated on the basis of the percentages of rights to use of the capacities of the various features and reaches set forth in the agreement.

San Joaquin Drainage Facilities

The San Joaquin Drainage Facilities considered in this report would provide for drainage of poor quality waters from the federal San Luis Unit Service Area as well as from areas to be drained by the State Water Project. In this report the annual capital and operating costs of the total facility are allocated between the Bureau of Reclamation and the State on the basis of the proportionate capacity requirements of the two agencies.

State Costs by Project Function

As stated above, the total annual costs of the State Water Project are shown on Tables 14 and 15. Those costs less the actual and projected federal contributions shown on Table 16, constitute the estimated annual expenditures which must be borne by the State.

The reimbursable functions of the State Water Project are included in the program entitled the "State Water Resources Development System Utility," herein referred to as the Utility. The Utility consists of the water supply program, including water conservation and water transportation, Oroville power generation, and drainage.

Other project functions, such as flood control, recreation and enhancement of fish and wildlife under the Davis-Dolwig Act,[4] are nonreimbursable. These functions are included in "nonutility" programs. Also included in this category are project functions, the degree of reimbursability of which is not currently known or firmly established. An example of the latter is the Davis-Grunsky Program. This will consist of a combination of loans and grants, the relative proportions of which cannot be predicted. Also currently included in the nonutility programs are certain miscellaneous functions of the Delta Facilities, such as seepage control and vehicular transportation.

Estimated nonutility costs are shown in Table 17. The estimated costs of major programs of the Utility with respect to drainage, water transportation and water conservation, together with Oroville power generation, are shown in Tables 18 through 21. These tables are briefly discussed in the sections that follow.

Nonutility Programs

Estimated capital expenditures for nonutility programs are shown in Table 17. Operation and maintenance costs for such programs are not shown. The State will not

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4/ Chapter 10 (commencing with Section 11900) of Part 3 of Division 6 of the Water Code.

participate in the annual operating costs of local projects under the Davis-Grunsky Program. Neither will the department operate separable recreational features or facilities for the enhancement of fish and wildlife under the Davis-Dolwig Act. The nonutility programs will include only the minor annual operating costs of multiple-purpose features, which are allocated to nonreimbursable functions such as recreation.

The specific capital cost items included in Table 17 are described in the following items.

Davis-Grunsky Program. The actual and estimated values include disbursements under loans and grants to local agencies together with costs of the department in administering the program. The total estimated costs of the program include the following expenditures from funds in addition to the $130,000,000 provided under the Burns-Porter Act: General Fund, $54,487; Local Projects Assistance Fund, $1,261,443; and special legislative appropriations from the California Water Fund, $102,548.

Oroville Flood Control. This special category includes the actual and estimated amounts of annual federal contributions. Under the financial program described in Chapter XIII, whereby these contributions are used to meet part of the general obligation bond service, the costs allocable to flood control must be financed by the State. They are classified as non-utility costs because they are not reimbursable by project customers.

Treatment of Oroville flood control contributions in this special way is differentiated from the handling of other federal contributions. For example, those pertaining to Del Valle Reservoir are used directly to reduce the capital or annual operating costs borne by the State. The costs of that facility allocated to flood control are included as utility costs and federal contributions are credited against such costs as received.

Separable and Multiple-purpose Nonreimbursable Costs. This category includes the following nonreimbursable costs: actual costs of land specifically for, and multiple-purpose project costs allocated on a preliminary basis to, recreation at Frenchman Dam and Reservoir;5/ estimated costs of land for recreation only at Grizzly Valley Reservoir and all estimated multiple-purpose costs of that feature, pending completion of a cost allocation between recreation and water conservation; total actual or estimated costs of Antelope Valley, Abbey Bridge and Dixie Refuge Dams and Reservoirs; and the costs of the Delta Facilities assumed for this report allocated in Bulletin No. 76,6/ on a preliminary basis to recreation, seepage control and vehicular transportation.

5/ As indicated in Chapter II, the Director of Water Resources approved a final basis for allocation of Frenchman Dam and Reservoir costs in April 1964 after the analyses for this report had been commenced.

6/ See reference in Chapter III.

Allocations of costs are currently in progress for multiple-purpose features of the project which are completed or under construction.

Certain of the nonreimbursable costs in this category are being contributed by the Federal Government under the "Open Space Land Acquisition Program" of the Housing and Home Finance Agency. Under this program, 30 percent of the costs of land acquired specifically for recreation may be advanced. Contracts have been signed for grants toward costs of lands at Cedar Springs and Perris Reservoirs and applications for such grants have been approved for Del Valle and Castaic Reservoirs.

Separable Recreation Nonreimbursable Costs. These costs are primarily for planning and right-of-way acquisition which can be identified as incurred specifically for the purpose of recreation. They pertain to those project features for which a preliminary allocation has not as yet been formulated.

Unassigned Costs

Also included in Table 17 are reimbursable costs previously associated with project features which have subsequently been deleted or postponed. Examples are the North Bay Aqueduct beyond the Napa Terminus and the Doolan Branch

of the South Bay Aqueduct. It is possible that these costs will be recovered in the future.

Column 13 of Table 20 also includes costs of the Airpoint Reservoir Site which will not be utilized for the project and which is in the process of being sold. After preparation of these data was completed, the department reached a policy decision to classify such charges as reimbursable utility costs, crediting receipts from rental and sale of the property, when received, against the costs. The Utility Financial Statements in Appendix D reflect the latter treatment of these costs.

Utility Costs for Drainage

The capital and annual operating costs for the San Joaquin Drainage Facilities which would be returned to the State by local agencies are shown in Table 18. These estimates must be considered preliminary.

Utility Costs for Water Transportation

The costs of the project transportation facilities analyzed in this report represent the total actual and projected costs of the North Bay, South Bay and California Aqueducts less (1) any separable costs of associated recreational features, (2) costs contributed by federal agencies, and (3) costs allocated to the project function of water conservation.

These costs will be reduced somewhat in the future upon approval of comprehensive multiple-purpose allocations, which will designate costs to be allocated to the nonreimbursable project function of recreation.

Actual and projected annual capital costs and annual operating costs for the project transportation facilities are shown in Tables 19 and 20, respectively.

Utility Costs for Water Conservation and Oroville Power. Presented in Table 21 are utility costs for water conservation and power which include the following items:

1. The costs of units of the Upper Feather Division of the Feather River Facilities currently allocated to water conservation.

2. The costs of the Oroville Division of the Feather River Facilities excluding separable recreational costs and those costs covered by the federal contribution for flood control.

3. Costs of the Delta Facilities allocated to water conservation.

4. Costs of the California Aqueduct which are allocated as described below to water conservation, including: a portion of the costs of the North San Joaquin Division; a portion of the State's share of the costs of San Luis Forebay and of the

aqueduct reach from the forebay to Mile 18 Pumping Plant of the San Luis Division; and all of the State's share of the costs of San Luis Dam, Reservoir, and Pumping-Generating Plant of the San Luis Division.

5. Costs of the authorized Upper Eel River Development, constituting an additional project conservation facility required to maintain the estimated minimum project yield of 4,000,000 acre-feet annually.

Allocations of the California Aqueduct to Conservation. Article 22(e) of the water supply contracts provides that costs of aqueduct reaches used jointly for conservation and transportation shall be allocated by the proportionate use of facilities method. As stated above, the North San Joaquin Division and a portion of the San Luis Division of the California Aqueduct serve both of those functions.

In the North San Joaquin Division, conveyance capacities are considered to be equitable measures of proportionate use for the two functions. As shown on Plate 4 that division is subdivided into two reaches: (1) Delta through Bethany Reservoir, with a capacity of 10,300 cubic feet per second; and (2) Bethany Reservoir to San Luis Forebay, with a capacity of 10,000 cubic feet per second. If San Luis Dam and Reservoir

did not exist and the aqueduct from the Delta had to meet the State's peaking requirements beyond San Luis Forebay, the required transportation capacities of these two reaches would be 7,927 and 7,651 cubic feet per second, respectively. These capacities include allowances for losses within the reaches. They are taken as the aqueduct capacities required for transportation and the remaining capacities are assumed to be allocated to water conservation.

The first reach of the San Luis Division, which includes San Luis Forebay and the aqueduct to Mile 18 Pumping Plant, will be utilized not only for conveyance, but also as a forebay to the San Luis Pumping-Generating Plant and to the Mile 18 Pumping Plant. The former plant is required for the conservation function, while the latter is required for transportation. The entire reach will be constructed on a flat gradient thus permitting flows in either direction. Due to the complexity of uses of the reach, the capacities of the San Luis Pumping-Generating Plant and of the Mile 18 Pumping Plant are considered to be measures of proportionate use between water conservation and water transportation, respectively. The design capacity of the San Luis Pumping-Generating Plant is 11,000 cubic feet per second, and that of the Mile 18 Pumping Plant is 13,100 cubic feet per second.

The above assumptions result in the following allocation percentages for the three aqueduct reaches with dual conservation-transportation functions:

Reach	Conservation	Transportation
	(in percent)	
Delta Through Bethany Reservoir	23.04	76.96
Bethany Reservoir to San Luis Forebay	23.49	76.51
San Luis Forebay to Mile 18 Pumping Plant	45.64	54.36

Reconciliation of Cost Changes

Table 22 presents a summary of the utility and non-utility capital costs described above. The total annual capital expenditures shown in the last column are used in the financial analyses described in Chapter XIII.

A general indication of the changes in total estimated capital costs of the State Water Project between the data shown in Bulletin No. 132-63 and those given in this report is presented in Table 23. The major reasons for cost changes are also indicated in this tabulation. The changes shown represent a composite of many major and minor effects. The estimated total cost of the State Water Project has increased about $225,000,000, approximately $200,000,000 of

which is due to the capacity increases required to convey the estimated additional 457,000 acre-feet annually to Southern California. The costs of conservation facilities have also increased, primarily due to increase in estimated costs of the Oroville Division of the Feather River Facilities. Those increases reflect greater costs of county road relocations and enlargement of Thermalito facilities.

CHAPTER XII. PROJECT REVENUES

This chapter describes the estimated utility revenues accruing from the State Water Project corresponding with the estimated costs of the Utility developed in Chapter XI. The revenues through 1963 are based upon preliminary accounting records of the department. Minor adjustments of these records were made in compiling the revenue summaries in Appendix D, entitled "Utility Financial Statements." Utility revenues for 1964 and subsequent years are estimated. The amounts by which these annual revenues are in excess of the total annual operating costs described in Chapter XI, are available to the State for meeting its financial obligations for the project as set forth in Chapter XIII.

Portions of Revenues Assured by Contracts

Water supply contracts executed to date have covered approximately 84 percent of the total utility costs for water supply, exclusive of the costs allocable to Oroville power generation, or about 66 percent of the total costs of the State Water Project as estimated in Chapter XI.

An appreciable portion of the total costs of the Utility have not as yet been covered by repayment contracts with project beneficiaries. Commitments have yet to be secured for the following:

1. Potential power generation of the Oroville Division of the Feather River Facilities;

2. The portion of the minimum project yield remaining uncommitted as of December 31, 1963; and

3. The reimbursable portions of the San Joaquin Drainage Facilities.

Nevertheless, the annual revenues estimated in this chapter assume repayment of all utility costs.

Interest Rates

Article 1(r) of the "Standard Provisions for Water Supply Contract" specifies that the "project interest rate" shall be four percent per annum until the first bonds are issued pursuant to the Burns-Porter Act. Thereafter, the project interest rate shall mean the weighted average of interest rates paid by the State on bonds issued under the Burns-Porter Act, without regard to any premiums received on the sale thereof. In the computations of the project interest rate the bond anticipation notes are taken into account.

The project interest rate as of April 1, 1964, is 3.508 percent per annum as shown in the table below. Because of time factors involved in preparing and substantiating statements of charges, the effect of the sale of the Series "B" bonds on May 5, 1964 on the project interest rate could not be incorporated in the statements to be rendered to water supply contractors in 1964.

Issue	Bond years[1] (in thousands)	Total interest cost	Project interest rate
$50,000,000 Bond Anticipation Notes dated 12/1/1963, due 6/15/1964	26,944	$ 530,805	
$100,000,000 Series "A" Water Bonds dated 3/1/1964, due 9/1/1973-2013	3,402,000	119,750,000	
TOTALS	3,428,944	$120,280,805	3.508%

For financial planning purposes, and for the reasons stated in Chapter XIII, an interest rate of four percent is assumed in the calculation of revenues in this report. Annual statements of charges to water supply contractors, of course, are based on the project interest rate pursuant to water supply contracts, and the statements each year will include adjustments as necessary to account for changes in the project interest rate.

Project Repayment Period

In accordance with Article 1(t) of the standard contract provisions, the "project repayment period" is the period beginning January 1, 1961, and extending until all

1/ A bond year is a unit equivalent to $1,000 principal amount outstanding for one year. The project interest rate is obtained by dividing the total interest cost by the bond years.

bonds secured by the pledge of revenues under the Burns-Porter Act have been repaid. Since the maximum term of such bonds is 50 years, the project repayment period will end no later than 50 years after the last bonds are issued.

Several assumptions may be made as to when the last Burns-Porter bonds will be sold. It is probable that this will occur sometime after 1990 when bonds reserved or "offset," under Water Code Section 12938, are used to construct future projects for local needs and to augment water supplies in the Delta. Under the standard contract provisions, such projects will be either "additional project conservation facilities" to maintain the minimum project yield of the State Water Project, estimated to be 4,000,000 acre-feet per year, or "supplemental conservation facilities" to provide water in addition to that yield. It is not possible at this time to predict when construction of such facilities will require sale of the last Offset Bonds. For purposes of revenue estimates in this chapter, it has been arbitrarily assumed that final sale of these bonds will occur in 1989, which is the last year in which capital expenditures are made for the State Water Project, as shown in Table 22. The same assumption has been made for compilation of repayment tables for each contractor described in Appendix C, entitled "Analysis of the State Water Project Transportation Facilities." Under this premise the project repayment period was assumed to extend to the year 2039.

Using estimates of financial resources available to fund the annual capital expenditures shown in Table 22, the financial analyses in Chapter XIII indicate that the last Burns-Porter bonds required for the State Water Project would be issued in 1983 and paid off at the end of 2032. Therefore, the discussions of project financing in that chapter assume a project repayment period extending through the year 2032. Use of revenues in those financial analyses, which are derived in this chapter for a longer project repayment period, result in presentation of a conservative view of revenues available to service general obligation bonds. This is because revenues would be greater if computed by using the shorter project repayment period for internal consistency in Chapter XIII.

Estimated Utility Revenues for Drainage

The rate structure for recovery of the State's costs associated with the San Joaquin Drainage Facilities is currently being formulated. Corresponding with the assumptions set forth in Bulletin No. 132-63, it is herein assumed that the net annual operating revenues from this facility will begin in 1968 from repayments of capital costs made on the same basis as contained in Article 24(c) of the standard contract provisions. This treats each year's capital cost as being repaid in 50 equal annual installments of principal and interest. It is also assumed that annual operating costs will

be repaid by beneficiaries of the facilities as such costs are incurred. Table 24 sets forth the project revenues resulting from these assumptions as applied to the drainage costs shown in Table 18.

Utility Revenues for Water Transportation

Utility revenues for water transportation were computed in the detail required to substantiate annual statements of charges to water supply contractors, to be rendered on or before July 1, 1964. The results of this work are set forth in Appendix C. This appendix performs the following functions: (1) it subdivides the annual transportation operating costs shown in Table 20 into the two categories of minimum and variable charges; (2) it segregates annual values of each of the two categories of operating costs and of transportation capital costs given in Table 19, in accordance with the aqueduct reaches shown on Plates 3 and 4; (3) it sets forth the detailed criteria and factors utilized to allocate transportation costs among water supply contractors; (4) it allocates such costs among water supply contractors; and (5) it compiles comprehensive repayment schedules pursuant to the applicable standard and special provisions of each water supply contract in accordance with known or assumed project conditions as set forth in this report, including the project interest rate of 3.508 percent per annum as of April 1, 1964.

Table 25 summarizes the annual values of actual or estimated utility revenues for the transportation facilities. It corresponds with Table C-15 of Appendix C with the following exceptions:

1. The planning interest rate of four percent per annum rather than the project interest rate has been utilized in compiling repayment schedules for Table 25.

2. Payments received through calendar year 1963 and payments to be received under outstanding statements for 1964 and estimated statements for 1965 have been substituted for the currently computed annual charges as developed using the planning interest rate; and

3. Overpayments or underpayments in 1963, 1964, and 1965, with relation to charges computed on the basis of annual costs shown in Chapter XI, at four percent interest, have been capitalized at the planning interest rate and algebraically added to the estimated payments for 1966.

The values in Table 25, derived as described above, are equivalent from a present worth standpoint, to the charges that would be computed for each year of the project repayment period on the basis of annual costs shown in Chapter XI and a four percent interest rate.

It is assumed for Table 25 that all remaining water marketed under Article 8 of the water supply contracts will be contracted for in 1964. It is also assumed that the type of capital cost amortization schedule applicable to the additional entitlements will be the same as that contained in the majority of contracts for the particular service area involved.

For the reasons given above in the discussion of the project repayment period, Table 25 presents estimated revenues through the year 2039. To facilitate the financial analyses in Chapter XIII, which consider an assumed project repayment period extending through the year 2032, subtotals are included in Table 25 showing the portion of transportation revenues available within that period.

Deferred Payments Under Capital Cost Component

Under Article 24(c) of the water supply contracts, the sum of annual capital expenditures for transportation facilities allocated to each contractor is repaid in 50 equal annual installments of principal and interest, subject to adjustments pursuant to Article 28 of the contracts. Most contracts executed to-date have specified this type of repayment. However, Article 45 of the prototype contract with The Metropolitan Water District of Southern California provides that, in certain events, annual payments by other contractors of the capital cost component may be deferred or varied from those

that would be applicable under Article 24(c). Article 45 was designed principally to meet the needs of agricultural contractors. It does not alter the basic requirement for contractors to repay their total allocated capital costs including interest at the project interest rate within the project repayment period. Three types of variations under Article 45 have been included in executed contracts which are reflected in Table 25. These are:

1. A repayment schedule for both principal and interest payments related to agricultural water entitlements in the San Joaquin Valley, such that each contractor's annual capital payments throughout the project repayment period are equal to a unit rate in dollars per acre-foot multiplied by such contractor's annual entitlements for agricultural water set forth in its contract;

2. A deferment until about 1976 of payment of both principal and interest by the two Central Coastal area contractors for their shares of the costs of the initial reaches of the Coastal Division which will be constructed in part to deliver agricultural water in the San Joaquin Valley. These reaches will be in operation more than 10 years in advance of the time the facilities will be required for the coastal contractors; and

3. A deferment of principal payments from 1964 through 1971 for the Alameda County Flood Control and Water Conservation District.

Oroville Power Revenues

As discussed in more detail in Chapter XIII, power facilities of the Oroville Division are not treated in the financial analyses as are other facilities of the State Water Project. This separate treatment is used because under the financial program the Oroville Division power facilities, including the portion of Oroville Dam and Reservoir allocated to power, will be financed by revenue bonds secured by sale of the power generated at the Oroville and Thermalito Powerplants. Nevertheless, revenues from sale of Oroville Division power will affect directly many other financial aspects of the State Water Project including the cost of Oroville Dam and Reservoir allocated to power, the total costs to be financed by general obligation bonds, and the Delta Water Charge.

Contracts for sale of the output of the Oroville-Thermalito plants are under negotiation. Accordingly, revenues from such sale must be estimated for the purposes of this report in order to ascertain their effect on costs allocated to power (to be financed by revenue bonds) and on remaining capital costs which are to be financed by general obligation bonds, and on conservation charges. For these purposes, the effect of net revenues from sale of Oroville-Thermalito power is presented in the financial analysis

in this report on Basis A and Basis B as described in Chapter XIII. Basis A uses the estimated revenues shown in Bulletin No. 132-63. Basis B uses estimated revenues derived from the preliminary proposal of the California Power Pool Companies referred to in Chapter VIII.

The valuation of power on which the Bulletin No. 132-63 revenues were based were estimated by the department and reflected absorption rates of peaking power estimated by outside utility experts. The development by the utility industry of much larger thermal generating units, with increased operating efficiencies, has tended to reduce the value of hydroelectric power as measured by the competitive costs of thermal power. This reduction probably is reflected in the preliminary proposal of the California Power Pool Companies. The department recognizes, of course, that many factors affect the evaluation of the output of major hydroelectric plants such as those in the Oroville Division and tend to make that output more useful to large utility systems than would be the output of any thermal plant.

Estimated Revenues Under the Power Pool Proposal

The preliminary proposal of the California Power Pool Companies did not specify a valuation of Oroville Division power. Based on data accompanying the preliminary proposal, the department has derived a valuation for Oroville Division power and has used it, for want of any other valuation, to

estimate the revenues for that power in Basis B. The resultant revenues are believed to be substantially below actual value. The valuation used in Bulletin No. 132-63 and the valuation derived from the preliminary proposal are reflected in Table 26 under the captions "Basis A" and "Basis B", respectively.

The estimated revenues presented in Bulletin No. 132-63 for Ovoille-Thermalito generation were based on a dependable capacity of the two plants of 685,000 kilowatts and a buildup in salable capacity as estimated by outside utility experts. Refinements in design and operation studies developed in the past year demonstrate that the two plants have a combined dependable capacity of 710,000 kilowatts subject to possible increase when efficiency tests are completed and operation studies are further refined. Also, the California Power Pool Companies have indicated that the total output can be absorbed in California as rapidly as it becomes available. These modifications also are reflected in the Basis B analyses.

Utility Revenues for Water Conservation

Utility revenues for water conservation accrue from water supply contractors under the Delta Water Charge. Such revenues are not expected to commence until 1967, when deliveries from the yield of project conservation facilities will be possible. As stated in Chapter IX, water currently being delivered to contractors in the South Bay Area is

purchased from the Bureau of Reclamation. Funds to pay the costs of such water are advanced by the South Bay water supply contractors under the Bureau Water Charge, which is assessed in lieu of the Delta Water Charge. In view of this, such costs and revenues are not included in this analysis.

Article 22 of the water supply contracts provides that the Delta Water Charge for each contractor shall be determined as the product of the entity's annual entitlement (for the capital cost and minimum operation, maintenance, power and replacement components) or actual deliveries (for the variable component) and the applicable Delta Water Rate for each component. It also provides that through December 31, 1969, the total Delta Water Rate will be $3.50 per acre-foot, without regard to components. The rate for each component of the charge thereafter, is specified by a formula set forth in Article 22 of the water supply contracts. For purposes of this report, these rates are computed in accordance with the following application of the formula:

1. The present worths of the differences between all appropriate costs and electrical energy revenues accounted to the time considered at the planning interest rate; plus

2. The present worths of the differences between all estimated future costs and electrical energy revenues to be incurred for authorized

facilities for the remainder of the project repayment period at the planning interest rate; minus

3. The present worths of all actual charges under the appropriate component collected to the time considered at the planning interest rate; the above quantities all divided by

4. The present worths of the total annual entitlements remaining in the project repayment period, from the time considered.

Authorization of the Upper Eel River Development

It has been pointed out in Chapters II and III that the Upper Eel River Development is authorized as an additional project conservation facility. Article 22(e) of the standard contract provisions states that:

> "....Commencing in the year in which the State first incurs capital costs for construction of additional project conservation facilities, the Delta Water Charge shall be determined on the basis . . . . of all projected costs of such additional project conservation facilities."

Furthermore, Article 1(s) of the standard contract provisions states that:

> "'Capital costs' shall mean all costs incurred subsequent to authorization of a facility for construction...."

This report includes expenditures on the Upper Eel River Development beginning July 1, 1964.

It was assumed in Bulletin No. 132-63 that the additional facility required to develop and maintain the minimum project yield would be authorized in the year 1977, immediately preceding the construction period for the facility. Thus, the Delta Water Rate was estimated to escalate in the year 1978 to recover the estimated costs of that facility. With the current authorization, the existing rate of $3.50 per acre-foot will be adjusted on January 1, 1970 to recover not only the costs of the initial project conservation facilities but also the costs of the additional facility.

Calculation of Rates

Table 26 presents a summary of data required for the current calculation of Delta Water Rates. Shown therein are pertinent schedules of annual entitlements, annual costs of water conservation and power, and annual power revenues. Present values of each of these discounted to the year 1964 at the planning interest rate of four percent per annum are also given. The calculations below using the discounted values in Table 26, develop the following estimated Delta Water Rates which would be applicable as of January 1, 1970 and for the remainder of the project repayment period:

Item	Basis "A"	Basis "B"
Present worth of expenditures, charges and power revenues (in millions of dollars):		
Total cost of water conservation and Oroville Power	$791.0	$791.0
Delta Water Charges through 1969 ($3.50 per acre-foot applied to present worths of entitlements through 1969)	- 1.7	- 1.7
Oroville power revenues	- 405.8	- 285.8
Net values	$383.5	$503.5
Present worth of entitlements from 1970 through remainder of project repayment period (in millions of acre-feet)	52.6	52.6
Delta Water Rate (Above net value divided by present worth of remaining entitlements, in dollars per acre-foot)	$ 7.29	$ 9.57
Difference between Delta Water Rates in Bases "A" and "B" (in dollars per acre-foot)	$2.28	

Tables 27 and 28 present the total utility revenues from water conservation estimated to be realized under the conditions assumed in this report. Developed thereon are also the net utility operating revenues estimated to accrue to the project from the water conservation facilities.

Summary of Utility Net Operating Revenues

Table 29 presents a summary of the net operating revenues of the Utility developed in Tables 24, 25, 27, and 28 for water drainage, transportation, conservation (Basis A), and conservation (Basis B), respectively. These revenues, which exclude those from Oroville power, are available for annual service on the general obligation bond issues required in the financial program for the State Water Project. Since the annual amounts of bond service estimated in Chapter XIII are on an accrual basis, the net operating revenues have been adjusted in Columns 7 and 8 of Table 29 to a similar accrual basis. This adjustment is explained in Chapter XIII in the section entitled "Revenues Calculated From Formulae."

CHAPTER XIII. PROJECT FINANCING

This chapter discusses the present financial program for the State Water Project, on the basis of current construction cost estimates. This financial program has been developed in close cooperation with the department's financial consultants, Dillon, Read & Co. Inc.

The implementation of the financial program through the sale of securities commenced with the sale on November 21, 1963 of $50,000,000 bond anticipation notes for "Water Bonds" at an interest cost of 1.96492 percent. This was followed by the sale on February 18, 1964 of $100,000,000 Water Bonds (including $50,000,000 to retire the notes) at an interest cost of 3.51979 percent and by the sale on May 5, 1964 of $50,000,000 Water Bonds at an interest cost of 3.5329 percent. In view of the long average life of these bonds, the interest costs thereon were widely acknowledged to be favorable to the State Water Project.

General Discussion

The financial program is in accord with the principles of the Burns-Porter Act, which became effective November 8, 1960, and of the Governor's Contracting Principles relating to the State Water Project, which were announced January 20, 1960. The implementation of the program through the sale of securities was, however, delayed by litigation

which tested, among other things, the authority to issue the required securities. This litigation was concluded by opinions rendered by the State Supreme Court on February 21, 1963, Metropolitan Water District v. Marquardt[1] and on December 12, 1963 Warne v. Harkness,[2] and California Water Resources Development Finance Committee v. Betts.[3] These opinions upheld the authority to issue the securities and also upheld the department's position as to other relevant matters.

The principal features of the financial program are the following:

1. The major part of the financing will be accomplished by the sale of Water Bonds of the State under the Burns-Porter Act. These bonds are general obligations of the State. This act authorizes the issuance of $1,750,000,000 of these bonds, of which $1,600,000,000 remain unsold.

2. The Department of Water Resources will issue revenue bonds to be supported by the power revenues of the Oroville-Thermalito hydroelectric project, which is part of the State Water Project.

1/ 59 Cal. 2d 159, 379 Pac. 2d 28.

2/ 60 Cal. Adv. 566.

3/ 60 Cal. Adv. 582.

These bonds are authorized by the provisions of the Water Code governing the Central Valley Project, and the department's authority to issue them was upheld in the December 12, 1963, decisions of the State Supreme Court in Warne v. Harkness, Supra.

3. The balance of the moneys required to complete the construction of the State Water Project is being provided principally out of the California Water Fund. The Burns-Porter Act contains an appropriation of these moneys for the construction of the State Water Project, subject to the right of the Legislature to reappropriate the California Water Fund for other purposes, which right has been exercised as to a portion of the fund.

4. The department intends to apply the federal reimbursements relating to Oroville flood control to payment of part of the interest on the Water Bonds during the construction period. To this end, the department is depositing these moneys in the State Central Valley Water Project Construction Fund, from which disbursements may be made for payment of interest on bonds during construction. There are no federal restraints on the State's management of these moneys.

The reason for applying these moneys toward payment of Water Bond interest during construction is that, under the Burns-Porter Act, none of the proceeds of the Water Bonds are made expressly available for the payment of interest during construction. Further, there does not appear to be clear authority under the Act to use California Water Fund moneys for this purpose. Since the major part of the construction expenditures is to be made in the decade ending with 1970, and an insufficient amount of project revenues for payment of interest on the Water Bonds will be derived during this period, the payment of a portion of the bond interest during this period would fall on the General Fund, consisting principally of tax revenues, were it not for this application of the Oroville reimbursement moneys.

The financial program as now projected to cover the initial facilities and presently authorized additional works will leave unissued some $175,000,000 to $210,000,000 of authorized Water Bonds. These unissued bonds are expected to be used under the Burns-Porter Act for water facilities additional or supplemental to the State Water Project as described in this report.

The financial analysis contained in Tables 30 and 31 of this report shows by years for the construction period, and

by decades for the later portions of the project repayment period, the amounts of the projected construction expenditures for the State Water Project, the sources of moneys to be applied thereto, the projected amounts of Water Bond service and the net revenues available therefor. This analysis has been prepared as a "working model" of the manner in which the State Water Project is expected to be financed and its costs repaid, on the basis of the department's best estimates and assumptions at the time of preparation of this report. The figures presented in this analysis are necessarily, to a considerable extent, still fluid. They differ from those presented in the department's previous report on the State Water Project, issued in April 1963 (Bulletin No. 132-63), by reason of changes since that time in the design and construction schedule, in the status of water supply contracts and in related factors, as discussed in previous chapters. This report will be revised annually to incorporate changes in the figures and assumptions as they are made, and to reflect modifications of the financial program if that should prove necessary.

The State Water Project as now designed will provide a firm supply of 4,000,000 acre-feet annually to the end of the project repayment period, estimated to occur at the end of the year 2032. In this report, it has been assumed that the demand for project water would reach substantially this 4,000,000 acre-feet by about 1990. The department has

always recognized, however, that the State's water program must be considered as a continuing one, that the acceleration of the timing of demands may lead to a requirement for deliveries of 4,000,000 acre-feet in advance of 1990, and that in any case the demand for water will continue to grow beyond this amount. These accelerated or increased demands may be the result of changes in population trends or other economic factors which cannot now be foreseen, and of the anticipated reduction in the availability of water from the Colorado River.

If in the future it should prove necessary to provide additional moneys to complete construction on account of possible enlargement of the State Water Project or for any other reason, the department will consider various alternative courses to be followed. This question is not expected to confront the department until after the commencement of water deliveries to all of the principal water supply contractors. Some possible alternatives at that time would be: supplemental legislative appropriations, such as for the construction of recreational and other nonreimbursable features of the project which would otherwise be financed under the Burns-Porter Act; advance of needed funds by one or more of the water supply contractors; possible federal financing in the instance of project enlargement arising from Colorado River developments; and recommendation to the Legislature that

a supplemental general obligation bond act be submitted to the voters. In line with the State Supreme Court's recent decision in California Water Resources Development Finance Committee v. Betts, Supra relating to project financing, the service of bonds issued under such a supplemental bond act could be paid from project revenues just as in the case of bonds issued under the Burns-Porter Act.

Financing Construction

Financing of construction of the State Water Project will be with moneys from the sources previously set forth.

Estimates of Construction Cost

The costs to the State of construction of the project, beginning with 1961, the commencement of the project repayment period, are estimated at $2,176,000,000. This excludes $102,000,000 covered by appropriations made prior to the effective date of the Burns-Porter Act.

For the purpose of this study, the estimated costs include the Oroville flood control features, although it is now estimated that some $69,000,000 will be reimbursed to the State on account thereof by the Federal Government, including $18,450,000 so paid to the State up to this time. This reimbursement, while subject to revision in amount and to Congressional appropriation of the required funds, is covered by agreement between the Department of Water Resources and

the U. S. Army, Corps of Engineers. The agreement is not affected by the considerations, discussed later in this report, relating to the valuation of Oroville power. Under the financial program, these reimbursement funds, together with interest earned thereon pending disbursement, will be applied mainly toward service of the Water Bonds to be issued for the project.

In addition, it is estimated that some $15,000,000 will be received from the Federal Government as reimbursement for flood control features of the Delta Facilities and of Del Valle Reservoir of the South Bay Aqueduct. In this report, it is assumed that these moneys will be used directly to construct the appropriate flood control features; consequently these funds are excluded from the estimate of the State's costs.

The construction cost estimates herein exclude interest during construction. As to those features of the project not covered by existing construction contracts, the cost estimates are derived essentially from the multiplication of estimated quantities by estimated unit costs at present price and wage levels. The estimates include appropriate allowances for engineering, administration and overhead, and contain allowances generally ranging between 15 and 20 percent for engineering contingencies. They do not include provision for possible increases in price and wage levels. It would not

be practicable to forecast these for the balance of the construction period, which extends over about 25 years. The following table summarizes these estimated costs:

Facility or program	Total construction cost	Less: Covered by prior appropriations	Balance of construction cost to be financed (1961-1989)
	(in millions of dollars)		
Utility:			
Oroville Division (including power facilities)	$ 399	$ 63	$ 336
San Luis Division conservation facilities (a)	116	0	116
Delta and miscellaneous conservation facilities	77	8	69
Upper Eel River Development (b)	172	0	172
Total conservation facilities (including Oroville power)	$ 764	$ 71	$ 693
Transportation facilities (a)	1,220	25	1,195
San Joaquin Drain (a)	49	0	49
Total utility	$2,033	$ 96	$1,937
Nonutility:			
Davis-Grunsky program	$ 130	$ 0	$ 130
Oroville flood control	69	0	69
Other nonutility	46	6	40
Total nonutility	$ 245	$ 6	$ 239
TOTAL, STATE WATER PROJECT	$2,278	$102	$2,176

(a) The San Luis Division facilities are being, and it is assumed that the San Joaquin Drain will be, undertaken jointly with the Federal Government. The estimated State and Federal expenditures for the San Luis Division facilities which are classified as conservation facilities are $116,000,000 and $95,000,000, respectively. In addition, certain of the San Luis Division facilities are classified as transportation facilities, and as to these the State and Federal expenditures are estimated at $104,000,000 and $85,000,000, respectively. The estimated Federal expenditures for the San Joaquin Drainage Facilities are $7,000,000. None of these estimated Federal expenditures are included in the above costs.

(b) This is an additional project conservation facility, not comprised in the State Water Facilities (as defined in the Burns-Porter Act), and is designed to firm up the yield of 4,000,000 acre-feet annually from the State Water Project.

Burns-Porter Financing

To finance this construction, the funds available to the State under the Burns-Porter Act consist of the proceeds of general obligation bonds (Water Bonds) authorized to be issued thereunder in the aggregate principal amount of $1,750,000,000, together with certain California Water Fund moneys, which are derived from payments to the State of oil and gas royalties and bonuses under certain tidelands leases.

The availability to the project of California Water Fund moneys is subject to the right of the Legislature to appropriate moneys from this fund for other purposes. This right has been exercised as to a portion of the fund, resulting currently in a limitation of $11,000,000 annually being available for project construction. This is the amount which is provided in the 1964-65 state budget and in S.B. 60[4] relative to the disposition of tideland revenues. The $11,000,000 figure is used for projecting the portions of annual accruals to the fund to be available for project construction. It is assumed that no limitation will apply to any net operating revenues of the project to be paid into the fund and applied therefrom to construction.

4/ Senate Bill 60, 1964 First Extraordinary Session.

The moneys made available from the California Water Fund for construction of the State Water Project include an unobligated balance of $90,000,000 in this fund as of the end of 1960 (all of which has now been expended), plus $42,000,000 of accruals from 1961 through 1963, and projected accruals from oil and gas royalties and bonuses, which are taken at $231.000,000 (21 years at $11,000,000 as stated above). While no additions from oil and gas royalties and bonuses are projected after 1984, as it is estimated that they will not be needed for the financial program, they are expected to continue to accrue and to be available for additional and supplemental facilities.

The foregoing amounts of California Water Fund moneys give a total of $363,000,000. Also, during the latter part of the construction period, some additional amounts are expected to be paid into this fund from net operating revenues of the project and applied to construction. This arises from a projected excess at that time of net operating revenues of the State Water Project over then current bond service requirements, and from a provision of the Burns-Porter Act that any remainder of net operating revenues, after the payment of Water Bond service, is to be paid into the California Water Fund to the extent of construction expenditures made therefrom. The projected construction payments from the California Water Fund, and reimbursements of this fund out of net operating revenues, are shown in Tables 30 and 31.

Revenue Bond Financing

In addition to Burns-Porter Act financing, funds available to the State for financing project construction include the proceeds of revenue bonds issuable under the Central Valley Project Act as stated above. In line with the State Supreme Court's recent decision, the pledge of revenues provided by the Burns-Porter Act does not preclude the pledge for such revenue bonds of the revenues allocable to the facilities financed by the revenue bonds. The revenue bonds proposed to be issued under the financial program will provide proceeds for construction equivalent to the total cost of the Oroville power facilities, including reimbursement for amounts previously expended, and will be secured by the pledge of the net operating revenues derived from these facilities.

The total cost of the Oroville-Thermalito power facilities consists of the portion of the cost of the dam and reservoir allocable to power plus the cost of the electrical facilities and their installation. The cost of the dam and reservoir is estimated at $244,000,000 and that of the electrical facilities and installation at $155,000,000, for a total of $399,000,000 (including $63,000,000 covered by prior appropriations), as shown for the Oroville Division in the last preceding table. However, the portion of the $244,000,000 cost of the dam and reservoir which will be allocated to power will depend upon the market value of the power.

In Bulletin No. 132-63 the total cost of the Oroville-Thermalito power facilities was estimated at $267,000,000. This reflected a valuation for the power based in part on earlier estimates made by the department and by outside electric utility experts. Since that time, the development by the utility industry of much larger thermal generating units, with increased operating efficiencies, has tended to reduce the value of the Oroville power as measured by the competitive cost of thermal power. It is recognized that the costs of thermal generation are not the only factor to be considered in the evaluation of the output of a major hydroelectric plant such as Oroville-Thermalito and that other important factors may be involved which will tend to increase the value of Oroville-Thermalito power over the cost of thermal generation. Based on the allocation which would result from the preliminary proposal made by the California Power Pool Companies for the purchase of the Oroville-Thermalito power, the department estimates that the total cost of the Oroville-Thermalito power facilities would be reduced by $50,000,000, resulting in a total cost of $217,000,000 for these facilities.

Since the determination of the allocation cannot be made until the conclusion of negotiations with prospective purchasers of the power neither the former estimate of $267,000,000 nor this estimate of $217,000,000 as the cost of the Oroville-Thermalito power facilities can be considered to be definitive. The department is using both of these

amounts, namely $267,000,000 and $217,000,000, as alternatives in its current projections.

One effect of a reduction in the valuation of the Oroville-Thermalito power would be to increase, for the purpose of the financial analysis, the amount of general obligation bonds required to be issued for the State Water Project, because the portion of the cost of the Oroville Dam and Reservoir not financed by revenue bonds would have to be made up from other sources. A related effect would be an increase in the Delta Water Charge, because the valuation of Oroville-Thermalito power is applied as a credit in the calculation of this charge. These effects are reflected in Tables 30 and 31, as well as in other tables which are contained in this report, as to which the consideration of alternative valuations for the Oroville-Thermalito power is relevant.

The foregoing alternatives of $267,000,000 and $217,000,000, for the cost of the Oroville-Thermalito power facilities exclude, in each case, interest on the revenue bonds during construction and reserve funds, which will be provided for in the revenue bond financing. In either case, the revenue bonds will be paid from the Oroville-Thermalito power revenues. Accordingly, the financial analysis presented in this report is directed to the construction cost excluding the portion thereof to be financed by revenue bonds, and to the bond service excluding the revenue bonds. This analysis is not dependent upon a calculation of the amount of revenue

bonds actually to be issued for the Oroville-Thermalito power facilities, of the revenues applicable thereto, and of the amortization schedule therefor, and for this reason such a calculation with respect to revenue bonds is omitted from this report.

Summary of Financing

Under the department's program, the financing of the State Water Project will be accomplished as shown in the following table. The total construction cost to be financed is $2,176,000,000 as shown in the last preceding table, after deducting the amounts covered by prior appropriations as therein set forth. On account of the uncertainty with respect to the allocation to be reflected in the cost of the Oroville-Thermalito power facilities the following presentation is made on two alternative bases, namely:

Basis A -- using the valuation of Oroville-Thermalito power reflected in Bulletin No. 132-63, and

Basis B -- using the valuation of Oroville-Thermalito power derived from the preliminary proposal of the California Power Pool Companies.

	Basis A	Basis B
	(in millions of dollars)	
Water Bonds		
Authorized	$1,750	$1,750
Deduct: unissued	210	175
Issued	$1,540	$1,575
Revenue bond proceeds	267	217
California Water Fund		
Expenditures under Burns-Porter appropriation of unobligated balance and accruals 1961-1963	$ 132	$ 132
Accruals 1964-1984	231	231
Net revenues paid into this fund and applied toward construction	3	17
Oroville flood control reimbursement not used for Water Bond service	3	4
TOTAL FUNDS FOR CONSTRUCTION	$2,176	$2,176

In the case of Basis A, there remains unissued an aggregate of $210,000,000 of Water Bonds as shown above. This includes $14,000,000 available for the construction of the State Water Facilities, which by definition exclude the Upper Eel River Development. The balance of $196,000,000 unissued Water Bonds is available for the construction of additional and supplemental facilities. In the case of Basis B, the unissued Water Bonds amount to $175,000,000 as shown above. They would not be available for the State Water Facilities but would be available for additional and supplemental facilities. These limitations on the use of Water Bonds for the State Water Facilities are the result of a restriction in the Burns-Porter Act which is discussed following under the heading "Offset Bonds."

By years, the data contained in the foregoing table are shown in Tables 30 and 31.

Offset Bonds

Under the Burns-Porter Act, as and when California Water Fund moneys are expended for the construction of the initial State Water Facilities, the amount of unissued Water Bonds available for construction of these facilities is reduced in the amount of these California Water Fund expenditures. A corresponding amount of Water Bonds is reserved for additional facilities, which include the Upper Eel River Development. The bonds so reserved are frequently referred to as "Offset Bonds." For the purpose of calculating the amount of Offset Bonds, the appropriations made from the California Water Fund prior to the effective date of the Burns-Porter Act are treated as having been expended prior to that date. This reservation of Water Bonds for additional facilities operates at the time the California Water Fund expenditures are made, and under the Burns-Porter Act the expenditure of the available California Water Fund moneys must be made before the expenditure of Water Bond proceeds.

The effect is to limit the sum of Water Bond proceeds and of California Water Fund moneys expended for the construction of the State Water Facilities to the sum of (1) $1,750,000,000, plus (2) the amount of any California Water Fund moneys so expended after the combined expenditure

of $1,750,000,000 from these two sources. In Basis A, the expenditure on the State Water Facilities of the full $1,750,000,000 from these two sources is never reached, as the revenue bond proceeds which are utilized for Oroville power (included in the State Water Facilities) are sufficient to reduce the balance of the required expenditure below this figure. The same was true in the financial analysis as presented in Bulletin No. 132-63.

In the case of Basis B, the expenditure of a cumulative total of $1,750,000,000 of Water Bond proceeds and California Water Fund moneys on the State Water Facilities is reached about the end of 1977, which is before the completion of construction of these facilities. Thus it becomes necessary to rely upon the availability of California Water Fund moneys thereafter to complete these facilities. For practical purposes, it can be said that under Basis B the availability of Water Bonds for this purpose ceases at the end of 1977, at which time the California Water Fund expenditures for this purpose will have amounted to $286,000,000. The annual amounts of the California Water Fund moneys available after 1977, as projected, would not provide for the full expenditures on the California Aqueduct during 1978 and 1979, as now estimated, although they would be more than sufficient to complete all of the State Water Facilities within the programed construction period. Thus, under Basis B, it would be

necessary to effect a moderate rescheduling of the final stages of the California Aqueduct expenditures after 1977.

The estimated cost of the State Water Facilities to be financed by Water Bond proceeds and the California Water Fund is $1,736,000,000 in the case of Basis A and $1,783,000,000 in the case of Basis B. These amounts are derived as shown below from the figures already presented in this report:

	Basis A	Basis B
	(in millions of dollars)	
Total construction cost to be financed, 1961-1989	$2,176	$2,176
Deduct:		
Cost of Upper Eel River Development (not part of the State Water Facilities)	172	172
Cost of Oroville-Thermalito power facilities (part of the State Water Facilities) financed by revenue bonds	267	217
Oroville flood control reimbursement not used for Water Bond service (portion available for State Water Facilities)	1 (a)	4
Total deductions	440	393
Cost of State Water Facilities financed by Water Bonds and California Water Fund	$1,736	$1,783

(a) Due to the timing, assumed in Table 30, of the application of unused flood control reimbursement to financing capital expenditures, about $2,000,000 of such were applied to the costs of the Upper Eel River Development.

Tables 32 and 33 present for Basis A and Basis B, respectively, the annual use of the California Water Fund and of Water Bonds for financing the costs of the State Water Facilities and of the Upper Eel River Development. These tables also identify the annual use of the California Water Fund causing Offset Bonds to be reserved, the annual use of such bonds for financing the costs of the Upper Eel River Development, and the balance of unissued bonds available for the State Water Facilities and for additional facilities.

The following tabulation presents a summary of Tables 32 and 33. The total amount of Offset Bonds is $312,000,000 in Basis A and $286,000,000 in Basis B. After allowing for the costs of the Upper Eel River Development the remainder of Offset Bonds is $196,000,000 in Basis A and $175,000,000 in Basis B.

	State Water Facilities	Additional Facilities	Total
	(in millions of dollars)		
Basis A			
Water Bonds issued	$1,424	$116	$1,540
California Water Fund expenditures	312 (a)	54	366 (d)
Total use of Water Bonds and California Water Fund	$1,736	$170 (b)	$1,906
Unissued Water Bonds	14	196 (c)	210
Total of authorized Water Bonds and California Water Fund	$1,750	$366	$2,116
Basis B			
Water Bonds issued	$1,464	$111	$1,575
California Water Fund expenditures			
Through 1977	286 (a)	0	286
Thereafter	33	61	94
Subtotal, California Water Fund	319	61	380 (d)
Total use of Water Bonds and California Water Fund	$1,783	$172 (b)	$1,955
Unissued Water Bonds	0	175 (c)	175
Total of authorized Water Bonds and California Water Fund	$1,783	$347	$2,130

(a) Equal to gross amount of Offset Bonds before providing for Upper Eel River Development.

(b) Upper Eel River Development.

(c) Balance of Offset Bonds after providing for Upper Eel River Development.

(d) Equals sum of amounts shown as California Water Fund moneys in preceding tabulation under the heading "Summary of Financing."

Scheduling of Bond Sales

Of the total issues of general obligation bonds projected, about 80 percent are expected to be issued before the end of 1970, including the following amounts already sold:

Issue	Dated	Due	Principal amount	Percent net interest cost
Series A Bonds	3/1/64	9/1/73-2013	$100,000,000 5/	3.51979
Series B Bonds	5/1/64	5/1/74-2014	50,000,000	3.5329
TOTAL			$150,000,000	

In accordance with a recommendation made by the department and in order to measure closely the differential in net interest cost as between Water Bonds, having maturities extending from the tenth to the 50th year, and shorter State of California general obligations, the Series B Bonds were sold by the State Treasurer simultaneously with the sale of $50,000,000 state bonds for school building aid, having maturities extending from the second to the 26th year. The differential in net interest cost in favor of the school bonds was 0.32752 of one percent. The difference in net interest cost as between the Series A and Series B Water Bonds was only 0.01311 of one percent although in the interim the Daily

5/ $50,000,000 reserved to retire Bond Anticipation Notes dated 12/1/63, due 6/15/64, and sold at a net interest cost of 1.96492 percent.

Bond Buyer's 20-bond index of yields on municipal bonds had advanced by 0.13 of one percent. This was the first occasion on which the State sold simultaneously two large issues of bonds with widely divergent schedules of maturities.

In Bulletin No. 132-63 general obligation bond issues were scheduled so as to produce a maximum annual issuance of $140,000,000. It now appears that the construction schedule will require a maximum annual issuance of from $180,000,000 to $200,000,000 of these bonds. The principal reasons for this increase are: the postponement of the initial issuance of general obligation bonds, which was planned for 1963, pending the decisions of the State Supreme Court rendered December 12, 1963, as above-mentioned; and the fact that the block of revenue bonds previously scheduled for issuance in 1964 is not now expected to be offered until 1965, since it is unlikely that a contract for the sale of the Oroville-Thermalito power will be negotiated before late 1964 or early 1965. These delays have imposed a temporarily greater burden on general obligation bond financing. Since construction of the Oroville-Thermalito power facilities cannot be deferred pending the availability of the revenue bond proceeds, a substantial portion of these proceeds will, in fact, fund power construction expenditures for which the necessary moneys were previously advanced from other sources, namely the California Water Fund and Water Bond proceeds. Thus, when they become

available, the revenue bond proceeds will be expended in part for other project construction, in replacement of California Water Fund moneys and Water Bond proceeds previously expended on the power facilities.

In practice, the annual amounts of issues, both of general obligation bonds and of revenue bonds, will necessarily vary from the pattern set up in the financial program. The issues will have to be fitted in with the State's overall financial requirements in a planned marketing procedure; and from time to time the department may again avail itself of the flexibility provided through the issuance of bond anticipation notes. It is expected that the marketing of the revenue bonds will not conflict unduly with the marketing of the general obligation bonds, since the revenue bonds will be of moderate amount in relation to the general obligation bonds and, to a considerable extent, will appeal to a different market.

The department and the State Treasurer have consulted and cooperated in planning the timing and amounts of Water Bond sales, in the interest of orderly marketing of all state general obligation bonds. Because of the need to maintain a prudent level of working capital, Water Bonds will have to be sold in advance of actual construction; on occasion sales will be further advanced to fit in with the needs of the State for other financing. This will provide a backlog of

unexpended bond proceeds, the investment of which at short term will produce interest income, approximately offsetting the interest cost involved in selling the bonds in advance of actual requirements. As the extent of future bond sales in advance of requirements and the consequent interest income to be earned on the proceeds are conjectural, this aspect has not been considered in the financial projections included in this report.

Rate Structure

The following sections set forth the rate concept used for the State Water Project and adjustments and applications of the rates to produce the project revenues.

Rate Base Concept

The Department of Water Resources has adopted a rate concept under which the rates charged for the water will be calculated to allow interest to the State on the utility portion of the capital investment, as measured by the construction expenditures, and to provide for the amortization of such investment out of the net operating revenues. For this purpose, the weighted average interest rate on the Water Bonds, including bond anticipation notes, issued for the project is taken as the interest rate allowed to the State, and the capital investment includes the State's pre-1961 construction expenditures, together with interest thereon.

Rate Formulae

Each contractor for a water supply will pay annually (1) a conservation charge, known as the Delta Water Charge, expressed as a rate per acre-foot which will be the same for all contractors, to cover the capital and operating costs of the conservation facilities, and (2) a Transportation Charge to cover the contractor's allocated share of the capital and operating costs of the transportation facilities. In the establishment of the conservation charge, there will be deducted a power credit on account of the revenues of the Oroville-Thermalito power facilities.

The Delta Water Charge is designed to amortize, with interest, over the entire project repayment period the State's capital investment represented by each year's construction expenditures on conservation facilities, together with applicable operating expenses incurred during the year, on the basis of an acre-foot rate applied to the schedule of water deliveries. In general, the Transportation Charge is designed to amortize, with interest, over the ensuing 50 years the State's capital investment represented by each year's construction expenditures on transportation facilities, on the basis of equal annual installments, the applicable operating expenses being added on substantially a pay-as-you-go basis. The portions of the Delta Water Charge and of the Transportation Charge which are calculated to amortize the capital investment

are referred to as the capital cost component of these charges and the portions which are calculated to provide for operating expenses are referred to as the operating expense components.

In general, in the case of agricultural contractors, the allocated share of the capital investment in transportation facilities is amortized, with interest on an acre-foot basis, similar to the method employed for the Delta Water Charge. The purpose of using this basis is to keep the Transportation Charge as low as practicable for these contractors during the early years of operation of the project, thus assisting in the sale of agricultural water and promoting the development of irrigation, including irrigation of large and potentially productive areas not now farmed. This is also in consideration of the fact that the initial payment capacity of agricultural water users is generally more limited than that of municipal and industrial users.

Unlike the general amortization pattern for the capital investment in transportation facilities, which is that of level debt service, the amortization pattern for the capital investment in conservation facilities, and in transportation facilities allocated to agricultural contractors, follows generally the curve of water deliveries. Since the water deliveries will be small in the early years of operation of the project, the application thereto of an acre-foot rate determined as above produces only a small amount of revenues during these early years, which amount is insufficient to carry the interest

charges on the capital investment. The balance is accumulated at interest, so that the revenues derived later in the project repayment period are calculated to be sufficient to amortize the investment with full interest.

The rate formulae are contained in the water supply contracts. Although these contracts are subject to alteration by mutual agreement, the Burns-Porter Act provides that they may not be impaired by legislative action so long as any of the Water Bonds are outstanding.

Adjustment of Delta Water Charge for Supplemental Facilities

For the initial period through 1969, the Delta Water Charge is set at $3.50 per acre-foot. Thereafter a rate is calculated for the remainder of the project repayment period. In the event of the construction of supplemental conservation facilities to supply water to the contractors in addition to the estimated project yield of 4,000,000 acre-feet a year, the Delta Water Charge will be recalculated to take into account the cost of these supplemental facilities.

Under the existing water contracts, the construction of such supplemental conservation facilities may be undertaken only after 1985. If and when this construction is undertaken and bonds are issued therefor, the project repayment period used in determining the Delta Water Charge may be extended to take into account the maturities of these bonds. In that case, as a result of the redetermination of the Delta Water

Charge, the capital investment in the conservation facilities comprising the project (i.e. for an estimated project yield of 4,000,000 acre-feet a year) might not be amortized fully within the project repayment period used in this study.

Effect of Revenue Bond Financing on Delta Water Charge

No effect on the Delta Water Rate ensues from the use of revenue bonds. Under the formula for this charge, as implemented in the existing water contracts, the calculation of the rate does not take into account the manner of financing the Oroville-Thermalito power facilities. The valuation of Oroville-Thermalito power does affect this charge, however, since the market value of the power is applied as a credit in the calculation of the rate. Thus the use of Basis B produces a Delta Water Charge greater by $2.28 per acre-foot after 1969 than that which would be applicable under Basis A.

Revenues Calculated From Formulae

The application of the rate formulae produces net operating revenues as shown below for the year 1990, when deliveries are expected to reach substantially the project yield of 4,000,000 acre-feet annually:

	Basis A	Basis B
	(in millions of dollars)	
Conservation facilities (excluding Oroville-Thermalito power)	$25	$35
Transportation facilities	60	60
San Joaquin Drainage Facilities (a)	2	2
TOTAL	$87	$97

(a) Revenues calculated on the basis of the general formula which is used for the calculation of the Transportation Charge.

The difference in net operating revenues from conservation facilities is equivalent to somewhat more than the aforesaid increase of $2.28 per acre-foot in the Delta Water Charge, which results from the use of Basis B. This is the effect of a difference in the amount of operating costs charged against Oroville-Thermalito power.

In addition, the project will derive revenues from the Oroville-Thermalito power facilities. These revenues are dedicated, under the financial program, to the repayment of the revenue bonds so long as any of them are outstanding. Since, under the recent State Supreme Court decision which has been mentioned, the availability of these revenues, after retirement of the revenue bonds, for the purposes set forth in the Burns-Porter Act, including the service of the Water Bonds, would depend upon future legislative action, these revenues are not treated as so available in this report.

Table 29 sets forth by years information with respect to the amounts of net operating revenues, as calculated from the rate formulae, applicable to the service of the Water Bonds. Because it is assumed for purposes of calculation that the future Water Bond issues for each year will be sold on January 1 of that year, and the amounts of service thereon as shown in the projections are on a calendar year accrual basis, the net operating revenues as used in the financial analysis are adjusted to a similar accrual basis.

Except as to the operating expense component of the Delta Water Charge, the payment of each year's Delta Water Charge is due under the water supply contracts one-half on January 1 and one-half on July 1. The January 1 payment is treated as having accrued during the last six months of the preceding calendar year, and the July 1 payment as having accrued during the first six months of the then current calendar year. In effect, the net operating revenues available for general obligation bond service as calculated in Table 29 treat the operating expense component of the Delta Water Charge and also the actual operating expenses of the conservation facilities for each calendar year as having accrued to the extent of one-half during the preceding calendar year. This treatment is for statistical purposes, and produces a minor overstatement of net operating revenues during the construction period aggregating $2,000,000.

Since, in the case of the transportation facilities, the operating expenses are on a pay-as-you-go basis, the capital cost component of the Transportation Charge is equivalent to the transportation net operating revenues; and, as the payment of this charge is due under the water supply contracts one-half on January 1 and one-half on July 1, the January 1 payment is similarly treated as having accrued during the last six months of the preceding calendar year. The same treatment is applied to the drainage revenues.

The interest rate used in the calculation of the revenues is four percent, which conforms to the assumption hereinafter discussed with respect to the interest rate on future bond issues. On the other hand, the "project interest rate," which is the weighted average interest rate on the Water Bonds, including notes, as used in the calculation of the charges under the water supply contracts, was 3.508 percent as of April 1, 1964, which rate was not materially increased by the subsequent issuance of the Series B Water Bonds. This weighted average interest rate reflects the results of the sale of a minor part of the total general obligation bond issues projected for the State Water Project.

Nonutility Operations

The foregoing discussion of revenues has excluded from consideration the nonutility features of the project, the major parts of which consist of costs allocated to flood control

at Oroville and of the Davis-Grunsky program of loans and grants for local facilities, treated herein as construction expenditures. Under the Burns-Porter Act, $130,000,000 is set aside exclusively for this program.

Davis-Grunsky loans are in the form of interest-bearing loans repayable over not exceeding 50 years. Any loan is limited to the portion of the cost of the particular project which the department finds to be beyond the reasonable ability of the borrower to finance from other sources. Non-reimbursable grants are for expenditures allocable to the enhancement of fish and wildlife or to recreation.

As it cannot be determined at this time to what extent, or on what amortization schedule, the State will recover the Davis-Grunsky loans, no payments of interest or principal thereon are included in the projections herein. This treatment recognizes the fact that recoveries on the Davis-Grunsky loans may be counterbalanced at least partly by those capital and expense requirements applicable to other nonutility features of the project, as to which no recovery can be expected.

Description of Bonds

The following sections describe both the general obligation bonds and the revenue bonds to be used in the financial program.

Pledge of Revenues

The Water Bonds authorized by the Burns-Porter Act are general obligations of the State, for the payment of which, as to principal and interest, there is pledged the full faith and credit of the State and also, with certain exceptions, the net revenues of the project. The Burns-Porter Act provides that the State is obligated to collect annually, in the same manner and at the same time as other state revenue is collected, such a sum, in addition to the ordinary revenues of the State, as shall be required to pay the principal of and interest on the Water Bonds to the extent they cannot be paid from project revenues.

According to an opinion of the Attorney General[6/] the revenues which are pledged by the Burns-Porter Act to the payment of the Water Bonds constitute solely the portion of the revenues which is allocable to the facilities, or portions thereof, constructed out of funds provided by the Burns-Porter Act, namely, proceeds of such bonds and California Water Fund moneys. Revenue bonds issued under the Central Valley Project Act for a portion of the project will be supported by the portion of the revenues which is allocable to the facilities, or portions thereof, constructed out of the proceeds of such revenue bonds. Also, if additional general obligation bonds

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6/ 36 Ops. Cal. Atty. Gen. 160 (1960).

are issued under a supplemental bond act to finance the completion of construction or the enlargement of the project, they can also be serviced out of net revenues of the project. This is in line with the recent State Supreme Court decision previously mentioned.

The Burns-Porter Act directs the application of the net revenues pledged thereby, after the payment of current Water Bond service, to the reimbursement of (1) the General Fund, with simple interest, at the rate borne by the Water Bonds, for previous advances therefrom for the service of the Water Bonds, and (2) the California Water Fund, without interest, for construction payments made therefrom. If additional general obligation bonds are issued on a self-supporting basis, this could be accomplished by a provision in the supplemental bond act therefor that the application of any available revenues to their service would take precedence over reimbursement of the California Water Fund. After reimbursement of the California Water Fund, any remaining net revenues become available under the Burns-Porter Act for further construction.

Pattern of General Obligation Bond Service

Under the Burns-Porter Act, each issue of the Water Bonds must commence to mature not later than ten years after issuance, with a final maturity not later than 50 years after issuance. As the rate formulae for sales of water to be delivered by the project are intended to amortize, over not

less than 50 years, the State's capital investment represented by construction expenditures for the utility portion of the project, it is necessary in order to make the Water Bonds revenue-supported that the repayment of the bonds be likewise scheduled over a long period. A bond service pattern which is considered appropriate to the revenue pattern is obtained by providing no maturities until the tenth anniversary after issuance, with maturities scheduled so as to produce level annual service for the last 41 years from the time of issue. For four percent bonds, the annual service for the first nine years would be four percent (interest only), and for the remaining 41 years approximately five percent (interest plus principal payments), of the issue. The average life of such an issue is $35\frac{1}{4}$ years. This is the bond service pattern which is used in this study as to future issues.

The Series A and Series B bonds depart slightly from a pattern of level bond service, in order to accommodate the preference of bidders for a maturity schedule wherein the annual maturities are fixed at constant amounts for several years at a time, instead of at amounts increasing from each year to the next, as would be required for level bond service. Also, the pattern of bond service for any series of Water Bonds will necessarily vary from level service because this pattern results, in part, from the naming by the successful bidder of different coupon rates for different maturities, in accordance with customary state practice and with a view to producing the

lowest possible overall net interest cost. This is a matter under the control of the bidders and not of the department. However, the variations from level bond service are not of sufficient magnitude to invalidate the assumption of level bond service for planning purposes, especially when it is considered that the issuance, over a period of years, of succeeding series of Water Bonds with maturity schedules similar to those of the Series A and Series B bonds would tend to spread out the peaks and dips in annual bond service of the various series, and thus to smooth out the overall pattern.

It must be expected that the interest cost on general obligation bonds maturing over a 50-year period will be higher than that which would apply on the State's other bond issues, if the maturities of the latter are scheduled, as has usually been the case, over a period not exceeding 26 years. As has been shown earlier in this report, the difference in net interest cost as between Water Bonds extending to 50 years and school bonds extending to 26 years was about 0.33 of one percent at the time of the May 1964 financing. In the 1920's, when the tax advantages of state and municipal bonds were small compared with what they are now, the State rarely had to pay on its borrowings a rate as high as four percent. The year 1959 was the first since 1933 in which the State had to pay a rate as high as four percent on its bond sales, and more recently the rate has been considerably lower. The department, in its calculations, has assumed an overall tax-exempt interest rate

of four percent for the Water Bonds to be hereafter issued which provides a reasonable cushion when compared with the current project interest rate.

On the foregoing basis, and giving effect to the proposed schedule of issuance, the annual service on the Water Bonds to be issued for the project would be as shown in Table 34.

Refunding

Although the Burns-Porter Act contains no provision for refunding the bonds, they could, of course, be refunded under a supplemental bond act as to one or more series. The Series A and Series B Water Bonds which have been issued to date include a provision which permits refunding by redemption in 1983 or thereafter.

Revenue Bonds

The revenue bonds, as planned, will mature over a period of not exceeding 50 years from the date of the first issue, with fixed retirements, in the form of sinking fund payments or a combination of sinking fund payments and serial maturities, calculated to produce approximately level annual bond service for the period from the first full year of operation of the Oroville-Thermalito power facilities to the final maturity of the bonds. The problem of forecasting an interest rate for these does not present the same difficulty as in the case of the Water Bonds, since the sale of the

Oroville revenue bonds is expected to be completed within the next three years. In any case the interest rate can be expected to be higher than that which will then be obtainable on the State's general obligation bonds. Under present conditions it would be reasonable to expect that the rate for the revenue bonds would not exceed four percent, but the actual rate will of course depend on conditions prevailing at the time of sale.

It is assumed that there will be a power contract or contracts covering the sale of the power to be provided by the Oroville-Thermalito power facilities, extending over the period to final maturity of the bonds. Under the Central Valley Project Act, a power contract made with other than a state agency must be cancellable by the department upon five years' notice, if and when the State or any financially responsible state agency makes application for the power, but only if the applicant enters into a contract whereby the State receives a total revenue or consideration at least equal to that which it would have received under the original contract. As the revenue bondholders will thus be protected by statute in respect of the amount of revenues available to service their bonds, it is believed that this provision of the Central Valley Project Act will not constitute a serious impediment to the marketing of the bonds.

For the reasons which have been stated in this report, the financial analysis herein excludes a detailed analysis of

the amount of revenue bonds issuable for the Oroville-Thermalito power facilities, of the revenues applicable thereto and of the amortization schedule. Since these bonds will be set up on a self-supporting basis, this detailed analysis with respect to revenue bonds is not needed for the purpose of the present report, or in order to evaluate the financial program with respect to the Water Bonds.

Financial Analysis

The entire financial analysis as relating to general obligation bonds is contained in Tables 30 and 31.

The preceding discussion has included, in summarized form, a statement of the sources of funds to be used for construction of the State Water Project, as shown in greater detail in these tables. It has also included a statement, as derived from the financial analysis, of the Offset Bonds which are reserved under the Burns-Porter Act for additional facilities.

The financial analysis shows that on the basis of the projections therein the net operating revenues, together with the Oroville flood control reimbursement moneys, are sufficient at all times to take care of the entire general obligation bond service, thus creating no impact upon the General Fund for this purpose. It also shows a substantial remainder, following the completion of the construction period, of net operating revenues after providing for bond service.

The following summaries have been prepared from the financial analysis:

	1961-1970	1971-1980	1981-1990	Balance of project repayment period	Total
	(in millions of dollars)				
Basis A					
Net operating revenues	$141	$604	$797	$2,891	$4,433
General obligation bond service	201	620	750	2,119	3,690
Less: portion paid from Oroville reimbursement (including interest earned thereon)	60	16	0	0	76
Portion paid from net operating revenues	141	604	750	2,119	3,614
Remainder of net operating revenues	0	0	47	772	819
Reimbursement of California Water Fund	0	0	47	319	366
Available for further construction	0	0	0	453	453

	1961-1970	1971-1980	1981-1990	Balance of project repayment period	Total
	(in millions of dollars)				
Basis B					
Net operating revenues	$146	$642	$874	$3,282	$4,944
General obligation bond service	212	643	769	2,153	3,777
Less: portion paid from Oroville reimbursement (including interest earned thereon)	66	7	0	0	73
Portion paid from net operating revenues	146	636	769	2,153	3,704
Remainder of net operating revenues	0	6	105	1,129	1,240
Reimbursement of California Water Fund	0	6	105	269	380
Available for further construction	0	0	0	860	860

The greater amounts of net operating revenues in Basis B as compared with Basis A result from the related increase in the Delta Water Charge which has been discussed previously.

The reimbursements of the California Water Fund during the periods through 1990 include moderate amounts of net operating revenues ($3,000,000 in Basis A and $17,000,000 in Basis B) paid into this fund and applied therefrom to construction. Reimbursement of this fund is completed about the year 2015 in Basis A and about the year 2005 in Basis B, the acceleration in the latter case being due to the higher amounts of net operating revenues.

The amounts of net operating revenues, available for further construction, remaining after reimbursement of the California Water Fund reflect principally the accumulation, in the revenue formulae, of interest on capital expenditures financed by the California Water Fund and the repayment, with interest, of expenditures financed from funds provided prior to the effective date of the Burns-Porter Act. These amounts, under the Burns-Porter Act, would be applied to the construction of additional water facilities. The greater size of these amounts in Basis B likewise reflects the higher amounts of net operating revenues.

As has been stated, the availability of Oroville-Thermalito power revenues after retirement of the revenue bonds

for application under the Burns-Porter Act would depend upon future legislative action. If these revenues are made so available, the reimbursement of the California Water Fund would be accomplished earlier than has been indicated above, and the amounts of net operating revenues, available for further construction, remaining after such reimbursement would be materially increased.

TABLE 1

CONSTRUCTION CONTRACTS
AS OF FEBRUARY 1, 1964

SPECIFICATION NUMBER	CONTRACT	CONTRACTOR	TOTAL COST (in dollars)	DATE STARTED	DATE COMPLETED	PERCENT COMPLETE FEB. 1, 1964
	UPPER FEATHER DIVISION					
59-19	Frenchman Dam & Reservoir	Isbell Construction Company Reno, Nevada	1,725,827	Sep. 15, 1959	Oct. 18, 1961	100
62-04	Frenchman Dam - Road Relocations	Isbell Construction Company Reno, Nevada	258,293	Jul. 21, 1962	Nov. 16, 1962	100
62-20	Antelope Valley Dam & Reservoir	Norman I. Fidel, Inc. & Granite Construction Company Eureka, California	2,909,774*	Aug. 28, 1962		87
63-14	Recreation Access Road near Frenchman Reservoir	A. Teichert & Son, Inc. Sacramento, California	326,138*	Sep. 20, 1963		13
	Division Total		5,220,032			88
	OROVILLE DIVISION					
57-3TC-38Y	U.S. 40A, Wicks Corner to Jarbo Gap	McCammon-Wunderlich San Diego, California	8,546,738	June 1957	Dec. 16, 1960	100
Agreement No. 351653	Poe Siding (Administered by W.P.R.R.)	Morrison-Knudsen Company Oroville, California	508,588*			100
57-03	Western Pacific R.R. - Tunnels Nos. 4 & 5	Peter Kiewit Sons' Company Omaha, Nebraska	10,417,600	May 24, 1957	Dec. 30, 1960	100
57-13	Western Pacific R.R. - North Fork Bridge	Pacific Bridge Company Alameda, California	1,580,940	Feb. 10, 1958	Jun. 29, 1960	100
58-01	Western Pacific R.R. - Feather River Bridge	John C. Gist Sacramento, California	1,293,159	Apr. 29, 1958	Mar. 16, 1960	100
59-16	Western Pacific R.R. - Tunnels Nos. 2 & 3	Gordon H. Ball, Gordon H. Ball, Inc., and Ball & Simpson Danville, California	6,236,000	Aug. 11, 1959	Sep. 8, 1961	100
60-07	Western Pacific R.R. - Tunnel No. 1	Frazier-Davis Construction Company St. Louis, Missouri	1,951,632	Aug. 1, 1960	Nov. 3, 1961	100
60-08	Western Pacific R.R. - Grading Oroville to West Branch Bridge	Gordon H. Ball, Gordon H. Ball, Inc., and Ball & Simpson Danville, California	4,043,180	Sep. 15, 1960	Apr. 20, 1962	100
60-14TC16-Y	U.S. 40A - West Branch Bridge	Stolte & Morrison-Knudsen Oakland, California	8,620,000	Nov. 10, 1959	Feb. 20, 1962	100
60-21	Western Pacific R.R. - Western Union Telegraph Line Relocation	Coopman Electric Company San Francisco, California	262,352	Oct. 28, 1960	Aug. 2, 1962	100
61-05	Diversion Tunnel No. 1	Frazier-Davis Construction Company St. Louis, Missouri	6,193,685*	Aug. 18, 1961	Dec. 27, 1963	100
61-15	Palermo Outlet Works	Morrison-Knudsen Company Oroville, California	801, 118	Nov. 16, 1961	May 7, 1963	100
61-17	Western Pacific R.R. - Section Headquarters	El Rey Builders, Inc. Van Nuys, California	168,324	Dec. 11, 1961	Jul. 13, 1962	100
61-21	Waterproofing North Fork and Feather River Bridges	Sacramento Roofing & Insulation Company, Inc. Sacramento, California	16,658	Jan. 3, 1962	Mar. 30, 1962	100
62-01	Feather River Hatchery - Interim Facilities	Frazier-Davis Construction Company St. Louis, Missouri	1,096,726*	Mar. 16, 1962		74
62-3T3C26	U.S. 40A - Oroville to Wicks Corner	Harms Bros. & Lord & Bishop, Inc. Sacramento, California	3,741,510*	Jan. 4, 1962	Jan 16, 1964	100
63-3T13C1	U.S. 40A - Approaches & Surfacing West Branch Bridge	Baldwin Construction Company Marysville, California	222,241	Mar. 22, 1962	Sep. 26, 1962	100
62-05	Oroville Dam, Diversion Tunnel No. 2, & Thermalito Diversion Dam	Oro Dam Constructors Oroville, California	120,863,333*	Aug. 13, 1962		31
62-11	Oroville Seismograph Station	El Rey Builders, Inc. Van Nuys, California	39,469	Jul. 23, 1962	Oct. 26, 1962	100
62-13	Left Abutment Access Road	Piombo Construction Company San Carlos, California	549,400	Jul. 14, 1962	Apr. 9, 1963	100
62-27	Oroville Construction Headquarters	A. Teichert & Son, Inc. Sacramento, California	938,000*	Nov. 16, 1962	Oct. 25, 1963	100
62-30	Middle Fork Bridge	Bethlehem Steel Company San Francisco, California	4,436,104*	Feb. 11, 1963		24
63-04	Employee Housing	Nomellini Construction Company Stockton, California	659,095*	Jul. 9, 1963		44
63-05	Turbines & Pump Turbines - Oroville Powerplant	Allis-Chalmers Mfg. Company York, Pennsylvania	7,238,791*	Jun. 17, 1963		L.S.
63-06	Oroville Powerplant	McNamara Corp. & G.A. Fuller Company Burlingame, California	18,366,780*	Jun. 24, 1963		10
63-11	Modification & Repairs to Power Canal	Baldwin Construction Company Marysville, California	24,262	Mar. 28, 1963	May 7, 1963	100

L.S. (Lump Sum); Total payment to be made upon delivery of units.

* Bid amount.

TABLE 1 (Continued)

CONSTRUCTION CONTRACTS
AS OF FEBRUARY 1, 1964

SPECIFICATION NUMBER	CONTRACT	CONTRACTOR	TOTAL COST (in dollars)	DATE STARTED	DATE COMPLETED	PERCENT COMPLETE FEB. 1, 1964
	OROVILLE DIVISION (continued)					
63-35	Oroville to Quincy County Road - Forbestown Road to Middle Fork Bridge	Piombo Construction Company San Carlos, California	1,053,196*	Dec. 20, 1963		3
63-38	Construction Overlook Modifications	A. Teichert & Son, Inc. Sacramento, California	138,483*	Dec. 18, 1963		9
	Division Total		210,007,364			48
	SOUTH BAY AQUEDUCT					
59-22	Interim Canal, Forebay Pumping Plant & Bethany Dam**	O.K. Mittry & Sons Gardena, California	876,339	Nov. 25, 1959	Mar. 9, 1961	100
60-01	South Bay Pumping Plant	Fred J. Early, Jr. Company, Inc. Torrance, California	869,157	May 26, 1960	May 23, 1962	100
60-14	Pumping Units - South Bay & Forebay Pumping Plants	Fairbanks-Morse & Company Sacramento, California	101,324	Sep. 9, 1960	Aug. 7, 1962	100
60-15	Surge Tank to Patterson Reservoir	Case-Hood Whittier, California	3,204,072	Nov. 15, 1960	Aug. 8, 1962	100
62-08	Asphalt Lining - Interim Canal	Capitol Roofing Company, Inc. Sacramento, California	38,703	Mar. 19, 1962	Apr. 9, 1962	100
62-12	Alameda Division Canal	McGuire & Hester Oakland, California	1,420,018	Aug. 7, 1962	Aug. 27, 1963	100
62-15	Mortar Lining - Interim Canal	Sacramento Gunite Company Sacramento, California	9,902	Jun. 1, 1962	Jun. 8, 1962	100
62-35	Project Maintenance Headquarters	Red Feather Construction Company Hayward, California	38,104	Jan. 22, 1963	Jun. 14, 1963	100
63-02	Instrumentation & Control	Darrel E. Jordon Fullerton, California	50,900*	May 27, 1963		88
63-03	La Costa & Mission Tunnels	Peter Kiewit Sons' Company Omaha, Nebraska	2,679,194*	Apr. 9, 1963		69
63-12	Forebay Pump Procurement	Fairbanks-Morse & Company Sacramento, California	21,048*	Apr. 11, 1963		L.S.
63-13	South Bay Pump Procurement	Peerless Pump Division Sacramento, California	108,300*	Apr. 11, 1963		L.S.
63-15	Installation of Additional Pump Units-South Bay & Forebay Pumping Plants	Fred J. Early, Jr. Company, Inc. Torrance, California	79,880*	Jul. 25, 1963		74
63-16	Del Valle & Sunol Pipelines	U. S. Steel Corporation South San Francisco, California	3,685,315*	Jul. 10, 1963		33
63-24	Floor Surfacing - South Bay Pumping Plant	Kivah Corporation Sacramento, California	4,546	Aug. 22, 1963	Sep. 19, 1963	100
63-31	Patterson Reservoir Repair	McGuire & Hester Oakland, California	24,865	Aug. 24, 1963	Sep. 23, 1963	100
63-33	Pump Units Nos. 8 & 9 - South Bay Pumping Plant	Johnston Pump Company Pasadena, California	129,021*	Oct. 24, 1963		L.S.
63-34	South Bay Pumping Plant - 2nd Stage	S & Q Construction Company South San Francisco, California	592,777*	Oct. 22, 1963		14
63-40	30-Inch Discharge Valves - South Bay P.P. - 2nd Stage	Chapman Valve Mfg. Company Emeryville, California	52,921*	Feb. 24, 1964		L.S.
63-41	South Bay Pumping Plant to Dyer Canal-2nd Stage	Green Construction Company & Winton Bros. Company San Mateo, California	1,202,055*	Jan. 23, 1964		0
	Total South Bay Aqueduct		15,188,441			43
	NORTH SAN JOAQUIN DIVISION					
63-01	1st Stage Construction, Sta. 2500 to Sta. 3000	Eugene Luhr Company & Elmer G. Wendt Rio Vista, California	750,117*	Feb. 8, 1963	Dec. 5, 1963	100
63-21	Delta Seismograph Station	Chas. I. Cunningham Company Oakdale, California	2,999*	Oct. 5, 1963	Jan. 3, 1964	100
63-22	Intake Channel - Sta. 85+00 to Sta. 174+50	Peter Kiewit Sons' Company Omaha, Nebraska	5,699,280*	Jul. 27, 1963		42
63-28	1st Stage Construction, Sta. 175 to Sta. 655	Morrison-Knudsen Co. Southgate, California	1,657,542*	Sep. 6, 1963		31
	Division Total		8,109,938			65

L.S. (Lump Sum); Total payment to be made upon delivery of units.

* Bid amount.

** Feature of the California Aqueduct.

TABLE 1 (Continued)

CONSTRUCTION CONTRACTS
AS OF FEBRUARY 1, 1964

SPECIFICATION NUMBER	CONTRACT	CONTRACTOR	TOTAL COST (in dollars)	DATE STARTED	DATE COMPLETED	PERCENT COMPLETE FEB. 1, 1964
	SOUTH SAN JOAQUIN DIVISION					
63-18	Drilling & Developing Two 16-inch Water Wells	Midway Drilling & Pump Company Saticoy, California	160,657*	Jun. 24, 1963	Nov. 13, 1963	100
63-32	Preconsolidation Features - Mi. 283.9 to Mi. 288.7	Pascal & Ludwig Upland, California	610,539*			21
	Division Total		771,196			60
	TEHACHAPI DIVISION					
63-19	Tehachapi Access Roads	William H. Schallock Bakersfield, California	559,598*	Jul. 9, 1963		70
	Division Total		559,598			87
	SAN LUIS DIVISION (Major U.S.B.R. Contracts)					
	Detour of State Highway Route 152	James H. Harrison San Ardo, California	287,269*	Aug. 13, 1962	Feb. 9, 1963	100
	Preconsolidation - Reach 2	Wilmoth Construction Company Fresno, California	266,131*	Oct. 24, 1962	Jan. 22, 1963	100
	Pump-Turbines - San Luis Pumping-Generating Plant	Hitachi, New York, Ltd. New York, New York	3,221,813*	Nov. 20, 1962		15
	Relocation of State Highway Route 152 (Administered by California Division of Highways)	McNamara & Mannix Burlingame, California	12,030,208*	January 1963		48
	Preconsolidation - Reach 3	Eugene Luhr Company & Elmer G. Wendt Rio Vista, California	1,230,027	Feb. 8, 1963	November 1963	100
	San Luis Dam, Pumping-Generating Plant and Forebay Dam	Morrison-Knudsen Company, Utah Construction & Mining Company, and Brown & Root Southgate, California	85,926,608*	Feb. 4, 1963		30
	Pumps - Mile 18 Pumping Plant	English Electric Company New York, New York	2,039,250*	Jun. 10, 1963		7
	San Luis Canal - Reach 1	Guy F. Atkinson Company San Francisco, California	16,493,785*	Jun. 5, 1963		13
	San Luis Canal - Reach 2	Morrison-Knudsen Company and Utah Construction & Mining Company Southgate, California	11,946,556*	Aug. 30, 1963		3
	Mile 18 Pumping Plant	Stolte, Sundt & Santa Fe Oakland, California	8,972,555*	Sep. 18, 1963		4
	Division Totals, State share Federal share		78,327,811 64,086,391			38 38
	Total California Aqueduct (State)		87,768,543			40
	TOTAL STATE TOTAL FEDERAL		318,184,380 64,086,391			46
	GRAND TOTAL		382,270,771			

* Bid amount.

TABLE 2

ESTIMATED ANNUAL WATER REQUIREMENTS IN THE DELTA AND TRIBUTARY AREAS

(in thousands of acre-feet)

	1960	1965	1975	1985	1995	2005	2015
TOTAL BENEFICIAL LOCAL USE:							
Irrigation consumptive use of applied water	6,556	6,830	7,615	8,446	9,040	9,473	9,735
Urban and suburban consumptive use	188	236	358	538	786	1,060	1,397
Miscellaneous consumptive use	114	127	152	176	201	226	250
Subtotal	6,858	7,193	8,125	9,160	10,027	10,759	11,382
TOTAL ASSOCIATED WATER LOSSES:							
Reservoir evaporation	343	359	404	455	497	532	562
Salt balance outflow	249	265	281	298	302	302	295
Subtotal	592	624	685	753	799	834	857
*TOTAL BASIN EXPORTS UNDER EXISTING RIGHTS	1,518	1,639	1,970	2,144	2,144	2,144	2,144
TOTAL ANNUAL REQUIREMENTS	8,968	9,456	10,780	12,057	12,970	13,737	14,383
INCREASES OVER 1960 REQUIREMENTS	0	488	1,812	3,089	4,002	4,769	5,415

* Consists of those for: the Cache Slough Diversion by the City of Vallejo, the Contra Costa Canal and Friant-Kern Canal of the Central Valley Project, the Mokelumne Aqueduct of the East Bay Municipal Utility District, and the Hetch Hetchy Aqueduct of the City of San Francisco.

TABLE 3

INFLOWS TO THE SACRAMENTO-SAN JOAQUIN DELTA*

(in thousands of acre-feet)

CALENDAR YEAR	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1922	1,718	4,162	2,632	2,104	3,085	2,293	1,280	1,084	1,087	802	802	1,621	22,670
23	1,780	1,219	1,035	1,967	1,445	1,112	990	1,019	1,042	871	721	1,604	14,805
24	594	704	488	544	581	671	857	941	901	711	609	666	8,267
25	704	4,289	1,211	1,495	1,309	821	989	1,034	1,035	763	581	663	14,894
26	716	3,228	978	1,279	675	788	989	1,021	1,027	747	1,048	1,149	13,645
27	1,671	7,913	3,035	2,919	1,908	1,199	1,107	1,074	1,046	844	1,048	989	24,753
28	0	0	0	2,289	1,019	787	990	1,041	1,041	746	563	558	9,034
29	601	655	684	615	672	746	989	1,007	1,018	747	518	600	8,852
1930	1,133	809	1,585	868	714	786	988	994	1,017	771	524	490	10,679
31	531	495	613	498	463	545	747	893	905	716	516	723	7,645
32	1,307	1,402	621	612	1,018	1,016	992	1,010	996	702	493	521	10,690
33	742	635	315	632	647	786	1,326	1,328	994	721	509	472	9,107
34	900	574	618	567	570	658	985	1,083	925	735	612	485	8,712
35	1,681	1,891	1,572	3,028	1,567	1,195	1,049	1,028	1,011	807	592	549	15,970
36	2,642	6,189	2,687	1,392	1,456	1,210	989	1,032	1,010	810	555	545	20,517
37	856	2,236	2,867	1,628	1,560	1,135	1,030	1,036	1,009	805	1,520	4,765	20,447
38	1,870	8,520	9,487	5,393	5,249	3,989	1,619	1,163	1,041	948	727	908	40,914
39	906	1,039	1,150	623	653	786	988	967	1,004	740	514	478	9,848
1940	1,751	4,471	6,051	5,095	1,536	1,044	1,000	1,027	1,012	747	644	3,861	28,239
41	6,559	6,917	5,787	4,680	3,219	1,760	1,263	1,090	1,029	844	854	4,229	38,231
42	4,944	7,601	1,910	2,847	3,168	2,355	1,250	1,079	1,033	966	927	1,813	29,893
43	5,333	3,839	4,685	2,603	1,863	1,229	993	1,027	1,019	857	716	748	24,912
44	892	1,956	1,519	695	767	823	989	1,013	1,021	763	743	860	12,041
45	702	4,168	2,039	1,098	1,272	1,129	989	1,055	1,041	791	942	4,335	19,561
46	3,373	1,143	1,608	1,390	1,685	937	988	1,011	1,051	803	686	901	15,576
47	787	979	1,718	861	664	774	989	996	1,025	785	613	511	10,702
48	650	559	753	2,238	2,361	1,841	1,042	1,014	1,042	811	610	741	13,662
49	691	1,063	3,068	1,102	1,177	807	987	1,032	1,058	744	574	508	12,811
1950	1,246	1,961	1,579	1,541	1,538	1,228	998	1,060	1,045	794	3,463	7,395	23,848
1951	4,617	4,851	2,535	1,178	1,810	931	989	1,040	1,088	815	844	2,841	23,539

* Under conditions projected for the year 2035.

TABLE 4

GENERAL DATA
RELATING TO WATER SUPPLY CONTRACTORS

AGENCY	LOCATION (County)	OFFICE (City)	PREDOMINANT TYPE OF WATER SERVICE	MAXIMUM ANNUAL ENTITLEMENT (Acre-feet)	DATE EXECUTED	GROSS AREA (Acres)	ASSESSED VALUATION (1960)	POPULATION (1960)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Feather River Area								
City of Yuba City	Sutter	Yuba City	Urban	8,300	Dec. 30, 1963	2,700	$ 26,500,000	11,500
County of Butte	Butte	Oroville	Urban	27,500	Dec. 26, 1963	1,066,000	157,500,000	82,000
Plumas County Flood Control and Water Conservation District	Plumas	Quincy	Urban	2,700	Dec. 26, 1963	1,645,000	73,000,000	11,600
North Bay Area								
Napa County Flood Control and Water Conservation District	Napa	Napa	Urban	25,000	Dec. 19, 1963	505,000	89,400,000	65,900
Solano County Flood Control and Water Conservation District	Solano	Fairfield	Urban	42,000	Dec. 26, 1963	529,000	178,800,000	134,600
South Bay Area								
Alameda County Flood Control and Water Conservation District, Zone 7	Alameda	Hayward	Urban	40,000	Nov. 20, 1961	272,000	47,300,000*	30,000
				6,000	Dec. 30, 1963			
Alameda County Water District	Alameda	Fremont	Urban	42,000	Nov. 29, 1961	64,000	109,500,000*	60,000
Santa Clara County Flood Control and Water Conservation District	Santa Clara	San Jose	Urban	88,000	Nov. 20, 1961	835,000	1,266,400,000	642,300
				12,000	Dec. 30, 1963			
San Joaquin Valley								
Devil's Den Water District	Kings & Kern	Fresno	Agricultural	11,000	Dec. 20, 1963	8,800	260,000*	Less than 100
Dudley Ridge Water District	Kings	Corcoran	Agricultural	50,000	Dec. 13, 1963	47,200	390,000*	Less than 100
Empire West Side Irrigation District	Kings	Lemoore	Agricultural	3,000	Dec. 30, 1963	7,700	500,000*	Less than 100
Hacienda Water District	Kings	Corcoran	Agricultural	8,500	Dec. 20, 1963	15,200	180,000*	Less than 100
Kern County Water Agency	Kern	Bakersfield	Agricultural	1,000,000	Nov. 15, 1963	5,229,000	735,700,000	292,000
Tulare Lake Basin Water Storage District	Kings & Tulare	Corcoran	Agricultural	90,000	Dec. 20, 1963	193,500	8,500,000*	Less than 100
				20,000	Dec. 30, 1963			
Central Coastal Area								
San Luis Obispo County Flood Control and Water Conservation District	San Luis Obispo	San Luis Obispo	Urban	25,000	Feb. 26, 1963	2,128,600	142,900,000	81,000
Santa Barbara County Flood Control and Water Conservation District	Santa Barbara	Santa Barbara	Urban	50,000	Feb. 26, 1963	1,756,800	327,600,000	169,000
Southern California								
Antelope Valley-East Kern Water Agency	Los Angeles & Kern	Lancaster	Urban	120,000	Sep. 20, 1962	1,360,000	140,800,000	65,000
City of West Covina	Los Angeles	West Covina	Urban	10,000	Dec. 2, 1963	7,800	76,300,000	50,600
Coachella Valley County Water District	Riverside & Imperial	Coachella	Urban	20,000	Mar. 29, 1963	567,000	96,200,000	37,000
Crestline-Lake Arrowhead Water Agency	San Bernardino	Crestline	Urban	5,000	Jun. 22, 1963	42,900	22,400,000	6,700
Desert Water Agency	Riverside	Palm Springs	Urban	33,000	Oct. 17, 1962	107,000	82,800,000	18,600
Littlerock Creek Irrigation District	Los Angeles	Littlerock	Urban	2,000	Jun. 22, 1963	10,200	2,400,000	1,200
Mojave Water Agency	San Bernardino	Victorville	Urban	44,000	Jun. 22, 1963	2,750,000	125,800,000	45,000
Palmdale Irrigation District	Los Angeles	Palmdale	Urban	15,000	Feb. 2, 1963	7,600	15,600,000	12,000
San Bernardino Valley Municipal Water District	San Bernardino	San Bernardino	Urban	85,000	Dec. 30, 1960	143,000	332,000,000	240,000
San Gabriel Valley Municipal Water District	Los Angeles	Alhambra	Urban	25,000	Nov. 3, 1962	20,000	219,200,000	123,000
San Gorgonio Pass Water Agency	Riverside	Beaumont	Urban	15,000	Nov. 16, 1962	129,000	32,300,000	20,800
The Metropolitan Water District of Southern California	Los Angeles, San Diego, Riverside, San Bernardino, Orange, & Ventura	Los Angeles	Urban	1,500,000	Nov. 4, 1960	2,200,000	13,738,000,000	7,329,000
Upper Santa Clara Valley Water Agency	Los Angeles	Newhall	Urban	23,000	Apr. 30, 1963	79,000	47,200,000	15,000
Ventura County Flood Control District	Ventura	Ventura	Urban	20,000	Dec. 2, 1963	1,189,000	482,600,000	199,100
TOTALS FOR AGENCY AREAS				3,468,000		22,918,000	$18,576,030,000	9,743,400
Percent of State Total in Agency Areas						23%	63%	62%
TOTALS FOR STATE						101,314,000	$29,600,920,000	15,717,000

* 1962-63 values.

TABLE 5

SUMMARY OF MAXIMUM ANNUAL ENTITLEMENTS
AND REQUESTS FOR OPTION WATER

(in acre-feet per year)

SERVICE AREA	EXISTING MAXIMUM ANNUAL ENTITLEMENTS	ENTITLEMENTS TO UNCOMMITTED YIELD UNDER OPTION PROVISION	EXPRESSIONS RECEIVED		TOTAL, EXISTING ENTITLEMENTS AND EXPRESSIONS RECEIVED
			UNDER OPTION PROVISION	UNDER REQUEST PROVISION	
	(1)	(2)	(3)	(4)	(5)
Feather River	38,500	5,900	0	0	38,500
North Bay	67,000	10,200	0	0	67,000
South Bay	188,000	28,900	0	0	188,000
San Joaquin Valley	1,182,500	181,400	162,800	80,250	1,425,550
Central Coastal	75,000	11,500	7,700	0	82,700
Southern California	1,917,000	294,100	285,700	358,200	2,560,900
TOTAL, STATE WATER PROJECT	3,468,000	532,000	456,200	438,450	4,362,650

TABLE 6

DISTRIBUTION OF MAXIMUM ANNUAL ENTITLEMENTS

(in acre-feet)

SERVICE AREA	EXISTING MAXIMUM ANNUAL ENTITLEMENTS	ASSUMED DISTRIBUTION OF UNCONTRACTED WATER	TOTAL OF EXTIMATED MAXIMUM ANNUAL ENTITLEMENTS FOR THIS ANALYSIS	TOTAL OF ESTIMATED MAXIMUM ANNUAL ENTITLEMENTS FOR BULLETIN NO. 132-63	CHANGE IN ESTIMATES
	(1)	(2)	(3)	(4)	(5)
Feather River	38,500	0	38,500	275,000	(-) 236,500
North Bay	67,000	6,000	73,000	150,000	(-) 77,000
South Bay	188,000	6,000	194,000	210,000	(-) 16,000
San Joaquin Valley	1,182,500	180,000	1,362,500	1,475,000	(-) 112,500
Central Coastal	75,000	0	75,000	75,000	0
Southern California	1,917,000	340,000	2,257,000	1,800,000	(+) 457,000
Unallocated	0	0	0	15,000	(-) 15,000
TOTAL, STATE WATER PROJECT	3,468,000	532,000	4,000,000	4,000,000	0

TABLE 7

ANNUAL ENTITLEMENTS TO PROJECT WATER[1]

(in acre-feet)

CALENDAR YEAR	FEATHER RIVER AREA				NORTH BAY AREA				SOUTH BAY AREA[2]				
	CITY OF YUBA CITY	COUNTY OF BUTTE	PLUMAS COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	TOTAL	NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	SOLANO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	ASSUMED ELECTIONS UNDER ARTICLE 8	TOTAL	ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT ZONE 7	ALAMEDA COUNTY WATER DISTRICT	SANTA CLARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	ASSUMED ELECTIONS UNDER ARTICLE 8	TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1962									494	8,412			8,906
63									1,731	10,914			12,645
64									2,000	25,776			27,776
65									3,200	18,800	25,600		47,600
66									3,600	19,400	38,100		61,100
67			250	250					4,000	14,300	50,600		68,900
68		300	270	570					7,500	15,000	88,000	200	110,700
69		350	300	650					8,800	15,500	88,000	400	112,700
1970		400	440	840					10,000	16,200	88,000	600	114,800
71		450	470	920					11,200	17,000	88,000	800	117,000
72		500	500	1,000					12,400	17,900	88,000	1,000	119,300
73		600	530	1,130					13,600	18,800	88,000	1,200	121,600
74		700	560	1,260					14,800	19,600	88,000	1,400	123,800
75		1,050	590	1,640					16,000	20,500	88,000	1,600	126,100
76		1,400	620	2,020					17,200	21,300	88,000	1,800	128,300
77		1,800	650	2,450					18,400	22,200	88,000	2,100	130,700
78		2,200	680	2,880					19,600	23,100	88,000	2,400	133,100
79		2,600	710	3,310					20,800	23,900	88,000	2,700	135,400
1980		4,000	740	4,740	12,500	6,750	500	19,750	22,000	24,800	88,000	3,000	137,800
81	4,200	5,450	770	10,420	13,750	8,000	1,000	22,750	23,000	26,000	88,000	3,300	140,300
82	4,600	6,900	800	12,300	15,000	9,400	1,500	25,900	24,000	27,200	88,000	3,600	142,800
83	5,050	8,350	830	14,230	16,250	10,800	2,000	29,050	25,000	28,400	88,000	3,900	145,300
84	5,500	9,800	860	16,160	17,500	12,100	2,500	32,100	26,000	29,600	88,000	4,200	147,800
85	5,950	12,250	890	19,090	18,750	14,000	3,000	35,750	27,000	30,800	88,000	4,500	150,300
86	6,400	14,700	920	22,020	20,000	16,500	3,600	40,100	28,000	32,100	88,000	4,800	152,900
87	6,850	17,150	960	24,960	21,250	20,000	4,200	45,450	29,000	33,300	88,000	5,100	155,400
88	7,300	20,600	1,000	28,900	22,500	27,000	4,800	54,300	30,000	34,500	88,000	5,400	157,900
89	7,800	24,050	1,040	32,890	23,750	34,500	5,400	63,650	31,000	35,700	90,000	5,700	162,400
1990	8,300	27,500	1,080	36,880	25,000	42,000	6,000	73,000	32,000	36,900	92,000	6,000	166,900
91	8,300	27,500	1,120	36,920	25,000	42,000	6,000	73,000	34,000	38,400	94,000	6,000	172,400
92	8,300	27,500	1,160	36,960	25,000	42,000	6,000	73,000	36,000	39,900	96,000	6,000	177,900
93	8,300	27,500	1,200	37,000	25,000	42,000	6,000	73,000	38,000	41,400	98,000	6,000	183,400
94	8,300	27,500	1,250	37,050	25,000	42,000	6,000	73,000	40,000	42,000	100,000	6,000	188,000
95	8,300	27,500	1,300	37,100	25,000	42,000	6,000	73,000	42,000	42,000	100,000	6,000	190,000
96	8,300	27,500	1,350	37,150	25,000	42,000	6,000	73,000	44,000	42,000	100,000	6,000	192,000
97	8,300	27,500	1,400	37,200	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
98	8,300	27,500	1,450	37,250	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
99	8,300	27,500	1,510	37,310	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
2000	8,300	27,500	1,570	37,370	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
01	8,300	27,500	1,630	37,430	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
02	8,300	27,500	1,690	37,490	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
03	8,300	27,500	1,750	37,550	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
04	8,300	27,500	1,810	37,610	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
05	8,300	27,500	1,880	37,680	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
06	8,300	27,500	1,950	37,750	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
07	8,300	27,500	2,020	37,820	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
08	8,300	27,500	2,090	37,890	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
09	8,300	27,500	2,160	37,960	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
2010	8,300	27,500	2,240	38,040	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
11	8,300	27,500	2,320	38,120	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
12	8,300	27,500	2,410	38,210	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
13	8,300	27,500	2,500	38,300	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
14	8,300	27,500	2,600	38,400	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000
2015[3]	8,300	27,500	2,700	38,500	25,000	42,000	6,000	73,000	46,000	42,000	100,000	6,000	194,000

1/ From Tables A of water supply contracts, and assumed elections under Article 8, as of January 1, 1964.

2/ It is currently estimated that the entitlements shown for the South Bay Area will be supplied by nonproject water through 1966. Actual delivery quantities are shown for 1962 and 1963. Quantities shown for 1964 are those requested by the contractors and approved by the department pursuant to Article 12(a) of water supply contracts.

3/ And each year thereafter for the remainder of the project repayment period.

TABLE 7 (Continued)

ANNUAL ENTITLEMENTS TO PROJECT WATER[1]

(in acre-feet)

CALENDAR YEAR	SAN JOAQUIN VALLEY AREA								CENTRAL COASTAL AREA		
	DEVIL'S DEN WATER DISTRICT	DUDLEY RIDGE WATER DISTRICT	EMPIRE WEST SIDE IRRIGATION DISTRICT	HACIENDA WATER DISTRICT	KERN COUNTY WATER AGENCY	TULARE LAKE BASIN WATER STORAGE DISTRICT	ASSUMED ELECTIONS UNDER ARTICLE 8	TOTAL	SAN LUIS OBISPO COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	TOTAL
	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
1962											
63											
64											
65											
66											
67											
68	2,000	10,000	3,000	1,300	87,000	26,900		130,200			
69	3,000	11,800	3,000	1,600	95,700	29,300		144,400			
1970	4,000	13,600	3,000	2,000	145,100	31,800		199,500			
71	5,000	15,500	3,000	2,300	159,600	34,200		219,600			
72	6,000	17,300	3,000	2,600	232,300	36,700		297,900			
73	7,000	19,100	3,000	2,900	264,500	39,100	10,000	345,600			
74	8,000	20,900	3,000	3,300	293,300	43,000	20,000	391,500			
75	9,000	22,700	3,000	3,600	324,100	46,900	30,000	439,300			
76	10,000	24,500	3,000	3,900	363,800	50,800	40,000	496,000			
77	11,000	26,300	3,000	4,200	406,900	54,800	50,000	556,200			
78	11,000	28,200	3,000	4,600	449,900	58,700	60,000	615,400			
79	11,000	30,000	3,000	4,900	491,900	62,600	70,000	673,400			
1980	11,000	31,800	3,000	5,200	534,800	66,500	80,000	732,300	1,000	1,000	2,000
81	11,000	33,600	3,000	5,600	584,000	70,400	90,000	797,600	1,000	2,000	3,000
82	11,000	35,500	3,000	5,900	630,200	74,300	100,000	859,900	2,000	4,000	6,000
83	11,000	37,200	3,000	6,200	682,400	78,200	110,000	928,000	3,000	6,000	9,000
84	11,000	39,100	3,000	6,500	730,200	82,100	120,000	991,900	4,500	9,000	13,500
85	11,000	40,900	3,000	6,900	776,900	86,000	130,000	1,054,700	7,500	15,000	22,500
86	11,000	42,700	3,000	7,200	822,500	90,000	140,000	1,116,400	10,000	20,000	30,000
87	11,000	44,500	3,000	7,500	870,100	93,900	150,000	1,180,000	12,500	25,000	37,500
88	11,000	46,400	3,000	7,800	921,200	97,800	160,000	1,247,200	15,500	31,000	46,500
89	11,000	48,200	3,000	8,200	958,900	101,700	170,000	1,301,000	20,000	40,000	60,000
1990	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
91	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
92	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
93	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
94	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
95	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
96	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
97	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
98	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
99	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
2000	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
01	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
02	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
03	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
04	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
05	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
06	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
07	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
08	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
09	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
2010	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
11	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
12	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
13	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
14	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000
2015[2]	11,000	50,000	3,000	8,500	1,000,000	110,000	180,000	1,362,500	25,000	50,000	75,000

1/ From Tables A of water supply contracts, and assumed elections under Article 8, as of January 1, 1964.

2/ And each year thereafter for the remainder of the project repayment period.

TABLE 7 (Continued

ANNUAL ENTITLEMENTS TO PROJECT WATER[1]

(in acre-feet)

CALENDAR YEAR	SOUTHERN CALIFORNIA AREA																TOTAL, STATE WATER PROJECT
	ANTELOPE VALLEY-EAST KERN WATER AGENCY	CITY OF WEST COVINA	COACHELLA VALLEY COUNTY WATER DISTRICT	CRESTLINE-LAKE ARROWHEAD WATER AGENCY	DESERT WATER AGENCY	LITTLEROCK CREEK IRRIGATION DISTRICT	MOJAVE WATER AGENCY	PALMDALE IRRIGATION DISTRICT	SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT	SAN GABRIEL VALLEY MUNICIPAL WATER DISTRICT	SAN GORGONIO PASS WATER AGENCY	THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA	UPPER SANTA CLARA VALLEY WATER AGENCY	VENTURA COUNTY FLOOD CONTROL DISTRICT	ASSUMED ELECTIONS UNDER ARTICLE 8	TOTAL	
	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)	(41)
1962																	8,906
63																	12,645
64																	27,776
65																	47,600
66																	61,100
67																	69,150
68																	241,470
69																	257,750
1970																	315,140
71	20,000											110,400				130,400	467,920
72	25,000	4,300	5,200	500	8,000	150	8,000	1,500	39,500	10,600	1,000	198,900	1,000		17,900	321,550	739,750
73	30,000	4,600	5,800	750	9,000	250	10,000	2,700	41,250	11,500	1,700	287,300	2,600		35,800	443,250	911,580
74	35,000	4,900	6,400	1,000	10,000	350	12,000	3,900	43,200	12,300	2,400	375,800	3,900		53,700	564,850	1,081,410
75	40,000	5,200	7,000	1,250	11,000	450	14,000	5,100	44,950	13,100	3,100	464,300	5,200		71,600	686,250	1,253,290
76	45,000	5,600	7,600	1,500	12,000	560	16,000	6,300	46,700	14,000	3,800	552,900	6,500		89,500	807,960	1,434,280
77	50,000	5,900	8,200	1,750	13,000	630	18,000	7,500	48,450	14,800	4,500	641,400	7,800		107,400	929,330	1,618,680
78	55,000	6,200	8,800	2,000	14,000	800	20,000	8,500	50,200	15,700	5,200	729,800	9,100		125,300	1,050,600	1,801,980
79	60,000	6,500	9,400	2,250	15,000	900	22,000	9,300	52,050	16,600	5,900	818,300	10,400		143,200	1,171,800	1,983,910
1980	65,000	6,900	10,000	2,500	16,000	1,000	24,000	10,000	53,700	17,400	6,600	906,800	12,000	1,000	161,100	1,294,000	2,190,590
81	70,500	7,200	11,000	2,750	17,500	1,100	26,000	10,500	55,650	18,300	7,400	966,100	13,100	2,000	178,900	1,388,000	2,362,070
82	76,000	7,500	12,000	3,000	19,000	1,200	28,000	11,000	55,650	19,100	8,200	1,025,400	14,200	3,000	196,800	1,480,050	2,526,950
83	81,500	7,800	13,000	3,250	20,500	1,300	30,000	11,500	55,650	19,900	9,000	1,084,700	15,300	4,000	214,700	1,572,100	2,697,680
84	87,000	8,100	14,000	3,500	22,000	1,400	32,000	12,000	55,650	20,700	9,800	1,144,000	16,400	5,000	232,600	1,664,150	2,865,610
85	92,500	8,500	15,000	3,750	23,500	1,500	34,000	12,500	55,650	21,500	10,600	1,203,400	17,500	6,000	250,500	1,756,400	3,038,740
86	98,000	8,800	16,000	4,000	25,000	1,600	36,000	13,000	57,400	22,200	11,500	1,262,800	18,600	8,000	268,400	1,851,300	3,212,720
87	103,500	9,100	17,000	4,250	27,000	1,700	38,000	13,500	62,850	22,900	12,400	1,322,100	19,700	10,000	286,300	1,950,300	3,393,610
88	109,000	9,400	18,000	4,500	29,000	1,800	40,000	14,000	68,300	23,600	13,300	1,381,400	20,800	13,000	304,200	2,050,300	3,585,100
89	114,500	9,700	19,000	4,750	31,000	1,900	42,000	14,500	73,650	24,300	14,200	1,440,800	21,900	16,000	322,100	2,150,300	3,770,240
1990	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	79,100	25,000	15,000	1,500,000	23,000	20,000	340,000	2,251,100	3,965,380
91	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,976,820
92	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,982,360
93	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,987,900
94	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,992,550
95	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,994,600
96	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,996,650
97	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,700
98	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,750
99	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,810
2000	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,870
01	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,930
02	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,998,990
03	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,050
04	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,110
05	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,180
06	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,250
07	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,320
08	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,390
09	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,460
2010	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,540
11	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,620
12	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,710
13	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,800
14	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	3,999,900
2015[2]	120,000	10,000	20,000	5,000	33,000	2,000	44,000	15,000	85,000	25,000	15,000	1,500,000	23,000	20,000	340,000	2,257,000	4,000,000

1/ From Tables A of water supply contracts, and assumed elections under Article 8, as of January 1, 1964.

2/ And each year thereafter for the remainder of the project repayment period.

TABLE 8

PROJECT WATER DEMANDS AND WATER SUPPLIES
AT THE DELTA

(in acre-feet)

CALENDAR YEAR	DEMANDS ON DELTA POOL (STATE ONLY)							SUPPLIES TO DELTA POOL			
	DELIVERIES					OPERATIONAL LOSSES 1/	TOTAL	PURCHASED BUREAU WATER 2/	INITIAL CONSERVATION FACILITIES 3/	ADDITIONAL CONSERVATION FACILITIES 4/	TOTAL
	FEATHER RIVER SERVICE AREA	NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT	TOTAL						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1962			8,906		8,906	741	9,647	9,647			9,647
63			12,645		12,645	495	13,140	13,140			13,140
64			27,776		27,776	1,800	29,576	29,576			29,576
65			47,600		47,600	1,800	49,400	49,400			49,400
66			61,100		61,100	3,800	64,900	64,900			64,900
67	250		68,900		69,150	5,200	74,350		74,350		74,350
68	570		110,700	130,200	241,470	101,200	342,670		342,670		342,670
69	650		112,700	144,400	257,750	101,200	358,950		358,950		358,950
1970	840		114,800	199,500	315,140	113,400	428,540		428,540		428,540
71	920		117,000	350,000	467,920	148,300	616,220		616,220		616,220
72	1,000		119,300	619,450	739,750	186,800	926,550		926,550		926,550
73	1,130		121,600	788,850	911,580	186,800	1,098,380		1,098,380		1,098,380
74	1,260		123,800	956,350	1,081,410	186,800	1,268,210		1,268,210		1,268,210
75	1,640		126,100	1,125,550	1,253,290	186,800	1,440,090		1,440,090		1,440,090
76	2,020		128,300	1,303,960	1,434,280	186,800	1,621,080		1,621,080		1,621,080
77	2,450		130,700	1,485,530	1,618,680	186,800	1,805,480		1,805,480		1,805,480
78	2,880		133,100	1,666,000	1,801,980	186,800	1,988,780		1,988,780		1,988,780
79	3,310		135,400	1,845,200	1,983,910	186,800	2,170,710		2,170,710		2,170,710
1980	4,740	19,750	137,800	2,028,300	2,190,590	191,800	2,382,390		2,382,390		2,382,390
81	10,420	22,750	140,300	2,188,600	2,362,070	191,800	2,553,870		2,553,870		2,553,870
82	12,300	25,900	142,800	2,345,950	2,526,950	191,800	2,718,750		2,718,750		2,718,750
83	14,230	29,050	145,300	2,509,100	2,697,680	191,800	2,889,480		2,889,480		2,889,480
84	16,160	32,100	147,800	2,669,550	2,865,610	191,800	3,057,410		3,057,410		3,057,410
85	19,090	35,750	150,300	2,833,600	3,038,740	191,800	3,230,540		3,230,540		3,230,540
86	22,020	40,100	152,900	2,997,700	3,212,720	191,800	3,404,520		3,364,520	40,000	3,404,520
87	24,960	45,450	155,400	3,167,800	3,393,610	191,800	3,585,410		3,505,410	80,000	3,585,410
88	28,900	54,300	157,900	3,344,000	3,585,100	191,800	3,776,900		3,626,900	150,000	3,776,900
89	32,890	63,650	162,400	3,511,300	3,770,240	191,800	3,962,040		3,737,040	225,000	3,962,040
1990	36,880	73,000	166,900	3,688,600	3,965,380	191,800	4,157,180		3,752,180	405,000	4,157,180
91	36,920	73,000	172,400	3,694,500	3,976,820	191,800	4,168,620		3,739,620	429,000	4,168,620
92	36,960	73,000	177,900	3,694,500	3,982,360	191,800	4,174,160		3,721,160	453,000	4,174,160
93	37,000	73,000	183,400	3,694,500	3,987,900	191,800	4,179,700		3,702,700	477,000	4,179,700
94	37,050	73,000	188,000	3,694,500	3,992,550	191,800	4,184,350		3,683,350	501,000	4,184,350
95	37,100	73,000	190,000	3,694,500	3,994,600	191,800	4,186,400		3,661,400	525,000	4,186,400
96	37,150	73,000	192,000	3,694,500	3,996,650	191,800	4,188,450		3,659,150	529,300	4,188,450
97	37,200	73,000	194,000	3,694,500	3,998,700	191,800	4,190,500		3,656,900	533,600	4,190,500
98	37,250	73,000	194,000	3,694,500	3,998,750	191,800	4,190,550		3,652,650	537,900	4,190,550
99	37,310	73,000	194,000	3,694,500	3,998,810	191,800	4,190,610		3,648,410	542,200	4,190,610
2000	37,370	73,000	194,000	3,694,500	3,998,870	191,800	4,190,670		3,644,170	546,500	4,190,670
01	37,430	73,000	194,000	3,694,500	3,998,930	191,800	4,190,730		3,639,930	550,800	4,190,730
02	37,490	73,000	194,000	3,694,500	3,998,990	191,800	4,190,790		3,635,690	555,100	4,190,790
03	37,550	73,000	194,000	3,694,500	3,999,050	191,800	4,190,850		3,631,450	559,400	4,190,850
04	37,610	73,000	194,000	3,694,500	3,999,110	191,800	4,190,910		3,627,210	563,700	4,190,910
05	37,680	73,000	194,000	3,694,500	3,999,180	191,800	4,190,980		3,622,980	568,000	4,190,980
06	37,750	73,000	194,000	3,694,500	3,999,250	191,800	4,191,050		3,618,750	572,300	4,191,050
07	37,820	73,000	194,000	3,694,500	3,999,320	191,800	4,191,120		3,614,520	576,600	4,191,120
08	37,890	73,000	194,000	3,694,500	3,999,390	191,800	4,191,190		3,610,290	580,900	4,191,190
09	37,960	73,000	194,000	3,694,500	3,999,460	191,800	4,191,260		3,606,060	585,200	4,191,260
2010	38,040	73,000	194,000	3,694,500	3,999,540	191,800	4,191,340		3,601,840	589,500	4,191,340
11	38,120	73,000	194,000	3,694,500	3,999,620	191,800	4,191,420		3,597,620	593,800	4,191,420
12	38,210	73,000	194,000	3,694,500	3,999,710	191,800	4,191,510		3,593,410	598,100	4,191,510
13	38,300	73,000	194,000	3,694,500	3,999,800	191,800	4,191,600		3,589,200	602,400	4,191,600
14	38,400	73,000	194,000	3,694,500	3,999,900	191,800	4,191,700		3,585,000	606,700	4,191,700
2015	38,500	73,000	194,000	3,694,500	4,000,000	191,800	4,191,800		3,580,800	611,000	4,191,800
2025	38,500	73,000	194,000	3,694,500	4,000,000	191,800	4,191,800		3,530,800	661,000	4,191,800
2035	38,500	73,000	194,000	3,694,500	4,000,000	191,800	4,191,800		3,480,800	711,000	4,191,800

1/ Operational losses shown include only those allocated to water transportation. Operational losses allocated to water conservation include a maximum of 35,000 and 15,000 acre-feet annually in San Luis Reservoir and in the California Aqueduct, respectively.

2/ Total of Bureau Water estimated to be purchased is 166,663 acre-feet.

3/ The initial conservation facilities include Frenchman, Oroville, and San Luis Reservoir, the Delta Facilities, and in the future, Grizzly Valley Reservoir

4/ The Upper Eel River Development.

TABLE 9

ESTIMATED ANNUAL PROJECT POWER CAPACITY REQUIREMENTS
FOR PUMPING

(in thousands of kilowatts)

CALENDAR YEAR	OROVILLE-THERMALITO POWERPLANTS	NORTH BAY AQUEDUCT		SOUTH BAY AQUEDUCT PUMPING PLANTS	CALIFORNIA AQUEDUCT																				SAN JOAQUIN DRAIN PUMPING PLANTS	TOTAL, STATE WATER PROJECT	
		CALHOUN PUMPING PLANT 1/	CORDELIA PUMPING PLANT		DELTA PUMPING PLANT		SAN LUIS PUMPING-GENERATING PLANT	MILE 18 PUMPING PLANT	BUENA VISTA PUMPING PLANT		WHEELER RIDGE PUMPING PLANT I		WHEELER RIDGE PUMPING PLANT II		TEHACHAPI PUMPING PLANT		PEARBLOSSOM PUMPING PLANT		WEST BRANCH PUMPING PLANT		AVENAL PUMPING PLANT	PYRAMID PUMPING PLANT	SAWTOOTH PUMPING PLANT	POLONIO PUMPING PLANT			
	O	U	U	U	O	U	O	U	O	U	O	U	O	U	O	U	O	U	O	U	U	U	U	U	U	O	U
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
1962				3																							3
63				3																							3
64				3																							3
65				5																							5
66				7																							7
67				6	8																					8	6
68			1	9	101		71	13													1				2	172	26
69			1	9	101		85	13													1				2	186	26
1970			1	10	101		81	13													1				2	182	27
71			1	10	101		71	13	15		16		36		166				20		1				2	425	27
72			1	10	101		61	20	30		33		72		276		49		20		1				2	642	34
73	434		1	10	101		87	22	36		37		83		332		49		20		3				2	1,179	38
74	434		1	11	219		114	25	44		46		104		387		49		29		3				2	1,426	42
75	434		1	11	244		142	29	53		56		124		442		65		29		3				2	1,589	46
76	434		1	11	219	25	150	33	62		65		144		497		81		39		3				2	1,691	75
77	434		1	11	202	42	160	37	71		78		165		608		81		39		3				2	1,838	96
78	434		1	11	185	59	168	41	80		84		186		663		98		39		3				2	1,937	117
79	434		1	12	168	76	177	45	82	5	79	7	175	15	608	55	98		29	10	4				2	1,850	232
1980	434		1	12	152	92	187	49	77	10	70	16	155	35	552	111	82	16	19	20	4	1	1	2	2	1,728	372
81	434		1	12	143	101	188	53	69	18	63	23	139	51	497	166	66	32	19	20	4	1	1	2	2	1,618	487
82	434		2	12	134	110	189	57	62	25	56	30	124	66	442	221	66	32	19	20	4	1	1	2	2	1,526	585
83	434		2	12	126	118	190	61	55	32	50	36	109	81	387	276	49	49	19	20	4	1	1	2	2	1,419	697
84	434		2	12	117	127	192	64	47	40	43	43	94	96	331	332	49	49	10	29	4	2	1	2	2	1,317	805
85	434		2	13	110	134	193	68	39	48	36	50	79	111	276	387	33	65	10	29	4	2	2	4	2	1,210	921
86	434		2	13	168	76	148	72	32	55	29	57	64	126	221	442	33	65	10	29	6	3	2	6	2	1,139	956
87	434		2	14	168	76	152	76	24	63	22	64	48	142	166	497	17	81	0	39	6	3	2	6	2	1,031	1,073
88	434		2	14	168	76	157	80	16	71	15	71	32	158	111	552	17	81	0	39	6	4	3	7	2	950	1,166
89	434		2	14	160	84	161	84	8	79	8	78	17	173	55	608	0	98	0	39	6	5	3	7	2	843	1,282
1990	434		2	15	160	84	166	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	760	1,374
91	434		2	15	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,382
92	434		2	15	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,382
93	434		2	15	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,382
94	434		2	15	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,382
95	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383
96	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383
97	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383
98	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383
99	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383
2000 2/	434		2	16	152	92	170	84	0	87	0	86	0	190	0	663	0	98	0	39	6	5	4	9	2	756	1,383

U (Unrestricted); The power capacity required to pump all or a portion of the maximum monthly conveyance on an unrestricted basis.

O (Off-peak); The additional power capacity required to pump all or the remaining portion of the maximum monthly conveyance on an off-peak basis.

1/ Annual power requirements of the Calhoun Pumping Plant, commencing operation in 1980, are less than 500 kilowatts.

2/ And each year thereafter for the remainder of the project repayment period.

TABLE 10

ESTIMATED ANNUAL PROJECT ENERGY REQUIREMENTS
FOR PUMPING

(in millions of kilowatt-hours)

CALENDAR YEAR	OROVILLE-THERMALITO POWERPLANTS	NORTH BAY AQUEDUCT		SOUTH BAY AQUEDUCT PUMPING PLANTS	CALIFORNIA AQUEDUCT											SAN JOAQUIN DRAIN PUMPING PLANTS	TOTAL STATE WATER PROJECT
		CALHOUN PUMPING PLANT	CORDELIA PUMPING PLANT		DELTA PUMPING PLANT	SAN LUIS PUMPING-GENERATING PLANT	MILE 18 PUMPING PLANT	BUENA VISTA PUMPING PLANT	WHEELER RIDGE PUMPING PLANT I	WHEELER RIDGE PUMPING PLANT II	TEHACHAPI PUMPING PLANT	PEARBLOSSOM PUMPING PLANT	WEST BRANCH PUMPING PLANT	AVENAL PUMPING PLANT	PYRAMID, SAWTOOTH, & POLONIO PUMPING PLANTS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1962				7													7
63				10													10
64				26													26
65				43													43
66				66													66
67				52	22												74
68			1	82	230	113	28							3		13	470
69			1	84	236	176	30							4		13	544
1970			1	85	226	133	39							4		13	501
71			2	87	227	58	78	61	66	146	539		65	5		13	1,347
72			2	88	238	100	124	120	133	283	1,093	167	54	5		13	2,420
73	882		3	90	238	130	135	136	147	326	1,165	144	72	6		13	3,487
74	882		3	91	419	155	159	169	184	408	1,450	182	91	7		13	4,213
75	882		3	93	439	194	184	201	219	486	1,734	220	109	8		13	4,785
76	575		4	95	492	208	210	235	255	566	2,017	257	127	9		13	5,063
77	575		4	96	547	220	236	268	291	646	2,300	295	145	10		13	5,646
78	575		5	98	601	234	262	302	327	725	2,585	332	163	11		13	6,233
79	575		5	100	654	248	288	335	362	804	2,869	371	181	12		13	6,817
1980	575	1	6	101	709	263	315	369	398	883	3,153	408	200	13	7	14	7,415
81	575	1	6	103	758	265	338	394	425	943	3,371	446	209	14	9	14	7,871
82	575	1	7	105	805	268	361	421	451	1,002	3,587	476	222	15	14	14	8,324
83	575	1	8	107	853	270	384	447	478	1,061	3,804	506	234	16	20	14	8,778
84	575	1	9	109	902	273	408	474	505	1,121	4,019	538	247	17	28	14	9,240
85	575	1	10	110	951	276	431	502	532	1,180	4,234	568	259	19	46	14	9,708
86	575	1	10	112	1,000	170	455	529	559	1,241	4,455	599	272	21	60	14	10,073
87	575	1	11	114	1,051	176	480	558	587	1,304	4,686	632	284	23	75	14	10,571
88	575	1	12	116	1,104	181	505	587	616	1,367	4,921	667	298	25	90	14	11,079
89	575	2	13	119	1,154	187	530	615	644	1,430	5,155	701	311	28	115	14	11,593
1990	575	2	14	122	1,208	192	555	644	672	1,493	5,390	734	325	31	144	13	12,114
91	575	2	14	126	1,211	198	556	645	674	1,497	5,403	752	318	31	144	13	12,159
92	575	2	14	130	1,213	198	556	645	674	1,497	5,403	752	318	31	144	13	12,165
93	575	2	14	134	1,214	198	556	645	674	1,497	5,403	752	318	31	144	13	12,170
94	575	2	14	137	1,216	198	556	645	674	1,497	5,403	752	318	31	144	13	12,175
95	575	2	14	139	1,217	198	556	645	674	1,497	5,403	752	318	31	144	13	12,178
96	575	2	14	140	1,217	198	556	645	674	1,497	5,403	752	318	31	144	13	12,179
97	575	2	14	141	1,217	198	556	645	674	1,497	5,403	752	318	31	144	13	12,180
98	575	2	14	141	1,217	198	556	645	674	1,497	5,403	752	318	31	144	13	12,180
99	575	2	14	141	1,217	198	556	645	674	1,497	5,403	752	318	31	144	13	12,180
2000*	575	2	14	141	1,217	198	556	645	674	1,497	5,403	752	318	31	144	10	12,177

* And each year thereafter for the remainder of the project repayment period.

TABLE 11

ESTIMATED ANNUAL PROJECT ENERGY GENERATION

(in millions of kilowatt-hours)

CALENDAR YEAR	OROVILLE-THERMALITO POWERPLANTS	COTTONWOOD POWERPLANT	RUBY & CASTAIC POWERPLANTS	SAN LUIS PUMPING-GENERATING PLANT	DEVIL CANYON POWERPLANTS NOS. 1 & 2	SAN LUIS OBISPO POWERPLANT	TOTAL GENERATION AT POWERPLANTS	TOTAL GENERATION AT LOAD CENTER 1/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1968				25			25	24
69	1,897			30			1,927	1,831
1970	1,897			44			1,941	1,845
71	1,897	21	297	64			2,279	2,173
72	1,897	44	248	96	208		2,493	2,382
73	2,772	46	331	105	244		3,498	3,340
74	2,772	57	414	113	318		3,674	3,512
75	2,772	69	497	119	393		3,850	3,683
76	2,528	80	580	125	467		3,780	3,621
77	2,528	92	662	131	540		3,953	3,792
78	2,528	103	745	137	614		4,127	3,961
79	2,528	114	828	143	688		4,301	4,131
1980	2,528	126	912	150	763	2	4,481	4,305
81	2,528	134	954	155	837	3	4,611	4,431
82	2,528	143	1,011	160	894	4	4,740	4,559
83	2,528	152	1,068	165	951	6	4,870	4,685
84	2,528	160	1,126	170	1,007	9	5,000	4,812
85	2,528	168	1,183	175	1,065	14	5,133	4,942
86	2,528	177	1,242	110	1,124	18	5,199	5,007
87	2,528	186	1,300	110	1,188	22	5,334	5,138
88	2,528	196	1,359	120	1,250	28	5,481	5,282
89	2,528	205	1,420	123	1,315	35	5,626	5,422
1990	2,528	214	1,451	123	1,379	43	5,738	5,533
91	2,528	215	1,451	123	1,417	43	5,777	5,572
92	2,528	215	1,451	123	1,417	43	5,777	5,572
93	2,528	215	1,451	123	1,417	43	5,777	5,572
94	2,528	215	1,451	123	1,417	43	5,777	5,572
95	2,528	215	1,451	123	1,417	43	5,777	5,572
96	2,528	215	1,451	123	1,417	43	5,777	5,572
97	2,528	215	1,451	123	1,417	43	5,777	5,572
98	2,528	215	1,451	123	1,417	43	5,777	5,572
99	2,528	215	1,451	123	1,417	43	5,777	5,572
2000 2/	2,528	215	1,451	123	1,417	43	5,777	5,572

1/ Column 7 as reduced by estimated transmission losses.

2/ And each year thereafter for the remainder of the project repayment period.

TABLE 12

FRENCHMAN RESERVOIR MONTHLY OPERATION

(in acre-feet unless otherwise indicated)

MONTH	WATER SURFACE ELEVATION (feet)	RESERVOIR STORAGE				OUTFLOW							COMPUTED INFLOW
		END OF MONTH STORAGE	STORAGE CHANGE	MAXIMUM STORAGE	MINIMUM STORAGE	MEASURED				SPILL	ESTIMATED EVAPORATION & SEEPAGE	TOTAL OUTFLOW	
						CONTRACT RELEASE	STREAMFLOW MAINTENANCE	MAXIMUM DAILY RELEASE	MINIMUM DAILY RELEASE				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1962													
Jan.	5,503.17	359	-	-	-	-	-	-	-	0	-	-	-
Feb.	5,510.62	988	629	988	359	-	-	-	-	0	-	-	629
Mar.	5,519.34	2,208	1,220	2,208	988	-	-	-	-	0	31	31	1,251
Apr.	5,549.86	13,619	11,411	13,652	2,208	922	-	182.0	-	0	196	1,118	12,529
May	5,550.15	13,811	192	13,811	12,784	3,099	-	260.0	3.8	0	250	3,349	3,541
Jun.	5,546.38	11,473	-2,338	14,032	11,473	2,790	-	260.0	3.8	0	284	3,074	736
Jul.	5,545.99	11,250	-223	11,473	11,250	128	-	6.3	1.4	0	304	432	209
Aug.	5,540.49	8,418	-2,832	11,250	8,418	2,453	-	161.0	0.6	0	387	2,840	8
Sep.	5,540.18	8,274	-144	8,418	8,265	13	-	0.6	0.4	0	227	240	96
Oct.	5,544.82	10,602	2,328	10,602	8,228	0	81	4.8	0.4	0	126	207	2,535
Nov.	5,545.58	11,020	418	11,020	10,602	0	114	3.8	3.8	0	88	202	620
Dec.	5,547.11	11,900	880	11,900	11,020	0	118	3.8	3.8	0	60	178	1,058
Totals			11,541			9,405	313			0	1,953	11,671	23,212
1963													
Jan.	5,554.61	16,995	5,095	16,995	11,900	0	120	6.1	3.8	0	43	163	5,258
Feb.	5,565.64	26,731	9,736	26,731	16,995	0	116	5.6	3.8	0	73	189	9,925
Mar.	5,567.73	28,875	2,144	28,875	26,731	65	53	3.8	3.8	0	129	247	2,391
Apr.	5,574.63	36,703	7,828	36,703	28,875	120	0	4.4	3.8	0	206	326	8,154
May	5,579.69	43,236	6,533	43,331	36,703	690	0	153.0	4.0	0	395	1,085	7,618
Jun.	5,578.12	41,138	-2,098	43,236	41,138	3,022	0	280.0	3.8	0	484	3,506	1,408
Jul.	5,577.35	40,133	-1,005	41,138	40,133	595	0	30.0	3.8	0	851	1,446	441
Aug.	5,572.66	34,341	-5,792	40,133	34,341	4,917	0	210.0	20.0	0	901	5,818	26
Sep.	5,572.41	34,049	-292	34,341	34,037	226	0	42.0	3.8	0	442	668	376
Oct.	5,572.17	33,770	-279	34,049	33,770	59	122	8.3	3.8	0	288	469	190
Nov.	5,572.89	34,611	841	34,611	33,770	10	115	6.3	3.8	0	188	313	1,154
Dec.	5,573.19	34,966	355	34,966	34,611	0	118	3.8	3.8	0	124	242	597
Totals			23,066			9,704	644			0	4,124	14,472	37,538

TABLE 13

SOUTH BAY AQUEDUCT MONTHLY OPERATION

(in acre-feet unless otherwise indicated)

MONTH	SUPPLY	STORAGE CHANGES		DELIVERIES						LOSSES			WATER QUALITY
				ALTAMONT TURNOUT				PATTERSON TURNOUT					
				ALAMEDA COUNTY FC & WCD, ZONE 7		ALAMEDA COUNTY WATER DISTRICT							
	FROM DELTA-MENDOTA CANAL	BETHANY RESERVOIR	PATTERSON RESERVOIR	MUNICIPAL & INDUSTRIAL	AGRICULTURE	MUNICIPAL & INDUSTRIAL	AGRICULTURE	ACFC & WCD, ZONE 7 MUNICIPAL & INDUSTRIAL	CONSTRUCTION WATER	FROM DELTA-MENDOTA CANAL TO ALTAMONT TURNOUT	FROM ALTAMONT TURNOUT THRU PATTERSON RESERVOIR	ENERGY CONSUMPTION (kilowatt-hours)	AVERAGE TOTAL DISSOLVED SOLIDS AT SOUTH BAY PUMPING PLANT (parts per million)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1962													
Jan.	-	-	-	-	-	-	-	-	-	-	-	38,000	-
Feb.	-	-	-	-	-	-	-	-	-	-	-	5,000	-
Mar.	-	-	-	-	-	-	-	-	-	-	-	10,000	-
Apr.	43	-	-	-	-	-	-	-	43	-	-	24,000	-
May	5	-	-	-	-	-	-	-	5	-	-	43,000	-
June	1,011	64	-	-	-	396	396	10	0	134	11	551,000	-
July	1,948	21	-	-	-	846	846	76	0	141	18	1,306,000	-
Aug.	1,669	-33	73	7	24	722	721	67	0	71	17	1,421,000	-
Sept.	1,868	28	13	18	54	773	774	65	2	103	38	1,272,000	-
Oct.	1,457	-16	9	10	28	664	664	47	4	47	0	1,185,000	-
Nov.	1,703	37	4	0	0	805	805	41	2	4	5	1,248,000	-
Dec.	0	-56	-22	0	0	0	0	47	1	14	16	139,000	-
Totals	9,704	45	77	35	106	4,206	4,206	353	57	514	105	7,242,000	-
1963													
Jan.	620	26	-36	11	35	231	232	59	1	61	0	432,000	438
Feb.	86	36	-21	0	0	0	0	36	0	22	13	43,000	475
Totals 1/	10,410	107	20	46	141	4,437	4,438	448	58	597	118	7,717,000	-
Mar.	1,148	-58	-30	14	40	569	568	40	0	0	5	946,000	409
Apr.	0	-66	Empty	0	0	0	0	39	0	13	14	53,000	420
May	645	53	"	35	30	204	204	57	0	61	1	296,000	327
June	1,539	16	"	44	66	629	629	138	0	8	9	1,171,000	158
July	1,407	-100	"	26	0	613	614	158	3	92	1	1,037,000	154
Aug.	2,205	80	"	29	3	935	934	96	0	128	0	1,507,000	195
Sept.	2,392	-43	82	76	191	947	948	78	0	106	7	1,680,000	285
Oct.	2,301	-27	2	59	134	925	924	79	0	196	9	1,896,000	322
Nov.	487	6	-10	14	3	180	181	65	17	15	16	403,000	280
Dec.	382	-246	6	4	0	224	223	72	51	22	26	562,000	282
Totals	13,212	-323	-7	312	502	5,457	5,457	917	72	724	101	10,026,000	268 2/
1964													
Jan.	1,277	-17	-9	4	0	588	588	70	53	0	0	1,008,000	290
Feb.	1,040	122	20	8	0	377	376	67	17	45	8	499,200	352
Totals 1/	14,823	-280	61	313	467	6,191	6,189	959	141	686	96	11,058,200	-

1/ Bureau Water Year totals.

2/ A weighted average.

TABLE 14

COMPOSITION OF TOTAL ANNUAL CAPITAL COSTS

(in dollars)

CALENDAR YEAR	PROJECTED ANNUAL EXPENDITURES										TOTAL ACTUAL, FROM ACCOUNTING RECORDS 2/
	SURVEYS & ENGINEERING STUDIES	DESIGN	RIGHTS OF WAY ACQUISITION & RELOCATIONS	CONSTRUCTION	LOCAL IMPACT AID	PRE-OPERATING EXPENSE 1/		LOCAL PROJECTS (Davis-Grunsky Program)	STATE PARTICIPATION IN COSTS OF SAN LUIS DIVISION	TOTAL PROJECTED	
						GENERAL	DIRECT				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1952											276,359
53											650,871
54											726,547
55											385,936
56											1,807,500
57											8,759,931
58											12,898,991
59											15,488,023
1960											21,101,120
61											31,922,447
62											37,797,360
63											116,700,453
Subtotal											248,515,538
1964	2,135,800	19,414,000	27,359,000	79,726,700	647,000	3,976,400	60,900	9,000,000	35,528,000	177,847,800	
65	1,546,200	14,658,000	41,709,000	144,351,700	420,000	4,364,400	319,300	10,000,000	50,869,000	268,237,600	
66	1,317,700	10,756,000	28,092,000	196,805,300	425,000	4,704,600	1,658,700	10,000,000	50,214,000	303,973,300	
67	994,600	7,845,000	15,356,000	217,751,500	415,139	3,507,700	1,407,200	10,000,000	29,090,000	286,367,139	
68	381,900	4,113,000	7,411,000	150,207,000		2,486,400	590,200	10,000,000	9,122,000	184,311,500	
69		3,641,000	5,286,000	163,337,371		2,473,700	1,084,000	10,000,000	808,000	186,630,071	
1970		576,000	4,332,000	147,458,000		2,419,200	2,231,100	10,000,000		167,016,300	
71		1,107,000	609,000	77,407,300		1,189,400	1,275,700	10,000,000		91,588,400	
72		1,302,000		12,679,800		573,100		10,000,000		24,554,900	
73		1,158,000	111,000	16,531,700		573,100		10,000,000		28,373,800	
74		427,000	112,000	25,945,700		573,100		10,000,000		37,057,800	
75		569,000	244,000	16,517,500		572,400		10,000,000		27,902,900	
76		606,000	575,000	16,045,900		572,400		7,455,894		25,255,194	
77		1,088,000	1,056,000	10,170,200		572,400				12,886,600	
78		231,000	1,210,000	20,163,400		572,400	307,000			22,483,800	
79		367,000	1,029,000	18,713,100		572,400	615,000			21,296,500	
1980		1,202,000	445,000	20,869,600		94,700				22,611,300	
81		2,338,000	911,000	39,497,500		92,900				42,839,400	
82		2,672,000	1,018,000	44,310,000		92,900				48,092,900	
83		86,000		36,000,000		92,900				36,178,900	
84		22,000		11,098,000		92,200				11,212,200	
85		32,000		1,000,000		92,200				1,124,200	
86		63,000		633,000						696,000	
87		15,000		745,000						760,000	
88		25,000		9,000						34,000	
89				298,000						298,000	
1990											
Subtotal	6,376,200	74,313,000	136,865,000	1,468,272,271	1,907,139	30,260,900	9,549,100	126,455,894 3/	175,631,000	2,029,630,504	
										GRAND TOTAL	2,278,146,042

1/ Annual operating costs incurred for each facility prior to the conversion from construction to an operational status.

2/ Preliminary, subject to adjustment pending accounting, engineering and legal decisions.

3/ Balance of the $130,000,000 reserved under the Burns-Porter Act.

TABLE 15

COMPOSITION OF TOTAL ANNUAL OPERATING COSTS

(in dollars)

CALENDAR YEAR	GENERAL OPERATING EXPENSE 1/	OPERATION AND MAINTENANCE SUPERVISION 2/	SALARIES 3/		MATERIALS AND SUPPLIES 4/	POWER AND ENERGY 5/		DEPOSITS TO REPLACEMENT RESERVES 6/	TOTAL OPERATING COSTS	
			OPERATING PERSONNEL	MAINTENANCE PERSONNEL		PUMPING PLANTS	RECOVERY PLANTS		ACTUAL	PROJECTED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1962									118,018	
63									234,684	
64	73,200	14,400	17,100	38,600	10,600	91,000		12,200		257,100
65	208,000	17,500	30,900	131,800	15,600	153,000		25,000		581,800
66	226,400	39,600	45,400	186,700	117,800	224,000		25,000		864,900
67	1,476,300	188,700	606,400	1,070,300	310,300	301,000		324,400		4,277,400
68	2,682,600	413,600	956,800	2,478,300	586,500	2,069,300	-141,000	1,467,100		10,513,200
69	2,823,300	479,100	1,057,700	3,134,100	764,400	2,325,350	-156,000	1,634,700		12,062,650
1970	2,877,800	469,100	1,121,900	3,617,300	806,000	2,308,350	-198,000	1,773,700		12,776,150
71	4,007,600	459,300	1,721,400	3,953,800	1,017,300	5,865,350	-1,699,000	2,633,500		17,959,250
72	4,623,900	545,400	2,189,300	5,079,600	1,117,500	10,002,350	-2,879,000	2,916,700		23,595,750
73	4,623,900	666,000	2,201,700	6,202,700	1,134,600	10,971,350	-3,515,000	2,961,100		25,246,350
74	4,623,900	677,500	1,932,600	6,310,200	1,232,100	13,994,350	-4,406,000	3,146,500		27,511,150
75	4,618,600	681,500	1,943,700	6,346,700	1,284,400	16,499,860	-5,258,000	3,437,900		29,554,660
76	4,618,600	681,900	1,944,800	6,350,500	1,309,500	19,737,860	-6,127,000	3,558,500		32,074,660
77	4,618,600	685,600	1,955,600	6,385,600	1,343,500	22,940,860	-6,987,000	3,658,500		34,601,260
78	4,618,600	686,600	1,958,400	6,395,000	1,366,500	25,856,860	-7,870,000	3,681,800		36,693,760
79	4,618,600	684,000	1,951,100	6,370,900	1,367,700	31,002,860	-9,260,000	3,683,700		40,418,860
1980	5,096,300	788,800	2,250,000	7,346,900	1,401,300	36,912,340	-10,530,000	3,825,300		47,090,940
81	4,998,100	790,100	2,253,600	7,358,600	1,402,400	41,743,340	-11,528,000	3,831,000		50,849,140
82	4,998,100	790,700	2,255,300	7,364,200	1,403,800	45,921,340	-12,645,000	3,834,100		53,922,540
83	4,998,100	791,200	2,256,700	7,368,800	1,405,000	50,520,340	-13,653,000	3,836,200		57,523,340
84	4,961,800	791,700	2,258,200	7,373,900	1,406,000	55,142,340	-14,582,000	3,838,300		61,190,240
85	5,054,000	786,800	2,244,100	7,327,700	1,408,900	59,934,340	-15,981,000	3,847,700		64,622,540
86	5,054,000	812,200	2,316,700	7,564,700	1,410,100	62,315,340	-16,547,000	3,870,800		66,796,840
87	5,054,000	812,700	2,318,100	7,569,600	1,412,300	66,975,340	-17,481,000	3,878,100		70,539,140
88	5,054,000	813,500	2,320,400	7,577,100	1,413,700	71,495,340	-18,583,000	3,880,300		73,971,340
89	5,054,000	813,800	2,321,000	7,579,000	1,417,500	76,393,340	-19,793,000	3,887,600		77,673,240
1990	5,054,000	814,300	2,322,500	7,583,600	1,417,500	80,786,840	-21,161,000	3,891,100		80,708,840
91	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,235,840	-21,348,000	3,892,100		80,971,840
92	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,254,840	-21,348,000	3,892,100		80,990,840
93	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,320,840	-21,348,000	3,892,100		81,056,840
94	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,337,840	-21,348,000	3,892,100		81,073,840
95	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,344,840	-21,348,000	3,892,100		81,080,840
96	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,349,840	-21,348,000	3,892,100		81,085,840
97	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,356,840	-21,348,000	3,892,100		81,092,840
98	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,356,840	-21,348,000	3,892,100		81,092,840
99	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,356,840	-21,348,000	3,892,100		81,092,840
2000	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
01	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
02	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
03	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
04	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
05	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
06	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
07	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
08	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
09	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,339,960	-21,348,000	3,892,100		81,075,960
2010 7/	5,054,000	814,300	2,322,500	7,583,600	1,417,500	81,320,110	-21,348,000	3,892,100		81,056,110

1/ Includes the costs of project-wide programs for contract negotiation and administration, operation and maintenance management, and general investigations.
2/ Includes the costs of yard administration and support for operation and maintenance personnel.
3/ Includes the direct costs of salaries, including a prorated share of indirect costs of the department.
4/ Includes the costs of materials, supplies, and equipment rental for electrical-mechanical plants and aqueduct reaches.
5/ Does not include power and energy requirements or production by power features of the Oroville Division or for the federal share of power and pumping plant features of the San Luis Division.
6/ Based on sinking funds earning 4 percent per annum.
7/ And each year thereafter for the remainder of the project repayment period.

TABLE 16

ACTUAL AND PROJECTED
ANNUAL FEDERAL PARTICIPATION IN COSTS

(in dollars)

CALENDAR YEAR	PROJECT FUNCTION, PROJECT FEATURE, AND CATEGORY OF COSTS						TOTAL ANNUAL FEDERAL PARTICIPATION	
	FLOOD CONTROL			WATER SUPPLY	DRAINAGE			
	OROVILLE DAM & RESERVOIR	DEL VALLE DAM & RESERVOIR	DELTA FACILITIES (PRELIMINARY)	SAN LUIS DIVISION (PRELIMINARY)	SAN JOAQUIN DRAINAGE FACILITIES (PRELIMINARY)			
	CAPITAL & ANNUAL OPERATING 1/	CAPITAL & ANNUAL OPERATING 2/	CAPITAL 3/	ANNUAL OPERATING 4/5/	CAPITAL 3/	ANNUAL OPERATING 4/	ACTUAL	PROJECTED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1962	13,950,000						13,950,000	
63								
64	15,500,000						4,500,000	11,000,000
65	3,587,265	401,000						3,988,265
66	10,096,163	1,114,000			2,950,000			14,160,163
67	11,971,586	1,720,000			2,950,000			16,641,586
68	9,464,477	1,621,000		1,051,300	1,474,000			13,610,777
69	4,122,019		2,041,829	1,151,600		133,000		7,448,448
1970	125,950		428,000	1,165,700		133,000		1,852,650
71	5,720		452,800	1,181,500		133,000		1,773,020
72			1,692,200	1,212,900		133,000		3,038,100
73			699,400	1,229,100		133,000		2,061,500
74			699,800	1,229,100		133,000		2,061,900
75			1,423,200	1,229,100		133,000		2,785,300
76			612,100	1,229,100		133,000		1,974,200
77			612,100	1,229,100		133,000		1,974,200
78			612,100	1,229,100		133,000		1,974,200
79			612,100	1,229,100		133,000		1,974,200
1980			391,800	1,229,100		133,000		1,753,900
81			253,500	1,229,100		133,000		1,615,600
82				1,229,100		133,000		1,362,100
83				1,229,100		133,000		1,362,100
84				1,229,100		133,000		1,362,100
85				1,229,100		133,000		1,362,100
86				1,229,100		133,000		1,362,100
87				1,229,100		133,000		1,362,100
88				1,229,100		133,000		1,362,100
89				1,229,100		133,000		1,362,100
1990 6/				1,229,100		133,000		1,362,100
TOTALS	68,823,180	4,856,000	10,530,929	-	7,374,000	-	18,450,000	-

1/ By agreement dated March 8, 1962, federal participation equal to 22% of capital costs, including allowance for capitalized share of annual operating costs. Utilized in Project Financial Program toward payment of general obligation bond service.

2/ Estimated on basis of proposed contract. Federal participation for capital costs incurred since 1959 equal to 29.82%. Contribution for annual operating costs assumed to be $776,000, paid in the year 1968. Total contribution utilized in Project Financial Program to decrease State capital expenditures.

3/ Estimated contributions for capital costs utilized in Project Financial Program to decrease State capital expenditures. Annual operating costs allocable to flood control excluded in this analysis.

4/ Power and energy costs excluded. Estimated contributions for annual operating costs utilized in Project Financing Program to decrease project operating costs.

5/ Federal share of capital costs not shown since the State is contributing funds for 55% of the construction costs incurred by the Federal Government.

6/ And each year thereafter for the remainder of the project repayment period.

TABLE 17

ACTUAL AND PROJECTED NONUTILITY CAPITAL COSTS

(in dollars)

CALENDAR YEAR	LOCAL PROJECTS (DAVIS-GRUNSKY PROGRAM) 1/	FEDERAL CONTRIBUTION FOR FLOOD CONTROL, OROVILLE DAM & RESERVOIR	SEPARABLE 2/ AND MULTIPLE-PURPOSE NONREIMBURSABLE				SEPARABLE RECREATION NONREIMBURSABLE 7/					UNASSIGNED COSTS 8/	TOTAL ANNUAL COSTS	
			UPPER FEATHER DIVISION											
			FRENCHMAN DAM & RESERVOIR 3/ (PRELIMINARY)	GRIZZLY VALLEY DAM & RESERVOIR 4/ (PRELIMINARY)	ANTELOPE VALLEY, ABBEY BRIDGE, & DIXIE REFUGE 5/ DAMS & RESERVOIRS	DELTA FACILITIES 6/ (PRELIMINARY)	OROVILLE DIVISION	CALIFORNIA AQUEDUCT	SOUTH BAY AQUEDUCT	NORTH BAY AQUEDUCT	SAN JOAQUIN DRAINAGE FACILITIES		ACTUAL 9/ 10/	PROJECTED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1952												69	69	
53												338	338	
54												1,109	1,109	
55												1,499	1,499	
56												18,384	18,384	
57			9,984	42,239	61,322	65,747						563,744	743,036	
58			83,345	37,683	122,739	144,575	10,784					594,206	993,332	
59	12,666		172,355	17,655	111,418	113,104	16,997	13,152	323	274		162,337	620,281	
1960	86,983		325,166	12,167	119,624	233,066	15,117	27,317	2,859	405	18	332,540	1,155,262	
61	544,166		270,654	930	199,440	244,157	32,527	380,099	4,258	29	8,302	55,014	1,739,576	
62	623,352	13,950,000	154,196	123,967	1,007,746	366,571	103,074	100,849	1,276	73	1,859	7,327	16,440,290	
63	3,695,417		35,001	183,047	2,697,222	664,286	150,118	323,771	338		10,421	23,700	7,783,321	
64	9,000,000	15,500,000		1,564,000	2,546,000	1,268,300								29,878,300
65	10,000,000	3,587,265		2,130,000	280,000	761,800								16,759,065
66	10,000,000	10,096,163			788,000	313,700								21,197,863
67	10,000,000	11,971,586			734,000	952,600								23,658,186
68	10,000,000	9,464,477			840,000	2,562,800								22,867,277
69	10,000,000	4,122,019			840,000	809,871								15,771,890
1970	10,000,000	125,950				1,409,600								11,535,550
71	10,000,000	5,720				3,038,200								13,043,920
72	10,000,000					5,500								10,005,500
73	10,000,000					1,312,100								11,312,100
74	10,000,000					4,077,900								14,077,900
75	10,000,000					1,748,900								11,748,900
76	7,455,894					2,501,200								9,957,094
77						2,273,700								2,273,700
78						909,000								909,000
79						147,200								147,200
1980						339,500								339,500
81						-253,500								-253,500
82														
83														
84														
85														
86														
87														
88														
89														
1990														
TOTALS	131,418,478	68,823,180	1,050,701	4,111,688	10,347,511	26,009,877	328,617	845,188	9,054	781	20,600	1,760,267	29,496,497	215,229,445
													GRAND TOTAL	244,725,942 10/

1/ Includes $54,487 prior expenditure from the General Fund, $102,548 special appropriations from the California Water Fund, and $1,261,443 from the Local Projects Assistance Fund in addition to the $130,000,000 reserved by the Burns-Porter Act.

2/ Projected future costs include only those funded from sources provided by the Burns-Porter Act.

3/ Based on a preliminary allocation of multiple-purpose costs: 33 percent to recreation.

4/ Multiple-purpose costs shown totally allocated to recreation. Cost allocation between recreation and water conservation currently under formulation.

5/ Costs totally allocable to recreation.

6/ Includes multiple-purpose costs allocated to recreation and to relatively minor project functions of seepage control, vehicular transportation, navigation, and salinity control (based on Bulletin No. 76).

7/ Allocation of multiple-purpose costs under formulation. Costs shown include only those for recreational plans and for land acquisitions specifically for recreational purposes.

8/ Includes prior costs of features deleted from the North Bay and South Bay Aqueducts.

9/ Preliminary, subject to adjustment pending accounting, engineering, and legal decisions.

10/ Costs have been credited with income received from right-of-way rentals and sales, totalling $1,900: $315 in 1959, $315 in 1960, $300 in 1961, $600 in 1962, and $370 in 1963.

TABLE 18

ACTUAL AND PROJECTED UTILITY COSTS FOR DRAINAGE

(in dollars)

CALENDAR YEAR	SAN JOAQUIN DRAINAGE FACILITIES (Preliminary)		
	CAPITAL COSTS		ANNUAL OPERATING COSTS PROJECTED
	ACTUAL 1/	PROJECTED	
	(1)	(2)	(3)
1960	53,420		
61	410,378		
62	446,234		
63	437,447		
64		467,000	
65		504,000	
66		17,664,000	
67		17,664,000	
68		8,832,000	
69			794,350
1970			794,350
71			794,350
72			794,350
73		1,418,000	794,350
74		1,418,000	794,350
75			899,860
76			899,860
77			899,860
78			899,860
79		435,000	899,860
1980			939,340
81			939,340
82			939,340
83			939,340
84			939,340
85			939,340
86			939,340
87			939,340
88			939,340
89			939,340
1990			928,840
91			928,840
92			928,840
93			928,840
94			928,840
95			928,840
96			928,840
97			928,840
98			928,840
99			928,840
2000			911,960
01			911,960
02			911,960
03			911,960
04			911,960
05			911,960
06			911,960
07			911,960
08			911,960
09			911,960
2010 2/			892,110
TOTALS	1,347,479	48,402,000	
GRAND TOTAL	49,749,479		

1/ Preliminary, subject to adjustment pending engineering, accounting, and legal decisions.

2/ And each year thereafter for the remainder of the project repayment period.

TABLE 19

ACTUAL AND PROJECTED UTILITY CAPITAL COSTS
FOR WATER TRANSPORTATION

(in dollars)

CALENDAR YEAR	NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	DIVISIONS OF THE CALIFORNIA AQUEDUCT								TOTAL CALIFORNIA AQUEDUCT	TOTAL TRANSPORTATION 1/	
			NORTH SAN JOAQUIN	SAN LUIS	SOUTH SAN JOAQUIN	TEHACHAPI	ANTELOPE	EAST BRANCH	WEST BRANCH	COASTAL		ACTUAL 2/3/	PROJECTED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1952		486	8,804	10,846	14,262	11,843	6,304	41,087	6,352		99,498	99,984	
53		2,414	21,651	28,838	52,483	37,495	21,128	137,720	21,309		320,624	323,038	
54		7,888	26,911	34,339	67,825	69,006	23,400	152,566	23,636		397,683	405,571	
55		10,594	14,363	16,714	32,023	45,089	9,103	59,364	9,209		185,865	196,459	
56		142,927	17,547	17,328	100,289	71,232	11,531	75,150	11,618		304,695	447,622	
57	70,460	330,566	19,878	18,558	243,035	166,426	32,362	210,897	32,606		723,762	1,124,788	
58	155,230	494,113	49,136	79,960	492,466	214,464	48,327	314,943	48,691		1,247,987	1,897,330	
59	93,089	728,938	297,140	183,962	731,632	180,504	61,157	412,176	102,189	55,690	2,024,450	2,846,477	
1960	57,406	1,533,309	370,500	192,722	768,284	201,569	64,244	860,647	146,220	112,664	2,716,850	4,307,565	
61	46,440	4,259,280	404,547	726,957	1,207,603	503,145	91,251	1,700,115	193,018	63,067	4,889,703	9,195,423	
62	17,583	3,367,748	1,111,085	1,856,135	1,210,913	483,908	126,423	981,971	652,941	90,037	6,513,413	9,898,744	
63	48,256	6,342,619	5,773,483	7,431,064	2,235,419	1,481,345	146,943	3,661,078	994,471	170,469	21,894,272	28,285,147	
64	218,700	16,073,500	11,471,700	19,031,900	9,482,700	6,660,800	262,200	6,289,100	4,371,600	1,140,900	58,710,900		75,003,100
65	425,900	9,680,700	22,950,200	26,786,700	21,932,900	21,514,800	924,400	8,522,200	6,149,400	1,643,000	110,423,600		120,530,200
66	1,326,100	6,226,900	30,818,500	26,394,200	24,246,800	27,277,000	3,375,700	10,699,100	13,759,200	4,289,300	140,859,800		148,412,800
67	2,251,900	-1,517,000	26,228,900	15,898,700	24,043,000	36,236,800	8,768,800	18,830,000	35,792,500	3,696,100	169,494,800		170,229,700
68	437,200	-1,621,000	1,161,000	4,719,000	20,852,600	20,835,700	7,686,000	44,450,800	37,266,600	441,500	137,413,200		136,229,400
69	38,100			425,000	31,294,300	20,086,600	2,827,400	61,305,100	44,184,200	724,300	160,846,900		160,885,000
1970	38,100				44,195,500	3,851,800	754,100	88,511,900	14,001,900	449,300	151,764,500		151,802,600
71	37,400		98,000		9,931,000	12,538,000	88,000	54,189,000	485,000	453,900	77,782,900		77,820,300
72	37,400		195,000		187,000	3,286,000	946,000	3,627,000	5,175,000	669,900	14,085,900		14,123,300
73	45,400		2,116,000		2,757,000	445,000	945,000	1,046,000	5,243,000	802,900	13,354,900		13,400,300
74	142,400		2,116,000		6,128,000	6,276,000		1,912,000	727,000	979,900	18,138,900		18,281,300
75	37,400				3,630,000	6,276,000		1,045,000	727,000	2,254,300	13,932,300		13,969,700
76	59,400					6,276,000		956,000		6,055,300	13,287,300		13,346,700
77	258,400							1,406,000		7,897,300	9,303,300		9,561,700
78	1,869,400	26,000						4,813,000		12,530,300	17,343,300		19,238,700
79	2,788,400	193,000						4,813,000		6,678,300	11,491,300		14,472,700
1980	105,000												105,000
81													
82													
83	16,000									70,000	70,000		86,000
84	217,000									903,000	903,000		1,120,000
85										32,000	32,000		32,000
86	8,000									688,000	688,000		696,000
87	112,000									648,000	648,000		760,000
88	8,000	26,000											34,000
89	105,000	193,000											298,000
1990													
TOTALS	11,071,064	46,501,982	105,270,345	103,852,923	205,837,034	175,026,526	27,219,773	321,022,914	170,124,660	53,539,427	1,161,893,602	59,028,148	1,160,438,500
												GRAND TOTAL	1,219,466,648 3/

1/ A small transportation facility may be added to the Grizzly Valley Unit for the Plumas County F.C. & W.C.D. depending on the desires of the district.

2/ Preliminary, subject to adjustment pending accounting, engineering, and legal decisions.

3/ The costs shown are basic to the computation of Transportation Charges and accordingly have been credited with the following income received from right-of-way rentals and sales:

Calendar Year	South Bay Aqueduct	California Aqueduct	Total
1959	250		250
1960	11,125	1,254	12,379
1961	24,459	4,868	29,327
1962	27,407	29,572	56,979
1963	26,970	35,327	62,297
Totals	90,211	71,021	161,232

TABLE 20

ACTUAL AND PROJECTED ANNUAL OPERATING COSTS
FOR WATER TRANSPORTATION

(in dollars)

CALENDAR YEAR	NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	DIVISIONS OF THE CALIFORNIA AQUEDUCT								TOTAL CALIFORNIA AQUEDUCT	TOTAL TRANSPORTATION 1/	
			NORTH SAN JOAQUIN	SAN LUIS	SOUTH SAN JOAQUIN	TEHACHAPI	ANTELOPE 2/	EAST BRANCH	WEST BRANCH 2/	COASTAL		ACTUAL	PROJECTED
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1962		109,805										109,805	
63		215,130										215,130	
64		242,800											242,800
65		567,200											567,200
66		850,000											850,000
67		1,212,600	412,100								412,100		1,624,700
68	168,800	1,613,700	1,762,100	1,367,800	394,000					261,000	3,784,900		5,567,400
69	170,600	1,641,600	1,817,000	1,493,500	434,400					275,300	4,020,200		5,832,400
1970	171,600	1,650,000	1,886,800	1,611,500	854,000					304,700	4,657,000		6,478,600
71	172,000	1,678,300	2,020,300	1,770,800	3,607,400	2,065,600	284,600		92,700	364,700	10,206,100		12,056,400
72	174,000	1,683,300	2,091,800	2,146,000	4,800,700	4,188,900	247,600	1,982,800	1,900	380,200	15,839,900		17,697,200
73	175,000	1,687,300	2,172,800	2,355,900	5,371,700	5,519,400	169,600	1,739,000	-357,200	413,600	17,384,800		19,247,100
74	176,000	1,693,300	2,734,600	2,537,800	6,098,900	6,596,800	129,400	1,465,500	-519,600	405,500	19,448,900		21,318,200
75	178,000	1,723,800	2,977,400	2,721,500	6,702,300	7,779,800	83,300	1,321,700	-776,900	408,300	21,217,400		23,119,200
76	192,100	1,727,800	3,686,400	2,919,600	7,300,300	8,965,200	41,300	1,199,500	-984,200	410,300	23,538,400		25,458,300
77	196,100	1,731,800	4,269,400	3,121,800	7,902,300	10,396,200	-14,700	992,500	-1,243,200	413,300	25,837,600		27,765,500
78	198,100	1,740,800	4,758,400	3,324,000	8,499,300	11,500,400	-56,700	850,600	-1,496,200	417,900	27,797,700		29,736,600
79	199,100	1,742,800	5,289,400	3,523,200	9,721,300	14,042,400	-159,700	640,600	-2,096,200	406,900	31,367,900		33,309,800
1980	311,100	1,776,200	5,805,400	3,729,400	11,279,300	16,584,400	-266,700	811,600	-2,523,200	2,292,000	37,712,200		39,799,500
81	311,700	1,775,500	6,142,800	3,906,800	12,463,500	19,153,600	-362,500	764,600	-2,933,800	2,287,100	41,422,100		43,509,300
82	330,900	1,779,500	6,480,800	4,087,000	13,655,500	21,261,600	-456,500	609,600	-3,495,600	2,299,100	44,441,500		46,551,900
83	332,900	1,785,500	6,799,800	4,275,200	14,865,500	23,602,600	-535,500	671,600	-3,980,800	2,309,100	48,007,500		50,125,900
84	334,500	1,790,700	7,142,000	4,456,600	16,080,400	25,935,200	-646,200	525,200	-4,235,100	2,354,500	51,612,600		53,737,800
85	340,700	1,873,700	7,442,000	4,642,700	17,306,400	28,272,200	-740,200	583,200	-5,070,100	2,499,300	54,935,500		57,149,900
86	358,800	1,880,000	6,317,000	4,828,800	18,540,400	30,626,200	-835,200	429,200	-5,288,100	2,670,300	57,288,600		59,527,400
87	361,800	1,885,000	6,470,000	5,022,000	19,812,400	33,010,200	-932,200	482,200	-5,544,100	2,699,500	61,020,000		63,266,800
88	367,000	1,891,000	6,629,000	5,217,200	21,089,400	35,412,200	-1,014,200	306,200	-6,032,100	2,816,500	64,424,200		66,682,200
89	371,000	1,901,500	6,955,000	5,405,400	22,358,400	37,798,200	-1,127,200	348,200	-6,599,100	2,932,800	68,071,700		70,344,200
1990	373,000	1,912,900	7,117,000	5,486,400	23,629,400	40,194,200	-1,221,200	174,200	-6,825,100	3,067,800	71,622,700		73,908,600
91	374,000	1,923,900	7,301,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,796,700		74,094,600
92	374,000	1,936,900	7,307,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,802,700		74,113,600
93	374,000	1,999,900	7,310,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,805,700		74,179,600
94	374,000	2,010,900	7,316,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,811,700		74,196,600
95	374,000	2,014,900	7,319,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,814,700		74,203,600
96	374,000	2,019,900	7,319,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,814,700		74,208,600
97	374,000	2,023,900	7,322,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,817,700		74,215,600
98	374,000	2,023,900	7,322,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,817,700		74,215,600
99	374,000	2,023,900	7,322,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,817,700		74,215,600
2000 3/	374,000	2,023,900	7,322,000	5,489,400	23,699,400	40,236,200	-1,224,200	52,200	-6,825,100	3,067,800	71,817,700		74,215,600

1/ A small transportation facility may be added to the Grizzly Valley Unit for the Plumas County F.C. & W.C.D. depending on the desires of the district.

2/ Negative amounts indicate that revenues from power recovery plants exceed the operating costs of the division.

3/ And each year thereafter for the remainder of the project repayment period.

TABLE 21

ACTUAL AND PROJECTED UTILITY COSTS
FOR WATER CONSERVATION AND OROVILLE POWER

(in dollars)

CALENDAR YEAR	CAPITAL COSTS						OPERATING COSTS						TOTAL COSTS OF CONSERVATION AND OROVILLE POWER
	FEATHER RIVER FACILITIES		DELTA FACILITIES (Preliminary)	CALIFORNIA AQUEDUCT	UPPER EEL RIVER DEVELOPMENT 3/ (Preliminary)	TOTAL CAPITAL COSTS 4/	FEATHER RIVER FACILITIES		DELTA FACILITIES (Preliminary)	CALIFORNIA AQUEDUCT	UPPER EEL RIVER DEVELOPMENT 3/ (Preliminary)	TOTAL OPERATING COSTS 4/	
	UPPER FEATHER DIVISION 1/	OROVILLE DIVISION 2/					UPPER FEATHER DIVISION 1/	OROVILLE DIVISION					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
1952		152,894		23,412		176,306							176,306
53		265,775		61,720		327,495							327,495
54		246,029		73,838		319,867							319,867
55		151,561		36,417		187,978							187,978
56		1,292,343		49,151		1,341,494							1,341,494
57	20,271	6,720,183	67,588	84,065		6,892,107							6,892,107
58	164,847	9,554,662	148,622	140,198		10,008,329							10,008,329
59	342,570	10,318,206	116,269	1,243,555		12,020,600							12,020,600
1960	657,191	13,040,322	232,401	1,602,165		15,532,079							15,532,079
61	547,084	18,677,561	244,756	1,029,242		20,498,643							20,498,643
62	310,908	8,071,286	320,478	2,209,064		10,911,736	8,213					8,213	10,919,949
63	71,069	51,775,273	621,695	27,609,450		80,077,487	19,554					19,554	80,097,041
64	1,000	47,689,500	2,965,800	21,521,900	321,200	72,499,400	14,300					14,300	72,513,700
65	1,000	96,544,635	956,600	32,173,100	769,000	130,444,335	14,600					14,600	130,458,935
66	2,000	80,855,937	744,400	34,150,900	945,400	116,698,637	14,900					14,900	116,713,537
67	1,000	49,394,553	2,029,000	22,563,200	827,500	74,815,253	12,900	2,079,400	460,300	100,100		2,652,700	77,467,953
68		2,927,523	8,232,500	4,810,000	412,800	16,382,823	11,000	2,584,200	471,500	1,879,100		4,945,800	21,328,623
69		1,229,981	8,233,500	413,000	96,700	9,973,181	11,100	2,775,000	479,300	2,170,500		5,435,900	15,409,081
1970		-125,950	3,707,400	0	96,700	3,678,150	11,100	2,814,700	722,200	1,955,200		5,503,200	9,181,350
71		-5,720	606,100	29,000	94,800	724,180	11,000	2,825,400	907,100	1,365,000		5,108,500	5,832,680
72			272,300	59,000	94,800	426,100	11,000	2,825,400	929,800	1,338,000		5,104,200	5,530,300
73			1,514,600	634,000	94,800	2,243,400	11,000	2,825,400	937,500	1,431,000		5,204,900	7,448,300
74			2,551,800	634,000	94,800	3,280,600	11,000	2,825,400	945,200	1,617,000		5,398,600	8,679,200
75			2,089,600		94,700	2,184,300	11,000	2,824,600	1,006,500	1,693,500		5,535,600	7,719,900
76			1,856,700		94,700	1,951,400	11,000	2,824,600	1,017,400	1,863,500		5,716,500	7,667,900
77			956,500		94,700	1,051,200	11,000	2,824,600	1,078,800	2,021,500		5,935,900	6,987,100
78			241,400		2,094,700	2,336,100	11,000	2,824,600	1,096,200	2,125,500		6,057,300	8,393,400
79			146,900		6,094,700	6,241,600	11,000	2,824,600	1,104,100	2,269,500		6,209,200	12,450,800
1980			1,072,100		21,094,700	22,166,800	11,000	2,824,600	1,133,000	2,383,500		6,352,100	28,518,900
81					43,092,900	43,092,900	11,000	2,810,700	1,150,500	2,428,300		6,400,500	49,493,400
82					48,092,900	48,092,900	11,000	2,810,700	1,159,300	2,450,300		6,431,300	54,524,200
83					36,092,900	36,092,900	11,000	2,810,700	1,158,100	2,468,300		6,458,100	42,551,000
84					10,092,200	10,092,200	11,000	2,805,500	1,174,400	2,522,100		6,513,100	16,605,300
85					1,092,200	1,092,200	11,000	2,805,600	1,183,500	2,533,100		6,533,300	7,625,500
86							11,000	2,805,600	1,192,200	1,953,100	368,200	6,330,100	6,330,100
87							11,000	2,805,600	1,201,100	1,947,100	368,200	6,333,000	6,333,000
88							11,000	2,805,600	1,200,000	1,955,100	368,200	6,349,800	6,349,800
89							11,000	2,805,600	1,218,800	1,986,100	368,200	6,389,700	6,389,700
1990							11,000	2,805,600	1,227,500	1,459,100	368,200	5,871,400	5,871,400
1991 5/							11,000	2,805,600	1,227,500	1,536,100	368,200	5,948,400	5,948,400
TOTALS	2,118,940	398,776,554	39,929,009	151,150,377	171,879,800	763,854,680 6/							

1/ Based on a preliminary allocation of 67 percent of the multiple-purpose costs of Frenchman Dam and Reservoir only. This allocation and the required allocation of the Grizzly Dam and Reservoir are being re-evaluated.

2/ As reduced by the assumed federal participation shown in first column of Table 16.

3/ Required Additional Project Conservation Facility.

4/ Actual costs, shown thru 1963, are preliminary and subject to adjustment pending accounting, engineering, and legal decisions.

5/ And each year thereafter for the remainder of the project repayment period.

6/ Capital costs shown are basic to the computation of Delta Water Charges and accordingly have been credited with the following income received from the right-of-way rentals and sales:

Calendar Year	Upper Feather Division	Oroville Division	California Aqueduct	Total
1959		100		100
1960		1,116	38,984	40,100
1961		4,281	44,519	48,800
1962	600	19,307	22,870	42,777
1963	750	38,676	14,958	54,384
Totals	1,350	63,480	121,331	186,181

TABLE 22

SUMMARY OF ANNUAL CAPITAL EXPENDITURES[1]

(in dollars)

CALENDAR YEAR	TOTAL NONUTILITY PROGRAMS[2]	UTILITY PROGRAM											TOTAL ANNUAL CAPITAL EXPENDITURES
		DRAINAGE	WATER TRANSPORTATION				WATER CONSERVATION AND OROVILLE POWER						
		SAN JOAQUIN DRAINAGE FACILITIES (PRELIMINARY)	NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT	TOTAL	FEATHER RIVER FACILITIES: OROVILLE DIVISION	FEATHER RIVER FACILITIES: UPPER FEATHER DIVISION	DELTA FACILITIES (PRELIMINARY)	CALIFORNIA AQUEDUCT	UPPER EEL RIVER DEVELOPMENT (PRELIMINARY)	TOTAL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
			FROM FUNDS NOT PROVIDED BY THE BURNS-PORTER ACT[3]										
1952	69			486	99,498	99,984	152,894			23,412		176,306	276,359
53	338			2,414	320,624	323,038	265,775			61,720		327,495	650,871
54	1,109			7,888	397,683	405,571	246,029			73,838		319,867	726,547
55	1,499			10,594	185,865	196,459	151,561			36,417		187,978	385,936
56	18,384			142,927	304,695	447,622	1,292,343			49,151		1,341,494	1,807,500
57	743,036		70,460	330,566	723,762	1,124,788	6,720,183	20,271	67,588	84,065		6,892,107	8,759,931
58	993,332		155,230	494,113	1,247,987	1,897,330	9,554,662	164,847	148,622	140,198		10,008,329	12,898,991
59	620,596		93,089	729,188	2,024,450	2,846,727	10,318,306	342,570	116,269	1,243,555		12,020,700	15,488,023
1960	1,155,577	53,420	57,406	1,544,434	2,718,104	4,319,944	13,041,438	657,191	232,401	1,641,149		15,572,179	21,101,120
61	1,363,203	246,538	45,053	3,607,437	3,294,899	6,947,389	16,616,824	469,080	167,062	65,039		17,318,005	25,875,135
62	271,743	17,078	-2,701	1,833,105	1,337,788	3,168,192	4,260,535	62,833	82,223	511,852		4,917,443	8,374,456
1963	756,144	-1,672	-302	898,251	1,912,883	2,810,832	607,401	-617	4,827	1,926,642		2,538,253	6,103,557
Subtotal	5,925,030	315,364	418,235	9,601,403	14,568,238	24,587,876	63,227,951	1,716,175	818,992	5,857,038	0	71,620,156	102,448,426
			FROM FUNDS PROVIDED BY THE BURNS-PORTER ACT[4]										
1961	376,673	163,840	1,387	676,302	1,599,672	2,277,361	2,065,018	78,004	77,694	1,008,722		3,229,438	6,047,312
62	16,169,147	429,156	20,284	1,562,050	5,205,197	6,787,531	3,830,058	248,675	238,255	1,720,082		6,037,070	29,422,904
63	7,027,547	439,119	48,558	5,471,338	20,016,716	25,536,612	51,206,548	72,436	616,868	25,697,766		77,593,618	110,596,896
64	29,878,300	467,000	218,700	16,073,500	58,710,900	75,003,100	47,689,500	1,000	2,965,800	21,521,900	321,200	72,499,400	177,847,800
65	16,759,065	504,000	425,900	9,680,700	110,423,600	120,530,200	96,544,635	1,000	956,600	32,173,100	769,000	130,444,335	268,237,600
66	21,197,863	17,664,000	1,326,100	6,226,900	140,859,800	148,412,800	80,855,937	2,000	744,400	34,150,900	945,400	116,698,637	303,973,300
67	23,658,186	17,664,000	2,251,900	-1,517,000	169,494,800	170,229,700	49,394,553	1,000	2,029,000	22,563,200	827,500	74,815,253	286,367,139
68	22,867,277	8,832,000	437,200	-1,621,000	137,413,200	136,229,400	2,927,523		8,232,500	4,810,000	412,800	16,382,823	184,311,500
69	15,771,890		38,100		160,846,900	160,885,000	1,229,981		8,233,500	413,000	96,700	9,973,181	186,630,071
1970	11,535,550		38,100		151,764,500	151,802,600	125,950		3,707,400		96,700	3,678,150	167,016,300
71	13,043,920		37,400		77,782,900	77,820,300	5,720		606,100	29,000	94,800	724,180	91,588,400
72	10,005,500		37,400		14,085,900	14,123,300			272,300	59,000	94,800	426,100	24,554,900
73	11,312,100	1,418,000	45,400		13,354,900	13,400,300			1,514,600	634,000	94,800	2,243,400	28,373,800
74	14,077,900	1,418,000	142,400		18,138,900	18,281,300			2,551,800	634,000	94,800	3,280,600	37,057,800
75	11,748,900		37,400		13,932,300	13,969,700			2,089,600		94,700	2,184,300	27,902,900
76	9,957,094		59,400		13,287,300	13,346,700			1,856,700		94,700	1,951,400	25,255,194
77	2,273,700		258,400		9,303,300	9,561,700			956,500		94,700	1,051,200	12,886,600
78	909,000		1,869,400	26,000	17,343,300	19,238,700			241,400		2,094,700	2,336,100	22,483,800
79	147,200	435,000	2,788,400	193,000	11,491,300	14,472,700			146,900		6,094,700	6,241,600	21,296,500
1980	339,500		105,000			105,000			1,072,100		21,094,700	22,166,800	22,611,300
81	-253,500										43,092,900	43,092,900	42,839,400
82											48,092,900	48,092,900	48,092,900
83			16,000		70,000	86,000					36,092,900	36,092,900	36,178,900
84			217,000		903,000	1,120,000					10,092,200	10,092,200	11,212,200
85					32,000	32,000					1,092,200	1,092,200	1,124,200
86			8,000		688,000	696,000							696,000
87			112,000		648,000	760,000							760,000
88			8,000	26,000		34,000							34,000
89			105,000	193,000		298,000							298,000
1990													
Subtotal	238,802,812	49,434,115	10,652,829	36,990,790	1,147,396,385	1,195,040,004	335,612,083	404,115	39,110,017	145,414,670	171,879,800	692,420,685	2,175,697,616
TOTALS	244,727,842	49,749,479	11,071,064	46,592,193	1,161,964,623	1,219,627,880	398,840,034	2,120,290	39,929,009	151,271,708	171,879,800	764,040,841	2,278,146,042

1/ This table presents the total capital costs to be financed by the State. It includes the total amounts set forth in Tables 17, 18, 19, and 21 for Nonutility Programs and for the Drainage, Water Transportation, and Water Conservation Programs of the Utility, respectively; together with the capital expenditures subsequently credited with income received, set forth in the footnotes thereto.

2/ Includes costs of Local Projects (Davis-Grunsky Program) and federal contributions for flood control at Oroville.

3/ Includes costs financed by special prior appropriations from the General Fund, the California Water Fund, and the Local Projects Assistance Fund.

4/ Includes costs covered by proceeds from revenue bonds supported by Oroville power revenues.

5/ Negative amounts shown in Columns 2, 3, and 8 for the portion of the table designated "from funds not provided by the Burns-Porter Act" reflect accounting adjustments. Negative amounts shown in Columns 1, 4, and 7 for the portion of the table designated "from funds provided by the Burns-Porter Act" result from the treatment of flood control contributions as being credited against State capital expenditures at the times that the Federal contributions are received.

TABLE 23

GENERAL RECONCILIATION
OF CAPITAL COST CHANGES

(in thousands of dollars)

ITEM	BULLETIN No. 132-63	BULLETIN No. 132-64	CHANGE	MAJOR REASON FOR CHANGE
TOTAL NONUTILITY1/	227,047	244,728	(+) 17,681	Increased number of cost items included and accounted for.
WATER CONSERVATION AND OROVILLE POWER				
Upper Feather Division	2,150	2,120	(-) 30	Adjustment of prior costs for Frenchman Unit, (Grizzly Valley Unit not included).
Oroville Division	376,456	398,840	(+) 22,384	Increased estimated costs of Feather River Railway and county road relocations; and enlarged Thermalito Afterbay.
Delta Facilities	40,759	39,929	(-) 830	Reduction in estimated planning costs.
North San Joaquin Division	37,025	31,984	(-) 5,041 2/	Greater allocation to transportation caused by increased deliveries South of San Luis.
San Luis Division	123,073	119,288	(-) 3,785 3/	
Upper Eel River Development	168,941	171,880	(+) 2,939	Increased estimated planning costs.
Total	748,404	764,041	(+) 15,637	Increased costs of Oroville.
WATER TRANSPORTATION				
North Bay Aqueduct	21,434	11,071	(-) 10,363	Deletion of works beyond Napa Terminus and reduction of capacity.
South Bay Aqueduct	44,197	46,592	(+) 2,395	Increased costs of Del Valle Reservoir, partially off-set by decreased tunnel & pipeline costs.
North San Joaquin Division	94,040	105,270	(+) 11,230 2/	See footnotes.
San Luis Division	118,832	103,924	(-) 14,908 3/	
South San Joaquin Division	153,257	205,837	(+) 52,580	Increased capacity, inclusion of substation costs and increased preconsolidation costs.
Tehachapi Division	132,818	175,027	(+) 42,209	Increased capacity, increased length due to shift in horizontal alignments & inclusion of substation costs.
Antelope Division	28,159	27,220	(-) 939	Increased capacity off-set by more economic design of Cottonwood Powerplant.
East Branch Division	268,387	321,023	(+) 52,636	Increased capacity.
West Branch Division	106,238	170,125	(+) 63,887	Increased capacity.
Coastal Division	51,368	53,539	(+) 2,171	Inclusion of substation costs and increased estimates of preoperational costs.
Total	1,018,730	1,219,628	(+) 200,898	Increased capacity
San Joaquin Valley Drain	58,899	49,749	(-) 9,150	The reuse of some of the drainage water allowed reductions in required reach capacities.
TOTAL STATE WATER PROJECT	2,053,080	2,278,146	(+) 225,066	Increased capacity.

1/ Including estimated federal contributions for the Oroville Division.

2/ Net increase in costs of $6,189,000 for total North San Joaquin Division due to the inclusion of substation costs and increased estimates of preoperational cost.

3/ Net decrease in total State contributions for San Luis Division of $18,693,000 due mainly to revised federal estimate of total costs (- $33 million).

TABLE 24

(PRELIMINARY)
PROJECTED UTILITY REVENUES FOR DRAINAGE

(in dollars)

CALENDAR YEAR	ASSUMED CHARGES FOR DRAINAGE 1/	ANNUAL OPERATING COSTS 2/	UTILITY NET OPERATING REVENUES
	(1)	(2)	(3)
1968	1,803,784		1,803,784
69	3,009,265	794,350	2,214,915
1970	3,009,265	794,350	2,214,915
71	3,009,265	794,350	2,214,915
72	3,009,265	794,350	2,214,915
73	3,009,265	794,350	2,214,915
74	3,075,273	794,350	2,280,923
75	3,246,791	899,860	2,346,931
76	3,246,791	899,860	2,346,931
77	3,246,791	899,860	2,346,931
78	3,246,791	899,860	2,346,931
79	3,246,791	899,860	2,346,931
1980	3,306,520	939,340	2,367,180
81	3,306,520	939,340	2,367,180
82	3,306,520	939,340	2,367,180
83	3,306,520	939,340	2,367,180
84	3,306,520	939,340	2,367,180
85	3,306,520	939,340	2,367,180
86	3,306,520	939,340	2,367,180
87	3,306,520	939,340	2,367,180
88	3,306,520	939,340	2,367,180
89	3,306,520	939,340	2,367,180
1990	3,296,020	928,840	2,367,180
91	3,296,020	928,840	2,367,180
92	3,296,020	928,840	2,367,180
93	3,296,020	928,840	2,367,180
94	3,296,020	928,840	2,367,180
95	3,296,020	928,840	2,367,180
96	3,296,020	928,840	2,367,180
97	3,296,020	928,840	2,367,180
98	3,296,020	928,840	2,367,180
99	3,296,020	928,840	2,367,180
2000	3,279,140	911,960	2,367,180
01	3,279,140	911,960	2,367,180
02	3,279,140	911,960	2,367,180
03	3,279,140	911,960	2,367,180
04	3,279,140	911,960	2,367,180
05	3,279,140	911,960	2,367,180
06	3,279,140	911,960	2,367,180
07	3,279,140	911,960	2,367,180
08	3,279,140	911,960	2,367,180
09	3,279,140	911,960	2,367,180
2010	3,259,290	892,110	2,367,180
11	3,259,290	892,110	2,367,180
12	3,259,290	892,110	2,367,180
13	3,259,290	892,110	2,367,180
14	3,259,290	892,110	2,367,180
15	3,259,290	892,110	2,367,180
16	3,259,290	892,110	2,367,180
17	3,259,290	892,110	2,367,180
18	1,455,506	892,110	563,396
19	1,044,375	892,110	152,265
2020	1,044,375	892,110	152,265
21	1,044,375	892,110	152,265
22	1,044,375	892,110	152,265
23	1,044,375	892,110	152,265
24	978,367	892,110	86,257
25	912,359	892,110	20,249
26	912,359	892,110	20,249
27	912,359	892,110	20,249
28	912,359	892,110	20,249
29	912,359	892,110	20,249
2030 3/	892,110	892,110	0

1/ It is assumed that each annual capital cost as shown in Table 18 will be repaid with interest in 50 equal annual installments together with repayment of annual operating costs as they occur. Costs occurring through 1967 are capitalized.

2/ As shown in the third column of Table 18.

3/ And each year thereafter for the remainder of the project repayment period.

TABLE 25

ACTUAL AND PROJECTED UTILITY REVENUES
FOR WATER TRANSPORTATION

(in dollars)

CALENDAR YEAR	TOTAL TRANSPORTATION CHARGES 1/ BY AREA						ANNUAL OPERATING COSTS 2/	UTILITY NET OPERATING REVENUES
	NORTH BAY	SOUTH BAY	SAN JOAQUIN VALLEY	CENTRAL COASTAL	SOUTHERN CALIFORNIA	TOTAL		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1962		60,363				60,363	109,805	-49,442
63		599,425			1,443,416	2,042,841	215,130	1,827,711
64		996,184		20,633	1,667,495	2,684,312	242,800	2,441,512
65		1,949,287	96,212	83,126	999,418	3,128,043	567,200	2,560,843
66	59,024	3,245,963	224,092	169,484	8,819,310	12,517,873	850,000	11,667,873
67	120,754	3,592,654	486,146	251,957	12,217,444	16,668,955	1,624,700	15,044,255
68	394,381	4,035,252	3,077,919	366,341	20,174,537	28,048,430	5,567,400	22,481,030
69	416,533	3,997,727	3,330,144	394,420	26,326,478	34,465,302	5,832,400	28,632,902
1970	419,306	3,997,792	3,944,824	428,146	33,869,664	42,659,732	6,478,600	36,181,132
71	421,479	4,005,730	4,383,890	450,986	45,944,337	55,206,422	12,056,400	43,150,022
72	425,220	4,031,940	5,009,685	473,657	54,996,561	64,937,063	17,697,200	47,239,863
73	427,961	4,030,075	5,537,817	504,805	56,942,121	67,442,779	19,247,100	48,195,679
74	431,075	4,085,781	6,135,913	544,942	59,177,492	70,375,203	21,318,200	49,057,003
75	439,704	4,127,202	6,595,973	592,328	61,510,432	73,265,639	23,119,200	50,146,439
76	455,545	4,175,394	7,305,005	1,123,014	63,973,608	77,032,566	25,458,300	51,574,266
77	462,310	4,206,681	8,011,642	1,404,826	66,266,778	80,352,237	27,765,500	52,586,737
78	476,339	4,232,804	8,672,381	1,766,075	67,991,650	83,139,249	29,736,600	53,402,649
79	564,359	4,254,084	9,345,686	2,350,030	71,463,435	87,977,594	33,309,800	54,667,794
1980	806,159	4,311,486	10,116,810	4,495,963	75,793,173	95,523,591	39,799,500	55,724,091
81	811,647	4,317,417	10,781,328	4,496,126	79,223,786	99,630,304	43,509,300	56,121,004
82	830,847	4,327,862	11,417,700	4,520,783	81,940,271	103,037,463	46,551,900	56,485,563
83	832,847	4,338,544	12,126,915	4,543,620	85,174,268	107,016,194	50,125,900	56,890,294
84	835,192	4,350,023	12,794,237	4,611,543	88,422,962	111,013,957	53,737,800	57,276,157
85	851,494	4,436,638	13,440,731	4,828,051	91,296,430	114,853,344	57,149,900	57,703,444
86	869,594	4,378,293	13,585,638	4,983,341	93,782,754	117,599,620	59,527,400	58,072,220
87	872,967	4,382,057	14,162,833	5,072,939	97,261,160	121,751,956	63,266,800	58,485,156
88	883,381	4,387,016	14,772,987	5,250,645	100,299,967	125,593,996	66,682,200	58,911,796
89	887,753	4,408,627	15,309,772	5,413,799	103,550,840	129,570,791	70,344,200	59,226,591
1990	894,641	4,431,074	15,798,824	5,593,855	106,786,258	133,504,652	73,908,600	59,596,052
91	895,641	4,457,468	15,858,042	5,597,019	106,882,482	133,690,652	74,094,600	59,596,052
92	895,641	4,478,553	15,857,267	5,596,976	106,881,215	133,709,652	74,113,600	59,596,052
93	895,641	4,549,490	15,855,434	5,596,876	106,878,211	133,775,652	74,179,600	59,596,052
94	895,641	4,567,286	15,855,134	5,596,861	106,877,730	133,792,652	74,196,600	59,596,052
95	895,641	4,574,259	15,855,142	5,596,862	106,877,748	133,799,652	74,203,600	59,596,052
96	895,641	4,582,085	15,854,096	5,596,805	106,876,025	133,804,652	74,208,600	59,596,052
97	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
98	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
99	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
2000	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
01	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
02	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
03	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
04	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
05	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
06	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
07	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
08	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
09	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
2010	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
11	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
12	895,641	4,589,057	15,854,107	5,596,805	106,876,042	133,811,652	74,215,600	59,596,052
13	895,641	4,045,739	15,854,107	5,596,805	106,131,589	132,523,881	74,215,600	58,308,281
14	895,641	3,751,678	15,854,107	5,562,969	105,377,767	131,442,162	74,215,600	57,226,562
15	895,641	3,008,254	15,748,790	5,517,530	103,426,730	128,596,945	74,215,600	54,381,345
16	836,617	2,538,040	15,639,484	5,437,597	99,635,360	124,087,098	74,215,600	49,871,498
17	774,887	2,223,244	15,507,989	5,350,762	94,836,980	118,693,862	74,215,600	44,478,262
18	670,060	2,280,387	15,400,380	5,278,715	88,326,761	111,956,303	74,215,600	37,740,703
19	649,708	2,353,937	15,361,850	5,253,207	82,269,714	105,888,416	74,215,600	31,672,816
2020	647,935	2,353,937	15,331,208	5,221,011	75,044,258	98,598,349	74,215,600	24,382,749
21	646,162	2,353,937	15,311,288	5,200,096	68,199,073	91,710,556	74,215,600	17,494,956
22	644,421	2,353,751	15,305,209	5,178,887	64,640,965	88,123,233	74,215,600	13,907,633
23	642,680	2,353,381	15,304,374	5,147,544	64,022,463	87,470,442	74,215,600	13,254,842
24	640,566	2,349,368	15,298,646	5,108,446	63,503,763	86,900,789	74,215,600	12,685,189
25	633,937	2,345,355	15,291,183	5,061,109	62,780,184	86,111,768	74,215,600	11,896,168
26	632,196	2,345,355	15,289,315	4,660,144	62,246,887	85,173,897	74,215,600	10,958,297
27	629,431	2,345,355	15,288,634	4,378,785	61,910,915	84,553,120	74,215,600	10,337,520
28	617,402	2,345,355	15,288,634	4,017,696	61,845,466	84,114,553	74,215,600	9,898,953
29	530,382	2,344,145	15,288,634	3,434,408	61,621,420	83,218,989	74,215,600	9,003,389
2030	400,582	2,335,161	15,288,634	3,123,531	61,397,374	82,545,282	74,215,600	8,329,682
31	395,694	2,335,161	15,288,634	3,123,531	61,397,374	82,540,394	74,215,600	8,324,794
32	395,694	2,335,161	15,288,634	3,123,531	61,397,374	82,540,394	74,215,600	8,324,794
Subtotal, 1962-2032 3/						6,981,450,248	3,972,558,035	3,008,892,213
33	395,694	2,335,161	15,288,634	3,123,531	61,397,374	82,540,394	74,215,600	8,324,794
34	394,949	2,335,161	15,288,634	3,120,788	61,397,374	82,536,906	74,215,600	8,321,306
35	384,847	2,335,161	15,288,634	3,085,286	61,397,374	82,491,302	74,215,600	8,275,702
36	384,847	2,335,161	15,288,634	3,083,797	61,397,374	82,489,813	74,215,600	8,274,213
37	384,474	2,335,161	15,288,634	3,051,771	61,397,374	82,457,414	74,215,600	8,241,814
38	379,260	2,335,161	15,288,634	3,021,606	61,397,374	82,422,035	74,215,600	8,206,435
2039	378,888	2,333,951	15,288,634	3,021,606	61,397,374	82,420,453	74,215,600	8,204,853
Subtotal, 2033-2039 3/						577,358,317	519,509,200	57,849,117
TOTALS	50,372,850	275,369,046	980.516.103	304,150,403	5,948.400,163	7,558,808,565	4,492,067,235	3,066,741,330

1/ Transportation Charges may eventually be included for the Feather River Area, depending on the desires of the Plumas County Flood Control and Water Conservation District as to construction of a transportation facility.

Total Transportation Charges equal to:
(a) Actual payments received thru 1963 from water supply contractors.
(b) Outstanding statements for 1964 payments.
(c) Current determination of 1965 payments under current project interest rate (See App. C).
(d) Estimates of future payments based on a long-term project interest rate of 4 percent per annum, including adjustments for (a) thru (c), on charges commencing in 1966.

2/ As shown on twelfth and thirteenth columns of Table 20.

3/ Subtotals are included since revenues are considered only through the year of final repayment of Water Bonds in the financial analyses presented in Chapter XIII, which treatment conforms to the definition of project repayment period set forth in Article 1(t) of the Standard Provisions for Water Supply Contract. In relevant revenue tables, the repayment of the capital costs extends 50 years beyond the completion of construction, consistent with Article 24 (c) (1) of the said standard provisions.

TABLE 26

CALCULATION OF PRESENT VALUES[1]
FOR USE IN DETERMINING DELTA WATER RATES

CALENDAR YEAR	PROJECT ENTITLEMENTS (in acre-feet)		TOTAL COSTS OF WATER CONSERVATION AND OROVILLE POWER (in dollars)		OROVILLE POWER REVENUES[5] (in dollars)			
					BASIS "A" [6]		BASIS "B" [7]	
	ACTUAL[2]	PRESENT WORTH[3]	ACTUAL[4]	PRESENT WORTH	ACTUAL	PRESENT WORTH	ACTUAL	PRESENT WORTH
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1952			176,306	282,271				
53			327,495	504,163				
54			319,867	473,481				
55			187,978	267,551				
56			1,341,494	1,835,927				
57			6,892,107	9,069,542				
58			10,008,329	12,663,729				
59			12,020,600	14,624,897				
1960			15,532,079	18,170,335				
61			20,498,643	23,058,185				
62			10,919,949	11,811,016				
63			80,097,041	83,300,922				
64			72,513,700	72,513,700				
65			130,458,935	125,441,283				
66			116,713,537	107,908,225				
67	69,150	61,474	77,467,953	68,868,728				
68	241,470	206,409	21,328,623	18,231,796				
69	257,750	211,851[8]	15,409,081	12,665,141	14,583,000	11,986,162	13,597,000	11,175,742
1970	315,140	249,059	9,181,350	7,256,154	15,609,000	12,336,019	14,284,000	11,288,852
71	467,920	355,580	5,832,680	4,432,357	16,270,000	12,363,862	14,284,000	10,854,666
72	739,750	540,528	5,530,300	4,040,936	16,270,000	11,888,329	14,284,000	10,437,178
73	911,580	640,464	7,448,300	5,233,076	18,401,000	12,928,298	14,284,000	10,035,748
74	1,081,410	730,561	8,679,200	5,863,356	19,427,000	13,124,185	14,284,000	9,649,758
75	1,253,290	814,113	7,719,900	5,014,699	20,453,000	13,285,878	14,284,000	9,278,614
76	1,434,280	895,847	7,667,900	4,789,347	21,304,000	13,306,415	14,284,000	8,921,744
77	1,618,680	972,137	6,987,100	4,196,271	21,304,000	12,794,630	14,284,000	8,578,600
78	1,801,980	1,040,598	8,393,400	4,846,979	21,304,000	12,302,529	14,284,000	8,248,654
79	1,983,910	1,101,594	12,450,800	6,913,487	21,304,000	11,829,354	14,284,000	7,931,398
1980	2,190,590	1,169,573	28,518,900	15,226,473	21,304,000	11,374,379	14,284,000	7,626,344
81	2,362,070	1,212,623	49,493,400	25,408,587	21,304,000	10,936,903	14,284,000	7,333,023
82	2,526,950	1,247,373	54,524,200	26,914,678	21,304,000	10,516,253	14,284,000	7,050,984
83	2,697,680	1,280,433	42,551,000	20,196,509	21,304,000	10,111,782	14,284,000	6,779,792
84	2,865,610	1,307,826	16,605,300	7,578,442	21,304,000	9,722,867	14,284,000	6,519,031
85	3,038,740	1,333,501	7,625,500	3,346,325	21,304,000	9,348,911	14,284,000	6,268,299
86	3,212,720	1,355,624	6,330,100	2,671,019	21,304,000	8,989,337	14,284,000	6,027,210
87	3,393,610	1,376,876	6,333,000	2,569,464	21,304,000	8,643,593	14,284,000	5,795,394
88	3,585,100	1,398,624	6,349,800	2,477,193	21,304,000	8,311,147	14,284,000	5,572,495
89	3,770,240	1,414,280	6,389,700	2,396,883	21,304,000	7,991,488	14,284,000	5,358,168
1990	3,965,380	1,430,269	5,871,400	2,117,750	21,304,000	7,684,123	14,284,000	5,152,085
91	3,976,820	1,379,227	5,948,400	2,063,003	21,304,000	7,388,580	14,284,000	4,953,927
92	3,982,360	1,328,027	5,948,400	1,983,657	21,304,000	7,104,404	14,284,000	4,763,392
93	3,987,900	1,278,725	5,948,400	1,907,362	21,304,000	6,831,157	14,284,000	4,580,184
94	3,992,550	1,230,977	5,948,400	1,834,002	21,304,000	6,568,420	14,284,000	4,404,023
95	3,994,600	1,184,240	5,948,400	1,763,464	21,304,000	6,315,789	14,284,000	4,234,638
96	3,996,650	1,139,276	5,948,400	1,695,638	21,304,000	6,072,874	14,284,000	4,071,767
97	3,998,700	1,096,020	5,948,400	1,630,421	21,304,000	5,839,302	14,284,000	3,915,161
98	3,998,750	1,053,878	5,948,400	1,567,713	21,304,000	5,614,713	14,284,000	3,764,578
99	3,998,810	1,013,360	5,948,400	1,507,416	21,304,000	5,398,763	14,284,000	3,619,786
2000	3,998,870	974,399	5,948,400	1,449,439	21,304,000	5,191,118	14,284,000	3,480,564
01	3,998,930	936,936	5,948,400	1,393,691	21,304,000	4,991,460	14,284,000	3,346,696
02	3,998,990	900,914	5,948,400	1,340,087	21,304,000	4,799,480	14,284,000	3,217,977
03	3,999,050	866,276	5,948,400	1,288,546	21,304,000	4,614,885	14,284,000	3,094,208
04	3,999,110	832,970	5,948,400	1,238,986	21,304,000	4,437,389	14,284,000	2,975,200
05	3,999,180	800,947	5,948,400	1,191,333	21,304,000	4,266,720	14,284,000	2,860,769
06	3,999,250	770,155	5,948,400	1,145,512	21,304,000	4,102,616	14,284,000	2,750,740
07	3,999,320	740,546	5,948,400	1,101,454	21,304,000	3,944,823	14,284,000	2,644,942
08	3,999,390	712,076	5,948,400	1,059,090	21,304,000	3,793,099	14,284,000	2,543,214
09	3,999,460	684,701	5,948,400	1,018,356	21,304,000	3,647,210	14,284,000	2,445,398
2010	3,999,540	658,379	5,948,400	979,189	21,304,000	3,506,933	14,284,000	2,351,344
11	3,999,620	633,070	5,948,400	941,527	21,304,000	3,372,051	14,284,000	2,260,908
12	3,999,710	608,734	5,948,400	905,315	21,304,000	3,242,357	14,284,000	2,173,950
13	3,999,800	585,335	5,948,400	870,495	21,304,000	3,117,651	14,284,000	2,090,336
14	3,999,900	562,836	5,948,400	837,014	21,304,000	2,997,741	14,284,000	2,009,938
15	4,000,000	541,202	5,948,400	804,822	21,304,000	2,882,443	14,284,000	1,932,633
16	4,000,000	520,386	5,948,400	773,867	21,304,000	2,771,580	14,284,000	1,858,301
17	4,000,000	500,372	5,948,400	744,103	21,304,000	2,664,981	14,284,000	1,786,828
18	4,000,000	481,126	5,948,400	715,483	21,304,000	2,562,482	14,284,000	1,718,104
19	4,000,000	462,622	5,948,400	687,965	21,304,000	2,463,925	14,284,000	1,652,023
2020	4,000,000	444,828	5,948,400	661,505	21,304,000	2,369,158	14,284,000	1,588,483
21	4,000,000	427,720	5,948,400	636,062	21,304,000	2,278,037	14,284,000	1,527,388
22	4,000,000	411,269	5,948,400	611,598	21,304,000	2,190,420	14,284,000	1,468,642
23	4,000,000	395,451	5,948,400	588,075	21,304,000	2,106,173	14,284,000	1,412,156
24	4,000,000	380,241	5,948,400	565,457	21,304,000	2,025,166	14,284,000	1,357,842
25	4,000,000	365,616	5,948,400	543,708	21,304,000	1,947,275	14,284,000	1,305,618
26	4,000,000	351,554	5,948,400	522,797	21,304,000	1,872,380	14,284,000	1,255,401
27	4,000,000	338,033	5,948,400	502,689	21,304,000	1,800,365	14,284,000	1,207,117
28	4,000,000	325,032	5,948,400	483,355	21,304,000	1,731,121	14,284,000	1,160,689
29	4,000,000	312,530	5,948,400	464,764	21,304,000	1,664,539	14,284,000	1,116,047
2030	4,000,000	300,510	5,948,400	446,889	21,304,000	1,600,518	14,284,000	1,073,122
31	4,000,000	288,952	5,948,400	429,701	21,304,000	1,538,960	14,284,000	1,031,848
32	4,000,000	277,838	5,948,400	413,174	21,304,000	1,479,769	14,284,000	992,162
33	4,000,000	267,152	5,948,400	397,282	21,304,000	1,422,855	14,284,000	954,002
34	4,000,000	256,877	5,948,400	382,002	21,304,000	1,368,130	14,284,000	917,309
35	4,000,000	246,997	5,948,400	367,310	21,304,000	1,315,509	14,284,000	882,028
36	4,000,000	237,497	5,948,400	353,182	21,304,000	1,264,913	14,284,000	848,104
37	4,000,000	228,363	5,948,400	339,598	21,304,000	1,216,262	14,284,000	815,485
38	4,000,000	219,580	5,948,400	326,537	21,304,000	1,169,483	14,284,000	784,120
2039	4,000,000	211,134	5,948,400	313,978	21,304,000	1,124,503	14,284,000	753,961
TOTALS[2]	241,702,260	53,112,140	1,194,168,547	790,969,533	1,484,469,000	405,766,960	1,013,477,000	285,836,865

1/ Calculated as of the end of 1964 by the use of the factor $(1 + i)^n$, where:
i = the project interest rate (herein taken as the planning interest rate of 0.04).
n = the difference, plus or minus, between 1964 and the calendar year listed at the left.

2/ As developed in Table 7, but excluding deliveries from purchased Bureau Water shown in Table 8.

3/ Present worth of entitlements may be considered as the present worth of the Delta Water Charge, assuming the Delta Water Rate is equivalent to $1/acre-foot.

4/ As shown in Column 13 of Table 21.

5/ Being the estimated gross revenue from the sale of Oroville-Thermalito power and energy, less the costs of energy consumed in the "pump-back" operation.

6/ Based on values presented in Bulletin No. 132-63.

7/ Based on the preliminary proposal by the California Power Pool Companies.

8/ Subtotal thru 1969: 479,735 acre-feet.

9/ In the financial analyses presented in Chapter XIII, revenues are considered only through the final repayment of Water Bonds. For the purpose of the preparation of relevant revenue tables, it was necessary to assume that the repayment of the capital costs would extend for a period of 50 years beyond the completion of construction. If the Delta Water Rate were calculated for the period through final repayment of the bonds only, the difference would not be significant.

TABLE 27

PROJECTED UTILITY REVENUES
FOR WATER CONSERVATION
BASIS "A"

(in dollars)

CALENDAR YEAR	DELTA WATER CHARGES 1/							ANNUAL OPERATING COSTS		UTILITY NET OPERATING REVENUES
	FEATHER RIVER	NORTH BAY	SOUTH BAY	SAN JOAQUIN VALLEY	CENTRAL COASTAL	SOUTHERN CALIFORNIA	TOTAL	CONSERVATION & OROVILLE POWER 2/	ALLOCATED TO OROVILLE POWER 3/	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1962								8,213		-8,213
63								19,554		-19,554
64								14,300		-14,300
65								14,600		-14,600
66								14,900		-14,900
67	875		241,150				242,025	2,652,700	724,000	-1,686,675
68	1,995		387,450	455,700			845,145	4,945,800	1,290,000	-2,810,655
69	2,275		394,450	505,400			902,125	5,435,900	1,860,000	-2,673,775
1970	6,121		836,528	1,453,723			2,296,372	5,503,200	1,976,000	-1,230,828
71	6,704		852,559	1,600,188		950,203	3,409,654	5,108,500	1,981,000	282,154
72	7,287		869,319	2,170,747		2,343,081	5,390,434	5,104,200	1,997,000	2,283,234
73	8,234		886,079	2,518,329		3,229,888	6,642,530	5,204,900	2,123,000	3,560,630
74	9,181		902,110	2,852,795		4,115,967	7,880,053	5,398,600	2,123,000	4.604,453
75	11,950		918,870	3,201,105		5,000,589	9,132,514	5,535,600	2,123,000	5,719,914
76	14,719		934,900	3,614,269		5,887,469	10,451,357	5,716,500	2,123,000	6,857,857
77	17,853		952,389	4,052,936		6,771,871	11,795,049	5,935,900	2,123,000	7,982,149
78	20,986		969,877	4,484,317		7,655,546	13,130,726	6,057,300	2,123,000	9,196,426
79	24,119		986,637	4,906,953		8,538,710	14,456,419	6,209,200	2,123,000	10,370,219
1980	34,539	143,915	1,004,125	5,336,147	14,574	9,429,161	15,962,461	6,352,100	2,167,000	11,777,361
81	75,929	165,775	1,022,343	5,811,977	21,860	10,114,123	17,212,007	6,400,500	2,167,000	12,978,507
82	89,628	188,729	1,040,560	6,265,947	43,721	10,784,875	18,413,460	6,431,300	2,167,000	14,149,160
83	103,692	211,682	1,058,777	6,762,180	65,581	11,455,629	19,657,541	6,458,100	2,167,000	15,366,441
84	117,755	233,907	1,076,994	7,227,809	98,372	12,126,382	20,881,219	6,513,100	2,167,000	16,535,119
85	139,105	260,504	1,095,211	7,685,422	163,954	12,798,592	22,142,788	6,533,300	2,167,000	17,776,488
86	160,456	292,202	1,114,157	8,135,019	218,605	13,490,112	23,410,551	6,330,100	2,167,000	19,247,451
87	181,879	331,186	1,132,374	8,598,462	273,256	14,211,509	24,728,666	6,333,000	2,167,000	20,562,666
88	210,589	395,675	1,150,591	9,088,137	338,838	14,940,192	26,124,022	6,349,800	2,167,000	21,941,222
89	239,664	463,807	1,183,382	9,480,168	437,210	15,668,875	27,473,106	6,389,700	2,167,000	23,250,406
1990	268,738	531,939	1,216,172	9,928,309	546,512	16,403,388	28,895,058	5,871,400	2,167,000	25,190,658
91	269,030	531,939	1,256,249	9,928,309	546,512	16,446,380	28,978,419	5,948,400	2,167,000	25,197,019
92	269,321	531,939	1,296,328	9,928,309	546,512	16,446,380	29,018,789	5,948,400	2,167,000	25,237,389
93	269,613	531,939	1,336,405	9,928,309	546,512	16,446,380	29,059,158	5,948,400	2,167,000	25,277,758
94	269,977	531,939	1,369,924	9,928,309	546,512	16,446,380	29,093,041	5,948,400	2,167,000	25,311,641
95	270,341	531,939	1,384,498	9,928,309	546,512	16,446,380	29,107,979	5,948,400	2,167,000	25,326,579
96	270,706	531,939	1,399,071	9,928,309	546,512	16,446,380	29,122,917	5,948,400	2,167,000	25,341,517
97	271,070	531,939	1,413,645	9,928,309	546,512	16,446,380	29,137,855	5,948,400	2,167,000	25,356,455
98	271,435	531,939	1,413,645	9,928,309	546,512	16,446,380	29,138,220	5,948,400	2,167,000	25,356,820
99	271,872	531,939	1,413,645	9,928,309	546,512	16,446,380	29,138,657	5,948,400	2,167,000	25,357,257
2000	272,309	531,939	1,413,645	9,928,309	546,512	16,446,380	29,139,094	5,948,400	2,167,000	25,357,694
01	272,746	531,939	1,413,645	9,928,309	546,512	16,446,380	29,139,531	5,948,400	2,167,000	25,358,131
02	273,184	531,939	1,413,645	9,928,309	546,512	16,446,380	29,139,969	5,948,400	2,167,000	25,358,569
03	273,621	531,939	1,413,645	9,928,309	546,512	16,446,380	29,140,406	5,948,400	2,167,000	25,359,006
04	274,058	531,939	1,413,645	9,928,309	546,512	16,446,380	29,140,843	5,948,400	2,167,000	25,359,443
05	274,568	531,939	1,413,645	9,928,309	546,512	16,446,380	29,141,353	5,948,400	2,167,000	25,359,953
06	275,078	531,939	1,413,645	9,928,309	546,512	16,446,380	29,141,863	5,948,400	2,167,000	25,360,463
07	275.588	531,939	1,413,645	9,928,309	546,512	16,446,380	29,142,373	5,948,400	2,167,000	25,360,973
08	276,098	531,939	1,413,645	9,928,309	546,512	16,446,380	29,142,883	5,948,400	2,167,000	25,361,483
09	276,608	531,939	1,413,645	9,928,309	546,512	16,446,380	29,143,393	5,948,400	2,167,000	25,361,993
2010	277,191	531,939	1,413,645	9,928,309	546,512	16,446,380	29,143,976	5,948,400	2,167,000	25,362,576
11	277,774	531,939	1,413,645	9,928,309	546,512	16,446,380	29,144,559	5,948,400	2,167,000	25,363,159
12	278,430	531,939	1,413,645	9,928,309	546,512	16,446,380	29,145,215	5,948,400	2,167,000	25,363,815
13	279,086	531,939	1,413,645	9,928,309	546,512	16,446,380	29,145,871	5,948,400	2,167,000	25,364,471
14	279,815	531,939	1,413,645	9,928,309	546,512	16,446,380	29,146,600	5,948,400	2,167,000	25,365,200
2015 4/	280,543	531,939	1,413,645	9,928,309	546,512	16,446,380	29,147,328	5,948,400	2,167,000	25,365,928

1/ Based on the product of the Delta Water Rates calculated in Chapter XII applied to the project entitlements shown in Table 7, commencing in the year 1967.

2/ As developed in Table 21.

3/ Being the annual operating costs of power features of the Oroville Division (together with a share of the operating costs of the dam and reservoir allocable to power generation) included in Column 8. These allocated operating costs are basic to those presented in Bulletin No. 132-63 and cannot be compared with the operating costs shown in Column 8 of Table 21 of this report, since the latter figures have been derived on the basis of an increased generating capacity. Conservation operating costs equal Column 8 less Column 9.

4/ And every year thereafter for the remainder of the project repayment period.

TABLE 28

PROJECTED UTILITY REVENUES
FOR WATER CONSERVATION
BASIS "B"

(in dollars)

CALENDAR YEAR	DELTA WATER CHARGES 1/							ANNUAL OPERATING COSTS		UTILITY NET OPERATING REVENUES
	FEATHER RIVER	NORTH BAY	SOUTH BAY	SAN JOAQUIN VALLEY	CENTRAL COASTAL	SOUTHERN CALIFORNIA	TOTAL	CONSERVATION & OROVILLE POWER 2/	ALLOCATED TO OROVILLE POWER 3/	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1962								8,213		-8,213
63								19,554		-19,554
64								14,300		-14,300
65								14,600		-14,600
66								14,900		-14,900
67	875		241,150				242,025	2,652,700	1,830,965	-579,710
68	1,995		387,450	455,700			845,145	4,945,800	2,280,200	-1,820,455
69	2,275		394,450	505,400			902,125	5,435,900	2,484,470	-2,049,305
1970	8,035		1,098,116	1,908,311			3,014,462	5,503,200	2,529,017	40,279
71	8,800		1,119,160	2,100,577		1,247,337	4,475,874	5,108,500	2,534,360	1,901,734
72	9,566		1,141,160	2,849,553		3,075,776	7,076,055	5,104,200	2,534,360	4,506,215
73	10,809		1,163,161	3,305,825		4,239,894	8,719,689	5,204,900	2,534,360	6,049,149
74	12,052		1,184,205	3,744,881		5,403,055	10,344,193	5,398,600	2,534,360	7,479,953
75	15,687		1,206,206	4,202,110		6,564,303	11,988,306	5,535,600	2,533,662	8,986,368
76	19,322		1,227,250	4,744,472		7,728,516	13,719,560	5,716,500	2,533,662	10,536,722
77	23,435		1,250,207	5,320,313		8,889,477	15,483,432	5,935,900	2,533,662	12,081,194
78	27,548		1,273,164	5,886,589		10,049,481	17,236,782	6,057,300	2,533,662	13,713,144
79	31,662		1,295,164	6,441,386		11,208,816	18,977,028	6,209,200	2,533,662	15,301,490
1980	45,340	188,918	1,318,122	7,004,792	19,131	12,377,716	20,954,019	6,352,100	2,533,662	17,135,581
81	99,672	217,614	1,342,035	7,629,417	28,697	13,276,870	22,594,305	6,400,500	2,521,190	18,714,995
82	117,655	247,746	1,365,949	8,225,346	57,393	14,157,371	24,171,460	6,431,300	2,521,190	20,261,350
83	135,117	277,877	1,389,863	8,876,754	86,089	15,037,872	25,804,572	6,458,100	2,521,190	21,867,662
84	154,578	307,051	1,413,776	9,487,988	129,134	15,918,374	27,410,901	6,513,100	2,516,601	23,414,402
85	182,605	341,966	1,437,690	10,088,699	215,223	16,800,788	29,066,971	6,533,300	2,516,601	25,050,272
86	210,632	383,575	1,462,560	10,678,889	286,964	17,708,551	30,731,171	6,330,100	2,516,601	26,917,672
87	238,754	434,751	1,486,474	11,287,252	358,705	18,655,532	32,461,468	6,333,000	2,516,601	28,645,069
88	276,442	519,405	1,510,388	11,930,052	444,794	19,612,079	34,293,160	6,349,800	2,516,601	30,459,961
89	314,608	608,842	1,553,432	12,444,674	573,928	20,568,626	36,064,110	6,389,700	2,516,601	32,191,011
1990	352,775	698,279	1,596,477	13,032,950	717,410	21,532,825	37,930,716	5,871,400	2,516,601	34,575,917
91	353,157	698,279	1,649,087	13,032,950	717,410	21,589,262	38,040,145	5,948,400	2,516,601	34,608,346
92	353,540	698,279	1,701,697	13,032,950	717,410	21,589,262	38,093,138	5,948,400	2,516,601	34,661,339
93	353,922	698,279	1,754,307	13,032,950	717,410	21,589,262	38,146,130	5,948,400	2,516,601	34,714,331
94	354,401	698,279	1,798,308	13,032,950	717,410	21,589,262	38,190,610	5,948,400	2,516,601	34,758,811
95	354,879	698,279	1,817,439	13,032,950	717,410	21,589,262	38,210,219	5,948,400	2,516,601	34,778,420
96	355,357	698,279	1,836,570	13,032,950	717,410	21,589,262	38,229,828	5,948,400	2,516,601	34,798,029
97	355,835	698,279	1,855,701	13,032,950	717,410	21,589,262	38,249,437	5,948,400	2,516,601	34,817,638
98	356,314	698,279	1,855,701	13,032,950	717,410	21,589,262	38,249,916	5,948,400	2,516,601	34,818,117
99	356,887	698,279	1,855,701	13,032,950	717,410	21,589,262	38,250,489	5,948,400	2,516,601	34,818,690
2000	357,461	698,279	1,855,701	13,032,950	717,410	21,589,262	38,251,063	5,948,400	2,516,601	34,819,264
01	358,035	698,279	1,855,701	13,032,950	717,410	21,589,262	38,251,637	5,948,400	2,516,601	34,819,838
02	358,609	698,279	1,855,701	13,032,950	717,410	21,589,262	38,252,211	5,948,400	2,516,601	34,820,412
03	359,183	698,279	1,855,701	13,032,950	717,410	21,589,262	38,252,785	5,948,400	2,516,601	34,820,986
04	359,757	698,279	1,855,701	13,032,950	717,410	21,589,262	38,253,359	5,948,400	2,516,601	34,821,560
05	360,427	698,279	1,855,701	13,032,950	717,410	21,589,262	38,254,029	5,948,400	2,516,601	34,822,230
06	361,096	698,279	1,855,701	13,032,950	717,410	21,589,262	38,254,698	5,948,400	2,516,601	34,822,899
07	361,766	698,279	1,855,701	13,032,950	717,410	21,589,262	38,255,368	5,948,400	2,516,601	34,823,569
08	362,435	698,279	1,855,701	13,032,950	717,410	21,589,262	38,256,037	5,948,400	2,516,601	34,824,238
09	363,105	698,279	1,855,701	13,032,950	717,410	21,589,262	38,256,707	5,948,400	2,516,601	34,824,908
2010	363,870	698,279	1,855,701	13,032,950	717,410	21,589,262	38,257,472	5,948,400	2,516,601	34,825,673
11	364,635	698,279	1,855,701	13,032,950	717,410	21,589,262	38,258,237	5,948,400	2,516,601	34,826,438
12	365,496	698,279	1,855,701	13,032,950	717,410	21,589,262	38,259,098	5,948,400	2,516,601	34,827,299
13	366,357	698,279	1,855,701	13,032,950	717,410	21,589,262	38,259,959	5,948,400	2,516,601	34,828,160
14	367,314	698,279	1,855,701	13,032,950	717,410	21,589,262	38,260,916	5,948,400	2,516,601	34,829,117
2015 4/	368,270	698,279	1,855,701	13,032,950	717,410	21,589,262	38,261,872	5,948,400	2,516,601	34,830,073

1/ Based on the product of the Delta Water Rates calculated in Chapter XII applied to the project entitlements shown in Table 7 commencing in the year 1967.

2/ As developed in Table 21.

3/ Being the annual operating costs of power features of the Oroville Division (together with a share of the operating costs of the dam and reservoir allocable to power generation) included in Column 8. Conservation operating costs equal Column 8 less Column 9.

4/ And every year thereafter for the remainder of the project repayment period.

TABLE 29

ACTUAL AND PROJECTED UTILITY REVENUES
APPLICABLE TO GENERAL OBLIGATION BOND SERVICE

(in thousands of dollars)

CALENDAR YEAR	UTILITY NET OPERATING REVENUES				TOTAL NET OPERATING REVENUES		TOTAL NET OPERATING REVENUES ADJUSTED 5/	
	DRAINAGE 1/	TRANSPORTATION 2/	CONSERVATION					
			BASIS "A" 3/	BASIS "B" 4/	BASIS "A"	BASIS "B"	BASIS "A"	BASIS "B"
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1962		-49	-8	-8	-57	-57	847	847
63		1,828	-20	-20	1,808	1,808	2,118	2,118
64		2,441	-14	-14	2,427	2,427	2,486	2,486
65		2,561	-15	-15	2,546	2,546	7,100	7,100
66		11,668	-15	-15	11,653	11,653	12,505	13,058
67		15,044	-1,687	-580	13,357	14,464	17,416	18,464
68	1,804	22,481	-2,811	-1,820	21,474	22,465	24,824	25,632
69	2,215	28,633	-2,674	-2,049	28,174	28,799	32,670	33,618
1970	2,215	36,181	-1,231	40	37,165	38,436	41,406	42,852
71	2,215	43,150	282	1,902	45,647	47,267	48,692	50,614
72	2,215	47,240	2,283	4,506	51,738	53,961	52,855	55,210
73	2,215	48,196	3,561	6,049	53,972	56,460	54,957	57,639
74	2,281	49,057	4,604	7,480	55,942	58,818	57,078	60,148
75	2,347	50,146	5,720	8,986	58,213	61,479	59,496	62,968
76	2,347	51,574	6,858	10,537	60,779	64,458	61,848	65,736
77	2,347	52,587	7,982	12,081	62,916	67,015	63,931	68,239
78	2,347	53,403	9,196	13,713	64,946	69,463	66,166	70,890
79	2,347	54,668	10,370	15,302	67,385	72,317	68,626	73,772
1980	2,367	55,724	11,777	17,136	69,868	75,227	70,668	76,215
81	2,367	56,121	12,979	18,715	71,467	77,203	72,234	78,158
82	2,367	56,486	14,149	20,261	73,002	79,114	73,812	80,120
83	2,367	56,890	15,366	21,868	74,623	81,125	75,400	82,091
84	2,367	57,276	16,535	23,414	76,178	83,057	77,012	84,088
85	2,367	57,703	17,777	25,050	77,847	85,120	78,766	86,238
86	2,367	58,072	19,247	26,918	79,686	87,357	80,550	88,427
87	2,367	58,485	20,563	28,645	81,415	89,497	82,318	90,618
88	2,367	58,912	21,941	30,460	83,220	91,739	84,032	92,762
89	2,367	59,227	23,250	32,191	84,844	93,785	85,999	95,162
1990	2,367	59,596	25,191	34,576	87,154	96,539	87,157	96,555
91	2,367	59,596	25,197	34,608	87,160	96,571	87,180	96,598
92	2,367	59,596	25,237	34,661	87,200	96,624	87,220	96,650
93	2,367	59,596	25,278	34,714	87,241	96,677	87,258	96,700
94	2,367	59,596	25,312	34,759	87,275	96,722	87,282	96,732
95	2,367	59,596	25,327	34,779	87,290	96,742	87,298	96,752
96	2,367	59,596	25,342	34,798	87,305	96,761	87,312	96,771
97	2,367	59,596	25,356	34,818	87,319	96,781	87,320	96,781
98	2,367	59,596	25,357	34,818	87,320	96,781	87,320	96,782
99	2,367	59,596	25,357	34,819	87,320	96,782	87,320	96,782
2000	2,367	59,596	25,358	34,819	87,321	96,782	87,321	96,782
01	2,367	59,596	25,358	34,820	87,321	96,783	87,322	96,784
02	2,367	59,596	25,359	34,821	87,322	96,784	87,322	96,784
03	2,367	59,596	25,359	34,821	87,322	96,784	87,322	96,784
04	2,367	59,596	25,359	34,822	87,322	96,785	87,322	96,785
05	2,367	59,596	25,360	34,822	87,323	96,785	87,323	96,786
06	2,367	59,596	25,360	34,823	87,323	96,786	87,324	96,786
07	2,367	59,596	25,361	34,824	87,324	96,787	87,324	96,787
08	2,367	59,596	25,362	34,824	87,325	96,787	87,325	96,788
09	2,367	59,596	25,362	34,825	87,325	96,788	87,326	96,789
2010	2,367	59,596	25,363	34,826	87,326	96,789	87,326	96,790
11	2,367	59,596	25,363	34,827	87,326	96,790	87,326	96,790
12	2,367	59,596	25,364	34,827	87,327	96,790	86,684	96,146
13	2,367	58,308	25,365	34,828	86,040	95,503	85,500	94,963
14	2,367	57,227	25,365	34,829	84,959	94,423	83,536	93,000
15	2,367	54,381	25,366	34,830	82,114	91,578	79,859	89,323
16	2,367	49,871	25,366	34,830	77,604	87,068	74,908	84,372
17	2,367	44,478	25,366	34,830	72,211	81,675	67,940	77,404
18	563	37,741	25,366	34,830	63,670	73,134	60,430	69,894
19	152	31,673	25,366	34,830	57,191	66,655	53,546	63,010
2020	152	24,383	25,366	34,830	49,901	59,365	46,457	55,921
21	152	17,495	25,366	34,830	43,013	52,477	41,220	50,684
22	152	13,908	25,366	34,830	39,426	48,890	39,100	48,564
23	152	13,255	25,366	34,830	38,773	48,237	38,455	47,919
24	86	12,685	25,366	34,830	38,137	47,601	37,709	47,174
25	20	11,896	25,366	34,830	37,282	46,746	36,813	46,277
26	20	10,958	25,366	34,830	36,344	45,808	36,034	45,498
27	20	10,338	25,366	34,830	35,724	45,188	35,504	44,968
28	20	9,899	25,366	34,830	35,285	44,749	34,837	44,301
29	20	9,003	25,366	34,830	34,389	43,853	34,042	43,506
2030		8,330	25,366	34,830	33,696	43,160	33,694	43,158
31		8,325	25,366	34,830	33,691	43,155	33,691	43,155
2032		8,325	25,366	34,830	33,691	43,155	16,846	21,578
Subtotal 1962-2032 6/	118,350	3,008,892	1,305,925	1,817,381	4,433,167	4,944,623	4,433,167	4,944,623
2032							16,845	21,577
33		8,325	25,366	34,830	33,691	43,155	33,689	43,153
34		8,321	25,366	34,830	33,687	43,151	33,664	43,128
35		8,276	25,366	34,830	33,642	43,106	33,641	43,105
36		8,274	25,366	34,830	33,640	43,104	33,624	43,088
37		8,242	25,366	34,830	33,608	43,072	33,590	43,054
38		8,206	25,366	34,830	33,572	43,036	33,572	43,036
2039		8,205	25,366	34,830	33,571	43,035	16,786	21,518
Subtotal 2033-2039		57,849	177,562	243,810	235,411	301,659	235,411	301,659
TOTALS 6/	118,350	3,066,741	1,483,487	2,061,191	4,668,578	5,246,282	4,668,578	5,246,282

1/ As derived in Table 24, column 3.

2/ As derived in Table 25, column 8.

3/ As derived in Table 27, column 10.

4/ As derived in Table 28, column 10.

5/ Since bond service is shown on an accrual basis in Table 34, the net operating revenues are herein adjusted to a similar accrual basis.

6/ In the financial analyses presented in Chapter XIII, revenues are considered only through the final repayment of Water Bonds. For the purpose of the preparation of relevant revenue tables, it was necessary to assume that the repayment of the capital costs would extend for a period of 50 years beyond the completion of construction.

TABLE 30

FINANCIAL ANALYSIS
FOR WATER BONDS, APRIL 1964
BASIS "A"1/

(in thousands of dollars)

CALENDAR YEAR	CAPITAL EXPENDITURES 2/	FINANCING OF EXPENDITURES3/		GENERAL OBLIGATION BOND SERVICE5/	APPLICABLE TO GENERAL OBLIGATION BOND SERVICE		REMAINDER OF NET OPERATING REVENUES	
		CALIFORNIA WATER FUND	GENERAL OBLIGATION BONDS4/		NET OPERATING REVENUES6/	FEDERAL REIMBURSEMENT7/	PAID INTO CALIFORNIA WATER FUND	BALANCE8/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1961	6,047	6,047						
1962	29,423	29,423			847 9/			
1963	110,597	95,103	50,000		2,118 9/			
1964	177,848	12,503	150,000	6,398	2,486	947		
1965	209,987	11,184	179,642	14,921	7,100	7,821		
1966	190,642	11,000	179,642	22,106	12,505	9,601		
1967	190,641	11,000	179,641	29,292	17,416	11,876		
1968	184,312	11,000	173,312	36,224	24,824	11,400		
1969	186,630	11,000	175,630	43,250	32,670	10,580		
1970	167,016	11,000	156,016	49,490	41,406	8,084		
10 years, 1961-1970	1,453,143	209,260	1,243,883	201,681	141,372	60,309	0	0
1971	91,588	11,000	80,588	52,714	48,692	4,022		
1972	24,555	11,000	13,555	53,256	52,855	401		
1973	28,374	11,000	17,374	56,153	54,957	1,196		
1974	37,058	11,000	26,058	58,934	57,078	1,856		
1975	27,903	11,000	16,903	61,350	59,496	1,854		
1976	25,255	11,000	14,255	63,660	61,848	1,812		
1977	12,887	11,000	1,887	65,411	63,931	1,480		
1978	22,484	11,000	11,484	67,870	66,166	1,704		
1979	21,297	11,000	10,297	69,770	68,626	1,144		
1980	22,611	11,000	11,611	70,967	70,668	299		
10 years, 1971-1980	314,012	110,000	204,012	620,085	604,317	15,768	0	0
1981	42,839	11,000	31,839	72,301	72,234	67		
1982	48,093	11,000	37,093	73,884	73,812	72		
1983	36,179	11,000	22,759	75,180	75,400		220 10/	
1984	11,212	11,212		75,264	77,012		1,748	
1985	1,124	1,124		75,321	78,766		3,445	
1986	696	696		75,256	80,550		5,294	
1987	760	760		75,286	82,318		7,032	
1988	34	34		75,604	84,032		8,428	
1989	298	298		75,641	85,999		10,358	
1990				75,891	87,157		11,266	
10 years, 1981-1990	141,235	47,124	91,691	749,628	797,280	139	47,791	0
10 years, 1991-2000	0	0	0	765,142	872,831	0	107,689	0
10 years, 2001-2010	0	0	0	765,639	873,236	0	107,597	0
10 years, 2011-2020	0	0	0	511,320	726,186	0	103,307	111,559
10 years, 2021-2030	0	0	0	73,069	367,408	0	0	294,339
2 years, 2031-2032	0	0	0	4,132	50,537	0	0	46,405
TOTALS	1,908,390	366,384	1,539,586	3,690,696	4,433,167	76,216	366,384	452,303

1/ Basis A: Oroville power revenues as shown in Bulletin No. 132-63.

2/ Excluding the following annual amounts from Table 22 assumed financed from revenue bond proceeds: 1965, $58,251,000; 1966, $113,331,000; and 1967, $95,726,000; for a total of $267,308,000 distributed so as to result in level use of general obligation bonds in these three years. Also excludes costs financed by special prior appropriations as shown in the upper portion of Table 22.

3/ Excludes remainder of Oroville flood control contribution (with interest thereon) not applied to general obligation bond service amounting to $2,420,000, and applied to finance capital expenditures in 1983.

4/ Includes $50 million of Bond Anticipation notes dated 12/1/63; and a net of $150 million in 1964 in actual and contemplated bond issues. Net excess of these amounts over requirements for 1963 and 1964 is applied in 1965.

5/ All contemplated issues assumed at 4 percent interest per annum, with amortization commencing in the 10th year from issue so as to produce level annual bond service for the 41-year period commencing with the 10th and ending with the 50th year.

6/ From Column 7, Table 29.

7/ Oroville flood control contribution only ($68,823,000) plus interest earned thereon, assumed at 3½ percent, pending disbursement.

8/ The balance of net revenues as shown above reflects principally the accumulation, in revenue formulas, of interest on capital expenditures financed by the California Water Fund and from funds provided prior to the Burns-Porter Act.

9/ Early excess revenues utilized for bond service in 1964.

10/ Repayments to the California Water Fund applied in part to financing capital expenditures in the following year.

TABLE 31

FINANCIAL ANALYSIS
FOR WATER BONDS, APRIL 1964
BASIS "B"1/

(in thousands of dollars)

CALENDAR YEAR	CAPITAL EXPENDITURES 2/	FINANCING OF EXPENDITURES3/		GENERAL OBLIGATION BOND SERVICE5/	APPLICABLE TO GENERAL OBLIGATION BOND SERVICE		REMAINDER OF NET OPERATING REVENUES	
		CALIFORNIA WATER FUND	GENERAL OBLIGATION BONDS4/		NET OPERATING REVENUES6/	FEDERAL REIMBURSEMENT7/	PAID INTO CALIFORNIA WATER FUND	BALANCE8/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1961	6,047	6,047						
1962	29,423	29,423			847 9/			
1963	110,597	95,103	50,000		2,118 9/			
1964	177,848	12,503	150,000	6,398	2,486	947		
1965	226,834	11,184	196,489	15,595	7,100	8,495		
1966	207,488	11,000	196,488	23,454	13,058	10,396		
1967	207,488	11,000	196,488	31,314	18,464	12,850		
1968	184,312	11,000	173,312	38,246	25,632	12,614		
1969	186,630	11,000	175,630	45,271	33,618	11,653		
1970	167,016	11,000	156,016	51,512	42,852	8,660		
10 years, 1961-1970	1,503,683	209,260	1,294,423	211,790	146,175	65,615	0	0
1971	91,588	11,000	80,588	54,735	50,614	4,121		
1972	24,555	11,000	13,555	55,278	55,210	68		
1973	28,374	11,000	17,374	58,175	57,639	536		
1974	37,058	11,000	26,058	61,125	60,148	977		
1975	27,903	11,000	16,903	63,709	62,968	741		
1976	25,255	11,000	14,255	66,188	65,736	452		
1977	12,887	11,000	0 11/	67,864	68,239		375 10/	
1978	22,484	11,375	9,255 11/	70,233	70,890		657 10/	
1979	21,297	11,657	9,640	72,107	73,772		1,665 10/	
1980	22,611	12,665	9,946	73,237	76,215		2,978 10/	
10 years, 1971-1980	314,012	112,697	197,574	642,651	641,431	6,895	5,675	0
1981	42,839	13,978	28,861	74,452	78,158		3,706 10/	
1982	48,093	14,706	33,387	75,887	80,120		4,233 10/	
1983	36,179	15,233	20,946	77,111	82,091		4,980 10/	
1984	11,212	11,212		77,195	84,088		6,893	
1985	1,124	1,124		77,253	86,238		8,985	
1986	696	696		77,168	88,427		11,259	
1987	760	760		77,176	90,618		13,442	
1988	34	34		77,488	92,762		15,274	
1989	298	298		77,507	95,162		17,655	
1990				77,728	96,555		18,827	
10 years, 1981-1990	141,235	58,041	83,194	768,965	874,219	0	105,254	0
10 years, 1991-2000	0	0	0	782,980	967,330	0	184,350	0
10 years, 2001-2010	0	0	0	783,459	967,863	0	84,719	99,685
10 years, 2011-2020	0	0	0	516,495	820,823	0	0	304,328
10 years, 2021-2030	0	0	0	66,457	462,049	0	0	395,592
2 years, 2031-2032	0	0	0	3,765	64,733	0	0	60,968
TOTALS	1,958,930	379,998	1,575,191	3,776,562	4,944,623	72,510	379,998	860,573

1/ Basis B: Oroville power revenues as estimated from data contained in the preliminary proposal by the California Power Pool Companies.

2/ Excluding the following annual amounts from Table 22 assumed financed from revenue bond proceeds: 1965, $41,404,000; 1966, $96,485,000; and 1967, $78,879,000 for a total of $216,768,000, distributed so as to result in level use of general obligation bonds in these three years. Also excludes costs financed by special prior appropriations as shown in the upper portion of Table 22.

3/ Excludes remainder of Oroville flood control contribution (with interest thereon) not applied to general obligation bond service, amounting to $3,741,000, and applied to finance capital expenditures as follows: $1,887,000 in 1977 and $1,854,000 in 1978.

4/ Includes $50 million of Bond Anticipation notes dated 12/1/63; and a net of $150 million in 1964 in actual and contemplated bond issues. Net excess of these amounts over requirements for 1963 and 1964 is applied in 1965.

5/ All contemplated issues assumed at 4 percent interest per annum, with amortization commencing in the tenth year from issue so as to produce level annual bond service for the 41-year period commencing with the 10th and ending with the 50th year.

6/ From Column 8, Table 29.

7/ Oroville flood control contribution only ($68,823,000) plus interest earned thereon, assumed at 3½ percent, pending disbursement.

8/ The balance of net revenues as shown reflects principally the accumulation, in revenue formulas, of interest on capital expenditures financed by the California Water Fund and from funds provided prior to the Burns-Porter Act.

9/ Early excess revenues utilized for bond service in 1964.

10/ Repayments to the California Water Fund applied in whole, or in part, to financing capital expenditures in the following year.

TABLE 32

SOURCES OF FUNDS FOR FINANCING
BASIS "A"

(in thousands of dollars)

CALENDAR YEAR	FINANCING OF CAPITAL EXPENDITURES						END-OF-YEAR BALANCE	
	CALIFORNIA WATER FUND			GENERAL OBLIGATION BONDS			UNISSUED AND UN-COMMITTED AUTHORI-ZATION	UNISSUED "OFFSET" BONDS
	TOTAL	FOR STATE WATER FACILITIES	FOR ADDITIONAL FACILITIES	TOTAL	FOR ADDITIONAL FACILITIES (OFFSET BONDS)	FOR STATE WATER FACILITIES		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1961	6,047	6,047					1,743,953	6,047
62	29,423	29,423					1,714,530	35,470
63	95,103	95,103		50,000		50,000	1,569,427	130,573
64	12,503	12,503		150,000	321	149,679	1,407,245	142,755
65	11,184	11,184		179,642	769	178,873	1,217,188	153,170
66	11,000	11,000		179,642	945	178,697	1,027,491	163,225
67	11,000	11,000		179,641	828	178,813	837,678	173,397
68	11,000	11,000		173,312	413	172,899	653,779	183,984
69	11,000	11,000		175,630	97	175,533	467,246	194,887
1970	11,000	11,000		156,016	97	155,919	300,327	205,790
71	11,000	11,000		80,588	94	80,494	208,833	216,696
72	11,000	11,000		13,555	94	13,461	184,372	227,602
73	11,000	11,000		17,374	94	17,280	156,092	238,508
74	11,000	11,000		26,058	95	25,963	119,129	249,413
75	11,000	11,000		16,903	95	16,808	91,321	260,318
76	11,000	11,000		14,255	95	14,160	66,161	271,223
77	11,000	11,000		1,887	95	1,792	53,369	282,128
78	11,000	11,000		11,484	2,095	9,389	32,980	291,033
79	11,000	11,000		10,297	6,095	4,202	17,778	295,938
1980	11,000	1,516	9,484	11,611	11,611		16,262	285,843
81	11,000	-254	11,254	31,839	31,839		16,516	253,750
82	11,000		11,000	37,093	37,093		16,516	216,657
83	11,000		11,000	22,759	22,759		16,516	193,898
84	11,212	1,120	10,092				15,396	195,018
85	1,124	32	1,092				15,364	195,050
86	696	696					14,668	195,746
87	760	760					13,908	196,506
88	34	34					13,874	196,540
1989	298	298					13,576	196,838
TOTALS	366,384	312,462	53,922	1,539,586	115,624	1,423,962	-	-

Notes to
Column No.

1. From Column 2, Table 30.

2. The total costs of the State Water Facilities to be financed (Column 13 less Column 11, Table 22; less $86,000 applicable flood control reimbursements in 1983; and less costs financed by revenue bonds, as shown in footnote (2) to Table 30), limited by Column 1, this table. This column is equal to the annual amount of Offset Bonds reserved for additional facilities.

3. Column 1 less Column 2.

4. From Column 3, Table 30.

5. The annual capital expenditures for the Upper Eel River Development to be financed (Column 11, Table 22, less $2,334,000 applicable flood control reimbursement in 1983), limited by the total annual bond issues shown in Column 4, this table.

6. Column 4 less Column 5.

7. The authorization of the Burns-Porter Act ($1,750,000,000) less the cumulative Offset Bonds reserved, shown annually in Column 2, and less the cumulative bonds issued to finance the State Water Facilities, shown annually in Column 6.

8. The cumulative Offset Bonds reserved, shown annually in Column 2, less the cumulative Offset Bonds issued, shown annually in Column 5.

TABLE 33

SOURCES OF FUNDS FOR FINANCING
BASIS "B"

(in thousands of dollars)

CALENDAR YEAR	FINANCING OF CAPITAL EXPENDITURES						BALANCE, UNISSUED AND UNCOMMITTED AUTHORIZATION (end-of-year)	FINANCING OF EXPENDITURES BEYOND AUTHORIZATION (Unadjusted)		BALANCE, UNISSUED "OFFSET" BONDS (end-of-year)
	CALIFORNIA WATER FUND			GENERAL OBLIGATION BONDS						
	TOTAL	FOR STATE WATER FACILITIES	FOR ADDITIONAL FACILITIES	TOTAL	FOR ADDITIONAL FACILITIES (OFFSET BONDS)	FOR STATE WATER FACILITIES		CALIFORNIA WATER FUND	GENERAL OBLIGATION BONDS	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1961	6,047	6,047					1,743,953			6,047
62	29,423	29,423					1,714,530			35,470
63	95,103	95,103		50,000		50,000	1,569,427			130,573
64	12,503	12,503		150,000	321	149,679	1,407,245			142,755
65	11,184	11,184		196,489	769	195,720	1,200,341			153,170
66	11,000	11,000		196,488	945	195,543	993,798			163,225
67	11,000	11,000		196,488	828	195,660	787,138			173,397
68	11,000	11,000		173,312	413	172,899	603,239			183,984
69	11,000	11,000		175,630	97	175,533	416,706			194,887
1970	11,000	11,000		156,016	97	155,919	249,787			205,790
71	11,000	11,000		80,588	94	80,494	158,293			216,696
72	11,000	11,000		13,555	94	13,461	133,832			227,602
73	11,000	11,000		17,374	94	17,280	105,552			238,508
74	11,000	11,000		26,058	95	25,963	68,589			249,413
75	11,000	11,000		16,903	95	16,808	40,781			260,318
76	11,000	11,000		14,255	95	14,160	15,621			271,223
77	11,000	11,000					4,621			282,223
78	11,375	11,375		9,255	2,095	7,160		11,375	2,539	280,128
79	11,657	11,657		9,640	6,095	3,545		11,657	3,545	274,033
1980	12,665	1,516	11,149	9,946	9,946			12,665		264,087
81	13,978	-254	14,232	28,861	28,861			13,978		235,226
82	14,706		14,706	33,387	33,387			14,706		201,839
83	15,233	86	15,147	20,946	20,946			15,233		180,893
84	11,212	1,120	10,092					11,212		180,893
85	1,124	32	1,092					1,124		180,893
86	696	696						696		180,893
87	760	760						760		180,893
88	34	34						34		180,893
1989	298	298						298		180,893
TOTALS	379,998	313,580	66,418	1,575,191	105,367	1,469,824	-	93,738	6,084	-
*ADJUSTED TOTALS	379,998	319,664	60,334	1,575,191	111,451	1,463,740	0	93,738	0	174,809

* The above column totals have been adjusted to reflect a possible rescheduling of capital expenditures, whereby $6,084,000 of construction of the State Water Facilities (as reflected in Column 9) would be deferred from 1978 and 1979 until about 1980. An additional issue of Offset Bonds could be made in that year in the amount of $6,084,000, thereby permitting financing for the deferred amount from the California Water Fund.

Notes to
Column No.

1. From Column 2, Table 31.

2. The total costs of the State Water Facilities to be financed (Column 13 less Column 11, Table 22; less $3,741,000 applicable flood control reimbursements; and less costs financed by revenue bonds, shown in footnote (2) to Table 31), limited by Column 1, this table. This column less Column 8, is equal to the annual amount of Offset Bonds reserved for additional facilities.

3. Column 1 less Column 2.

4. From Column 3, Table 31.

5. The annual capital expenditures for the Upper Eel River Development to be financed (Column 11, Table 22), limited by the total annual bond issues shown in Column 4, this table.

6. Column 4 less Column 5.

7. The authorization of the Burns-Porter Act ($1,750,000,000) less the cumulative Offset Bonds reserved, shown annually in Column 2 and as reduced by Column 8, and less the cumulative bonds issued to finance the State Water Facilities, shown annually in Column 6.

8. Column 1 in excess of the total authorization shown in Column 7.

9. The amounts by which the capital expenditures of Column 1, Table 31, would have to be rescheduled.

10. The cumulative Offset Bonds reserved, shown annually in Column 2 and as reduced by Column 8, less the cumulative Offset Bonds issued, shown annually in Column 5.

TABLE 34

SERVICE ON ACTUAL AND PROJECTED
GENERAL OBLIGATION BONDS

(in thousands of dollars)

CALENDAR YEAR	BOND SERVICE ON ACTUAL ISSUES AS OF APRIL 1, 1964			BOND SERVICE ON PROJECTED ISSUES* BASIS "A"			TOTAL BOND SERVICE ACTUAL AND PROJECTED (BASIS "A")	BOND SERVICE ON PROJECTED ISSUES* BASIS "B"			TOTAL BOND SERVICE ACTUAL AND PROJECTED (BASIS "B")
	PRINCIPAL	INTEREST	TOTAL	PRINCIPAL	INTEREST	TOTAL		PRINCIPAL	INTEREST	TOTAL	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1961											
62											
63											
64		2,398	2,398		4,000	4,000	6,398		4,000	4,000	6,398
65		3,735	3,735		11,186	11,186	14,921		11,860	11,860	15,595
66		3,735	3,735		18,371	18,371	22,106		19,719	19,719	23,454
67		3,735	3,735		25,557	25,557	29,292		27,579	27,579	31,314
68		3,735	3,735		32,489	32,489	36,224		34,511	34,511	38,246
69		3,735	3,735		39,515	39,515	43,250		41,536	41,536	45,271
1970		3,735	3,735		45,755	45,755	49,490		47,777	47,777	51,512
71		3,735	3,735		48,979	48,979	52,714		51,000	51,000	54,735
72		3,735	3,735		49,521	49,521	53,256		51,543	51,543	55,278
73	1,200	3,735	4,935	1,002	50,216	51,218	56,153	1,002	52,238	53,240	58,175
74	1,200	3,675	4,875	2,841	51,218	54,059	58,934	3,010	53,240	56,250	61,125
75	1,200	3,615	4,815	4,755	51,780	56,535	61,350	5,099	53,795	58,894	63,709
76	1,200	3,555	4,755	6,744	52,161	58,905	63,660	7,271	54,162	61,433	66,188
77	1,200	3,495	4,695	8,750	51,966	60,716	65,411	9,298	53,871	63,169	67,864
78	1,500	3,435	4,935	10,859	52,076	62,935	67,870	11,429	53,869	65,298	70,233
79	1,500	3,360	4,860	12,857	52,053	64,910	69,770	13,449	53,798	67,247	72,107
1980	1,500	3,285	4,785	14,178	52,004	66,182	70,967	14,794	53,658	68,452	73,237
81	1,500	3,210	4,710	14,881	52,710	67,591	72,301	15,522	54,220	69,742	74,452
82	1,500	3,135	4,635	15,651	53,598	69,249	73,884	16,317	54,935	71,252	75,887
83	1,700	3,060	4,760	16,538	53,882	70,420	75,180	17,231	55,120	72,351	77,111
84	1,700	2,975	4,675	17,368	53,221	70,589	75,264	18,089	54,431	72,520	77,195
85	1,700	2,890	4,590	18,206	52,525	70,731	75,321	18,956	53,707	72,663	77,253
86	1,700	2,805	4,505	18,953	51,798	70,751	75,256	19,714	52,949	72,663	77,168
87	1,700	2,720	4,420	19,826	51,040	70,866	75,286	20,595	52,161	72,756	77,176
88	2,000	2,635	4,635	20,722	50,247	70,969	75,604	21,516	51,337	72,853	77,488
89	2,000	2,555	4,555	21,668	49,418	71,086	75,641	22,476	50,476	72,952	77,507
1990	2,000	2,487	4,487	22,853	48,551	71,404	75,891	23,664	49,577	73,241	77,728
91	2,000	2,419	4,419	24,139	47,637	71,776	76,195	24,945	48,631	73,576	77,995
92	2,000	2,351	4,351	25,333	46,671	72,004	76,355	26,153	47,633	73,786	78,137
93	2,400	2,283	4,683	26,346	45,658	72,004	76,687	27,199	46,587	73,786	78,469
94	2,400	2,199	4,599	27,400	44,604	72,004	76,603	28,287	45,499	73,786	78,385
95	2,400	2,115	4,515	28,496	43,508	72,004	76,519	29,419	44,367	73,786	78,301
96	2,400	2,031	4,431	29,636	42,368	72,004	76,435	30,595	43,191	73,786	78,217
97	2,400	1,947	4,347	30,821	41,183	72,004	76,351	31,819	41,967	73,786	78,133
98	2,900	1,863	4,763	32,054	39,950	72,004	76,767	33,092	40,694	73,786	78,549
99	2,900	1,762	4,662	33,336	38,668	72,004	76,666	34,416	39,370	73,786	78,448
2000	2,900	1,660	4,560	34,669	37,335	72,004	76,564	35,792	37,994	73,786	78,346
01	2,900	1,558	4,458	36,056	35,948	72,004	76,462	37,223	36,563	73,786	78,244
02	2,900	1,457	4,357	37,498	34,506	72,004	76,361	38,712	35,074	73,786	78,143
03	3,500	1,356	4,856	38,998	33,006	72,004	76,860	40,261	33,525	73,786	78,642
04	3,500	1,233	4,733	40,558	31,446	72,004	76,737	41,871	31,915	73,786	78,519
05	3,500	1,107	4,607	42,181	29,823	72,004	76,611	43,546	30,240	73,786	78,393
06	3,500	981	4,481	43,868	28,136	72,004	76,485	45,288	28,498	73,786	78,267
07	3,500	855	4,355	45,623	26,381	72,004	76,359	47,099	26,687	73,786	78,141
08	4,000	729	4,729	47,447	24,557	72,004	76,733	48,983	24,803	73,786	78,515
09	4,000	584	4,584	49,345	22,659	72,004	76,588	50,943	22,843	73,786	78,370
2010	4,000	439	4,439	51,319	20,685	72,004	76,443	52,980	20,806	73,786	78,225
11	4,000	294	4,294	53,372	18,632	72,004	76,298	55,100	18,686	73,786	78,080
12	4,000	149	4,149	55,507	16,497	72,004	76,153	57,304	16,482	73,786	77,935
13	4,000	4	4,004	57,727	14,277	72,004	76,008	59,596	14,190	73,786	77,790
14				55,034	11,968	67,002	67,002	56,978	11,806	68,784	68,784
15				48,251	9,767	58,018	58,018	49,429	9,527	58,956	58,956
16				41,195	7,837	49,032	49,032	41,579	7,549	49,128	49,128
17				33,858	6,189	40,047	40,047	33,414	5,886	39,300	39,300
18				26,544	4,834	31,378	31,378	26,082	4,550	30,632	30,632
19				18,821	3,773	22,594	22,594	18,340	3,506	21,846	21,846
2020				11,770	3,020	14,790	14,790	11,271	2,773	14,044	14,044
21				8,210	2,550	10,760	10,760	7,690	2,322	10,012	10,012
22				7,861	2,220	10,081	10,081	7,320	2,014	9,334	9,334
23				7,306	1,906	9,212	9,212	6,744	1,721	8,465	8,465
24				6,295	1,614	7,909	7,909	5,710	1,452	7,162	7,162
25				5,701	1,363	7,064	7,064	5,094	1,223	6,317	6,317
26				5,216	1,135	6,351	6,351	4,584	1,019	5,603	5,603
27				5,331	925	6,256	6,256	4,767	836	5,603	5,603
28				4,969	713	5,682	5,682	4,496	645	5,141	5,141
29				4,653	514	5,167	5,167	4,193	466	4,659	4,659
2030				4,259	328	4,587	4,587	3,863	298	4,161	4,161
31				2,836	158	2,994	2,994	2,574	143	2,717	2,717
2032				1,095	43	1,138	1,138	1,008	40	1,048	1,048
Totals	100,000	120,281	220,281	1,439,586	2,030,829	3,470,415	3,690,696	1,475,191	2,081,090	3,556,281	3,776,562

* All projected issues are assumed at 4 percent interest per annum, with amortization commencing in the tenth year from issues so as to produce level annual bond service for the 41-year period beginning with the tenth and ending with the fiftieth year.

State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 132-64

THE CALIFORNIA STATE WATER PROJECT IN 1964

Appendix A

STATE WATER PROJECT STATISTICS

JUNE 1964

HUGO FISHER
Administrator
The Resources Agency of California

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

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FOREWORD

These statistics are current as of April 1964. Some of the data are subject to change as additional arrangements for water service are consummated and as final plans and designs are accomplished. This is particularly the case with respect to the North Bay Aqueduct and the California Aqueduct south of Kettleman City. Since the Delta Facilities, the Upper Eel River Development, and the San Joaquin Drainage Facilities are still in the advanced planning stage, physical statistics for these features of the State Water Project are not listed at this time.

Construction of the works listed is scheduled for completion by 1972. Work on Oroville Dam began in 1962 and work on the California Aqueduct commenced in 1963.

GENERAL SUMMARY

Reservoirs (15)		Dams (15)	
Storage	6,633,000 acre-feet	Crest Length	18 miles
Surface Area	51,205 acres (80 sq. miles)	Volume	229 million cubic yds.
Shoreline	439 miles	**Power Plants (9)**	
Aqueducts		Capacity	1,576,000 kilowatts
Canal	437 miles	Annual Output	5.8 billion kilowatt hours
Pipeline	165 miles		
Tunnel	17 miles		
Total	619 miles	Pumping Plants (18)	
		Annual Energy Used	12 billion kilowatt hours

Total State Costs	$2,300,600,000
Less Federal Flood Control Contributions	84,200,000
Net State Cost	$2,216,400,000

SUMMARY OF COSTS

Feature	$ Million
Upper Feather River Division	18
Oroville Division	468
Delta Faciltiesl/	76
North Bay Aqueduct	11
South Bay Aqueduct	51
North San Joaquin Division	137
San Luis Division, (State Share)	223
South San Joaquin Division	206
Tehachapi Division	175
Antelope Division	27
East Branch	322
West Branch2/	170
Coastal Branch	54
Upper Eel River Development	172
San Joaquin Drainage Facilities	57
Local Projects	131
Costs Associated with Deleted Features	2
Sub-Total	$2,300
Estimated Federal Flood Control Contributions	- 84
Net State Cost	$2,216

1/ Based on "Typical Alternative Delta Project," not a final plan.
2/ Based on Elizabeth Lake Canyon Route, not a final plan.

SUMMARY

Major Dams and Reservoirs

Name	Reservoirs (15) Capacity (acre-feet)	Area (acres)	Shore-line (miles)	Dams Height (feet)	Crest Length (feet)	Volume (cubic yards)
Frenchman	55,400	1,580	21	128	720	543,000
Antelope	22,900	930	15	105	1,320	339,000
Grizzly	83,000	4,000	35	115	800	230,000
Abbey Bridge	11,000	540	11	79	750	250,000
Dixie Refuge	16,000	900	15	82	1,050	370,000
Oroville	3,484,000	15,500	167	748 1/	5,600	78,000,000
Thermalito Diversion	13,500	330	10	133	1.280	145,000
Thermalito Forebay	11,400	600	9	65	16,000	1,000,000
Thermalito Afterbay	57,500	4,500	26	30	43,500	4,000,000
Del Valle	74,000	715	16	220	900	3,000,000
San Luis	2,100,000	13,300	41	320	17,000	75,000,000
San Luis Forebay	54,000	2,000	9	70	10,000	3,000,000
Cedar Springs	200,000	1,630	22	280	2,500	14,500,000
Perris	100,000	2,080	8	120	11,450	13,400,000
Castaic	350,000	2,600	34	325	4,800	35,000,000
Totals	6,632,700	51,205	439		117,670	228,777,000

Aqueducts

Name	Length in Miles Total	Canal	Pipeline	Tunnel
California Aqueduct (Main Line)				
North San Joaquin Division	63	63	0	0
San Luis Division	103	103	0	0
South San Joaquin Division	120	120	0	0
Tehachapi Division	9	0	1	8
Antelope Division	23	21	2	0
East Branch	116	79	33	4
Subtotals, Main Line	434	386	36	12
West Branch	13	0	10	3
Coastal Aqueduct	100	20	80	0
North Bay Aqueduct	28	20	8	0
South Bay Aqueduct	44	11	31	2
Totals	619	437	165	17

1/ Rounded from 747.5

SUMMARY

Powerplants

Name	Installed Capacity, Kilowatts	Annual Output, Kilowatt-hours
Oroville	644,000	2,191,000,000
Thermalito	115,000	337,000,000
San Luis	424,000	123,000,000
Cottonwood	27,500	215,000,000
Devil Canyon No. 1	121,000	905,000,000
Devil Canyon No. 2	68,000	512,000,000
Ruby	104,000	903,000,000
Castaic	67,000	548,000,000
San Luis Obispo	5,400	43,000,000
Totals	1,575,900	5,777,000,000

Pumping Plants

Name	Static Head (feet)	Capacity Cubic Ft. per sec.	Annual Energy Requirements, Kilowatt Hours
Oroville-Thermalito (Pumped Storage)	592	1,870	575,000,000
North Bay Aqueduct:			
Calhoun	20	138	2,000,000
Cordelia	366	57	14,000,000
Subtotal			16,000,000
South Bay Aqueducts			
South Bay	600	300	141,000,000
Del Valle	60	120	
Subtotal			141,000,000
California Aqueduct (Main Line):			
Delta	244	10,300	1,217,000,000
San Luis	320	11,000	198,000,000
Mile 18	120	13,100	556,000,000
Buena Vista	206	4,338	645,000,000
Wheeler Ridge I	233	3,722	674,000,000
Wheeler Ridge II	520	3,720	1,497,000,000
Tehachapi	1,926	3,442	5,403,000,000
Pearblossom	545	1,802	752,000,000
Subtotal			10,942,000,000
West Branch	249	1,501	318,000,000
Coastal Aqueduct:			
Avenal Gap	173	328	31,000,000
Pyramid	436	115	
Sawtooth	331	115	144,000,000
Polonio (Temblor)	810	115	
Subtotal			175,000,000
Total			12,167,000,000

UPPER FEATHER DIVISION

Reservoir Data	Frenchman	Antelope	Grizzly	Abbey Bridge	Dixie Refuge
Storage, acre-feet	55,400	22,900	83,000	11,000	16,000
Surface Area, acres	1,580	930	4,000	540	900
Shoreline, miles	21	15	35	11	15
Dams					
Height, feet	128	105	115	79	82
Volume, cubic yards	543,000	339,000	230,000	250,000	370,000
Crest Length, feet	720	1,320	800	750	1,050
Crest Elevation, feet	5,607	5,025	5,785	5,444	5,754

Cost

Frenchman	$ 3,171,000
Antelope	$ 6,216,000
Grizzly	$ 4,112,000
Abbey Bridge	$ 1,979,000
Dixie Refuge	$ 2,153,000
Total Cost	$17,631,000

OROVILLE DIVISION

Oroville Powerplant

Capacity	644,000 kilowatts
Units	6 (3 reversible)
Annual Output	2,191,000,000 kilowatt hours

Fish Hatchery

Dam	Concrete Gravity
Height	63.5 feet
Length	600 feet

Oroville Reservoir

Capacity	3,484,000 acre-feet
Area	15,500 acres
Shoreline	167 miles

Oroville Dam

Type		Earthfill
Height		747.5 feet
Volume		78,000,000 cubic yards
Crest Elevation		922 feet
Crest Length		5,600 feet
Base Width		3,500 feet
Spillway Capacity		650,000 cubic feet per second
Diversion Tunnels	No. 1	No. 2
Length	4,295 feet	4,589 feet
Diameter	35 feet	35 feet
Capacity	92,000 cfs	88,000 cubic feet per second
Palermo Outlet Tunnel:		
Length		2,500 feet
Diameter		6.5 feet
Capacity		40 cubic feet per second

Cost of Oroville Division

Oroville Dam & Reservoir	$208,415,000
Fish Hatchery	5,017,000
Oroville Powerplant	79,992,000
Thermalito Facilities	76,509,000
WPRR Relocation	46,197,000
US 40A Relocation	15,003,000
Other Relocations	34,179,000
General Property	2,616,000
Total	$467,928,000

Thermalito Features

Diversion Dam and Reservoir

Type	Concrete Gravity
Height	133 feet
Length	1,280 feet
Volume	145,000 cubic yards
Reservoir Area	330 acres
Capacity	13,500 acre-feet
Shoreline	10 miles

Power Canal

Capacity	17,000 cubic feet per second
Length	2.5 miles

Powerplant

Capacity	115,000 kilowatts
Units	4 (3 reversible)
Annual Output	337,000,000 kilowatt hours

Forebay Dam and Reservoir

Type	Earthfill
Height	65 feet
Length	16,000 feet
Volume	1,000,000 cubic yards
Capacity	11,400 acre-feet
Surface Area	600 acres
Shoreline	9 miles

Afterbay Dam and Reservoir

Type	Earthfill
Height	30 feet
Length	43,500 feet
Volume	4,000,000 cubic yards
Capacity	57,500 acre-feet
Surface Area	4,500 acres
Shoreline	26 miles

NORTH BAY AQUEDUCT

Aqueduct		Pumping Plants		
		Name	Capacity	Static Head
Unlined Canal	20 miles			
Pipeline	8 miles	Calhoun	138 cubic feet per second	20 feet 366 feet
Total Length	28 miles	Cordelia	57 cubic feet per second	

Cost	
Pumping plants	$ 2,014,000
Pipeline	9,058,000
Total	$11,072,000

SOUTH BAY AQUEDUCT

Aqueduct

Capacity	363 to 184 cubic feet per second
Pipeline	30.6 miles
Concrete-lined Canal	11.5 miles
Tunnels (2)	1.6 miles
Total Length 1/	43.7 miles

Pumping Plants	Capacity	Static Head
South Bay	300 cubic feet per second	600 feet
Del Valle	120 cubic feet per second	60 feet

Del Valle Reservoir

Capacity	74,000 acre-feet
Surface Area	715 acres
Shoreline	16 miles
Dam	Earthfill
Height	220 feet
Crest Elevation	771 feet
Crest Length	900 feet
Volume	3,000,000 cubic yards

Cost

Del Valle Reservoir	$14,684,600
Aqueduct	36,682,400
Total	$51,367,000

1/ Measured from South Bay Pumping Plant to terminal facilities near San Jose. Does not include 2½ miles in temporary intake canal and Bethany Forebay.

CALIFORNIA AQUEDUCT

North San Joaquin Division

Aqueduct

Length 1/	63 miles
Capacity	10,000 cubic feet per second 2/
Type	Concrete lined

Delta Pumping Plant

Capacity	10,300 cubic feet per second
Number of Pumps	11
Static Head	244 feet

Costs

Delta Pumping Plant	$34,567,000
Intake Channel and Fish Protective Works	18,451,000
Aqueduct	84,268,000
Total	$137,286,000

1/ Does not include 3 miles of unlined intake channel.
2/ Except first three miles between Delta Pumping Plant and Bethany Forebay which will have a capacity of 10,330 cubic feet per second.

San Luis Division

San Luis Canal

Length 1/	103	miles
Capacity	13,100 to 8,350	cubic feet per second
Type		Concrete lined

San Luis Pump-Generating Plant

Capacity Generating	424,000	kilowatts
Capacity Pumping	11,000	cubic feet per second
Number of Units	8	(all reversible)
Maximum Static Head	320	feet
Annual Output	123,000,000	kilowatt hours

Mile 18 Pumping Plant

Static Head	120	feet
Capacity	13,100	cubic feet per second

San Luis Reservoir

Capacity	2,100,000	acre-feet
Surface Area	13,300	acres
Shoreline	41	miles

San Luis Dam

Type		Earthfill
Height	320	feet
Volume	75,000,000	cubic yards
Crest Length	17,000	feet
Crest Elevation	554	feet

San Luis Forebay

Capacity	54,000	acre-feet
Area	2,000	acres
Shoreline	9	miles
Dam		Earthfill
Height	70	feet
Crest Length	10,000	feet

Costs

San Luis Dam & Reservoir	$ 88,200,000
San Luis Forebay	6,300,000
San Luis Pumping Plant	66,750,000
San Luis Canal	137,131,000
Mile 18 Pumping Plant	30,120,000
Floodways & Wasteways	63,068,000
Switchyard & Trans. Lines	8,718,000
Total	400,287,000
State Share (55%)	220,158,000
U.S. Share (45%)	180,129,000
Additional State-only Costs	2,991,000
Total State-Federal Cost	$403,278,000

1/ Forebay reservoir provides about 3 miles additional conveyance in lieu of aqueduct.

South San Joaquin Division

Aqueduct

Type	Concrete-lined Canal
Length	120 miles
Capacity	7,344 to 3,720 cubic feet per second

Pumping Plants

Name	Static Head	Capacity
Buena Vista	206 feet	4,338 cubic feet per second
Wheeler Ridge I	233 feet	3,722 cubic feet per second
Wheeler Ridge II	520 feet	3,720 cubic feet per second

Costs

Aqueduct	$142,460,000
Pumping Plants	63,407,000
Total	$205,867,000

Tehachapi Division

Aqueduct

Capacity	3,433 cubic feet per second
Canal (Afterbay)	0.7 mile
Tunnel	7.9 miles
Pipeline	0.6 mile
Total Length	9.2 miles

Tehachapi Pumping Plant

Capacity	3,442 cubic feet per second
Static Head	1,926 feet

Tunnel Data

Tunnels 1, 2 & 3	3.2 miles long, 20 feet diameter
Tunnel 4	4.7 miles long, 17 feet diameter
Total	7.9 miles

Costs

Tehachapi Pumping Plant	$85,799,000
Aqueduct	89,229,000
Total	$175,028,000

Antelope Division

Aqueduct

Concrete-lined Canal	21 miles
Pipeline	2 miles
Total Length	23 miles
Capacity	3,348 cubic feet per second

Cottonwood Powerplant

Capacity	27,500 kilowatts
Static Head	119 feet
Annual Output	215,000,000 kilowatt hours

Costs

Aqueduct	$22,902,000
Cottonwood Powerplant	4,319,000
Total	$27,221,000

East Branch

Aqueduct

Concrete-lined Canal	79 miles
Pipeline	33 miles
Tunnel	4 miles
Total Length	116 miles
Capacity	1,842 to 925 cubic feet per second

Pearblossom Pumping Plant

Static Head	545 feet
Capacity	1,802 cubic feet per second

Devil Canyon Powerplants

	No. 1	No. 2
Static Head, feet	1,075	594
Capacity, kilowatts	121,000	68,000
Annual Output, kilowatt hours	905,000,000	512,000,000
Total Output #1 & #2	1,417,000,000 kilowatt hours	

Cedar Springs Reservoir

Capacity	200,000 acre-feet
Surface Area	1,630 acres
Shoreline	22 miles
Dam	Earthfill
Height	280 feet
Volume	14,500,000 cubic yards
Crest Elevation	3,460 feet
Crest Length	2,500 feet

Perris Reservoir

Capacity	100,000 acre-feet
Surface Area	2,080 acres
Shoreline	8 miles
Dam	Earthfill
Height	120 feet
Volume	13,400,000 cubic yards
Crest Elevation	1,587 feet
Crest Length	11,450 feet

Cost

Aqueduct	$199,106,000
Cedar Springs Reservoir	36,669,000
Perris Reservoir	30,236,000
Pearblossom Pumping Plant	24,768,000
Devil Canyon Powerplants	30,879,000
Total	$321,658,000

CALIFORNIA AQUEDUCT (cont.)

West Branch

Aqueduct

Pipeline	10 miles
Tunnel	3 miles
Total	13 miles
Capacity	1,501 cubic feet per second

West Branch Pumping Plant

Static Head	249 feet
Capacity	1,501 cubic feet per second

Castaic Reservoir

Capacity	350,000 acre-feet
Surface Area	2,600 acres
Shoreline	34 miles
Dam	Earthfill
Height	325 feet
Volume	35,000,000 cubic yards
Crest Elevation	1,525 feet
Crest Length	4,800 feet

Powerplants

Name	Static Head	Capacity
Ruby Powerplant	1,042 feet	104,000 kilowatts
Castaic Powerplant	650 feet	67,000 kilowatts
Combined Annual Output		1,451,000,000 kilowatt hours

Costs

Aqueduct 1/	$ 76,392,000
Castaic Reservoir	93,746,000
Total	$170,138,000

1/ Includes pumping plants and powerplants

COASTAL AQUEDUCT

Aqueduct

Concrete Lined Canal	20 miles
Pipeline	80 miles
Total Length	100 miles
Capacity	329 to 91 cubic feet per second

San Luis Obispo Powerplant

Static Head	694 feet
Capacity	5,400 kilowatts
Annual Output	43,000,000 kilowatt hours

Pumping Plants

Name	Capacity, Cubic Feet Per Second	Static Head
Avenal Gap	328	173 feet
Pyramid	115	436 feet
Sawtooth	115	331 feet
Polonio (Temblor)	115	810 feet

Costs

Aqueduct	$43,796,000
Pumping Plants	8,192,000
Powerplant	1,553,000
Total	$53,541,000

APPENDIX B

Advance Notice on Bids for Construction and Equipment

CALIFORNIA STATE WATER PROJECT

ADVANCE NOTICE ON BIDS FOR CONSTRUCTION AND EQUIPMENT
ESTIMATED THRU JUNE 30, 1965

UPPER FEATHER DIVISION

Grizzly Valley Dam — Scheduled to be Advertised in April 1964

Location: Approximately 5 miles north of the City of Portola, California in Plumas County on Big Grizzly Creek.

Work: Construction of a 114-foot high earthfill dam with a crest length of 450 feet. The embankment will contain 255,000 cubic yards of material. Included is the construction of a concrete-lined channel spillway and a 36-inch conduit outlet.

OROVILLE DIVISION

Oroville Powerplant Penstock Valves — Scheduled to be Advertised in January 1964

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish and deliver to the site six 114-inch spherical valves. Each of the valves is to be complete with 1,000 psi hydraulic operator, accumulator tank, oil pump and sump, air compressor, and all necessary control valves and accessories.

Oroville Powerplant Generators (Furnish and Install) — Scheduled to be Advertised in March 1964

Location: At the Oroville Powerplant located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish and install three generators and three reversible motor/generators of the vertical shaft, hydroelectric type. The generators will be rated at 123,157 kva at 0.95 power factor, 60 cycles, 3-phase, and 200 rpm. The motor/generators will be rated as motors at 173,000 hp, 1.00 power factor, and as generators at 102,222 kva, 0.90 power factor, both at 60 cycles, 3-phase, and 189.5 rpm.

Oroville Powerplant Intake Structure Completion — Scheduled to be Advertised in March 1964

Location: At the Oroville Powerplant located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish and install approximately 55,500 square feet of stainless steel trash racks, thirty 40 feet by 40 feet control shutters, 2 gantry cranes, 2 hydraulically operated 22 feet by 35 feet coaster gates and a lifting device, embedded rails and second stage concrete work.

Pioneer Cemetery — Scheduled to be Advertised in March 1964

Location: The Pioneer Cemetery site is located adjacent to the Thompson Flat Cemetery on the Cherokee Road, approximately 1 mile east of the intersection of the Oroville-Chico Highway and the Cherokee Road near Oroville.

Work: This work includes preparation of the site, construction of gravel roadways and surface drainage facilities, disinterring bodies and moving monuments from existing cemeteries in the Oroville Reservoir area, and reinterring bodies and placing new or existing monuments in the Pioneer Cemetery site.

Oroville Powerplant Powerhouse Bridge Cranes — Scheduled to be Advertised in April 1964

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: The work consists of furnishing and delivering two 200-ton traveling bridge cranes and one rotor lifting beam. Each crane will have a span of approximately 65 feet and will have two 100-ton trolleys with a 25-ton auxiliary hook.

Thermalito Power Canal Bridges	Scheduled to be Advertised in May 1964

Location: At the Thermalito Power Canal, located approximately one mile north of the City of Oroville, California; in Butte County.

Work: Construction of two reinforced concrete box-girder bridges, and a water flume across the Thermalito Power Canal, which will serve the Oroville-Chico County Road, the Oroville-Cherokee Road, and the California Water Service Company Canal.

Radial Gates and Hoists for Thermalito Diversion Dam	Scheduled to be Advertised in June 1964

Location: At the Thermalito Diversion Dam located approximately 3/4-mile north of the City of Oroville, California, on the Feather River, in Butte County.

Work: Furnish and deliver to the site 14 radial gates approximately 40 feet by 23 feet by 26 feet. Included with each gate will be the appurtenant equipment, and a motor-driven hoist of 45-ton capacity.

Thermalito Powerplant	Scheduled to be Advertised in July 1964

Location: At the Thermalito Forebay Dam located approximately 4 miles west of the City of Oroville, California, in Butte County.

Thermalito Powerplant
(Continued)

Work: Complete construction of the powerhouse and bypass structure, furnish and install 2 gantry cranes, bridge crane and mechanical and electrical equipment and systems. Also included will be access roads, parking areas, and forebay and tailrace channel transition excavation. Excavation will involve the removal of approximately 818,000 cubic yards of earth and 475,000 cubic yards of rock. Concrete quantities for the powerhouse and bypass structure will be approximately 326,500 cubic yards.

Oroville Powerplant High Voltage Cables — Scheduled to be Advertised in October 1964

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish and supervise installation of six 230 kv, 3-phase cables, each approximately 1,800 feet long. The cables will be the high-pressure, oil filled, pipe type, 500 mcm conductors, complete with terminal pot heads, pipe, oil, and pressure regulating equipment.

Oroville Powerplant Transformers — Scheduled to be Advertised in November 1964

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish six 13.2/230 kv, 3-phase transformers of 126,000 kva capacity, 900 kv bil, forced water and forced oil cooling, with lightning arresters.

Thermalito Powerplant Generators — Scheduled to be Advertised in December 1964

Location: At the Thermalito Powerplant, located approximately 4 miles west of the City of Oroville, California, in Butte County.

Work: Furnish and install 3 reversible motor/generators rated at 40,000 hp/30,555 kva, 100/90 percent power factors and 112.5 rpm; and one generator rated 36,222 kva, 90 percent power factor and 138.5 rpm. All units will be enclosed, vertical shaft type, with full voltage motor starting on the motor/generators.

Oroville Powerplant Governors — Scheduled to be Advertised in January 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Oroville Powerplant Governors
(Continued)

Work: Furnish 6 cabinet actuator-type governors. Three will control the reversible pump-turbines and 3 will govern the conventional turbines. The governors will be furnished with the necessary auxiliary devices for local and remote control.

Thermalito Power Canal — Scheduled to be Advertised in January 1965

Location: At Thompson Flat, located approximate 1 mile north of the City of Oroville, California, in Butte County.

Work: Excavate approximately 5,500,000 cubic yards of earth and rock and place approximately 31,000 cubic yards of concrete lining. The first 10,000 feet of canal is to be lined.

Thermalito Forebay and Afterbay — Scheduled to be Advertised in January 1965

Location: Approximately 5 miles east of the City of Oroville, California, in Butte County.

Work: Construction of approximately 44,000 lineal feet of earth-fill dam varying in height to a maximum of 65 feet, and containing approximately 5,000,000 cubic yards of material, 2 railroad bridges, 2 highway bridges, 3 outlet structures, and excavation of approximately 4,500,000 cubic yards of channel excavation.

Oroville Reservoir Site Clearing

Scheduled to be Advertised Under 3 Separate Contractual Units in January 1965

Location: On the Feather River and extending from the Oroville damsite, up the South Fork Feather River to the Ponderosa Dam, up the Middle Fork of Feather River to Feather Falls, up the North Fork of Feather River to Big Ben Powerplant Diversion Dam, and up the West Branch Feather River to 1-$\frac{1}{2}$ miles above the Wilenor Siphon. The clearing is located in Butte County, California.

Work: Clear all trees, brush, and structures from an area of approximately 9,600 acres. Clean all floatable material from an area of approximately 5,645 acres.

Oroville Dam Spillway

Scheduled to be Advertised in February 1965

Location: In the right abutment of Oroville Dam, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Construction of a gated outlet structure with 7 radial gates approximately 20 feet by 33 feet each, a fixed crest structure approximately 1,750 feet long, and a concrete-lined chute approximately 170 feet wide, 22 feet deep, and 3,500 feet long.

Oroville Powerplant Supervisory Control and Telemetering Equipment	Scheduled to be Advertised in February 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish 4 master control stations, 3 remote receivers, and telemetering equipment.

Oroville Powerplant Station Service Switchboards and Generator Switchgear	Scheduled to be Advertised in February 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish isolated-phase 6,000 ampere bus for 6 generators, with 3 reversing switches and 3 disconnect switches, four 2,500 kva 13,800/440 volt transformers, two 440 volt main distribution switchboards with breakers up to 4,000 amperes, and six 440 volt distribution boards with breakers up to 600 amperes.

Oroville Powerplant Main Control Switchboard	Scheduled to be Advertised in February 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Oroville Powerplant Main Control Switchboard (Continued)

Work: Furnish the control board for a six-unit powerplant and switchboard, 6 generator control boards, graphic switchboard, emergency control board and accessories.

Oroville Powerplant Carrier Current or Microwave Equipment	Scheduled to be Advertised in March 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish equipment for control channels between Oroville and Thermalito Powerplants and Sacramento.

Oroville Powerplant High Voltage Breakers	Scheduled to be Advertised in April 1965

Location: At the Oroville Powerplant, located approximately 5 miles northeast of the City of Oroville, California, in Butte County.

Work: Furnish eighteen 230 kv circuit breakers with 20,000 mva interrupting capacity.

Oroville-Quincy County Road Relocation (Middle Fork Bridge to Existing County Road)	Scheduled to be Advertised in April 1965

Location: Approximately 8 miles northeast of the City of Oroville, California, in Butte County.

Oroville-Quincy County Road Relocation
(Middle Fork Bridge to Existing County Road)
(Continued)

Work: Construction of approximately 6 miles of two-lane county road along new alignment north from the Middle Fork Bridge, which is now under construction.

Thermalito Powerplant Transformers — Scheduled to be Advertised in June 1965

Location: At the Thermalito Powerplant, approximately 4 miles west of the City of Oroville, California, in Butte County.

Work: Furnish and install three 13.8/230 kv, 32,000 kva transformers and one 13.8/230 kv, 37,500 kva transformer. The transformers will be forced oil and forced air cooled.

SOUTH BAY AQUEDUCT

Santa Clara Pipeline — Scheduled to be Advertised in January 1964

Location: From the West Portal of Mission Tunnel near Mission San Jose, California, in Alameda County, to about 2 miles northeast of San Jose, California, in Santa Clara County.

Santa Clara Pipeline (Continued)

Work: This work includes excavation for and placement of 12.7 miles of pipe and diversion works. Alternative bids will be received for both steel and concrete pipe.

Excavation	400,000 cubic yards
Pipe	230 feet of 90-inch pipe 67,500 feet of 72-inch pipe

Santa Clara Pipeline Terminal Facilities	Scheduled to be Advertised in April 1964

Location: About 2 miles northeast of San Jose, California, in Santa Clara County.

Work: This work includes excavation for and placement of 14,800 feet of pipe and diversion works and construction of a small terminal reservoir. Alternative bids will be received for both steel and concrete pipe.

Excavation	600,000 cubic yards
Pipe	4,000 feet of 72-inch pipe 3,400 feet of 66-inch pipe 3,400 feet of 60-inch pipe 4,000 feet of 42-inch pipe
Consolidated embankment	16,000 cubic yards

CALIFORNIA AQUEDUCT

Aqueduct from Del Puerto Canyon Road to Orestimba Creek (Mi. 39.6 - Mi. 51.3) — Scheduled to be Advertised in January 1964

Location: In Stanislaus County from approximately 3 miles west of Patterson to about 5 miles west of Newman, California.

Work: This work includes excavation, embankment, and concrete lining for 11.7 miles of canal and related structures, such as checks, overchutes, bridges, and culverts.

Excavation	6,000,000 cubic yards
Compacted embankment	1,000,000 cubic yards
Concrete lining	121,000 cubic yards
Concrete for structures	14,000 cubic yards

Delta Pumping Plant Pump Contract — Scheduled to be Advertised in February 1964

Location: Approximately 3 miles northeast of Byron Hot Springs, Alameda County, California.

Work: Pump Contract--Fabricate and install two 350 cfs, 11,000 hp pumps. The first of the 350 cfs pumps shall be operational by January 1967, and all pumps shall be operational by January 1968. Pump models and pump tests will be required.

Pumping Units for Water Wells Preconsolidation Features	Scheduled to be Advertised in March 1964

Location: In Kern County, about 20 miles south of Bakersfield, California, and near U. S. Highway 99.

Work: Procurement and installation of two pumps and motors for deep wells and two booster pumps and motors. Pump capacities will be in the range of 4 cfs.

Conveyance and Ponding Facilities for Preconsolidation	Scheduled to be Advertised in April 1964

Location: Approximately 20 miles south of Bakersfield and 3 miles northwest of Wheeler Ridge, Kern County, California.

Work: This work includes nearly 5 miles of excavation and dike construction required in the preconsolidation phase of the California Aqueduct construction. Infiltration wells will be constructed in the preconsolidation pond areas. The contract includes furnishing and installing five miles of steel pipeline with valves and fittings.

Aqueduct from Orestimba Creek to San Luis Forebay (Mi. 51.3 - Mi. 67)	Scheduled to be Advertised in May 1964

Location: In Stanislaus County from about 5 miles west of Newman, California, to Merced County, San Luis Forebay, about 12 miles west of Los Banos, California.

Aqueduct from Orestimba Creek to
San Luis Forebay (Mi. 51-3 - Mi. 67)
(Continued)

Work: This work includes excavation, embankment, and concrete lining for approximately 16 miles of canal and related structures, such as checks, overchutes, inverted siphons, bridges, and culverts.

Excavation	11,000,000 cubic yards
Compacted embankment	500,000 cubic yards
Concrete lining	169,000 cubic yards
Concrete structures	18,000 cubic yards

Delta Pumping Plant
Initial Contract

Scheduled to be Advertised in June 1964

Location: Approximately 3 miles northeast of Byron Hot Springs, Alameda County, California.

Work: Initial Contract -- Construct the first stage concrete and superstructure of the pumping plant main structure, electric power switchyards, and mechanical and electrical utilities and auxiliary systems.

Operations and Maintenance
Facilities - Phase I

Scheduled to be Advertised in May 1964

Location: At the Delta Pumping Plant, approximately 4 miles northeast of Byron Hot Springs, Alameda County, California.

Operations and Maintenance Facilities -
Phase I (Continued)

Work: Construct 5 rigid frame, tilt-up concrete slab, single story maintenance buildings, each having approximately 5,000 square feet of floor space. Other work includes site development, construction of a guard station, sewage treatment facilities, mechanical and electrical facilities.

Delta Pumping Plant — See Advertising Schedule Below

Location: Approximately 3 miles northeast of Byron Hot Springs, Alameda County, California.

Work: Pump Motor Contract (Adv.-January 1965) — Furnish and install motors for the following 7 pumps: Two of 350 cfs capacity at 249 feet total dynamic head, 80 percent pump efficiency; and five of 1,067 cfs capacity at 249 feet total dynamic head, 80 percent pump efficiency.

Valves Contract (Adv.-July 1964) — Furnish and install 7 spherical valves: Two 54-inch size and five 84-inch size.

Other contracts for such items as miscellaneous electrical machinery, controls and instrumentation, etc., are being developed.

Preconsolidation Features from Lerdo Highway to Tupman Road (Mi. 217 - Mi. 238) — Scheduled to be Advertised in August 1964

Location: Approximately 32 miles west of Bakersfield, Kern County, California.

Preconsolidation Features from Lerdo Highway to Tupman Road (Mi. 217 - Mi. 238) (Continued)

Work: Excavation and dike construction for subsidence ponds along the aqueduct alignment extending approximately 24 miles. The contract includes relocations, infiltration wells and water delivery pipelines with respective booster pumps and motors.

Excavation	1,700,000 cubic yards
16-inch pipeline	52,000 lineal feet
14-inch pipeline	67,000 lineal feet
Infiltration wells	270,000 lineal feet

Aqueduct from Chrisman Road to Del Puerto Canyon Road (Mi. 21.1 - Mi. 39.6)

Scheduled to be Advertised in October 1964

Location: From approximately 6-½ miles south of Tracy, California, to about 3 miles west of Patterson in Stanislaus County.

Work: This work includes excavation, embankment, and concrete lining for approximately 18.5 miles of canal and related structures, such as checks, overchutes, inverted siphons, bridges, and culverts.

Excavation	9,000,000 cubic yards
Compacted embankment	700,000 cubic yards
Concrete lining	200,000 cubic yards
Concrete for structures	26,000 cubic yards

Conveyance and Ponding Facilities for Preconsolidation	Scheduled to be Advertised in October 1964

Location: Approximately 25 miles southwest of Bakersfield, Kern County, California.

Work: Excavation and dike construction for subsidence ponds along the aqueduct alignment extending approximately 24 miles. The contract includes infiltration wells and water delivery pipelines with respective booster pumps and motors.

Excavation	1,750,000 cubic yards
12-inch pipeline	104,000 lineal feet
Infiltration wells	83,000 lineal feet

Preconsolidation Features from Buena Vista Pumping Plant to Wheeler Ridge Pumping Plant (Mi. 253 - Mi. 280)	Scheduled to be Advertised in October 1964

Location: Approximately 25 miles southwest from Bakersfield, Kern County, California.

Work: Excavation and dike construction for subsidence ponds along the aqueduct alignment extending approximately 24 miles. The contract includes infiltration wells and water delivery pipelines.

Excavation	4,200,000 cubic yards
Infiltration wells	360,000 lineal feet
Pipeline	120,000 lineal feet

Tehachapi Crossing - Tunnels 1 and 2 and Siphon 1 — Scheduled to be Advertised in November 1964

Location: In Kern County approximately 8 miles northeast of Gorman.

Work: This work includes excavation and concrete lining of two tunnels 20 feet in diameter, one being 7,900 feet long and the other 2,900 feet long. Also included is a surge chamber 70 feet in diameter and 90 feet high, and 500 feet of cast-in-place concrete pipe 20 feet in diameter.

Tunnel excavation	200,000 cubic yards
Portal excavation	500,000 cubic yards

Tehachapi Crossing - Tunnels 3 and 4 and Siphon 3 — Scheduled to be Advertised in November 1964

Location: In Kern County approximately 7 miles northeast of Gorman.

Work: This work includes excavation and concrete lining of two tunnels, one 20 feet in diameter and 5,700 feet long, and the other 17 feet in diameter and 23,500 feet long, and 400 feet of cast-in-place concrete pipe 20 feet in diameter.

Tunnel excavation	450,000 cubic yards
Portal excavation	1,500,000 cubic yards

Aqueduct from Delta Pumping Plant to Chrisman Road (Mi. 3 - Mi. 21)	Scheduled to be Advertised in January 1965

Location: From the Delta Pumping Plant to approximately 6-½ miles south of Tracy, California.

Work: This work includes excavation, embankment, and concrete lining for approximately 18 miles of canal and related structures, such as checks, overchutes, bridges and culverts.

Excavation	9,000,000 cubic yards
Compacted embankment	800,000 cubic yards
Concrete lining	180,000 cubic yards
Concrete for structures	17,000 cubic yards

Intake Channel from the Delta to Byron Road (Mi. 0 - Mile 2)	Scheduled to be Advertised in January 1965

Location: From the Delta area to west of Byron Road, Contra Costa County.

Work: This work includes excavation and embankment for approximately 2 miles of unlined canal and such related structures as bridges and culverts.

Excavation	2,900,000 cubic yards
Compacted embankment	340,000 cubic yards
Concrete for structures	5,300 cubic yards

Aqueduct from Avenal Gap to Lerdo Highway (Mi. 187 - Mi. 217)	Scheduled to be Advertised in March 1965

Location: In Kern County about 44 miles northwest of Bakersfield, California.

Work: The work includes excavation, embankment, and concrete lining and related structures, such as checks, overchutes, bridges, and culverts for 30 miles of canal.

Excavation	12,000,000 cubic yards
Compacted embankment	460,000 cubic yards
Concrete lining	290,000 cubic yards

Intake Channel at Buena Vista Pumping Plant	Scheduled to be Advertised in April 1965

Location: Approximately 24 miles southwest of Bakersfield, California.

Work: This work includes excavation for approximately 6,700 feet of unlined channel.

Excavation	7,000,000 cubic yards

Operations and Maintenance Facilities - Phase II	Scheduled to be Advertised in April 1965

Location: At the Delta Pumping Plant, approximately 4 miles northeast of Byron Hot Springs, Alameda County, California.

Work: Construct 2 rigid frame, tilt-up concrete slab, single story buildings, and administration building of 13,500 square feet of floor area and a maintenance building of 17,500 square feet of floor area.

Tehachapi Crossing - Tunnels 3 and 4 and Siphon 3	Scheduled to be Advertised in May 1965

Location: In Kern County approximately 7 miles northeast of Gorman.

Work: This work includes excavation and concrete lining of two tunnels, one 20 feet in diameter and 5,700 feet long, and the other 17 feet in diameter and 25,100 feet long, and 400 feet of cast-in-place concrete pipe 20 feet in diameter.

Tunnel excavation	500,000 cubic yards
Portal excavation	2,900,000 cubic yards

State of California

THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 132-64

THE CALIFORNIA STATE WATER PROJECT IN 1964

Appendix C

ANALYSIS OF THE STATE WATER PROJECT TRANSPORTATION FACILITIES

JUNE 1964

HUGO FISHER
Administrator
The Resources Agency of California

EDMUND G. BROWN
Governor
State of California

WILLIAM E. WARNE
Director
Department of Water Resources

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Introduction

Article 29 of the "Standard Provisions for Water Supply Contract", in describing the annual statements of charges, provides in part that:

> "- - - All such statements shall be accompanied by the latest revised copies of the document amendatory to Article 22 and of Tables B, C, D, E, F, and G of this contract, together with such other data and computations used by the State in determining the amounts of the above charges as the State deems appropriate."

Compliance with this article requires comprehensive annual review of the water supply aspects of the project as the basis for the substantiating data. This annual reanalysis is provided for in the standard provisions under Article 28 in regard to the project transportation facilities and under Article 22(f) for the project conservation facilities.

This appendix constitutes such an analysis for the purpose of substantiating estimated water charges in 1965. It reflects the general development of the State Water Project set forth in the main text of this report. The date of this analysis is about April 1, 1964, which allows a period of three months for compilation and computation of the data and transmittal thereof to the contractors by the July 1 deadline specified in Article 29 of the standard provisions. It must be recognized that this is an interim analysis and that to a certain extent it will be obsolete by the time payments are initiated under the statements which it substantiates.

Scope of Analysis

This analysis does not consider the project conservation facilities. In accordance with Article 22(f) of the standard provisions, the Delta Water Rate is fixed at $3.50 per acre-foot through December 31, 1969. Therefore, a document amendatory to Article 22 is not required until July 1, 1969. In any event, it is estimated that for the service defined in this report, deliveries supported by project conservation facilities will not be made prior to 1967. The Bureau Water Charge, which is a special charge, in lieu of the Delta Water Charge, prior to 1967, is estimated only for the following Bureau Water Year, pursuant to Article 29 of the appropriate water supply contracts. This special charge is substantiated in separate attachments to the statements of charges for the appropriate contractors.

This analysis does not cover the adjustment of overpayments or underpayments as described in Article 28 of the standard provisions for the nineteen contractors who have made, or are under obligation to make, payments in 1964. These adjustments must be determined individually for the contractors involved and consequently are set forth in separate attachments to the statements of charges for each individual contractor.

This analysis contains the following information concerning the project transportation facilities reflecting the status of project formulation as of about January 1, 1964:

1. The estimated size of each aqueduct reach and the proportionate use thereof by each water supply contractor;

2. The total actual and estimated annual expenditures for each aqueduct reach for each category of.cost;

3. An allocation of costs to each contractor; and

4. A compilation of annual repayment schedules with all annual values consistent with and calculated from the above data, and without regard to prior payments by contractors.

The basic tabular material contained in this analysis, and the inter-relationships among the various data contained thereon are schematically portrayed in Figure C-1. All tables are included at the end of this appendix.

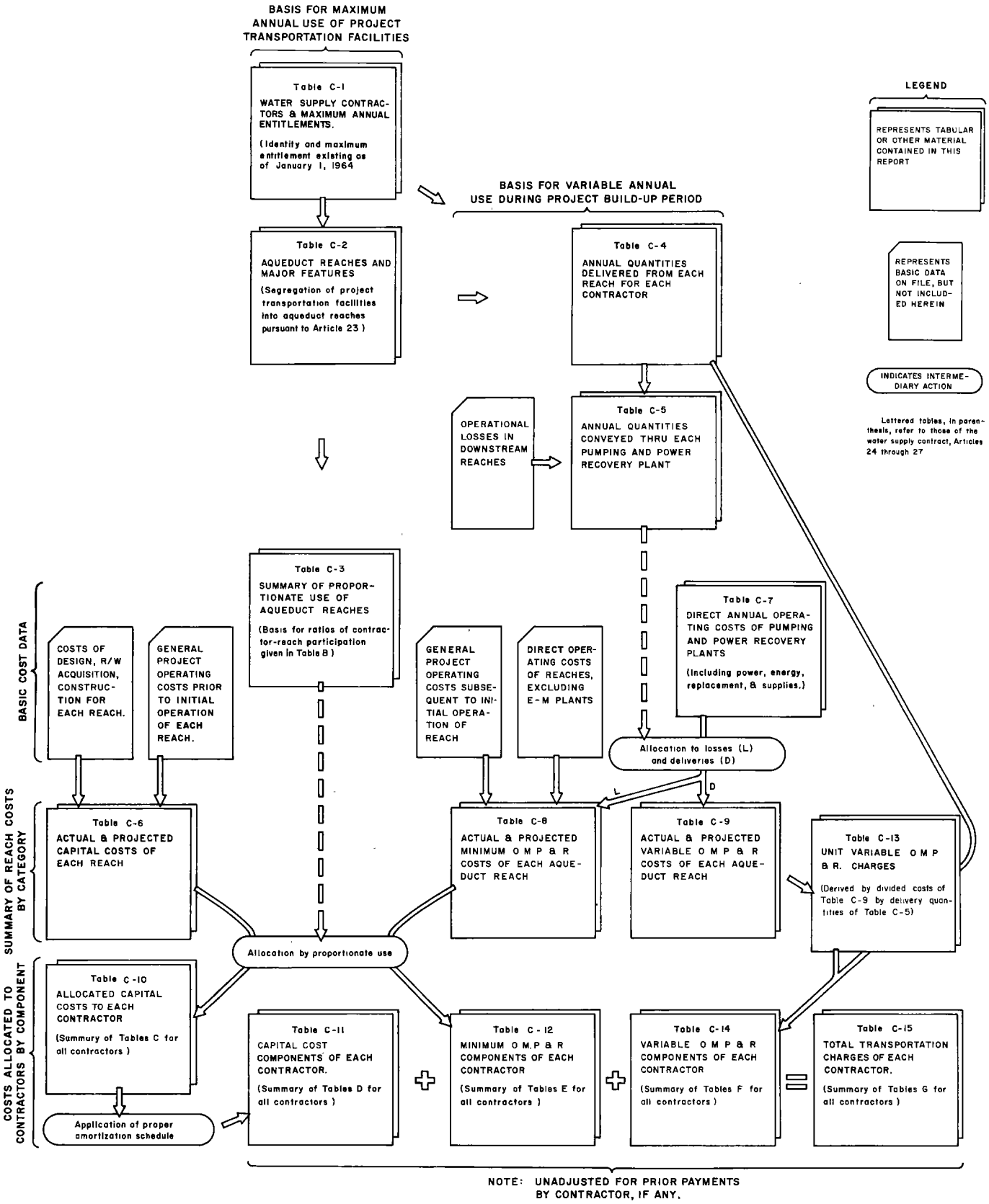
Basis for Maximum Annual Use of Facilities

Maximum Annual Entitlements

A summary of the maximum annual entitlements for each water supply contractor and the assumed distribution by service area of the portion of the minimum project yield remaining uncommitted as of January 1, 1964 is shown on Table C-1. The assumed eventual distribution of the presently uncommitted portion of the minimum project yield shown on Table C-1 is discussed in Chapter VI, "Entitlements to Project Water."

Figure C-1

SCHEMATIC RELATIONSHIP OF DATA SUBSTANTIATING STATEMENTS OF CHARGES



Aqueduct Reaches

The designation of aqueduct reaches for purposes of the cost allocations in this analysis are presented in Table C-2 and are located on the generalized plans and profiles of Plates 3 and 4. The differences between these reaches and those referred to in Article 23 of the various contracts, reflect modifications required under subsequently executed contracts and that most likely will be required under potential contract amendments. Reach nomenclature has been revised in certain instances to describe reach termini more accurately and to reflect route modifications under continuing engineering studies.

Reach termini have been selected as those points at which the physical use of project transportation facilities significantly changes for any of the contractors. These points are generally at (1) aqueduct branch turnouts or junctions, (2) aqueduct regulatory reservoirs, and (3) major delivery structures for contractors.

The locations and capacities of delivery structures are not specified in the originally executed contracts. Pursuant to Article 10(a) of the standard provisions, this information is to be based upon written requests by the contractors submitted within certain specified time limits. At the time that computations were initiated for this analysis, such requests had been made by all contractors located in the

South Bay and Central Coastal Areas, and by all but two of the contractors in Southern California. The location and capacities of delivery structures for the remaining contractors have been largely assumed for this analysis.

Plan of Operation

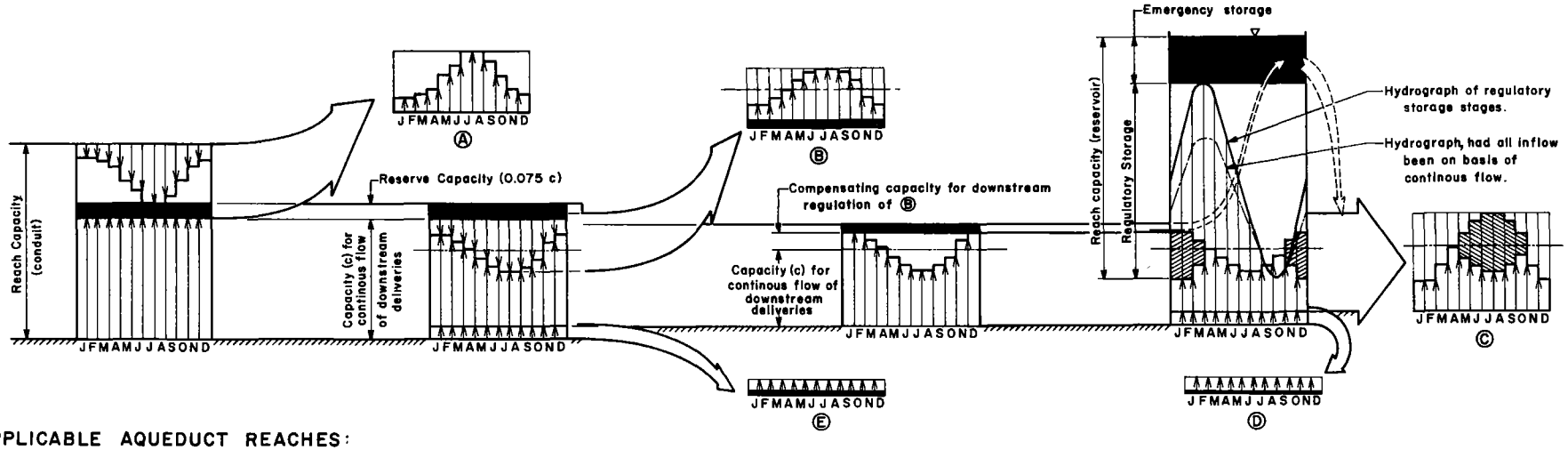
The basic plan of operation of the project transportation facilities is a vital prerequisite to any determination of proportionate use. Current plans for the operation of the project transportation facilities are discussed in Chapter VIII, "Plans for Project Operations and Maintenance." The final plan of operation is dependent upon and must follow in time the commitment of the entire minimum project yield. In this interim analysis, certain operational assumptions have been made which would provide the degree of service analyzed herein. These assumptions are schematically shown on Figure C-2.

Calculation of Reach Proportionate Use Ratios

The computations required to determine the proportionate use by each water supply contractor of each aqueduct reach of the project transportation facilities are summarized on Table C-3.

Table C-3 presents three main types of information:

1. Schematic diagrams showing the locations of the aqueduct reaches, turnouts from the reaches, and major aqueduct features included in the reach;



APPLICABLE AQUEDUCT REACHES:

REACHES OF THE CALIFORNIA AQUEDUCT THROUGH THE SAN JOAQUIN VALLEY AND NORTH BAY AQUEDUCT.	INTER-BASIN REACHES, SUCH AS THOSE IMMEDIATELY BELOW THE TEHACHAPI, SOUTH BAY,* & PYRAMID PUMPING PLANTS.	SUBSEQUENT REACHES ABOVE AQUEDUCT REGULATION RESERVOIRS.	REGULATION RESERVOIRS, SUCH AS CEDAR SPRINGS, CASTAIC, DEL VALLE* & PERRIS	SUBSEQUENT REACHES BELOW AQUEDUCT REGULATION RESERVOIRS.

TYPE OF DELIVERY	APPLICABLE CONTRACTORS
Ⓐ	ALL SAN JOAQUIN VALLEY & NORTH BAY AQUEDUCT CONTRACTORS
Ⓑ	ALAMEDA COUNTY F. C. & W. C. D. (a portion of)* ANTELOPE VALLEY-EAST KERN W. A. COACHELLA VALLEY COUNTY W. D. DESERT WATER AGENCY MOJAVE WATER AGENCY
Ⓒ	ALAMEDA COUNTY W. D.* ALAMEDA COUNTY F. C. & W. C. D. (a portion of)* CITY OF WEST COVINA CRESTLINE-LAKE ARROWHEAD W. A. SAN BERNARDINO VALLEY M. W. D. SANTA CLARA COUNTY F. C. & W. C. D.* THE METROPOLITAN W. D. OF S. C. UPPER SANTA CLARA VALLEY W. A. VENTURA COUNTY F. C. D.
Ⓓ	SAN GABRIEL VALLEY M. W. D.
Ⓔ	LITTLEROCK CREEK I. D. PALMDALE I. D. SAN GORGONIO PASS W. A. SAN LUIS OBISPO COUNTY F. C. & W. C. D. SANTA BARBARA COUNTY F. C. & W. C. D.

WATER QUANTITY LEGEND

- MAXIMUM ANNUAL ENTITLEMENT SHOWN BY APPROXIMATE MONTHLY DISTRIBUTION AS REACH CONVEYANCE OR AS TURNOUT DELIVERY.
- DELIVERY CAPABILITY OF RESERVE CAPACITY, TO REPLENISH EMERGENCY STORAGE IN THE AQUEDUCT, OR IN THE CONTRACTOR'S DISTRIBUTION SYSTEM.
- WATER QUANTITIES ENTERING REGULATORY STORAGE.
- WATER QUANTITIES RELEASED FROM REGULATORY STORAGE.

Note: Water quantities lost due to evaporation and seepage, and additional capacity to compensate for such losses, are not presented. However, their characteristics would correspond with delivery types Ⓐ, , and Ⓒ for the appropriate reaches.

* With the exception that reserve capacity and emergency storage are currently not considered for the reaches of the South Bay Aqueduct.

SCHEMATIC DIAGRAM OF OPERATIONAL CONSIDERATIONS ASSOCIATED WITH PROPORTIONATE USE

FIGURE C-2

2. Derivations of the total reach capacity and the maximum annual quantity of water conveyed from or through each reach including allowances for operational water losses; and

3. Allocations of (2) among the contractors utilizing the reach in terms of (a) the quantity and capacity related to each contractor, (b) separate proportionate use ratios on the bases of quantity and capacity, and (c) the average of quantity and capacity ratios.

Estimated operational losses within each aqueduct reach have been prorated among users of the reach. This has been done both with regard to the maximum annual quantity of the loss, and to the reach capacity required to compensate for the loss, in proportion to the respective quantities flowing out of the reach, and capacities associated therewith, for each contractor either through turnouts or as inflow to the next reach downstream. It has therefore been necessary to initiate the computations to account for losses at the farthest downstream reach in the aqueduct system and to proceed progressively upstream in order for the true gross requirements of each contractor for maximum water quantities and maximum aqueduct capacities to be reflected in any reach of the project transportation facilities.

Basis for Variable Annual Use of Facilities

Actual prior deliveries and future annual entitlements together with associated transportation losses, form the bases for the following computations: (1) definition of service during the project development period; (2) estimation of annual project operating costs; (3) allocation of operating costs among the minimum and variable operation, maintenance, power and replacement categories; and (4) allocation of costs under the variable category among contractors.

Annual entitlements for each agency are shown in Table A included in each water supply contract. Table 7 presents a summary of these values as modified by actual deliveries in prior years, together with the assumed build-up in demand for water currently uncommitted.

Annual Reach Deliveries for Each Contractor

It is necessary to project the annual deliveries at each major delivery structure in order to estimate charges under the variable operation, maintenance, power, and replacement components for future years of the project repayment period. These estimated charges are to be set forth in Tables F in compliance with Article 26(c). However, requests by the contractors for the annual quantities to be delivered through each turnout are not specifically required by the standard provisions. It has therefore been necessary for the department to assume the annual quantities to be desired at each location for those contractors served by more than one such structure.

Table C-4 presents the assumed annual deliveries to each present and assumed potential contractor from each aqueduct reach.

Annual Quantities Conveyed

Total quantities conveyed through each pumping and power recovery plant are required to estimate the direct annual operating costs of such facilities and to allocate such costs between the variable and minimum operation, maintenance, power and replacement categories. In addition, certain of these costs during the construction period are properly allocable to the capital cost category. It is therefore necessary to develop the total annual quantities of water passing through such plants for each aqueduct reach, and to determine the eventual disposition of this water. Table C-5 presents a summary of the annual quantities conveyed through each pumping or power recovery plant. These values include water in the following categories with respect to downstream aqueduct reaches:

1. Water available at delivery structures for contractors;
2. Water lost through evaporation or seepage; or
3. Water utilized for construction.

The water deliveries conveyed through each plant represent the cumulative values of Table C-4, proceeding upstream from the end of each aqueduct or branch aqueduct with allowances for operational losses.

Water quantities utilized for construction generally include those for the testing of aqueduct siphons and pumps and those required to bring the aqueduct and reservoir water surfaces to operational levels.

Reach Costs by Category

Chapter XI, "Project Costs," includes a discussion of the actual and projected costs of the Utility allocated to water transportation. Tables 19 and 20 present the total annual costs by aqueduct, incurred, or estimated to be incurred, for capital and annual operating requirements, respectively. This section describes the segregation of these costs into reaches for each aqueduct, and further divides the annual operating costs into the minimum and variable categories.

Capital Costs

The segregation of annual capital expenditures into aqueduct reaches is presented in Table C-6

Annual Operating Costs

As mentioned above, the annual operating costs of project transportation facilities are divided into two categories:

1. Minimum, including those items of cost which are incurred irrespective of the actual amount of water delivered during a particular year; and

2. Variable, including those items of costs which vary with, or are dependent upon, annual water deliveries.

The annual operating costs of pumping and power recovery plants constitute the major portion of the annual operating costs of the project transportation facilities and warrant special discussion. Furthermore, these particular costs are allocated annually between the minimum and variable categories. The costs directly associated with the pumping of, and power recovery from, the annual conveyance of water to compensate for operational losses in the downstream aqueduct reaches are considered of a minimum nature. Operational losses will be incurred regardless of the annual amount of deliveries at downstream contractor delivery structures. The costs directly associated with the pumping of, and power recovery from, the annual conveyance of water for delivery at contractor delivery structures are of course of a variable nature.

The direct operating costs associated with pumping and power recovery plants, exclusive of salaries of operating and maintenance personnel, are presented in Table C-7. These costs are annually allocated to the minimum and variable categories by the data contained in Table C-5.

Cost items included in the minimum category for this analysis are as follows:

1. Direct annual operating costs of pumping and power recovery plants, exclusive of salaries of operation and maintenance personnel, which are allocable to the conveyance of operational water losses in downstream reaches.

2. Salaries of operation and maintenance personnel associated with pumping and power recovery plants.

3. Direct annual operating costs of the remaining features of reaches of the project transportation facilities.

4. General project operation costs, allocated among reaches in proportion to the maximum annual values of (2) and (3) above.

The costs included in the minimum category are summarized in Table C-8 for each reach of those project transportation facilities analyzed herein.

The costs included in the variable operating cost category have been taken as the annual operating costs of pumping and power recovery plants exclusive of salaries of operation and maintenance personnel, as shown in Table C-7, which are allocable to the conveyance of water quantities eventually made available at downstream delivery structures of contractors. The results of this allocation are summarized in Table C-9 for each aqueduct reach.

Costs Allocated to Contractors

The accumulation by category, of the annual reach costs allocated to each contractor, forms the basis for the components of the Transportation Charge for the respective contractors.

Allocated Capital Costs

Table C-10 summarizes for each water supply contractor the total annual share of reach capital costs, presented in Table C-6, which are allocated by the average reach proportionate use of facilities ratios presented in Table C-3.

Capital Cost Component

Table C-11 presents the repayment schedule for each water supply contractor corresponding to the allocated capital costs of Table C-10.

The project interest rate as of April 1, 1964, is derived in Chapter XII, "Project Revenues," to be 3.508 percent per annum. The annual repayments in Table C-11 reflects the application of this rate throughout the project repayment period in lieu of the four percent per annum previously utilized.

Criteria for the types of repayment schedules used for each water supply contractor are summarized in the following tabulation:

Water supply contractor	Schedule type
Alameda County Flood Control and Water Conservation District, Zone 7	2
Alameda County Water District	1
Antelope Valley-East Kern Water Agency	1
Butte County	9
City of West Covina	4
City of Yuba City	9
Coachella Valley County Water District	4
Crestline-Lake Arrowhead Water Agency	4
Desert Water Agency	3
Devil's Den Water District	8
Dudley Ridge Water District	8
Empire West Side Irrigation District	8
Hacienda Water District	8
Kern County Water Agency:	
Agricultural Use	8
Municipal Use	6
Littlerock Creek Irrigation District	4
The Metropolitan Water District of Southern California	1
Mojave Water Agency	4
Napa County Flood Control and Water Conservation District	7
Palmdale Irrigation District	4
Plumas County Flood Control and Water Conservation District	9
San Bernardino Valley Municipal Water District	1
San Gabriel Valley Municipal Water District	3
San Gorgonio Pass Water Agency	3
San Luis Obispo County Flood Control and Water Conservation District	5
Santa Barbara County Flood Control and Water Conservation District	5
Santa Clara County Flood Control and Water Conservation District	1
Solano County Flood Control and Water Conservation District	7
Tulare Lake Basin Water Storage District	8
Upper Santa Clara Valley Water Agency	4
Ventura County Flood Control District	4

1. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1963.

2. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1963 and with principal payments on each annual capital cost prior to 1971 delayed until calendar year 1972, except payments for 1963.

3. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1963 but deferred and added to the 1964 payment with accrued interest.

4. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1964.

5. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1964, except that all principal and interest payments for costs of the "Coastal stub" are assumed deferred until 1976.

6. Repayment of allocated capital costs in 50 equal annual installments, with initial payment due in calendar year 1965.

7. Repayment of allocated capital costs in 50 equal annual installments, with initial payment assumed in 1966.

8. Repayment of allocated capital costs on the basis of equivalent unit rate applied to annual entitlements.

9. Payments on the Delta Water Charge only (Plumas County Flood Control and Water Conservation District may eventually be assessed a Transportation Charge).

Minimum Operation, Maintenance, Power and Replacement Components

Table C-12 summarizes for each water supply contractor the annual total share of reach minimum operating costs, presented in Table C-8, allocated by the average reach proportionate use of facilities ratios presented in Table C-3.

Variable Operation, Maintenance, Power and Replacement Components

Article 26(a) of the standard contract provisions indicates the manner in which the variable operating component is to be computed for each contractor. This is as follows:

1. An annual unit charge per acre-foot of deliveries from or through each reach is determined. This is to recover the estimated reach variable operation, maintenance, power, and replacement costs for each year.

2. The total charge to any contractor for a given reach is obtained by multiplying the unit charge associated with that reach by the quantity of water delivered from or through the reach to the contractor.

The annual unit charges referred to in (1) above are presented in Table C-13. Data in that table have been computed by dividing the annual reach costs in the variable category, shown in Table C-9, by the total annual quantities delivered from or through the reach as shown in Table C-5.

The unit charges presented in Table C-13 have been cumulated from the Delta through the particular pumping and power recovery plant listed in the headings of the table to facilitate their usage.

The annual total charge to each water supply contractor is obtained by multiplying the appropriate reach deliveries of Table C-4 by the unit charges of Table C-13. The resulting variable operating components are summarized in Table C-14.

Total Annual Transportation Charges

Table C-15 presents the estimated total annual Transportation Charges for the entire project repayment period for each water supply contractor. Table C-15 constitutes the sum of the values shown in Tables C-11, C-12, and C-14. These total charges are those calculated as of the date of this report and do not include adjustments for overpayments or underpayments by water supply contractors who have made, or are under obligation to make, payments during the current calendar year. As indicated in the introduction to this appendix, these adjustments will be set forth on separate attachments to the individual statements of charges for each contractor.

TABLE C-1

WATER SUPPLY CONTRACTORS AND MAXIMUM ANNUAL ENTITLEMENTS
AS OF JANUARY 1, 1964

Contractor	Maximum Annual Entitlement in Acre-Feet
FEATHER RIVER SERVICE AREA	
City of Yuba City	8,300
County of Butte	27,500
Plumas County Flood Control and Water Conservation District	2,700
Assumed election under Article 8	0
Area Total	38,500
NORTH BAY SERVICE AREA	
Napa County Flood Control and Water Conservation District	25,000
Solano County Flood Control and Water Conservation District	42,000
Assumed election under Article 8	6,000
Area Total	73,000
SOUTH BAY SERVICE AREA	
Alameda County Flood Control and Water Conservation District, Zone 7	46,000
Alameda County Water District	42,000
Santa Clara County Flood Control and Water Conservation District	100,000
Assumed election under Article 8	6,000
Area Total	194,000
SAN JOAQUIN VALLEY SERVICE AREA	
Devil's Den Water District	11,000
Dudley Ridge Water District	50,000
Empire West Side Irrigation District	3,000
Hacienda Water District	8,500
Kern County Water Agency	1,000,000
Tulare Lake Basin Water Storage District	110,000
Assumed election under Article 8	180,000
Area Total	1,362,500
CENTRAL COASTAL SERVICE AREA	
San Luis Obispo County Flood Control and Water Conservation District	25,000
Santa Barbara County Flood Control and Water Conservation District	50,000
Assumed election under Article 8	0
Area Total	75,000
SOUTHERN CALIFORNIA SERVICE AREA	
Antelope Valley-East Kern Water Agency	120,000
City of West Covina	10,000
Coachella Valley County Water District	20,000
Crestline-Lake Arrowhead Water Agency	5,000
Desert Water Agency	33,000
Littlerock Creek Irrigation District	2,000
Mojave Water Agency	44,000
Palmdale Irrigation District	15,000
San Bernardino Valley Municipal Water District	85,000
San Gabriel Valley Municipal Water District	25,000
San Gorgonio Pass Water Agency	15,000
The Metropolitan Water District of Southern California	1,500,000
Upper Santa Clara Valley Water Agency	23,000
Ventura County Flood Control District	20,000
Assumed election under Article 8	340,000
Area Total	2,257,000
GRAND TOTAL	4,000,000

TABLE C-2

PROJECT TRANSPORTATION FACILITIES
AQUEDUCT REACHES AND MAJOR FEATURES

REACH NO.	DESCRIPTION	CAPACITY	FEATURES
NORTH BAY AQUEDUCT			
1	Lindsey Slough to Suisun City	138 cfs	Intake Canal Fish Protective Facilities Calhoun Pumping Plant Aqueduct
2	Suisun City to Cordelia Pumping Plant	135 cfs	Aqueduct
3	Cordelia Pumping Plant to Napa Terminus	57 cfs	Cordelia Pumping Plant Aqueduct
SOUTH BAY AQUEDUCT			
1	Bethany Reservoir to Altamont Turnout	300 cfs	Interim Canal and Pumping Plant South Bay Pumping Plant Aqueduct
2	Altamont Turnout thru Patterson Reservoir	300 cfs	Aqueduct Patterson Reservoir
4	Patterson Reservoir to Del Valle Branch	300 cfs	Aqueduct
5	Del Valle Branch thru Del Valle Reservoir	120 cfs 74,000 AF	Del Valle Pumping Plant Del Valle Pipeline Del Valle Reservoir
6	Del Valle Branch to South Livermore Turnout	363 cfs	Aqueduct
7	South Livermore Turnout to Vallecitos Turnout	305 cfs	Aqueduct
8	Vallecitos Turnout to Alameda-Bayside Turnout	255 cfs	Aqueduct
9	Alameda-Bayside Turnout to Santa Clara Terminus	184 cfs	Aqueduct
CALIFORNIA AQUEDUCT			
1	Delta thru Bethany Reservoir	10,300 cfs	Intake Canal Fish Protective Facilities Delta Pumping Plant Aqueduct
2	Bethany Reservoir to San Luis Forebay	10,000 cfs	Aqueduct
-	San Luis Dam and Reservoir*	2,100,000 AF	San Luis Dam and Reservoir San Luis Pumping-Generating Plant
3	San Luis Forebay to Mile 18 Pumping Plant	13,100 cfs	San Luis Forebay and Dam Aqueduct
4	Mile 18 Pumping Plant to Panoche Creek	13,100 cfs	Aqueduct Mile 18 Pumping Plant
5	Panoche Creek to Five Points	11,800 cfs	Aqueduct
6	Five Points to Arroyo Pasajero	9,350 cfs	Aqueduct
7	Arroyo Pasajero to Kettleman City	8,350 cfs	Aqueduct
8	Kettleman City to Avenal Gap	7,344 cfs	Aqueduct
9	Avenal Gap to Twisselman Road	6,711 cfs	Aqueduct
10	Twisselman Road to Lost Hills	6,528 cfs	Aqueduct
11A	Lost Hills to Lerdo Highway	5,963 cfs	Aqueduct
12B	Lerdo Highway to Elk Hills Road	5,489 cfs	Aqueduct
12C	Elk Hills Road to Taft Highway	5,478 cfs	Aqueduct
13A	Taft Highway to Buena Vista Pumping Plant	4,876 cfs	Aqueduct
14A	Buena Vista Pumping Plant to Santiago Creek	4,338 cfs	Buena Vista Pumping Plant Aqueduct
14B	Santiago Creek to Old River Road	4,154 cfs	Aqueduct
14C	Old River Road to Wheeler Ridge Pumping Plant I	4,027 cfs	Aqueduct
15	Wheeler Ridge Pumping Plant I to Wheeler Ridge Pumping Plant II	3,722 cfs	Wheeler Ridge Pumping Plant I Aqueduct
16	Wheeler Ridge Pumping Plant II to Tehachapi Pumping Plant	3,720 cfs	Wheeler Ridge Pumping Plant II Aqueduct
17A	Tehachapi Pumping Plant to North Portal Tehachapi Tunnel No. 1	3,442 cfs	Tehachapi Pumping Plant Aqueduct
17B	North Portal Tehachapi Tunnel No. 1 to Cottonwood Power Development	3,433 cfs	Aqueduct
18A	Cottonwood Power Development	3,348 cfs	Cottonwood Powerplant
19	Cottonwood Power Development to West Branch Junction	3,348 cfs	Aqueduct

* Conservation Facility

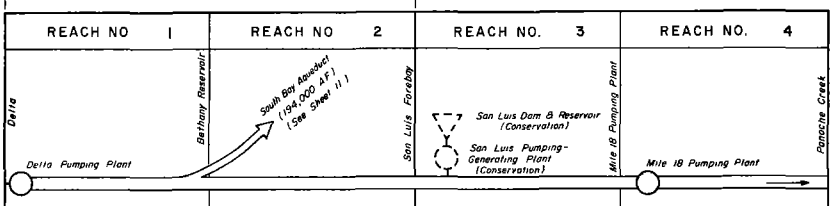
TABLE C-2 (Continued)

PROJECT TRANSPORTATION FACILITIES
AQUEDUCT REACHES AND MAJOR FEATURES

REACH NO.	DESCRIPTION	CAPACITY	FEATURES
CALIFORNIA AQUEDUCT (continued)			
East Branch			
20	West Branch Junction to Palmdale	1,842 cfs	Aqueduct
21	Palmdale to Littlerock Creek	1,810 cfs	Aqueduct
22A	Littlerock Creek to Pearblossom Pumping Plant	1,802 cfs	Aqueduct
22B	Pearblossom Pumping Plant to West Fork Mojave River	1,802 cfs	Aqueduct Pearblossom Pumping Plant
23	West Fork Mojave River to Cedar Springs Reservoir	1,768 cfs	Aqueduct
24	Cedar Springs Dam and Reservoir	200,000 AF	Cedar Springs Dam and Reservoir
25	Cedar Springs Reservoir to South Portal San Bernardino Tunnel	1,631 cfs	San Bernardino Tunnel
26	South Portal San Bernardino Tunnel thru Devil Canyon Powerplant No. 1	1,622 cfs	Aqueduct Devil Canyon Powerplant No. 1
27	Devil Canyon Powerplant No. 1 thru Devil Canyon Powerplant No. 2	1,622 cfs	Aqueduct Devil Canyon Powerplant No. 2
28A	Devil Canyon Powerplant No. 2 to Mill Avenue	998 cfs	Aqueduct
28B	Mill Avenue to Perris Reservoir	925 cfs	Aqueduct
28C	Perris Dam and Reservoir	100,000 AF	Perris Dam and Reservoir
West Branch			
29	West Branch Junction to Castaic Reservoir	1,501 cfs	West Branch Pumping Plant Ruby Powerplant Castaic Powerplant Aqueduct
30	Castaic Dam and Reservoir	350,000 AF	Castaic Dam and Reservoir
Coastal Division			
31	Avenal Gap thru Avenal Pumping Plant	329 cfs	Aqueduct Avenal Pumping Plant
32A	Avenal Pumping Plant to Pyramid Pumping Plant	328 cfs	Aqueduct
33A	Pyramid Pumping Plant thru San Luis Obispo Powerplant	115 cfs	Aqueduct Pyramid Pumping Plant Sawtooth Pumping Plant Polonio Pumping Plant San Luis Obispo Powerplant
34	San Luis Obispo Powerplant to Arroyo Grande	99 cfs	Aqueduct
35	Arroyo Grande to Santa Maria Terminus	91 cfs	Aqueduct

TABLE C-3

North San Joaquin Division — San Luis Division



REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 1 of 12
California Aqueduct

LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a-f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a-f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a-f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a-f, annually)	ASSOCIATED CAPACITY (second-feet)	
4,053,201.0	7,650.67620	4,024,701.0	7,603.76713	4,017,501.0	7,591.91641	4,008,001.0	7,576.28008	INFLOW TO DOWNSTREAM REACH
198,960.0	274.98574	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
-	-	-	-	-	-	-	-	CONTRACTOR TURNOUT
500.0	0.82299	28,500.0	46.90907	7,200.0	11.85072	9,500.0	15.63633	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
4,252,661.0	7,926.48493	4,053,201.0	7,650.67620	4,024,701.0	7,603.76713	4,017,501.0	7,591.91641	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

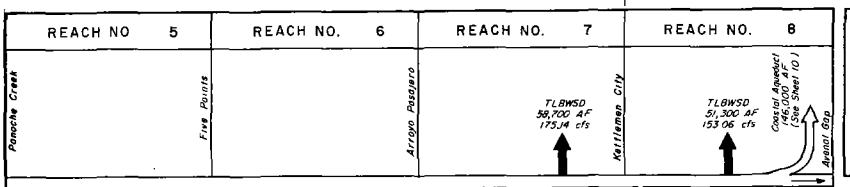
1,703,016.7 0.40045908 0.34978388	2,370.87737 0.29910829	1,702,822.0 0.42011783 0.36498358	2,370.55691 0.30984933	1,691,135.7 0.42018915 0.36471018	2,351.32206 0.30923120	1,688,183.2 0.42020729 0.36464054	2,346.46245 0.30907380	Metropolitan Water District of Southern California (MWD-SC)
393,663.8 0.09261585 0.08094470	549.09576 0.06927355	393,818.6 0.09716237 0.08446176	549.02136 0.07176116	391,112.0 0.09717790 0.08439794	544.56648 0.07161799	390,428.2 0.09718186 0.08438169	543.44099 0.07158153	Assumed Election Under Article 8 - Southern California (Option SC)
96,913.9 0.02278900 0.01990776	134.96044 0.01702652	96,902.8 0.02390772 0.02077283	134.94217 0.01763794	96,237.5 0.02391171 0.02075723	133.84713 0.01760274	96,069.4 0.02391273 0.02075325	133.57046 0.01759377	San Bernardino Valley Municipal Water District (SBVMWD)
28,504.2 0.00670268 0.00585525	39.69442 0.00500782	28,500.9 0.00703170 0.00610967	39.68899 0.00518764	28,305.2 0.00703287 0.00610508	39.36688 0.00517729	28,255.8 0.00703318 0.00610392	39.28557 0.00517466	San Gabriel Valley Municipal Water District (SGVMWD)
11,401.8 0.00268110 0.00234213	15.87798 0.00200316	11,400.5 0.00281272 0.00244390	15.87584 0.00207509	11,322.2 0.00281318 0.00244206	15.74696 0.00207094	11,302.4 0.00281329 0.00244159	15.71437 0.00206988	City of West Covina (WC)
5,700.9 0.00134055 0.00117106	7.93894 0.00100157	5,700.2 0.00140635 0.00122194	7.93779 0.00103753	5,661.1 0.00140659 0.00122103	7.87343 0.00103546	5,651.2 0.00140665 0.00122079	7.85714 0.00103494	Crestline - Lake Arrowhead Water Agency (C-LAWA)
49,793.6 0.01170881 0.01022614	69.30493 0.00874346	49,787.9 0.01228380 0.01067052	69.29555 0.00905744	49,446.3 0.01228571 0.01066254	68.73330 0.00903937	49,360.0 0.01228625 0.01066051	68.59126 0.00903478	Mojave Water Agency (MWA)
37,345.4 0.00878165 0.00766985	51.97902 0.00655764	37,341.1 0.00921274 0.00800293	51.97194 0.00679312	37,084.9 0.00921432 0.00799595	51.55025 0.00677957	37,020.2 0.00921473 0.00799543	51.44376 0.00677612	Desert Water Agency (DWA)
22,633.5 0.00532220 0.00464826	31.50233 0.00397431	22,630.9 0.00558346 0.00485025	31.49805 0.00411703	22,475.6 0.00558441 0.00484661	31.24244 0.00410881	22,436.4 0.00558467 0.00484570	31.17792 0.00410673	Coachella Valley County Water District (CVCWD)
16,975.1 0.00399164 0.00348619	23.62671 0.00298073	16,973.2 0.00418760 0.00363769	23.62358 0.00308778	16,856.7 0.00418831 0.00363496	23.43183 0.00308161	16,827.3 0.00418850 0.00363427	23.38344 0.00308004	San Gorgonio Pass Water Agency (SGPWA)
2,247.1 0.00052843 0.00046139	3.12604 0.00039438	2,246.6 0.00055433 0.00048143	3.12555 0.00040653	2,231.4 0.00055443 0.00048107	3.10020 0.00040772	2,227.5 0.00055445 0.00048098	3.09378 0.00040751	Littlerock Creek Irrigation District (LCID)
16,007.4 0.00395221 0.00345070	23.37674 0.00294919	16,805.5 0.00414623 0.00360067	23.37361 0.00305510	16,690.3 0.00414697 0.00359799	23.18400 0.00304901	16,661.2 0.00414715 0.00359731	23.13610 0.00304746	Palmdale Irrigation District (PID)
133,450.9 0.03138056 0.02739224	185.51080 0.02340352	133,435.6 0.03292104 0.02858269	185.48862 0.02424434	132,521.2 0.03292697 0.02855147	183.98058 0.02419598	132,290.2 0.03292848 0.02855607	183.60037 0.02418367	Antelope Valley - East Kern Water Agency (AVEKWA)
25,929.7 0.00609729 0.00532458	36.08035 0.00455127	25,926.7 0.00639660 0.00555596	36.07541 0.00471532	25,748.9 0.00639772 0.00555182	35.78276 0.00470593	25,704.0 0.00639801 0.00555077	35.70886 0.00470354	Upper Santa Clara Valley Water Agency (USCVWA)
22,547.9 0.00530207 0.00463014	31.37418 0.00395822	22,545.3 0.00556234 0.00483135	31.37050 0.00410036	22,390.6 0.00556330 0.00482773	31.11587 0.00409217	22,351.5 0.00556353 0.00482680	31.05151 0.00409008	Ventura County Flood Control District (VCFCD)
151,367.7 0.03564067 0.03520139	275.54139 0.03476212	151,549.2 0.03739000 0.03670066	275.91093 0.03601132	150,435.6 0.03737808 0.03668225	273.67802 0.03599242	150,154.3 0.03737505 0.03668134	273.21502 0.03598762	Kern County Water Agency (M&I) (KCWA - M&I)
877,616.2 0.20636672 0.26627650	2,585.49412 0.32618427	877,508.4 0.21649763 0.27720886	2,585.31729 0.33792010	871,059.8 0.21642845 0.27751868	2,574.70333 0.33860891	869,430.7 0.21641082 0.27759755	2,572.02193 0.33878428	Kern County Water Agency (AG) (KCWA - AG)
185,795.8 0.04368930 0.05632277	546.58062 0.06895624	185,773.0 0.04583365 0.05863544	546.54309 0.07143723	184,407.8 0.04581901 0.05870071	544.29507 0.07158242	184,062.9 0.04581527 0.05871733	543.72838 0.07161938	Assumed Election Under Article 8 - San Joaquin Valley (Option SJV)
51,082.3 0.01201184 0.01552839	150.95948 0.01904495	51,076.0 0.01260140 0.01615548	150.94911 0.01973017	50,700.7 0.01259738 0.01618401	150.33139 0.01977065	50,605.9 0.01259636 0.01618866	150.17535 0.01978095	Dudley Ridge Water District (DRWD)
112,249.3 0.02639507 0.03413330	331.89397 0.04187152	112,235.6 0.02769061 0.03553433	331.87142 0.04337805	111,410.8 0.02768176 0.03557444	330.51386 0.04346712	111,202.4 0.02767949 0.03558464	330.17085 0.04348979	Tulare Lake Basin Water Storage District (TLBWSD)
8,681.0 0.00204131 0.00263916	25.65819 0.00323702	8,679.9 0.00214149 0.00274749	25.65638 0.00335348	8,616.1 0.00214080 0.00275058	25.55137 0.00336036	8,600.0 0.00214063 0.00275137	25.52487 0.00336211	Hacienda Water District (HWD)
57,000.8 0.01340356 0.01171019	79.39610 0.01001681	56,994.3 0.01406155 0.01221904	79.38740 0.01037652	56,603.0 0.01406390 0.01220987	78.74335 0.01035583	56,504.2 0.01406451 0.01220755	78.58073 0.01035058	Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD)
28,159.8 0.00662169 0.00578301	39.19120 0.00494434	28,156.6 0.00694676 0.00603432	39.18593 0.00512189	27,963.4 0.00694794 0.00602981	38.86793 0.00511167	27,914.6 0.00694825 0.00602866	38.78760 0.00510907	San Luis Obispo County Flood Control and Water Conservation District (SLOCFC&WCD)
11,332.5 0.00266483 0.00343717	33.36662 0.00420931	11,331.2 0.00279562 0.00357829	33.36432 0.00436096	11,247.9 0.00279472 0.00358228	33.22721 0.00436983	11,226.9 0.00279450 0.00358330	33.19265 0.00437210	Devil's Den Water District (DDWD)
3,059.2 0.00071936 0.00093043	9.04812 0.00114131	3,058.8 0.00075466 0.00096862	9.04746 0.00118257	3,036.3 0.00075442 0.00096971	9.01043 0.00118500	3,030.6 0.00075435 0.00096998	9.00105 0.00118561	Empire West Side Irrigation District (EWSID)
102,788.1 0.02417030 0.02104695	142.07120 0.01792361							Santa Clara County Flood Control and Water Conservation District (SCCFC&WCD)
42,964.9 0.01010306 0.00879752	59.38502 0.00749197							Alameda County Water District (ACWD)
6,403.2 0.00150569 0.00131112	8.85035 0.00111655							Assumed Election Under Article 8 - South Bay (Option - SB)
46,828.2 0.01101151 0.00958823	64.71934 0.00816495							Alameda County Flood Control and Water Conservation District (ACFC&WCD)

TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 2 of 12
California Aqueduct

San Luis Division — South San Joaquin Division



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
3,993,101.0	7,551.75573	3,987,101.0	7,541.88013	3,917,001.0	7,343.96854	3,657,376.0	6,711.22696	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	155,125.0	328.71753	AQUEDUCT BRANCH TURNOUT
-	-	-	-	61,700.0	184.08576	98,700.0	294.47754	CONTRACTOR TURNOUT
14,900.0	24.52435	6,000.0	9.87560	8,400.0	13.82583	5,800.0	9.54641	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
4,008,001.0	7,576.28008	3,993,101.0	7,551.75573	3,987,101.0	7,541.88013	3,917,001.0	7,343.96854	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

1,684,288.0 0.42023143 0.36454849	2,340.05122 0.30886546	1,678,178.3 0.42026944 0.36440315	2,329.99508 0.30853687	1,675,717.7 0.42028474 0.36434431	2,325.94510 0.30840388	1,672,273.1 0.42692690 0.37143496	2,320.27553 0.31594301	Metropolitan Water District of Southern California (MWD-SC)
389,526.0 0.09718710 0.08436018	541.95603 0.01153326	388,111.0 0.09719539 0.08432628	539.62704 0.07145716	387,541.2 0.09719874 0.08431256	538.68919 0.07142638	386,743.5 0.09873459 0.08595353	537.37623 0.07317246	Assumed Election Under Article 8 - Southern California (Option SC)
95,847.6 0.02391407 0.02074798	133.20538 0.01758190	95,499.7 0.02391617 0.02073967	132.63276 0.01756317	95,339.7 0.02391705 0.02073633	132.40232 0.01755561	95,163.6 0.02429501 0.02113989	132.07955 0.01798476	San Bernardino Valley Municipal Water District (SBVMWD)
28,190.6 0.00703358 0.00610238	39.17826 0.00517117	28,088.3 0.00703421 0.00609994	39.00988 0.00516567	28,047.1 0.00703446 0.00609895	38.94207 0.00516344	27,989.4 0.00714562 0.00621764	38.84710 0.00528966	San Gabriel Valley Municipal Water District (SGVMWD)
11,276.3 0.00281345 0.00244097	15.67141 0.00206848	11,235.4 0.00281370 0.00243999	15.60409 0.00206629	11,218.9 0.00281380 0.00243960	15.57693 0.00206539	11,195.8 0.00285826 0.00248707	15.53851 0.00211587	City of West Covina (WC)
5,638.2 0.00140674 0.00122049	7.83574 0.00103425	5,617.7 0.00140685 0.00121999	7.80200 0.00103314	5,609.5 0.00140691 0.00121981	7.78850 0.00103270	5,598.0 0.00142915 0.00124355	7.76957 0.00105795	Crestline - Lake Arrowhead Water Agency (C-LAWA)
49,246.1 0.01228695 0.01065781	68.40379 0.00902868	49,067.5 0.01228807 0.01065357	68.10983 0.00901907	48,995.6 0.01228853 0.01065186	67.99149 0.00901519	48,694.9 0.01248274 0.01085915	67.82574 0.00923557	Mojave Water Agency (MWA)
36,934.8 0.00921927 0.00799341	51.30320 0.00677156	36,800.8 0.00921609 0.00799022	51.08265 0.00676434	36,746.9 0.00921645 0.00798894	50.99393 0.00676144	36,671.4 0.00936211 0.00814442	50.86966 0.00692673	Desert Water Agency (DWA)
22,384.6 0.00558498 0.00484446	31.09266 0.00410395	22,303.4 0.00558548 0.00484253	30.95901 0.00409958	22,270.7 0.00558569 0.00484175	30.90519 0.00409781	22,224.9 0.00567396 0.00493597	30.82961 0.00419798	Coachella Valley County Water District (CVCWD)
16,788.5 0.00418875 0.00363336	23.31958 0.00307797	16,727.6 0.00418913 0.00363191	23.21934 0.00307469	16,703.1 0.00418928 0.00363133	23.17901 0.00307337	16,668.8 0.00425550 0.00370200	23.12255 0.00314851	San Gorgonio Pass Water Agency (SGPWA)
2,222.4 0.00055449 0.00048087	3.08539 0.00040724	2,214.3 0.00055453 0.00048067	3.07206 0.00040680	2,211.1 0.00055456 0.00048060	3.06679 0.00040663	2,205.6 0.00056334 0.00048996	3.05938 0.00041658	Littlerock Creek Irrigation District (LCID)
16,622.8 0.00414740 0.00359641	23.07290 0.00304541	16,562.6 0.00414780 0.00359499	22.97381 0.00304218	16,538.3 0.00414795 0.00359441	22.93381 0.00304086	16,504.3 0.00421350 0.00366435	22.87785 0.00311519	Palmdale Irrigation District (PID)
131,985.4 0.03293048 0.02854892	183.09869 0.02416736	131,507.3 0.03293363 0.02853763	182.31177 0.02414164	131,314.8 0.03293491 0.02853307	181.99493 0.02413124	131,043.3 0.03345552 0.02908833	181.55135 0.02472115	Antelope Valley - East Kern Water Agency (AVEKWA)
25,644.7 0.00639838 0.00554937	35.61126 0.00470036	25,551.7 0.00639896 0.00554716	35.45819 0.00469536	25,514.3 0.00639921 0.00554628	35.39663 0.00469334	25,461.9 0.00650036 0.00565422	35.31038 0.00480808	Upper Santa Clara Valley Water Agency (USCVWA)
22,299.9 0.00556385 0.00482558	30.96658 0.00408731	22,219.0 0.00556435 0.00482365	30.83342 0.00408295	22,186.4 0.00556455 0.00482286	30.77976 0.00408118	22,140.8 0.00565249 0.00491672	30.70471 0.00418094	Ventura County Flood Control District (VCFCD)
149,783.1 0.03737102 0.03667614	272.60406 0.03598125	149,200.9 0.03736467 0.03666794	271.64581 0.03597121	148,966.5 0.03736211 0.03666463	271.26000 0.03596716	148,638.3 0.03794896 0.03740492	270.71982 0.03686268	Kern County Water Agency (M&I) (KCWA - M&I)
867,281.0 0.21638742 0.27770194	2,568.48368 0.33901646	863,909.7 0.21635098 0.27786661	2,562.93476 0.33938264	862,552.2 0.21633568 0.27793323	2,560.70042 0.33953078	860,651.6 0.21972208 0.28398843	2,557.57215 0.34825478	Kern County Water Agency (AG) (KCWA - AG)
183,607.8 0.04581032 0.05873932	542.97931 0.07166833	182,894.1 0.04580252 0.05877402	541.80461 0.07174552	182,606.7 0.04579937 0.05878805	541.33157 0.07177674	182,204.3 0.04651628 0.06006856	540.66924 0.07362085	Assumed Election Under Article 8 - San Joaquin Valley (Option SJV)
50,480.8 0.01259901 0.01619480	149.96944 0.01979460	50,284.6 0.01259287 0.01620450	149.64451 0.01981612	50,205.5 0.01259198 0.01620839	149.51632 0.01982481	50,094.9 0.01278910 0.01656169	149.33428 0.02033428	Dudley Ridge Water District (DRWD)
110,927.5 0.02767651 0.03559817	329.71839 0.04351983	110,496.3 0.02767180 0.03561949	329.00866 0.04356717	110,322.7 0.02766990 0.03562812	328.72293 0.04358634	51,379.6 0.0131707 0.01698805	153.18774 0.02085899	Tulare Lake Basin Water Storage District (TLBWSD)
8,578.7 0.00214039 0.00275241	25.48981 0.00336442	8,545.4 0.00214004 0.00275406	25.43500 0.00336809	8,532.0 0.00213990 0.00275474	25.41294 0.00336958	8,513.2 0.00217340 0.00281478	25.38200 0.00345617	Hacienda Water District (HWD)
56,373.8 0.01406532 0.01220446	78.36610 0.01034361	56,169.2 0.01406656 0.01219958	78.02934 0.01033261	56,086.8 0.01406706 0.01219761	77.89372 0.01032816	55,971.5 0.01428938 0.01243501	77.70394 0.01058065	Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD)
27,850.2 0.00694865 0.00602713	38.68160 0.00510562	27,749.3 0.00694931 0.00602476	38.51553 0.00510021	27,708.6 0.00694956 0.00602378	38.44854 0.00509800	27,651.7 0.00705941 0.00614102	38.35489 0.00522264	San Luis Obispo County Flood Control and Water Conservation District (SLOCFC&WCD)
11,199.1 0.00279416 0.00358464	33.14689 0.00437509	11,155.6 0.00279372 0.00358677	33.07529 0.00437981	11,138.1 0.00279353 0.00358763	33.04649 0.00438173	11,113.6 0.00283727 0.00366580	33.00616 0.00449432	Devil's Den Water District (DDWD)
3,023.1 0.00075426 0.00097035	8.98871 0.00118643	3,011.3 0.00075413 0.00097092	8.96929 0.00118771	3,006.6 0.00075408 0.00097116	8.96155 0.00118824			Empire West Side Irrigation District (EWSID)

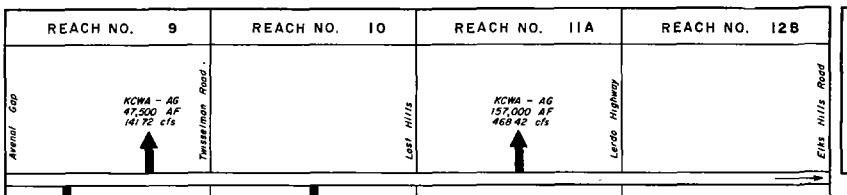
TABLE C-3

South San Joaquin Division

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 3 of 12
California Aqueduct

SCHEMATIC DIAGRAM



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

REACH WATER SUMMARY

REACH NO. 9 QUANTITY FROM OR THRU REACH (a - f, annually)	REACH NO. 9 ASSOCIATED CAPACITY (second-feet)	REACH NO. 10 QUANTITY FROM OR THRU REACH (a - f, annually)	REACH NO. 10 ASSOCIATED CAPACITY (second-feet)	REACH NO. 11A QUANTITY FROM OR THRU REACH (a - f, annually)	REACH NO. 11A ASSOCIATED CAPACITY (second-feet)	REACH NO. 12B QUANTITY FROM OR THRU REACH (a - f, annually)	REACH NO. 12B ASSOCIATED CAPACITY (second-feet)	
3,593,376.0	6,527.50221	3,401,676.0	5,963.04416	3,241,276.0	5,489.02883	3,234,276.0	5,477.50730	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
58,600.0	174.83672	186,100.0	555.24084	157,000.0	468.41919	-	-	CONTRACTOR TURNOUT
5,400.0	8.88803	5,600.0	9.21721	3,400.0	5.59614	7,000.0	11.52153	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
3,657,376.0	6,711.22696	3,593,376.0	6,527.50221	3,401,676.0	5,963.04416	3,241,276.0	5,489.02883	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

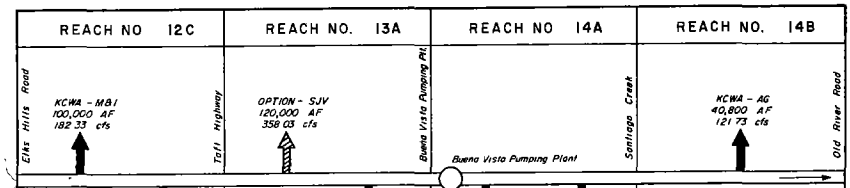
REACH NO. 9	REACH NO. 10	REACH NO. 11A	REACH NO. 12B	
1,669,855.8 0.45657209 2,316.29681 0.34513761 0.40085485	1,667,444.8 0.46403293 2,312.32847 0.35424400 0.40913847	1,664,901.8 0.48943574 2,308.14286 0.38707459 0.43825516	1,663,268.7 0.51315244 2,305.45489 0.42001144 0.46668194	Metropolitan Water District of Southern California (MWD-SC)
386,183.6 0.10559035 536.45467 0.07993392 0.09276213	385,625.2 0.10731557 535.53558 0.08204296 0.09467926	385,036.2 0.11319015 534.56613 0.08964651 0.10141833	384,658.0 0.11867487 533.94364 0.09727470 0.10797478	**Assumed Election Under Article 8 - Southern California (Option SC)**
95,025.9 0.02598199 131.85290 0.01964662 0.02281430	94,888.6 0.02640653 131.62691 0.02016497 0.02328575	94,743.9 0.02785212 131.38874 0.02203384 0.02494298	94,651.0 0.02920177 131.23583 0.02390875 0.02655526	San Bernardino Valley Municipal Water District (SBVMWD)
27,948.9 0.00764179 38.78044 0.00577844 0.00671012	27,908.5 0.00776665 38.71394 0.00593090 0.00684877	27,865.9 0.00819181 38.64382 0.00648055 0.00733619	27,838.6 0.00858878 38.59889 0.00703201 0.00781039	San Gabriel Valley Municipal Water District (SGVMWD)
11,179.6 0.00305673 15.51225 0.00231139 0.00268406	11,163.5 0.00310669 15.48575 0.00237238 0.00273954	11,146.5 0.00327677 15.45777 0.00259226 0.00293452	11,135.6 0.00343556 15.43983 0.00281285 0.00312421	City of West Covina (WC)
5,589.9 0.00152839 7.75624 0.00115571 0.00134205	5,581.8 0.00155336 7.74291 0.00118620 0.00136978	5,573.3 0.00163840 7.72892 0.00129614 0.00146727	5,567.8 0.00171778 7.71987 0.00140642 0.00156210	Crestline - Lake Arrowhead Water Agency (C-LAWA)
48,824.2 0.01334952 67.70937 0.01008897 0.01171924	48,753.7 0.01356766 67.59333 0.01035516 0.01196141	48,679.4 0.01431042 67.47104 0.01131486 0.01281264	48,631.7 0.01500388 67.39253 0.01227768 0.01364078	Mojave Water Agency (MWA)
36,618.4 0.01001220 50.78243 0.00756679 0.00878950	36,565.5 0.01017581 50.69536 0.00776643 0.00897112	36,509.7 0.01073286 50.60352 0.00848619 0.00960952	36,473.9 0.01125295 50.54460 0.00920830 0.01023062	Desert Water Agency (DWA)
22,192.8 0.00606796 30.77698 0.00458589 0.00532693	22,160.8 0.00616713 30.72431 0.00470690 0.00543701	22,127.0 0.00650473 30.66868 0.00514312 0.00582393	22,105.3 0.00681994 30.63296 0.00558076 0.00620035	Coachella Valley County Water District (CVCWD)
16,644.7 0.00455099 23.08288 0.00343944 0.00399522	16,620.7 0.00462537 23.04338 0.00353020 0.00407779	16,595.4 0.00487859 23.00174 0.00385738 0.00436799	16,579.1 0.00511499 22.97491 0.00418561 0.00465030	San Gorgonio Pass Water Agency (SGPWA)
2,203.4 0.00060245 3.05411 0.00045507 0.00052876	2,200.2 0.00061229 3.04884 0.00046708 0.00053968	2,196.8 0.00064580 3.04324 0.00051035 0.00057807	2,194.6 0.00067708 3.03962 0.00055376 0.00061542	Littlerock Creek Irrigation District (LCID)
16,480.5 0.00450610 22.83868 0.00340306 0.00395458	16,456.7 0.00457973 22.79951 0.00349284 0.00403629	16,431.6 0.00483044 22.75820 0.00381654 0.00432349	16,415.5 0.00506452 22.73170 0.00414130 0.00460291	Palmdale Irrigation District (PID)
130,856.1 0.03577868 181.23994 0.02700548 0.03139208	130,667.5 0.03636344 180.92952 0.02771803 0.03204073	130,468.5 0.03835418 180.60198 0.03028688 0.03432053	130,340.7 0.04021277 180.39163 0.03286403 0.03653840	Antelope Valley - East Kern Water Agency (AVEKWA)
45,425.1 0.00695173 35.24981 0.00525236 0.00610205	25,388.4 0.00706533 35.18940 0.00539094 0.00622814	25,349.7 0.00745212 35.12570 0.00587057 0.00667134	25,324.9 0.00781325 35.08488 0.00639182 0.00710254	Upper Santa Clara Valley Water Agency (USCVWA)
22,108.8 0.00604499 30.65204 0.00456728 0.00530613	22,076.9 0.00614378 30.59953 0.00468778 0.00541578	22,043.2 0.00648010 30.54406 0.00512223 0.00580116	22,021.6 0.00679411 30.50851 0.00555809 0.00617610	Ventura County Flood Control District (VCFCD)
148,407.9 0.04057770 270.34060 0.04028184 0.04042977	148,178.1 0.04123646 269.96237 0.04135768 0.04129707	147,935.8 0.04348909 269.56357 0.04520570 0.04434739	147,780.2 0.04559322 269.30748 0.04906286 0.04732804	Kern County Water Agency (M&I) (KCWA - M&I)
798,791.3 0.21840557 2,375.49654 0.35395861 0.28618209	750,054.8 0.20873262 2,231.74217 0.34189834 0.27531548	562,728.1 0.16542672 1,674.48227 0.28080997 0.22311835	405,136.3 0.12459284 1,205.08902 0.21954503 0.17226894	Kern County Water Agency (AG) (KCWA - AG)
181,921.9 0.04974110 540.20442 0.08049265 0.06511687	181,640.3 0.05054865 539.74093 0.08268721 0.06661793	181,343.2 0.05330996 539.25192 0.09043232 0.07187114	181,152.5 0.05588925 538.93804 0.09818459 0.07703692	**Assumed Election Under Article 8 - San Joaquin Valley (Option SJV)**
11,117.2 0.00303967 33.14585 0.00493887 0.00398927				Dudley Ridge Water District (DRWD)

TABLE C-3

South San Joaquin Division

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 4 of 12
California Aqueduct



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT
- ⇨ ASSUMED OPTION TURNOUT

SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
2,991,376.0	4,875.78325	2,809,776.0	4,338.24886	2,734,276.0	4,153.90767	2,690,276.0	4,026.91138	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
237,700.0	593.16522	178,400.0	532.26741	71,800.0	178.25124	40,800.0	121.72931	CONTRACTOR TURNOUT
5,200.0	8.55883	3,200.0	5.26698	3,700.0	5.08995	3,200.0	5.26698	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
3,234,276.0	5,477.50730	3,991,376.0	4,875.78325	2,809,776.0	4,338.24886	2,734,276.0	4,153.90767	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

1,659,735.2 0.51317055 0.46650184	2,299.63899 0.41983312	1,657,110.3 0.55396256 0.51236075	2,295.31859 0.47075895	1,655,358.9 0.58914266 0.55878345	2,292.43591 0.52842425	1,653,196.8 0.60461958 0.57781871	2,288.87724 0.55101784	Metropolitan Water District of Southern California (MWD-SC)
383,839.6 0.11867868 0.10795603	532.59661 0.09723339	383,231.7 0.12811218 0.11857000	531.59605 0.10902783	382,826.1 0.13624791 0.12931552	530.92846 0.12238313	382,325.4 0.13982692 0.13372137	530.10434 0.12761582	Assumed Election Under Article 8 - Southern California (Option SC)
94,449.8 0.02920276 0.02655067	130.90467 0.02389858	94,300.4 0.03152409 0.02916079	130.65877 0.02679749	94,200.7 0.03352605 0.03180304	130.49468 0.03008004	94,077.7 0.03440680 0.03288650	130.29223 0.03136618	San Bernardino Valley Municipal Water District (SBVMWD)
27,779.4 0.00858906 0.00780904	38.50145 0.00702901	27,735.5 0.00927182 0.00857673	38.42919 0.00788164	27,706.2 0.00986064 0.00935388	38.38096 0.00884711	27,670.0 0.01011968 0.00967253	38.32138 0.00922538	San Gabriel Valley Municipal Water District (SGVMWD)
11,111.9 0.00343567 0.00312366	15.40082 0.00281165	11,094.3 0.00370876 0.00343073	15.37185 0.00315269	11,082.6 0.00394430 0.00374160	15.35259 0.00353889	11,068.1 0.00404791 0.00386905	15.32872 0.00369019	City of West Covina (WC)
5,556.0 0.00171785 0.00156184	7.70045 0.00140583	5,547.2 0.00185440 0.00171538	7.68597 0.00157636	5,541.3 0.00197215 0.00187079	7.67626 0.00176944	5,534.1 0.00202397 0.00193454	7.66441 0.00184511	Crestline - Lake Arrowhead Water Agency (C-LAWA)
48,528.4 0.01500441 0.01363844	67.22251 0.01227246	48,451.7 0.01619713 0.01497913	67.09627 0.01376113	48,400.5 0.01722575 0.01633627	67.01200 0.01544679	48,337.3 0.01767828 0.01689276	66.90798 0.01610724	Mojave Water Agency (MWA)
36,396.4 0.01125334 0.01022886	50.41704 0.00920438	36,338.8 0.01214785 0.01123435	50.32223 0.01032085	36,300.4 0.01291932 0.01225221	50.25903 0.01158510	36,253.0 0.01325872 0.01256958	50.18101 0.01208043	Desert Water Agency (DWA)
22,058.3 0.00682017 0.00619927	30.55560 0.00557838	22,023.4 0.00736230 0.00680866	30.49816 0.00625503	22,000.1 0.00782984 0.00742553	30.45981 0.00702122	21,971.4 0.00803555 0.00767849	30.41257 0.00732144	Coachella Valley County Water District (CVCWD)
16,543.9 0.00511518 0.00464951	22.91697 0.00418383	16,517.7 0.00552177 0.00510655	22.87385 0.00469132	16,500.2 0.00587243 0.00556919	22.84505 0.00526596	16,478.7 0.00602671 0.00575892	22.80966 0.00549113	San Gorgonio Pass Water Agency (SGPWA)
2,189.9 0.00067709 0.00061530	3.03188 0.00055351	2,186.4 0.00073090 0.00067577	3.02612 0.00062064	2,184.1 0.00077732 0.00073700	3.02233 0.00069667	2,181.2 0.00079773 0.00076208	3.01756 0.00072644	Littlerock Creek Irrigation District (LCID)
16,380.7 0.00506472 0.00460213	22.67442 0.00413955	16,354.8 0.00546732 0.00505449	22.63179 0.00464167	16,337.5 0.00581452 0.00551238	22.60332 0.00521024	16,316.2 0.00596728 0.00570015	22.56826 0.00543302	Palmdale Irrigation District (PID)
130,064.2 0.04021432 0.03653220	179.93653 0.03285008	129,858.8 0.04341106 0.04012293	179.59846 0.03683479	129,721.8 0.04616802 0.04375744	179.37297 0.04134686	129,552.6 0.04738095 0.04524783	179.09448 0.04311470	Antelope Valley - East Kern Water Agency (AVEKWA)
25,271.1 0.00781353 0.00710131	34.99633 0.00638910	25,231.2 0.00843465 0.00779938	34.93066 0.00716411	25,204.5 0.00897029 0.00850597	34.88671 0.00804166	25,171.6 0.00920595 0.00879572	34.83256 0.00838549	Upper Santa Clara Valley Water Agency (USCVWA)
21,974.8 0.00679435 0.00617503	30.43148 0.00555572	21,940.1 0.00733445 0.00678205	30.37437 0.00622964	21,916.9 0.00780023 0.00739648	30.33618 0.00699272	21,888.3 0.00800516 0.00764844	30.28911 0.00729172	Ventura County Flood Control District (VCFCD)
147,443.5 0.04558779 0.04732634	268.75329 0.04906489	47,193.3 0.01577645 0.01670862	86.01270 0.01764080	47,139.8 0.01677707 0.01829168	85.92464 0.01980629	16,073.8 0.00587863 0.00646540	29.29409 0.00705218	Kern County Water Agency (M&I) (KCWA - M&I)
404,213.1 0.12497792 0.17235367	1,203.56949 0.21972942	265,827.3 0.08886455 0.12560942	791.60426 0.16235428	207,125.9 0.07371616 0.10795453	616.86817 0.14219289	166,035.7 0.06072383 0.08990358	494.66120 0.11908334	Kern County Water Agency (AG) (KCWA - AG)
180,739.8 0.05588261 0.07707486	538.25877 0.09826710	180,433.1 0.06031776 0.08530427	537.75396 0.11029078	60,228.5 0.02143534 0.03139304	179.38979 0.04135074	60,144.1 0.02199635 0.03257435	179.25087 0.04315235	Assumed Election Under Article 8 - San Joaquin Valley (Option SJV)

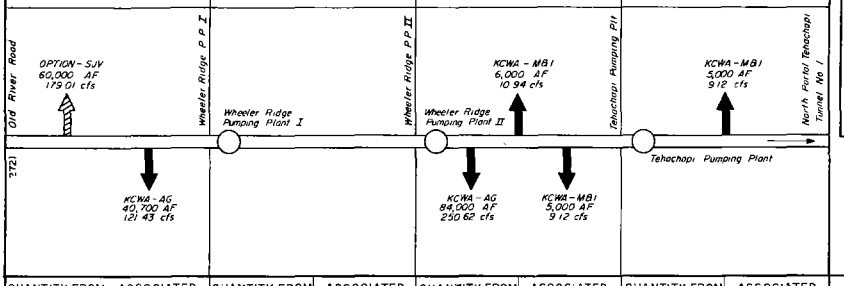
TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 5 of 12

California Aqueduct

South San Joaquin Division — Tehachapi Division



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT
- ⇨ ASSUMED OPTION TURNOUT

SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
2,586,676.0	3,721.69351	2,585,876.0	3,720.37678	2,485,376.0	3,442.29473	2,481,376.0	3,433.17829	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
100,700.0	300.44467	-	-	95,000.0	270.67536	5,000.0	9.11644	CONTRACTOR TURNOUT
2,900.0	4.77320	800.0	1.31673	4,500.0	7.40669	-	-	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
2,590,276.0	4,026.91138	2,586,676.0	3,721.69351	2,585,876.0	3,720.37678	2,486,376.0	3,442.29473	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

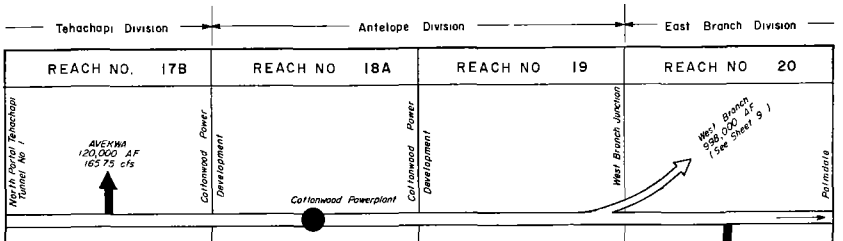
1,651,274.8 0.61379383 0.59070174	2,285,713.76	1,649,504.6 0.63769278 0.62553475	2,282.80013	1,648,996.1 0.63769342 0.62553113	2,281.98317	1,646,134.8 0.66206189 0.66186047	2,274.25367	Metropolitan Water District of Southern California (MWD-SC)
361,880.2 0.14194833 0.13670340	529.37157 0.13145846	381,470.2 0.14747506 0.14476658	528.69674 0.14205811	381,352.4 0.14747513 0.14476570	528.50285 0.14205627	380,589.8 0.15311031 0.15316281	527.41226 0.15321531	Assumed Election Under Article 8 - Southern California (Option SC)
93,968.3 0.03492287 0.03361976	130.11216 0.03231066	93,867.6 0.03628889 0.03560241	129.94641 0.03491594	93,838.7 0.03628894 0.03560222	129.89885 0.03491551	93,675.9 0.03767568 0.03766698	129.63089 0.03765828	San Bernardino Valley Municipal Water District (SBVMWD)
27,637.8 0.01027322 0.00988819	38.26838 0.00990316	27,608.2 0.01067323 0.01047133	38.21966 0.01026943	27,599.7 0.01067325 0.01047128	38.20567 0.01026930	27,551.8 0.01108111 0.01107855	38.12665 0.01107599	San Gabriel Valley Municipal Water District (SGVMWD)
11,055.2 0.00410932 0.00395531	15.30749 0.00380130	11,043.3 0.00426930 0.00418854	15.28790 0.00410778	11,039.9 0.00426931 0.00418852	15.28230 0.00410773	11,020.7 0.00443243 0.00443141	15.25070 0.00443039	City of West Covina (WC)
5,527.7 0.00205470 0.00197769	7.65388 0.00190068	5,521.8 0.00213471 0.00205423	7.64417 0.00205395	5,520.1 0.00213471 0.00205432	7.64137 0.00205392	5,510.5 0.00221628 0.00221577	7.62557 0.00221526	Crestline - Lake Arrowhead Water Agency (C-LAWA)
48,281.1 0.01794652 0.01726938	66.81548 0.01659224	48,229.4 0.01864532 0.01828772	66.73039 0.01793011	48,214.5 0.01864533 0.01828760	66.70587 0.01792987	48,130.9 0.01935785 0.01934810	66.56827 0.01933834	Mojave Water Agency (MWA)
36,210.9 0.01345992 0.01295206	50.11172 0.01244421	36,172.1 0.01398401 0.01371581	50.04786 0.01344760	36,160.9 0.01398400 0.01371571	50.02943 0.01344741	36,098.2 0.01451840 0.01451108	49.92623 0.01450376	Desert Water Agency (DWA)
21,945.9 0.00815749< 0.00784970	30.37060 0.00754191	21,922.4 0.00847512 0.00831258	30.33192 0.00815003	21,915.6 0.00847512 0.00831251	30.32073 0.00814991	21,877.6 0.00879899 0.00879455	30.25818 0.00879012	Coachella Valley County Water District (CVCWD)
16,459.5 0.00611814 0.00588730	22.77806 0.00565546	16,441.9 0.00635638 0.00623447	22.74909 0.00611266	16,436.8 0.00635637 0.00623442	22.74070 0.00611247	16,408.3 0.00659928 0.00659596	22.69379 0.00659263	San Gorgonio Pass Water Agency (SGPWA)
2,178.7 0.00080984 0.00077909	3.01345 0.00074833	2,176.4 0.00084139 0.00082503	3.00966 0.00080868	2,175.7 0.00084138 0.00082502	3.00851 0.00080866	2,171.9 0.00087352 0.00087284	3.00226 0.00087217	Littlerock Creek Irrigation District (LCID)
16,297.2 0.00605782 0.00582721	22.53699 0.00559659	16,279.7 0.00629368 0.00617076	22.50819 0.00604784	16,274.7 0.00629369 0.00617073	22.49995 0.00604775	16,246.5 0.00653421 0.00652852	22.45354 0.00652284	Palmdale Irrigation District (PID)
129,402.2 0.04809997 0.04625645	178.84693 0.04441293	129,263.7 0.04997290 0.04898345	178.61897 0.04799400	129,223.9 0.04997297 0.04898317	178.55346 0.04799338	129,000.0 0.05188274 0.05182308	178.18494 0.05176342	Antelope Valley - East Kern Water Agency (AVEKWA)
25,142.3 0.00934562 0.00899179	34.78433 0.00863797	25,115.4 0.00970953 0.00952200	34.74005 0.00933446	25,107.7 0.00970955 0.00952196	34.72738 0.00933437	25,064.2 0.01008062 0.01007413	34.65578 0.01006764	Upper Santa Clara Valley Water Agency (USCVWA)
21,862.9 0.00812664 0.00781896	30.24730 0.00751129	21,839.5 0.00844308 0.00828001	30.20679 0.00811695	21,832.8 0.00844310 0.00827998	30.19776 0.00811686	21,794.9 0.00876573 0.00876009	30.13538 0.00875445	Ventura County Flood Control District (VCFCD)
16,053.7 0.00596731 0.00661684	29.26101 0.00726837	16,035.2 0.00619915 0.00702663	29.23055 0.00785410	16,029.8 0.00619898 0.00702673	29.22166 0.00785449	5,000.0 0.00201096 0.00232956	9.11644 0.00264836	Kern County Water Agency (M&I) (KCWA - M&I)
123,028.5 0.04647423 0.06949972	372.59084 0.09252521	84,184.6 0.03254947 0.04998360	250.52303 0.06742173	84,156.7 0.03254475 0.04998900	250.87711 0.06742325			Kern County Water Agency (AG) (KCWA - AG)
60,069.1 0.02232823 0.03340541	179.12743 0.04448238							Assumed Election Under Article 8 - San Joaquin Valley (Option SJV)

TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 6 of 12
California Aqueduct

SCHEMATIC DIAGRAM



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
2,352,376.0	3,347.64335	2,352,376.0	3,347 64335	1,262,926.0	1,841 40969	1,239,201 0	1,809 21152	INFLOW TO DOWNSTREAM REACH
-	-	-	-	1,085,950 0	1,501.64657	-	-	AQUEDUCT BRANCH TURNOUT
120,000 0	165 75343	-	-	-	-	15,000 0	20 71918	CONTRACTOR TURNOUT
-	-	-	-	3,500 0	4.83449	7,600.0	10.49772	REACH EVAP & SEEPAGE LOSSES
-	-92.65000	-	0.00000	-	-0.61000	-	-1.36000	COMPENSATING REGULATION CAP
9,000 0	12 43151	-	-	-	0 36250	1,125 0	2 34127	CHANGE IN RESERVE CAPACITY
2,481,376 0	3,433 17829	2,352,376 0	3,347 64335	2,352 376 0	3,347 64335	1,262,926 0	1,841.40969	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

1,646,134.8 0.66339996 0.66335184	2,277.25367 0.66330772	1,646,134.8 0.69977538 0.69001557	2,277.25367 0.68025576	1,646,134.8 0.69977538 0.69001557	2,277.25367 0.68025576	604,525.5 0.47867036 0.46663634	837.10874 0.45460212	Metropolitan Water District of Southern California (MWD-SC)
380,689.8 0.15341883 0.15352049	527.41226 0.15362216	380,689.8 0.16183204 0.15968968	527.41226 0.15754733	380,689.8 0.16183204 0.15968968	527.41226 0.15754733	380,122.7 0.30098073 0.29350020	526.67019 0.28601467	Assumed Election Under Article 8 - Southern California (Option SC)
93,675.9 0.03775159 0.03775493	129.63089 0.03775828	93,675.9 0.03982182 0.03927243	129.63089 0.03872303	93,675.9 0.03982182 0.03927243	129.63089 0.03872303	93,536.5 0.07406333 0.07217970	129.44389 0.07029609	San Bernardino Valley Municipal Water District (SBVMWD)
27,551.8 0.01110344 0.01110442	38.12683 0.01110540	27,551.8 0.01171233 0.01155074	38.12683 0.01138916	27,551.8 0.01171233 0.01155074	38.12683 0.01138916	27,510.8 0.02178338 0.02123050	38.07595 0.02067761	San Gabriel Valley Municipal Water District (SGVMWD)
11,020.7 0.00444137 0.00444176	15.25070 0.00444215	11,020.7 0.00468492 0.00462029	15.25070 0.00455565	11,020.7 0.00468492 0.00462029	15.25070 0.00455565	11,004.3 0.00871334 0.00849110	15.22635 0.00826886	City of West Covina (WC)
5,510.5 0.00222074 0.00222094	7.62557 0.00222114	5,510.5 0.00234253 0.00231021	7.62557 0.00227789	5,510.5 0.00234253 0.00231021	7.62557 0.00227789	5,502.3 0.00435679 0.00424567	7.61339 0.00413454	Crestline - Lake Arrowhead Water Agency (C-LAWA)
48,130.9 0.01939886 0.01939328	66.56827 0.01938969	48,130.9 0.02046055 0.02017283	66.56827 0.01988511	48,130.9 0.02046055 0.02017283	66.56827 0.01988511	48,059.3 0.03805393 0.03707617	66.47195 0.03609840	Mojave Water Agency (MWA)
36,098.2 0.01454765 0.01454497	49.92623 0.01454228	36,098.2 0.01534542 0.01512963	49.92623 0.01491384	36,098.2 0.01534542 0.01512963	49.92623 0.01491384	36,044.5 0.02854047 0.02780782	49.85649 0.02707518	Desert Water Agency (DWA)
21,877.6 0.00881672 0.00881509	30.25818 0.00881346	21,877.6 0.00930021 0.00916943	30.25818 0.00903865	21,877.6 0.00930021 0.00916943	30.25818 0.00903865	21,845.1 0.01729721 0.01685425	30.21992 0.01641130	Coachella Valley County Water District (CVCWD)
16,408.3 0.00661258 0.00661136	22.69379 0.00661014	16,408.3 0.00697520 0.00687712	22.69379 0.00677903	16,408.3 0.00697520 0.00687712	22.69379 0.00677903	16,383.9 0.01297297 0.01263872	22.65756 0.01230446	San Gorgonio Pass Water Agency (SGPWA)
2,171.9 0.00087528 0.00087488	3.00226 0.00087449	2,171.9 0.00092328 0.00091006	3.00226 0.00089683	2,171.9 0.00092328 0.00091006	3.00226 0.00089683	2,168.7 0.00171720 0.00167252	2.99751 0.00162783	Littlerock Creek Irrigation District (LCID)
16,246.5 0.00654738 0.00654377	22.45354 0.00654016	16,246.5 0.00690642 0.00680684	22.45354 0.00670727	16,246.5 0.00690642 0.00680684	22.45354 0.00670727	16,222.4 0.01284509 0.01250966	22.41775 0.01217423	Palmdale Irrigation District (PID)
129,000.0 0.05198728 0.05194408	178.18494 0.05190087	0.0 0.00000000 0.01383809	92.65000 0.02767619	0.0 0.00000000 0.01383809	92.65000 0.02767619	0.0 0.00000000 0.02515735	92.65000 0.05031471	Antelope Valley - East Kern Water Agency (AVEKWA)
25,064.2 0.01010093 0.01009765	34.65578 0.01009437	25,064.2 0.01065484 0.01050357	34.65578 0.01035229	25,064.2 0.01065484 0.01050357	34.65578 0.01035229			Upper Santa Clara Valley Water Agency (USCVWA)
21,794.9 0.00878339 0.00878054	30.13538 0.00877769	21,794.9 0.00926506 0.00913351	30.13538 0.00900197	21,794.9 0.00926506 0.00913351	30.13538 0.00900197			Ventura County Flood Control District (VCFCD)

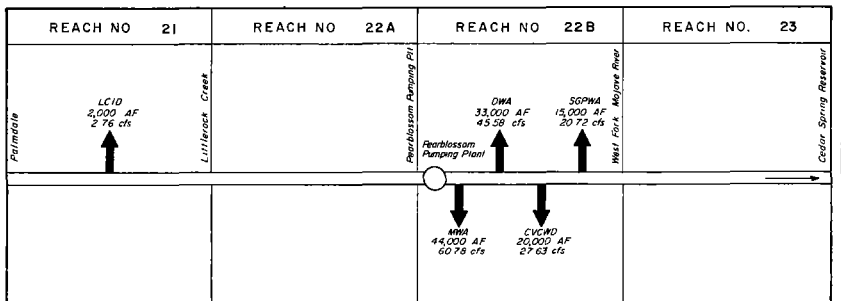
TABLE C-3

East Branch Division

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 7 of 12
California Aqueduct

SCHEMATIC DIAGRAM



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
1,233,751 0	1,801.92167	1,233,351.0	1,801.38772	1,104,451.0	1,768.00035	1,104,451 0	1,488 06139	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
2,000 0	2 76256	-	-	112,000.0	154 70320	-	-	CONTRACTOR TURNOUT
3 300 0	4 55823	400.0	0.55251	8,500.0	11.74087	-	-	REACH EVAP & SEEPAGE LOSSES
-	-0 58000	-	-0.06000	-	-145 54000	-	240 50000	COMPENSATING REGULATION CAP
150.0	0 54905	-	0.04144	8,400 0	12 48330	-	39 43896	CHANGE IN RESERVE CAPACITY
1,239,201 0	1,809 21152	1,233,751 0	1,801.92167	1,233,351 0	1,801 38772	1,104,451 0	1,768.00035	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

600,887.5 0.48449914 0.47247982	832.34677 0.46006051	599,287.3 0.48574413 0.47325130	830.25667 0.46075847	599,093.0 0.48574412 0.47329061	830.00216 0.46075709	594,964.1 0.53869669 0.50255001	824.60126 0.46640334	Metropolitan Water District of Southern California (MWD-SC)
377,033.8 0.30490114 0.29717700	523.68146 0.28945287	376,827.1 0.30543205 0.29766313	522.36664 0.28989420	376,704.8 0.30543195 0.29766118	522.20504 0.28989042	374,107.4 0.33872702 0.31608527	518.80623 0.29344351	Assumed Election Under Article 8 - Southern California (Option SC)
92,974.0 0.07502738 0.07308682	128.71864 0.07114526	92,726.6 0.07515828 0.07320535	128.39128 0.07125242	92,696.6 0.07515833 0.07320357	128.34673 0.07124881	92,058.0 0.08339182 0.07773600	127.50850 0.07212018	San Bernardino Valley Municipal Water District (SBVMWD)
27,345.3 0.02206688 0.02149662	37.86020 0.02092635	27,272.5 0.02210535 0.02153096	37.76210 0.02095657	27,263.7 0.02210539 0.02153048	37.74903 0.02095555	27,079.9 0.02451528 0.02286286	37.50017 0.02121050	San Gabriel Valley Municipal Water District (SGVMWD)
10,938.1 0.00882674 0.00859697	15.13805 0.00836721	10,909.0 0.00884214 0.00861238	15.10484 0.00838263	10,905.5 0.00884217 0.00861220	15.09964 0.00838223	10,830.4 0.00980614 0.00914462	14.99813 0.00848310	City of West Covina (WC)
5,469.2 0.00441349 0.00429999	7.57424 0.00418649	5,454.6 0.00442115 0.00430627	7.55256 0.00419139	5,452.8 0.00442113 0.00430614	7.54989 0.00419115	5,415.2 0.00490307 0.00457372	7.50405 0.00424438	Crestline - Lake Arrowhead Water Agency (C-LAWA)
47,770.4 0.03854935 0.03754036	66.09297 0.03653137	47,643.3 0.03861662 0.03760107	65.92424 0.03658552	47,627.9 0.03861666 0.03760016	65.90137 0.03658367	0.0 0.00000000 0.01851810	65.46000 0.03703819	Mojave Water Agency (MWA)
35,827.8 0.02891202 0.02815665	49.57472 0.02740128	35,732.5 0.02896249 0.02820360	49.45321 0.02744471	35,720.9 0.02896248 0.02820288	49.43599 0.02744328	0.0 0.00000000 0.01388857	49.11000 0.02777714	Desert Water Agency (DWA)
21,713.8 0.01752242 0.01706454	30.04496 0.01660868	21,636.0 0.01755298 0.01709237	29.96913 0.01663176	21,649.0 0.01755299 0.01709196	29.95874 0.01663092	0.0 0.00000000 0.00841912	29.77000 0.01683823	Coachella Valley County Water District (CVCWD)
16,285.4 0.01314185 0.01279776	22.53130 0.01245366	16,242.1 0.01316481 0.01281936	22.47700 0.01247390	16,236.8 0.01316478 0.01281901	22.46913 0.01247323	0.0 0.00000000 0.00001414	0.03000 0.00002828	San Gorgonio Pass Water Agency (SGPWA)
2,155.7 0.00173959 0.00169286	2.9782 0.00164614							Littlerock Creek Irrigation District (LCID)
0.0 0.00000000 0.00000553	0.02000 0.00001105	0.0 0.00000000 0.00000555	0.02000 0.00001110	0.0 0.00000000 0.00000555	0.02000 0.00001110	0.0 0.00000000 0.00000563	0.02000 0.00001131	Palmdale Irrigation District (PID)
0.0 0.00000000 0.02560508	92.65000 0.05121015	0.0 0.00000000 0.02570866	92.65000 0.05141733	0.0 0.00000000 0.02571628	92.65000 0.05143297	0.0 0.00000000 0.02620192	92.65000 0.05240384	Antelope Valley - East Kern Water Agency (AVEKW4)

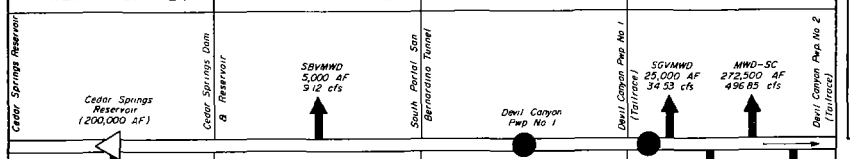
TABLE C-3

East Branch Division

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 8 of 12
California Aqueduct

SCHEMATIC DIAGRAM



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (acre feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
1,053,313 0	-	1,058,313.0	1,621 48292	1,058,313.0	1,621.48292	708,938.0	998.00830	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
5,000 0	173.4051/	5,000 0	9 11644	-	-	347,500 0	620 88472	CONTRACTOR TURNOUT
8,200 0	3,5952/	-	-	-	-	-	-	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
27,938.0	-	-	-	-	-	1,875.0	2.58990	CHANGE IN RESERVE CAPACITY
1 104,451 0	177,000	1,063,313 0	1,630.59936	1,058,313.0	1,621 48292	1,058,313.0	1,621.48292	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (acre feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
594,954.1 0.53869669 0.53155061	92,855 0.52460452	570,109.4 0.53618329 0.54663279	908,41064 0.55710229	570,109.4 0.53869640 0.54946544	908,41064 0.56023448	570,109.4 0.53869640 0.54946544	908,41064 0.56023448	Metropolitan Water District of Southern California (MWD-SC)
374,107.4 0.33872702 0.24739176	27,522 0.15605650	371,328.6 0.34921853 0.33227040	513,51206 0.31492228	371,328.6 0.33086841 0.33378063	513,51206 0.31669286	371,328.6 0.33086841 0.33378063	513,51206 0.31669286	Assumed Election Under Article 8 - Southern California (Option SC)
92,050.0 0.08335182 0.12326066	28,301 0.16316949	85,000.0 0.07993885 0.08749165	154,97946 0.09504447	80,000.0 0.07559200 0.08277428	145,86302 0.08995656	80,000.0 0.07559200 0.08277428	145,86302 0.08995656	San Bernardino Valley Municipal Water District (SBVMWD)
27,075.9 0.02451326 0.01232543	0.024 0.00013559	26,879.0 0.02527478 0.02402028	37,12186 0.02276578	26,875.0 0.02539419 0.02414398	37,12186 0.02289377	26,875.0 0.02539419 0.02414398	37,12186 0.02289377	San Gabriel Valley Municipal Water District (SGVMWD)
10,830.4 0.00980614 0.00951606	1,533 0.00922549	10,000.0 0.00940457 0.00978488	16,57534 0.01016516	10,000.0 0.00944900 0.00983567	16,57534 0.01022233	10,000.0 0.00944900 0.00983567	16,57534 0.01022233	City of West Covina (WC)
5,415.2 0.00490307 0.00644871	1,415 0.00799435							Crestline - Lake Arrowhead Water Agency (C-LAWA)
0.0 0.00000000 0.0412712	5,001 0.02825424							Mojave Water Agency (MWA)
0.0 0.00000000 0.01059322	3,750 0.02118644							Desert Water Agency (DWA)
0.0 0.00000000 0.00642090	2,273 0.01284181							Coachella Valley County Water District (CVCWD)
0.0 0.00000000 0.00003955	14 0.00007909							San Gorgonio Pass Water Agency (SGPWA)
0.0 0.00000000 0.00000282	1 0.00000565							Littlerock Creek Irrigation District (LCID)
0.0 0.00000000 0.00001695	6 0.00003390							Palmdale Irrigation District (PID)
0.0 0.00000000 0.03820621	13,525 0.07641243							Antelope Valley - East Kern Water Agency (AVEKWA)

1/ Regulatory and Emergency storage capacity in acre feet

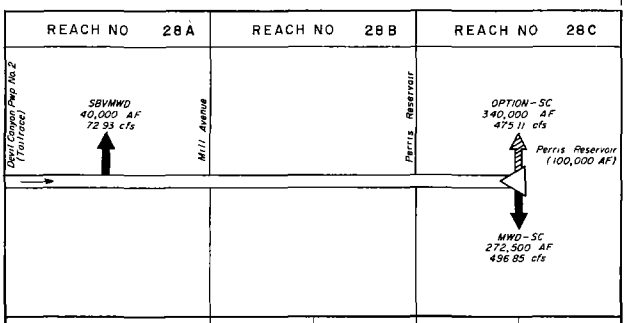
2/ Capacity in acre feet required to regulate losses

TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 9 of 12
California Aqueduct

East Branch Division



SCHEMATIC DIAGRAM

LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT
- ⇨ ASSUMED OPTION TURNOUT

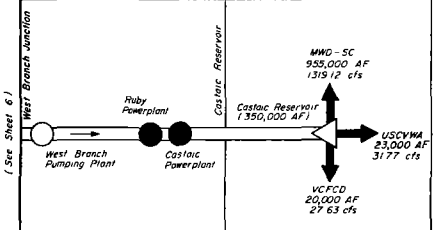
REACH WATER SUMMARY

	REACH NO 28A		REACH NO 28B		REACH NO 28C	
	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (acre feet)
INFLOW TO DOWNSTREAM REACH	668,938 0	925 07679	668,938 0	860.53655	-	-
AQUEDUCT BRANCH TURNOUT	-	-	-	-	-	-
CONTRACTOR TURNOUT	40,000 0	72 93151	-	-	612,500 0	95,787 1/
REACH EVAP & SEEPAGE LOSSES	-	-	-	-	10,500.0	3,213 2/
COMPENSATING REGULATION CAP	-	-	-	-	-	-
CHANGE IN RESERVE CAPACITY	-	-	-	64 54024	45,938.0	-
TOTAL, INFLOW FROM UPSTREAM REACH	708,938 0	998 00830	668,938.0	925.07679	668,938 0	99,000

REACH PARTICIPATION BY CONTRACTORS

Metropolitan Water District of Southern California (MWD-SC)	297,609.4 0.41979609 0.41609108	411.56473 0.41238608	297,609.4 0.44489833 0.44489812	411.56473 0.44489191	297,609.4 0.44489833 0.69660068	93.882 0.94830303
Assumed Election Under Article 8 - Southern California (Option SC)	371,328.6 0.52378149 0.51915918	513.51206 0.51453686	371,328.6 0.55510167 0.55510188	513.51206 0.55510209	371,328.6 0.55510167 0.30339932	5.118 0.05169697
San Bernardino Valley Municipal Water District (SBVMWD)	40,000.0 0.05642242 0.0647474	72.93151 0.07307706				

West Branch Division



SCHEMATIC DIAGRAM

REACH WATER SUMMARY

	REACH NO 29		REACH NO 30	
	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (acre feet)
INFLOW TO DOWNSTREAM REACH	1,085,950 0	1,396 61077	-	-
AQUEDUCT BRANCH TURNOUT	-	-	-	-
CONTRACTOR TURNOUT	-	-	998,000 0	331,910 1/
REACH EVAP & SEEPAGE LOSSES	-	-	13,100 0	4,090 2/
COMPENSATING REGULATION CAP	-	0.29000	-	-
CHANGE IN RESERVE CAPACITY	-	104.74580	74,850.0	-
TOTAL, INFLOW FROM UPSTREAM REACH	1,085,950.0	1,501 64657	1,085,950.0	335,000

REACH PARTICIPATION BY CONTRACTORS

Metropolitan Water District of Southern California (MWD-SC)	1,039,160.6 0.95691385 0.95691136	1,436.93891 0.95690886	1,039,160.6 0.95691385 0.96040618	322.906 0.96389851
Upper Santa Clara Valley Water Agency (USCVWA)	25,026.9 0.02304609 0.02304719	34.61039 0.02304829	25,026.9 0.02304609 0.02117827	6.469 0.01931045
Ventura County Flood Control District (VCFCD)	21,762.5 0.02004006 0.02004145	30.09727 0.02004285	21,762.5 0.02004006 0.01841555	5.625 0.01679104

1/ Regulatory and Emergency storage capacity in acre feet

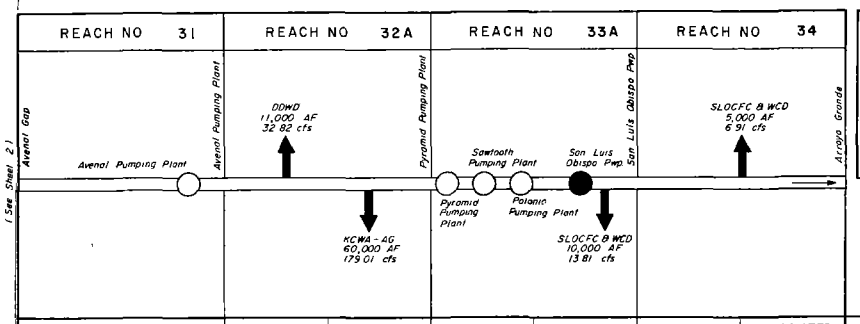
2/ Capacity in acre feet required to regulate losses

TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 10 of 12
California Aqueduct

Coastal Division



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT

SCHEMATIC DIAGRAM

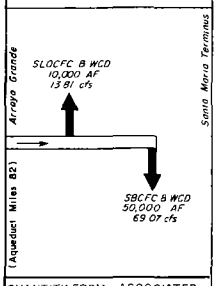
REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
154,925 0	328 38845	82,825 0	114 74505	71,375.0	98.74416	65,500 0	90.57734	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
-	-	71,000 0	211.83288	10,000.0	13.81279	5,000.0	6.90640	CONTRACTOR TURNOUT
200 0	0 32918	1,100 0	1 81052	700.0	1 15215	500 0	0 69064	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	750.0	1.03595	375.0	0.56978	CHANGE IN RESERVE CAPACITY
155,125.0	328 71763	154,925.0	328 38845	82,825.0	114.74505	71,375.0	98.74416	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

60,526.3 0.39017760 0.46869741	179.67995 0.54721723	60,445.3 0.39015847 0.46875912	179.74663 0.54735978					Kern County Water Agency (AO) (KCWA - AO)
55,890.6 0.36029396 0.29813697	77.57078 0.23597998	55,820.9 0.36030918 0.29808818	77.45606 0.23586719	55,437.1 0.66932810 0.66942511	76.82435 0.66952213	54,968.4 0.77013520 0.77016835	76.05290 0.77020150	Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD)
27,611.7 0.17799645 0.14723826	38.28905 0.11648006	27,577.2 0.17800355 0.14721374	38.23227 0.11642392	27,387.9 0.33067190 0.33057489	37.92070 0.33047787	16,406.6 0.22986480 0.22983165	22.69126 0.22979850	San Luis Obispo County Flood Control and Water Conservation District (SLOCFC&WCD)
11,096.4 0.07153199 0.08592736	32.97785 0.10032273	11,081.6 0.07152880 0.08593896	32.95349 0.10034911					Devil's Den Water District (DDWD)

Coastal Division



SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
-	-	INFLOW TO DOWNSTREAM REACH
-	-	AQUEDUCT BRANCH TURNOUT
50,000.0	82.87671	CONTRACTOR TURNOUT
1,000.0	1 38128	REACH EVAP & SEEPAGE LOSSES
-	-	COMPENSATING REGULATION CAP
4 500 0	6 31935	CHANGE IN RESERVE CAPACITY
65,500 0	90 57734	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

54,583.3 0.83333282 0.83333282	75.48107 0.83333282	Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD)
10,916.7 0.16666718 0.16666718	15.09627 0.16666718	San Luis Obispo County Flood Control and Water Conservation District (SLOCFC&WCD)

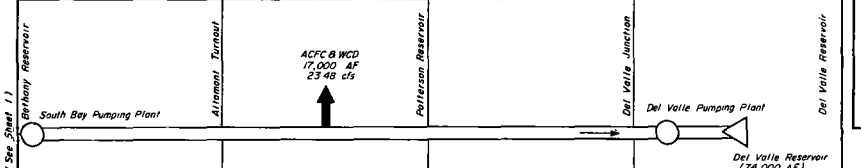
TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 11 of 12
South Bay Aqueduct

Livermore Division | Alameda Division | Del Valle Division

REACH NO 1 | REACH NO. 2 | REACH NO. 4 | REACH NO. 5



LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT
- ⇨ ASSUMED OPTION TURNOUT

SCHEMATIC DIAGRAM

REACH WATER SUMMARY

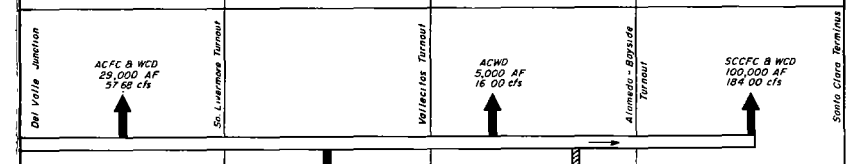
QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (acre feet)	
198,550 0	274 38091	181,310.0	259.93961	180,500 0	249 32078	26,475.0 4/	28,855 5/	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
-	-	17,000 0	23.48173	-	-	-	-	CONTRACTOR TURNOUT
410.0	0.67483	240.0	0.38957	810.0	1.11863	3,500.0	1,145 3/	REACH EVAP & SEEPAGE LOSSES
-	-0 07000	-	-9.43000	-	9.50000	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
198,960.0	274.98574	198,550.0	274.38091	181,310.0	259.93961	29,975.0	30,000	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

102,775.5 0.51656363	142.05046 0.51651391	102,563.6 0.51656308	141.74169 0.51658729	102,439.1 0.56499752	141.55776 0.54457941	16,982.0 0.56653878	15,617 0.52056661	Santa Clara County Flood Control and Water Conservation District (SCCFC&WCD)
0.51656877		0.51657518		0.55478841		0.54355272		
42,959.7 0.21592129	59.37646 0.21592560	42,871.2 0.21592143	59.24080 0.21590715	42,819.3 0.23616624	59.16538 0.22761202	5,374.0 0.17928274	4,946 0.16486666	Alameda County Water District (ACWD)
0.21592344		0.21591429		0.23188913		0.17207470		
6,402.4 0.03217933	8.84903 0.03217996	6,389.2 0.03217930	8.82730 0.03217170	6,381.5 0.03519662	8.81463 0.03391030	3,022.0 0.10081735	2,735 0.09116667	Assumed Election Under Article 8 - South Bay (Option - SB)
0.03217965		0.03217550		0.03455346		0.09599201		
46,822.4 0.23533575	64.70979 0.23532053	46,726.0 0.23533619	64.57112 0.23533386	29,669.5 0.16363962	50.40184 0.19389827	4,597.0 0.15336113	6,702 0.22340000	Alameda County Flood Control and Water Conservation District (ACFC&WCD)
0.23532814		0.23533503		0.17876894		0.18838057		

Niles Division | Santa Clara Division

REACH NO. 6 | REACH NO. 7 | REACH NO. 8 | REACH NO. 9



SCHEMATIC DIAGRAM

REACH WATER SUMMARY

QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	
148,000.0	304 99782	111,000.0	254.99973	100,000.0	184 00000	-	-	INFLOW TO DOWNSTREAM REACH
-	-	-	-	-	-	-	-	AQUEDUCT BRANCH TURNOUT
29,000.0	57.99219 6/	37,000.0	49.99809 6/	11,000.0	70.99973 5/	100,000.0	184.00000	CONTRACTOR TURNOUT
-	-	-	-	-	-	-	-	REACH EVAP & SEEPAGE LOSSES
-	-	-	-	-	-	-	-	COMPENSATING REGULATION CAP
-	-	-	-	-	-	-	-	CHANGE IN RESERVE CAPACITY
177,000 0	362.99001	148,000.0	304.99782	111,000.0	254.99973	100,000.0	184.00000	TOTAL, INFLOW FROM UPSTREAM REACH

REACH PARTICIPATION BY CONTRACTORS

100,000.0 0.56497175	184.00000 0.50690100	100,000.0 0.67567568	184.00000 0.60328300	100,000.0 0.90090090	184.00000 0.72156939	100,000.0 1.00000000	184.00000 1.00000000	Santa Clara County Flood Control and Water Conservation District (SCCFC&WCD)
0.53593638		0.63947934		0.81123515		1.00000000		
42,000.0 0.23728814	76.57809 0.21096473	42,000.0 0.28378378	76.57809 0.25107750	5,000.0 0.04504505	16.00000 0.06274516			Alameda County Water District (ACWD)
0.22412643		0.26743064		0.05389510				
6,000.0 0.03389830	10.93973 0.03013783	6,000.0 0.04054054	10.93973 0.03586822	6,000.0 0.05405405	10.93973 0.04290095			Assumed Election Under Article 8 - South Bay (Option - SB)
0.03201807		0.03820438		0.04847750				
29,000.0 0.16384181	57.68219 0.15890848							Alameda County Flood Control and Water Conservation District (ACFC&WCD)
0.16137514								
0.0 0.00000000	33.79000 0.09308796	0.0 0.00000000	33.48000 0.10977128	0.0 0.00000000	44.06000 0.17278450			Excess
0.04654398		0.05488564		0.08639225				

3/ Capacity in acre feet required to regulate losses

4/ Regulatory storage quantity for Contractors turning out below reservoir

5/ Regulatory storage, all Contractors

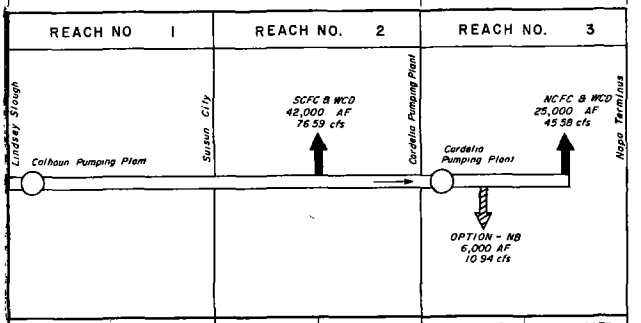
6/ Includes excess capacity in amounts of 0.31, 10.58, and 44.06 cfs in reaches 6, 7, and 8 respectively

TABLE C-3

REACH SUMMARY OF PROPORTIONATE USE OF PROJECT TRANSPORTATION FACILITIES

Sheet 12 of 12
North Bay Aqueduct

Calhoun Division | Cordelia Division



SCHEMATIC DIAGRAM

LEGEND
- ○ PUMPING PLANT
- ● POWER RECOVERY PLANT
- ▽ REGULATION RESERVOIR
- ▼ FOREBAY OR AFTERBAY
- ⇨ AQUEDUCT BRANCH
- ➡ CONTRACTOR TURNOUT
- ⇨ ASSUMED OPTION TURNOUT

REACH WATER SUMMARY

	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)	QUANTITY FROM OR THRU REACH (a - f, annually)	ASSOCIATED CAPACITY (second-feet)
INFLOW TO DOWNSTREAM REACH	74,000.0	134.74593	31,000.0	56.52192	-	-
AQUEDUCT BRANCH TURNOUT	-	-	-	-	-	-
CONTRACTOR TURNOUT	-	-	42,000.0	76.57808	31,000.0	56.52192
REACH EVAP & SEEPAGE LOSSES	1,800.0	2.96267	1,000.0	1.64593	-	-
COMPENSATING REGULATION CAP	-	-	-	-	-	-
CHANGE IN RESERVE CAPACITY	-	-	-	-	-	-
TOTAL, INFLOW FROM UPSTREAM REACH	75,800.0	137.70860	74,000.0	134.74593	31,000.0	56.52192

REACH PARTICIPATION BY CONTRACTORS

Napa County Flood Control and Water Conservation District (NCFC&WCD)	25,959.0 0.34246702 0.34246697	47.16064 0.34246692	25,342.5 0.34246622 0.34246618	46.14592 0.34246615	25,000.0 0.80645161 0.80645158	45.58219 0.80645155	
Assumed Election Under Article 8 - North Bay (Option - NB)	6,230.1 0.08219129 0.08219133	11.31846 0.08219138	6,082.2 0.08219189 0.08219192	11.07503 0.08219194	6,000.0 0.19354839 0.19354842	10.93973 0.19354845	
Solano County Flood Control and Water Conservation District (SCFC&WCD)	43,610.9 0.57534169 0.57534170	79.22950 0.57534170	42,575.3 0.57534189 0.57534190	77.52498 0.57534191			

TABLE C-4

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

NORTH BAY AQUEDUCT

Calendar Year	CALHOUN DIVISION	CORDELIA DIVISION		TOTAL NORTH BAY AQUEDUCT
	Reach 2	Reach 3		
	SC FC & WCD	NC FC & WCD	Option*	
1962				
63				
64				
65				
66				
67				
68				
69				
1970				
71				
72				
73				
74				
75				
76				
77				
78				
79				
1980	6,750	12,500	500	19,750
81	8,000	13,750	1,000	22,750
82	9,400	15,000	1,500	25,900
83	10,800	16,250	2,000	29,050
84	12,100	17,500	2,500	32,100
85	14,000	18,750	3,000	35,750
86	16,500	20,000	3,600	40,100
87	20,000	21,250	4,200	45,450
88	27,000	22,500	4,800	54,300
89	34,500	23,750	5,400	63,650
1990	42,000	25,000	6,000	73,000
91	42,000	25,000	6,000	73,000
92	42,000	25,000	6,000	73,000
93	42,000	25,000	6,000	73,000
94	42,000	25,000	6,000	73,000
95	42,000	25,000	6,000	73,000
96	42,000	25,000	6,000	73,000
97	42,000	25,000	6,000	73,000
98	42,000	25,000	6,000	73,000
99	42,000	25,000	6,000	73,000
2000**	42,000	25,000	6,000	73,000

SOUTH BAY AQUEDUCT

Calendar Year	LIVERMORE DIVISION			ALAMEDA DIVISION	NILES DIVISION				SANTA CLARA DIVISION	TOTAL SOUTH BAY AQUEDUCT
	Reach 1		Reach 2	Reach 4	Reach 6	Reach 7	Reach 8		Reach 9	
	AC FC & WCD	ACWD	AC FC & WCD	AC FC & WCD	AC FC & WCD	ACWD	ACWD	Option*	SCC FC & WCD	
1962	141	8,412	353							8,906
63	814	10,914	917							12,645
64	626	25,776	1,374							27,776
65	1,076		1,624	500		18,800			25,600	47,600
66	1,236		1,864	500		19,400			38,100	61,100
67	1,394		2,106	500		14,300			50,600	68,900
68	2,100		4,900	500		15,000		200	88,000	110,700
69	2,600		5,700	500		15,500		400	88,000	112,700
1970	3,300		6,200		500	15,700	500	600	88,000	114,800
71	3,400		6,300		1,500	16,000	1,000	800	88,000	117,000
72	3,500		6,400		2,500	16,400	1,500	1,000	88,000	119,300
73	3,500		6,600		3,500	16,800	2,000	1,200	88,000	121,600
74			10,300		4,500	17,100	2,500	1,400	88,000	123,800
75			10,500		5,500	17,500	3,000	1,600	88,000	126,100
76			10,700		6,500	17,800	3,500	1,800	88,000	128,300
77			10,900		7,500	18,200	4,000	2,100	88,000	130,700
78			11,200		8,400	18,600	4,500	2,400	88,000	133,100
79			11,500		9,300	18,900	5,000	2,700	88,000	135,400
1980			11,900		10,100	19,800	5,000	3,000	88,000	137,800
81			12,200		10,800	21,000	5,000	3,300	88,000	140,300
82			12,400		11,600	22,200	5,000	3,600	88,000	142,800
83			12,600		12,400	23,400	5,000	3,900	88,000	145,300
84			12,800		13,200	24,600	5,000	4,200	88,000	147,800
85			13,000		14,000	25,800	5,000	4,500	88,000	150,300
86			13,200		14,800	27,100	5,000	4,800	88,000	152,900
87			13,400		15,600	28,300	5,000	5,100	88,000	155,400
88			13,600		16,400	29,500	5,000	5,400	88,000	157.900
89			13,800		17,200	30,700	5,000	5,700	90,000	162,400
1990			14,000		18,000	31,900	5,000	6,000	92,000	166,900
91			14,200		19,800	33,400	5,000	6,000	94,000	172,400
92			14,400		21,600	34,900	5,000	6,000	96,000	177,900
93			14,700		23,300	36,400	5,000	6,000	98,000	183,400
94			15,000		25,000	37,000	5,000	6,000	100,000	188,000
95			15,300		26,700	37,000	5,000	6,000	100,000	190,000
96			16,000		28,000	37,000	5,000	6,000	100,000	192,000
97			17,000		29,000	37,000	5,000	6,000	100,000	194,000
98			17,000		29,000	37,000	5,000	6,000	100,000	194,000
99			17,000		29,000	37,000	5,000	6,000	100,000	194,000
2000**			17,000		29,000	37,000	5,000	6,000	100,000	194,000

* Assumed election under Article 8.
** and thereafter for the remainder of the project repayment period.

Note: Abbreviations for titles of contractors are as shown in Table C-3

TABLE C-4 (Continued)

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

CALIFORNIA AQUEDUCT

Calendar Year	SAN LUIS DIVISION		SOUTH SAN JOAQUIN DIVISION								
	Reach 7		Reach 8			Reach 9		Reach 10	Reach 11A	Reach 12C	
	EWSID	TLBWSD	TLBWSD	HWD	DRWD	DRWD	KCWA	KCWA	KCWA	KCWA	KCWA
1968	3,000	14,300	12,600	1,300	7,800	2,200	7,500	12,500	55,000		
69	3,000	15,600	13,700	1,600	9,200	2,600	8,500	14,600	58,600		
1970	3,000	17,000	14,800	2,000	10,600	3,000	10,000	30,100	56,000	20,000	14,000
71	3,000	18,200	16,000	2,300	12,100	3,400	12,000	33,000	59,000	21,600	14,000
72	3,000	19,600	17,100	2,600	13,500	3,800	13,000	65,000	60,000	47,300	21,000
73	3,000	20,900	18,200	2,900	14,900	4,200	16,500	40,000	73,000	30,700	24,000
74	3,000	22,900	20,100	3,300	16,300	4,600	20,000	40,800	83,000	32,500	25,000
75	3,000	25,000	21,900	3,600	17,700	5,000	23,000	46,000	94,000	31,500	28,000
76	3,000	27,100	23,700	3,900	19,100	5,400	25,000	52,900	104,000	32,500	31,000
77	3,000	29,200	25,600	4,200	20,500	5,800	27,500	61,000	113,000	36,300	33,000
78	3,000	31,300	27,400	4,600	21,900	6,300	32,000	69,700	119,000	39,000	34,000
79	3,000	33,400	29,200	4,900	23,300	6,700	35,000	77,700	125,000	44,200	36,000
1980	3,000	35,500	31,000	5,200	24,700	7,100	38,000	87,900	132,000	45,600	38,000
81	3,000	37,500	32,900	5,600	26,100	7,500	39,500	96,400	136,000	59,300	45,000
82	3,000	39,600	34,700	5,900	27,600	7,900	41,000	106,800	140,000	64,800	53,000
83	3,000	41,700	36,500	6,200	28,900	8,300	42,500	118,200	144,000	75,200	59,000
84	3,000	43,800	38,300	6,500	30,400	8,700	43,500	128,100	147,000	83,600	65,000
85	3,000	45,900	40,100	6,900	31,800	9,100	45,000	139,000	150,000	88,700	70,000
86	3,000	48,000	42,000	7,200	33,200	9,500	46,000	146,800	153,000	99,000	76,000
87	3,000	50,100	43,800	7,500	34,600	9,900	46,500	157,900	155,000	109,300	81,000
88	3,000	52,200	45,600	7,800	36,100	10,300	47,000	169,200	156,000	120,700	89,000
89	3,000	54,200	47,500	8,200	37,500	10,700	47,500	177,000	157,000	127,900	95,000
1990	3,000	58,700	51,300	8,500	38,900	11,100	47,500	186,100	157,000	137,700	100,000
1991*	3,000	58,700	51,300	8,500	38,900	11,100	47,500	186,100	157,000	137,700	100,000

* and thereafter for the remainder of the project repayment period.

TABLE C-4 (Continued)

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	SOUTH SAN JOAQUIN DIVISION (continued)									
	Reach 13A		Reach 14A		Reach 14B	Reach 14C		Reach 16		
	KCWA	Option*	KCWA	KCWA	KCWA	KCWA	Option*	KCWA	KCWA	KCWA
1968										
69										
1970										
71				3,000						
72				5,000						2,000
73	16,800	6,700	3,500	6,000	3,500	3,500	3,300	17,000	4,000	2,000
74	15,000	13,300	3,400	7,000	3,300	3,300	6,700	25,000	4,000	3,000
75	14,600	20,000	3,700	8,000	3,700	3,600	10,000	30,000	4,000	3,000
76	17,500	26,700	5,000	8,000	5,000	4,900	13,300	36,000	4,000	4,000
77	18,700	33,300	6,500	9,000	6,500	6,400	16,700	43,000	5,000	4,000
78	21,100	40,000	7,700	10,000	7,700	7,700	20,000	48,000	5,000	5,000
79	25,000	46,700	9,000	11,000	9,000	9,000	23,300	53,000	5,000	6,000
1980	28,100	53,300	11,100	12,000	11,100	11,000	26,700	58,000	5,000	6,000
81	31,400	60,000	12,800	13,000	12,800	12,800	30,000	61,000	5,000	6,000
82	35,200	66,700	15,200	14,000	15,100	15,100	33,300	64,000	5,000	6,000
83	37,900	73,300	17,900	16,000	17,900	17,800	36,700	67,000	5,000	6,000
84	41,400	80,000	20,900	18,000	20,900	20,800	40,000	71,000	5,000	6,000
85	44,900	86,700	24,100	20,000	24,100	24,100	43,300	75,000	5,000	6,000
86	47,100	93,300	27,200	22,000	27,200	27,200	46,700	78,000	5,000	6,000
87	50,100	100,000	30,800	25,000	30,800	30,700	50,000	80,000	5,000	6,000
88	53,100	106,700	34,800	26,000	34,700	34,700	53,300	81,000	5,000	6,000
89	55,500	113,300	37,400	28,000	37,300	37,300	56,700	83,000	5,000	6,000
1990	58,400	120,000	40,800	31,000	40,800	40,700	60,000	84,000	5,000	6,000
1991**	58,400	120,000	40,800	31,000	40,800	40,700	60,000	84,000	5,000	6,000

* Assumed election under Article 8.
** and thereafter for the remainder of the project repayment period.

TABLE C-4 (Continued)

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	TEHACHAPI DIVISION		EAST BRANCH DIVISION							
	Reach 17A	Reach 17B	Reach 20	Reach 21	Reach 22B				Reach 24	Reach 25
	KCWA	AVEKWA	PID	LCID	MWA	CVCWD	DWA	SGPWA	CLAWA	SBVMWD
1968										
69										
1970										
71		20,000								
72		25,000	1,500	150	8,000	5,200	8,000	1,000	500	1,500
73	1,000	30,000	2,700	250	10,000	5,800	9,000	1,700	750	1,750
74	2,000	35,000	3,900	350	12,000	6,400	10,000	2,400	1,000	2,000
75	2,000	40,000	5,100	450	14,000	7,000	11,000	3,100	1,250	2,150
76	2,000	45,000	6,300	560	16,000	7,600	12,000	3,800	1,500	2,300
77	2,000	50,000	7,500	630	18,000	8,200	13,000	4,500	1,750	2,450
78	3,000	55,000	8,500	800	20,000	8,800	14,000	5,200	2,000	2,600
79	3,000	60,000	9,300	900	22,000	9,400	15,000	5,900	2,250	2,650
1980	3,000	65,000	10,000	1,000	24,000	10,000	16,000	6,600	2,500	2,700
81	3,000	70,500	10,500	1,100	26,000	11,000	17,500	7,400	2,750	2,850
82	3,000	76,000	11,000	1,200	28,000	12,000	19,000	8,200	3,000	2,850
83	4,000	81,500	11,500	1,300	30,000	13,000	20,500	9,000	3,250	2,850
84	4,000	87,000	12,000	1,400	32,000	14,000	22,000	9,800	3,500	2,850
85	4,000	92,500	12,500	1,500	34,000	15,000	23,500	10,600	3,750	2,850
86	4,000	98,000	13,000	1,600	36,000	16,000	25,000	11,500	4,000	3,000
87	4,000	103,500	13,500	1,700	38,000	17,000	27,000	12,400	4,250	3,450
88	5,000	109,000	14,000	1,800	40,000	18,000	29,000	13,300	4,500	3,900
89	5,000	114,500	14,500	1,900	42,000	19,000	31,000	14,200	4,750	4,250
1990	5,000	120,000	15,000	2,000	44,000	20,000	33,000	15,000	5,000	4,500
1991*	5,000	120,000	15,000	2,000	44,000	20,000	33,000	15,000	5,000	5,000

* and thereafter for the remainder of the project repayment period.

TABLE C-4 (Continued)

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	EAST BRANCH DIVISION (continued)							WEST BRANCH DIVISION		
	Reach 27				Reach 28A	Reach 28C		Reach 30		
	CWC	SGVMWD	MWD-SC	SBVMWD	SBVMWD	MWD-SC	Option*	USCVWA	VCFCD	MWD-SC
1968										
69										
1970										
71										110,400
72	4,300	10,600	20,050	19,000	19,000	20,050	17,900	1,000		158,800
73	4,600	11,500	36,150	19,750	19,750	36,150	35,800	2,600		215,000
74	4,900	12,300	52,200	20,600	20,600	52,200	53,700	3,900		271,400
75	5,200	13,100	68,250	21,400	21,400	68,250	71,600	5,200		327,800
76	5,600	14,000	84,350	22,200	22,200	84,350	89,500	6,500		384,200
77	5,900	14,800	100,450	23,000	23,000	100,450	107,400	7,800		440,500
78	6,200	15,700	116,500	23,800	23,800	116,500	125,300	9,100		496,800
79	6,500	16,600	132,600	24,700	24,700	132,600	143,200	10,400		553,100
1980	6,900	17,400	148,650	25,500	25,500	148,650	161,100	12,000	1,000	609,500
81	7,200	18,300	164,750	26,400	26,400	164,750	178,900	13,100	2,000	636,600
82	7,500	19,100	175,500	26,400	26,400	175,500	196,800	14,200	3,000	674,400
83	7,800	19,900	186,300	26,400	26,400	186,300	214,700	15,300	4,000	712,100
84	8,100	20,700	197,050	26,400	26,400	197,050	232,600	16,400	5,000	749,900
85	8,500	21,500	207,850	26,400	26,400	207,850	250,500	17,500	6,000	787,700
86	8,800	22,200	218,600	27,200	27,200	218,600	268,400	18,600	8,000	825,600
87	9,100	22,900	229,400	29,700	29,700	229,400	286,300	19,700	10,000	863,300
88	9,400	23,600	240,200	32,200	32,200	240,200	304,200	20,800	13,000	901,000
89	9,700	24,300	250,950	34,700	34,700	250,950	322,100	21,900	16,000	938,900
1990	10,000	25,000	261,750	37,300	37,300	261,750	340,000	23,000	20,000	976,500
1991**	10,000	25,000	272,500	40,000	40,000	272,500	340,000	23,000	20,000	955,000

* Assumed election under Article 8.
** and thereafter for the remainder of the project repayment period.

TABLE C-4 (Continued)

ANNUAL QUANTITIES DELIVERED FROM EACH REACH FOR EACH CONTRACTOR

(in acre-feet)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	COASTAL DIVISION						TOTAL CALIFORNIA AQUEDUCT
	Reach 32A		Reach 33	Reach 34	Reach 35		
	DDWD	KCWA	SLOC FC&WCD	SLOC FC&WCD	SLOC FC&WCD	SBC FC&WCD	
1968	2,000	12,000					130,200
69	3,000	14,000					144,400
1970	4,000	15,000					199,500
71	5,000	17,000					350,000
72	6,000	19,000					619,450
73	7,000	23,000					788,850
74	8,000	26,000					956,350
75	9,000	29,000					1,125,550
76	10,000	32,000					1,303,960
77	11,000	35,000					1,485,530
78	11,000	41,000					1,666,000
79	11,000	44,000					1,845,200
1980	11,000	48,000	400	200	400	1,000	2,028,300
81	11,000	50,000	400	200	400	2,000	2,188,600
82	11,000	52,000	800	400	800	4,000	2,345,950
83	11,000	54,000	1,200	600	1,200	6,000	2,509,100
84	11,000	55,000	1,800	900	1,800	9,000	2,669,550
85	11,000	57,000	3,000	1,500	3,000	15,000	2,833,600
86	11,000	58,000	4,000	2,000	4,000	20,000	2,997,700
87	11,000	58,000	5,000	2,500	5,000	25,000	3,167,800
88	11,000	59,000	6,200	3,100	6,200	31,000	3,344,000
89	11,000	60,000	8,000	4,000	8,000	40,000	3,511,300
1990	11,000	60,000	10,000	5,000	10,000	50,000	3,688,600
1991*	11,000	60,000	10,000	5,000	10,000	50,000	3,694,500

* and thereafter for the remainder of the project repayment period.

TABLE C-5

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

Calendar Year	NORTH BAY AQUEDUCT								SOUTH BAY AQUEDUCT				CALIFORNIA AQUEDUCT			
	CALHOUN DIVISION				CORDELIA DIVISION				LIVERMORE DIVISION				NORTH SAN JOAQUIN DIVISION			
	CALHOUN PUMPING PLANT				CORDELIA PUMPING PLANT				SOUTH BAY PUMPING PLANT				DELTA PUMPING PLANT			
	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total
1962									9	8,906	272	9,187				
63									71	12,645	185	12,901				
64										27,776	1,200	28,976				
65										47,600	1,200	48,800				
66									10,000	61,100	3,200	74,300				
67										68,900	4,700	73,600		68,900	5,200	74,100
68						900**		900**		110,700	4,700	115,400	26,700	240,900	101,200	368,800
69						1,900		1,900		112,700	4,700	117,400	5,700	257,100	101,200	364,000
1970						2,800		2,800		114,800	4,700	119,500	40,200	314,300	113,400	467,900
71						3,800		3,800		117,000	4,700	121,700	120,800	467,000	148,300	736,100
72						4,800		4,800		119,300	4,700	124,000	92,000	738,750	186,800	1,017,550
73						5,800		5,800		121,600	4,700	126,300		910,450	186,800	1,097,250
74						6,700		6,700		123,800	4,700	128,500		1,080,150	186,800	1,266,950
75						7,700		7,700		126,100	4,700	130,800		1,251,650	186,800	1,438,450
76						8,600		8,600		128,300	4,700	133,000		1,432,260	186,800	1,619,060
77						9,600		9,600		130,700	4,700	135,400		1,616,230	186,800	1,803,030
78						10,500		10,500		133,100	4,700	137,800		1,799,100	186,800	1,985,900
79						11,500**		11,500**		135,400	4,700	140,100	300	1,980,600	186,800	2,167,700
1980		19,750	2,800	22,550		13,000		13,000		137,800	4,700	142,500		2,166,100	189,000	2,355,100
81		22,750	2,800	25,550		14,750		14,750		140,300	4,700	145,000		2,328,900	189,000	2,517,900
82		25,900	2,800	28,700		16,500		16,500		142,800	4,700	147,500		2,488,750	189,000	2,677,750
83		29,050	2,800	31,850		18,250		18,250		145,300	4,700	150,000		2,654,400	189,000	2,843,400
84		32,100	2,800	34,900		20,000		20,000		147,800	4,700	152,500		2,817,350	189,000	3,006,350
85		35,750	2,800	38,550		21,750		21,750		150,300	4,700	155,000		2,983,900	189,000	3,172,900
86		40,100	2,800	42,900		23,600		23,600		152,900	4,700	157,600		3,150,600	189,000	3,339,600
87		45,450	2,800	48,250		25,450		25,450		155,400	4,700	160,100		3,323,200	189,000	3,512,200
88		54,300	2,800	57,100		27,300		27,300		157,900	4,700	162,600		3,501,900	189,000	3,690,900
89		63,650	2,800	66,450		29,150		29,150		162,400	4,700	167,100		3,673,700	189,000	3,862,700
1990		73,000	2,800	75,800		31,000		31,000		166,900	4,700	171,600		3,855,500	189,000	4,044,500
91		73,000	2,800	75,800		31,000		31,000		172,400	4,700	177,100		3,866,900	189,000	4,055,900
92		73,000	2,800	75,800		31,000		31,000		177,900	4,700	182,600		3,872,400	189,000	4,061,400
93		73,000	2,800	75,800		31,000		31,000		183,400	4,700	188,100		3,877,900	189,000	4,066,900
94		73,000	2,800	75,800		31,000		31,000		188,000	4,700	192,700		3,882,500	189,000	4,071,500
95		73,000	2,800	75,800		31,000		31,000		190,000	4,700	194,700		3,884,500	189,000	4,073,500
96		73,000	2,800	75,800		31,000		31,000		192,000	4,700	196,700		3,886,500	189,000	4,075,500
97		73,000	2,800	75,800		31,000		31,000		194,000	4,700	198,700		3,888,500	189,000	4,077,500
98		73,000	2,800	75,800		31,000		31,000		194,000	4,700	198,700		3,888,500	189,000	4,077,500
99		73,000	2,800	75,800		31,000		31,000		194,000	4,700	198,700		3,888,500	189,000	4,077,500
2000*		73,000	2,800	75,800		31,000		31,000		194,000	4,700	198,700		3,888,500	189,000	4,077,500

* and thereafter for the remainder of the project repayment period.

** inclusive amounts assumed to be non-project water transported thru Reach 3.

TABLE C-5 (Continued)

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

CALIFORNIA AQUEDUCT (cont.)

Calendar Year	SAN LUIS DIVISION				SOUTH SAN JOAQUIN DIVISION							
	MILE 18 PUMPING PLANT				BUENA VISTA PUMPING PLANT				WHEELER RIDGE PUMPING PLANT I			
	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total
1968	26,700	130,200	60,300	217,200								
69	5,700	144,400	60,300	210,400								
70	40,200	199,500	72,500	312,200	40,200			40,200	36,300			36,300
71	120,800	350,000	107,400	578,200	120,800	133,400	31,700	285,900	120,800	130,400	21,900	273,100
72	92,000	619,450	145,900	857,350	92,000	328,550	70,200	490,750	92,000	323,550	60,400	475,950
73		788,850	145,900	934,750		487,050	70,200	557,250		467,250	60,400	527,650
74		956,350	145,900	1,102,250		622,550	70,200	692,750		598,850	60,400	659,250
75		1,125,550	145,900	1,271,450		754,250	70,200	824,450		725,250	60,400	785,650
76		1,303,960	145,900	1,449,860		890,160	70,200	960,360		853,960	60,400	914,360
77		1,485,530	145,900	1,631,430		1,028,430	70,200	1,098,630		983,330	60,400	1,043,730
78		1,666,000	145,900	1,811,900		1,164,700	70,200	1,234,900		1,111,600	60,400	1,172,000
79	300	1,845,200	145,900	1,991,400		1,300,100	70,200	1,370,300		1,238,800	60,400	1,299,200
1980		2,028,300	148,100	2,176,400		1,437,900	70,200	1,508,100		1,366,000	60,400	1,426,400
81		2,188,600	148,100	2,336,700		1,544,400	70,200	1,614,600		1,463,000	60,400	1,523,400
82		2,345,950	148,100	2,494,050		1,650,750	70,200	1,720,950		1,558,050	60,400	1,618,450
83		2,509,100	148,100	2,657,200		1,760,400	70,200	1,830,600		1,654,100	60,400	1,714,500
84		2,669,550	148,100	2,817,650		1,870,750	70,200	1,940,950		1,750,150	60,400	1,810,550
85		2,833,600	148,100	2,981,700		1,982,000	70,200	2,052,200		1,846,400	60,400	1,906,800
86		2,997,700	148,100	3,145,800		2,094,600	70,200	2,164,800		1,944,300	60,400	2,004,700
87		3,167,800	148,100	3,315,900		2,212,600	70,200	2,282,800		2,045,300	60,400	2,105,700
88		3,344,000	148,100	3,492,100		2,330,800	70,200	2,401,000		2,147,300	60,400	2,207,700
89		3,511,300	148,100	3,659,400		2,446,000	70,200	2,516,200		2,249,300	60,400	2,309,700
1990		3,688,600	148,100	3,836,700		2,564,400	70,200	2,634,600		2,351,100	60,400	2,411,500
1991*		3,694,500	148,100	3,842,600		2,570,300	70,200	2,640,500		2,357,000	60,400	2,417,400

* and thereafter for the remainder of the project repayment period.

TABLE C-5 (Continued)

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

CALIFORNIA AQUEDUCT (cont.)

Calendar Year	SOUTH SAN JOAQUIN DIVISION (cont.)				TEHACHAPI DIVISION				ANTELOPE DIVISION			
	WHEELER RIDGE PUMPING PLANT II				TEHACHAPI PUMPING PLANT				COTTONWOOD POWERPLANT			
	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total
1968												
69												
1970	36,000			36,000	34,500			34,500	34,200			34,200
71	120,800	130,400	21,100	272,300	120,800	130,400	16,600	267,800	120,800	110,400	16,600	247,800
72	92,000	323,550	59,600	475,150	92,000	321,550	55,100	468,650	92,000	296,550	55,100	443,650
73		467,250	59,600	526,850		444,250	55,100	499,350		413,250	55,100	468,350
74		598,850	59,600	658,450		566,850	55,100	621,950		529,850	55,100	584,950
75		725,250	59,600	784,850		688,250	55,100	743,350		646,250	55,100	701,350
76		853,960	59,600	913,560		809,960	55,100	865,060		762,960	55,100	818,060
77		983,330	59,600	1,042,930		931,330	55,100	986,430		879,330	55,100	934,430
78		1,111,600	59,600	1,171,200		1,053,600	55,100	1,108,700		995,600	55,100	1,050,700
79		1,238,800	59,600	1,298,400		1,174,800	55,100	1,229,900		1,111,800	55,100	1,166,900
1980		1,366,000	59,600	1,425,600		1,297,000	55,100	1,352,100		1,229,000	55,100	1,284,100
81		1,462,300	59,600	1,521,900		1,391,000	55,100	1,446,100		1,317,500	55,100	1,372,600
82		1,558,050	59,600	1,617,650		1,483,050	55,100	1,538,150		1,404,050	55,100	1,459,150
83		1,654,100	59,600	1,713,700		1,576,100	55,100	1,631,200		1,490,600	55,100	1,545,700
84		1,750,150	59,600	1,809,750		1,668,150	55,100	1,723,250		1,577,150	55,100	1,632,250
85		1,846,400	59,600	1,906,000		1,760,400	55,100	1,815,500		1,663,900	55,100	1,719,000
86		1,944,300	59,600	2,003,900		1,855,300	55,100	1,910,400		1,753,300	55,100	1,808,400
87		2,045,300	59,600	2,104,900		1,954,300	55,100	2,009,400		1,846,800	55,100	1,901,900
88		2,147,300	59,600	2,206,900		2,055,300	55,100	2,110,400		1,941,300	55,100	1,996,400
89		2,249,300	59,600	2,308,900		2,155,300	55,100	2,210,400		2,035,800	55,100	2,090,900
1990		2,351,100	59,600	2,410,700		2,256,100	55,100	2,311,200		2,131,100	55,100	2,186,200
1991*		2,357,000	59,600	2,416,600		2,262,000	55,100	2,317,100		2,137,000	55,100	2,192,100

* and thereafter for the remainder of the project repayment period.

TABLE C-5 (Continued)

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

CALIFORNIA AQUEDUCT (cont.)

Calendar Year	WEST BRANCH DIVISION (ALL WEST BRANCH PLANTS)				EAST BRANCH DIVISION: PEARBLOSSOM PUMPING PLANT				EAST BRANCH DIVISION: DEVIL CANYON PWP.'S NOS. 1 & 2			
	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total
1968												
69												
1970	32,400			32,400								
71	84,000	110,400	13,100	207,500	30,700			30,700	7,500			7,500
72		159,800	13,100	172,900	92,000	135,100	27,200	254,300	27,000	110,900	10,500	148,400
73		217,600	13,100	230,700		192,700	27,200	219,900		163,700	10,500	174,200
74		275,300	13,100	288,400		250,300	27,200	277,500		216,500	10,500	227,000
75		333,000	13,100	346,100		307,700	27,200	334,900		269,200	10,500	279,700
76		390,700	13,100	403,800		365,400	27,200	392,600		322,200	10,500	332,700
77		448,300	13,100	461,400		422,900	27,200	450,100		375,000	10,500	385,500
78		505,900	13,100	519,000		480,400	27,200	507,600		427,800	10,500	438,300
79		563,500	13,100	576,600		538,100	27,200	565,300		480,900	10,500	491,400
1980		622,500	13,100	635,600		595,500	27,200	622,700		533,700	10,500	544,200
81		651,700	13,100	664,800		654,200	27,200	681,400		586,700	10,500	597,200
82		691,600	13,100	704,700		700,250	27,200	727,450		627,200	10,500	637,700
83		731,400	13,100	744,500		746,400	27,200	773,600		667,800	10,500	678,300
84		771,300	13,100	784,400		792,450	27,200	819,650		708,300	10,500	718,800
85		811,200	13,100	824,300		838,700	27,200	865,900		749,000	10,500	759,500
86		852,200	13,100	865,300		886,500	27,200	913,700		791,000	10,500	801,500
87		893,000	13,100	906,100		938,600	27,200	965,800		836,500	10,500	847,000
88		934,800	13,100	947,900		990,700	27,200	1,017,900		882,000	10,500	892,500
89		976,800	13,100	989,900		1,042,600	27,200	1,069,800		927,400	10,500	937,900
1990		1,019,500	13,100	1,032,600		1,094,600	27,200	1,121,800		973,100	10,500	983,600
1991*		998,000	13,100	1,011,100		1,122,000	27,200	1,149,200		1,000,000	10,500	1,010,500

* and thereafter for the remainder of the project repayment period.

TABLE C-5 (Continued)

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

CALIFORNIA AQUEDUCT (cont.)

Calendar Year	COASTAL DIVISION											
	AVENAL PUMPING PLANT				PYRAMID PUMPING PLANT				SAWTOOTH PUMPING PLANT			
	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total	Const. Water	Deliveries	Operat'l Losses	Total
1968	100	14,000	1,100	15,200								
69		17,000	1,100	18,100								
1970		19,000	1,100	20,100								
71		22,000	1,100	23,100								
72		25,000	1,100	26,100								
73		30,000	1,100	31,100								
74		34,000	1,100	35,100								
75		38,000	1,100	39,100								
76		42,000	1,100	43,100								
77		46,000	1,100	47,100								
78		52,000	1,100	53,100								
79	300	55,000	1,100	56,400	300			300	300			300
1980		61,000	3,300	64,300		2,000	2,200	4,200		2,000	1,800	3,800
81		64,000	3,300	67,300		3,000	2,200	5,200		3,000	1,800	4,800
82		69,000	3,300	72,300		6,000	2,200	8,200		6,000	1,800	7,800
83		74,000	3,300	77,300		9,000	2,200	11,200		9,000	1,800	10,800
84		79,500	3,300	82,800		13,500	2,200	15,700		13,500	1,800	15,300
85		90,500	3,300	93,800		22,500	2,200	24,700		22,500	1,800	24,300
86		99,000	3,300	102,300		30,000	2,200	32,200		30,000	1,800	31,800
87		106,500	3,300	109,800		37,500	2,200	39,700		37,500	1,800	39,300
88		116,500	3,300	119,800		46,500	2,200	48,700		46,500	1,800	48,300
89		131,000	3,300	134,300		60,000	2,200	62,200		60,000	1,800	61,800
1990		146,000	3,300	149,300		75,000	2,200	77,200		75,000	1,800	76,800
1991*		146,000	3,300	149,300		75,000	2,200	77,200		75,000	1,800	76,800

* and thereafter for the remainder of the project repayment period.

TABLE C-5 (Continued)

ANNUAL QUANTITIES CONVEYED
THROUGH EACH PUMPING AND POWER RECOVERY PLANT

(in acre-feet)

CALIFORNIA AQUEDUCT (cont.)

Calendar Year	COASTAL DIVISION (cont.)			
	POLONIO PP and SAN LUIS OBISPO PWP			
	Const. Water	Deliveries	Operat'l Losses	Total
1968				
69				
1970				
71				
72				
73				
74				
75				
76				
77				
78				
79	300			300
1980		2,000	1,500	3,500
81		3,000	1,500	4,500
82		6,000	1,500	7,500
83		9,000	1,500	10,500
84		13,500	1,500	15,000
85		22,500	1,500	24,000
86		30,000	1,500	31,500
87		37,500	1,500	39,000
88		46,500	1,500	48,000
89		60,000	1,500	61,500
1990		75,000	1,500	76,500
1991*		75,000	1,500	76,500

Notes: (a) Construction water includes channel and reservoir dead storage filling, maximum year emergency storage in reservoirs, and evaporation & seepage losses associated solely with same. Water applied for aqueduct preconsolidation in subsidence areas not shown.

(b) Operational losses include canal and reservoir evaporation & seepage losses associated with water deliveries to contractors.

* and thereafter for the remainder of the project repayment period.

TABLE C-6

ACTUAL AND PROJECTED CAPITAL COSTS ALLOCATED
TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

Calendar Year	NORTH BAY AQUEDUCT				SOUTH BAY AQUEDUCT								
	CALHOUN DIVISION		CORDELIA DIVISION	TOTAL NORTH BAY AQUEDUCT	LIVERMORE DIVISION		ALAMEDA DIVISION	DEL VALLE DIVISION	NILES DIVISION			SANTA CLARA DIVISION	TOTAL SOUTH BAY AQUEDUCT
	Reach 1	Reach 2	Reach 3		Reach 1	Reach 2	Reach 4	Reach 5	Reach 6	Reach 7	Reach 8	Reach 9	
1952	0	0	0	0	80	28	25	122	6	55	61	109	486
1953	0	0	0	0	400	138	123	607	29	273	302	542	2,414
1954	0	0	0	0	1,306	452	402	1,981	95	892	987	1,773	7,888
1955	0	0	0	0	1,791	637	526	2,641	126	1,189	1,316	2,368	10,594
1956	0	0	0	0	23,426	8,141	6,667	32,930	1,573	14,816	16,389	38,985	142,927
1957	25,755	6,682	38,023	70,460	53,341	18,499	15,197	74,949	3,581	33,721	37,302	93,976	330,566
1958	37,788	9,804	107,638	155,230	207,420	90,727	8,931	44,044	2,104	19,816	21,921	99,150	494,113
1959	15,005	3,893	74,191	93,089	451,170	131,579	22,496	56,019	601	5,656	6,257	55,160	728,938
1960	27,602	7,161	22,643	57,406	1,165,233	58,062	70,476	213,346	1,277	12,023	13,307	415-	1,533,309
1961	24,717	6,413	15,310	46,440	3,132,400	514,931	305,114	251,244	2,185	20,580	24,226	8,600	4,259,280
1962	8,010	2,078	7,495	17,583	1,482,304	188,378	935,745	128,759	19,232	181,102	161,220	271,008	3,367,748
1963	22,164	5,728	20,364	48,256	448,299	75,789	1,702,903	584,872	94,247	2,898,804	278,641	259,064	6,342,619
1964	67,900	23,600	127,200	218,700	2,768,000	30,000	147,700	2,050,400	97,900	1,842,400	3,341,300	5,795,800	16,073,500
1965	155,300	68,200	202,400	425,900	223,000	32,000	91,000	6,802,700	15,000	46,000	72,000	2,399,000	9,680,700
1966	53,700	9,700	1,262,700	1,326,100	126,000	17,000	54,000	5,877,900	8,000	23,000	40,000	81,000	6,226,900
1967	117,100	22,800	2,112,000	2,251,900	193,000	0	0	1,715,000-	0	0	0	5,000	1,517,000-
1968	220,200	42,000	175,000	437,200	0	0	0	1,621,000-	0	0	0	0	1,621,000-
1969	32,000	6,100	0	38,100	0	0	0	0	0	0	0	0	0
1970	32,000	6,100	0	38,100	0	0	0	0	0	0	0	0	0
1971	31,400	6,000	0	37,400	0	0	0	0	0	0	0	0	0
1972	31,400	6,000	0	37,400	0	0	0	0	0	0	0	0	0
1973	31,400	6,000	8,000	45,400	0	0	0	0	0	0	0	0	0
1974	31,400	6,000	105,000	142,400	0	0	0	0	0	0	0	0	0
1975	31,400	6,000	0	37,400	0	0	0	0	0	0	0	0	0
1976	47,400	12,000	0	59,400	0	0	0	0	0	0	0	0	0
1977	170,400	44,000	44,000	258,400	0	0	0	0	0	0	0	0	0
1978	1,322,400	347,000	200,000	1,869,400	26,000	0	0	0	0	0	0	0	26,000
1979	1,722,400	620,000	446,000	2,788,400	193,000	0	0	0	0	0	0	0	193,000
1980	0	0	105,000	105,000	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	8,000	0	8,000	16,000	0	0	0	0	0	0	0	0	0
1984	112,000	0	105,000	217,000	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	8,000	0	0	8,000	0	0	0	0	0	0	0	0	0
1987	112,000	0	0	112,000	0	0	0	0	0	0	0	0	0
1988	0	0	8,000	8,000	26,000	0	0	0	0	0	0	0	26,000
1989	0	0	105,000	105,000	193,000	0	0	0	0	0	0	0	193,000
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,498,841	1,273,259	5,298,964	11,071,064	10,715,170	1,166,361	3,361,305	12,786,514	245,956	5,100,327	4,015,229	9,111,120	46,501,982

TABLE C-6 (Continued)

ACTUAL AND PROJECTED CAPITAL COSTS ALLOCATED
TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT

Calendar Year	NORTH SAN JOAQUIN DIVISION			SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 1	Reach 2	Subtotal	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8	Reach 9	Reach 10	Reach 11A
1952	3,996	4,808	8,804	1,717	3,285	3,727	948	1,169	10,846	642	834	834	827
1953	9,836	11,815	21,651	4,566	8,734	9,910	2,520	3,108	28,838	2,362	3,070	3,070	3,044
1954	12,263	14,648	26,911	5,437	10,401	11,801	3,000	3,700	34,339	3,052	3,968	3,968	3,934
1955	6,558	7,805	14,363	2,646	5,063	5,744	1,460	1,801	16,714	1,441	1,873	1,873	1,858
1956	9,721	7,826	17,547	2,743	5,249	5,955	1,514	1,867	17,328	4,508	5,860	5,860	5,811
1957	11,506	8,372	19,878	2,938	5,621	6,378	1,621	2,000	18,558	10,860	14,118	14,118	13,999
1958	22,689	26,447	49,136	11,177	24,601	28,112	7,089	8,981	79,960	16,561	21,549	21,549	28,668
1959	140,419	156,721	297,140	26,178	56,469	64,443	16,225	20,647	183,962	18,568	23,890	23,890	43,000
1960	171,229	199,271	370,500	29,665	57,468	63,361	16,519	25,709	192,722	48,296	40,085	61,633	37,592
1961	198,557	205,990	404,547	106,383	262,072	201,418	63,423	93,661	726,957	80,371	41,804	79,153	57,110
1962	373,264	737,821	1,111,085	440,262	602,171	459,374	145,445	208,883	1,856,135	173,672	68,547	60,804	49,587
1963	3,445,320	2,328,163	5,773,483	1,811,324	2,982,978	2,696,205	6,476	65,919-	7,431,064	184,533	90,108	62,052	72,380
1964	5,619,800	5,851,900	11,471,700	2,195,300	7,045,700	6,456,900	1,385,300	1,948,700	19,031,900	129,800	192,100	547,100	505,300
1965	8,941,300	14,008,900	22,950,200	3,105,700	9,902,600	9,117,200	1,942,200	2,719,000	26,786,700	491,300	1,743,100	1,845,100	1,108,100
1966	12,125,800	18,692,700	30,818,500	3,060,800	9,760,400	8,987,700	1,910,600	2,674,700	26,394,200	6,947,000	3,086,700	3,595,400	2,163,800
1967	7,250,000	18,978,900	26,228,900	1,819,500	5,852,900	5,373,800	1,179,800	1,672,700	15,898,700	3,111,700	2,845,300	3,559,000	2,125,100
1968	1,157,000	4,000	1,161,000	552,000	1,742,000	1,615,000	338,000	472,000	4,719,000	6,000	5,000	5,000	5,000
1969	0	0	0	49,000	157,000	145,000	31,000	43,000	425,000	32,000	25,000	29,000	18,000
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	98,000	0	98,000	0	0	0	0	0	0	0	0	0	0
1972	195,000	0	195,000	0	0	0	0	0	0	0	0	0	0
1973	2,116,000	0	2,116,000	0	0	0	0	0	0	0	0	0	0
1974	2,116,000	0	2,116,000	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	44,024,258	61,246,087	105,270,345	13,227,336	38,484,712	35,252,028	7,053,140	9,835,707	103,852,923	11,262,666	8,212,906	9,919,404	6,243,110

TABLE C-6 (Continued)

ACTUAL AND PROJECTED CAPITAL COSTS ALLOCATED
TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	SOUTH SAN JOAQUIN DIVISION (Cont.)									TEHACHAPI DIVISION		
	Reach 12B	Reach 12C	Reach 13A	Reach 14A	Reach 14B	Reach 14C	Reach 15	Reach 16	Subtotal	Reach 17A	Reach 17B	Subtotal
1952	2,243	1,549	933	583	198	207	1,128	4,284	14,262	5,720	6,123	11,843
1953	8,254	5,701	3,433	2,146	727	764	4,151	15,761	52,483	18,110	19,385	37,495
1954	10,667	7,367	4,436	2,773	940	987	5,365	20,368	67,825	33,330	35,676	69,006
1955	5,037	3,478	2,094	1,309	444	466	2,533	9,617	32,023	21,778	23,311	45,089
1956	15,755	10,880	6,551	4,165	1,412	1,482	7,924	30,081	100,289	34,405	36,827	71,232
1957	37,957	26,213	15,784	10,869	3,684	3,869	19,090	72,474	243,035	80,384	86,042	166,426
1958	77,731	53,680	32,324	30,455	10,324	10,840	53,648	135,137	492,466	103,586	110,878	214,464
1959	116,590	80,516	48,483	55,585	18,788	19,727	97,941	184,654	731,632	87,220	93,284	180,504
1960	101,926	70,390	42,385	60,734	18,863	19,806	114,577	151,997	768,284	97,863	103,706	201,569
1961	154,850	106,938	64,393	119,317	41,694	43,779	191,347	226,847	1,207,603	264,113	239,032	503,145
1962	134,450	92,851	55,910	106,434	36,079	42,559	179,226	210,794	1,210,913	246,021	237,887	483,908
1963	196,253	135,531	83,300	268,828	110,391	116,094	454,335	461,614	2,235,419	664,210	817,135	1,481,345
1964	1,454,600	940,700	76,200	1,287,000	883,900	651,000	1,139,600	1,675,400	9,482,700	1,016,000	5,644,800	6,660,800
1965	2,234,500	1,416,500	227,500	4,883,600	2,852,200	3,380,200	768,600	982,200	21,932,900	1,546,800	19,968,000	21,514,800
1966	263,200	252,700	158,600	2,714,900	1,078,300	1,485,800	1,083,400	1,417,000	24,246,800	1,592,600	25,684,400	27,277,000
1967	2,404,000	1,979,200	348,000	2,337,500	1,220,600	1,570,000	1,033,500	1,509,100	24,043,000	5,168,200	31,068,600	36,236,800
1968	5,443,300	3,706,400	2,516,800	2,672,800	549,800	150,200	2,333,200	3,459,100	20,852,600	18,749,800	2,085,900	20,835,700
1969	4,191,400	2,640,700	3,104,100	6,283,900	573,900	170,000	5,683,900	8,542,400	31,294,300	18,673,400	1,413,200	20,086,600
1970	0	0	105,000	10,041,100	5,546,200	5,901,300	6,535,300	16,066,600	44,195,500	3,773,300	78,500	3,851,800
1971	0	0	0	2,498,000	0	0	3,213,000	4,220,000	9,931,000	12,538,000	0	12,538,000
1972	0	0	0	187,000	0	0	0	0	187,000	3,286,000	0	3,286,000
1973	0	0	0	2,498,000	0	0	107,000	152,000	2,757,000	445,000	0	445,000
1974	0	0	0	2,498,000	0	0	1,526,000	2,104,000	6,128,000	6,276,000	0	6,276,000
1975	0	0	0	0	0	0	1,526,000	2,104,000	3,630,000	6,276,000	0	6,276,000
1976	0	0	0	0	0	0	0	0	0	6,276,000	0	6,276,000
1977	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0
Total	16,852,713	11,531,294	6,896,226	38,564,998	12,948,444	13,569,080	26,080,765	43,755,428	205,837,034	87,273,840	87,752,686	175,026,526

TABLE C-6 (Continued)

ACTUAL AND PROJECTED CAPITAL COSTS ALLOCATED
TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	ANTELOPE DIVISION			EAST BRANCH DIVISION									
	Reach 18A	Reach 19	Subtotal	Reach 20	Reach 21	Reach 22A	Reach 22B	Reach 23	Reach 24	Reach 25	Reach 26	Reach 27	Reach 28A
1952	4,596	1,708	6,304	3,880	6,503	164	2,445	2,022	2,710	3,745	3,325	2,966	2,399
1953	15,404	5,724	21,128	13,005	21,798	551	8,196	6,777	9,085	12,552	11,146	9,942	8,040
1954	17,061	6,339	23,400	14,407	24,148	610	9,079	7,508	10,065	13,905	12,347	11,014	8,907
1955	6,637	2,466	9,103	5,606	9,396	238	3,533	2,921	3,916	5,410	4,804	4,286	3,466
1956	8,407	3,124	11,531	7,096	11,895	301	4,472	3,698	4,958	6,849	6,082	5,425	4,387
1957	23,595	8,767	32,362	19,915	33,381	844	12,550	10,378	13,913	19,221	17,068	15,225	12,312
1958	35,235	13,092	48,327	29,740	49,849	1,260	18,742	15,498	20,777	28,704	25,488	22,736	18,387
1959	39,268	21,889	61,157	40,512	58,166	1,502	22,333	18,653	45,853	38,176	29,886	26,677	22,123
1960	35,597	28,647	64,244	87,083	131,748	3,788	56,345	30,859	99,150	76,958	54,373	48,924	47,457
1961	45,650	45,601	91,251	206,032	339,897	10,770	192,910	85,753	218,326	166,012	119,510	115,407	39,840
1962	81,911	44,512	126,423	81,067	123,450	6,717	171,882	65,635	106,547	61,479	60,144	73,534	40,333
1963	60,535	86,408	146,943	275,410	438,776	19,033	280,289	109,784	452,926	222,101	192,041	206,844	125,416
1964	138,200	124,000	262,200	193,900	49,100	35,300	314,900	2,900	1,295,400	392,900	122,400	82,400	376,300
1965	361,900	562,500	924,400	319,700	90,100	47,500	556,600	3,300	2,260,500	738,600	133,700	103,900	381,000
1966	2,899,900	475,800	3,375,700	1,058,300	294,300	148,000	1,686,600	67,600	3,651,900	692,800	294,300	401,100	112,000
1967	2,690,200	6,078,600	8,768,800	785,400	319,600	144,200	1,829,100	187,600	3,459,100	9,374,000	291,900	264,600	26,300
1968	1,603,300	6,082,700	7,686,000	10,012,300	2,562,100	1,548,100	8,280,300	254,000	7,981,700	9,373,200	912,200	1,715,400	446,500
1969	2,712,900	114,500	2,827,400	8,093,400	2,540,300	2,058,100	17,549,900	2,061,000	7,991,000	9,380,800	2,128,400	3,382,600	458,600
1970	525,800	228,300	754,100	331,100	93,100	68,300	17,402,900	4,116,200	8,020,900	55,900	5,834,900	2,781,700	14,952,900
1971	88,000	0	88,000	325,700	91,800	66,600	6,522,100	2,064,200	63,000	52,900	4,413,700	1,943,600	3,800,600
1972	946,000	0	946,000	0	0	0	89,000	0	0	0	0	0	0
1973	945,000	0	945,000	0	0	0	1,046,000	0	0	0	0	0	0
1974	0	0	0	0	0	0	1,912,000	0	0	0	0	0	0
1975	0	0	0	0	0	0	1,045,000	0	0	0	0	0	0
1976	0	0	0	0	0	0	956,000	0	0	0	0	0	0
1977	0	0	0	0	0	0	956,000	0	0	0	280,000	170,000	0
1978	0	0	0	0	0	0	0	0	0	0	2,996,000	1,817,000	0
1979	0	0	0	0	0	0	0	0	0	0	2,996,000	1,817,000	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	13,285,096	13,934,677	27,219,773	21,903,553	7,289,407	4,161,878	60,929,176	9,116,286	35,711,726	30,716,212	20,939,714	15,022,280	20,887,267

TABLE C-6 (Continued)

ACTUAL AND PROJECTED CAPITAL COSTS ALLOCATED
TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	EAST BRANCH DIVISION (Cont.)			WEST BRANCH DIVISION			COASTAL DIVISION						TOTAL CALIFORNIA AQUEDUCT
	Reach 28B	Reach 28C	Subtotal	Reach 29	Reach 30	Subtotal	Reach 31	Reach 32A	Reach 33A	Reach 34	Reach 35	Subtotal	
1952	7,516	3,412	41,087	4,771	1,581	6,352	0	0	0	0	0	0	99,498
1953	25,193	11,435	137,720	16,005	5,304	21,309	0	0	0	0	0	0	320,624
1954	27,908	12,668	152,566	17,753	5,883	23,636	0	0	0	0	0	0	397,683
1955	10,859	4,929	59,364	6,870	2,339	9,209	0	0	0	0	0	0	185,865
1956	13,747	6,240	75,150	8,679	2,939	11,618	0	0	0	0	0	0	304,695
1957	38,579	17,511	210,897	24,490	8,116	32,606	0	0	0	0	0	0	723,762
1958	57,612	26,150	314,943	36,572	12,119	48,691	0	0	0	0	0	0	1,247,987
1959	69,319	38,976	412,176	68,605	33,584	102,189	11,823	5,721	28,978	4,584	4,584	55,690	2,024,450
1960	148,700	75,262	860,647	101,156	45,064	146,220	23,075	11,783	58,583	7,874	11,349	112,664	2,716,850
1961	124,831	80,827	1,700,115	102,455	90,563	193,018	11,769	7,299	35,636	2,465	5,898	63,067	4,889,703
1962	126,376	64,807	981,971	421,978	230,963	652,941	14,154	11,654	56,901	2,353	4,975	90,037	6,513,413
1963	392,966	945,492	3,661,078	777,079	217,392	994,471	25,904	21,754	106,209	5,159	11,443	170,469	21,894,272
1964	2,635,600	788,000	6,289,100	1,025,400	3,346,200	4,371,600	226,300	493,000	316,500	38,000	67,100	1,140,900	58,710,900
1965	2,651,000	1,236,300	8,522,200	1,215,900	4,933,500	6,149,400	186,500	649,000	621,900	67,500	118,100	1,643,000	110,423,600
1966	336,000	1,956,200	10,699,100	4,927,100	8,832,100	13,759,200	1,681,700	1,905,800	523,200	64,800	113,800	4,289,300	140,859,800
1967	79,900	2,068,300	18,830,000	10,092,100	25,700,400	35,792,500	1,290,000	1,679,300	535,800	69,300	121,700	3,696,100	169,494,800
1968	578,700	786,300	44,450,800	16,501,600	20,765,000	37,266,600	0	0	325,400	41,800	74,300	441,500	137,413,200
1969	2,104,500	3,556,500	61,305,100	19,803,800	24,380,400	44,184,200	16,000	25,000	504,400	64,800	114,100	724,300	160,846,900
1970	27,737,200	7,116,800	88,511,900	10,328,600	3,673,300	14,001,900	0	0	331,400	42,800	75,100	449,300	151,764,500
1971	27,731,300	7,113,500	54,189,000	485,000	0	485,000	0	0	325,200	42,000	86,700	453,900	77,782,900
1972	0	3,538,000	3,627,000	5,175,000	0	5,175,000	0	0	480,200	66,000	123,700	669,900	14,085,900
1973	0	0	1,046,000	5,243,000	0	5,243,000	0	0	509,200	78,000	215,700	802,900	13,354,900
1974	0	0	1,912,000	727,000	0	727,000	0	0	636,200	83,000	260,700	979,900	18,138,900
1975	0	0	1,045,000	727,000	0	727,000	0	0	1,926,800	83,900	243,600	2,254,300	13,932,300
1976	0	0	956,000	0	0	0	20,000	0	5,783,800	83,900	167,600	6,055,300	13,287,300
1977	0	0	1,406,000	0	0	0	253,000	0	6,982,800	435,900	225,600	7,897,300	9,303,300
1978	0	0	4,813,000	0	0	0	0	0	8,086,800	1,553,900	2,889,600	12,530,300	17,343,300
1979	0	0	4,813,000	0	0	0	0	0	3,319,800	482,900	2,875,600	6,678,300	11,491,300
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	20,000	0	50,000	0	0	70,000	70,000
1984	0	0	0	0	0	0	253,000	0	650,000	0	0	903,000	903,000
1985	0	0	0	0	0	0	0	0	32,000	0	0	32,000	32,000
1986	0	0	0	0	0	0	0	0	688,000	0	0	688,000	688,000
1987	0	0	0	0	0	0	0	0	648,000	0	0	648,000	648,000
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	64,897,806	29,447,609	321,022,914	77,837,913	92,286,747	170,124,660	4,033,225	4,810,311	33,563,707	3,320,935	7,811,249	53,539,427	1,161,893,602

TABLE C-7

DIRECT ANNUAL OPERATING COSTS[1] OF PUMPING AND POWER RECOVERY PLANTS

(in dollars)

Calendar Year	NORTH BAY AQUEDUCT		SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT												
	Calhoun PP	Cordelia PP	South Bay & Del Valle PP's	Delta PP	Mile 18 PP	Buena Vista PP	Wheeler Ridge PP I	Wheeler Ridge PP II	Tehachapi PP	Cottonwood Pwp	West Branch PP & Ruby & Castaic Pwp's	Pear-blossom PP	Devil Canyon Pwp's Nos. 1 & 2	Avenal PP	Pyramid, Sawtooth & Polonio PP's & San Luis Obispo Pwp	Total California Aqueduct
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1962			41,691													
63			63,108													
64			104,500													
65			178,800													
66			249,800													
67			248,800	79,800												79,800
68		17,600	562,300	556,000	329,900									60,400		946,300
69		18,600	566,300	543,000	350,900									62,400		956,300
1970		19,600	572,300	605,000	440,900									63,400		1,109,300
71		20,600	603,300	845,000	702,900	214,600	271,300	659,100	2,268,000	-64,400	-794,400			65,400		4,167,500
72		22,600	608,300	896,000	1,036,900	448,600	535,300	1,247,100	4,425,400	-152,400	-614,400	1,079,800	-1,082,800	67,400		7,886,900
73		23,600	612,300	896,000	1,135,600	512,600	597,300	1,348,100	4,933,500	-168,400	-878,400	952,800	-1,298,800	117,400		8,147,700
74		24,600	618,300	1,457,800	1,317,500	736,000	744,300	1,711,100	6,038,800	-188,300	-976,900	1,171,800	-1,727,800	119,400		10,403,700
75		26,600	649,300	1,701,000	1,501,700	865,000	933,800	2,096,900	7,222,200	-234,300	-1,233,900	1,456,600	-2,155,800	122,400		12,275,600
76		40,700	653,300	2,410,000	1,699,800	1,000,000	1,077,800	2,415,900	8,407,600	-276,300	-1,441,200	1,751,400	-2,572,800	124,400		14,596,600
77		44,700	657,300	2,993,000	1,902,000	1,137,000	1,221,800	2,736,900	9,838,600	-332,300	-1,700,200	1,969,400	-2,997,800	127,400		16,895,800
78		46,700	666,300	3,482,000	2,104,200	1,272,000	1,365,800	3,054,900	10,924,800	-374,300	-1,953,200	2,264,500	-3,434,800	132,000		18,837,900
79		47,700	668,300	4,013,000	2,303,400	1,459,000	1,687,800	3,767,900	13,484,800	-477,300	-2,553,200	2,483,500	-3,863,800	181,000		22,486,100
1980	8,500	49,700	701,700	4,529,000	2,509,600	1,811,000	2,062,800	4,598,900	16,026,800	-584,300	-2,980,200	2,964,500	-4,173,800	186,000	143,400	27,093,700
81	8,500	51,700	706,700	4,874,000	2,693,700	2,099,000	2,345,800	5,228,900	18,602,800	-678,300	-3,387,200	3,359,500	-4,603,800	187,000	147,400	30,868,800
82	8,500	70,900	710,700	5,212,000	2,873,900	2,391,000	2,625,800	5,848,900	20,710,800	-772,300	-3,949,000	3,532,500	-4,931,800	191,000	155,400	33,888,200
83	8,500	72,900	716,700	5,531,000	3,062,100	2,694,000	2,906,800	6,474,900	23,051,800	-851,300	-4,434,200	3,917,500	-5,254,800	194,000	162,400	37,454,200
84	8,500	74,900	723,700	5,876,000	3,246,100	3,001,000	3,190,800	7,104,900	25,386,800	-961,300	-4,687,200	4,101,500	-5,580,800	198,000	207,400	41,083,200
85	11,700	77,900	806,700	6,176,000	3,432,200	3,312,000	3,474,800	7,735,900	27,723,800	-1,055,300	-5,522,200	4,487,500	-5,908,800	206,500	343,700	44,406,100
86	11,700	96,000	812,700	5,051,000	3,618,300	3,624,000	3,760,800	8,371,900	30,077,800	-1,150,300	-5,740,200	4,672,500	-6,247,800	259,500	461,700	46,759,200
87	11,700	99,000	817,700	5,204,000	3,811,500	3,950,000	4,054,800	9,023,900	32,461,800	-1,247,300	-5,996,200	5,091,500	-6,613,800	263,500	486,900	50,490,600
88	14,900	101,000	823,700	5,363,000	4,006,700	4,277,000	4,349,800	9,678,900	34,863,800	-1,329,300	-6,484,200	5,287,500	-6,985,800	269,500	597,900	53,894,800
89	15,900	104,000	834,200	5,689,000	4,194,900	4,591,000	4,645,800	10,337,900	37,249,800	-1,442,300	-7,051,200	5,696,500	-7,352,800	278,500	705,200	57,542,300
1990	15,900	106,000	845,600	5,851,000	4,275,900	4,916,000	4,939,800	10,989,900	39,645,800	-1,536,300	-7,277,200	5,892,500	-7,722,800	288,500	830,200	61,093,300
91	15,900	107,000	856,600	6,035,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,267,300
92	15,900	107,000	869,600	6,041,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,273,300
93	15,900	107,000	932,600	6,044,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,276,300
94	15,900	107,000	943,600	6,050,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,282,300
95	15,900	107,000	947,600	6,053,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,285,300
96	15,900	107,000	952,600	6,053,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,285,300
97	15,900	107,000	956,600	6,056,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,288,300
98	15,900	107,000	956,600	6,056,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,288,300
99	15,900	107,000	956,600	6,056,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,288,300
2000[2]	15,900	107,000	956,600	6,056,000	4,278,900	4,931,000	4,956,800	11,027,900	39,687,800	-1,539,300	-7,277,200	5,995,500	-7,947,800	288,500	830,200	61,288,300

1/ Includes only the costs allocated to transportation of electrical power and energy, materials, supplies, and replacements associated with the operation of electro-mechanical units, prior to allocation between losses and deliveries.

2/ And thereafter for the remainder of the project repayment period.

TABLE C-8

ACTUAL AND PROJECTED MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

Calendar Year	NORTH BAY AQUEDUCT: CALHOUN DIVISION Reach 1	CALHOUN DIVISION Reach 2	CORDELIA DIVISION Reach 3	TOTAL NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT: LIVERMORE DIVISION Reach 1	LIVERMORE DIVISION Reach 2	ALAMEDA DIVISION Reach 4	DEL VALLE DIVISION Reach 5	NILES DIVISION Reach 6	NILES DIVISION Reach 7	NILES DIVISION Reach 8	SANTA CLARA DIVISION Reach 9	TOTAL SOUTH BAY AQUEDUCT
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962					63,470	5,878							69,348
1963					135,276	17,998							153,274
1964					126,000	15,500							141,500
1965					191,100	16,600	51,400		3,100	19,100	37,100	74,400	392,800
1966					244,900	26,500	104,200		6,300	38,100	74,500	150,100	644,600
1967					274,100	35,300	138,800	173,900	8,400	50,600	99,100	199,500	979,700
1968			151,200	151,200	294,600	40,000	157,400	176,800	9,500	57,300	112,400	226,300	1,074,300
1969			152,000	152,000	304,100	40,400	158,900	185,400	9,500	57,900	113,400	228,400	1,098,000
1970			152,000	152,000	302,100	40,800	160,700	182,700	9,600	58,600	114,700	231,000	1,100,200
1971			151,400	151,400	301,800	40,800	160,500	181,900	9,700	58,400	114,600	230,600	1,098,300
1972			151,400	151,400	301,600	40,800	160,500	181,900	9,700	58,400	114,600	230,600	1,098,100
1973			151,400	151,400	301,300	40,800	160,500	181,900	9,700	58,400	114,600	230,600	1,097,800
1974			151,400	151,400	301,100	40,800	160,500	181,900	9,700	58,400	114,600	230,600	1,097,600
1975			151,400	151,400	301,700	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,097,800
1976			151,400	151,400	301,500	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,097,600
1977			151,400	151,400	301,200	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,097,300
1978			151,400	151,400	301,100	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,097,200
1979			151,400	151,400	300,800	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,096,900
1980	122,000	24,000	108,000	254,000	301,500	40,800	160,400	181,800	9,700	58,400	114,500	230,500	1,097,600
1981	121,100	23,900	107,400	252,400	299,700	40,600	159,600	180,900	9,600	58,100	113,900	229,300	1,091,700
1982	121,000	23,900	107,400	252,300	299,400	40,600	159,600	180,900	9,600	58,100	113,900	229,300	1,091,400
1983	120,900	23,900	107,400	252,200	299,300	40,600	159,600	180,900	9,600	58,100	113,900	229,300	1,091,300
1984	120,700	23,900	107,200	251,800	298,600	40,500	159,300	180,500	9,600	58,000	113,800	229,000	1,089,300
1985	120,800	23,900	107,200	251,900	300,800	40,500	159,300	180,500	9,600	58,000	113,800	229,000	1,091,500
1986	120,800	23,900	107,200	251,900	300,500	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,091,500
1987	120,700	23,900	107,200	251,800	300,300	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,091,300
1988	120,700	23,900	107,200	251,800	300,100	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,091,100
1989	120,700	23,900	107,200	251,800	299,800	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,800
1990	120,600	23,900	107,200	251,700	299,500	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,500
1991	120,600	23,900	107,200	251,700	299,000	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,000
1992	120,600	23,900	107,200	251,700	298,700	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,089,700
1993	120,600	23,900	107,200	251,700	299,600	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,600
1994	120,600	23,900	107,200	251,700	299,300	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,300
1995	120,600	23,900	107,200	251,700	299,200	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,200
1996	120,600	23,900	107,200	251,700	299,100	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,090,100
1997	120,600	23,900	107,200	251,700	298,900	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,089,900
1998	120,600	23,900	107,200	251,700	298,900	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,089,900
1999	120,600	23,900	107,200	251,700	298,900	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,089,900
2000 *	120,600	23,900	107,200	251,700	298,900	40,500	159,300	180,500	9,600	58,000	113,800	229,300	1,089,900

* and thereafter for the remainder of the project repayment period.

TABLE C-8 (Continued)

ACTUAL AND PROJECTED MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT

Calendar Year	NORTH SAN JOAQUIN DIVISION			SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 1	Reach 2	Subtotal	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8	Reach 9	Reach 10	Reach 11A
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967	338,100		338,100										
1968	513,300	888,800	1,402,100	78,500	447,400	287,400	120,600	208,400	1,142,300	119,700	91,600	113,500	69,200
1969	530,000	897,400	1,427,400	88,300	464,300	322,700	136,100	234,600	1,246,000	132,200	101,200	124,700	76,300
1970	535,100	907,100	1,442,200	88,500	504,600	323,400	136,500	235,100	1,288,100	158,800	121,700	148,300	91,500
1971	550,800	905,200	1,456,000	90,300	516,500	330,100	139,400	240,100	1,316,400	221,700	170,000	204,200	127,500
1972	536,100	905,200	1,441,300	94,200	562,500	344,000	145,600	250,500	1,396,800	235,400	180,600	216,500	135,300
1973	524,100	905,200	1,429,300	94,200	563,300	344,000	145,600	250,500	1,397,600	235,400	180,600	216,500	135,300
1974	586,500	905,200	1,491,700	94,200	560,400	344,000	145,600	250,500	1,394,700	235,400	180,600	216,500	135,300
1975	592,300	905,000	1,497,300	94,100	558,100	343,900	145,600	250,400	1,392,100	235,400	180,600	216,400	135,200
1976	649,400	905,000	1,554,400	94,100	556,900	343,900	145,600	250,400	1,390,900	235,400	180,600	216,400	135,200
1977	681,500	905,000	1,586,500	94,100	555,900	343,900	145,600	250,400	1,389,900	235,400	180,600	216,400	135,200
1978	698,900	905,000	1,603,900	94,100	555,200	343,900	145,600	250,400	1,389,200	235,400	180,600	216,400	135,200
1979	717,300	905,000	1,622,300	94,100	554,600	343,900	145,600	250,400	1,388,600	235,400	180,600	216,400	135,200
1980	734,900	905,000	1,639,900	94,100	556,600	343,900	145,600	250,400	1,390,600	235,400	180,600	216,400	135,200
1981	734,200	900,500	1,634,700	93,700	553,800	342,200	144,900	249,200	1,383,800	234,200	179,700	215,400	134,600
1982	736,200	900,500	1,636,700	93,700	553,800	342,200	144,900	249,200	1,383,800	234,200	179,700	215,400	134,600
1983	735,900	900,500	1,636,400	93,700	553,800	342,200	144,900	249,200	1,383,800	234,200	179,700	215,400	134,600
1984	736,500	898,900	1,635,400	93,500	552,700	341,600	144,600	248,700	1,381,100	233,800	179,400	215,000	134,300
1985	735,000	898,900	1,633,900	93,500	552,600	341,600	144,600	248,700	1,381,000	233,800	179,400	215,000	134,300
1986	653,000	898,900	1,551,900	93,500	552,400	341,600	144,600	248,700	1,380,800	233,800	179,400	215,000	134,300
1987	647,100	898,900	1,546,000	93,500	552,300	341,600	144,600	248,700	1,380,700	233,800	179,400	215,000	134,300
1988	641,700	898,900	1,540,600	93,500	552,000	341,600	144,600	248,700	1,380,400	233,800	179,400	215,000	134,300
1989	645,500	898,900	1,544,400	93,500	551,900	341,600	144,600	248,700	1,380,300	233,800	179,400	215,000	134,300
1990	640,500	898,900	1,539,400	93,500	547,200	341,600	144,600	248,700	1,375,600	233,800	179,400	215,000	134,300
1991	648,300	898,900	1,547,200	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1992	648,200	898,900	1,547,100	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1993	648,000	898,900	1,546,900	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1994	647,900	898,900	1,546,800	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1995	647,900	898,900	1,546,800	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1996	647,800	898,900	1,546,700	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1997	647,800	898,900	1,546,700	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1998	647,800	898,900	1,546,700	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
1999	647,800	898,900	1,546,700	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300
2000 *	647,800	898,900	1,546,700	93,500	547,000	341,600	144,600	248,700	1,375,400	233,800	179,400	215,000	134,300

* and thereafter for the remainder of the project repayment period.

TABLE C-8 (Continued)

ACTUAL AND PROJECTED MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	SOUTH SAN JOAQUIN DIVISION (Cont.)									TEHACHAPI DIVISION		
	Reach 12B	Reach 12C	Reach 13A	Reach 14A	Reach 14B	Reach 14C	Reach 15	Reach 16	Subtotal	Reach 17A	Reach 17B	Subtotal
1952												
1953												
1954												
1955												
1956												
1957												
1958												
1959												
1960												
1961												
1962												
1963												
1964												
1965												
1966												
1967												
1968									394,000			
1969									434,400			
1970	193,300	140,400							854,000			
1971	269,300	197,200	146,400	483,100	145,100	123,800	311,100	578,400	2,977,800	675,000	110,300	785,300
1972	285,900	209,500	155,500	532,500	154,000	131,200	356,200	689,700	3,282,300	1,035,300	117,200	1,152,500
1973	285,900	209,500	155,500	494,700	154,000	131,200	318,200	650,500	3,167,300	1,013,100	117,200	1,130,300
1974	285,900	209,500	155,500	481,600	154,000	131,200	394,700	625,000	3,205,200	975,800	117,200	1,093,000
1975	285,800	209,400	155,500	480,500	154,000	131,200	298,200	629,100	3,111,300	975,700	117,200	1,092,900
1976	285,800	209,400	155,500	479,900	154,000	131,200	297,600	627,500	3,108,500	975,900	117,200	1,093,100
1977	285,800	209,400	155,500	479,500	154,000	131,200	297,100	626,300	3,106,400	990,000	117,200	1,107,200
1978	285,800	209,400	155,500	479,100	154,000	131,200	296,800	625,400	3,104,800	984,200	117,200	1,101,400
1979	285,800	209,400	155,500	481,500	154,000	131,200	304,900	642,900	3,132,800	1,044,500	117,200	1,161,700
1980	285,800	209,400	155,500	491,100	154,000	131,200	313,700	662,200	3,170,500	1,093,500	117,200	1,210,700
1981	284,400	208,400	154,700	495,300	153,200	130,500	317,500	671,000	3,178,900	1,143,000	116,600	1,259,600
1982	284,400	208,400	154,700	501,500	153,200	130,500	322,500	681,700	3,200,800	1,176,100	116,600	1,292,700
1983	284,400	208,400	154,700	507,300	153,200	130,500	326,900	691,400	3,220,700	1,212,900	116,600	1,329,500
1984	283,900	208,000	154,400	511,500	153,000	130,300	330,100	698,900	3,232,600	1,243,700	116,400	1,360,100
1985	283,900	208,000	154,400	516,300	153,000	130,300	333,800	706,800	3,249,000	1,273,400	116,400	1,389,800
1986	283,900	208,000	154,400	520,500	153,000	130,300	337,000	713,900	3,263,500	1,299,500	116,400	1,415,900
1987	283,900	208,000	154,400	524,500	153,000	130,300	340,000	720,400	3,277,000	1,322,100	116,400	1,438,500
1988	283,900	208,000	154,400	528,100	153,000	130,300	342,700	726,300	3,289,200	1,342,300	116,400	1,458,700
1989	283,900	208,000	154,400	531,100	153,000	130,300	345,200	731,800	3,300,200	1,360,600	116,400	1,477,000
1990	283,900	208,000	154,400	534,000	153,000	130,300	347,400	736,600	3,310,100	1,377,200	116,400	1,493,600
1991	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1992	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1993	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1994	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1995	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1996	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1997	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1998	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
1999	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200
2000 *	283,900	208,000	154,400	534,100	153,000	130,300	347,600	736,900	3,310,700	1,375,800	116,400	1,492,200

* and thereafter for the remainder of the project repayment period.

TABLE C-8 (Continued)

ACTUAL AND PROJECTED MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	ANTELOPE DIVISION			EAST BRANCH DIVISION									
	Reach 18A	Reach 19	Subtotal	Reach 20	Reach 21	Reach 22A	Reach 22B	Reach 23	Reach 24	Reach 25	Reach 26	Reach 27	Reach 28A
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967													
1968													
1969													
1970													
1971	92,700	225,600	318,300										
1972	81,700	267,800	349,500	385,600	108,400	78,600	875,800	14,900	74,100	61,100	76,100	96,700	99,100
1973	50,400	267,800	318,200	385,600	108,400	78,600	845,800	14,900	74,100	61,100	44,000	65,100	99,100
1974	32,200	267,800	300,000	385,600	108,400	78,600	821,000	14,900	74,100	61,100	21,900	43,900	99,100
1975	31,500	267,700	299,200	385,500	108,400	78,500	824,200	14,900	74,100	61,100	21,200	43,400	99,100
1976	31,300	267,700	299,000	385,500	108,400	78,500	827,200	14,900	74,100	61,100	21,100	43,200	99,100
1977	30,300	267,700	298,000	385,500	108,400	78,500	824,900	14,900	74,100	61,100	20,900	43,000	99,100
1978	30,300	267,700	298,000	385,500	108,400	78,500	827,200	14,900	74,100	61,100	20,300	42,900	99,100
1979	27,400	267,700	295,100	385,500	108,400	78,500	825,400	14,900	74,100	61,100	20,100	42,800	99,100
1980	24,800	267,700	292,500	385,500	108,400	78,500	835,400	14,900	74,100	61,100	21,400	43,600	99,100
1981	22,200	266,400	288,600	383,600	107,800	78,200	835,800	14,800	73,700	60,800	20,000	42,600	98,600
1982	20,200	266,400	286,600	383,600	107,800	78,200	833,800	14,800	73,700	60,800	19,900	42,500	98,600
1983	19,100	266,400	285,500	383,600	107,800	78,200	839,400	14,800	73,700	60,800	19,800	42,500	98,600
1984	16,700	265,900	282,600	382,900	107,600	78,000	836,200	14,800	73,600	60,700	19,300	42,100	98,400
1985	15,400	265,900	281,300	382,900	107,600	78,000	841,100	14,800	73,600	60,700	19,200	42,100	98,400
1986	14,200	265,900	280,100	382,900	107,600	78,000	839,200	14,800	73,600	60,700	19,000	42,000	98,400
1987	13,100	265,900	279,000	382,900	107,600	78,000	843,500	14,800	73,600	60,700	19,000	42,000	98,400
1988	12,500	265,900	278,400	382,900	107,600	78,000	841,400	14,800	73,600	60,700	18,800	41,900	98,400
1989	11,200	265,900	277,100	382,900	107,600	78,000	844,900	14,800	73,600	60,700	18,800	41,800	98,400
1990	10,500	265,900	276,400	382,900	107,600	78,000	843,000	14,800	73,600	60,700	18,700	41,800	98,400
1991	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1992	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1993	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1994	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1995	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1996	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1997	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1998	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
1999	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400
2000 *	10,500	265,900	276,400	382,900	107,600	78,000	842,000	14,800	73,600	60,700	18,600	41,700	98,400

* and thereafter for the remainder of the project repayment period.

TABLE C-8 (Continued)

ACTUAL AND PROJECTED MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	EAST BRANCH DIVISION (Cont.)			WEST BRANCH DIVISION			COASTAL DIVISION						TOTAL CALIFORNIA AQUEDUCT
	Reach 28B	Reach 28C	Subtotal	Reach 29	Reach 30	Subtotal	Reach 31	Reach 32A	Reach 33A	Reach 34	Reach 35	Subtotal	
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967													338,100
1968							113,900	91,100				205,000	3,143,400
1969							115,600	101,100				216,700	3,324,500
1970							122,100	122,700				244,800	3,829,100
1971				443,200	72,200	515,400	128,500	173,900				302,400	7,671,600
1972	301,600	46,300	2,218,300	486,400	83,300	569,700	130,500	185,100				315,600	10,726,000
1973	301,600	46,300	2,124,600	388,000	83,300	471,300	115,300	185,100				300,400	10,339,000
1974	301,600	46,300	2,056,500	329,600	83,300	412,900	104,700	185,100				289,800	10,243,800
1975	301,600	46,300	2,058,300	327,100	83,200	410,300	104,300	185,000				289,300	10,150,700
1976	301,600	46,300	2,061,000	327,000	83,200	410,200	104,100	185,000				289,100	10,206,200
1977	301,600	46,300	2,058,300	325,500	83,200	408,700	103,900	185,000				288,900	10,243,900
1978	301,600	46,300	2,059,900	324,500	83,200	407,700	103,600	185,000				288,600	10,253,500
1979	301,600	46,300	2,057,800	315,800	83,200	399,000	104,400	185,000				289,400	10,346,700
1980	301,600	46,300	2,069,900	312,400	83,200	395,600	110,400	185,000	1,299,100	164,300	288,400	2,047,200	12,216,900
1981	300,000	46,100	2,062,000	303,900	82,800	386,700	109,600	184,100	1,280,100	163,500	287,000	2,024,300	12,218,600
1982	300,000	46,100	2,059,800	297,200	82,800	380,000	109,100	184,100	1,259,400	163,500	287,000	2,003,100	12,243,500
1983	300,000	46,100	2,065,300	292,600	82,800	375,400	108,700	184,100	1,249,600	163,500	287,000	1,992,900	12,289,500
1984	299,500	46,000	2,059,100	291,100	82,700	373,800	108,100	183,800	1,244,500	163,200	286,500	1,986,100	12,310,800
1985	299,500	46,000	2,063,900	281,600	82,700	364,300	107,500	183,800	1,246,000	163,200	286,500	1,987,000	12,350,200
1986	299,500	46,000	2,061,700	282,500	82,700	365,200	108,600	183,800	1,246,900	163,200	286,500	1,989,000	12,308,100
1987	299,500	46,000	2,066,000	282,700	82,700	365,400	108,100	183,800	1,242,400	163,200	286,500	1,984,000	12,336,600
1988	299,500	46,000	2,063,600	279,800	82,700	362,500	107,600	183,800	1,242,400	163,200	286,500	1,983,500	12,356,900
1989	299,500	46,000	2,067,000	276,100	82,700	358,800	107,000	183,800	1,240,300	163,200	286,500	1,980,800	12,385,600
1990	299,500	46,000	2,065,000	277,100	82,700	359,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,399,100
1991	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,700
1992	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,600
1993	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,400
1994	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,300
1995	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,300
1996	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,200
1997	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,200
1998	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,200
1999	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,200
2000*	299,500	46,000	2,063,800	275,100	82,700	357,800	106,600	183,800	1,239,100	163,200	286,500	1,979,200	12,402,200

* and thereafter for the remainder of the project repayment period.

TABLE C-9

ACTUAL AND PROJECTED VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

Calendar Year	NORTH BAY AQUEDUCT: CALHOUN DIVISION Reach 1	CALHOUN DIVISION Reach 2	CORDELIA DIVISION Reach 3	TOTAL NORTH BAY AQUEDUCT	SOUTH BAY AQUEDUCT: LIVERMORE DIVISION Reach 1	LIVERMORE DIVISION Reach 2	ALAMEDA DIVISION Reach 4	DEL VALLE DIVISION Reach 5	NILES DIVISION Reach 6	NILES DIVISION Reach 7	NILES DIVISION Reach 8	SANTA CLARA DIVISION Reach 9	TOTAL SOUTH BAY AQUEDUCT
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962					40,457								40,457
1963					61,856								61,856
1964					101,300								101,300
1965					174,400								174,400
1966					205,400								205,400
1967					232,900								232,900
1968			17,600	17,600	539,400								539,400
1969			18,600	18,600	543,600								543,600
1970			19,600	19,600	549,800								549,800
1971			20,600	20,600	580,000								580,000
1972			22,600	22,600	585,200								585,200
1973			23,600	23,600	589,500								589,500
1974			24,600	24,600	595,700								595,700
1975			26,600	26,600	626,000								626,000
1976			40,700	40,700	630,200								630,200
1977			44,700	44,700	634,500								634,500
1978			46,700	46,700	643,600								643,600
1979			47,700	47,700	645,900								645,900
1980	7,400		49,700	57,100	678,600								678,600
1981	7,600		51,700	59,300	683,800								683,800
1982	7,700		70,900	78,600	688,100								688,100
1983	7,800		72,900	80,700	694,200								694,200
1984	7,800		74,900	82,700	701,400								701,400
1985	10,900		77,900	88,800	782,200								782,200
1986	10,900		96,000	106,900	788,500								788,500
1987	11,000		99,000	110,000	793,700								793,700
1988	14,200		101,000	115,200	799,900								799,900
1989	15,200		104,000	119,200	810,700								810,700
1990	15,300		106,000	121,300	822,400								822,400
1991	15,300		107,000	122,300	833,900								833,900
1992	15,300		107,000	122,300	847,200								847,200
1993	15,300		107,000	122,300	909,300								909,300
1994	15,300		107,000	122,300	920,600								920,600
1995	15,300		107,000	122,300	924,700								924,700
1996	15,300		107,000	122,300	929,800								929,800
1997	15,300		107,000	122,300	934,000								934,000
1998	15,300		107,000	122,300	934,000								934,000
1999	15,300		107,000	122,300	934,000								934,000
2000*	15,300		107,000	122,300	934,000								934,000

* and thereafter for the remainder of the project repayment period.

TABLE C-9 (continued)

ACTUAL AND PROJECTED VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT

Calendar Year	NORTH SAN JOAQUIN DIVISION			SAN LUIS DIVISION						SOUTH SAN JOAQUIN DIVISION			
	Reach 1	Reach 2	Subtotal	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Subtotal	Reach 8	Reach 9	Reach 10	Reach 11A
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967	74,000		74,000										
1968	360,000		360,000		225,500				225,500				
1969	389,600		389,600		247,500				247,500				
1970	444,600		444,600		323,400				323,400				
1971	564,300		564,300		454,400				454,400				
1972	650,500		650,500		749,200				749,200				
1973	743,500		743,500		958,300				958,300				
1974	1,242,900		1,242,900		1,143,100				1,143,100				
1975	1,480,100		1,480,100		1,329,400				1,329,400				
1976	2,132,000		2,132,000		1,528,700				1,528,700				
1977	2,682,900		2,682,900		1,731,900				1,731,900				
1978	3,154,500		3,154,500		1,934,800				1,934,800				
1979	3,667,100		3,667,100		2,134,600				2,134,600				
1980	4,165,500		4,165,500		2,338,800				2,338,800				
1981	4,508,100		4,508,100		2,523,000				2,523,000				
1982	4,844,100		4,844,100		2,703,200				2,703,200				
1983	5,163,400		5,163,400		2,891,400				2,891,400				
1984	5,506,600		5,506,600		3,075,500				3,075,500				
1985	5,808,100		5,808,100		3,261,700				3,261,700				
1986	4,765,100		4,765,100		3,448,000				3,448,000				
1987	4,924,000		4,924,000		3,641,300				3,641,300				
1988	5,088,400		5,088,400		3,836,800				3,836,800				
1989	5,410,600		5,410,600		4,025,100				4,025,100				
1990	5,577,600		5,577,600		4,110,800				4,110,800				
1991	5,753,800		5,753,800		4,114,000				4,114,000				
1992	5,759,900		5,759,900		4,114,000				4,114,000				
1993	5,763,100		5,763,100		4,114,000				4,114,000				
1994	5,769,200		5,769,200		4,114,000				4,114,000				
1995	5,772,200		5,772,200		4,114,000				4,114,000				
1996	5,772,300		5,772,300		4,114,000				4,114,000				
1997	5,775,300		5,775,300		4,114,000				4,114,000				
1998	5,775,300		5,775,300		4,114,000				4,114,000				
1999	5,775,300		5,775,300		4,114,000				4,114,000				
2000*	5,775,300		5,775,300		4,114,000				4,114,000				

* and thereafter for the remainder of the project repayment period.

TABLE C-9 (continued)

ACTUAL AND PROJECTED VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	SOUTH SAN JOAQUIN DIVISION (Cont.)									TEHACHAPI DIVISION		
	Reach 12B	Reach 12C	Reach 13A	Reach 14A	Reach 14B	Reach 14C	Reach 15	Reach 16	Subtotal	Reach 17A	Reach 17B	Subtotal
1952												
1953												
1954												
1955												
1956												
1957												
1958												
1959												
1960												
1961												
1962												
1963												
1964												
1965												
1966												
1967												
1968												
1969												
1970												
1971				114,900			149,700	365,000	629,600	1,280,300		1,280,300
1972				300,300			368,900	849,200	1,518,400	3,036,400		3,036,400
1973				448,000			528,900	1,227,500	2,204,400	4,389,100		4,389,100
1974				661,400			676,100	1,556,200	2,893,700	5,503,800		5,503,800
1975				791,300			862,000	1,937,700	3,591,000	6,686,900		6,686,900
1976				926,900			1,006,600	2,258,300	4,191,800	7,872,100		7,872,100
1977				1,064,300			1,151,100	2,580,500	4,795,900	9,289,000		9,289,000
1978				1,199,700			1,295,400	2,899,400	5,394,500	10,399,000		10,399,000
1979				1,384,300			1,609,300	3,594,900	6,588,500	12,880,700		12,880,700
1980				1,726,700			1,975,500	4,406,600	8,108,800	15,373,700		15,373,700
1981				2,007,700			2,252,800	5,024,100	9,284,600	17,894,000		17,894,000
1982				2,293,500			2,527,800	5,633,400	10,454,700	19,968,900		19,968,900
1983				2,590,700			2,804,400	6,249,700	11,644,800	22,273,100		22,273,100
1984				2,892,500			3,084,400	6,870,900	12,847,800	24,575,100		24,575,100
1985				3,198,700			3,364,700	7,494,000	14,057,400	26,882,400		26,882,400
1986				3,506,500			3,647,500	8,122,900	15,276,900	29,210,300		29,210,300
1987				3,828,500			3,938,500	8,768,400	16,535,400	31,571,700		31,571,700
1988				4,151,900			4,230,800	9,417,500	17,800,200	33,953,500		33,953,500
1989				4,462,900			4,524,300	10,071,000	19,058,200	36,321,200		36,321,200
1990				4,785,000			4,816,100	10,718,200	20,319,300	38,700,600		38,700,600
1991				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1992				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1993				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1994				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1995				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1996				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1997				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1998				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
1999				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000
2000 *				4,799,900			4,832,900	10,755,900	20,388,700	38,744,000		38,744,000

* and thereafter for the remainder of the project repayment period.

TABLE C-9 (continued)

ACTUAL AND PROJECTED VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	ANTELOPE DIVISION			EAST BRANCH DIVISION									
	Reach 18A	Reach 19	Subtotal	Reach 20	Reach 21	Reach 22A	Reach 22B	Reach 23	Reach 24	Reach 25	Reach 26	Reach 27	Reach 28A
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967													
1968													
1969													
1970													
1971	33,700-		33,700-										
1972	101,900-		101,900-				573,700				515,800-	293,400-	
1973	148,600-		148,600-				834,900				778,300-	442,200-	
1974	170,600-		170,600-				1,056,900				1,051,200-	596,700-	
1975	215,900-		215,900-				1,338,300				1,323,600-	751,300-	
1976	257,700-		257,700-				1,630,100				1,585,500-	906,100-	
1977	312,700-		312,700-				1,850,400				1,855,300-	1,060,900-	
1978	354,700-		354,700-				2,143,200				2,138,700-	1,213,800-	
1979	454,800-		454,800-				2,364,000				2,412,500-	1,368,700-	
1980	559,200-		559,200-				2,835,000				2,613,200-	1,480,100-	
1981	651,100-		651,100-				3,225,400				2,886,900-	1,635,900-	
1982	743,100-		743,100-				3,400,400				3,096,800-	1,753,800-	
1983	821,000-		821,000-				3,779,800				3,302,700-	1,870,800-	
1984	928,800-		928,800-				3,965,400				3,510,600-	1,988,700-	
1985	1,021,500-		1,021,500-				4,346,500				3,719,500-	2,107,700-	
1986	1,115,300-		1,115,300-				4,533,400				3,936,300-	2,229,600-	
1987	1,211,200-		1,211,200-				4,948,100				4,170,300-	2,361,600-	
1988	1,292,600-		1,292,600-				5,146,200				4,407,100-	2,496,500-	
1989	1,404,300-		1,404,300-				5,551,700				4,641,100-	2,629,400-	
1990	1,497,600-		1,497,600-				5,749,600				4,877,000-	2,763,400-	
1991	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1992	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1993	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1994	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1995	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1996	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1997	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1998	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
1999	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	
2000*	1,500,600-		1,500,600-				5,853,600				5,020,900-	2,844,300-	

* and thereafter for the remainder of the project repayment period.

TABLE C-9 (continued)

ACTUAL AND PROJECTED VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COSTS ALLOCATED TO TRANSPORTATION FOR EACH AQUEDUCT REACH

(in dollars)

CALIFORNIA AQUEDUCT (continued)

Calendar Year	EAST BRANCH DIVISION (Cont.)			WEST BRANCH DIVISION			COASTAL DIVISION						TOTAL CALIFORNIA AQUEDUCT
	Reach 28B	Reach 28C	Subtotal	Reach 29	Reach 30	Subtotal	Reach 31	Reach 32A	Reach 33A	Reach 34	Reach 35	Subtotal	
1952													
1953													
1954													
1955													
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967													74,000
1968							56,000					56,000	641,500
1969							58,600					58,600	695,700
1970							59,900					59,900	827,900
1971				422,700-		422,700-	62,300					62,300	2,534,500
1972			235,500-	567,800-		567,800-	64,600					64,600	5,113,900
1973			385,600-	828,500-		828,500-	113,200					113,200	7,045,800
1974			591,000-	932,500-		932,500-	115,700					115,700	9,205,100
1975			736,600-	1,187,200-		1,187,200-	119,000					119,000	11,066,700
1976			861,500-	1,394,400-		1,394,400-	121,200					121,200	13,332,200
1977			1,065,800-	1,651,900-		1,651,900-	124,400					124,400	15,593,700
1978			1,209,300-	1,903,900-		1,903,900-	129,300					129,300	17,544,200
1979			1,417,200-	2,495,200-		2,495,200-	117,500					117,500	21,021,200
1980			1,258,300-	2,918,800-		2,918,800-	176,500		68,300			244,800	25,495,300
1981			1,297,400-	3,320,500-		3,320,500-	177,800		85,000			262,800	29,203,500
1982			1,450,200-	3,875,600-		3,875,600-	182,300		113,700			296,000	32,198,000
1983			1,393,700-	4,356,200-		4,356,200-	185,700		130,500			316,200	35,718,000
1984			1,533,900-	4,608,900-		4,608,900-	190,100		178,300			368,400	39,301,800
1985			1,480,700-	5,434,400-		5,434,400-	199,200		313,100			512,300	42,585,300
1986			1,632,500-	5,653,300-		5,653,300-	251,100		430,200			681,300	44,980,500
1987			1,583,800-	5,909,500-		5,909,500-	255,600		459,900			715,500	48,683,400
1988			1,757,400-	6,394,600-		6,394,600-	262,100		570,900			833,000	52,067,300
1989			1,718,800-	6,957,900-		6,957,900-	271,700		680,300			952,000	55,686,100
1990			1,890,800-	7,184,900-		7,184,900-	282,100		806,500			1,088,600	59,223,600
1991			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,394,000
1992			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,400,100
1993			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,403,300
1994			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,409,400
1995			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,412,400
1996			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,412,500
1997			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,415,500
1998			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,415,500
1999			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,415,500
2000 *			2,011,600-	7,182,900-		7,182,900-	282,100		806,500			1,088,600	59,415,500

* *and thereafter for the remainder of the project repayment period.*

TABLE C-10

ALLOCATED CAPITAL COSTS TO EACH CONTRACTOR

(in dollars)

Calendar Year	NORTH BAY AREA				SOUTH BAY AREA				
	Napa County FC & WCD	Solano County FC & WCD	Assumed Elections under Article 8	Total	Alameda County FC & WCD, Zone 7	Alameda County Water District	Santa Clara County FC & WCD	Assumed Elections under Article 8	Total
1952	0	0	0	0	92	105	416	27	640
1953	0	0	0	0	362	432	1861	118	2773
1954	0	0	0	0	990	1235	5661	362	8248
1955	0	0	0	0	1246	1576	7382	472	10676
1956	0	0	0	0	15171	19313	100707	5831	141022
1957	41772	18663	10025	70460	34431	43864	234242	13256	325793
1958	103103	27382	24745	155230	80615	81177	314119	16047	491958
1959	66303	10873	15913	93089	153157	143905	411089	25629	733780
1960	30165	20000	7241	57406	342513	322916	809337	63650	1538416
1961	23008	17911	5521	46440	962455	910572	2236702	154317	4264046
1962	9499	5804	2280	17583	591381	664598	1987920	114294	3358193
1963	25975	16047	6234	48256	586182	1450368	3995244	263638	6295432
1964	133916	52644	32140	218700	1140791	1735403	12497107	534832	15908133
1965	239767	128589	57544	425900	1445926	1344940	6562888	681805	10035559
1966	1040018	36477	249605	1326100	1268144	1171613	3686433	589671	6715861
1967	1751137	80490	420273	2251900	208140-	189653-	674905-	148909-	1221607-
1968	230924	150854	55422	437200	294272-	268754-	856748-	154086-	1573860-
1969	13048	21921	3131	38100	0	0	0	0	0
1970	13048	21921	3131	38100	0	0	0	0	0
1971	12808	21518	3074	37400	940	862	2063	128	3993
1972	12808	21518	3074	37400	1870	1715	4104	256	7945
1973	19260	21518	4622	45400	20289	18615	44535	2774	86213
1974	97485	21518	23397	142400	20289	18615	44535	2774	86213
1975	12808	21518	3074	37400	0	0	0	0	0
1976	20343	34175	4882	59400	0	0	0	0	0
1977	108909	123353	26138	258400	0	0	0	0	0
1978	733004	960476	175920	1869400	6118	5614	13431	837	26000
1979	1161871	1347681	278848	2788400	45418	41673	99698	6211	193000
1980	84677	0	20323	105000	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	9192	4603	2205	16000	0	0	0	0	0
1984	123033	64438	29529	217000	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0
1986	2740	4603	657	8000	0	0	0	0	0
1987	38356	64438	9206	112000	0	0	0	0	0
1988	6452		1548	8000	6118	5614	13431	837	26000
1989	84677		20323	105000	45418	41673	99698	6211	193000
1990									
Total	6250106	3320933	1500025	11071064	6267504	7567991	31640950	2180982	47657427

TABLE C-10 (continued)

ALLOCATED CAPITAL COSTS TO EACH CONTRACTOR

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Devil's Den Water District	Dudley Ridge Water District	Empire West Side Irrigation District	Hacienda Water District	Kern County Water Agency		Tulare Lake Basin Water Storage District	Assumed Elections under Article 8	Total
					Agriculture	Urban			
1952	71	329	20	55	7382	1103	705	1755	11420
1953	187	862	49	144	21160	3260	1823	5190	32675
1954	229	1050	58	175	26239	4092	2214	6474	40531
1955	115	530	30	88	12981	2024	1119	3180	20067
1956	141	655	33	107	23429	3981	1305	6322	35973
1957	177	850	37	135	44065	7952	1535	12628	67379
1958	520	2436	125	401	99898	17375	4843	27957	153555
1959	3279	8097	461	1359	231680	35591	17229	57599	355295
1960	5165	9963	540	1667	279225	40377	20610	65049	422596
1961	5957	19691	1088	3317	483967	71473	41352	115139	741984
1962	13430	50948	2863	8613	1011823	139734	108016	224102	1559529
1963	51574	214898	12671	36463	3920596	527087	468000	841937	6073226
1964	170763	493117	29371	83680	9924638	1338580	1079727	2153063	15272939
1965	250474	814408	47893	137232	17255073	2348132	1765334	3904608	26523154
1966	536925	1045554	55011	175606	22481981	2824795	2136223	4566931	33823026
1967	416388	739969	40566	123832	17551150	2311679	1541134	3750865	26475583
1968	20927	94592	5661	16073	4156193	827707	207766	1370568	6699487
1969	5165	7515	413	1260	3185540	658248	15680	1044614	4918435
1970	0	0	0	0	3135744	427935	0	701977	4265656
1971	337	1521	91	258	667294	130582	3342	83935	887360
1972	670	3025	181	514	72069	17941	6650	16844	117894
1973	7273	32830	1967	5580	845605	123041	72163	197496	1285955
1974	7273	32830	1967	5580	1014111	160312	72163	197496	1491732
1975	0				181452	40128			221580
1976	1718				9374	14621			25713
1977	21740				118580				140320
1978	0				0				0
1979	0				0				0
1980	0				0				0
1981	0				0				0
1982	0				0				0
1983	1718				9374				11092
1984	21740				118580				140320
1985									
1986									
1987									
1988									
1989									
1990									
Total	1543956	3575670	201096	602139	86889203	12077750	7568933	19355729	131814476

TABLE C-10 (continued)

ALLOCATED CAPITAL COSTS TO EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	City of West Covina	Coachella Valley County Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Irrigation District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
1952	2330	431	613	172	1010	50	1346	310	3966	1048
1953	7454	1423	1987	562	3280	173	4373	1003	13031	3437
1954	10233	1746	2537	709	4188	223	5582	1358	15872	4229
1955	5365	796	1221	335	2020	109	2687	703	7180	1940
1956	9844	1273	2067	554	3409	190	4542	1276	11309	3111
1957	22646	3140	4949	1340	8167	449	10888	2954	28119	7664
1958	39670	5188	8382	2253	13838	770	18447	5143	46244	12694
1959	59866	7457	12201	3341	20132	1128	26842	7680	66877	18078
1960	70348	10619	16029	4591	26448	1398	35266	8804	97792	25338
1961	139064	22884	34058	9847	56193	2823	74925	16822	206893	54536
1962	175492	20928	35762	9683	59003	3125	78668	21803	185148	51009
1963	593133	67383	114918	31412	189620	10518	252821	73119	600698	162990
1964	1678164	162157	294018	80338	485133	27766	646842	207031	1459111	390275
1965	3545878	336565	620759	167321	1024257	59151	1365673	441261	2984215	815055
1966	4178133	426126	772496	212429	1274617	71186	1699484	528701	3786465	1022828
1967	4309052	538384	830643	226448	1370566	76744	1827417	569954	4764562	1301909
1968	3103160	603885	863231	256664	1424322	63724	1899069	444207	5538523	1412923
1969	3607638	721705	1022930	301377	1687832	61465	2250380	427682	6538824	1706082
1970	3158992	551293	784796	246570	1294917	39727	1726512	296034	5987200	1282422
1971	1363534	239501	329318	88336	543376	19743	724477	146553	2279453	595170
1972	199199	20857	41390	10428	68294	3957	91058	29596	177272	52139
1973	243025	30737	61000	15368	100652	4279	134199	32017	261261	76841
1974	719522	73790	146439	36894	241628	11291	322164	84460	627192	184469
1975	529924	52017	103230	26008	170332	8473	227105	63379	442132	130039
1976	349827	36045	71534	18023	118034	5478	157375	40978	306381	90112
1977	24585	12659	16340	4117	26962		35946	5	107232	31447
1978		47339							398393	116205
1979		47339							398393	116205
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988										
1989										
1990										
Total	28146078	4043667	6192848	1755120	10218230	473940	13624088	3452833	37339738	9670195

TABLE C-10 (continued)

ALLOCATED CAPITAL COSTS TO EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (Continued)						CENTRAL COASTAL AREA			GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Upper Santa Clara Valley Water Agency	Ventura County Flood Control District	Assumed Elections under Article 8	Total	San Luis Obispo County FC & WCD	Santa Barbara County FC & WCD	Total	
1952	430	53660	552	480	21151	87549	121	246	367	99976
1953	1404	175301	1777	1547	69838	286590	317	641	958	322996
1954	1807	219412	2353	2046	83194	355489	385	779	1164	405432
1955	879	103035	1184	1031	36456	164941	196	394	590	196274
1956	1501	169440	2089	1819	55188	267612	236	477	713	445320
1957	3583	411825	4902	4261	140133	655020	295	600	895	1119547
1958	6091	689751	8464	7359	226567	1090861	874	1772	2646	1894250
1959	8811	1035867	13364	11621	315193	1608458	16961	38015	54976	2845598
1960	11354	1358641	15188	13206	487881	2182903	31850	72524	104374	4305695
1961	23960	2488813	26248	22825	885266	4065157	23404	51068	74472	9192099
1962	25897	3227985	46686	40600	824098	4805887	42845	89944	132789	9873981
1963	83334	10013672	130010	113051	2858253	15294932	125122	260616	385738	28097584
1964	214310	28107921	410181	356681	7392599	41912527	413762	882699	1296461	74608760
1965	454755	54636607	807166	701885	13486393	81446941	664500	1424703	2089203	120520757
1966	561503	71237267	1095878	952940	15259617	103079670	1119663	2343390	3463053	148407710
1967	605281	101414225	1641091	1427031	18950455	139853762	921875	1948187	2870062	170229700
1968	607684	90508953	1311943	1140817	20939503	130118608	164754	383211	547965	136229400
1969	716030	106730125	1476056	1283525	26686914	155218565	209446	500454	709900	160885000
1970	524360	86058750	765854	665962	43666155	147049544	131907	317393	449300	151802600
1971	233682	41682901	230958	200834	27758097	76435933	132173	323441	455614	77820300
1972	31042	10458899	164938	143427	1794254	13286750	195656	477655	673311	14123300
1973	45751	8757103	170233	148029	1062321	11142816	234443	605473	839916	13400300
1974	109830	10161125	147065	127883	2550287	15544039	285075	731841	1016916	18281300
1975	77423	7614403	114544	99604	1797807	11456420	696835	1557465	2254300	13969700
1976	53651	4605924	63225	54978	1245814	7217379	1962140	4082068	6044208	13346700
1977	12255	699686			434766	1406000	2483373	5273607	7756980	9561700
1978		2644577			1606486	4813000	3512029	9018271	12530300	19238700
1979		2644577			1606486	4813000	1687697	4990603	6678300	14472700
1980							0	0	0	105000
1981							0	0	0	0
1982							0	0	0	0
1983							19474	39434	58908	86000
1984							252125	510555	762680	1120000
1985							10578	21422	32000	32000
1986							227436	460564	688000	696000
1987							214213	433787	648000	760000
1988										34000
1989										298000
1990										
Total	4416608	647910445	8651949	7523442	192241172	975660353	15781760	36843299	52625059	1218828379

TABLE C-11

CAPITAL COST COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	NORTH BAY AREA				SOUTH BAY AREA				
	Napa County FC & WCD	Solano County FC & WCD	Assumed Elections under Article 8	Total	Alameda County FC & WCD, Zone 7	Alameda County Water District	Santa Clara County FC & WCD	Assumed Elections under Article 8	Total
1962	0	0	0	**0**	0	0	0	0	**0**
1963	0	0	0	**0**	97346	97605	275155	17739	487845
1964	0	0	0	**0**	99937	159529	445733	28995	**734194**
1965	0	0	0	**0**	139956	233622	979299	51830	**1404707**
1966	31886	13827	7653	**53366**	190679	291044	1259503	80940	**1822166**
1967	76290	15384	18310	**109984**	235165	341066	1416896	106116	**2099243**
1968	151055	18821	36254	**206130**	227863	332969	1388081	99758	**2048671**
1969	160914	25262	38620	**224796**	217540	321494	1351502	93179	**1983715**
1970	161471	26198	38754	**226423**	217540	321494	1351502	93179	**1983715**
1971	162028	27134	38888	**228050**	217540	321494	1351502	93179	**1983715**
1972	162575	28053	39019	**229647**	282969	321531	1351590	93184	**2049274**
1973	163122	28972	39150	**231244**	283049	321604	1351765	93195	**2049613**
1974	163944	29891	39347	**233182**	283915	322399	1353666	93313	**2053293**
1975	168106	30810	40346	**239262**	284781	323194	1355567	93431	**2056973**
1976	168653	31729	40477	**240859**	284781	323194	1355567	93431	**2056973**
1977	169522	33188	40685	**243395**	284781	323194	1355567	93431	**2056973**
1978	174172	38455	41801	**254428**	284781	323194	1355567	93431	**2056973**
1979	205468	79463	49312	**334243**	285042	323434	1356140	93467	**2058083**
1980	255074	137003	61217	**453294**	286981	325213	1360397	93732	**2066323**
1981	258689	137003	62085	**457777**	286981	325213	1360397	93732	**2066323**
1982	258689	137003	62085	**457777**	286981	325213	1360397	93732	**2066323**
1983	258689	137003	62085	**457777**	286981	325213	1360397	93732	**2066323**
1984	259081	137200	62179	**458460**	286981	325213	1360397	93732	**2066323**
1985	264334	139951	63440	**467725**	286981	325213	1360397	93732	**2066323**
1986	264334	139951	63440	**467725**	286981	325213	1360397	93732	**2066323**
1987	264451	140148	63468	**468067**	286981	325213	1360397	93732	**2066323**
1988	266089	142899	63861	**472849**	286981	325213	1360397	93732	**2066323**
1989	266364	142899	63927	**473190**	287242	325453	1360970	93768	**2067433**
1990	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1991	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1992	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1993	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1994	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1995	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1996	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1997	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1998	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
1999	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2000	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2001	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2002	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2003	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2004	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2005	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2006	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2007	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2008	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2009	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2010	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2011	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2012	269979	142899	64795	**477673**	289181	327232	1365227	94033	**2075673**
2013	269979	142899	64795	**477673**	183486	229627	1090072	76294	**1579479**
2014	269979	142899	64795	**477673**	157402	167703	919494	65038	**1309637**
2015	269979	142899	64795	**477673**	105628	93610	385928	42203	**627369**
2016	238093	129072	57142	**424307**	40652	36188	105724	13093	**195657**
2017	193689	127515	46485	**367689**	15797-	13834-	51669-	12083-	**93383-**
2018	118924	124078	28541	**271543**	6616-	5737-	22854-	5725-	**40932-**
2019	109065	117637	26175	**252877**	6252	5738	13725	854	**26569**
2020	108508	116701	26041	**251250**	6252	5738	13725	854	**26569**
2021	107951	115765	25907	**249623**	6252	5738	13725	854	**26569**
2022	107404	114846	25776	**248026**	6212	5701	13637	849	**26399**
2023	106857	113927	25645	**246429**	6132	5628	13462	838	**26060**
2024	106035	113008	25448	**244491**	5266	4833	11561	720	**22380**
2025	101873	112089	24449	**238411**	4400	4038	9660	602	**18700**
2026	101326	111170	24318	**236814**	4400	4038	9660	602	**18700**
2027	100457	109711	24110	**234278**	4400	4038	9660	602	**18700**
2028	95807	104444	22994	**223245**	4400	4038	9660	602	**18700**
2029	64511	63436	15483	**143430**	4139	3798	9087	566	**17590**
2030	14905	5896	3578	**24379**	2200	2019	4830	301	**9350**
2031	11290	5896	2710	**19896**	2200	2019	4830	301	**9350**
2032	11290	5896	2710	**19896**	2200	2019	4830	301	**9350**
2033	11290	5896	2710	**19896**	2200	2019	4830	301	**9350**
2034	10898	5699	2616	**19213**	2200	2019	4830	301	**9350**
2035	5645	2948	1355	**9948**	2200	2019	4830	301	**9350**
2036	5645	2948	1355	**9948**	2200	2019	4830	301	**9350**
2037	5528	2751	1327	**9606**	2200	2019	4830	301	**9350**
2038	3890	0	934	**4824**	2200	2019	4830	301	**9350**
2039	3615	0	868	**4483**	1939	1779	4257	265	**8240**

TABLE C-11 (continued)

CAPITAL COST COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Devils Den Water District	Dudley Ridge Water District	Empire West Side Irrigation District	Hacienda Water District	Kern County Water Agency		Tulare Lake Basin Water Storage District	Assumed Elections under Article 8	Total
					Agriculture	Urban			
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	96212	0	0	96212
1966	0	0	0	0	0	196466	0	0	196466
1967	0	0	0	0	0	317071	0	0	317071
1968	12864	39533	8104	5205	514644	415769	103803	0	1099922
1969	19297	46649	8104	6406	566109	451108	113064	0	1210737
1970	25729	53765	8104	8007	775516	479212	122711	0	1473044
1971	32161	61277	8104	9208	843543	497483	131972	0	1583748
1972	38593	68393	8104	10410	1208527	503058	141620	0	1978705
1973	45025	75509	8104	11611	1369427	503824	150881	70337	2234718
1974	51458	82625	8104	13212	1516130	509077	165930	140674	2487210
1975	57890	89741	8104	14413	1674664	515922	180980	211010	2752724
1976	64322	96857	8104	15614	1885846	517635	196029	281347	3065754
1977	70754	103973	8104	16815	2123055	518259	211465	351684	3404109
1978	70754	111484	8104	18417	2353758	518259	226514	422021	3729311
1979	70754	118600	8104	19618	2578545	518259	241564	492357	4047801
1980	70754	125716	8104	20819	2814572	518259	256613	562694	4377531
1981	70754	132832	8104	22420	3058288	518259	271663	633031	4715351
1982	70754	140343	8104	23622	3278343	518259	286712	703368	5029505
1983	70754	147064	8104	24823	3533891	518259	301762	773705	5378362
1984	70754	154575	8104	26024	3769325	518259	316811	844041	5707893
1985	70754	161691	8104	27625	4004169	518259	331861	914378	6036841
1986	70754	168807	8104	28826	4226590	518259	347296	984715	6353351
1987	70754	175924	8104	30027	4460842	518259	362345	1055052	6681307
1988	70754	183434	8104	31228	4703967	518259	377395	1125388	7018529
1989	70754	190551	8104	32830	4879656	518259	392444	1195725	7288323
1990	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1991	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1992	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1993	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1994	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1995	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1996	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1997	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1998	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
1999	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2000	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2001	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2002	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2003	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2004	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2005	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2006	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2007	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2008	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2009	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2010	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2011	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2012	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2013	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2014	70754	197666	8104	34031	5075457	518259	424473	1266062	7594806
2015	70754	197666	8104	34031	5075457	422047	424473	1266062	7498594
2016	70754	197666	8104	34031	5075457	321793	424473	1266062	7398340
2017	70754	197666	8104	34031	5075457	201188	424473	1266062	7277735
2018	70754	197666	8104	34031	5075457	102490	424473	1266062	7179037
2019	70754	197666	8104	34031	5075457	67151	424473	1266062	7143698
2020	70754	197666	8104	34031	5075457	39047	424473	1266062	7115594
2021	70754	197666	8104	34031	5075457	20776	424473	1266062	7097323
2022	70754	197666	8104	34031	5075457	15201	424473	1266062	7091748
2023	70754	197666	8104	34031	5075457	14435	424473	1266062	7090982
2024	70754	197666	8104	34031	5075457	9182	424473	1266062	7085729
2025	70754	197666	8104	34031	5075457	2337	424473	1266062	7078884
2026	70754	197666	8104	34031	5075457	624	424473	1266062	7077171
2027	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2028	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2029	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2030	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2031	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2032	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2033	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2034	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2035	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2036	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2037	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2038	70754	197666	8104	34031	5075457	0	424473	1266062	7076547
2039	70754	197666	8104	34031	5075457	0	424473	1266062	7076547

TABLE C-11 (continued)

CAPITAL COST COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	City of West Covina	Coachella Valley County Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Irrigation District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
1962	0	0	0	0	0	0	0	0	0	0
1963	24742	0	0	0	9034	0	0	0	31255	8384
1964	50066	6473	10574	2920	17130	943	23261	6332	56902	15343
1965	121716	13396	23127	6350	37843	2128	50878	15171	119199	32006
1966	273108	27766	49630	13494	81574	4653	109186	34011	246611	66805
1967	451494	45960	82612	22564	135994	7692	181746	56584	408275	110475
1968	635470	68946	118076	32232	194511	10969	259768	80918	611699	166060
1969	767960	94729	154932	43190	255323	13690	340849	99884	848167	226385
1970	921989	125542	198606	56057	327385	16314	436929	118144	1127343	299227
1971	1056863	149080	232113	66584	382672	18010	510643	130783	1382968	353980
1972	1115079	159306	246173	70356	405872	18853	541575	137040	1480290	379391
1973	1123584	160196	247940	70801	408788	19022	545463	138304	1487859	381617
1974	1133960	161508	250544	71457	413085	19205	551193	139671	1499014	384898
1975	1164680	164658	256796	73032	423401	19687	564948	143277	1525792	392774
1976	1187305	166879	261203	74142	430673	20049	574644	145983	1544669	398326
1977	1202241	168418	264257	74911	435712	20283	581363	147733	1557750	402173
1978	1203291	168958	264955	75087	436863	20283	582898	147733	1562328	403516
1979	1203291	170979	264955	75087	436863	20283	582898	147733	1579337	408477
1980	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1981	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1982	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1983	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1984	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1985	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1986	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1987	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1988	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1989	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1990	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1991	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1992	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1993	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1994	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1995	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1996	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1997	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1998	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
1999	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2000	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2001	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2002	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2003	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2004	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2005	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2006	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2007	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2008	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2009	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2010	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2011	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2012	1203291	173000	264955	75087	436863	20283	582898	147733	1596346	413438
2013	1178549	173000	264955	75087	427829	20283	582898	147733	1565091	405054
2014	1153225	166527	254381	72167	419733	19340	559637	141401	1539444	398095
2015	1081575	159604	241828	68737	399020	18155	532020	132562	1477147	381432
2016	930183	145234	215325	61593	355289	15630	473712	113722	1349735	346633
2017	751797	127040	182343	52523	300869	12591	401152	91149	1188071	302963
2018	567821	104054	146879	42855	242352	9314	323130	66815	984647	247378
2019	435331	78271	110023	31897	181540	6593	242049	47849	748179	187053
2020	281302	47458	66349	19030	109478	3969	145969	29589	469003	114211
2021	146428	23920	32842	8503	54191	2273	72255	16950	213378	59458
2022	88212	13694	18782	4731	30991	1430	41323	10693	116056	34047
2023	79707	12804	17015	4286	28075	1261	37435	9429	108487	31821
2024	69331	11492	14411	3630	23778	1078	31705	8062	97332	28540
2025	38611	8342	8159	2055	13462	596	17950	4456	70554	20664
2026	15986	6121	3752	945	6190	234	8254	1750	51677	15112
2027	1050	4582	698	176	1151	0	1535	0	38596	11265
2028	0	4042	0	0	0	0	0	0	34018	9922
2029	0	2021	0	0	0	0	0	0	17009	4961
2030	0	0	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0	0	0	0

TABLE C-11 (continued)

CAPITAL COST COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (Continued)						CENTRAL COASTAL AREA			GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Upper Santa Clara Valley Water Agency	Ventura County Flood Control District	Assumed Elections under Article 8	Total	San Luis Obispo County FC & WCD	Santa Barbara County FC & WCD	Total	
1962	0	0	0	0	0	0	0	0	0	0
1963	3917	450745	0	0	144662	672739	0	0	0	1160584
1964	7475	878281	11334	9856	266696	1363586	9813	21049	30862	2128642
1965	16625	2078354	28847	25085	582324	3153049	22957	49581	72538	4726506
1966	36041	4411075	63309	55052	1158128	6630443	46076	99775	145851	8848292
1967	60014	7452564	110098	95738	1809640	11031450	71330	154165	225495	13783243
1968	85857	11782465	180165	156665	2618733	17002534	92025	199550	291575	20648832
1969	111802	15646763	236179	205372	3512749	22557974	99059	215911	314970	26292192
1970	142373	20203627	299200	260172	4652152	29185060	107744	236756	344500	33212742
1971	164761	23877923	331898	288605	6516487	35463370	113376	250307	363683	39622566
1972	174738	25657583	341759	297180	7701625	38726820	119019	264116	383135	43367581
1973	176063	26104128	348801	303304	7778231	39294101	127373	284510	411883	44221559
1974	178016	26478014	356069	309624	7823587	39769845	137383	310361	447744	44991274
1975	182705	26911845	362348	315084	7932472	40433499	149554	341607	491161	45973619
1976	186011	27236943	367238	319337	8009230	40922632	265703	583047	848750	47134968
1977	188302	27433594	369937	321684	8062420	41230778	349477	757332	1106809	48042064
1978	188825	27463467	369937	321684	8080982	41290807	455505	982490	1437995	48769514
1979	188825	27576378	369937	321684	8149571	41496298	605452	1367527	1972979	49909404
1980	188825	27689289	369937	321684	8218160	41701789	677509	1580602	2258111	50857048
1981	188825	27689289	369937	321684	8218160	41701789	677509	1580602	2258111	51199351
1982	188825	27689289	369937	321684	8218160	41701789	677509	1580602	2258111	51513505
1983	188825	27689289	369937	321684	8218160	41701789	677509	1580602	2258111	51862362
1984	188825	27689289	369937	321684	8218160	41701789	678340	1582286	2260626	52195091
1985	188825	27689289	369937	321684	8218160	41701789	689105	1604084	2293189	52565867
1986	188825	27689289	369937	321684	8218160	41701789	689557	1604999	2294556	52883744
1987	188825	27689289	369937	321684	8218160	41701789	699267	1624663	2323930	53241416
1988	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	53611087
1989	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	53882332
1990	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1991	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1992	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1993	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1994	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1995	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1996	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1997	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1998	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
1999	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2000	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2001	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2002	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2003	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2004	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2005	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2006	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2007	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2008	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2009	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2010	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2011	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2012	188825	27689289	369937	321684	8218160	41701789	708413	1643184	2351597	54201538
2013	184908	27238544	369937	321684	8073498	41029050	708413	1643184	2351597	53032605
2014	181350	26811008	358603	311828	7951464	40338203	698600	1622135	2320735	52041054
2015	172200	25610935	341090	296599	7635836	38548740	685456	1593603	2279059	49431435
2016	152784	23278214	306628	266632	7060032	35071346	662337	1543409	2205746	45295396
2017	128811	20236725	259839	225946	6408520	30670339	637083	1489019	2126102	40348482
2018	102968	15906824	189772	165019	5599427	24699255	616388	1443634	2060022	34168925
2019	77023	12042526	133758	116312	4705411	19143815	609354	1427273	2036627	28603586
2020	46452	7485662	70737	61512	3566008	12516729	600669	1406428	2007097	21917239
2021	24064	3811366	38039	33079	1701673	6238419	595037	1392877	1987914	15599848
2022	14087	2031706	28178	24504	516535	2974969	589394	1379068	1968462	12309604
2023	12762	1585161	21136	18380	439929	2407688	581040	1358674	1939714	11710873
2024	10809	1211275	13868	12060	394573	1931944	571030	1332823	1903853	11188397
2025	6120	777444	7589	6600	285688	1268290	558859	1301577	1860436	10464721
2026	2814	452346	2699	2347	208930	779157	442710	1060137	1502847	9614689
2027	523	255695	0	0	155740	471011	358936	885852	1244788	9045324
2028	0	225822	0	0	137178	410982	252908	660694	913602	8643076
2029	0	112911	0	0	68589	205491	102961	275657	378618	7821676
2030	0	0	0	0	0	0	30904	62582	93486	7203762
2031	0	0	0	0	0	0	30904	62582	93486	7199279
2032	0	0	0	0	0	0	30904	62582	93486	7199279
2033	0	0	0	0	0	0	30904	62582	93486	7199279
2034	0	0	0	0	0	0	30073	60898	90971	7196081
2035	0	0	0	0	0	0	19308	39100	58408	7154253
2036	0	0	0	0	0	0	18856	38185	57041	7152886
2037	0	0	0	0	0	0	9146	18521	27667	7123170
2038	0	0	0	0	0	0	0	0	0	7090721
2039	0	0	0	0	0	0	0	0	0	7089270

TABLE C-12

MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	NORTH BAY AREA				SOUTH BAY AREA				
	Napa County FC & WCD	Solano County FC & WCD	Assumed Elections under Article 8	Total	Alameda County FC & WCD, Zone 7	Alameda County Water District	Santa Clara County FC & WCD	Assumed Elections under Article 8	Total
1962	0	0	0	**0**	16319	14974	0	0	**31293**
1963	0	0	0	**0**	36070	33095	79177	4932	**153274**
1964	0	0	0	**0**	33299	30552	73095	4554	**141500**
1965	0	0	0	**0**	58567	64569	254180	11087	**388403**
1966	0	0	0	**0**	83513	98381	436282	17604	**635780**
1967	0	0	0	**0**	134980	152648	655224	38894	**981746**
1968	121935	0	29265	**151200**	146640	167197	726288	41792	**1081917**
1969	122581	0	29419	**152000**	151017	171523	740556	43082	**1106178**
1970	122581	0	29419	**152000**	150520	171457	743521	42933	**1108431**
1971	122097	0	29303	**151400**	150429	171307	742597	42852	**1107185**
1972	122097	0	29303	**151400**	150241	171134	742184	42826	**1106385**
1973	122097	0	29303	**151400**	150055	170964	741777	42801	**1105597**
1974	122097	0	29303	**151400**	150606	171470	742987	42876	**1107939**
1975	122097	0	29303	**151400**	150767	171605	743128	42884	**1108384**
1976	122097	0	29303	**151400**	151269	172064	744226	42952	**1110511**
1977	122097	0	29303	**151400**	151505	172282	744747	42986	**1111520**
1978	122097	0	29303	**151400**	151648	172414	745062	43004	**1112128**
1979	122097	0	29303	**151400**	151755	172511	745294	43018	**1112578**
1980	137097	84000	32903	**254000**	152088	172816	746025	43065	**1113994**
1981	136271	83425	32704	**252400**	151282	171903	742114	42840	**1108139**
1982	136237	83367	32696	**252300**	151230	171856	742001	42833	**1107920**
1983	136202	83310	32688	**252200**	151204	171832	741942	42829	**1107807**
1984	135973	83195	32632	**251800**	150892	171494	740712	42749	**1105847**
1985	136007	83252	32641	**251900**	151395	171956	741818	42817	**1107986**
1986	136007	83252	32641	**251900**	150538	171170	740237	42700	**1104645**
1987	135973	83195	32632	**251800**	150435	171075	740009	42685	**1104204**
1988	135973	83195	32632	**251800**	150336	170984	739792	42672	**1103784**
1989	135973	83195	32632	**251800**	150301	170953	739717	42668	**1103639**
1990	135939	83137	32624	**251700**	150183	170844	739457	42652	**1103196**
1991	135939	83137	32624	**251700**	150140	170804	739363	42646	**1102953**
1992	135939	83137	32624	**251700**	150069	170739	739206	42636	**1102650**
1993	135939	83137	32624	**251700**	150278	170932	739667	42665	**1103542**
1994	135939	83137	32624	**251700**	150207	170866	739509	42655	**1103237**
1995	135939	83137	32624	**251700**	150183	170844	739458	42652	**1103137**
1996	135939	83137	32624	**251700**	150158	170822	739404	42649	**1103033**
1997	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
1998	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
1999	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2000	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2001	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2002	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2003	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2004	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2005	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2006	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2007	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2008	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2009	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2010	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2011	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2012	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2013	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2014	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2015	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2016	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2017	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2018	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2019	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2020	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2021	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2022	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2023	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2024	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2025	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2026	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2027	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2028	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2029	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2030	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2031	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2032	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2033	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2034	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2035	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2036	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2037	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2038	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**
2039	135939	83137	32624	**251700**	150112	170779	739300	42642	**1102833**

TABLE C-12 (continued)

MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Devils Den Water District	Dudley Ridge Water District	Empire West Side Irrigation District	Hacienda Water District	Kern County Water Agency		Tulare Lake Basin Water Storage District	Assumed Elections under Article 8	Total
					Agriculture	Urban			
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	1162	5246	314	892	89956	11902	11530	19026	140028
1968	27095	43199	2447	7279	903462	108517	91827	173858	1357684
1969	28606	45523	2573	7668	955561	114858	96609	184029	1435427
1970	31321	46963	2627	7900	1065283	136203	99079	218671	1608047
1971	36650	48870	2666	8190	1318454	173081	101623	281093	1970627
1972	38073	50213	2730	8410	1375705	181777	104219	292975	2054102
1973	36726	50039	2720	8381	1357672	180099	103839	291159	2030635
1974	36020	50960	2775	8537	1369635	182220	105863	294090	2050100
1975	35990	51006	2779	8546	1365343	181634	105961	294187	2045446
1976	36165	51872	2830	8693	1379934	183573	107865	297310	2068242
1977	36254	52354	2859	8775	1387976	184681	108923	299046	2080868
1978	36285	52613	2875	8819	1392166	185239	109492	299971	2087460
1979	36415	52889	2891	8866	1398810	186228	110098	301048	2097245
1980	36999	53194	2909	8918	1409300	187408	110770	302457	2111955
1981	36804	52976	2898	8882	1404624	186964	110323	301342	2104813
1982	36768	53007	2900	8887	1406376	187334	110391	301649	2107312
1983	36732	53002	2900	8886	1407439	187614	110381	301814	2108768
1984	36639	52936	2897	8874	1406369	187594	110241	301528	2107078
1985	36582	52911	2895	8869	1406759	187777	110187	301589	2107569
1986	36395	51635	2819	8653	1386369	185093	107384	297094	2075442
1987	36331	51543	2814	8636	1385444	185074	107178	296882	2073902
1988	36269	51454	2809	8622	1384509	185047	106983	296673	2072366
1989	36230	51511	2812	8631	1385935	185331	107110	296975	2074535
1990	36162	51357	2802	8605	1383774	185123	106772	296509	2071104
1991	36187	51475	2810	8625	1385830	185393	107030	296940	2074290
1992	36187	51474	2809	8625	1385803	185389	107027	296934	2074248
1993	36186	51471	2809	8625	1385749	185382	107020	296923	2074165
1994	36186	51469	2809	8624	1385723	185378	107017	296917	2074123
1995	36186	51469	2809	8624	1385723	185378	107017	296917	2074123
1996	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
1997	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
1998	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
1999	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2000	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2001	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2002	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2003	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2004	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2005	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2006	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2007	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2008	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2009	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2010	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2011	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2012	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2013	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2014	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2015	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2016	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2017	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2018	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2019	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2020	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2021	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2022	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2023	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2024	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2025	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2026	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2027	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2028	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2029	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2030	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2031	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2032	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2033	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2034	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2035	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2036	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2037	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2038	36186	51468	2809	8624	1385696	185375	107013	296912	2074083
2039	36186	51468	2809	8624	1385696	185375	107013	296912	2074083

TABLE C-12 (continued)

MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	City of West Covina	Coachella Valley County Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Irrigation District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	9267	792	1573	396	2595	156	3460	1167	6735	1981
1968	84430	7219	14327	3610	23641	1422	31520	10634	61361	18048
1969	89359	7641	15163	3821	25020	1504	33360	11256	64943	19102
1970	105866	9052	17964	4525	29642	1784	39521	13338	76938	22629
1971	246265	22149	43962	11076	72534	4363	96715	32636	188281	55380
1972	321240	40793	75330	19375	124298	5796	165723	42000	356420	101031
1973	313143	39173	73360	18879	121049	5654	161393	40919	342712	97013
1974	313873	38588	73045	18799	120529	5664	160698	40999	337774	95569
1975	309423	38213	72325	18616	119334	5587	159109	40423	334581	94630
1976	310905	38357	72614	18687	119811	5612	159744	40598	335791	94985
1977	312314	38453	72818	18739	120145	5635	160188	40778	336629	95230
1978	312452	38474	72868	18753	120231	5637	160306	40788	336797	95281
1979	317336	38870	73655	18949	121531	5718	162035	41394	340139	96262
1980	322434	39380	74630	19195	123139	5797	164179	41992	344486	97540
1981	324993	39541	75004	19289	123759	5836	165008	42278	345797	97948
1982	327724	39753	75428	19397	124459	5882	165944	42618	347598	98478
1983	330696	40038	75996	19540	125397	5930	167191	42970	350023	99191
1984	332620	40153	76251	19605	125814	5960	167747	43207	351002	99483
1985	335003	40384	76708	19719	126568	5995	168755	43483	352955	100054
1986	334726	40339	76629	19700	126438	5991	168580	43448	352588	99949
1987	336467	40513	76971	19785	127003	6020	169333	43646	354059	100380
1988	337875	40613	77181	19839	127346	6042	169791	43829	354922	100636
1989	339518	40771	77495	19919	127867	6068	170483	44019	356265	101030
1990	340519	40842	77636	19954	128100	6086	170794	44148	356857	101204
1991	340658	40845	77645	19956	128117	6089	170816	44167	356886	101214
1992	340655	40845	77645	19956	128116	6089	170815	44167	356884	101214
1993	340650	40845	77644	19955	128115	6089	170813	44166	356880	101212
1994	340647	40844	77643	19955	128114	6089	170812	44166	356878	101212
1995	340647	40844	77643	19955	128114	6089	170812	44166	356878	101212
1996	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
1997	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
1998	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
1999	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2000	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2001	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2002	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2003	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2004	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2005	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2006	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2007	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2008	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2009	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2010	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2011	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2012	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2013	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2014	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2015	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2016	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2017	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2018	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2019	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2020	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2021	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2022	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2023	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2024	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2025	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2026	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2027	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2028	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2029	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2030	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2031	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2032	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2033	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2034	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2035	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2036	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2037	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2038	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211
2039	340644	40844	77643	19955	128113	6089	170811	44166	356876	101211

TABLE C-12 (continued

MINIMUM OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (Continued)						CENTRAL COASTAL AREA			GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Upper Santa Clara Valley Water Agency	Ventura County Flood Control District	Assumed Election under Article 8	Total	San Luis Obispo County FC & WCD	Santa Barbara County FC & WCD	Total	
1962	0	0	0	0	0	0	0	0	0	31293
1963	0	0	0	0	0	0	0	0	0	153274
1964	0	0	0	0	0	0	0	0	0	141500
1965	0	0	0	0	0	0	0	0	0	388403
1966	0	0	0	0	0	0	0	0	0	635780
1967	1179	118331	1801	1566	27383	178382	1955	3959	5914	1306070
1968	10746	1078124	16412	14272	249490	1625256	15950	32301	48251	4264308
1969	11372	1141075	17370	15104	264060	1720150	16802	34020	50822	4464577
1970	13476	1351838	20579	17894	312834	2037880	17306	35046	52352	4958710
1971	32969	3801581	62101	54002	765572	5489586	17942	36335	54277	8773075
1972	56052	5378893	70327	61156	1635337	8453771	18426	37313	55739	11821397
1973	54572	5125924	66391	57733	1579775	8097690	18362	37182	55544	11440866
1974	54336	5042632	65168	56670	1559821	7984165	18706	37877	56583	11350187
1975	53796	4982707	64223	55846	1546843	7895656	18722	37910	56632	11257518
1976	54010	5001695	64492	56081	1551764	7925146	61607	124746	186353	11441652
1977	54162	5017177	64735	56291	1555164	7948458	61757	125049	186806	11479052
1978	54202	5017946	64727	56286	1555850	7950598	61810	125156	186966	11488552
1979	54792	5070086	65463	56923	1569443	8032596	62031	125602	187633	11581452
1980	55524	5133183	66303	57657	1587114	8132553	578306	1364144	1942450	13554952
1981	55809	5152385	66583	57899	1591490	8163619	571277	1348976	1920253	13549224
1982	56128	5179429	66954	58219	1598816	8206827	564371	1334994	1899365	13573724
1983	56554	5213173	67390	58600	1608677	8261366	561072	1328311	1889383	13619524
1984	56743	5233197	67725	58890	1612310	8290707	559076	1323931	1883007	13638439
1985	57087	5254507	67934	59073	1620247	8328472	559475	1324737	1884212	13680139
1986	57028	5250767	67901	59044	1618761	8321889	559459	1324704	1884163	13638039
1987	57284	5273268	68216	59317	1624735	8356997	557863	1321473	1879336	13666239
1988	57439	5287681	68428	59500	1628254	8379376	557757	1321256	1879013	13686339
1989	57676	5304929	68633	59680	1633702	8408055	556995	1319715	1876710	13714739
1990	57781	5317970	68854	59873	1636122	8426740	556483	1318676	1875159	13727839
1991	57791	5317573	68841	59861	1636244	8426703	556527	1318766	1875293	13730939
1992	57790	5317538	68840	59861	1636236	8426651	556526	1318764	1875290	13730539
1993	57789	5317468	68839	59860	1636220	8426545	556525	1318762	1875287	13731239
1994	57789	5317433	68839	59860	1636212	8426493	556525	1318761	1875286	13730839
1995	57789	5317433	68839	59860	1636212	8426493	556525	1318761	1875286	13730739
1996	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730539
1997	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
1998	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
1999	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2000	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2001	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2002	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2003	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2004	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2005	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2006	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2007	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2008	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2009	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2010	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2011	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2012	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2013	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2014	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2015	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2016	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2017	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2018	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2019	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2020	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2021	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2022	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2023	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2024	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2025	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2026	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2027	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2028	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2029	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2030	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2031	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2032	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2033	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2034	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2035	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2036	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2037	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2038	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339
2039	57789	5317397	68838	59859	1636204	8426439	556524	1318760	1875284	13730339

TABLE C-13

UNIT VARIABLE OPERATION, MAINTENANCE, POWER AND REPLACEMENT CHARGES 1/

(in dollars per acre-foot)

Calendar Year	NORTH BAY AQUEDUCT		SOUTH BAY AQUEDUCT	CALIFORNIA AQUEDUCT											
	Reach 1 Calhoun PP	Reach 3 Cordelia PP	South Bay & Del Valle PP's 2/	Reach 1 Delta PP	Reach 4 Mile 18 PP	Reach 14a Buena Vista PP	Reach 15 Wheeler Ridge PP I	Reach 16 Wheeler Ridge PP II	Reach 17a Tehachapi PP	Reach 18 Cottonwood Pwp	Reach 29 West Branch PP & Ruby & Castaic Pwp's	Reach 22b Pear-blossom PP	Reach 26,27 Devil Canyon Pwp's Nos. 1 & 2	Reach 31 Avenal PP	Reach 33a Pyramid, Sawtooth, & Polonio PP's & San Luis Obispo Pwp
1962			4.5426679												
63			4.8917359												
64			3.6470334												
65			3.6638655												
66			3.3617021												
67			4.4542815	1.0740203											
68		19.5555556	6.3670247	1.4943960	3.2263468									7.2263468	
69		9.7894737	6.3387887	1.5153637	3.2293526									6.6764114	
1970		7.0000000	6.2037707	1.4145721	3.0356247									6.1882563	
71		5.4210526	6.1656162	1.2083512	2.5066369	3.3679562	4.5159623	7.3150421	17.1332936	16.8280400	12.9992357			5.3384551	
72		4.7083333	5.7858223	.8805415	2.0900015	3.0040176	4.1441814	6.7688144	16.2118248	15.8682065	12.3150150	20.1146906	12.8180269	4.6740015	
73		4.0689655	5.6644909	.8166291	2.0314355	2.9512589	4.0832011	6.7102744	16.5900718	16.2304832	12.4230383	20.5631246	13.1074130	5.8047688	
74		3.6716418	5.9624667	1.1506735	2.3459472	3.4083518	4.5373490	7.1359964	16.8454433	16.5234654	13.1362515	20.7459984	13.1344510	5.7488884	
75		3.4545455	6.1468331	1.1825191	2.3636306	3.4127522	4.6013079	7.2730763	16.9888772	16.6547960	13.0896308	21.0041623	13.2965100	5.4952095	
76		4.7325581	6.4004817	1.4885565	2.6609084	3.7021819	4.8809256	7.5254289	17.2445508	16.9067874	13.3378086	21.3679259	13.6348409	5.5466227	
77		4.6562500	6.5146030	1.6599741	2.8258206	3.8606990	5.0313131	7.6555593	17.6294676	17.2738559	13.5890466	21.6493584	13.8728250	5.5301684	
78		4.4476190	6.5888388	1.7533767	2.9147212	3.9447719	5.1101191	7.7184314	17.5884010	17.2321334	13.4687414	21.6934157	13.8568098	5.4012597	
79		4.1478261	6.6218198	1.8515096	3.0083490	4.0731132	5.3721930	8.2741142	19.2382783	18.8292119	14.4011729	23.2224474	15.3596900	5.1447126	
1980	.3746835	4.1977604	6.8475697	1.9230414	3.0761253	4.2769738	5.7231671	8.9490822	20.8023590	20.3473549	15.6585196	25.1080602	17.4383956	5.9695679	40.1195679
81	.3340659	3.8391506	6.8095625	1.9357207	3.0885124	4.3884994	5.9283490	9.3641009	22.2282274	21.7340339	16.6388981	26.6643304	18.9554502	5.8666374	34.1999707
82	.2972973	4.5942670	6.7650263	1.9463988	3.0986825	4.4880510	6.1104636	9.7261370	23.1908887	22.6616340	17.0578168	27.5176140	19.7838768	5.7407115	24.6907115
83	.2685026	4.2630231	6.7229243	1.9452230	3.0975884	4.5692426	6.2646661	10.0429745	24.1747555	23.6239706	17.6679958	28.6880113	20.9409313	5.6070479	20.1070479
84	.2429907	3.9879907	6.7001339	1.9545317	3.1065985	4.6527698	6.4151330	10.3410251	25.0729737	24.4840633	18.5085674	29.4880383	21.7239553	5.4977935	18.7052009
85	.3048951	3.8865043	7.1507376	1.9464794	3.0975593	4.7114342	6.5337371	10.5924459	25.8630662	25.2491471	18.5499361	30.4315723	22.6515990	5.2986643	19.2142199
86	.2718204	4.3396170	6.6694074	1.5124421	2.6626573	4.3367239	6.2127204	10.3905222	26.1347684	25.4986536	18.8648822	30.6124720	22.8174025	5.1990209	19.5390209
87	.2420242	4.1320046	6.5891690	1.4817044	2.6311772	4.3614945	6.2871289	10.5742261	26.7292177	26.0733806	19.4557994	31.3451684	23.5365611	5.0311772	17.2951772
88	.2615101	3.9611438	6.5189043	1.4530398	2.6004082	4.3817279	6.3520162	10.7377564	27.2577292	26.5918867	19.7512791	31.7863956	23.9591847	4.8501936	17.1276130
89	.2388060	3.8065590	6.4647882	1.4727931	2.6191207	4.4436914	6.4551172	10.9325102	27.7845494	27.0947469	19.9715897	32.4196078	24.5799485	4.6931665	16.0314998
1990	.2095890	3.6289438	6.3741621	1.4466606	2.5611214	4.4270550	6.4755004	11.0343027	28.1880636	27.4853279	20.4378536	32.7380229	24.8864146	4.4933132	15.2466465
91	.2095890	3.6612019	6.3249689	1.4879619	2.6015091	4.4689565	6.5194020	11.0827877	28.2109928	27.5087935	20.3114989	32.7259058	24.8607058	4.5337009	15.2870342
92	.2095890	3.6612019	6.2496498	1.4874238	2.6009710	4.4684184	6.5188639	11.0822496	28.2104547	27.5082554	20.3109608	32.7253677	24.8601677	4.5331628	15.2864961
93	.2095890	3.6612019	6.4441547	1.4861394	2.5996866	4.4671340	6.5175795	11.0809652	28.2091703	27.5069710	20.3096764	32.7240833	24.8588833	4.5318784	15.2852117
94	.2095890	3.6612019	6.3827583	1.4859498	2.5994970	4.4669444	6.5173899	11.0807756	28.2089807	27.5067814	20.3094868	32.7238937	24.8586937	4.5316888	15.2850221
95	.2095890	3.6612019	6.3527991	1.4859570	2.5995042	4.4669516	6.5173971	11.0807828	28.2089879	27.5067886	20.3094940	32.7239009	24.8587009	4.5316960	15.2850293
96	.2095890	3.6612019	6.3279264	1.4852181	2.5987653	4.4662127	6.5166582	11.0800439	28.2082490	27.5060497	20.3087551	32.7231620	24.8579620	4.5309571	15.2842904
97	.2095890	3.6612019	6.2988872	1.4844542	2.5980014	4.4654488	6.5158943	11.0792800	28.2074851	27.5052858	20.3079912	32.7223981	24.8571981	4.5301932	15.2835265
98	.2095890	3.6612019	6.2988872	1.4844542	2.5980014	4.4654488	6.5158943	11.0792800	28.2074851	27.5052858	20.3079912	32.7223981	24.8571981	4.5301932	15.2835265
99	.2095890	3.6612019	6.2988872	1.4844542	2.5980014	4.4654488	6.5158943	11.0792800	28.2074851	27.5052858	20.3079912	32.7223981	24.8571981	4.5301932	15.2835265
2000 3/	.2095890	3.6612019	6.2988872	1.4844542	2.5980014	4.4654488	6.5158943	11.0792800	28.2074851	27.5052858	20.3079912	32.7223981	24.8571981	4.5301932	15.2835265

1/ Rates as shown constitute the total rate, cumulative from the Sacramento-San Joaquin Delta, applicable to deliveries downstream from the indicated pumping and power recovery plants.

2/ The relatively minor estimated costs of the Del Valle Pumping Plant have been combined with those of the South Bay Pumping Plant to simplify the allocation procedure. The increase in the unit rate in 1968 reflects use of commercial power, rather than power currently supplied by the Bureau of Reclamation.

3/ And thereafter for the remainder of the project repayment period.

TABLE C-14

VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	NORTH BAY AREA				SOUTH BAY AREA				
	Napa County FC & WCD	Solano County FC & WCD	Assumed Elections under Article 8	Total	Alameda County FC & WCD, Zone 7	Alameda County Water District	Santa Clara County FC & WCD	Assumed Elections under Article 8	Total
1962	0	0	0	0	2244	38213	0	0	40457
1963	0	0	0	0	8468	53388	0	0	61856
1964	0	0	0	0	7294	94006	0	0	101300
1965	0	0	0	0	11724	68881	93795	0	174400
1966	0	0	0	0	12102	65217	128081	0	205400
1967	0	0	0	0	17817	63697	225386	0	306900
1968	17600	0	0	17600	47753	95505	560298	1274	704830
1969	18600	0	0	18600	55781	98251	557814	2535	714381
1970	19600	0	0	19600	62038	100501	545931	3723	712193
1971	20600	0	0	20600	69054	104816	542574	4933	721377
1972	22600	0	0	22600	71744	103567	509153	5785	690249
1973	23600	0	0	23600	77037	106493	498475	6797	688802
1974	24600	0	0	24600	88245	116864	524697	8347	738153
1975	26600	0	0	26600	98349	126010	540922	9835	775116
1976	40700	0	0	40700	110088	136330	563242	11521	821181
1977	44700	0	0	44700	119869	144624	573285	13681	851459
1978	46700	0	0	46700	129141	152202	579818	15813	876974
1979	47700	0	0	47700	137734	158261	582720	17879	896594
1980	52472	2529	2099	57100	150647	169820	602586	20543	943596
1981	52788	2673	3839	59300	156620	177049	599241	22472	955382
1982	68914	2795	6891	78600	162361	184009	595322	24354	966046
1983	69274	2900	8526	80700	168073	190931	591618	26219	976841
1984	69790	2940	9970	82700	174204	198324	589612	28140	990280
1985	72872	4268	11660	88800	193070	220243	629265	32178	1074756
1986	86792	4485	15623	106900	186743	214088	586908	32013	1019752
1987	87805	4840	17355	110000	191085	219420	579847	33605	1023957
1988	89126	7061	19013	115200	195567	224902	573664	35203	1029336
1989	90406	8239	20555	119200	200409	230793	581831	36849	1049882
1990	90724	8803	21773	121300	203973	235207	586423	38245	1063848
1991	91530	8803	21967	122300	215049	242879	594547	37950	1090425
1992	91530	8803	21967	122300	224987	249361	599967	37498	1111813
1993	91530	8803	21967	122300	244878	266788	631527	38665	1181858
1994	91530	8803	21967	122300	255310	268076	638276	38297	1199959
1995	91530	8803	21967	122300	266818	266817	635280	38117	1207032
1996	91530	8803	21967	122300	278429	265773	632793	37967	1214962
1997	91530	8803	21967	122300	289784	264586	629966	37798	1222134
1998	91530	8803	21967	122300	289784	264586	629966	37798	1222134
1999	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2000	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2001	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2002	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2003	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2004	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2005	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2006	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2007	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2008	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2009	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2010	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2011	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2012	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2013	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2014	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2015	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2016	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2017	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2018	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2019	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2020	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2021	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2022	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2023	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2024	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2025	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2026	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2027	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2028	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2029	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2030	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2031	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2032	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2033	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2034	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2035	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2036	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2037	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2038	91530	8803	21967	122300	289784	264586	629966	37798	1222134
2039	91530	8803	21967	122300	289784	264586	629966	37798	1222134

TABLE C-14 (continued)

VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Devils Den Water District	Dudley Ridge Water District	Empire West Side Irrigation District	Hacienda Water District	Kern County Water Agency		Tulare Lake Basin Water Storage District	Assumed Election under Article 8	Total
					Agriculture	Urban			
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0
1968	14452	32264	9679	4194	328692	0	86789	0	476070
1969	20029	38106	9688	5167	357309	0	94620	0	524919
1970	24753	41284	9107	6071	445260	42499	96533	0	665507
1971	26692	38853	7520	5765	405587	45197	85727	0	615341
1972	28044	36157	6270	5434	476083	72447	76703	0	701138
1973	40633	38800	6094	5891	664978	96472	79429	23349	955646
1974	45991	49030	7038	7742	839279	137606	100876	54037	1241599
1975	49457	53654	7091	8509	938420	149281	110854	81400	1398666
1976	55467	65192	7983	10378	1150737	176696	135174	120285	1721912
1977	60832	74319	8478	11869	1360743	193879	154855	158573	2023548
1978	59414	82195	8744	13408	1540106	229905	171094	195484	2300350
1979	56592	90250	9025	14741	1739502	260463	188323	235393	2594289
1980	65665	97821	9228	15996	2012370	284318	204562	278153	2968113
1981	64534	103774	9266	17296	2199666	318888	217431	316965	3247820
1982	63147	110003	9296	18282	2375047	354993	230232	356134	3517134
1983	61677	115230	9293	19205	2564959	412822	242231	394745	3820162
1984	60476	121468	9320	20193	2757648	448018	255052	434639	4106814
1985	58285	126690	9293	21373	2938475	478064	266390	472564	4371134
1986	57189	113695	7988	19171	2827596	464652	239639	450951	4180881
1987	55343	117087	7893	19734	2958238	492525	247067	481192	4379079
1988	53352	120659	7801	20283	3086008	546076	254320	511009	4599508
1989	51625	126242	7857	21477	3220885	577757	266365	548703	4820911
1990	49426	128056	7683	21770	3295692	600497	281723	572958	4957805
1991	49870	130075	7805	22113	3331249	606240	286166	580319	5013837
1992	49865	130048	7803	22108	3330787	606164	286107	580222	5013104
1993	49851	129984	7799	22097	3329685	605981	285966	579991	5011354
1994	49848	129975	7798	22096	3329523	605955	285945	579956	5011096
1995	49849	129975	7798	22096	3329528	605955	285945	579958	5011104
1996	49840	129938	7796	22089	3328895	605851	285864	579825	5010098
1997	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
1998	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
1999	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2000	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2001	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2002	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2003	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2004	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2005	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2006	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2007	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2008	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2009	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2010	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2011	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2012	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2013	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2014	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2015	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2016	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2017	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2018	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2019	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2020	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2021	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2022	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2023	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2024	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2025	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2026	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2027	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2028	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2029	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2030	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2031	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2032	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2033	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2034	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2035	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2036	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2037	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2038	49840	129939	7796	22089	3328902	605852	285865	579826	5010109
2039	49840	129939	7796	22089	3328902	605852	285865	579826	5010109

TABLE C-14 (continued)

VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	City of West Covina	Coachella Valley County Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Irrigation District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
1962	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0
1971	342666	0	0	0	0	0	0	0	0	0
1972	405295	55118	104597	10057	160917	2381	160917	23802	517258	135873
1973	497702	60295	119265	15423	185068	4058	205630	43822	553731	150735
1974	589591	64358	132772	20747	207460	5783	248951	64441	582633	161554
1975	679555	69143	147028	26256	231045	7495	294059	84940	614249	174186
1976	776004	76355	162397	32052	256415	9468	341887	106512	654533	190889
1977	881473	81850	177525	37887	281442	10882	389689	129555	691192	205317
1978	967362	85913	190903	43387	303707	13786	433868	146473	715985	217553
1979	1154297	99838	218290	52251	348337	16947	510895	175112	820309	254971
1980	1352152	120325	251080	62771	401728	20347	602594	203473	957151	303429
1981	1566974	136468	293289	73322	466597	23905	693229	228189	1076750	346856
1982	1762507	148379	330212	82552	522835	27195	770493	249278	1123014	377872
1983	1970242	163340	372944	93236	588105	30711	860641	271675	1187442	416725
1984	2181349	175964	412831	103209	648737	34278	943616	293808	1231066	449686
1985	2392333	192539	456473	114119	715143	37873	1034673	315616	1282734	487010
1986	2561208	200793	489800	122449	765312	40797	1102049	331483	1333104	506546
1987	2766474	214183	532869	133218	846320	44325	1191117	351990	1506210	538987
1988	2971093	225218	572154	143039	921805	47864	1271456	372286	1666939	565438
1989	3181329	238425	615973	153993	1005008	51480	1361623	392873	1843631	597295
1990	3382567	248864	654761	163691	1080356	54971	1440473	412280	2003847	622160
1991	3385319	248606	654518	163629	1079956	55018	1439940	412633	2152486	621518
1992	3385254	248601	654507	163626	1079938	55017	1439917	412625	2152441	621504
1993	3385100	248588	654482	163620	1079896	55014	1439860	412605	2152331	621472
1994	3385078	248586	654478	163618	1079889	55014	1439852	412602	2152315	621468
1995	3385078	248586	654478	163619	1079890	55014	1439852	412603	2152316	621468
1996	3384990	248579	654463	163615	1079865	55013	1439820	412591	2152253	621449
1997	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
1998	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
1999	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2000	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2001	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2002	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2003	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2004	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2005	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2006	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2007	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2008	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2009	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2010	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2011	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2012	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2013	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2014	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2015	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2016	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2017	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2018	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2019	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2020	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2021	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2022	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2023	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2024	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2025	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2026	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2027	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2028	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2029	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2030	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2031	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2032	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2033	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2034	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2035	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2036	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2037	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2038	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449
2039	3384991	248579	654463	163615	1079865	55013	1439820	412591	2152254	621449

TABLE C-14 (continued)

VARIABLE OPERATION, MAINTENANCE, POWER, AND REPLACEMENT COMPONENTS
OF EACH CONTRACTOR

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (Continued)						CENTRAL COASTAL AREA			GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Upper Santa Clara Valley Water Agency	Ventura County Flood Control District	Assumed Elections under Article 8	Total	San Luis Obispo County FC & WCD	Santa Barbara County FC & WCD	Total	
1962	0	0	0	0	0	0	0	0	0	40457
1963	0	0	0	0	0	0	0	0	0	61856
1964	0	0	0	0	0	0	0	0	0	101300
1965	0	0	0	0	0	0	0	0	0	174400
1966	0	0	0	0	0	0	0	0	0	205400
1967	0	0	0	0	0	0	0	0	0	306900
1968	0	0	0	0	0	0	0	0	0	1198500
1969	0	0	0	0	0	0	0	0	0	1257900
1970	0	0	0	0	0	0	0	0	0	1397300
1971	0	1435116	0	0	0	1777782	0	0	0	3135100
1972	20114	2469628	12314	0	229442	4307713	0	0	0	5721700
1973	34958	3618619	32300	0	469246	5990852	0	0	0	7658900
1974	49791	4936416	51231	0	705320	7821048	0	0	0	9825400
1975	65112	6105754	68065	0	952031	9518918	0	0	0	11719300
1976	81198	7424583	86696	0	1220318	11419307	0	0	0	14003100
1977	97423	8773024	105993	0	1489941	13353193	0	0	0	16272900
1978	112806	9919907	122566	0	1736260	15010476	0	0	0	18234500
1979	137012	12038679	149772	0	2199507	18176217	0	0	0	21714800
1980	165714	14728301	187902	15658	2809327	22181952	40119	40120	80239	26231000
1981	197304	16836556	217949	33275	3390836	25581499	34200	68399	102599	29946600
1982	225645	18447933	242221	51172	3893468	28254776	49382	98762	148144	32964700
1983	258192	20383972	270320	70672	4496017	31434234	60321	120642	180963	36492900
1984	288983	22440985	303541	92542	5052992	34653587	84172	168347	252519	40085900
1985	322574	24028054	324624	111299	5674226	37489290	144107	288213	432320	43456300
1986	352045	25550616	350886	150919	6124190	39982197	195390	390780	586170	45875900
1987	388681	27594765	383279	194559	6738518	43425495	216189	432380	648569	49587100
1988	422760	29305894	410825	256767	7288385	46441923	265478	530955	796433	52982400
1989	460359	31088003	437378	319545	7917202	49664117	320630	641260	961890	56616000
1990	491070	32985603	470069	408757	8461381	52880850	381165	762332	1143497	60167300
1991	490890	32946564	467165	406230	8452639	52977111	382176	764351	1146527	60350200
1992	490882	32945757	467152	406219	8452456	52975896	382163	764324	1146487	60369600
1993	490862	32943831	467123	406194	8452020	52972998	382130	764260	1146390	60434900
1994	490859	32943547	467118	406190	8451955	52972569	382126	764250	1146376	60452300
1995	490860	32943557	467119	406190	8451957	52972587	382126	764251	1146377	60459400
1996	490848	32942449	467102	406175	8451706	52970918	382108	764214	1146322	60464600
1997	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
1998	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
1999	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2000	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2001	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2002	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2003	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2004	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2005	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2006	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2007	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2008	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2009	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2010	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2011	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2012	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2013	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2014	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2015	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2016	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2017	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2018	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2019	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2020	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2021	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2022	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2023	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2024	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2025	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2026	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2027	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2028	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2029	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2030	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2031	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2032	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2033	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2034	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2035	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2036	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2037	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2038	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800
2039	490849	32942460	467102	406175	8451709	52970935	382108	764214	1146322	60471800

TABLE C-15

TOTAL TRANSPORTATION CHARGES OF EACH CONTRACTOR*

(in dollars)

Calendar Year	NORTH BAY AREA				SOUTH BAY AREA				
	Napa County FC & WCD	Solano County FC & WCD	Assumed Elections under Article 8	Total	Alameda County FC & WCD, Zone 7	Alameda County Water District	Santa Clara County FC & WCD	Assumed Elections under Article 8	Total
1962	0	0	0	**0**	18563	53187	0	0	**71750**
1963	0	0	0	**0**	141884	184088	354332	22671	**702975**
1964	0	0	0	**0**	138586	259031	518828	33549	**949994**
1965	0	0	0	**0**	210247	367072	1327274	62917	**1967510**
1966	31886	13827	7653	**53366**	286294	454642	1823866	98544	**2663346**
1967	76290	15384	18310	**109984**	387962	557411	2297506	145010	**3387889**
1968	290590	18821	65519	**374930**	422256	595671	2674667	142824	**3835418**
1969	302095	25262	68039	**395396**	424338	591268	2649872	138796	**3804274**
1970	303652	26198	68173	**398023**	430098	593452	2640954	139835	**3804339**
1971	304725	27134	68191	**400050**	437023	597617	2636673	140964	**3812277**
1972	307272	28053	68322	**403647**	504954	596232	2602927	141795	**3845908**
1973	308819	28972	68453	**406244**	510141	599061	2592017	142793	**3844012**
1974	310641	29891	68650	**409182**	522766	610733	2621350	144536	**3899385**
1975	316803	30810	69649	**417262**	533897	620809	2639617	146150	**3940473**
1976	331450	31729	69780	**432959**	546138	631588	2663035	147904	**3988665**
1977	336319	33188	69988	**439495**	556155	640100	2673599	150098	**4019952**
1978	342969	38455	71104	**452528**	565570	647810	2680447	152248	**4046075**
1979	375265	79463	78615	**533343**	574531	654206	2684154	154364	**4067255**
1980	444643	223532	96219	**764394**	589716	667849	2709008	157340	**4123913**
1981	447748	223101	98628	**769477**	594883	674165	2701752	159044	**4129844**
1982	463840	223165	101672	**788677**	600572	681078	2697720	160919	**4140289**
1983	464165	223213	103299	**790677**	606258	687976	2693957	162780	**4150971**
1984	464844	223335	104781	**792960**	612077	695031	2690721	164621	**4162450**
1985	473213	227471	107741	**808425**	631446	717412	2731480	168727	**4249065**
1986	487133	227688	111704	**826525**	624262	710471	2687542	168445	**4190720**
1987	488229	228183	113455	**829867**	628501	715708	2680253	170022	**4194484**
1988	491188	233155	115506	**839849**	632884	721099	2673853	171607	**4199443**
1989	492743	234333	117114	**844190**	637952	727199	2682518	173285	**4220954**
1990	496642	234839	119192	**850673**	643337	733283	2691107	174930	**4242657**
1991	497448	234839	119386	**851673**	654370	740915	2699137	174629	**4269051**
1992	497448	234839	119386	**851673**	664237	747332	2704400	174167	**4290136**
1993	497448	234839	119386	**851673**	684337	764952	2736421	175363	**4361073**
1994	497448	234839	119386	**851673**	694698	766174	2743012	174985	**4378869**
1995	497448	234839	119386	**851673**	706182	764893	2739965	174802	**4385842**
1996	497448	234839	119386	**851673**	717768	763827	2737424	174649	**4393668**
1997	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
1998	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
1999	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2000	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2001	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2002	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2003	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2004	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2005	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2006	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2007	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2008	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2009	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2010	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2011	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2012	497448	234839	119386	**851673**	729077	762597	2734493	174473	**4400640**
2013	497448	234839	119386	**851673**	623382	664992	2459338	156734	**3904446**
2014	497448	234839	119386	**851673**	597298	603068	2288760	145478	**3634604**
2015	497448	234839	119386	**851673**	545524	528975	1755194	122643	**2952336**
2016	465562	221012	111733	**798307**	480548	471553	1474990	93533	**2520624**
2017	421158	219455	101076	**741689**	424099	421531	1317597	68357	**2231584**
2018	346393	216018	83132	**645543**	433280	429628	1346412	74715	**2284035**
2019	336534	209577	80766	**626877**	446148	441103	1382991	81294	**2351536**
2020	335977	208641	80632	**625250**	446148	441103	1382991	81294	**2351536**
2021	335420	207705	80498	**623623**	446148	441103	1382991	81294	**2351536**
2022	334873	206786	80367	**622026**	446108	441066	1382903	81289	**2351366**
2023	334326	205867	80236	**620429**	446028	440993	1382728	81278	**2351027**
2024	333504	204948	80039	**618491**	445162	440198	1380827	81160	**2347347**
2025	329342	204029	79040	**612411**	444296	439403	1378926	81042	**2343667**
2026	328795	203110	78909	**610814**	444296	439403	1378926	81042	**2343667**
2027	327926	201651	78701	**608278**	444296	439403	1378926	81042	**2343667**
2028	323276	196384	77585	**597245**	444296	439403	1378926	81042	**2343667**
2029	291980	155376	70074	**517430**	444035	439163	1378353	81006	**2342557**
2030	242374	97836	58169	**398379**	442096	437384	1374096	80741	**2334317**
2031	238759	97836	57301	**393896**	442096	437384	1374096	80741	**2334317**
2032	238759	97836	57301	**393896**	442096	437384	1374096	80741	**2334317**
2033	238759	97836	57301	**393896**	442096	437384	1374096	80741	**2334317**
2034	238367	97639	57207	**393213**	442096	437384	1374096	80741	**2334317**
2035	233114	94888	55946	**383948**	442096	437384	1374096	80741	**2334317**
2036	233114	94888	55946	**383948**	442096	437384	1374096	80741	**2334317**
2037	232997	94691	55918	**383606**	442096	437384	1374096	80741	**2334317**
2038	231359	91940	55525	**378824**	442096	437384	1374096	80741	**2334317**
2039	231084	91940	55459	**378483**	441835	437144	1373523	80705	**2333207**

*** Unadjusted for prior overpayments or underpayments of charges.**

TABLE C-15 (continued)

TOTAL TRANSPORTATION CHARGES OF EACH CONTRACTOR*

(in dollars)

Calendar Year	SAN JOAQUIN VALLEY AREA								
	Devils Den Water District	Dudley Ridge Water District	Empire West Side Irrigation District	Hacienda Water District	Kern County Water Agency		Tulare Lake Basin Water Storage District	Assumed Elections under Article 8	Total
					Agriculture	Urban			
1962	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	96212	0	0	96212
1966	0	0	0	0	0	196466	0	0	196466
1967	1162	5246	314	892	89956	328973	11530	19026	457099
1968	54411	114996	20230	16678	1746798	524286	282419	173858	2933676
1969	67932	130278	20365	19241	1878979	565966	304293	184029	3171083
1970	81803	142012	19838	21978	2286059	657914	318323	218671	3746598
1971	95503	149000	18290	23163	2567584	715761	319322	281093	4169716
1972	104710	154763	17104	24254	3060315	757282	322542	292975	4733945
1973	122384	164348	16918	25883	3392077	780395	334149	384845	5220999
1974	133469	182615	17917	29491	3725044	828903	372669	488801	5778909
1975	143337	194401	17974	31468	3978427	846837	397795	586597	6196836
1976	155954	213921	18917	34685	4416517	877904	439068	698942	6855908
1977	167840	230646	19441	37459	4871774	896819	475243	809303	7508525
1978	166453	246292	19723	40644	5286030	933403	507100	917476	8117121
1979	163761	261739	20020	43225	5716857	964950	539985	1028798	8739335
1980	173418	276731	20241	45733	6236242	989985	571945	1143304	9457599
1981	172092	289582	20268	48598	6662578	1024111	599417	1251338	10067984
1982	170669	303353	20300	50791	7059766	1060586	627335	1361151	10653951
1983	169163	315296	20297	52914	7506289	1118695	654374	1470264	11307292
1984	167869	328979	20321	55091	7933342	1153871	682104	1580208	11921785
1985	165621	341292	20292	57867	8349403	1184100	708438	1688531	12515544
1986	164338	334137	18911	56650	8440555	1168004	694319	1732760	12609674
1987	162428	344554	18811	58397	8804524	1195858	716590	1833126	13134288
1988	160375	355547	18714	60133	9174484	1249382	738698	1933070	13690403
1989	158609	368304	18773	62938	9486476	1281347	765919	2041403	14183769
1990	156342	377079	18589	64406	9754923	1303879	812968	2135529	14623715
1991	156811	379216	18719	64769	9792536	1309892	817669	2143321	14682933
1992	156806	379188	18716	64764	9792047	1309812	817607	2143218	14682158
1993	156791	379121	18712	64753	9790891	1309622	817459	2142976	14680325
1994	156788	379110	18711	64751	9790703	1309592	817435	2142935	14680025
1995	156789	379110	18711	64751	9790708	1309592	817435	2142937	14680033
1996	156780	379072	18709	64744	9790048	1309485	817350	2142799	14678987
1997	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
1998	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
1999	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2000	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2001	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2002	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2003	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2004	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2005	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2006	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2007	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2008	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2009	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2010	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2011	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2012	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2013	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2014	156780	379073	18709	64744	9790055	1309486	817351	2142800	14678998
2015	156780	379073	18709	64744	9790055	1213274	817351	2142800	14582786
2016	156780	379073	18709	64744	9790055	1113020	817351	2142800	14482532
2017	156780	379073	18709	64744	9790055	992415	817351	2142800	14361927
2018	156780	379073	18709	64744	9790055	893717	817351	2142800	14263229
2019	156780	379073	18709	64744	9790055	858378	817351	2142800	14227890
2020	156780	379073	18709	64744	9790055	830274	817351	2142800	14199786
2021	156780	379073	18709	64744	9790055	812003	817351	2142800	14181515
2022	156780	379073	18709	64744	9790055	806428	817351	2142800	14175940
2023	156780	379073	18709	64744	9790055	805662	817351	2142800	14175174
2024	156780	379073	18709	64744	9790055	800409	817351	2142800	14169921
2025	156780	379073	18709	64744	9790055	793564	817351	2142800	14163076
2026	156780	379073	18709	64744	9790055	791851	817351	2142800	14161363
2027	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2028	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2029	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2030	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2031	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2032	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2033	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2034	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2035	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2036	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2037	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2038	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739
2039	156780	379073	18709	64744	9790055	791227	817351	2142800	14160739

* Unadjusted for prior overpayments or underpayments of charges.

TABLE C-15 (continued)

TOTAL TRANSPORTATION CHARGES OF EACH CONTRACTOR*

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA									
	Antelope Valley-East Kern Water Agency	City of West Covina	Coachella Valley County Water District	Crestline-Lake Arrowhead Water Agency	Desert Water Agency	Littlerock Creek Irrigation District	Mojave Water Agency	Palmdale Irrigation District	San Bernardino Valley Municipal Water District	San Gabriel Valley Municipal Water District
1962	0	0	0	0	0	0	0	0	0	0
1963	24742	0	0	0	9034	0	0	0	31255	8384
1964	50066	6473	10574	2920	17130	943	23261	6332	56902	15343
1965	121716	13396	23127	6350	37843	2128	50878	15171	119199	32006
1966	273108	27766	49630	13494	81574	4653	109186	34011	246611	66805
1967	460761	46752	84185	22960	138589	7848	185206	57751	415010	112456
1968	719900	76165	132403	35842	218152	12391	291288	91552	673060	184108
1969	857319	102370	170095	47011	280343	15194	374209	111140	913110	245487
1970	1027855	134594	216570	60582	357027	18098	476450	131482	1204281	321856
1971	1645794	171229	276075	77660	455206	22373	607358	163419	1571249	409360
1972	1841614	255217	426100	99788	691087	27030	868215	202842	2353968	616295
1973	1934429	259664	440565	105103	714905	28734	912486	223045	2384302	629365
1974	2037424	264454	456361	111003	741074	30652	960842	245111	2419421	642021
1975	2153658	272014	476149	117904	773780	32769	1018116	268640	2474622	661590
1976	2274214	281591	496214	124881	806899	35129	1076275	293093	2534993	684200
1977	2396028	288721	514600	131537	837299	36800	1131240	318066	2585571	702720
1978	2483105	293345	528726	137227	860801	39706	1177072	334994	2615110	716350
1979	2674924	309687	556900	146287	906731	42948	1255828	364239	2739785	759710
1980	2877877	332705	590665	157053	961730	46427	1349671	393198	2897983	814407
1981	3095258	349009	633248	167698	1027219	50024	1441135	418200	3018893	858242
1982	3293522	361132	670595	177036	1084157	53360	1519335	439629	3066958	889788
1983	3504229	376378	713895	187863	1150365	56924	1610730	462378	3133811	929354
1984	3717260	389117	754037	197901	1211414	60521	1694261	484748	3178414	962607
1985	3930627	405923	798136	208925	1278574	64151	1786326	506832	3232035	1000502
1986	4099225	414132	831384	217236	1328613	67071	1853527	522664	3282038	1019933
1987	4306232	427696	874795	228090	1410186	70628	1943348	543369	3456615	1052805
1988	4512259	438831	914290	237965	1486014	74189	2024145	563848	3618207	1079512
1989	4724138	452196	958423	248999	1569738	77831	2115004	584625	3796242	1111763
1990	4926377	462706	997352	258732	1645319	81340	2194165	604161	3957050	1136802
1991	4929268	462451	997118	258672	1644936	81390	2193654	604533	4105718	1136170
1992	4929200	462446	997107	258669	1644917	81389	2193630	604525	4105671	1136156
1993	4929041	462433	997081	258662	1644874	81386	2193571	604504	4105557	1136122
1994	4929016	462430	997076	258660	1644866	81386	2193562	604501	4105539	1136118
1995	4929016	462430	997076	258661	1644867	81386	2193562	604502	4105540	1136118
1996	4928925	462423	997061	258657	1644841	81385	2193529	604490	4105475	1136098
1997	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
1998	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
1999	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2000	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2001	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
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2004	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2005	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2006	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2007	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2008	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2009	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2010	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2011	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2012	4928926	462423	997061	258657	1644841	81385	2193529	604490	4105476	1136098
2013	4904184	462423	997061	258657	1635807	81385	2193529	604490	4074221	1127714
2014	4878860	455950	986487	255737	1627711	80442	2170268	598158	4048574	1120755
2015	4807210	449027	973934	252307	1606998	79257	2142651	589319	3986277	1104092
2016	4655818	434657	947431	245163	1563267	76732	2084343	570479	3858865	1069293
2017	4477432	416463	914449	236093	1508847	73693	2011783	547906	3697201	1025623
2018	4293456	393477	878985	226425	1450330	70416	1933761	523572	3493777	970038
2019	4160966	367694	842129	215467	1389518	67695	1852680	504606	3257309	909713
2020	4006937	336881	798455	202600	1317456	65071	1756600	486346	2978133	836871
2021	3872063	313343	764948	192073	1262169	63375	1682886	473707	2722508	782118
2022	3813847	303117	750888	188301	1238969	62532	1651954	467450	2625186	756707
2023	3805342	302227	749121	187856	1236053	62363	1648066	466186	2617617	754481
2024	3794966	300915	746517	187200	1231756	62180	1642336	464819	2606462	751200
2025	3764246	297765	740265	185625	1221440	61698	1628581	461213	2579684	743324
2026	3741621	295544	735858	184515	1214168	61336	1618885	458507	2560807	737772
2027	3726685	294005	732804	183746	1209129	61102	1612166	456757	2547726	733925
2028	3725635	293465	732106	183570	1207978	61102	1610631	456757	2543148	732582
2029	3725635	291444	732106	183570	1207978	61102	1610631	456757	2526139	727621
2030	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2031	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2032	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2033	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2034	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2035	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2036	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2037	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2038	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660
2039	3725635	289423	732106	183570	1207978	61102	1610631	456757	2509130	722660

* Unadjusted for prior overpayments or underpayments of charges.

TABLE C-15 (continued)

TOTAL TRANSPORTATION CHARGES OF EACH CONTRACTOR*

(in dollars)

Calendar Year	SOUTHERN CALIFORNIA AREA (Continued)						CENTRAL COASTAL AREA			GRAND TOTAL
	San Gorgonio Pass Water Agency	The Metropolitan Water District of Southern California	Upper Santa Clara Valley Water Agency	Ventura County Flood Control District	Assumed Elections under Article 8	Total	San Luis Obispo County FC & WCD	Santa Barbara County FC & WCD	Total	
1962	0	0	0	0	0	0	0	0	0	71750
1963	3917	450745	0	0	144662	672739	0	0	0	1375714
1964	7475	878281	11334	9856	266696	1363586	9813	21049	30862	2344442
1965	16625	2078354	28847	25085	582324	3153049	22957	49581	72538	5289309
1966	36041	4411075	63309	55052	1158128	6630443	46076	99775	145851	9689472
1967	61193	7570895	111899	97304	1837023	11209832	73285	158124	231409	15396213
1968	96603	12860589	196577	170937	2868223	18627790	107975	231851	339826	26111640
1969	123174	16787838	253549	220476	3776809	24278124	115861	249931	365792	32014669
1970	155849	21555465	319779	278066	4964986	31222940	125050	271802	396852	39568752
1971	197730	29114620	393999	342607	7282059	42730738	131318	286642	417960	51530741
1972	250904	33506104	424400	358336	9566404	51488304	137445	301429	438874	60910678
1973	265593	34848671	447492	361037	9827252	53382643	145735	321692	467427	63321325
1974	282143	36457062	472468	366294	10088728	55575058	156089	348238	504327	66166861
1975	301613	38000306	494636	370930	10431346	57848073	168276	379517	547793	68950437
1976	321219	39663221	518426	375418	10781312	60267085	327310	707793	1035103	72579720
1977	339887	41223795	540665	377975	11107525	62532429	411234	882381	1293615	75794016
1978	355833	42401320	557230	377970	11373092	64251881	517315	1107646	1624961	78492566
1979	380629	44685143	585172	378607	11918521	67705111	667483	1493129	2160612	83205656
1980	410063	47550773	624142	394999	12614601	72016294	1295934	2984866	4280800	90643000
1981	441938	49678230	654469	412858	13200486	75446907	1282986	2997977	4280963	94695175
1982	470598	51316651	679112	431075	13710444	78163392	1291262	3014358	4305620	98051929
1983	503571	53286434	707647	450956	14322854	81397389	1298902	3029555	4328457	101974786
1984	534551	55363471	741203	473116	14883462	84646083	1321588	3074564	4396152	105919430
1985	568486	56971850	762495	492056	15512633	87519551	1392687	3217034	4609721	109702306
1986	597898	58490672	788724	531647	15961111	90005875	1444406	3320483	4764889	112397683
1987	634790	60557322	821432	575560	16581413	93484281	1473319	3378516	4851835	116494755
1988	669024	62282864	849190	637951	17134799	96523088	1531648	3495395	5027043	120279826
1989	706860	64082221	875948	700909	17769064	99773961	1586038	3604159	5190197	124213071
1990	737676	65992862	908860	790314	18315663	103009379	1646061	3724192	5370253	128096677
1991	737506	65953426	905943	787775	18307043	103105603	1647116	3726301	5373417	128282677
1992	737497	65952584	905929	787764	18306852	103104336	1647102	3726272	5373374	128301677
1993	737476	65950588	905899	787738	18306400	103101332	1647068	3726206	5373274	128367677
1994	737473	65950269	905894	787734	18306327	103100851	1647064	3726195	5373259	128384677
1995	737474	65950279	905895	787734	18306329	103100869	1647064	3726196	5373260	128391677
1996	737462	65949135	905877	787718	18306070	103099146	1647045	3726158	5373203	128396677
1997	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
1998	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
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2000	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2001	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2002	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2003	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2004	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
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2006	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2007	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2008	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2009	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2010	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2011	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2012	737463	65949146	905877	787718	18306073	103099163	1647045	3726158	5373203	128403677
2013	733546	65498401	905877	787718	18161411	102426424	1647045	3726158	5373203	127234744
2014	729988	65070865	894543	777862	18039377	101735577	1637232	3705109	5342341	126243193
2015	720838	63870792	877030	762633	17723749	99946114	1624088	3676577	5300665	123633574
2016	701422	61538071	842568	732666	17147945	96468720	1600969	3626383	5227352	119497535
2017	677449	58496582	795779	691980	16496433	92067713	1575715	3571993	5147708	114550621
2018	651606	54166681	725712	631053	15687340	86096629	1555020	3526608	5081628	108371064
2019	625661	50302383	669698	582346	14793324	80541189	1547986	3510247	5058233	102805725
2020	595090	45745519	606677	527546	13653921	73914103	1539301	3489402	5028703	96119378
2021	572702	42071223	573979	499113	11789586	67635793	1533669	3475851	5009520	89801987
2022	562725	40291563	564118	490538	10604448	64372343	1528026	3462042	4990068	86511743
2023	561400	39845018	557076	484414	10527842	63805062	1519672	3441648	4961320	85913012
2024	559447	39471132	549808	478094	10482486	63329318	1509662	3415797	4925459	85390536
2025	554758	39037301	543529	472634	10373601	62665664	1497491	3384551	4882042	84666860
2026	551452	38712203	538639	468381	10296843	62176531	1381342	3143111	4524453	83816828
2027	549161	38515552	535940	466034	10243653	61868385	1297568	2968826	4266394	83247463
2028	548638	38485679	535940	466034	10225091	61808356	1191540	2743668	3935208	82845215
2029	548638	38372768	535940	466034	10156502	61602865	1041593	2358631	3400224	82023815
2030	548638	38259857	535940	466034	10087913	61397374	969536	2145556	3115092	81405901
2031	548638	38259857	535940	466034	10087913	61397374	969536	2145556	3115092	81401418
2032	548638	38259857	535940	466034	10087913	61397374	969536	2145556	3115092	81401418
2033	548638	38259857	535940	466034	10087913	61397374	969536	2145556	3115092	81401418
2034	548638	38259857	535940	466034	10087913	61397374	968705	2143872	3112577	81398220
2035	548638	38259857	535940	466034	10087913	61397374	957940	2122074	3080014	81356392
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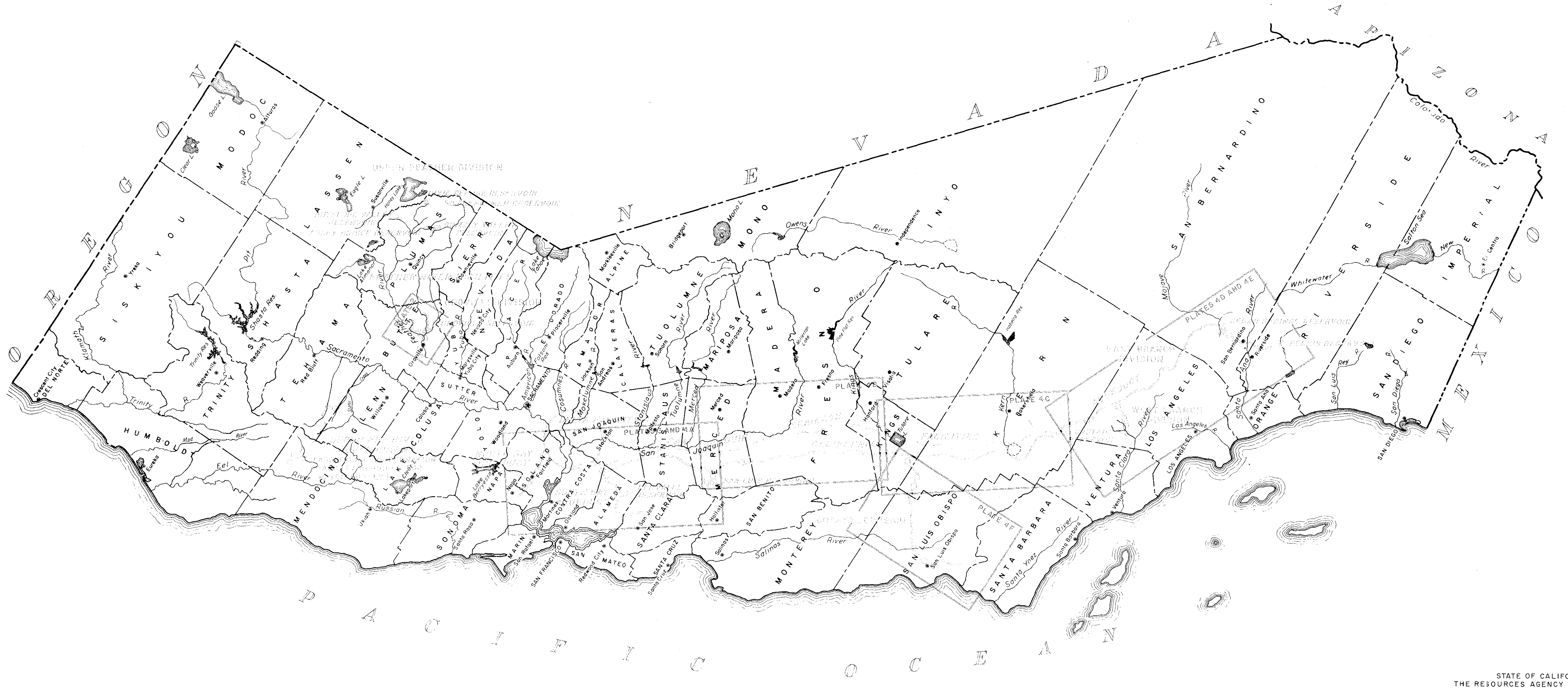
2037	548638	38259857	535940	466034	10087913	61397374	947778	2101495	3049273	81325309
2038	548638	38259857	535940	466034	10087913	61397374	938632	2082974	3021606	81292860
2039	548638	38259857	535940	466034	10087913	61397374	938632	2082974	3021606	81291409

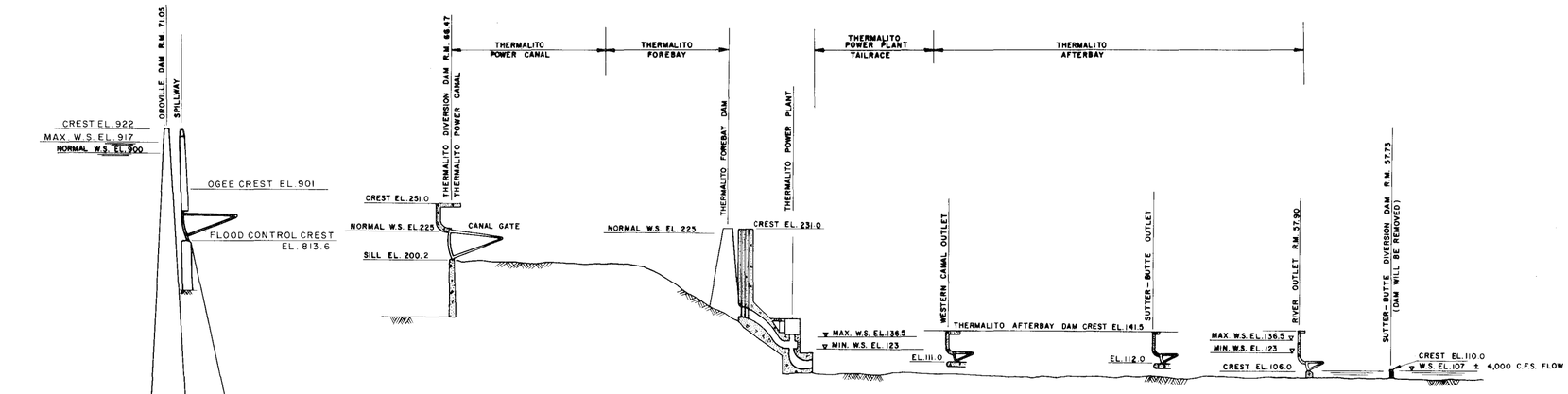
* Unadjusted for prior overpayments or underpayments of charges.



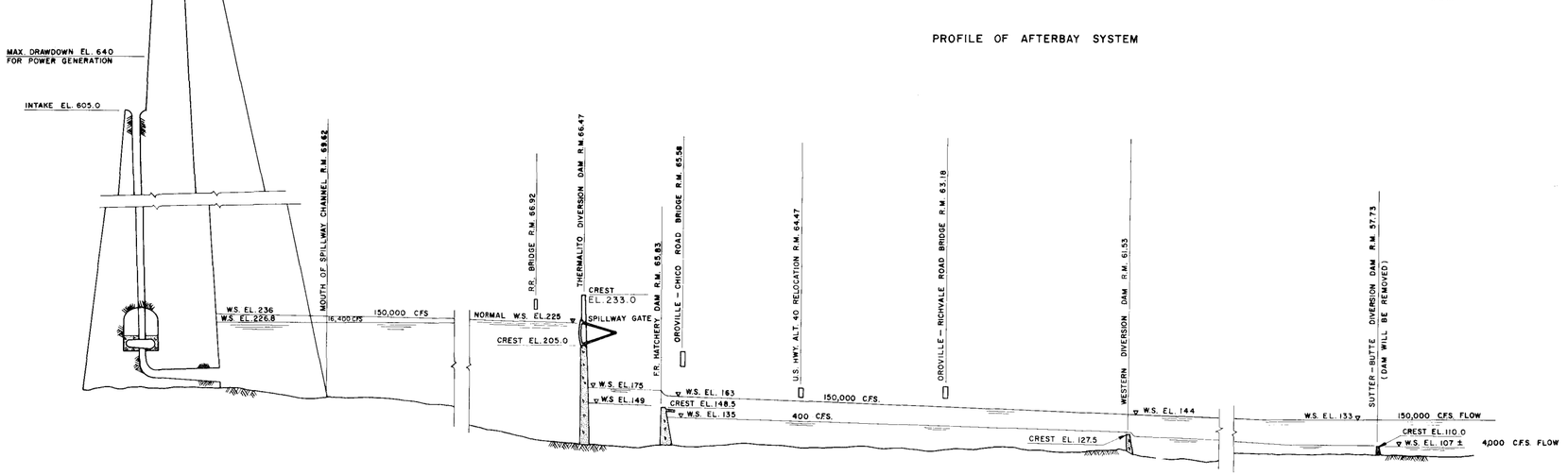
STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF OPERATIONS

THE CALIFORNIA STATE WATER PROJECT
IN 1964
GENERAL
LOCATION AND INDEX MAP

APRIL 1964



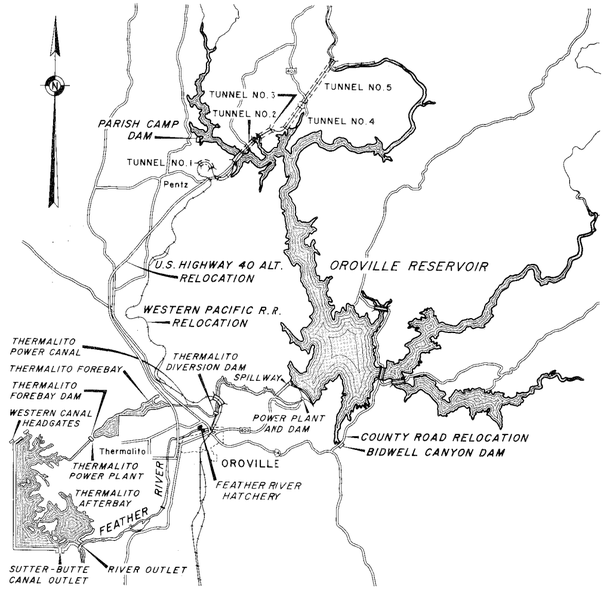
PROFILE OF AFTERBAY SYSTEM



NOTE: ELEVATIONS SHOWN REFER TO U.S.C.&G.S. DATUM 1929 ADJUSTMENT
RIVER MILE 00 IS AT MOUTH OF FEATHER RIVER

PROFILE OF RIVER CHANNEL

SCHEMATIC DIAGRAM

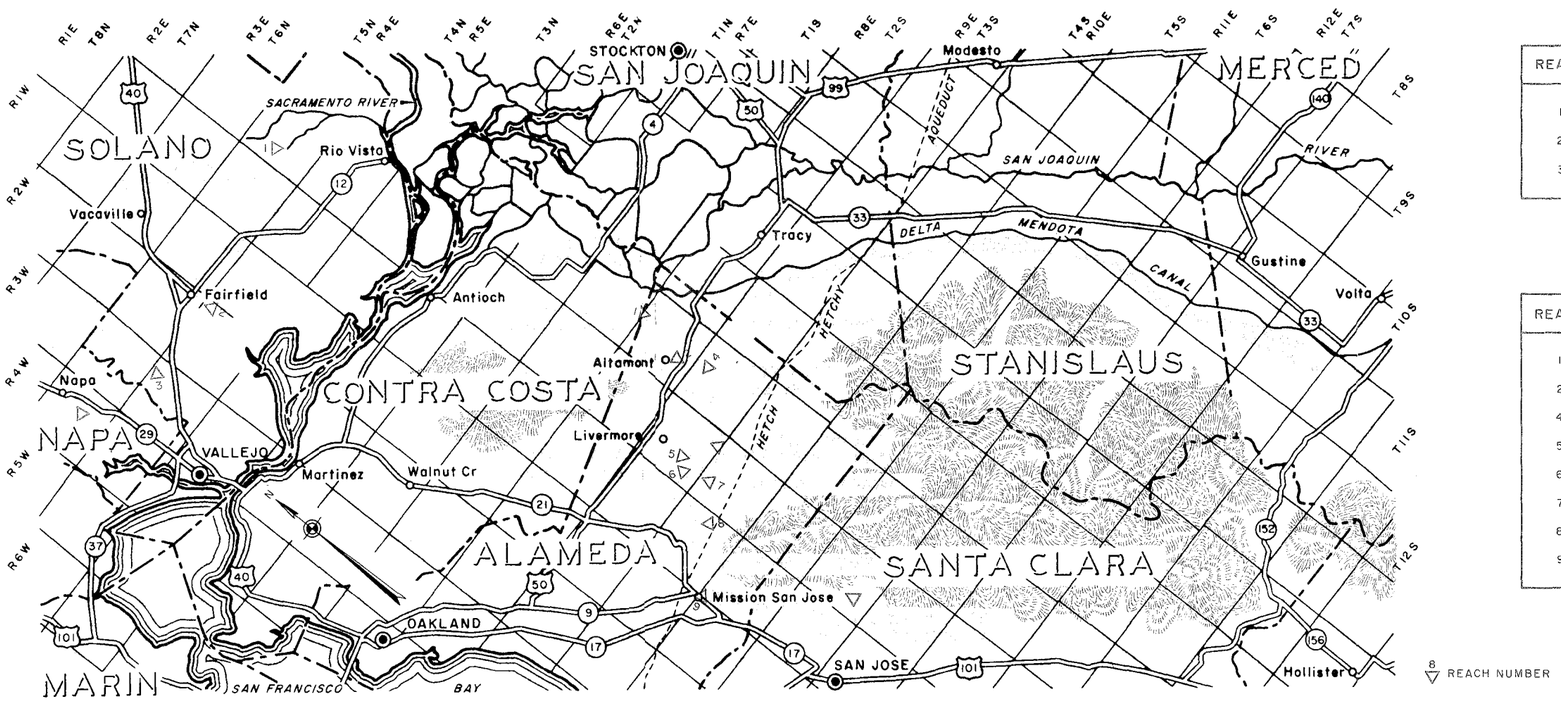


PLAN

STATE OF CALIFORNIA
THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF OPERATIONS

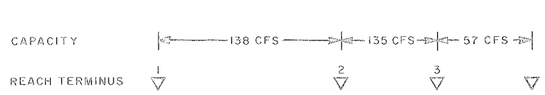
THE CALIFORNIA STATE WATER PROJECT
IN 1964
OROVILLE DIVISION
PLAN AND SCHEMATIC DIAGRAM

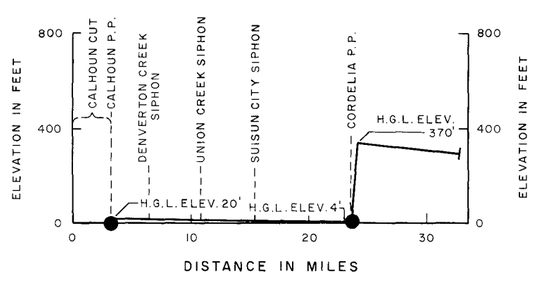
APRIL 1964

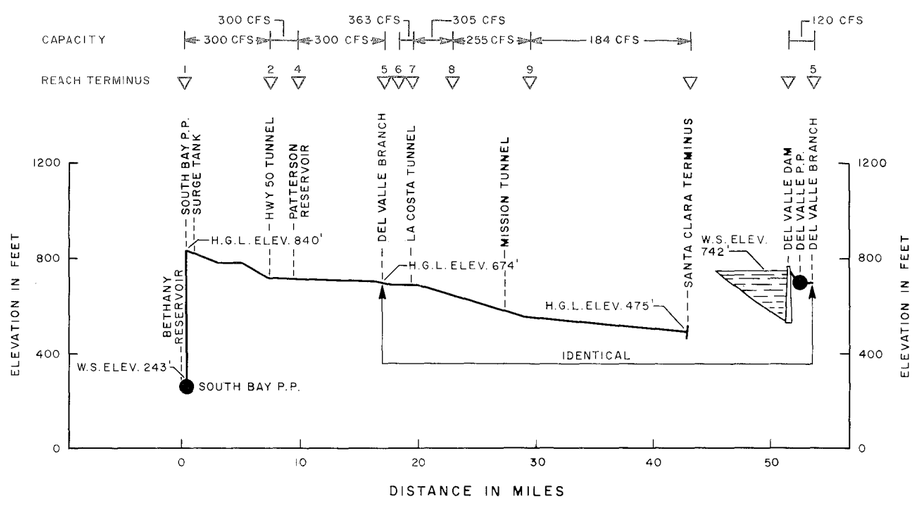


REACH	NORTH BAY AQUEDUCT
1	LINDSEY SLOUGH TO SUISUN CITY
2	SUISUN CITY TO CORDELIA PUMPING PLANT
3	CORDELIA PUMPING PLANT TO NAPA TERMINUS

REACH	SOUTH BAY AQUEDUCT
1	BETHANY RESERVOIR TO ALTAMONT TURNOUT
2	ALTAMONT TURNOUT THRU PATTERSON RESERVOIR
4	PATTERSON RESERVOIR TO DEL VALLE BRANCH
5	DEL VALLE BRANCH THRU DEL VALLE RESERVOIR
6	DEL VALLE BRANCH TO SOUTH LIVERMORE TURNOUT
7	SOUTH LIVERMORE TURNOUT TO VALLECITOS TURNOUT
8	VALLECITOS TURNOUT TO ALAMEDA-BAYSIDE TURNOUT
9	ALAMEDA-BAYSIDE TURNOUT TO SANTA CLARA TERMINUS







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THE CALIFORNIA STATE WATER PROJECT
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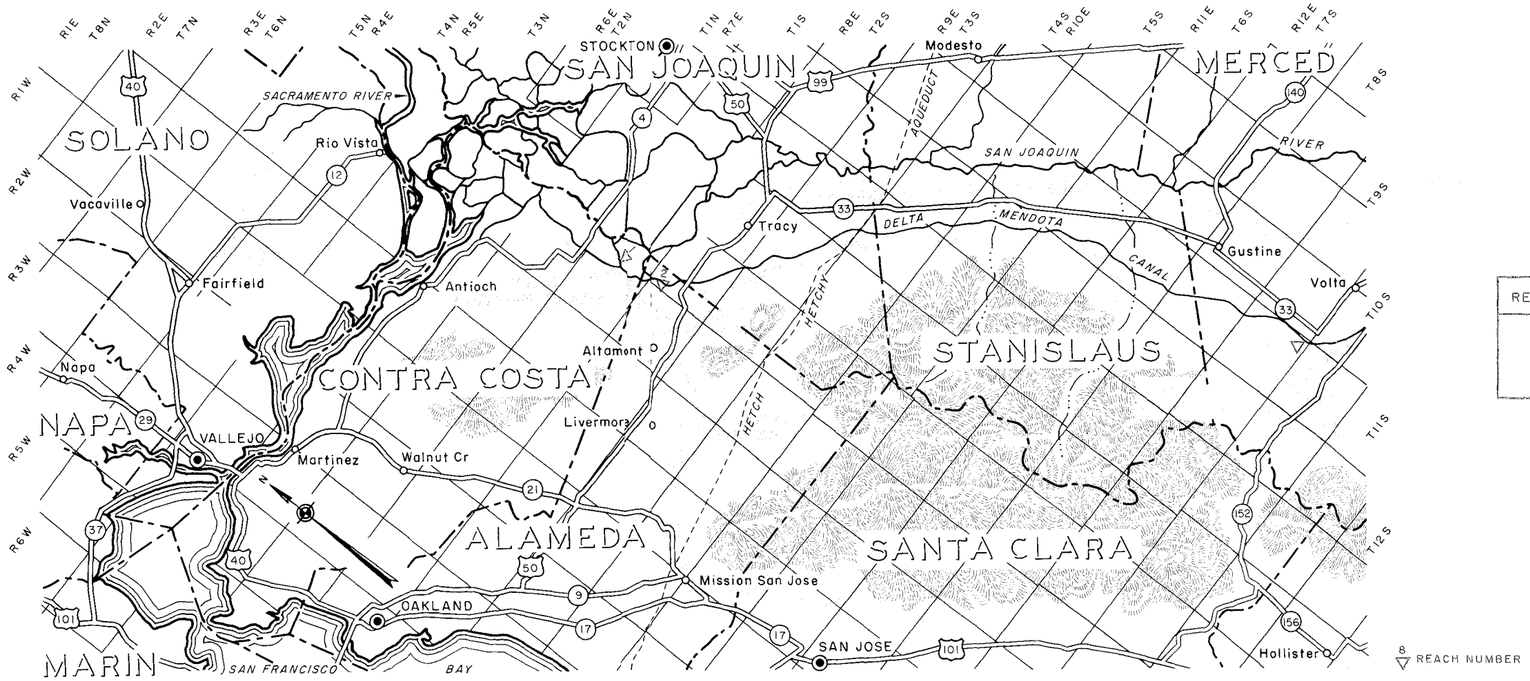
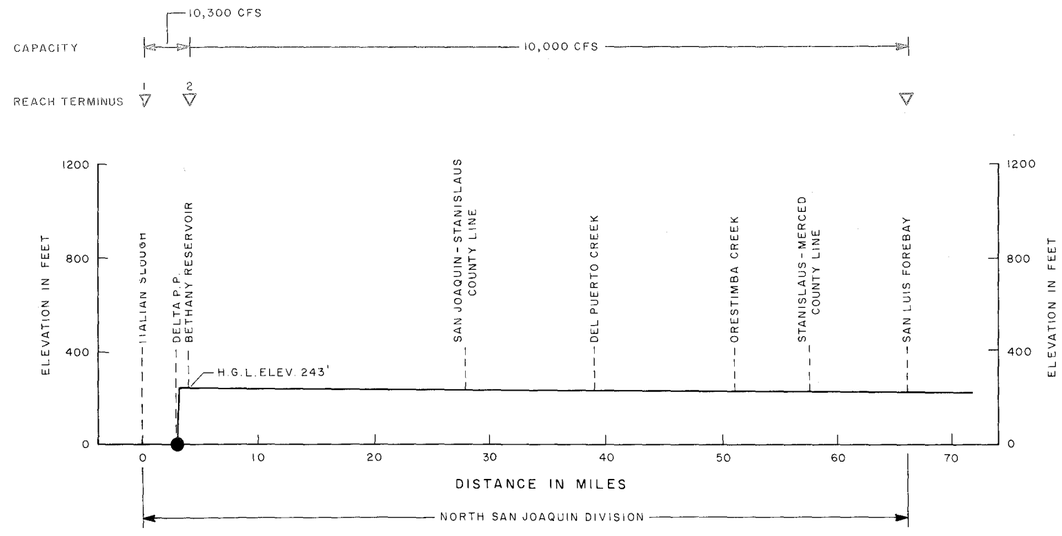
NORTH AND SOUTH BAY AQUEDUCTS
PLAN AND PROFILE

SCALE OF MILES
10 5 0 10

APRIL 1964



REACH	CALIFORNIA AQUEDUCT
1	DELTA THRU BETHANY RESERVOIR
2	BETHANY RESERVOIR TO SAN LUIS FOREBAY



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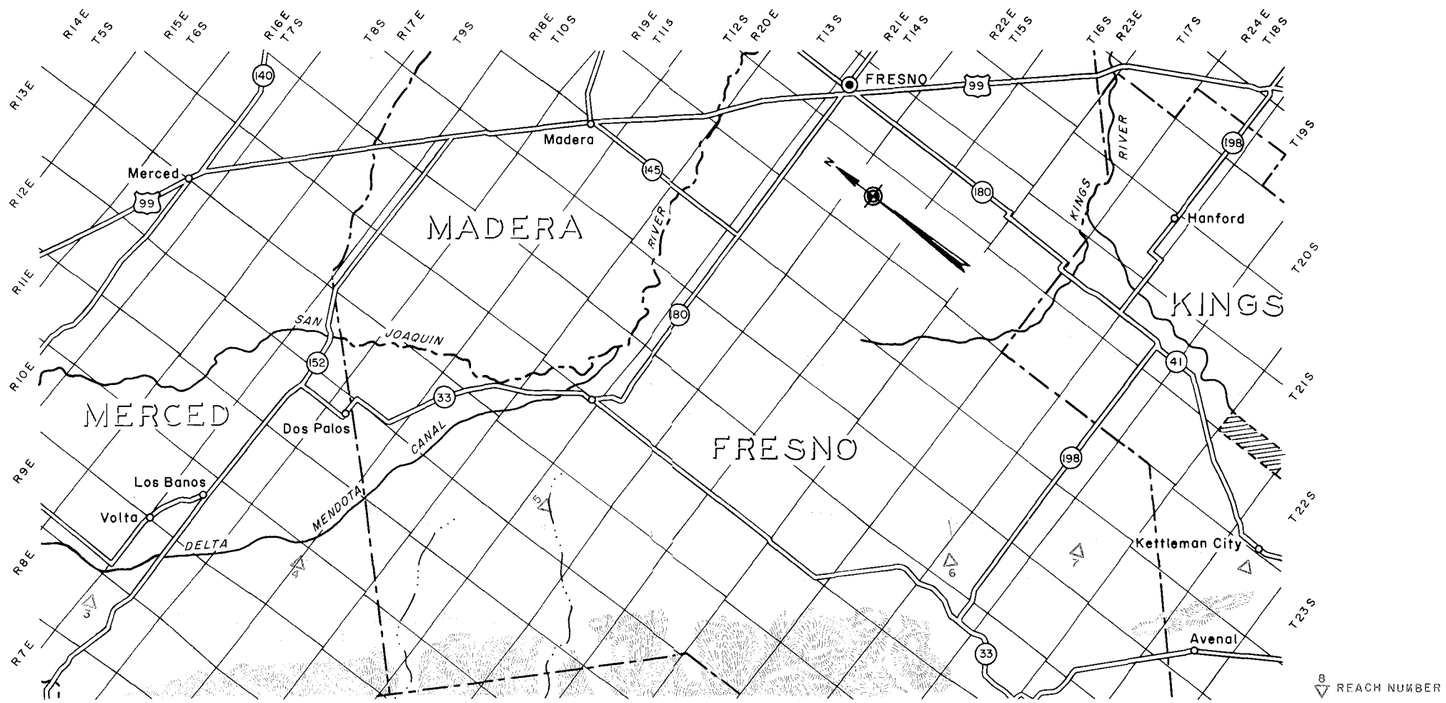
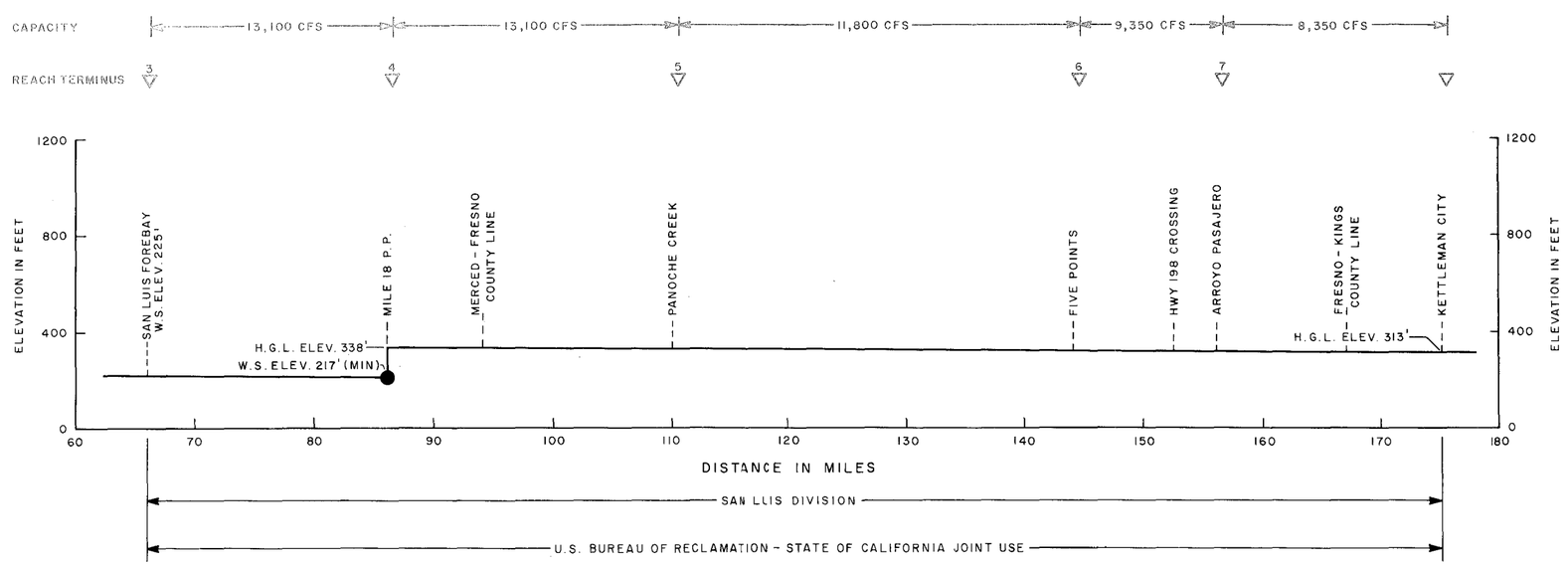


REACH	CALIFORNIA AQUEDUCT
3	SAN LUIS FOREBAY TO MILE 18 PUMPING PLANT
4	MILE 18 PUMPING PLANT TO PANOCHE CREEK
5	PANOCHE CREEK TO FIVE POINTS
6	FIVE POINTS TO ARROYO PASAJERO
7	ARROYO PASAJERO TO KETTLEMAN CITY



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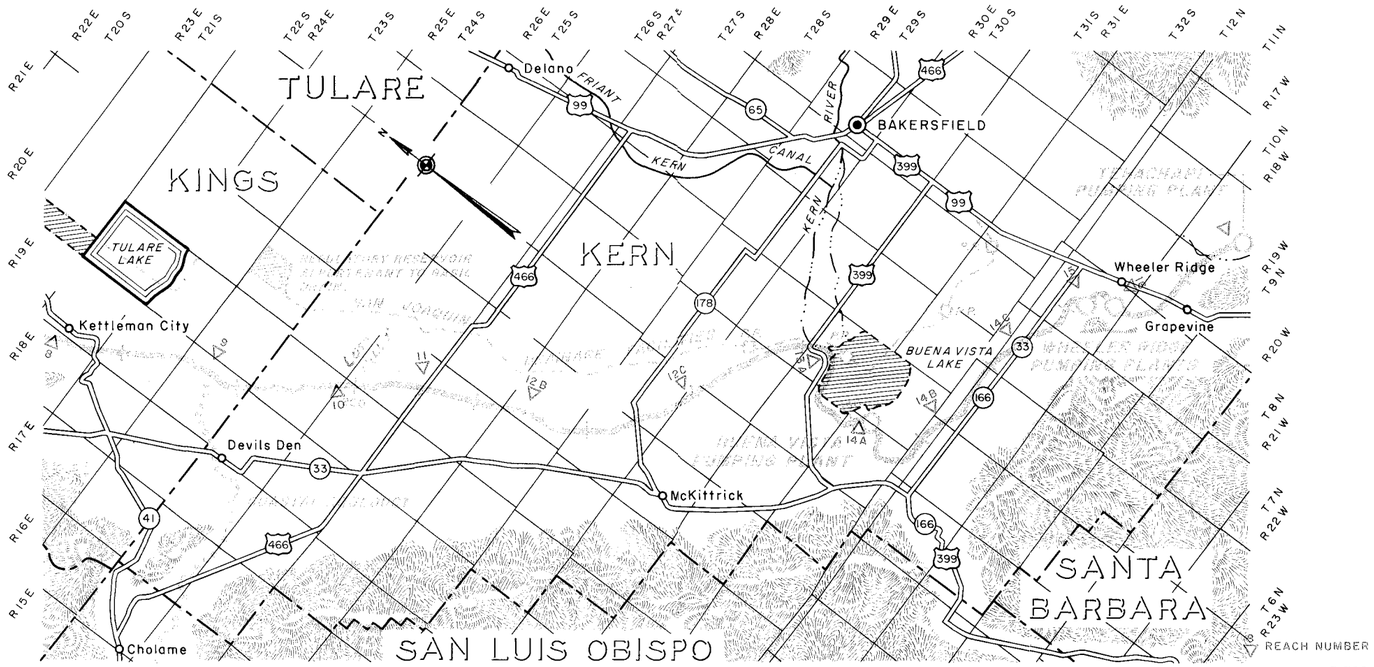
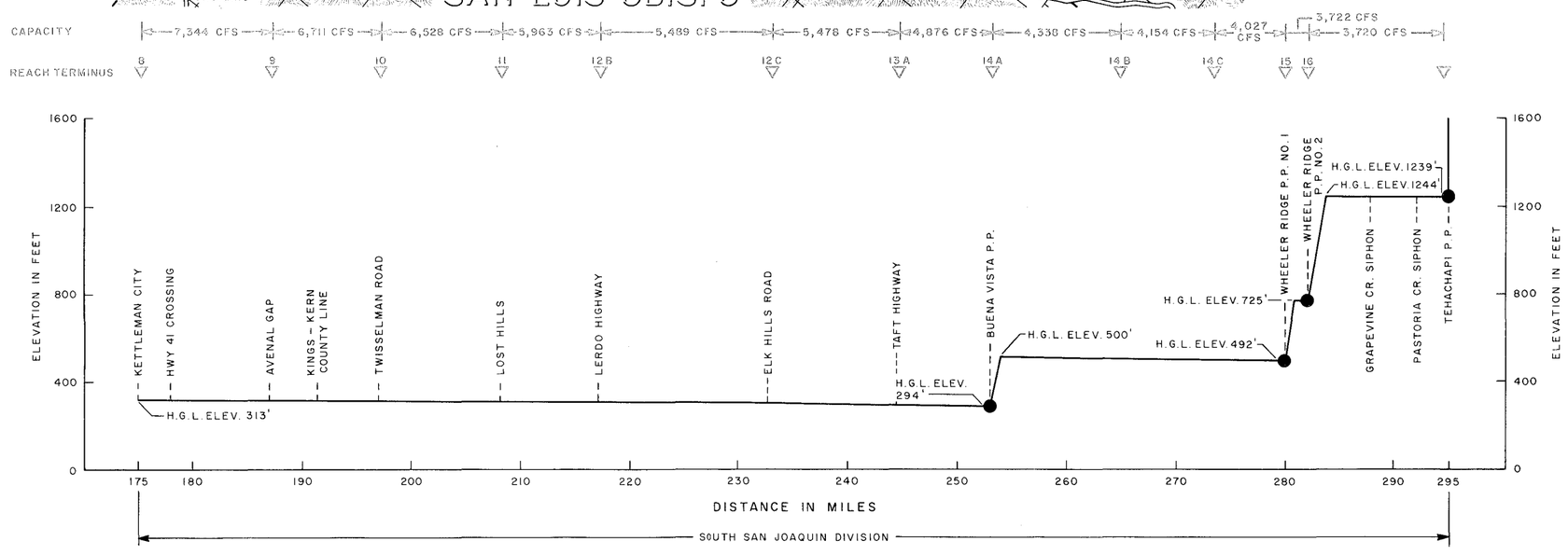


REACH	CALIFORNIA AQUEDUCT
8	KETTLEMAN CITY TO AVENAL GAP
9	AVENAL GAP TO TWISSELMAN ROAD
10	TWISSELMAN ROAD TO LOST HILLS
11	LOST HILLS TO LERDO HIGHWAY
12B	LERDO HIGHWAY TO ELK HILLS ROAD
12C	ELK HILLS ROAD TO TAFT HIGHWAY
13A	TAFT HIGHWAY TO BUENA VISTA PUMPING PLANT
14A	BUENA VISTA PUMPING PLANT TO SANTIAGO CREEK
14B	SANTIAGO CREEK TO OLD RIVER ROAD
14C	OLD RIVER ROAD TO WHEELER RIDGE PUMPING PLANT I
15	WHEELER RIDGE PUMPING PLANT I TO WHEELER RIDGE PUMPING PLANT II
16	WHEELER RIDGE PUMPING PLANT II TO TEHACHAPI PUMPING PLANT



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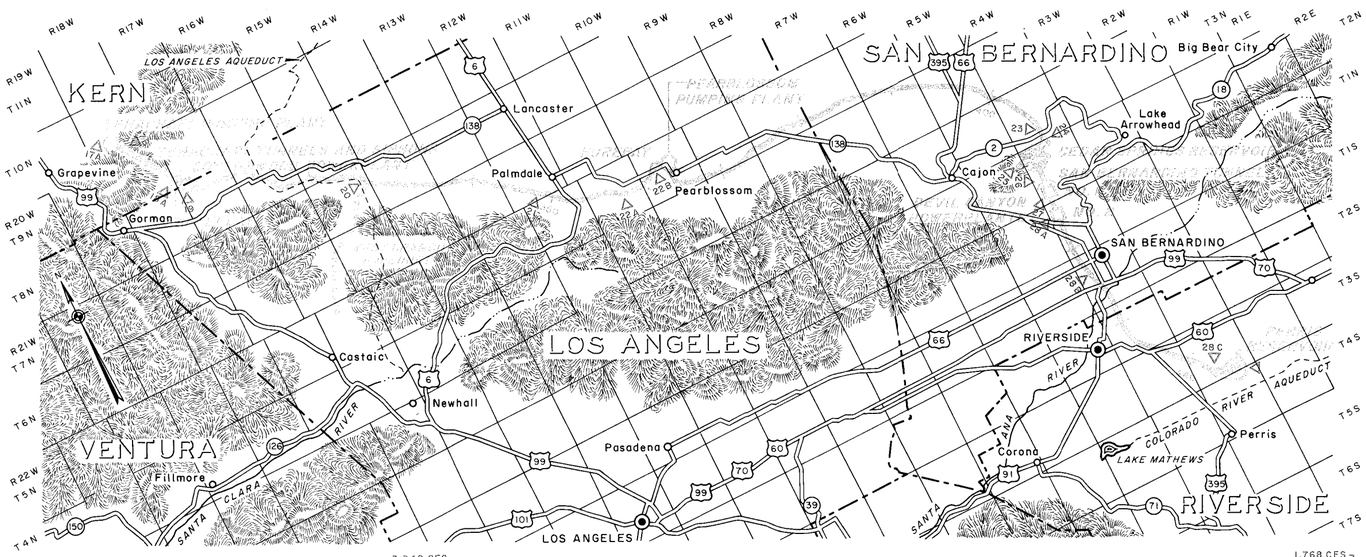
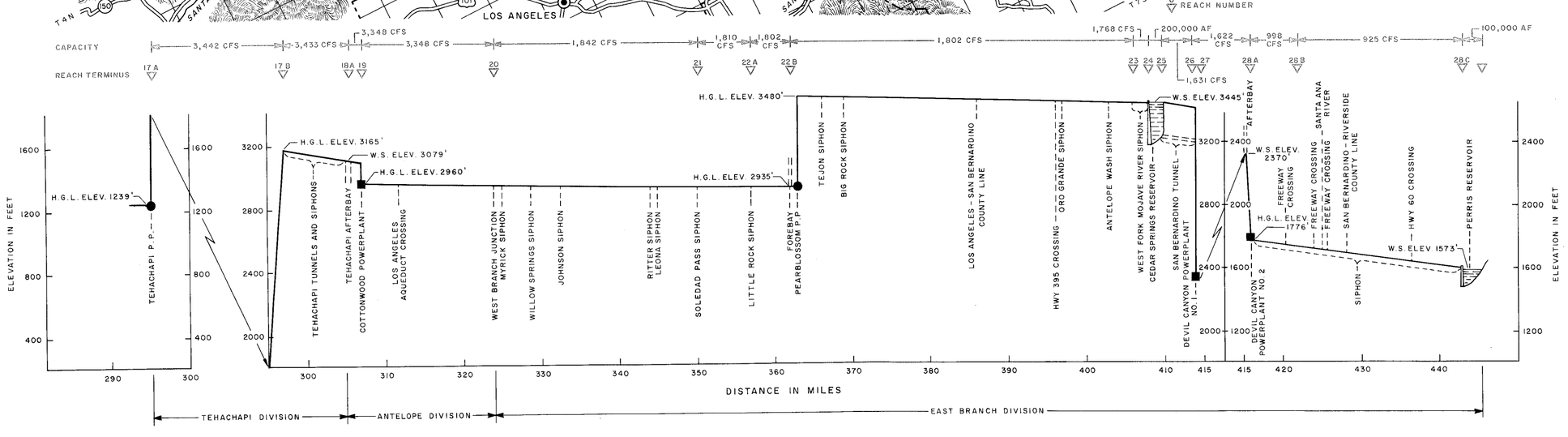


REACH	CALIFORNIA AQUEDUCT
17A	TEHACHAPI PUMPING PLANT TO NORTH PORTAL TEHACHAPI TUNNEL No. 1
17B	NORTH PORTAL TEHACHAPI TUNNEL No. 1 TO COTTONWOOD POWERPLANT
18A	COTTONWOOD POWER DEVELOPMENT
19	COTTONWOOD POWERPLANT TO WEST BRANCH JUNCTION
20	WEST BRANCH JUNCTION TO PALMDALE
21	PALMDALE TO LITTLEROCK CREEK
22 A	LITTLEROCK CREEK TO PEARBLOSSOM PUMPING PLANT
22 B	PEARBLOSSOM PUMPING PLANT TO WEST FORK MOJAVE RIVER
23	WEST FORK MOJAVE RIVER TO CEDAR SPRINGS RESERVOIR
24	CEDAR SPRINGS DAM AND RESERVOIR
25	CEDAR SPRINGS RESERVOIR TO SOUTH PORTAL SAN BERNARDINO TUNNEL
26	SOUTH PORTAL SAN BERNARDINO TUNNEL THRU DEVIL CANYON POWERPLANT No. 1
27	DEVIL CANYON POWERPLANT No. 1 THRU DEVIL CANYON POWERPLANT No. 2
28 A	DEVIL CANYON POWERPLANT No. 2 TO MILL AVENUE
28 B	MILL AVENUE TO PERRIS RESERVOIR
28 C	PERRIS DAM AND RESERVOIR



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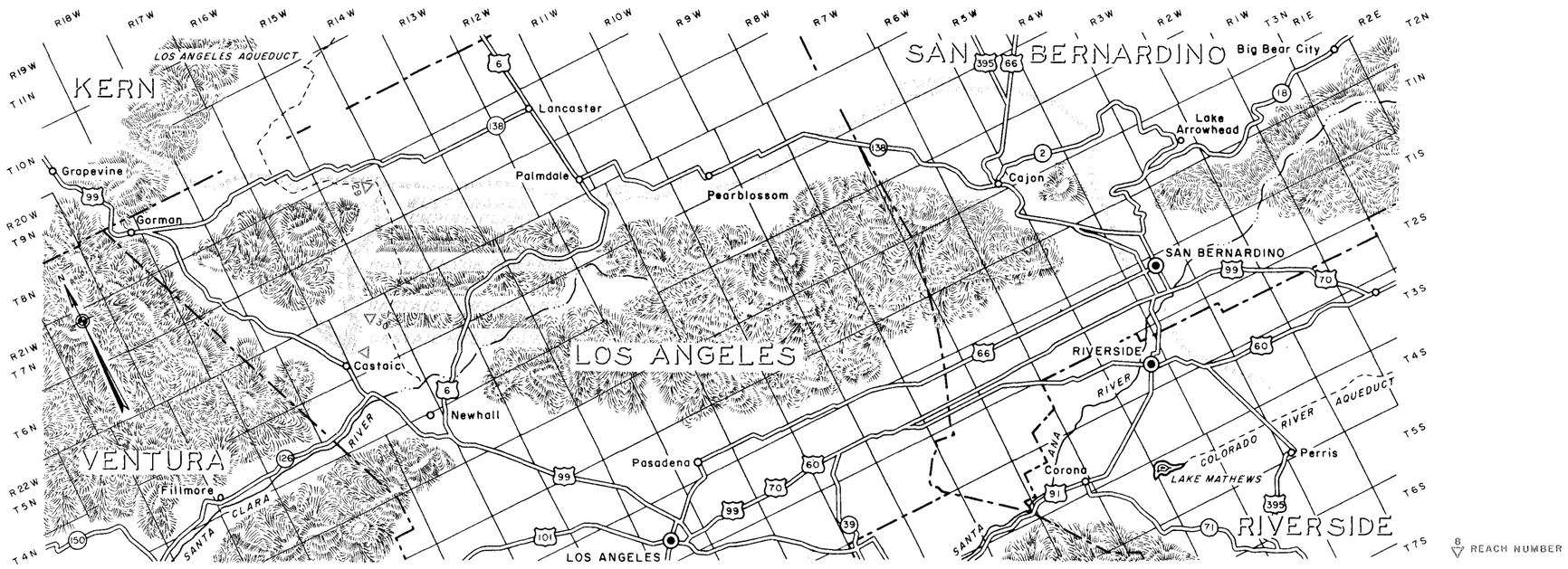

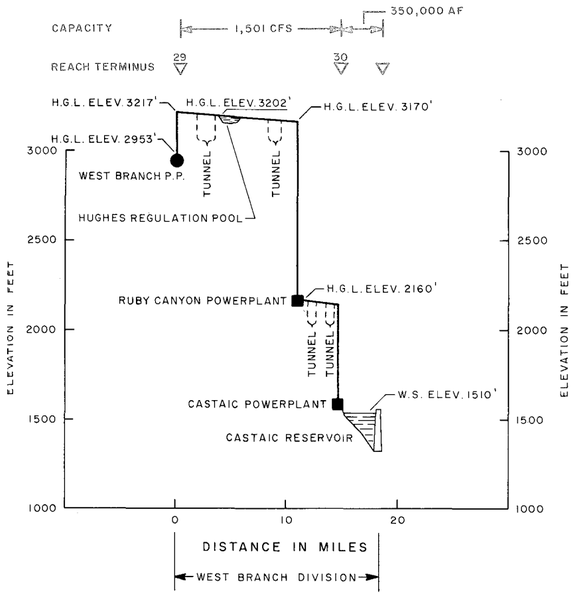

REACH	CALIFORNIA AQUEDUCT
29	WEST BRANCH JUNCTION TO CASTAIC RESERVOIR
30	CASTAIC DAM AND RESERVOIR

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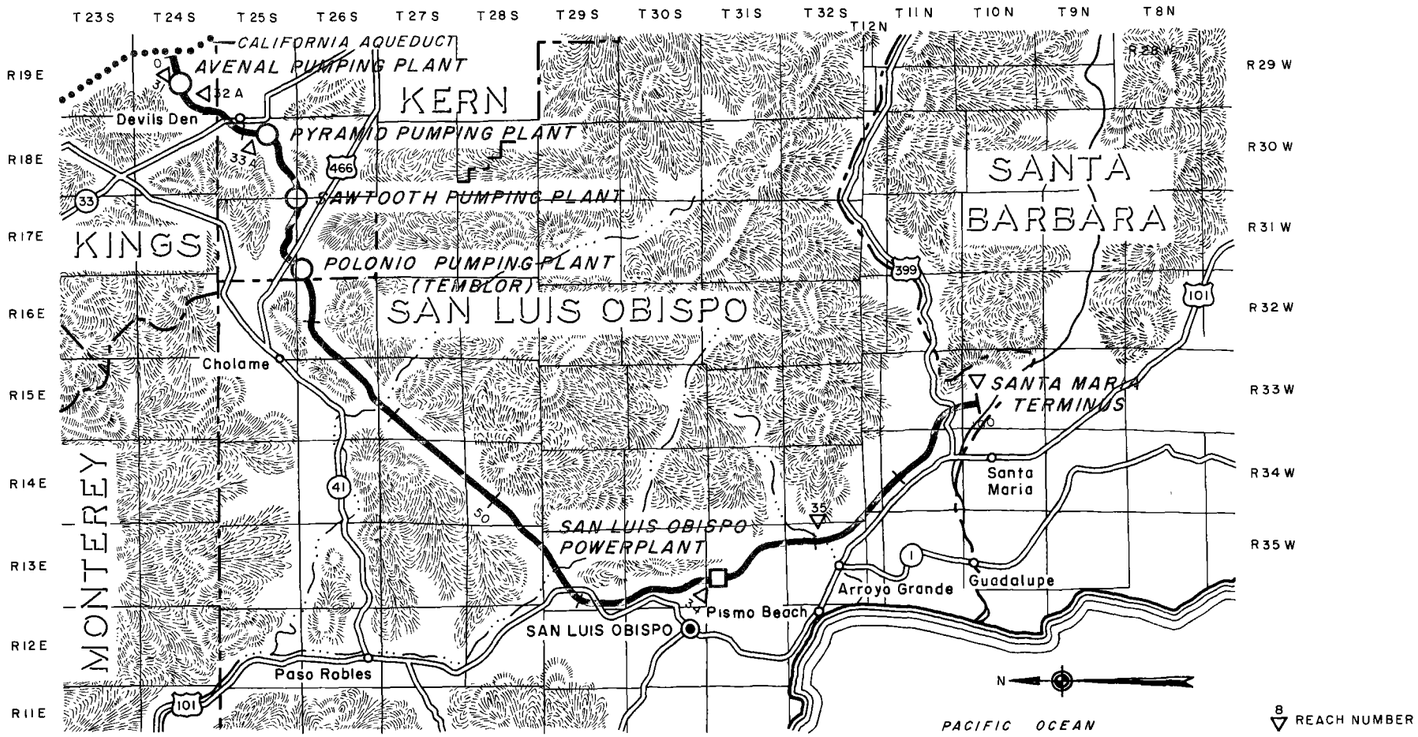
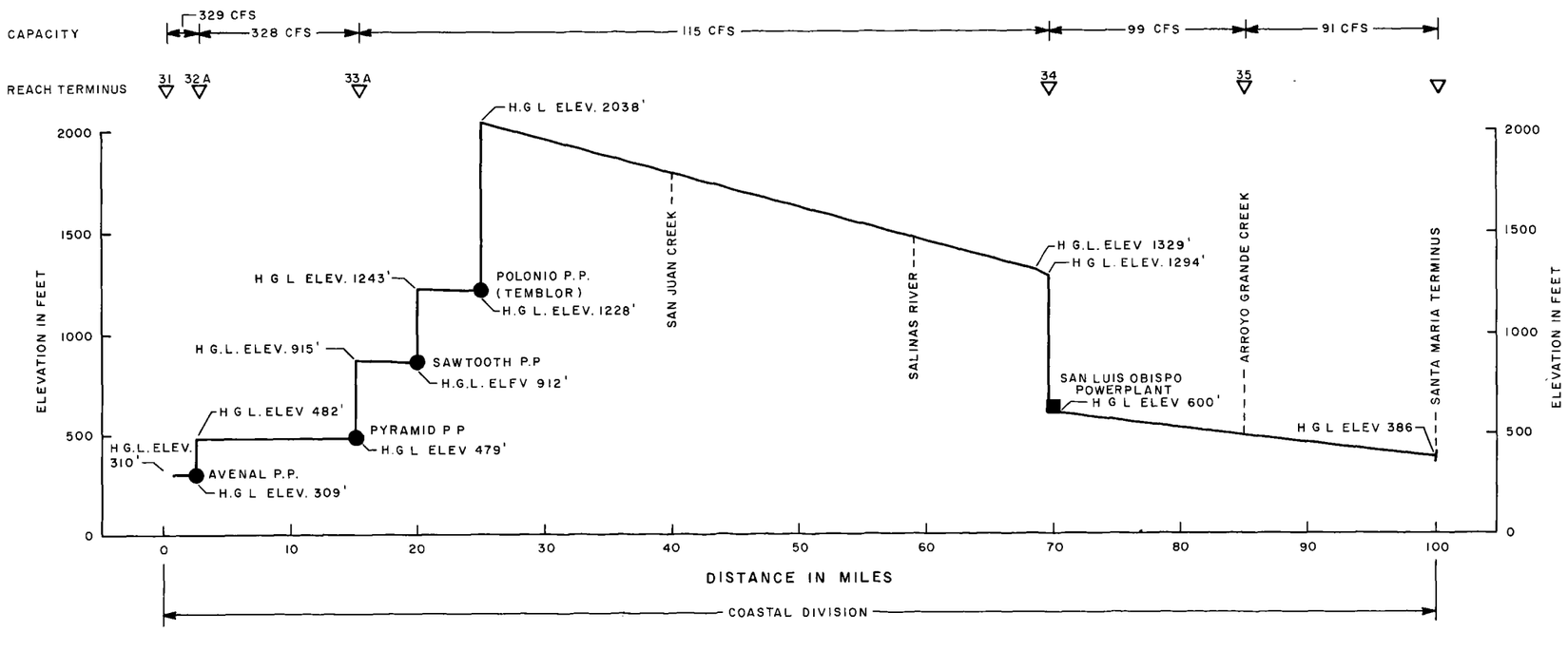


REACH	CALIFORNIA AQUEDUCT
31	AVENAL GAP THRU AVENAL PUMPING PLANT
32 A	AVENAL PUMPING PLANT TO PYRAMID PUMPING PLANT
33 A	PYRAMID PUMPING PLANT THRU SAN LUIS OBISPO POWERPLANT
34	SAN LUIS OBISPO POWERPLANT TO ARROYO GRANDE
35	ARROYO GRANDE TO SANTA MARIA TERMINUS



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LOCATION OF WATER SUPPLY CONTRACTING AGENCIES

LEGEND

FEATHER RIVER AND UPPER FEATHER RIVER

1 — Plumas County Flood Control & Water Conservation District
2 — Butte County
3 — Last Chance Creek Water District (Annual Interim Contract)
4 — City of Yuba City

NORTH BAY

5 — Napa County Flood Control & Water Conservation District
6 — Solano County Flood Control & Water Conservation District

SOUTH BAY

7 — Alameda County Flood Control & Conservation District-Zone 7 Water
8 — Alameda County Water District
9 — Santa Clara County Flood Control & Water Conservation District

SAN JOAQUIN VALLEY

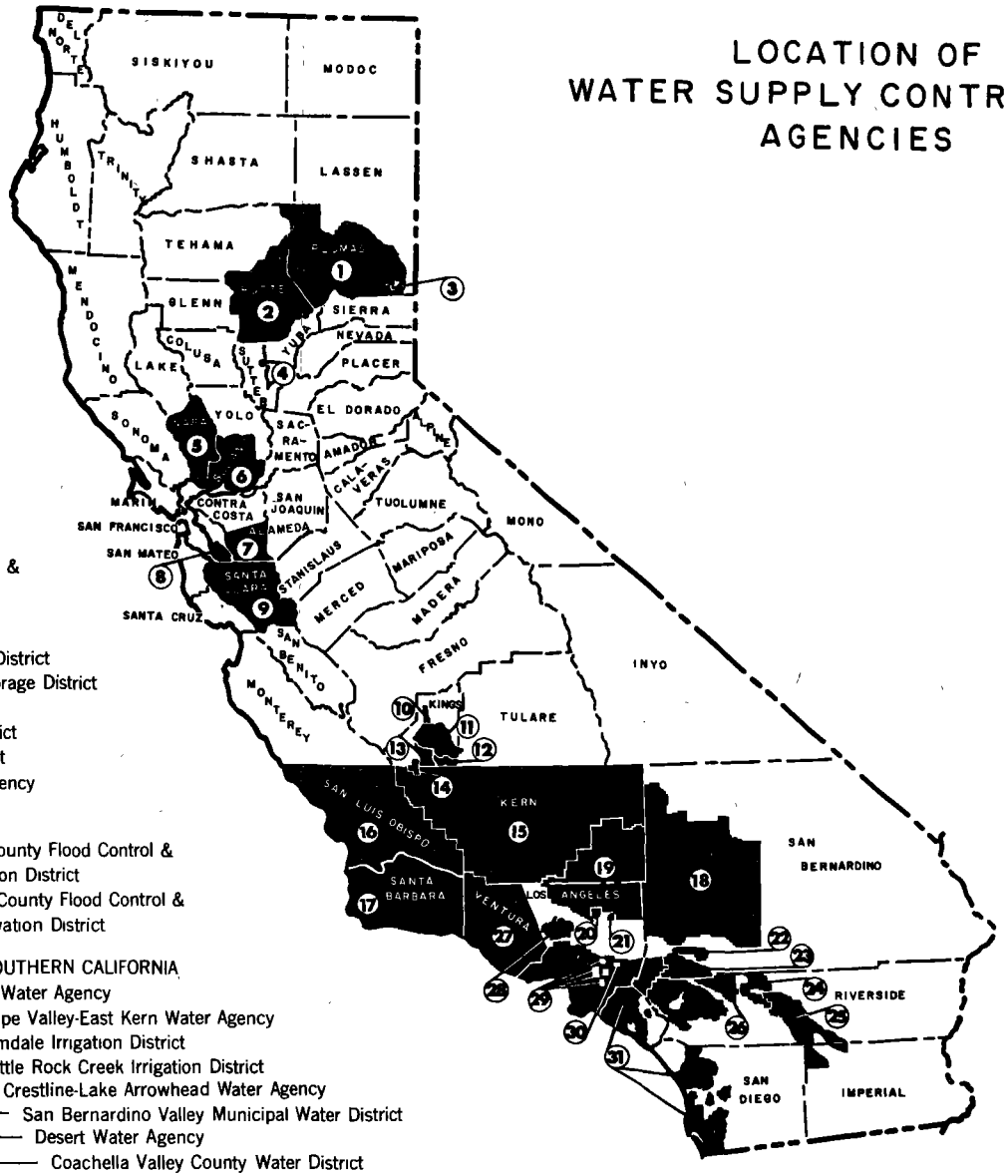
10 — Empire West Side Irrigation District
11 — Tulare Lake Basin Water Storage District
12 — Hacienda Water District
13 — Dudley Ridge Water District
14 — Devils Den Water District
15 — Kern County Water Agency

COASTAL

16 — San Luis Obispo County Flood Control & Water Conservation District
17 — Santa Barbara County Flood Control & Water Conservation District

SOUTHERN CALIFORNIA

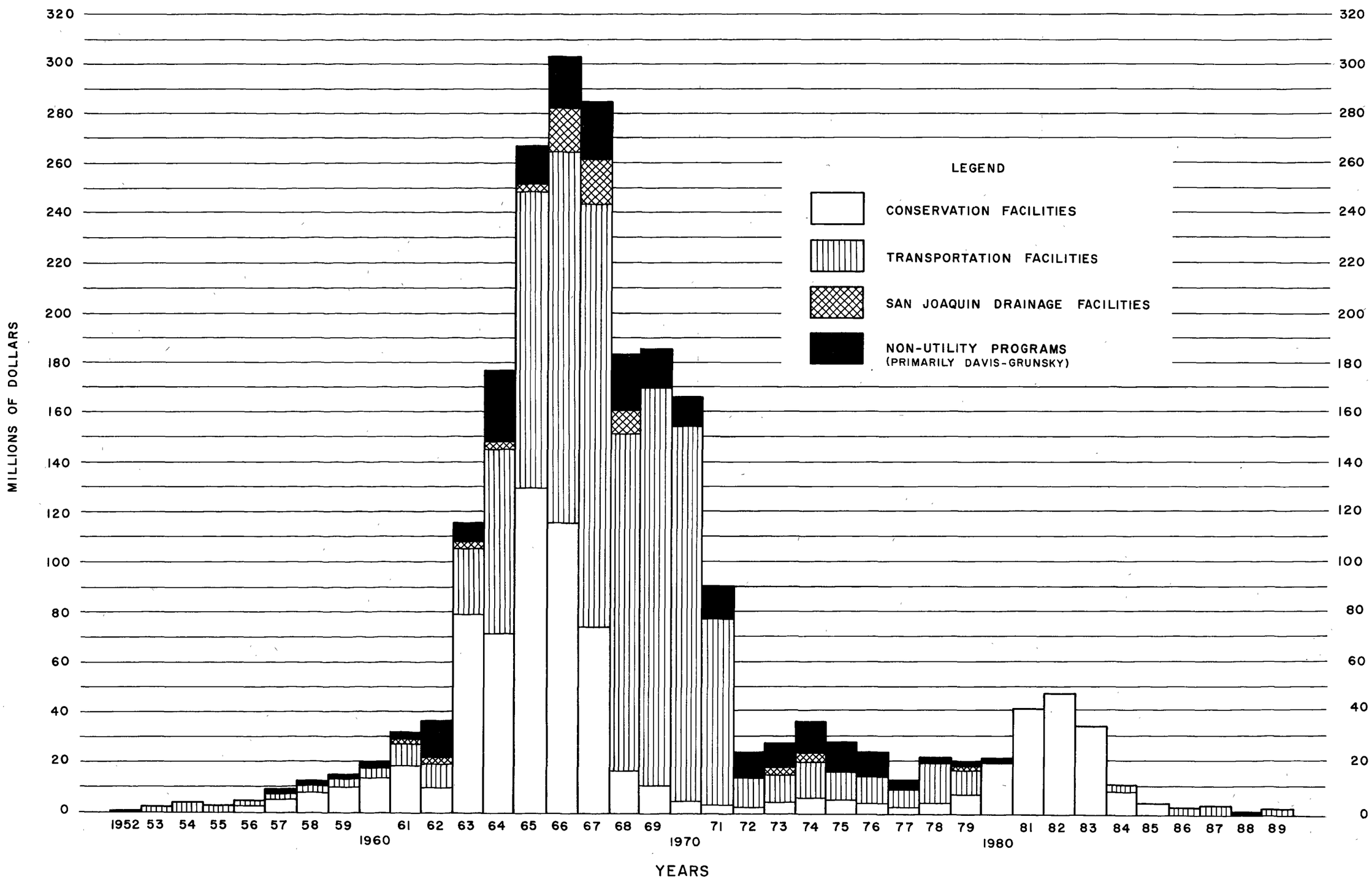
18 — Mojave Water Agency
19 — Antelope Valley-East Kern Water Agency
20 — Palmdale Irrigation District
21 — Little Rock Creek Irrigation District
22 — Crestline-Lake Arrowhead Water Agency
23 — San Bernardino Valley Municipal Water District
24 — Desert Water Agency
25 — Coachella Valley County Water District
26 — San Gorgonio Pass Water Agency
27 — Ventura County Flood Control District
28 — Upper Santa Clara Valley Water Agency
29 — San Gabriel Valley Municipal Water District
30 — City of West Covina
31 — The Metropolitan Water District of Southern California



APRIL 1964

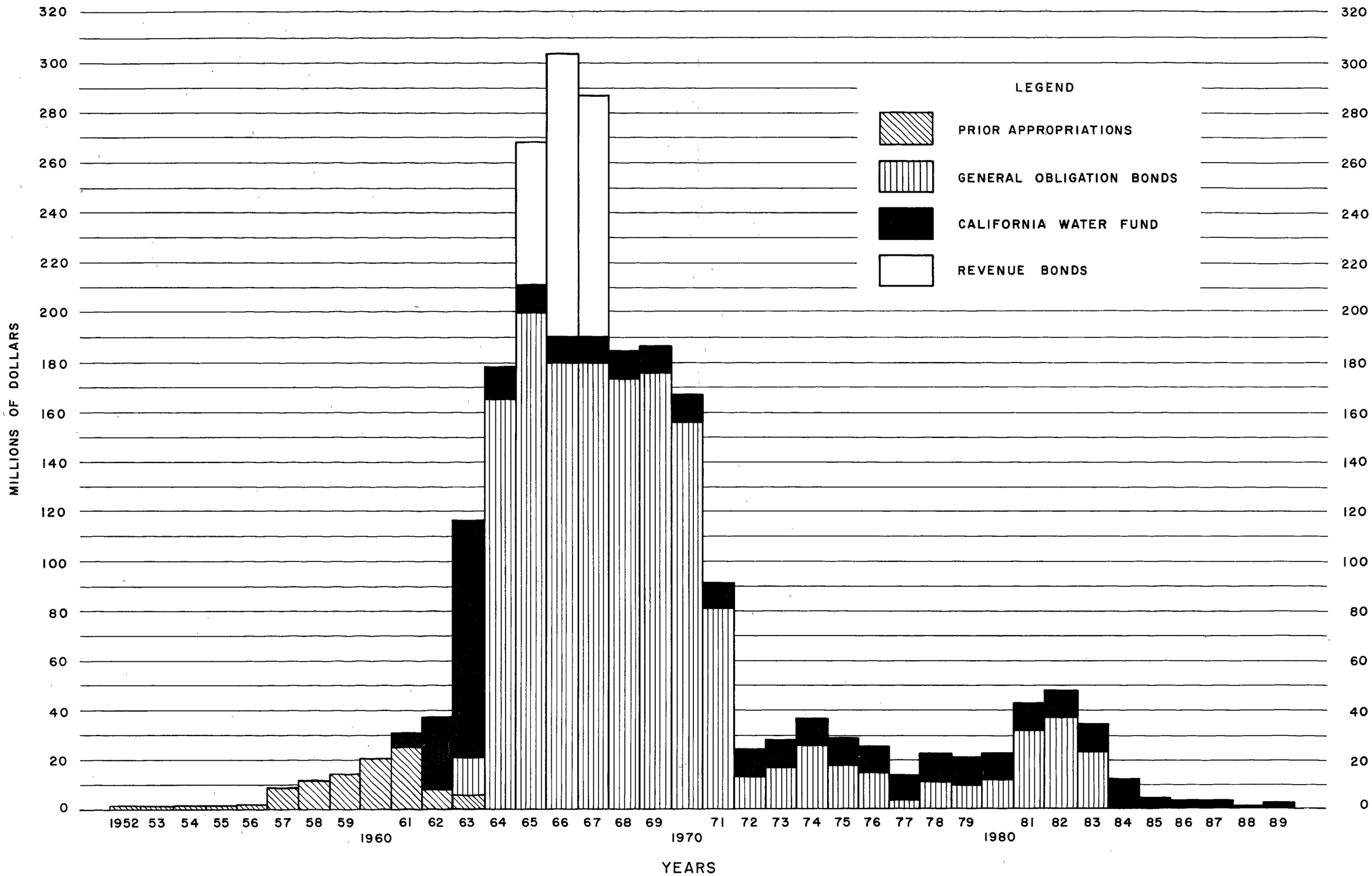
PLATE 5

ANNUAL CAPITAL EXPENDITURES



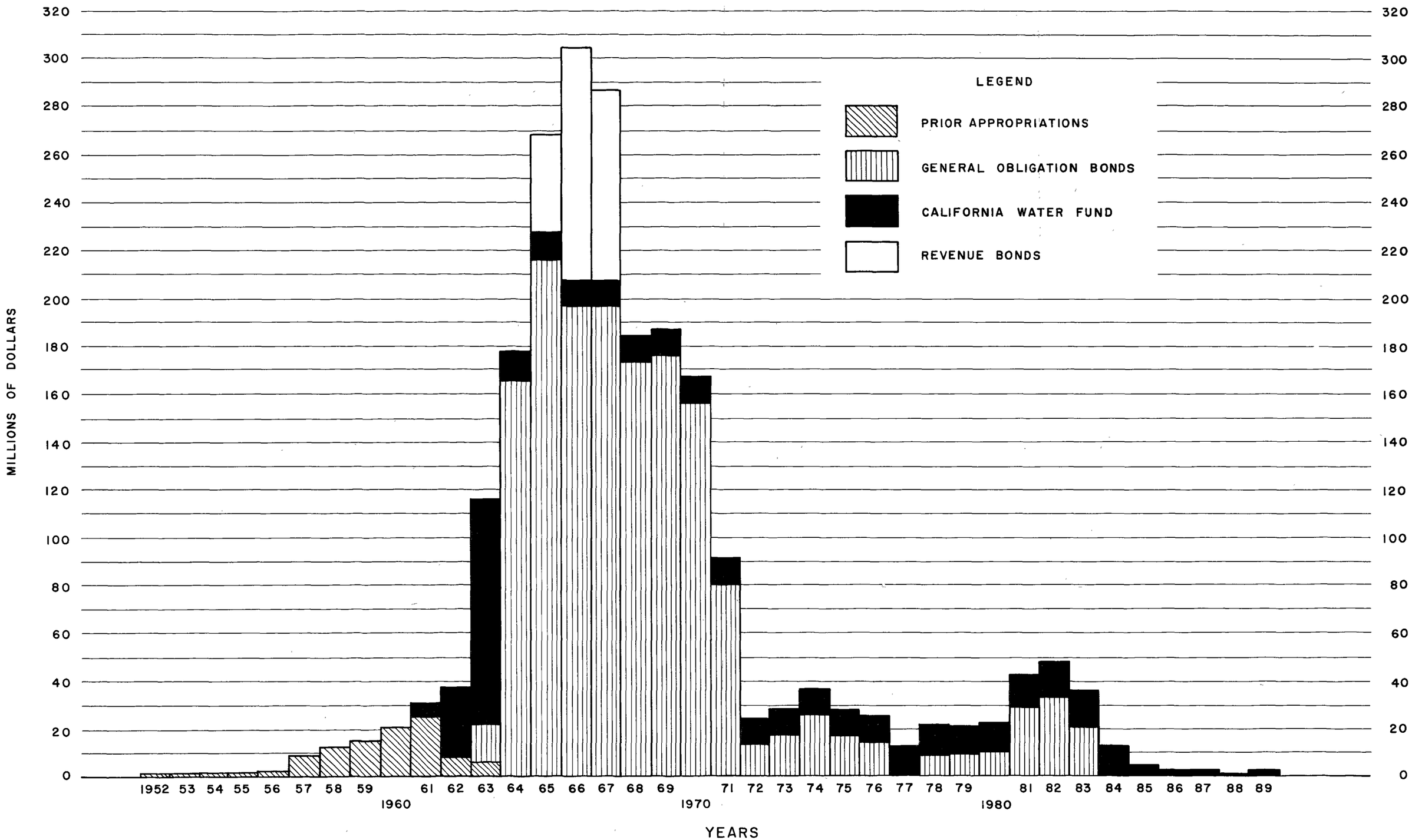
FINANCING OF CAPITAL EXPENDITURES

BASIS A



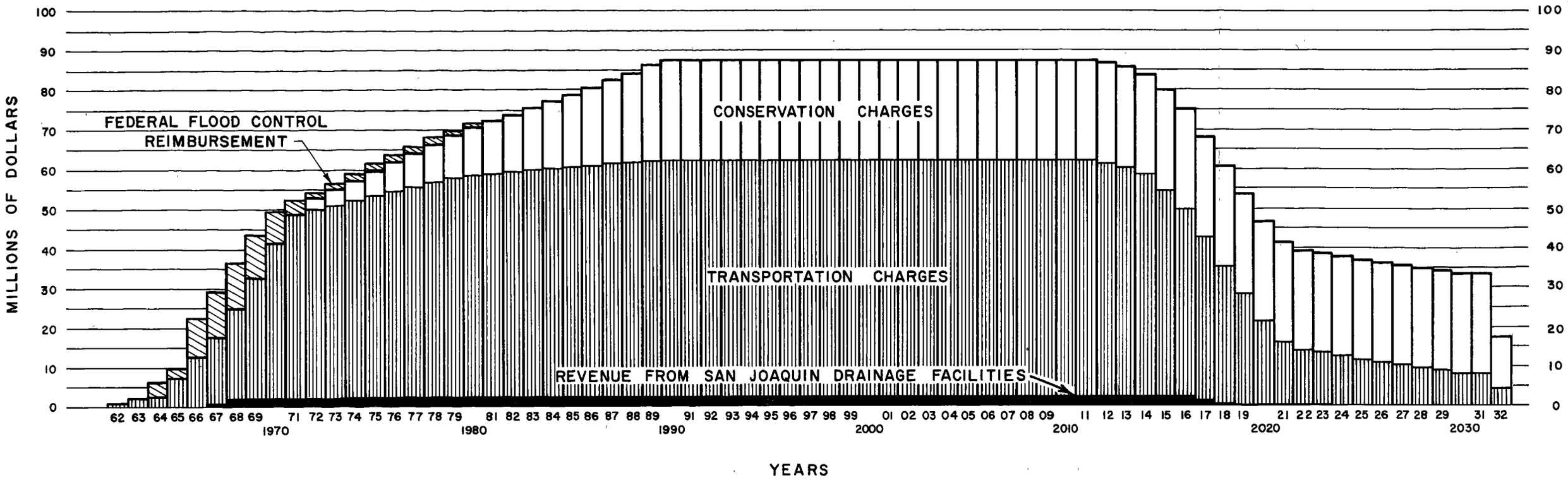
FINANCING OF CAPITAL EXPENDITURES

BASIS B



NET OPERATING REVENUES *

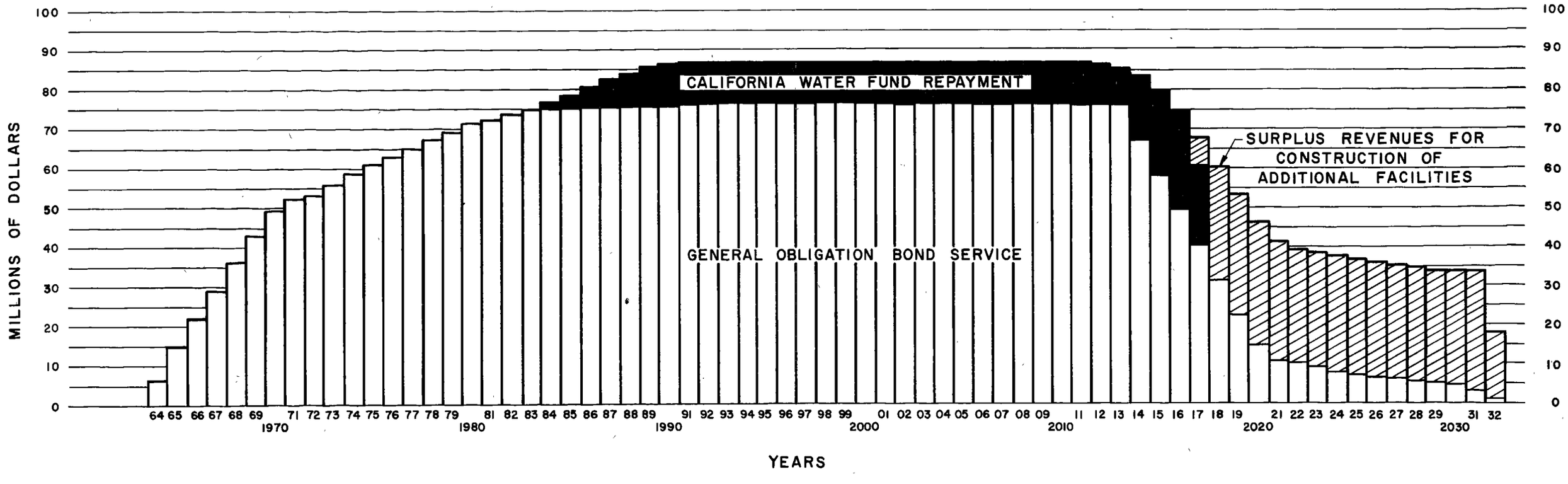
BASIS A



*EXCLUDING OROVILLE POWER REVENUES AND INCLUDING FEDERAL FLOOD CONTROL REIMBURSEMENT

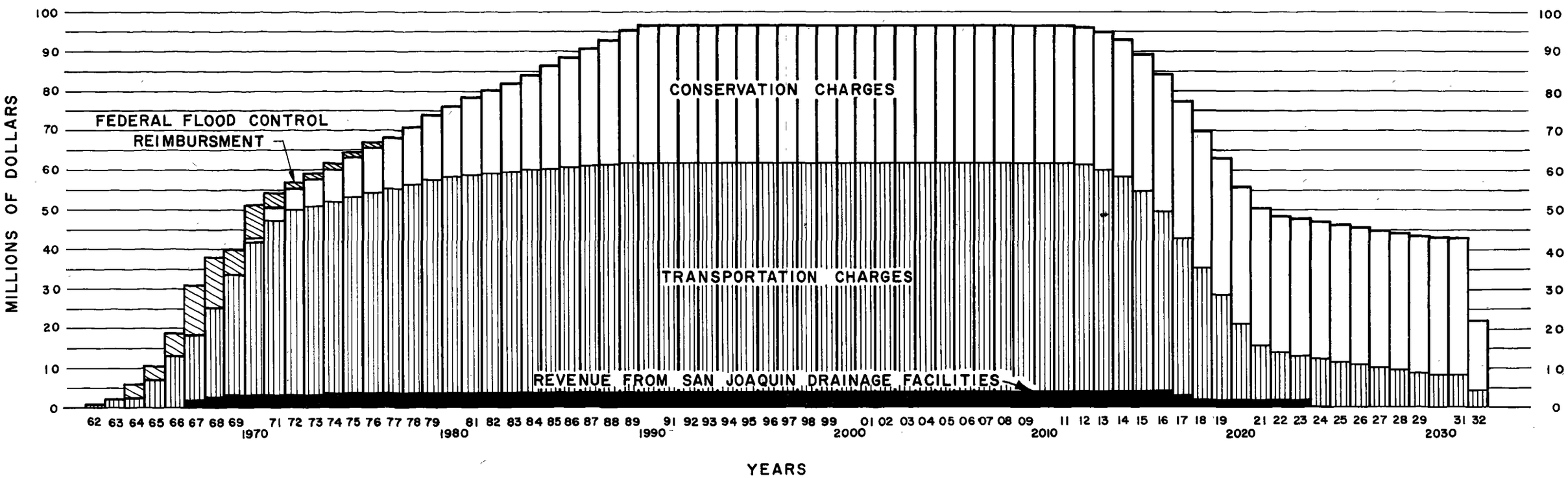
APPLICATION OF NET OPERATING REVENUES *

BASIS A

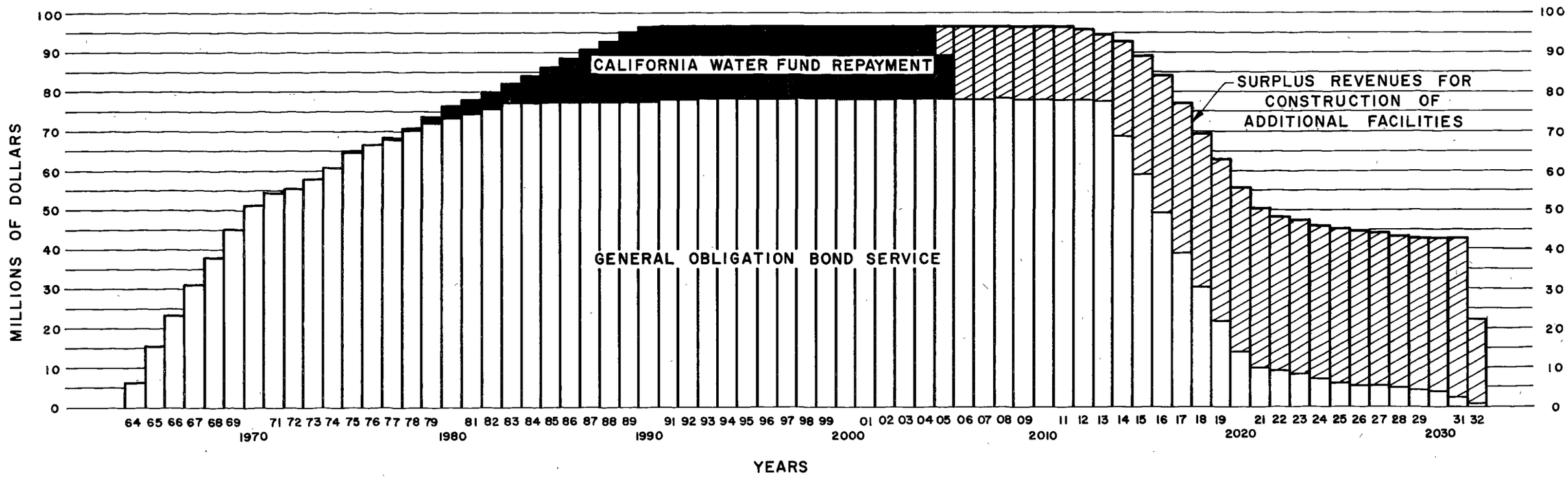


NET OPERATING REVENUES*

BASIS B



*EXCLUDING OROVILLE POWER REVENUES AND INCLUDING FEDERAL FLOOD CONTROL REIMBURSEMENT

APPLICATION OF NET OPERATING REVENUES*

BASIS B