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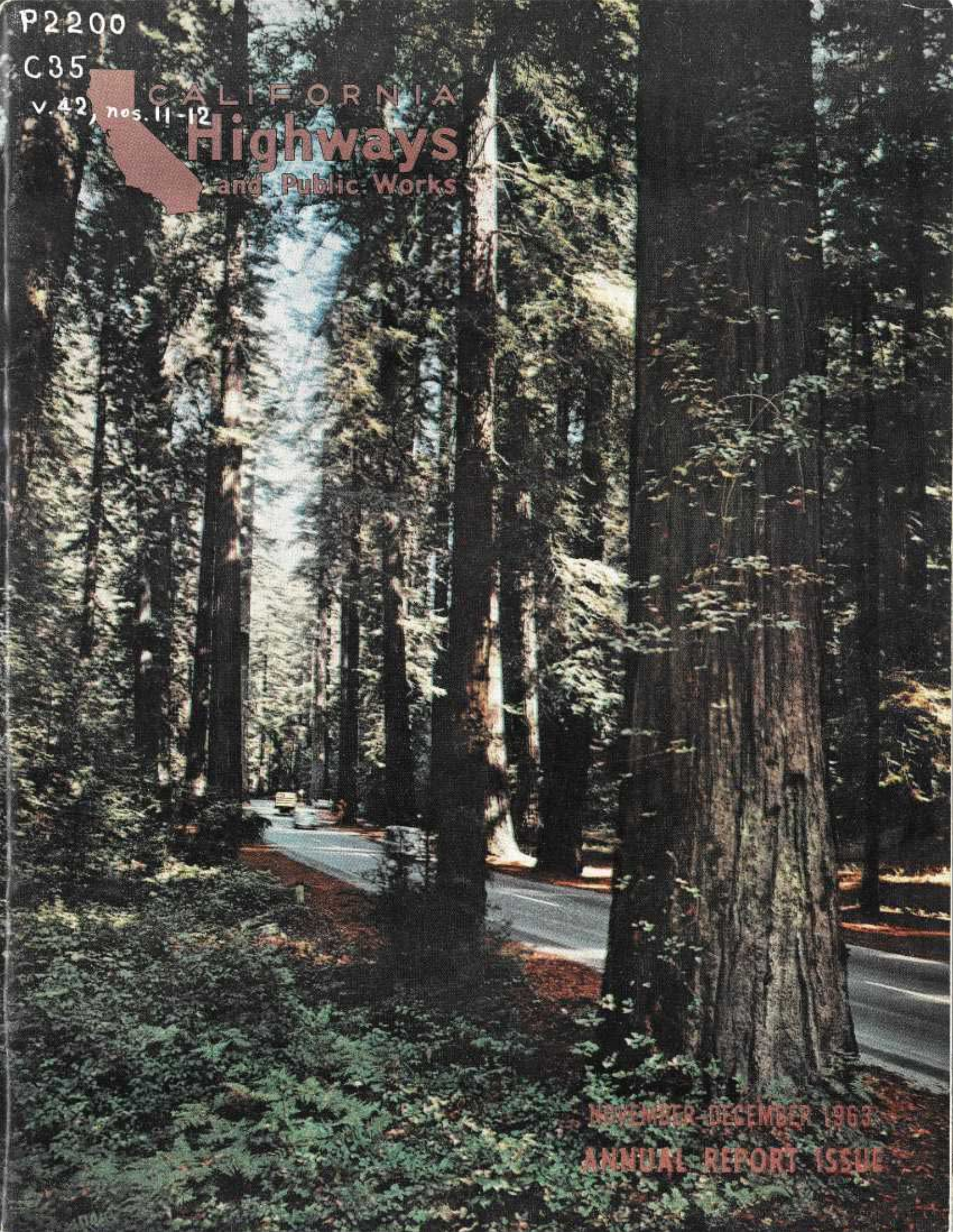
CALIFORNIA Highways and Public Works



NOVEMBER-DECEMBER 1963

ANNUAL REPORT ISSUE

Letters of Transmittal

December 9, 1963

EDMUND G. BROWN
Governor of California

My dear Governor:

The 17th Annual Report of the Division of Highways, Department of Public Works, which I am pleased to submit to you, presents a broad picture of the state highway program during fiscal year 1962-63. It describes the steady progress in planning and constructing today for tomorrow's transportation needs, as well as the activities of the division's various units.

Your attention is invited to the comments contained in the enclosed letter of transmittal from the State Highway Engineer regarding progress on the interstate system and on the network of freeways and expressways envisioned by the Legislature's master plan.

The greatest benefit that Californians are receiving from freeway construction is increased traffic safety. More than one life was saved each day by freeways in service in 1961 and approximately 47,400 accidents and 23,800 injuries were prevented. As less than 10 percent of our ultimate freeway mileage was open to traffic at that time, subsequent years will show many times greater savings in life and limb.

Encouraging progress has been and is being made in co-operation between the State and local governments in highway planning. This co-operation has been furthered by provisions of the Federal-aid Highway Act of 1962, which requires highway projects in urban areas of 50,000 or more people to be based on a continuing, co-ordinated and comprehensive transportation plan to be eligible for federal funds after July 1, 1965.

Along with the spectacular progress in multilane freeway construction, there has continued an active, orderly program to widen roadways and bridges, ease curves, and provide "spot" correction of hazardous conditions so that every section of California benefits according to the most urgent needs and within the limits of available funds.

Respectfully,

JOHN ERRECA
Director of Public Works

December 9, 1963

JOHN ERRECA
Director of Public Works
State of California

Dear Sir:

In compliance with Section 143 of the Streets and Highways Code, the 17th Annual Report of the Division of Highways for the fiscal year ending June 30, 1963, is submitted herewith for your approval and transmittal to Governor Edmund G. Brown.

The report contains information on the construction program through the end of 1963 and a description of the projects in the budget for fiscal year 1964-65 which the California Highway Commission adopted in October.

The division is pleased to report that construction of California's share of the national system of interstate and defense highways is on schedule, except in San Francisco, and good progress is being made on the rest of the statewide network of freeways and expressways authorized by the Legislature in 1959.

The recent completion of intersecting and paralleling freeways in the Los Angeles area has offered motorists a choice of routes and relieved congestion on older freeways and traffic arterials.

The text portion of the report, with appropriate illustrations, is again published as the November-December issue of our bimonthly magazine, *California Highways and Public Works*. A supplement, available to interested persons on request, will contain financial statements, apportionment tables and contract statistics.

J. C. WOMACK
State Highway Engineer

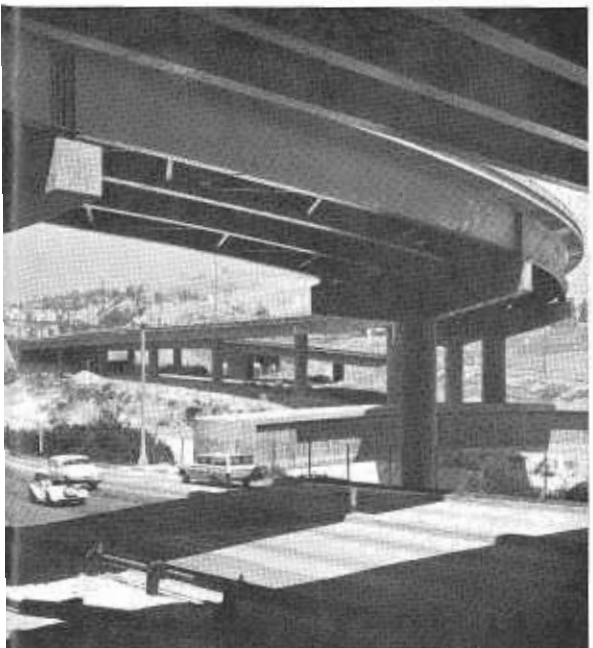
California Highways and Public Works

Official Journal of the Division of Highways, Department of Public Works, State of California

Vol. 42 November-December Nos. 11-12

FRONT COVER—The section of U.S. 101 shown on the cover is a stretch of the Redwood Highway which has been included in the Avenue of the Giants since the photo was taken; the truck shown here is probably now using the new U.S. 101 freeway section across the Eel River, and the old two-lane highway (now State Highway 254) will be reserved for those who want to meander through the redwoods. (Photo by Pete Asano.)

BACK COVER—The Elysian Viaduct Bridge in Los Angeles, which carries a Golden State Freeway connection over the Pasadena Freeway, local city streets, railroad tracks, and the Los Angeles River, was given the award of merit by the American Institute of Steel Construction in 1963 for medium-span bridges with fixed spans under 400 feet and costing more than $500,000. (Photo by John Meyerpeter.)



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LESTER S. KORITZ, *Editor*

STEWART MITCHELL, *Associate Editor* JOHN C. ROBINSON, *Associate Editor*

WILLIAM R. CHANEY, *Chief Photographer*

Editors are invited to use information contained herein and to request prints of any black and white photographs.

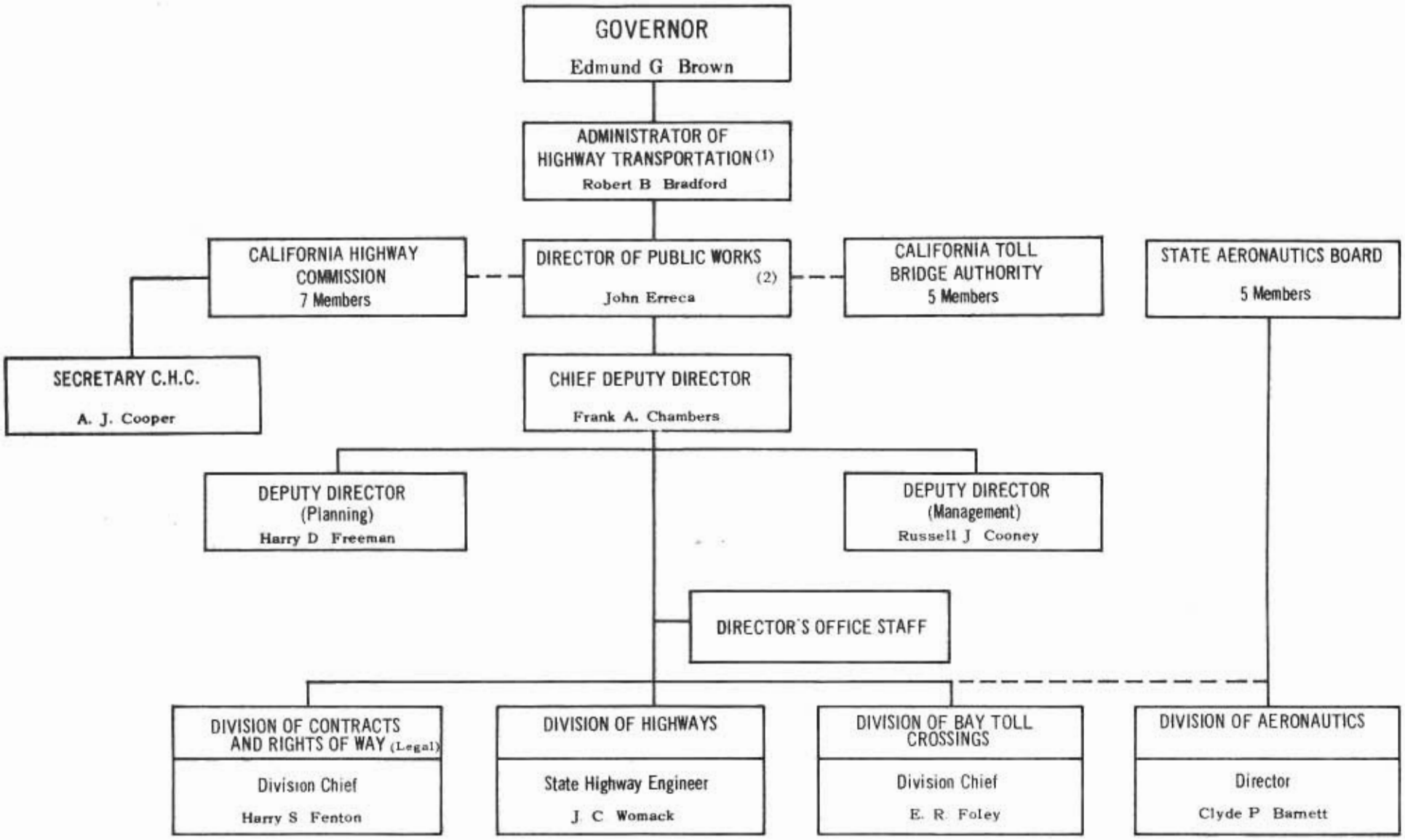
Address communications to: EDITOR,

CALIFORNIA HIGHWAYS AND PUBLIC WORKS

P.O. Box 1499

SACRAMENTO, CALIFORNIA 95807

State of California
Department of Public Works – Organization Chart



(1) Administrator is Ex-officio Chairman and Member of the California Highway Commission and a Member of the California Toll Bridge Authority

(2) Director is Ex-officio Administrative Officer of the California Highway Commission and Administrative Officer of the California Toll Bridge Authority

NOVEMBER, 1963

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS

CALIFORNIA HIGHWAY COMMISSION

ROBERT B. BRADFORD, Chairman, Ex Officio

Member	*Residence*	*Date of original Appointment*	*Term Expires*
JAMES A. GUTHRIE	San Bernardino	September 14, 1943	January 15, 1965
ARTHUR T. LUDDY	Sacramento	February 16, 1959	January 15, 1967
ROGER S. WOOLEY	San Diego	March 18, 1959	January 15, 1967
ABRAHAM KOFMAN	San Jose	September 14, 1961	January 15, 1964
FRANKLIN S. PAYNE	Los Angeles	February 3, 1962	January 15, 1966
WILLIAM S. WHITEHURST	Fresno	April 25, 1963	January 15, 1965

Executive Officer: JOHN ERRECA
Secretary: A. J. COOPER
Assistant Secretary: ROBERT T. MARTIN

CALENDAR OF MEETINGS

CALIFORNIA HIGHWAY COMMISSION

July 1, 1962, to June 30, 1963

July 24, 1962 — Los Angeles
(Public hearing, Road VII-LA-170-C,BwP,Irw, between San Bernardino Freeway (Route 26) and adopted Route 9 (Foothill) Freeway)

July 24, 1962 — Seal Beach
(Public hearing, Road VII-Ora,LA-170-A,S1B;A, between Bay Boulevard and San Diego Freeway (Route 158))

July 25, 1962 — Los Angeles

August 22 and 23, 1962 — Sacramento

September 19, 1962 — Thousand Oaks
(Public hearing, Road VII-Ven-155-B, between Route 2 (Ventura Freeway) and Tierra Rejada Road)

September 20, 1962 — San Diego

September 27, 1962 — Novato
(Public hearing, Road IV-Mrn-1-Nvto,A, between 0.8 mile north of Atherton Ave. and 0.3 mile south of Novato Creek)

October 17 and 18, 1962 — Eureka

October 19, 1962 — Sacramento

November 27 and 28, 1962 — Sacramento

November 28, 1962 — Williams
(Public hearing, Road III-Col-7-B,C, between Route 15 near Williams and the Colusa-Maxwell Road)

November 29, 1962 — Mill Valley
(Public hearing, Road IV-Mrn-56-A,B, between Route 1 and 2.8 miles south of Olema)

November 30, 1962 — San Bruno
(Public hearing, Road IV-SM-229-A,Pfa,SBr, between Sweeney Ridge and Route 68)

December 19, 1962 — Los Angeles
(Public hearing, Road VII-LA-162-LA, between Ardmore Avenue and Glendale Boulevard.)

December 20, 1962 — Los Angeles

December 21, 1962 — Los Angeles
Inspection of highways and opening of San Diego Freeway

Jan. 23 and 24, 1963 — Sacramento

Feb. 27 and 28, 1963 — Sacramento

March 14, 1963 — Santa Ana
(Public hearing, Road VII-Ora-60-B,NptB,A,HntB, between 2.2 miles south of MacArthur Boulevard (Legislative Route 184) and Beach Boulevard (Legislative Route 171))

March 26, 1963 — Sutter Creek
(Public hearing, Road X-Ama-65-B,StCk,Ana, between Route 34 at Martell and Route 54 at Central House)

March 27, 1963 — Sacramento

April 24, 1963 — Sacramento

May 22 and 23, 1963 — Sacramento

June 26 and 27, 1963 — Sacramento

PAST MEMBERS OF THE CALIFORNIA HIGHWAY COMMISSION

Name	Residence	Date of appointment	Termination of membership
Burton A. Towne*	Lodi	Aug. 2, 1911	Resigned Jan. 14, 1914
Charles D. Blaney*	Saratoga	Aug. 2, 1911	Resigned Mar. 1, 1917
N. D. Darlington*	Los Angeles	Aug. 2, 1911	Resigned Jan. 8, 1923
Charles F. Stern	Eureka	Jan. 15, 1914	Resigned Dec. 21, 1918
Henry J. Widenmann*	Vallejo	Mar. 1, 1917	Died Oct. 6, 1918
Charles A. Whitmore*	Visalia	Nov. 29, 1918	Resigned Jan. 8, 1923
Emmett Phillips*	Sacramento	Dec. 21, 1918	Died June 18, 1919
George C. Mansfield*	Oroville	June 24, 1919	Resigned Jan. 9, 1923
Harvey M. Toy*	San Francisco	Jan. 9, 1923	Resigned Jan. 3, 1927
Louis Everding*	Arcata	Jan. 9, 1923	Resigned Jan. 17, 1927
Nelson T. Edwards*	Orange	Jan. 10, 1923	Resigned Jan. 3, 1927
Ralph W. Bull*	Eureka	Jan. 6, 1927	Resigned Jan. 6, 1931
J. P. Baumgartner*	Santa Ana	Jan. 6, 1927	Resigned Jan. 6, 1931
M. B. Harris*	Fresno	April 18, 1927	Resigned Jan. 6, 1931
Joseph N. Schenck*	Los Angeles	Aug. 19, 1927	Resigned Jan. 6, 1931
Fred S. Moody*	San Francisco	Aug. 19, 1927	Resigned Jan. 6, 1931
Earl Lee Kelly*	Redding	Jan. 6, 1931	Died Nov. 1, 1962
Frank A. Tetley*	Riverside	Jan. 6, 1931	Resigned July 31, 1935
Timothy A. Reardon*	San Francisco	Jan. 6, 1931	Resigned May 7, 1936
Harry A. Hopkins*	Taft	Jan. 6, 1931	Resigned Oct. 14, 1937
Philip A. Stanton*	Anaheim	Jan. 6, 1931	Resigned Mar. 3, 1939
Dr. W. W. Barham	Yreka	Dec. 20, 1932	Resigned May 21, 1935
Ray Ingels	Ukiah	May 21, 1935	Resigned Oct. 4, 1935
C. D. Hamilton*	Banning	Aug. 1, 1935	Died April 24, 1936
H. R. Judah*	Santa Cruz	May 7, 1936	Resigned Oct. 5, 1937
Paul G. Jasper*	Fortuna	May 7, 1936	Resigned Mar. 3, 1939
William T. Hart*	Carlsbad	July 7, 1936	Resigned Mar. 3, 1939
Robert S. Redington	Los Angeles	Oct. 5, 1937	Resigned Jan. 27, 1939
Frank W. Clark	Los Angeles	Jan. 27, 1939	Resigned Mar. 10, 1939
Lawrence Barrett	San Francisco	Mar. 3, 1939	Resigned Jan. 11, 1943
Iener W. Nielsen	Fresno	Mar. 3, 1939	Resigned Jan. 11, 1943
Amerigo Bozzani	Los Angeles	Mar. 3, 1939	Resigned Jan. 11, 1943
Bert L. Vaughn	Jacumba	Mar. 3, 1939	Resigned Jan. 11, 1943
L. G. Hitchcock	Santa Rosa	Mar. 10, 1939	Resigned Jan. 11, 1943
Gordon H. Garland†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Mrs. Dora Shaw Heffner†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Miss Helen MacGregor†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
Verne Scoggins†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
William Sweigert†	Sacramento	Jan. 11, 1943	Resigned Sept. 14, 1943
C. Arnholt Smith	San Diego	Sept. 14, 1943	Resigned Jan. 1, 1949
C. H. Purcell*	Sacramento	Sept. 14, 1943	Resigned July 31, 1951
Homer P. Brown*	Placerville	Sept. 14, 1943	Resigned Oct. 26, 1951
Harrison R. Baker	Pasadena	Sept. 14, 1943	Jan. 15, 1954
Charles T. Leigh	San Diego	May 11, 1949	Jan. 15, 1955
F. Walter Sandelin	Ukiah	Sept. 14, 1943	Jan. 15, 1956
Frank B. Durkee	Sacramento	Aug. 4, 1951	Resigned Dec. 31, 1957
H. Stephen Chase	San Francisco	Oct. 30, 1951	Resigned Feb. 25, 1958
Fred W. Speers	Escondido	Jan. 21, 1955	Jan. 15, 1959
C. M. Gilliss	Sacramento	Jan. 1, 1958	Resigned Nov. 10, 1958
John O. Bronson	Sacramento	Feb. 26, 1958	Jan. 15, 1959
T. Fred Bagshaw	Mill Valley	Nov. 10, 1958	Resigned Jan. 4, 1959
Robert L. Bishop	Santa Rosa	Jan. 15, 1956	Jan. 15, 1960
Chester H. Warlow*	Fresno	Sept. 14, 1943	Jan. 15, 1961
John J. Purchio	Hayward	Jan. 15, 1960	Resigned Sept. 9, 1961
Robert E. McClure	Santa Monica	Jan. 18, 1954	Jan. 15, 1962
John Erreca	Los Banos	Jan. 16, 1961	Sept. 20, 1963

* Deceased.
† Member of the Interim Commission.

The curving ramps at center and right of photo connect the San Diego Freeway (Interstate 5) now opened to traffic between Palm and 28th Streets in San Diego and under construction through National City, with the SSR 94 Freeway (foreground). The latter route connects with the F and G Street one-way couplet in the city's business district (background).

California Highways...1963

Paradoxically, although California's rapid growth will cause the number of registered motor vehicles to double by 1980 and the motor vehicle miles traveled to increase from a current 70 billion to 200 billion a year, highway engineers are confident that there will be less traffic congestion then than exists today.

This confidence is based on the sound financing of the highway construction program which permits orderly planning, on the tested procedures for adopting highway routes, and on the master plan enacted in 1959 for the construction of a 12,414-mile, $10,500,000,000 freeway and expressway system by 1980—all provided by the people of California through their Legislature.

Conventional highways are in time choked by the encroachments of roadside strip developments that slow traffic, and the high rate of turning movements and vehicles moving at random from the sides of the road multiply accident potentials on these roads.

Access to and exit from freeways and expressways, on the other hand, are limited to certain strategic points where traffic can enter or leave safely. Free from encroachments along their routes, their carrying capacity and safety benefits are permanent.

The word "freeway" signifies a controlled-access highway that is free of traffic lights and stop signs, left turn movements across oncoming traffic and intersections at grade.

Legally, expressways are classified as freeways as access to them is controlled. However, they may have some crossings at grade, with channelization to permit left turn movements.

Both freeways and multilane expressways are divided by median strips of varying widths.

As conventional highways are superseded by a network of interchanging and paralleling freeways and expressways, a network that will constitute only 10 percent of the total road mileage but will carry 60 percent of all the State's traffic—leaving the remaining 90 percent of the mileage composed of streets, county roads and highways to carry only 40 percent of the traffic—congestion lessens and travel time is shortened.

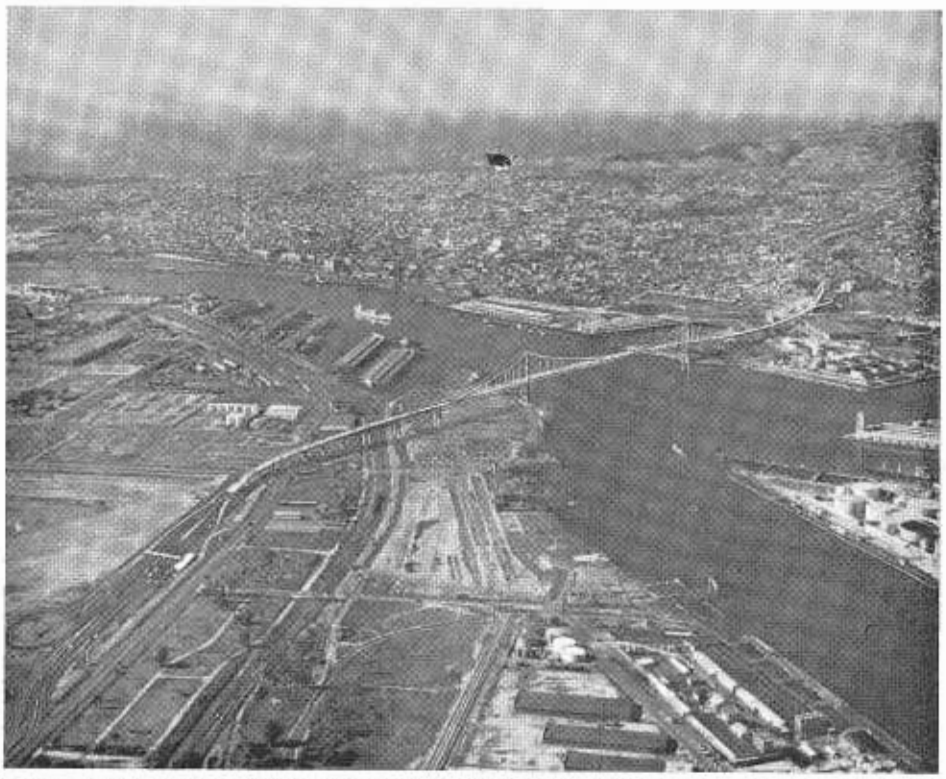
This section of Interstate 5 Freeway in Shasta County between Shotgun Creek and Castella was completed in March. Its rolling curves and gentle grades blend with the natural surroundings along this scenic but high-speed route.

The Master Plan

The freeway and expressway system envisioned by the master plan will connect all cities of 5,000 or more people, and will serve every major industrial, agricultural, commercial and recreational region when completed in 1980. Its construction is a necessity if California is to continue to prosper.

The Legislature has provided for periodic review of the system to determine if additions, deletions or revisions should be made because of changing traffic requirements. Such a review will be submitted early in 1965.

At year's end, of the 2,742 miles of multilane divided highways opened to traffic, 1,352 miles were constructed to full freeway and 761 miles to expressway standards. Another 595 miles of freeways and 61 miles of expressways are under construction or budg-



The Vincent Thomas Bridge was opened to traffic in mid-November between San Pedro in Los Angeles and Terminal Island. It is Southern California's first major, high-level suspension span and cost $21,000,000.

eted. (Expressway mileage was 833 a year ago. It is shrinking as many sections are progressively converted to full freeway.)

Additionally, 798 miles of two-lane expressways, mostly in rural and mountain areas, are opened to traffic, under construction or budgeted. Sufficient rights-of-way have been obtained to permit widening to four lanes when traffic volumes warrant and funds are available.

While particular attention is devoted to access-controlled types of highways, work continues to alleviate deficiencies on all state routes. Roads are being widened, resurfaced and realigned to ease curves. The entire highway program is balanced to benefit each area of the State.

Interstate System

The 41,000-mile National System of Interstate and Defense Highways, commonly referred to as the interstate system, is the largest construction project in history. When completed in 1972, it will link the principal metropolitan areas and industrial centers of all the states except Hawaii and Alaska by high-speed, ultrasafe freeways.

Of the 2,177 miles of interstate routes authorized for California, locations for all but 33 miles have been adopted. A total of 576 miles are now completed and another 394 miles are under construction or budgeted. An additional 217 miles of interstate routes are in operation as expressways but will be upgraded to full freeway standards by 1972.

Because this State concentrated its early interstate freeway efforts in urban areas where traffic needs are greatest but where each mile is more difficult and costly to construct, California's mileage completed may not seem impressive. However, this State leads the nation in the amount of funds expended, obligated or budgeted, and is among the leaders in the amount of rights-of-way purchased.

California's interstate freeway mileage, all of which is included in the freeway and expressway system referred to previously, will cost nearly $3,550,000,000. Counting projects in the budget for fiscal year 1964-65, a total of $1,970,000,000 has been spent, obligated or budgeted to date.

Traffic Safety

The most important benefit that the public receives from modern freeways is improved safety. Carefully kept statistics over the past 14 years covering billions of miles of travel prove conclusively that freeways are much safer than their conventional counterparts in both rural and urban areas.

An examination of the causes of accidents and the design characteristics of freeways that differentiate them from conventional highways reveals the freeway's built-in safety features.

Head-on, right-angle, and many other collisions, also accidents involving pedestrians, are eliminated by the freeway's divider strips and median barriers between opposing lanes of traffic; by its elimination of crossings at grade and movements to and from driveways and parking spaces; by its provision of acceleration and deceleration lanes that permit vehicles to enter or leave the freeway without endangering following cars; and by its fencing which limits pedestrian crossing to overpasses.

More than 130 accidents and 65 injuries were prevented and almost one life was saved each day during 1961 by California freeways. Using the California Traffic Safety Foundation's values for accidents, California freeways saved the motorist over $65,000,000 that year.

The U.S. Bureau of Public Roads recently compared fatality rates on 1,130 miles of modern interstate freeways with those of the older highways in the same traffic corridors and concluded that the 41,000-mile interstate freeway system will save an estimated 8,000 lives each year when completed.

Other User Benefits

To these savings in deaths, injuries and property damage should be added the savings in pain, lost man-hours of employment, lower insurance rates, fuel and equipment costs and tremendous savings in travel time.

The 5.8 billion motor vehicle-miles driven on freeways in the Los Angeles area alone (Los Angeles, Orange and Ventura Counties) in 1962 resulted in estimated savings of $63,000,000 in

vehicle operating costs, $12,000,000 from prevented accidents, and $221,000,000 in lessened travel time.

The time savings offered by freeways are particularly important in commercial operations. Each day, 48,000 tons of goods, the equivalent of 800 60-ton railroad boxcars, are transported over the Hollywood Freeway west of the four-level interchange. Similar tonnages are carried on sections of the San Bernardino, Santa Ana and Harbor Freeways. Lower equipment and labor costs to shippers are reflected in lower prices to consumers.

Motorbuses not only use freeways in intercity travel; they also take advantage of freeways in metropolitan areas to provide a form of mass transit. Also, the running time of buses using city streets is reduced as other traffic is diverted to the new freeway facilities.

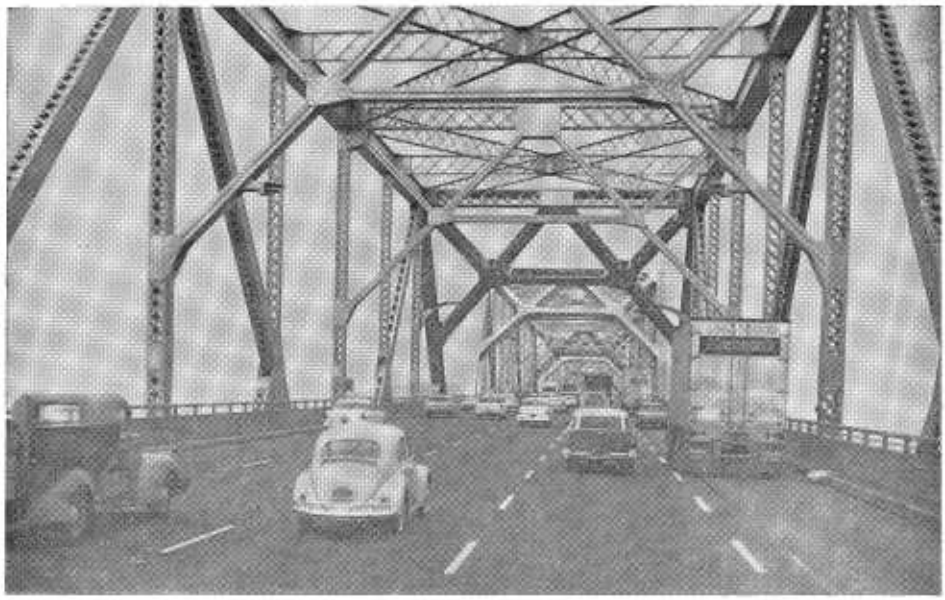
Community Benefits

Traditionally, towns and cities developed along railroads and highways, with the latter frequently the principal streets. As the highways became increasingly congested, they tended to divide the communities through which they ran and diminished the importance of the retail establishments along their routes.

When through traffic is diverted to freeways that either bypass or traverse the communities on new alignment, the former wall of traffic is removed and, with ample parking again available to local shoppers, "Main Street" is revitalized, and everyone benefits from the elimination of annoying traffic noise and gasoline fumes that resulted from stop-and-go driving.

Industry today is moving away from central city districts to suburbia and beyond. Manufacturers want the advantages of cheaper land for their modern one-level plants. They locate in and pay taxes to communities served by modern freeways for the faster and cheaper movement of supplies and products, for the greater area that can be served by a central warehouse, and for the wider labor market upon which to draw.

The expanded commuting radius offers workers in such communities greater employment possibilties.



Five lanes of traffic on the upper deck of the San Francisco-Oakland Bay Bridge head west for the City by the Golden Gate following the shift to one-way operation on the bridge in October. Four years and $35,000,000 were needed for the extensive reconstruction of the structure by the Division of Bay Toll Crossings that made the change in traffic flow possible.

Those residents displaced by freeway construction are paid in cash for their properties and, for the most part, purchase better quarters in the same neighborhood.

Studies made by the Research and Development Section of the Right of Way Department, Division of Highways, confirm similar studies made by the U.S. Department of Commerce nationally. Both reveal but minor differences in the sale prices of homes adjacent to modern landscaped freeways and for homes a few blocks away. In many instances, the freeways have increased the values.

The Highway Team

The State Legislature must be regarded as the captain of the highway team composed of itself, the California Highway Commission and the Division of Highways.

Over the years, successive Legislatures have determined that the highway construction program should be financed by highway-user taxes on a pay-as-you-go basis; have created the California Highway Commission and delegated to it the responsibility of allocating funds to particular highway projects; have charged the commission with determining specific highway routings between termini which it, the Legislature, designates; and have created the master plan for the freeway and expressway system.

California's laws and practices governing the entire highway program are frequent subjects of study by highway organizations in other states and foreign countries.

The California Highway Commission

The Highway Commission was created in its present form to provide continuity in highway policy and to remove decisions on highway improvement from sectional and political considerations.

The members of the Highway Commission are appointed by the Governor and confirmed by the State Senate. Six of them are business and professional men who serve without pay for four-year staggered terms. Each is instructed by law to represent the State as a whole rather than particular cities or areas.

The Administrator of the Highway Transportation Agency serves as the commission's ex officio chairman, and the State Director of Public Works acts as its executive officer.

Commission members approve county primary road systems, authorize condemnation proceedings, execute deeds and right-of-way relinquishments and abandonments, as well as budgeting highway funds and adopting freeway and highway routes.

Not only does the commission make an annual budget each October for the coming fiscal year, but to insure that all savings from individual projects can be made available quickly for other jobs, adjusts budgeted amounts each month.

The Division of Highways

A unit of the Department of Public Works, the State Division of Highways is charged with the actual operation of the highway program including planning, design, right-of-way acquisition, construction and maintenance.

It is an organization of career civil servants chosen on the basis of competitive civil service examinations, and headed by the State Highway Engineer.

He, in turn, is assisted by a headquarters staff in Sacramento, and by engineers in charge of each of the State's 11 highway districts who are responsible for all phases of the highway program in their areas.

This decentralization insures the program's responsiveness to local conditions and needs.

Information on local highway matters may best be obtained from the following:

District I —Sam Helwer, District Engineer, 430 West Wabash Avenue, Eureka

District II —H. S. Miles, District Engineer, 1657 Riverside Drive, Redding

District III —Alan S. Hart, Assistant State Highway Engineer, 703 B Street, Marysville

District IV —J. P. Sinclair, Assistant State Highway Engineer, 150 Oak Street, San Francisco

District V —R. J. Datel, District Engineer, 50 Higuera Street, San Luis Obispo

District VI —W. L. Welch, District Engineer, 1352 West Olive Avenue, Fresno

District VII —E. T. Telford, Metropolitan District Engineer, 120 South Spring Street, Los Angeles

District VIII—C. V. Kane, District Engineer, 247 Third Street, San Bernardino

District IX —C. A. Shervington, District Engineer, South Main Street, Bishop

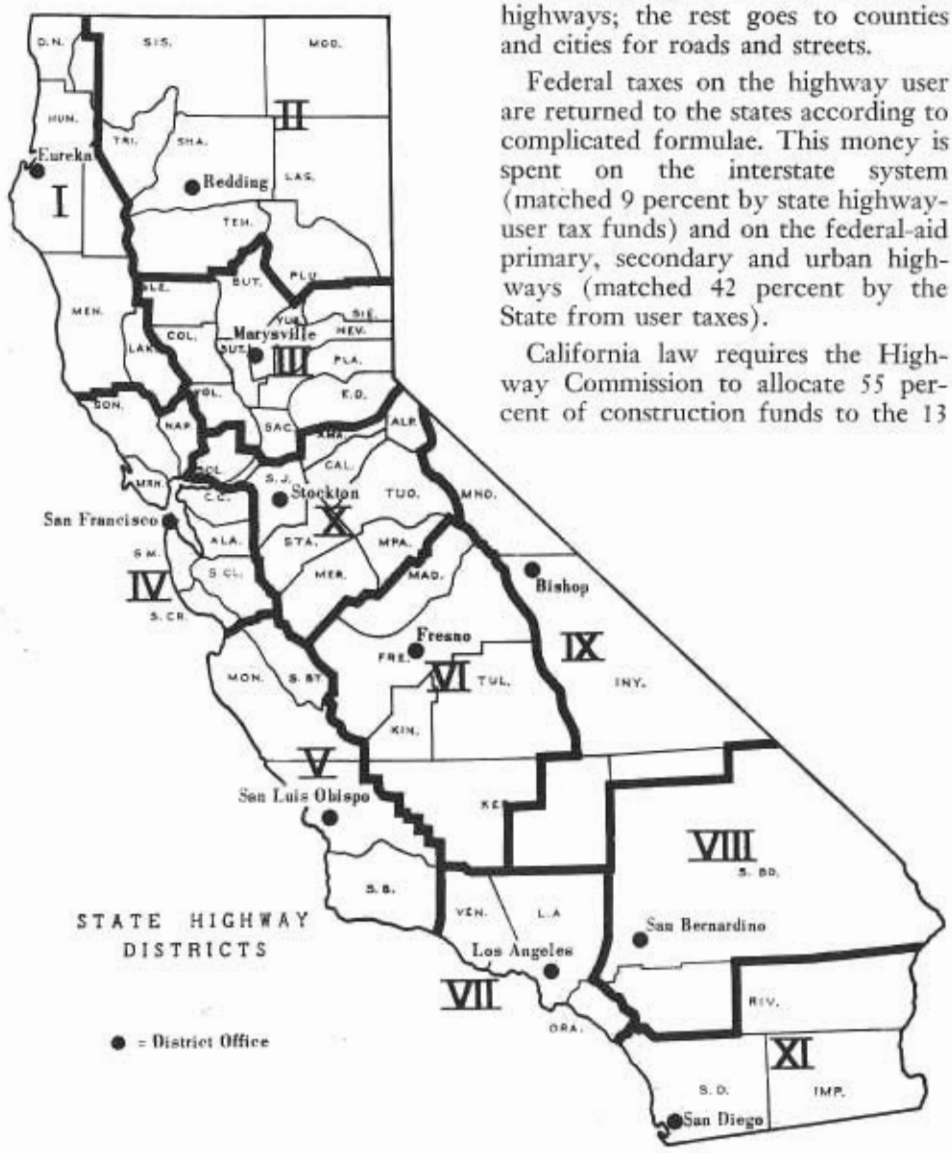
District X —J. G. Meyer, District Engineer, 1976 East Charter Way, Stockton

District XI —J. Dekema, Assistant State Highway Engineer, 4075 Taylor Street, San Diego

Highway Financing

It is axiomatic in highway construction that sound programming depends upon sound financing.

Major freeway projects in metropolitan areas, for example, require a minimum of four to six years from the beginning of route studies to the start of construction. Since the planning program must schedule the acquisition of rights-of-way and construction dates for specific projects, planners must be certain that sufficient revenue will be forthcoming.



Fortunately, California's highway program is based on pay-as-you-go highway-user taxes on such fairly predictable items as gasoline and diesel fuel consumption, drivers' licensing and registration fees, weight fees on commercial vehicles, and taxes on for-hire trucking.

The State Constitution requires that all revenues so produced be spent for road construction and maintenance and for the administration of the Division of Highways, the Department of Motor Vehicles and the Highway Patrol. They may not be diverted for other purposes.

The state tax on gasoline is the largest revenue source. It was increased this year from 6 to 7 cents per gallon. Of this, 3.61 cents are spent on construction and maintenance of state highways; the rest goes to counties and cities for roads and streets.

Federal taxes on the highway user are returned to the states according to complicated formulae. This money is spent on the interstate system (matched 9 percent by state highway-user tax funds) and on the federal-aid primary, secondary and urban highways (matched 42 percent by the State from user taxes).

California law requires the Highway Commission to allocate 55 percent of construction funds to the 13

southern counties and 45 percent to the remaining 45 counties. It further requires the expenditure of certain minimums in each of the 11 highway districts, and a minimum of $4,000,000 in each county other than sparsely populated Alpine and Sierra over each four-year period. These two counties must be allocated $1,000,000 in highway projects as four-year minimums.

The law permits the commission, however, to spend 30 percent of total construction funds at its discretion within the 55-45 restriction. This insures the financial flexibility essential to meet requirements caused by lead time and other factors and the various controls imposed by state and federal law.

Because California's well-established long-range highway planning program results in sufficient projects being brought through the stages of route determination, freeway agreement, right-of-way acquisition, and the preparation of plans and specifications, no delay occurs in obligating available funds.

Freeway Route Selection

Although the Legislature designates the termini of all state highways and may specify certain control points through which they must pass, it has charged the Highway Commission with determining the specific routings.

The governing bodies of cities and counties are notified by the appropriate highway district at the initiation of studies leading to freeway construction, and their co-operation is requested to insure that the studies consider the area's master plan for transportation and development.

This policy of many years' standing puts this State in good position to comply with the Federal Aid Highway Act of 1962 which requires highway projects in urban areas of 50,000 or more people to be based on continuing, co-ordinated and comprehensive transportation planning procedures to be eligible for federal funds after July 1, 1965.

Several alternate routes are developed. Each is considered in relationship to the origins and destinations of traffic, community plans for land use, the engineering controls imposed by the area's geography, right-of-way and construction cost factors, the number of homes or businesses each would take, effects upon the area's economy, and the social impact of each upon community values.

The widening of Tiburon Boulevard (SHR 52) in Marin County typifies continuing attention to conventional highways.

Utility and transportation companies, water and school districts, and interested agencies of federal, state and local governments are consulted. The alternate routes are mapped and thoroughly analyzed prior to well publicized public hearings at which the studies are explained and area residents are urged to express their views.

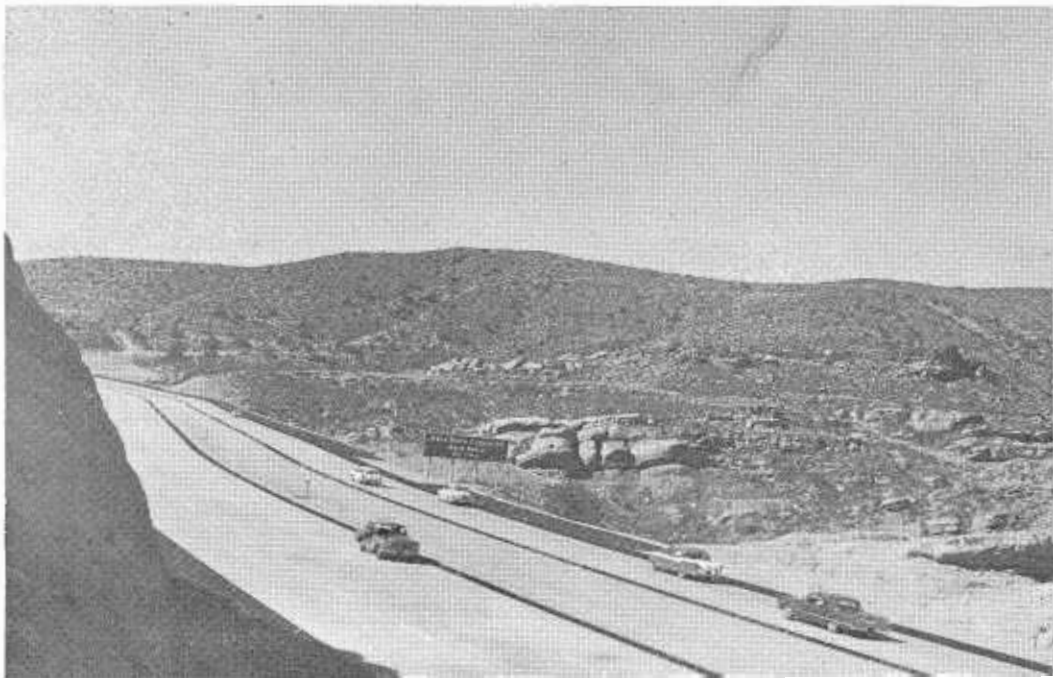
The district engineer forwards the completed study, including hearing transcripts, to the State Highway Engineer, who, in turn, recommends a routing to the Highway Commission.

The commission informs the local governing body of its intention to adopt a route and asks if a public hearing by the commission members is desired. Such a request is always granted. Occasionally, the commission will decide that the public interest requires such a hearing even though no request is made.

Finally, the commission weighs the merits and defects of each alternate and adopts the routing which appears to serve the greatest public interest.

Every effort is made throughout the route selection process to consider and protect the views and rights of all—property owners, local merchants, civic planners, and, among others, the motorists who will use the new facility.

Route selection is followed by conferences between Division of Highways personnel and the local govern-



Shown is a portion of the 14.4-mile section of the Antelope Valley Freeway in northern Los Angeles County which was opened to traffic in October.

ing body to negotiate a freeway agreement covering local street and road adjustments. The local government thus joins the team which decides the types and locations of interchanges and traffic separation structures.

Right of Way Acquisition

When design studies are sufficiently advanced as to identify properties in the path of the freeway's construction, agents of the Right of Way Department visit affected residents and explain acquisition procedures.

This is done as early as possible before the properties will be required to permit those affected to plan intelligently. Adequate time always exists between route adoption and property acquisition to prevent serious inconvenience.

Skilled appraisers, who in truth work jointly for the State and for the property owners as shareholders in the State, establish the price the State should pay. Their reports are reviewed and approved and owners are offered fair market value for their holdings. The courts have defined fair market value as "the highest price in terms of money which the land (property) will bring if exposed for sale in the open market with a reasonable time to find a purchaser, buying with full knowledge of all the uses and purposes to which it is adapted and for which it is capable of being used."

The "fair market value" appraisal is based on trained judgment. It is completely uninfluenced by an owner's bargaining skill.

The fairness of the state appraisers is attested to by the fact that although the Right of Way Department acquired 8,116 properties for highway construction last fiscal year, 96.8 percent of the transactions were settled amicably. Only 3.2 percent were acquired by court action in eminent domain proceedings.

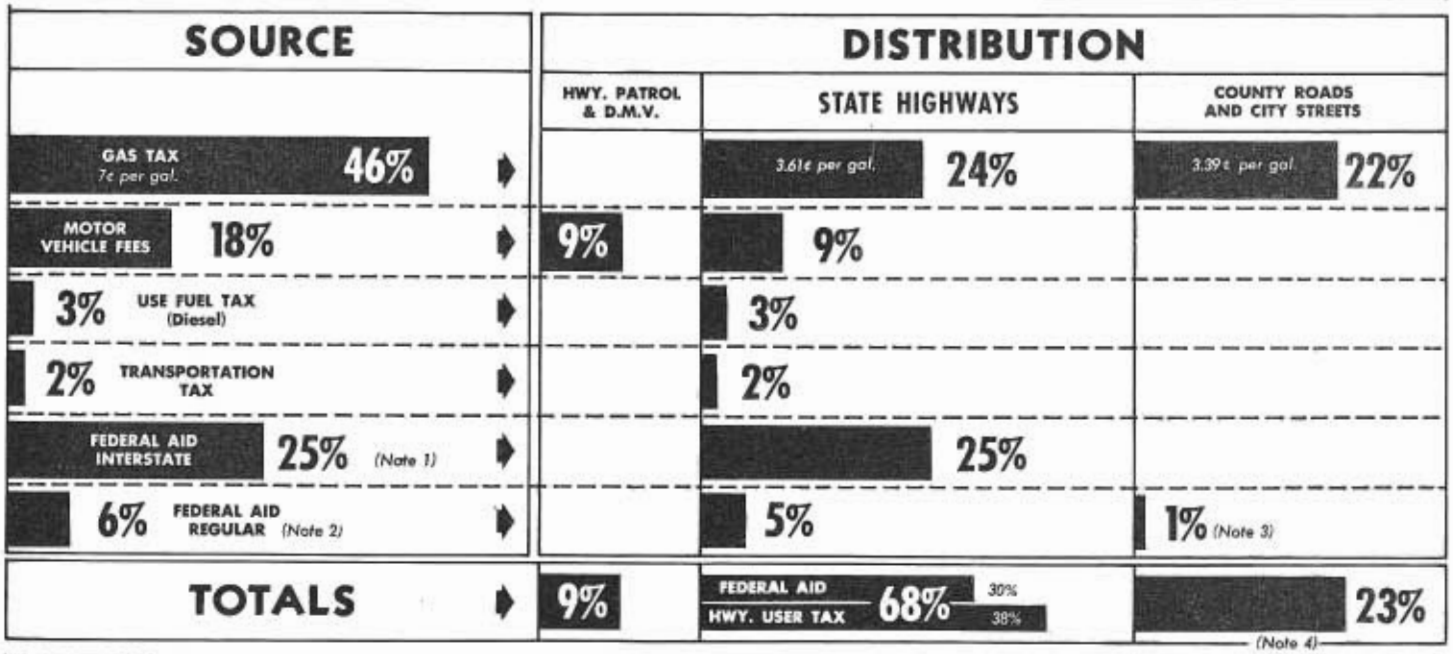
The Right of Way staff in each highway district office is ready and able to advise and assist people displaced by freeway construction to purchase or rent the type of dwelling they desire and can afford.

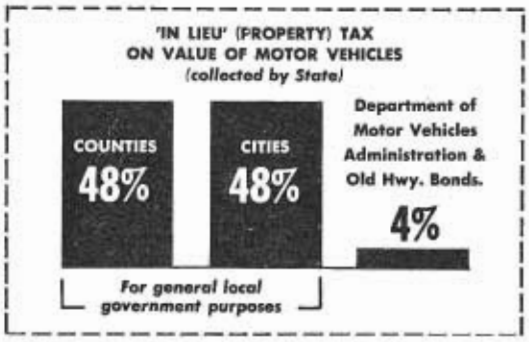
Among the advantages owners discover in selling to the State rather than a private buyer are: Payment is made in cash; no real estate commission is deducted; the State pays all title costs and document fees; the U.S. Internal Revenue Department does not require income or capital gains taxes on the increase in the sale price over the original cost when property

Highway User Taxes Including Federal Aid

Percentages based generally on 1964-65 Budget.

State of California
Department of Public Works
Division of Highways





NOTES:

1. *Federal Aid Interstate must be matched 9% by State funds from above sources.*
2. *Federal Aid Primary, Secondary, and Urban must be matched 42%, mostly by State funds from above sources.*
3. *Federal Aid Secondary Funds for county roads do not include matching funds, up to $100,000 per county per year, from State Highway Fund.*
4. *Does not include $5,000,000 per year State highway matching funds for local railroad grade separations, or about $3,000,000 a year for urban extension of F.A.S. county roads.*

is sold to a governmental agency for public purposes, provided that the money received is used to purchase a similar property within certain time limits; loans from the U.S. Veterans Administration and the California Department of Veterans' Affairs may be transferred for coverage on another property.

Highway Aesthetics

Reflecting the determination of state officials and residents to preserve California's natural beauty against the onslaughts of a rapid population and industrial growth, the Legislature at its last session passed Senate Bill 1467 which created an advisory committee to recommend standards for a statewide scenic highway system on portions of existing and future state highway routes.

This new law was the outgrowth of preliminary and final reports submitted to the Legislature in March of 1962 and 1963, prepared under the administrative direction of the Department of Public Works by an interdepartmental group and a citizens advisory committee.

Fresno residents examine large-scale maps of proposed alternate freeway routes and ask questions of the engineers prior to a public hearing conducted by the district office of the Division of Highways at the Fresno Memorial Auditorium last May.

Thirteen well-publicized regional workshop sessions organized by the Division of Highways in co-operation with the above groups were held with local officials and citizens to test the preliminary report's recommendations against local knowledge and desires. These meetings not only helped to appraise criteria for the scenic highway concept, but also communicated wider understanding of the proposed program.

The execution of the approximately 5,000-mile scenic highway system depends on both the preservation of the scenic corridors through which the highways pass and special attention to the highways' visual appearance and impact on the landscape.

The Division of Highways has the main responsibility for effecting those planning and design standards adopted for scenic highways.

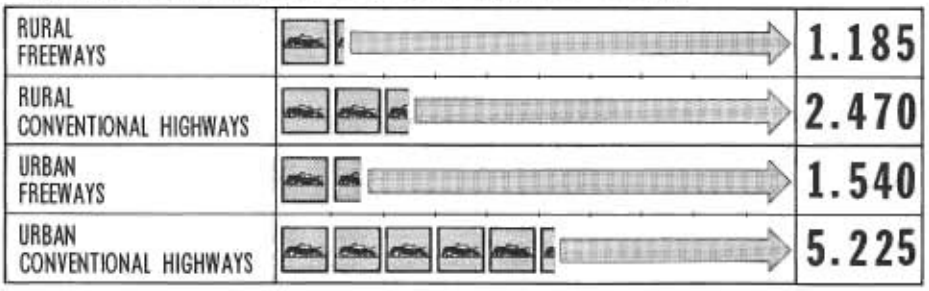
Local governments, through zoning ordinances, and the State, acting through the Department of Parks and Recreation and with the advice of the Office of Planning, will share the responsibility for planning the preservation of the scenic appearance of the landscape outside the highways' right-of-way viewed by the passing motorist.

Senate Bill 173, enacted at the same session and based on a report pre-

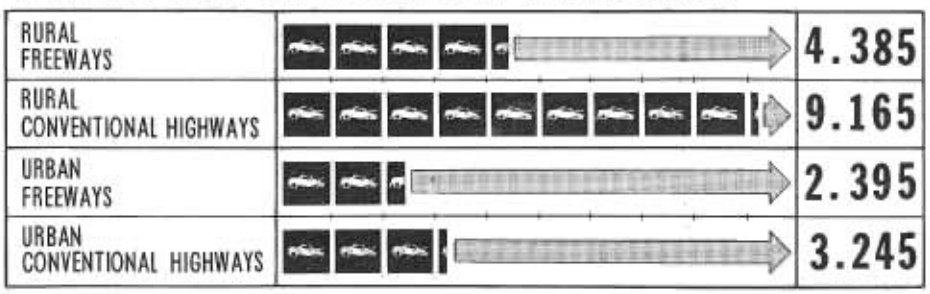
FREEWAYS and SAFETY

(1961 - 62 AVERAGES)

*** ACCIDENT RATE PER MILLION VEHICLE MILES**



*** FATALITY RATE PER 100 MILLION VEHICLE MILES**



The new Vista Point parking area at the north end of the Golden Gate Bridge, which affords a spectacular view of San Francisco (above), and new safety rest areas on the Interstate 15 Freeway in the Mountain Pass area of San Bernardino County near the Nevada line (right), reflect increased services to the motorist.

pared by the Division of Highways, authorized an eventual total of 250 safety roadside rests along state highways at approximate half-hour normal driving time intervals, and at highway entrances to large metropolitan areas for map inspection purposes.

It also transferred responsibility for maintaining 10 existing roadside rests from the Division of Beaches and Parks to the Division of Highways.

The safety rest area program will cost an estimated $5,845,000 to construct and approximately $1,164,000 each year to maintain.

Both roadside rest and scenic highways policies are incorporated in Senate Bill 581, passed in the last session, which deals specifically with the Westside Freeway (Interstate 5), with provision for co-ordinating the activities of several state agencies in developing both the highway and adjacent facilities.

The concern of the Division of Highways for the aesthetic appearance of its routes has long been evidenced by its landscaping of freeway sections in urban areas, its functional and tree planting program, its treatment of cut slopes and its design of structures.

In the past fiscal year, the division installed 184,350 trees and shrubs and 5,648,000 ground cover plants along its highways at a cost of $4,111,252.

The functional planting program, though intended primarily for erosion and fire control, the delineation of curves and structures, and the reduction of traffic noise and headlight glare, provides improvement in attractiveness as a secondary benefit.

The tree-planting program replaces trees removed by highway construction and improves the appearance of highways in areas where more costly landscaping and planting cannot be justified.

Maintaining existing landscaping and controlling roadside vegetation cost more than $5,400,000 last fiscal year. Approximately $1,500,000 was spent on the removal of litter.

Contract Data

During the 1962-63 fiscal year, the Division of Highways opened bids on 508 projects with an estimated construction value of $352,786,700, including construction engineering. Contracts valued at $313,724,400 were awarded for 486 of these projects, and all bids for 13 projects were rejected as not in the best interests of the State. Contracts for the remaining nine projects were awarded after the close of the fiscal year.

Bids received in the previous fiscal year resulted in the award of an additional 15 contracts valued at $2,270,600.

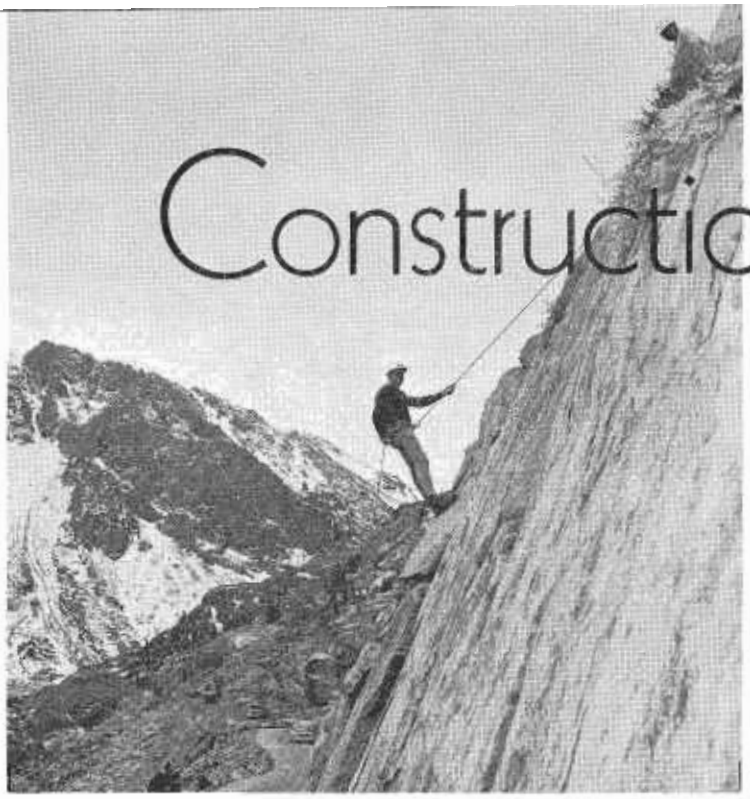
The year's cost for right-of-way acquisition and utility relocation, exclusive of land clearance, overhead, and acquisition for other agencies, amounted to approximately $160,600,000.

The total of $315,995,000 in contracts awarded in the fiscal year was composed of $280,241,700 for construction on state highways; $14,949,300 for work on county roads, including the Federal Aid Secondary System; and $20,804,000 for maintenance and emergency repairs and work for other agencies.

The contracts totalling $280,241,700 for work on state highways employed $216,724,100 from the 1962-63 budget, and $63,517,600 from the budget for 1963-64. Statutory provisions permit the award of contracts financed by funds in the budget for the following fiscal year as early as January 1, six months before the fiscal year begins.

The contracted state highway work involved improvement of 1,427 miles of highways and construction of 506 bridges and separation structures.

Construction Progress



The highway employee scaling the cliff to place construction stakes for the SSR 120 (Tioga Pass) construction job was specially trained for such climbing by the Marine Corps Mountain Warfare Training Center in Mono County.

California's highway construction program in 1963 included such major and costly projects as the completion of the Vincent Thomas Bridge between San Pedro in Los Angeles and Terminal Island, the Webster Street Tube under the estuary separating the Cities of Oakland and Alameda, and the Randolph Collier Tunnel on US 199 through Oregon Mountain.

Continued progress was made in constructing interstate and other freeway sections and in upgrading the standards of existing freeways and expressways by adding lanes or by eliminating intersections at grade.

Of equal importance to the motorists affected, however, curves were eased on conventional highways, roads were widened, channelization was installed where needed, and travel in remote rural areas was made more safe and convenient.

The program was balanced, not only geographically, but between relieving present deficiencies and constructing for tomorrow's needs.

At the last session of the Legislature, a bill was passed which renumbers the state highway routes effective July 1, 1964. Projects on the following pages are listed by both old and new route designations. If only one route number appears, it will not change.

San Diego and Imperial Counties

The future San Diego Freeway (Interstate 5), presently in operation between Palm and 28th Streets in San Diego,, will be opened to traffic through National City to connect to the Montgomery Freeway next spring. A project is being advertised for bids for a connection to the Washington Street Interchange, and funds have been budgeted for a northerly extension of the freeway to Rosecrans Street.

Three contracts have been completed on Interstate 5 in the north San Diego County area, including substantial fills in several unstable lagoon areas. Two major projects are underway and nearly $19,000,000 have been allocated to construct another 12.5 miles of this critical route to full freeway standards at several locations between Balboa Avenue in San Diego and five miles north of San Marcos Road in Encinitas.

Construction completed last February added five miles to the SSR 78 Freeway east of Vista, and a project is underway on this route to extend the freeway to U.S. 395 in Escondido, completing a freeway and expressway facility eastward from Interstate 5 in Oceanside.

Work is progressing rapidly on a contract to provide a full freeway segment on U.S. 395 near Poway Road, with an interchange at this high-volume critical intersection. The four-lane full freeway will extend 1.4 miles north and 2.2 miles south of the Poway Road Interchange. Funds have been budgeted to continue this four-lane section southerly two miles to connect to the existing four-lane facility near Miramar Road. Four miles of four-lane expressway are budgeted on U.S. 395 north and south of Escondido.

The new budget also provides funds for 1.7 miles of SSR 67 Freeway north of Interstate 8 near Santee.

A four-mile freeway contract on Interstate 8 east of El Cajon was awarded last fall. A project included in the new budget will extend it farther east to the vicinity of Harbison Canyon Road west of Alpine, providing 24 miles of continuous full freeway from Pacific Highway in San Diego.

Farther east on Interstate 8, 10 miles of west bound freeway lanes in the Mountain Springs area near the San Diego-Imperial county line were opened to traffic in early December and work is underway on the eastbound lanes.

In Imperial County, the 1964-65 budget provides for construction of an expressway on U.S. 99-SSR 111 (new SSR 111) between the north city limit of Calexico and the junction of the future Interstate 8 Freeway. The existing roadway will be widened and resurfaced north of this junction to existing U.S. 80.

San Bernardino and Riverside Counties

Construction is underway on a 45-mile section of Interstate 15 Freeway between Yermo and Cronese Valley in San Bernardino County, and a project included in the new budget will extend the freeway 18 miles to east of Baker. A 23-mile section extending to the Nevada line was completed in October.

Ten miles of the westbound lanes (lower level) of the Interstate 8 Freeway in the Mountain Springs area near the San Diego-Imperial county line were opened to traffic in December. Work continues on the eastbound lanes.

These three projects, totalling more than $25,500,000, will provide a continuous freeway between the Nevada line and Barstow and freeway and expressway southwesterly to San Bernardino.

Another 6.7-mile section of this route has been budgeted for conversion from expressway to freeway in and near Victorville.

A project to construct nine miles of Interstate 40 Freeway southeast of Barstow has been advertised for bids and the new budget will finance California's share of the Colorado River Bridge near Needles on this route.

A 1.6-mile section of SSR 18 near Camp Waterman has been budgeted for conversion from two-lane highway to four-lane freeway south of the soon-to-be-started Crestline Interchange.

The San Bernardino Freeway (Interstate 10) will be widened from four lanes to eight for 5.4 miles in and east of Ontario with funds provided in the 1964-65 budget.

Farther east, an 11-mile project to convert a four-lane expressway to six-lane Interstate 10 Freeway between Redlands and Beaumont is under construction.

On Interstate 10 in Riverside County, an eight-lane freeway is under construction between Banning and the east city limit of Cabazon, and the new budget provides for extending it another 6.1 miles easterly. A freeway conversion project was completed in January near the Whitewater junction with Twentynine Palms Highway, and a 3.4-mile conversion project is budgeted northwest of Thousand Palms. A 9.7-mile section of four-lane freeway is under construction east of Indio and a 14.1-mile extension easterly is budgeted.

A 4.7-mile freeway on U.S. 60 between Sunnyslope and Riverside was completed in February; a freeway conversion project extending to U.S. 395 in Riverside is budgeted; a four-mile section between U.S. 395 and Sunnymead was completed in January; and construction is underway to extend the freeway 5.4 miles easterly to SSR 79 (new SSR 177), completing freeway and expressway on this route between Ontario in San Bernardino County and Beaumont in Riverside County.

Widening of SSR 111 to four lanes between Palm Springs and Cathedral City and through Palm Desert was completed in October. The widening of the connecting section to four lanes is budgeted. Also budgeted is the five-mile section of this route west of Palm Springs, connecting to Interstate 10, to be widened to four lanes.

A 2.6-mile, four-lane expressway was completed this fall on SHR 187 in Morongo Valley north and south of the San Bernardino-Riverside county line.

Los Angeles Metropolitan Area

The Vincent Thomas Bridge between San Pedro and Terminal Island, the first major, high-level suspension span in Southern California, was opened to traffic on November 15. This $21,000,000 toll structure replaced a ferry service in the Los Angeles Harbor area.

Construction of the Santa Monica Freeway from the Golden State Freeway to the Harbor Freeway in 1962 completed an inner freeway loop around the Los Angeles downtown area. Projects completed in 1963, under construction or budgeted on the San Diego (Interstate 405), Garden Grove (SSR 22) and Interstate 605 freeways will form an outer loop west, south and east of the Los Angeles central district.

Approximately 20 miles of the San Diego Freeway (Interstate 405) were completed in 1963, completing this freeway between the Golden State Freeway north of San Fernando and southeast of the Long Beach Freeway, at a cost of more than $50,000,000. Another 14.7 miles are under construction to extend this freeway southeasterly to Beach Boulevard (SSR 39) in Orange County, and the new budget provides for extending it 2.9 miles farther to Fountain Valley.

Interstate 605 Freeway is under construction for 11.1 miles between the San Bernardino Freeway in El Monte and south of the Santa Ana Freeway in Norwalk, and is budgeted southerly to the San Diego Freeway.

Two miles of the Garden Grove Freeway (SSR 22) are under construction east and west of Beach Boulevard, and a short section west of the Santa Ana Freeway was completed in August. The remaining sections of this freeway, which connects the Santa Ana and San Diego Freeways, have been budgeted.

Approximately 8.5 miles of the Santa Monica Freeway (Interstate 10) are under construction between just west of the Harbor Freeway and the San Diego Freeway. The last section of this route, 3.2 miles between the San Diego Freeway and Pacific Coast

Highway in Santa Monica, was advertised for bids in November.

A 2.4-mile section of the Golden State Freeway south of Osborne Street in Pacoima was completed in February. This freeway was extended northerly past the interchange with the San Diego Freeway to north of San Fernando in November, completing it through the San Fernando Valley.

The 1964-65 budget provides for extending the Hollywood Freeway 1.7 miles northerly to Victory Boulevard in North Hollywood.

The Pomona Freeway is under construction between the East Los Angeles Interchange and Third Street in East Los Angeles. The new budget contains two more projects on this route: One will extend it 1.4 miles easterly to Woods Avenue, interchanging with the Long Beach Freeway, and the other provides for a four-mile section between South San Gabriel and east of Interstate 605.

Several projects recently completed or under construction will convert almost all of U.S. 101 between the Cities of Los Angeles and Ventura from expressway to full freeway standards.

A 4.5-mile freeway loop of U.S. 101 around the business district of the City of Ventura was opened to traffic in the fall of 1962. Work was completed in September to extend it 2.5 miles westerly with an interchange with the Ojai Freeway.

A five-mile section of State Sign Route 126 Freeway between Ventura and Wells Road was opened to traffic in April and construction is underway on an 8.5-mile easterly extension to Santa Paula.

The Antelope Valley Freeway (U.S. 6—new SSR 14) was opened to traffic in October for the 14.4 miles between Solamint Junction and Red Rover Mine Road and construction is underway easterly for 8 miles to Angeles Forest Highway. The 1964-65 budget contains a project which will extend it northerly to Palmdale.

The first project to convert the Ridge Route section of U.S. 99 (Interstate 5) from expressway to full freeway standards between San Fernando and the Kern county line, a three-mile section south of Castaic, is under construction.

Six and a half miles of the Newport Freeway were completed last year, joining the Santa Ana and Riverside Freeways in Orange County, and construction is underway on a two-mile section south of the Santa Ana Freeway.

San Joaquin Valley and Central Mountain Counties

North of Los Angeles county line in Kern County, eight-lane Interstate 5 freeway is under construction for four miles to Fort Tejon, connecting to the completed Grapevine section past Wheeler Ridge where the present route continues north as U.S. 99.

Upon completion of a final 4.8-mile contract last summer, the 17-mile Bakersfield Freeway was fully opened to traffic at an overall cost of more than $13,000,000. Most of the project was opened last year to southbound traffic only.

An 8.5-mile, four-lane expressway section between north of the new Bakersfield project and Cawelo is being converted to six-lane freeway. Conversion of a 3.5-mile expressway section north of McFarland, connecting to completed freeway for 60 miles through Tulare County to one mile south of the Fresno county line, was completed in July.

From this point, south of Kingsburg, a four-lane freeway is under construction northerly for eight miles to Selma, connecting to a recently completed freeway to Malaga. The freeway between Malaga and the Fresno Freeway was completed this fall.

In Madera County, a four-mile expressway-to-freeway conversion is underway north of the Fresno county line.

Farther north on this route, a 4.5-mile freeway bypass of downtown Merced was opened to traffic in October.

In Stanislaus County a two-mile freeway through Ceres and the 5.8-mile Modesto Bypass Freeway are under construction.

North of Stockton, the four-lane expressway for 6.8 miles north of the Calaveras River is being converted to six-lane freeway and the 4.5-mile Lodi Bypass Freeway was opened to traffic in November.

The first project on the 321-mile Westside Freeway (Interstate 5), which will extend from Wheeler

The freeway loop of U.S. 101 around the business district of Ventura completed in 1962 now extends farther west, including an interchange with the Ojai Freeway (upper left).

Construction of a four-lane freeway and expressway on SSR 1 between Morro Bay (below) and 6.2 miles northerly to south of Cayucos was completed last fall. The superseded two-lane highway is at the left of the new facility.

The $13,000,000, 17-mile Bakersfield Freeway on U.S. 99 was completed last summer. Most of its length had been opened to southbound traffic in 1962.

Ridge south of Bakersfield to Woodland, was started this spring in Merced County west of Los Banos. A joint project of the Division of Highways and the U.S. Bureau of Reclamation, it will provide freeway bridges across the San Luis Canal and portions of an interchange with State Sign Route 152.

The new budget provides $5,400,000 for a 8.6-mile project on this route in Merced County, and $8,700,000 for 12.2 miles on the connecting Interstate 580 Freeway south and west of Tracy.

A 12.4-mile, four-lane expressway relocation of State Sign Route 152 around the area to be inundated by the San Luis Reservoir is under construction in the Pacheco Pass area.

This joint project of the Division of Highways and the Department of Water Resources will cost more than $13,000,000.

In Kings County, a four-lane freeway on State Sign Route 198 for 6.4 miles easterly from the main gate of the Lemoore Naval Air Station was completed in June. A second project is underway to continue this route as a four-lane expressway for 8.5 miles to Hanford.

On U.S. 466 (new State Sign Route 58) in Kern County, a grading and structures project is under construction for 7.6 miles of four-lane freeway west of Tehachapi. The new budget will complete this project.

In the Sierra Foothills, a 3.1-mile four-lane expressway was completed on State Sign Route 108 west of Twain Harte in October. Two two-lane expressway projects east of Twain Harte grade are financed in the new budget, and a two-lane expressway project on this Sonora Pass route is underway east and west of Long Barn.

Other two-lane expressway projects include:

- 7.3 miles under construction on State Sign Route 41 north of the North Fork Kings River in Kings and Fresno Counties.
- 4.3 miles were completed in February on State Highway Route 135 between north of Corcoran and Kings County and one mile south of the Kings-Tulare county line.
- 5.6 miles under construction on State Sign Route 4 in Calaveras County west of the Alpine county line.
- 3.8 miles were completed in September on State Sign Route 88 (Carson Pass) between Woodfords and Picketts in Alpine County.
- 2 miles are under construction on State Sign Route 120 (Tioga Pass) west of Lee Vining in Mono County.

A 6.4-mile freeway on SSR 198 easterly from the Lemoore Naval Air Station in Kings County was completed in June. Work continues to extend it for another 8.5 miles as an expressway to Hanford.

Sacramento Valley and Northern Counties

A total of 47 miles of Interstate 5 Freeway have been completed or are under construction between Sacramento and the Oregon line, and an additional 40 miles have been budgeted including an initial stage of work on Interstate 5 (Second and Third Street Freeway) in the City of Sacramento. These budgeted projects will cost more than $27,000,000.

A Glenn County section 11 miles long has been budgeted for 1964-65 at $6,600,000 between Artois and the Tehama county line. In Tehama County, a project estimated to cost $13,460,000 is included to provide 22 miles of freeway between Corning and just north of Red Bluff, connecting to a 15.2-mile section nearing completion to north of Cottonwood in Shasta County.

Another budgeted project will continue northerly to the Sacramento River Bridge north of Anderson. Grading and structures are already underway for a future freeway extending north of Redding.

Farther north, the new budget provides for widening the Pit River Bridge. A 5.8-mile section ($9,825,000) between Shotgun Creek and one mile south of Castella was completed in March, connecting with a 7.9-mile section completed earlier to Dunsmuir. The new budget provides funds to convert another 1.1 miles of U.S. 99 Expressway to Interstate 5 Freeway in that city.

A 6.8-mile section north and south of the City of Mt. Shasta will be completed next fall.

On Interstate 80 (former U.S. 40), the principal route between San Francisco and Nevada, a 4.5-mile expressway section east of Vallejo was con-

verted to interstate freeway standards in June. A seven-mile conversion near Dixon will be completed by year's end and another five-mile section near Vacaville next fall.

Three additional Solano County conversion projects totalling 11.5 miles, west and east of Vacaville and northeast of Dixon, have been budgeted, leaving only 8.1 miles of U.S. 40 Expressway to be converted to Interstate 80 Freeway between San Francisco and Sacramento.

Farther east, the three-mile dual-structure Yolo Causeway carrying three lanes of traffic in each direction was completed in October. Traffic had been using part of this facility since the fall of 1962.

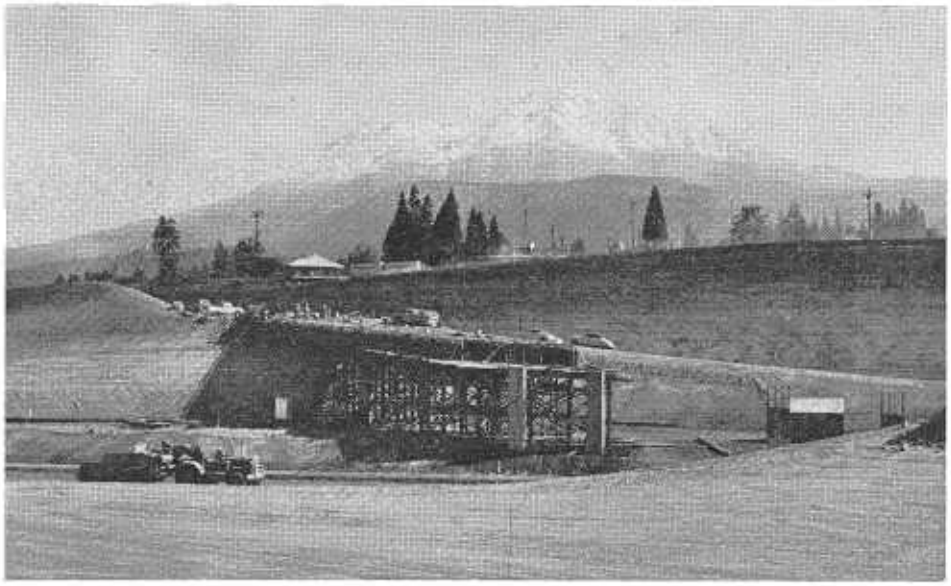
The substructure of the W-X Street Bridge across the Sacramento River for Interstate 80 is under construction. The superstructure and two miles of freeway approaches in Yolo and Sacramento Counties have been included in the new budget, and are estimated to cost $18,200,000.

The eight-lane Interstate 80 (29th-30th Street) Freeway in the City of Sacramento connecting the South Sacramento and Elvas Freeways has also been budgeted. Its cost is estimated at $12,700,000.

On Interstate 80 in the Sierra Nevada, a 12-mile project between Emigrant Gap and Hampshire Rocks will be completed next fall. Grading of the 10.6-mile section easterly of Soda Springs was completed in September and a contract for paving this section to complete the Donner Summit relocation will be completed next year.

On U.S. 50, the 1964-65 budget provides $6,200,000 for extending freeway construction ten miles easterly between Folsom Junction in Sacramento County and a mile east of Bass Lake Road in El Dorado County. A two-mile freeway section west of Placerville was completed in September, and two other projects, a two-mile expressway west of Camino and a 5.5-mile freeway section near Pollock Pines, will be completed next year.

Initial freeway construction on U.S. 99E in Chico was completed this fall and work is underway southerly to the Skyway turnoff. The new budget provides funds to complete the freeway through Chico.



Construction is underway on a 6.8-mile section of Interstate 5 north and south of the City of Mount Shasta. The famed snow-covered landmark looms in the background.

A 6.8-mile freeway on U.S. 40 Alternate (new State Sign Route 70) was completed in November, completing the relocation of this route around the Oroville Dam Reservoir.

A 1.9-mile four-lane freeway on SSR 44 easterly from Market Street in Redding and a 4.5-mile two-lane expressway on this route near Palo Cedro are under construction. The new budget provides for extending the latter project another four miles.

The first unit of the four-lane Grass Valley-Nevada City Freeway, 3.3 miles, is financed in the new budget.

In Sutter County, a 3.6-mile four-lane expressway on SSR 20 west of Yuba City will be completed next summer.

Two-lane expressway projects include: 4.4 miles on U.S. 299 east of Douglas City in Trinity County completed this year; 3.3 miles on U.S. 299 northeast of Adin in Modoc County under construction; 5.3 miles on U.S. 395 between one mile south of the Lassen-Modoc county line and four miles north of Likely completed in July; 1.3 miles on SSR 89 at the southern end of Lake Almanor in Plumas County, completed this fall; and 2.2 miles on SSR 20 west of Meridian in Colusa County, completed this fall.

Central Coastal Counties

Seven miles of two-lane expressway on State Sign Route 154 north of San Marcos Pass in Santa Barbara County will be completed in early 1964 to realign the existing highway and eliminate tortuous curves and steep grades, in conjunction with a recently completed steel arch bridge across Cold Springs Canyon.

A 2.6-mile freeway section on U.S. 101 in the City of Santa Barbara is nearing completion, and a freeway bypass of Buellton on this route is now under construction.

An 8.5-mile two-lane expressway on State Sign Route 154 between Surf and Lompoc and a freeway between the University of California at Santa Barbara campus and U.S. 101 at Goleta were completed this summer.

A 1.5-mile section of U.S. 101 Expressway was converted to freeway standards south of San Luis Obispo in May, and work continues to convert the expressway southerly to Pismo Beach.

A four-mile freeway construction project on U.S. 101 is just starting between north of San Miguel and north of Gate 1, Camp Roberts, in Monterey County. The new budget will extend the freeway to connect with construction in progress between Bradley and San Ardo which will be completed next summer.

Farther north on U.S. 101, a six-mile freeway bypass of Gonzales was completed in July and a 4.5-mile freeway between North Main Street in

This section of SSR 108 west of Twain Harte in Tuolumne County completed in October typifies four-lane expressway construction in many scenic areas. The former highway, at left, connects with the expressway at left foreground.

Salinas and north of Espinosa Road has been budgeted.

On State Sign Route 1, between Morro Bay and south of Cayucos, a 6.2-mile four-lane freeway and expressway was completed this fall. Completion of a 3.6-mile two-lane expressway relocation of this route to bypass Cambria to the west is expected in early 1964.

Construction of a two- and four-lane expressway was completed in May for three miles of State Sign Route 156 north of Hollister in San Benito County.

San Francisco Bay Region

The most costly project completed in 1963 in the Bay region and the one offering the most immediate and dramatic traffic improvement was the opening of the new 5,923-foot Webster Street Tube at a cost of approximately $19,000,000, and the renovation of the paralleling Posey Tube between Alameda and Oakland. The renovation project was completed in November and now each tube carries two lanes of one-directional traffic.

Three projects are under construction to extend the eight-lane Interstate 580 (MacArthur) Freeway, which was completed between the San Francisco-Oakland Bay Bridge distribution structure and Park Boulevard in Oakland last year, another 11 miles to Sybil Avenue in San Leandro at a cost of $24,600,000.

Work is underway to construct a new 3,371-foot two-lane bore on SSR 24 paralleling the existing Caldecott Tunnel through the Berkeley Hills at a cost of almost $11,000,000. When it is completed next fall, the existing tunnel will be renovated. A two-mile, eight-lane freeway connecting the tunnel's east end to Orinda Highway should be completed next year.

Funds have been budgeted to construct a future eight-lane freeway west of the tunnel on SSR 24.

Widening of 5.6 miles of the Nimitz Freeway from six to eight lanes in Oakland was completed in September. A 1.7 mile length of four-lane divided highway on Jackson Street (new SSR 92) in Hayward was opened in April. The new budget provides funds to convert this latter route from two-lane highway to four-lane freeway between the east end of the San Mateo-Hayward Bridge and the expressway at Hesperian Boulevard.

The Interstate 680 Freeway was opened to traffic by year's end between SSR 9 near Mission San Jose and SSR 84 east of Sunol, and work should start soon to construct this freeway between south of Dublin and one mile north of the Alameda-Contra Costa county line. The new budget will finance construction northerly to one mile south of Danville.

Work is underway to construct the Interstate 680 Freeway between south of Danville and Walnut Creek. The 1.7-mile gap on this route between Pleasant Hill and Concord was recently opened to traffic, completing the freeway from Walnut Creek to the Benicia-Martinez Bridge.

The 1964-65 budget provides funds for five miles of SSR 4 Freeway in Contra Costa County east of Cummings Skyway.

In San Francisco, the Southern Freeway has just been completed between the interchange with the James Lick Memorial Freeway and Alemany Boulevard near Mission Street. Three projects are underway to extend this freeway westerly to near the south city limits and for one-half mile easterly as a viaduct. Funds have been budgeted to extend the viaduct facility easterly to Army Street.

Work will start soon on a connection between the Southern Freeway construction in progress and the Interstate 280 (Junipero Serra) Freeway in Daly City and on SSR 1 between St. Francis Boulevard in Daly City and Interstate 280.

Bids were received in December for the construction of the ramps between Interstate 480 (Embarcadero) Freeway and Clay and Washington Streets in the Golden Gate Redevelopment Area.

In San Mateo County, the first project on the SHR 105 (new SSR 92) Freeway west of the Bayshore Freeway was completed in October.

Construction started this spring on 3.3 miles of four-lane SSR 1 Freeway in Pacifica.

The new budget allocates $15,800,000 to extend the Interstate 280 Freeway southerly to west of South San Francisco and to construct two freeway bridges across San Mateo Creek near Hillsborough.

Bids were received in November for construction of a 1.3-mile SHR 214 (new SHR 114) expressway between the Bayshore Freeway and Cypress Avenue in Redwood City as a joint project with the city.

In Santa Clara County, construction emphasis is on the Interstate 280 and SHR 114 (new SR 85) freeways.

On the former route, construction is underway between San Jose and Cupertino, and the new budget provides funds for 7.2 miles of this route between Mountain View-Stevens Creek Road in Los Altos and Los Altos Hills. Work has started on the SHR 114 (new SR 85) Freeway between Cupertino and the Bayshore Freeway in Mountain View.

In Santa Cruz County, the second of several projects to convert the SSR 1 Expressway between Santa Cruz and Rob Roy Junction to full freeway standards was completed in November, and bids were opened in

November for grading and structures on the freeway bypass route west of Watsonville.

Two major projects are underway in Marin County in and south of Novato to convert four miles of U.S. 101 from expressway to freeway.

Farther north, the new budget will convert a U.S. 101 section in Santa Rosa from expressway to freeway standards with a connection at Steele Lane, and two projects to convert four miles of U.S. 101 to freeway south of Cloverdale will be completed next year.

The first unit of the SSR 12 Freeway, a 4.3-mile section between east of Sebastopol and Santa Rosa, will be completed next spring.

The substructure of the high-level Napa River Bridge on SSR 48 (new SSR 37) west of Vallejo was completed in April. The new budget provides funds for the superstructure.

Northern Coastal Counties

In Mendocino County, 5.2 miles of four-lane U.S. 101 Freeway north of Ukiah were opened to traffic in November and construction is underway south of the city. A contract was awarded in September for structures for the section through the Ukiah area on this route.

In Humboldt County, a 5.7-mile section of the Redwood Parks Freeway was completed on U.S. 101 in October, extending a previously built 12-mile section southerly to Maple Hills Road Bridge. Another 5.9-mile section is underway to south of Phillipsville. The 1964-65 budget contains funds for an extension southerly to Dean Creek.

A 3.7-mile section of U.S. 101 near Fields Landing was completed in April and construction is underway for 3.5 miles northerly to the Elk River, which will complete freeway construction from south of Fortuna to Eureka.

Continuing north, eight miles of freeway are under construction between Mad and Little Rivers, and 1.5 miles of U.S. 101 Expressway in and near Arcata will be brought to full freeway standards by a project included in the 1964-65 budget.

A $4,300,000 contract for clearing and grading for five miles of U.S. 101 freeway between 0.9 mile south of the Del Norte county line and 1.1 miles south of Klamath was awarded in March. The new budget will finance construction of a 2,000-foot bridge across the Klamath River.

The Randolph Collier Tunnel under Hazelview Summit on U.S. 199 and 4.2 miles of two-lane expressway approaches were completed in July at a cost of more than $7,500,000, eliminating five steep switchbacks and 128 turns and shortening this route to Oregon by 2.8 miles.

Construction of 22.6 miles of Interstate 80 in the Sierra Nevada will be completed next fall, providing continuous freeway and expressway on this route between San Francisco and the Nevada border. In photo above, the new Interstate freeway crosses over SSR 20. U.S. 40, which will be superseded, carries traffic in the background.

Other significant northern coastal county projects include:

A 2.9-mile, two-lane expressway under construction on SSR 1 near the City of Mendocino. A project in the 1964-65 budget will extend it 4.4 miles northerly to Mitchell Creek.

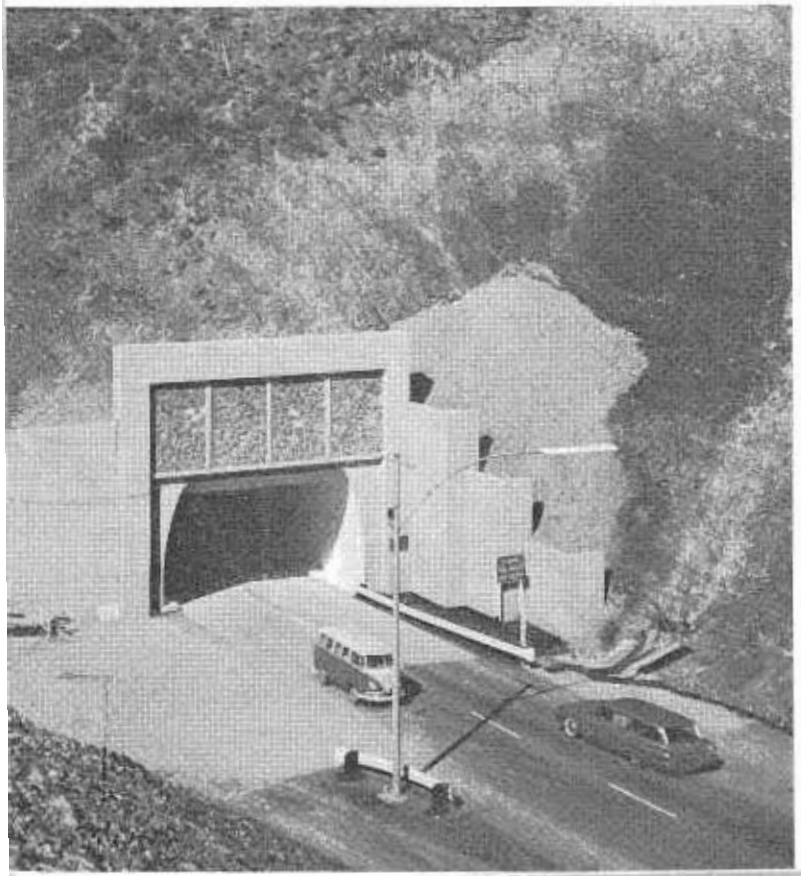
A 3.3-mile, two-lane expressway on SHR 56 under construction between Ferndale and Fernbridge.

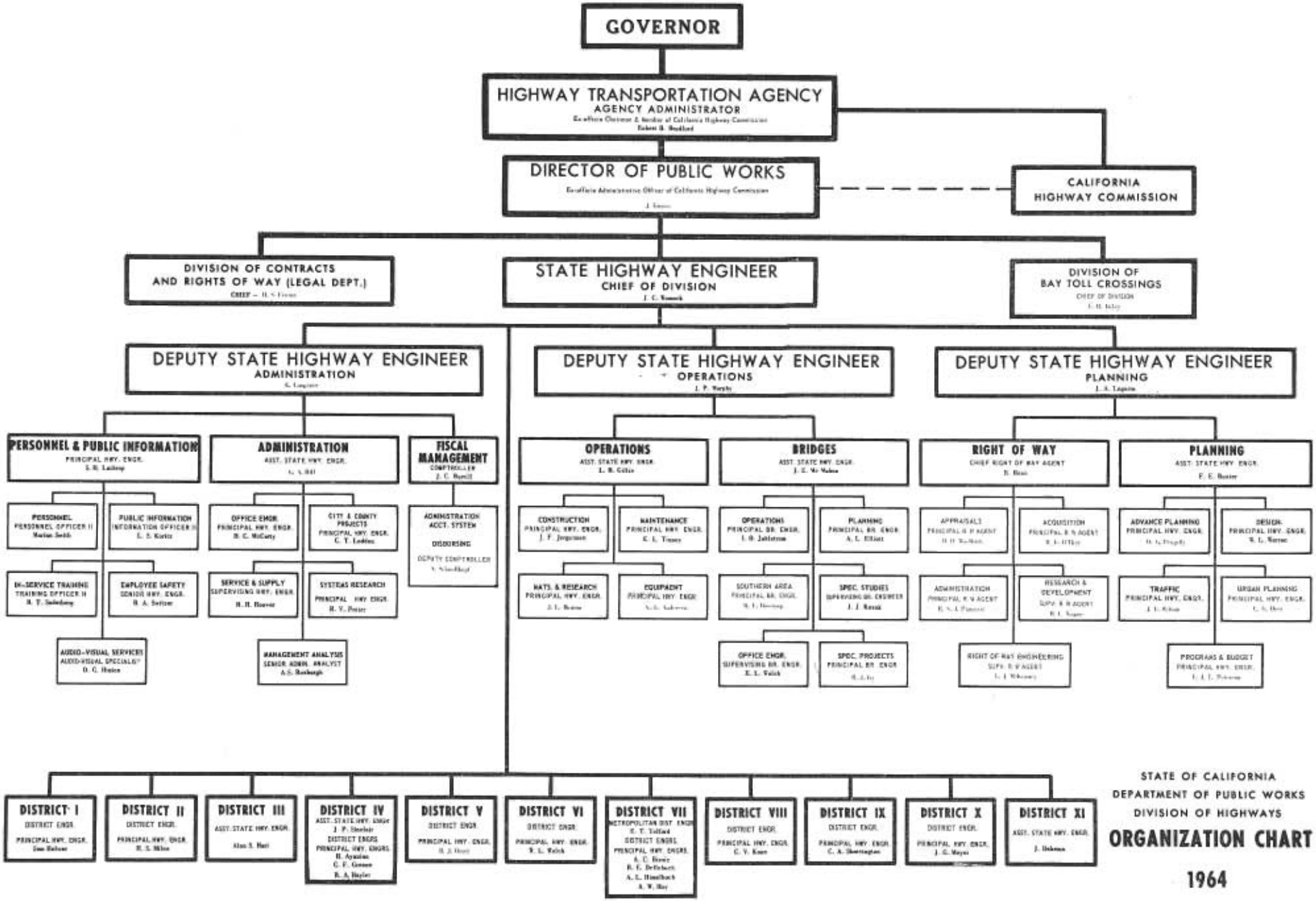
A $5,600,000 project in the 1964-65 budget will extend the U.S. 299 Expressway as a freeway between west of Mad River and Blue Lake.

The Eagle Point Viaduct carries the Redwood Parks Freeway (U.S. 101) traffic on part of a 5.7-mile freeway section completed in October south of Myers Flat.

Traffic Moves in New Tubes and Tunnels Under Water and Through Mountains

When the 5,923-foot Webster Street Tube (upper left) under the estuary between Alameda and Oakland was completed in February at a cost of over $19,000,000, it handled two-way traffic until the paralleling Posey Tube could be renovated. This was completed in November. Now each tube carries two lanes of one-directional traffic. A new two-lane bore, paralleling the existing four-lane Caldecott Tunnel (upper right) through the Berkeley Hills on SSR 24, will be completed next year as will an eight-lane freeway connecting the tunnel's east end to Orinda Highway. The new bore will cost nearly $11,000,000. The Randolph Collier Tunnel through Oregon Mountain on U.S. 199 (south portal shown below left) and 4.2 miles of two-lane expressway approaches were completed in July at a cost of more than $7,500,000. Their completion eliminated five steep switchbacks and 128 turns and shortened this route to Oregon by 2.8 miles. The old tortuous, climbing highway over Hazelview Summit is shown at lower right.





STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF HIGHWAYS

ORGANIZATION CHART

1964

Operations

- *The construction, maintenance, equipment and materials and research departments are administered under the direction of the Assistant State Highway Engineer—Operations*

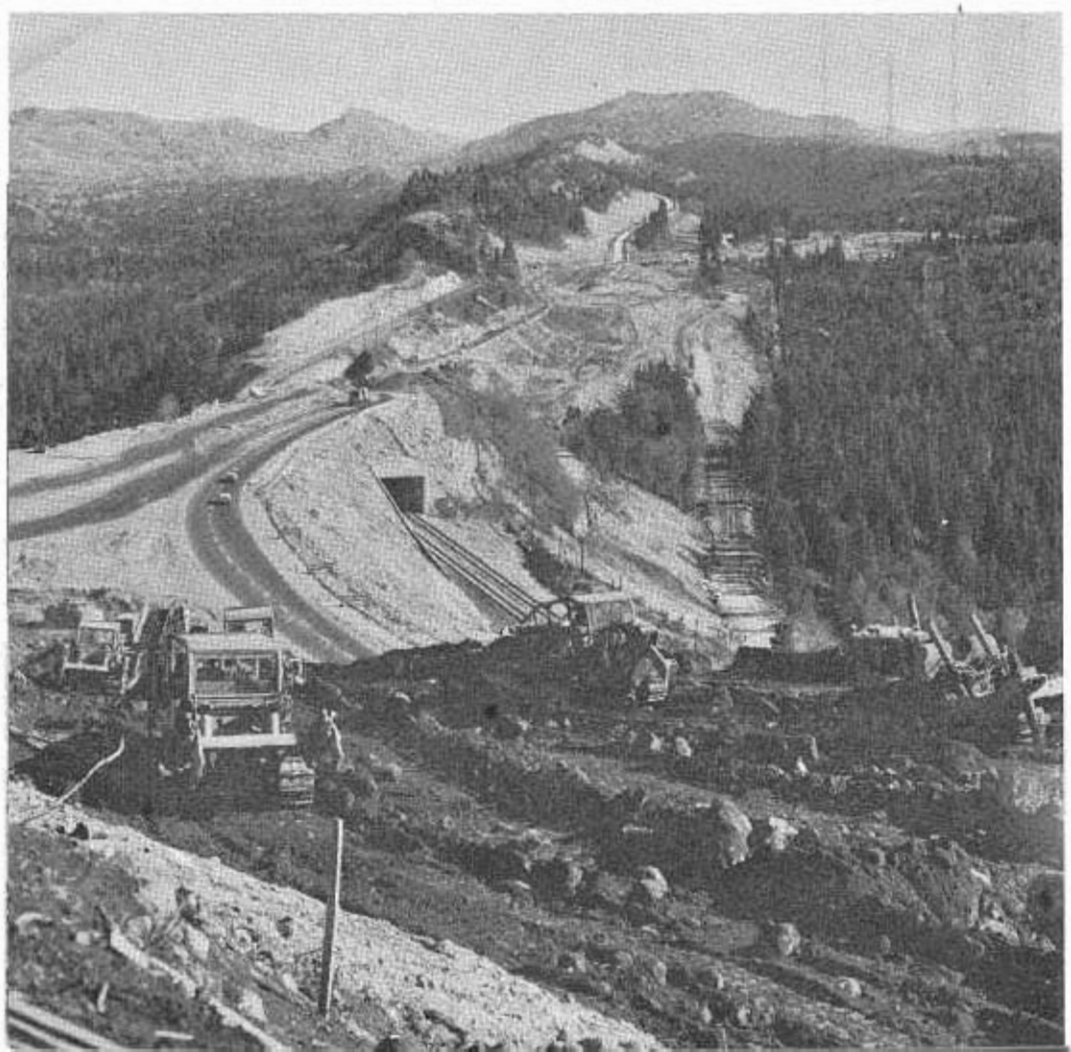
CONSTRUCTION

In the 1962-63 fiscal year 504 major contracts administered by the districts were completed at a cost of $317,550,697.

Each construction contract is under the direct administration of a resident engineer. The work on several contracts in an area is supervised by a construction engineer. All of the construction work in any one highway district is under the general supervision and administration of an assistant district engineer who reports directly to the district engineer. Headquarters Construction acts as a staff department for the State Highway Engineer for purposes of co-ordination uniformity of contract administration.

The engineers and technicians perform the staking, inspection and testing necessary to lay out the project and to insure that the terms of the contract are met. When revisions of plans and specifications are necessary the engineer must investigate and initiate the covering changes.

Grading operations on the Interstate 80 relocation at Emigrant Gap in the Sierra Nevada.



The work itself is performed by the contractor's organization and forces. It is the contractors job to plan his work, determine what methods and equipment he will use, procure and produce the necessary materials, and to accomplish the planned project according to the lines and grades set by the engineer, in compliance with the specifications governing the work.

Special Projects

The paving engineer of Headquarters Construction Department with the co-operation of the Portland Cement Association and the division training officer started a program of presenting the latest techniques in portland cement concrete paving. This program was started in the spring of 1963 and will be continued. All possible field personnel who are involved in the inspection of concrete paving attended a program consisting of slides and lectures with discussion periods following.

Experimental Sections

On two contracts, experimental sections of concrete paving using a special shrinkage-compensated cement were placed. The purpose of this experiment was to explore possibilities of obtaining satisfactory performance from pavements without joints.

The department developed and issued a uniform system of indexing and filing contract records and documents for the project field offices. This system furnishes supporting data for the new contract records procedure and effects considerable savings in the field offices.

Tolerance Study

The study of tolerances in the various elements of the structural section of the roadway is a continuing project and the results of the construction on each project are tabulated by the electronic data processing unit of the division.

Construction Practice

The ingenuity of the highway construction industry was again demonstrated during the past fiscal year by the development of attachments to the

slip-form paving train on portland cement concrete paving which automatically inserts the polyethylene plastic strips in the longitudinal and transverse joints in the fresh concrete.

Central-mixed concrete for paving was used more extensively during the past fiscal year.

Honor Camp Projects

The Division of Highways and the Department of Corrections continued the joint operation of Camp No. 41 near Happy Camp on the Klamath River in Siskiyou County, and Camp No. 42 near Lord Ellis Summit in Humboldt County.

Klamath River Highway

Camp 41 continued construction on the portion of the Klamath River Highway between 1.7 miles north of Dillon Creek and Clear Creek, a distance of about 11 miles.

Construction was completed on one portion between Wright Ranch and 0.2 mile east of Happy Camp. Construction was started on a 1.7-mile section south of Dillon Creek.

Most of the work performed by Camp 42 during the fiscal year was concentrated in Unit 4 which is located in the vicinity of Redwood Creek Bridge.

A northward view of the new Golden State-San Diego Freeways junction (Interstate 5 and 605) north of Los Angeles. The freeway may be seen starting up the Ridge Route through the mountains in the distance. The San Fernando Reservoir is at the left.

MAINTENANCE

Approximately 3,700 maintenance men are employed by the Division of Highways, working out of 267 maintenance stations. It cost a total of $45,670,000 to maintain 14,650 miles of highways in the state system for the 1962-63 fiscal year.

Pavement Repair and Bridge Maintenance

During the summer months, maintenance forces undertook a moderate program of surface restoration, including the reprocessing of asphalt, application of leveling blankets, surface planing, seal coat application and base restoration. Contracts (financed from maintenance funds) were let for screening seal coats considered as replacements. Approximately 222 miles of road surface were covered in this program at an estimated cost of approximately $479,000.

The Maintenance Department again reviewed road surface needs and prepared the annual resurfacing and seal coat program, called the "thin blanket" program, which covered 631 miles of resurfacing and 44 miles of delayed seal coat, at an estimated cost of about $5,000,000 (financed out of construction funds and performed by contract). During the 1962-63 fiscal year, a total of $1,490,000 in maintenance funds was spent for surface and base restoration work. This covered 973 miles of traveled way and 1,092 miles of shoulder work. During the year, limited use (about $47,000) was made of mudjacking pavement restoration.

The Bridge Department prepares and makes recommendations for the painting and repair of bridges on the state highway system. The direct field cost of this work undertaken during the past fiscal year which was considered a maintenance obligation was approximately $625,000, including $208,900 under contracts and $416,100 for work performed by city and state forces.

Ferry Operations, Maintenance in Cities and Roadside Cleanups

The Benicia-Martinez Ferry was in operation until September 15, when the new toll bridge was opened to traffic. Expenditure in maintaining the ferry operation during this period approximated $58,800.

The construction of the deep water channel from Rio Vista to Sacramento requires that the cable-operated ferry known as the Ryer Island Ferry, which crosses Cache Slough about 2.4 miles upstream from Rio Vista, be rebuilt and converted to a free-running ship. Conversion of this ferry has now been completed.

The skymaster being used to wash signs on the U.S. 99 freeway in Sacramento.

Under state law, the State can authorize contracts with cities or counties covering maintenance of state highways and certain features of maintenance work are delegated to cities. Maintenance funds in the amount of $1,651,000 were expended in maintaining state highways within 335 cities.

Removing litter continues to increase despite publicity campaigns by public service organizations and others. The distribution of litter bags at service stations and laws prohibiting the disposal of rubbish on highways have aided in controlling the roadside garbage problem. In spite of these efforts, roadside cleanup continues to be a costly maintenance item. In 1962-63 it cost $2,247,000 for roadside litter removal and street sweeping.

Roadside Vegetation, Tree Care and Landscaping

Several programs have been instituted during the past fiscal year relative to roadside and landscape maintenance. Growth-inhibiting chemicals have been tested in an attempt to reduce the cost of mowing while retaining attractive roadsides. Spraying was done at the manufacturers rates and with assistance from their personnel.

Several 24-foot hydraulically operated spray booms have been obtained. Mounted on 2,000-gallon spray rigs, they allow broader and faster roadside spraying. Other spray rigs have been equipped with fingertip solenoid control mechanisms to enable greater flexibility of small spray bars and spray nozzles. Roadsides which will be treated for fire control will be sterilized. Roadsides which will be treated to reduce mowing will be sprayed with contact herbicides after seed germination and before the resultant vegetation becomes large enough to leave a serious fire hazard. Summer spraying will be required where deep-rooted perennial plants may cause unsightly roadsides.

As in the past, chemical herbicides are continually being evaluated and used in greater numbers to control weeds in landscaped plantings, thus greatly reducing the amount of labor required. A new heavy duty mechanical edger was produced by Headquarters Shop for edging hundreds of miles of ice plant, vinca, ivy or other ground covers and a companion machine which will pick up, grind and redistribute the cuttings from the former machine back into the plantings from which they were taken is now being developed. Landscape maintenance and roadside vegetation control cost $6,929,000 in the past fiscal year.

Lighting, Signals, Electrical Devices

Maintenance of highway lighting, illuminated signs and electrical devices continues to expand at a rapid rate. The complexity of traffic signal equipment continues to increase. The outlook is for more rapid and revolutionary change in the technical complexity of this type of equipment.

During the past year, there has been considerable experience with the inductive loop detector. Loop detectors from three different manufacturers have been installed in the field. Each manufacturer has one, two or more models with different circuitry and different construction. During the year, some of the component parts have been changed to improve the detector. In the field the location of the loop in the left turn pocket is frequently changed to detect and handle traffic better.

In the future much of the division's control equipment will be solid state which will revolutionize controllers and detectors from those of today.

The increases during the fiscal year in highway lighting, illuminated signs, traffic signals and electrical devices serviced by the highway traffic signal and electrical crews are as follows:

The increase in the number of lamps used in highway lighting was 5,651 for a new total of 27,695. Of these, 3,394 were mercury vapor lamps, 1,983 were incandescent lamps and 274 were fluorescent lamps. The mercury vapor lamps vary in lumen output from 35,000 lumens to 6,800 lumens. The incandescent lamps vary from 15,000 lumens to 2,500 lumens and from 1,000 watts to 300 watts. The fluorescent lamps are 96 inches and 72 inches long.

The number of fluorescent tubes and incandescent lamps used in lighting tunnels on state routes increased by 1,243 for a new total of 7,066 lamps. The fluorescent tubes are 96 inches and 72 inches long.

The number of photocells, cadmium sulphide cells, plain and astronomical time switches and series multiple relays used in switching the electrical circuits for highway lighting and tunnel lighting increased by 145 for a new total, 1,463.

The increase in traffic-actuated controllers and railroad and fire station pre-empted controllers was 196 for a new total of 1,675 controllers.

Fixed-time controllers increased by 24 for a new total of 602.

The increase in electrically or electronically operated timers at intersections was 190 for a new total of 1,471.

These timers control the movements of pedestrian traffic in the intersection.

The number of fluorescent tubes, neon tubes and incandescent lamps used in illuminated signs increased by 6,808 for a new total of 19,495.

The number of photocells, cadmium sulphide cells, plain and astronomical time switches used in switching the electrical circuits for these illuminated signs has increased by 12 for a new total of 208.

The number of flasher mechanisms used to operate one-way, two-way, three-way and four-way flasher units on state highways increased by 67 for a new total of 485.

The number of knockdowns of lighting, signal, and illuminated sign facilities increased by 222 per year for a new total of 1,085 per year. A knockdown is where a lighting pole, traffic signal pole, signal cabinet, illuminated sign pole or any other lighting, signal or sign facility is actually knocked down. It also includes situations where the lighting, signal or sign facility is damaged by a car or truck beyond what constitutes regular maintenance.

During the past fiscal year $3,205,000 was expended in maintaining lighting, signals and other traffic devices.

Highway Signs and Pavement Markings

New machines have been constructed by the Equipment Department for use in placing thermoplastic traffic striping. The use of the thermoplastic material on pavement markings has proven quite satisfactory.

During this past winter an experiment was performed on Interstate 80 where three two-mile sections were selected to determine its value and economy of use under actual traffic and climatic conditions. The first section was located at the 1,500-foot elevation, and the second at the 6,000-foot elevation, both on the western slope of the Sierra, while a third was located east of Truckee at approximately the 5,500-foot elevation. These experimental sections consisted of longitudinal grooves in the pavement. The grooves in the four-inch stripe were cut to a depth of one-eighth of an inch with a spacing of one-sixteenth of an inch between grooves. This type of grooving provided a firm base for the hot thermoplastic material. Several types of thermoplastic material were applied with variable results. In some areas the material was practically lost and in others there was a 90 percent retention. It is felt that these methods were much better and more economical than our standard traffic stripe painting, which under sanding operations during the winter months has been completely lost after each storm.

There will be more experimentation this coming winter and it is anticipated that results will be more satisfactory as thermoplastic materials are improved.

In the 1962-63 fiscal year, $2,547,000 of maintenance funds were expended in replacing traffic stripes, pavement markings, repairing and replacing signs.

Communications

The division's statewide radio system at the end of the fiscal year consisted of 1,390 mobile radio units, 200 radio stations, 49 microwave stations and 125 hand-carry units.

Improvements were made in the districts to provide expanded and more reliable mobile radio coverage. The installation of special equipment at Sacramento now provides direct radio contact to all districts. In addition to the use of radio communications in maintenance work, radio is now used in major construction projects, bridge maintenance, geodometer surveys, and materials and research projects.

The division continued operation of its leased, private-line teletypewriter systems. This automatic system, consisting of 20 stations, is connected to all the district offices, Sacramento, and various key departments. The speed of the system was increased from 60 to 75 words per minute. Approximately 3,300 messages were handled per month.

As a continuing winter service the division furnished road and weather information, gathered and disseminated by the radio and teletype system, to news media, radio and television stations, automobile clubs, governmental agencies, trucking concerns and other interested groups. The service was offered from January to May.

Outdoor Advertising Section

As in previous years, the regulation of outdoor advertising displays adja-

A maintenance crew repairs a section of chain link fence on the San Diego Freeway (Interstate 605) in Los Angeles.

cent to public highways unincorporated areas has been administered and financed solely through revenue derived from license and permit fees.

Operations and enforcement activities were maintained at the level compatible with the fee schedule effected in 1959 when the Outdoor Advertising Act was amended to provide, through increased permit and license fees, the revenue required to meet rising costs of operation.

For comparison, records showing the last three calendar and fiscal years are as follows:

Number of advertising operators licensed for each fiscal year:

1960-61	838
1961-62	880
1962-63	884

Number of permits issued during the calendar year:

	Signs	*Structures*
1960	1,115	35,126
1961	972	34,357
1962	1,826	33,258

Gross receipts—license and permit fees and penalties for each fiscal year:

1960-61	$127,104.25
1961-62	124,693.32
1962-63	118,047.78

Permits

During the past fiscal year the number of transportation permits issued for extralegal hauling operations increased some 34 percent over the preceding period. This resulted from the lapse of state authority to issue annual permits for overwidth trailer coaches. This authority was restored by emergency legislation early in the 1963 session and should reduce the workload considerably. The Los Angeles and San Francisco Districts, in that order, continued to handle the largest volume of permits. Military certifications handled during the fiscal year decreased slightly, averaging about 38 cases per month.

The encroachment permit function remained fairly constant with the Los Angeles and San Francisco Districts processing some 37 percent and 14 percent respectively of the statewide total.

Following is a comparison of the number of permits issued for both functions during the past three fiscal years:

	1960-61	*1961-62*	*1962-63*
Encroachment permits	13,151	12,778	12,453
Transportation permits	70,306	75,603	101,542
	83,457	88,381	113,995

In February 1963 high water washed out this section of State Route 102 near Conn Dam in Napa County.

Truck Scales

Plans have been developed by the Office of Architecture and Construction for six new truck scale installations as a part of new freeway construction located as follows:

Little River, north of Arcata on U.S. 101.

Northbound Cottonwood Scale on U.S. 99, approximately one mile south of Cottonwood.

Northbound Castaic Scale expanded to include brake inspection facility south of Castaic Junction.

Banning Scales (replacing the existing ones at White Water) expanded to include a brake inspection facility for westbound movement only.

Dominguez Scales on the San Diego Freeway in Los Angeles.

Montalvo Scale replacing existing facility near Montalvo on U.S. 101.

The Little River, Banning, Cottonwood and Castaic scale installations are under construction and will be completed during the coming fiscal year. The Dominguez installation in Los Angeles was completed in 1962-63 fiscal year. New loadometer pits have been made at several locations through the State where problems in connection with overloads justify their installation.

Maintenance Stations

Contracts were let for new station facilities at nine locations throughout the State. New superintendents' offices, employee cottages, equipment garages and other facilities were built at an approximate cost of $1,108,000. Preliminary work, site selection or land acquisition has been undertaken for 14 new maintenance stations.

Road Closures

Only minor road closures occurred during the first part of the summer from forest fires and minor flash floods in desert areas.

An unprecedented storm hit Northern California in mid-October, depositing up to seven inches of rainfall in Sacramento and heavier amounts in other areas and causing the following road closures:

Caldecott Tunnel (on Sign Route 24)	Oct. 13-16
U.S. 40 Alternate (Feather River Highway)	Oct. 12-16
Sign Route 32 (Deer Creek Highway)	Oct. 13-14
U.S. 395 (at Litchfield near Susanville)	Oct. 12-16
Sign Route 89 (at Blairsden)	Oct. 12-13
Sign Route 44 (north of Viola)	Oct. 12-13
U.S. 299 (Montgomery Creek—Burney area)	Oct. 12-13
Sign Route 36 (Morgan Summit—Susanville area)	Oct. 12-13

Sign Route 16 (Woodland –Sacramento area)	Oct. 12-15
Legislative Route 45 (Willows–Biggs area)	Oct. 12-15
Sonora Pass (State Route 108)	Oct. 12-23
Tioga Pass (State Route 120)	Oct. 13-15

U.S. 50, approximately one-half mile east of Echo Summit, was closed during the last week in November to permit removal of an overhanging rock and reopened to traffic on November 30.

The bridge across the Sacramento River at Rio Vista on SR 12 was closed while the lift span was up on the night of December 18 when dredging operations severed the submarine power cable and was not reopened until December 21.

A heavy ground fog prevailed over most of the Sacramento Valley and portions of the San Joaquin Valley during the first part of January causing numerous delays.

A series of storms occurred during the last week in January and the first part of February, 1963, and caused widespread damage in Northern California. Heavy rainfall occurred up to the 8,000-foot elevation causing exceptionally high water in the Feather, Yuba and American drainage river areas. This storm caused flooding resulting in temporary road closures at numerous locations. Major road closures were as follows:

U.S. 40 (near Cisco)	Jan.31-Feb.
U.S. 40 Alternate Feather River Highway)	Jan. 31-Feb. 3
U.S. 50 (Pacific House–Kyburz area)	Jan. 31-Feb. 1
Spanish Creek Bridge (west of Quincy)	Jan. 31-Feb. 3
State Route 36 (Mineral –Doyle area)	Jan. 31-Feb. 2
State Route 89 (Emerald Bay area)	Jan. 30-Feb. 5
U.S. 395 (north of Bridgeport)	Jan. 31-Feb. 4
State Route 16 (Woodland-Sacramento area)	Feb. 1-Feb. 8
State Route 120 (Big Oak Flat Road)	Jan. 29-Feb. 27
State Route 49 (west of Downieville)	Jan. 31-Feb. 13

SR 128 at the Montebello Damsite was closed due to slides April 14 to April 16.

High water in the Yolo Bypass on SR 16 between Woodland and Sacramento was closed April 8 to April 25.

An earthquake in the Imperial Valley resulted in the May 29 closing of the westbound lanes on the New River Bridge near Seeley and reopening on June 28.

Major Slides and Storm Damage

After the intense October 12 storm, precipitation was meager until late January when a severe storm encompassed Northern California.

The Governor declared a state of emergency due to the extensive damage resulting from the storm.

The Caldecott Tunnel between Berkeley and Walnut Creek on SR 24 was closed due to mudslides and power failures.

High tides along the coast in the Los Angeles area near Redondo Beach caused extensive damage. Numerous slides and high water occurred, closing routes throughout California.

Two slipouts of major importance occurred on U.S. 40 on January 31 between Baxter and the Whitmore Maintenance Station and a washout on this route in the vicinity of Cisco resulted in major damage at this location.

Heavy rockslides occurred on U.S. 50 between Pacific House and Riverton. There was minor damage to embankments due to high water between Susanville and Doyle on SR 36 and loss of embankment near Litchfield on U.S. 395.

Approximately two miles of roadbed were destroyed on SR 49 due to high waters in the Downieville area.

The total damage to highway facilities as a result of the January-February storm was approximately $4,051,000.

Snow Removal

The unusual winter reduced the snow removal and pavement sanding costs to approximately $2,647,000 or 5.8 percent of the maintenance budget.

The October 12 storm caused some temporary road closures due to snowfall at the higher elevations. However, snow in appreciable quantities requiring snow removal from highways in the mountains was not started until the middle of March. The snowpack on Donner Summit at the end of March amounted to 53 inches as compared to an 85-inch snowpack for the preceding season. Additional storms in April increased the snowpack in the Sierra and boosted the rainfall in Sacramento to some 25 percent above normal. The maximum snowpack at Donner Summit was 90 inches on April 20 with some 45 inches remaining on the ground on May 1. Heavy snow and blizzard conditions closed U.S. 40 over Donner Summit for seven hours on April 15 and eight hours on April 19.

Pavement sanding operations in the mountainous areas of the State were aided by the addition of new sand houses at strategic points, either as a part of a major highway project or as maintenance station facilities.

Closing-Opening Dates

The closing and opening dates of mountain roads for which snow is not regularly removed during the winter are as follows:

Route	*Name*	*Closing Date*	*Opening Date*
SR 89	Lassen Park	October 10	May 30
SR 89	Luther Pass	February 1	February 5
SR 88	Carson Pass	December 2	June 4
SR 4	Ebbetts Pass	December 3	May 31
SR 108	Sonora Pass	November 27	June 7
SR 120	Tioga Pass	November 27	May 30
SR 89	Monitor Pass	January 30	May 3
SR 120	Big Oak Flat	January 29 March 14	February 27 May 1

MATERIALS AND RESEARCH DEPARTMENT

Control of the materials purchased and used on state highways is the responsibility of the Materials and Research Department in Sacramento and by 11 district laboratories.

In general, Headquarters Laboratory tests and inspects all products manufactured at locations other than jobsite, carries on research projects, makes foundation studies and special investigations as requested by other departments. The major portion of the work of the district laboratories is the testing required for contract control of materials produced by the contractors, preliminary exploration of materials sites and preliminary investigations of foundation conditions along proposed highway alignments. Headquarters Laboratory performs more than 150 different types of tests while the district units are equipped to do approximately 33.

The various phases of inspection, testing, research, and exploration require approximately 300 full-time persons in the Materials and Research Department. The district employs 340.

The work of the department falls into four general classifications: standard procedures or routine testing; preliminary investigations; research; and training.

Standard Procedures or "Routine" Testing

This accounts for approximately 50 percent of the workload. It covers the task of setting up and controlling the materials for highway contracts—including inspection at manufacturing plants; routine testing in the laboratory; and the final sampling and testing required by the U.S. Bureau of Public Roads.

During the year, 5,146 aggregate samples were received and processed for various purposes, and 260 settlement devices were installed at bridge approaches to expedite the completion of many projects. The final record test program involved 1,862 individual samplings from 1,470 lane-miles of new construction. Aggregate base, subbase, and pavement soil samples totaled 4,366. There were also 6,866 tests on asphalt paving mixtures, and 6,300 portland cement concrete samples taken.

Approximately 11,000 samples of asphalts and road oils were tested in the department's three asphalt laboratories, located at Sacramento, Los Angeles, and Bakersfield.

More than 2,300 tests of various construction materials were performed on steel products, concrete pipe, ceramic tile, waterstop, plastic glare shield, etc.

The following amounts of fabricated and manufactured products were inspected:

Electrical conduit	5,620 l.f.
Clay pipe	120,849 l.f.
Concrete pipe	491,118 l.f.
Steel pipe	625,870 l.f.
Cast iron pipe	1,090 l.f.
Miscellaneous iron and steel	6,676,591 lb.
Guard rail	912,851 l.f.
Treated and untreated timber	769,482 b.m.
Expansion joint filler	456,007 sq.ft.
Rubber waterstop	56,742 l.f.
Corrugated metal pipe	777,708 l.f.
Structural steel	71,643,964 lb.
Reinforcing steel	170,460,062 lb.
Precast, prestressed girders	221 each

The cement laboratory performed about 1,600 tests on 7,500 samples of portland cement concrete, sand, and other materials. More than 600 samples of portland cement, representing approximately 2.5 million barrels of Type II cement, were tested for compliance.

Control readings on stress and strain meter gauges are being recorded on this reinforced steel culvert for design engineers. Readings were taken at regular intervals as the culvert was covered over with a 200-foot-high fill.

The chemistry laboratory made 6,660 chemical analyses on such varied materials as paint, cement, soil, culvert material, thermoplastic, and other materials.

X-ray diffraction equipment was put into operation during the year. In addition to providing research information it was used to determine specification compliance for paints. Approximately 30,000 gallons of paint were rejected because of formulation deficiencies during the first six months of operation of the new instrument.

The 11 district laboratories reported over 130,000 tests for various control purposes.

Preliminary Investigations

The Materials and Research Department is called upon to make studies during the planning and design stages of many projects. Approximately 1,100 materials reports, typical sections, materials handouts, and preliminary reports were referred to the department for review by staff engineers to determine the adequacy of materials data and specifications.

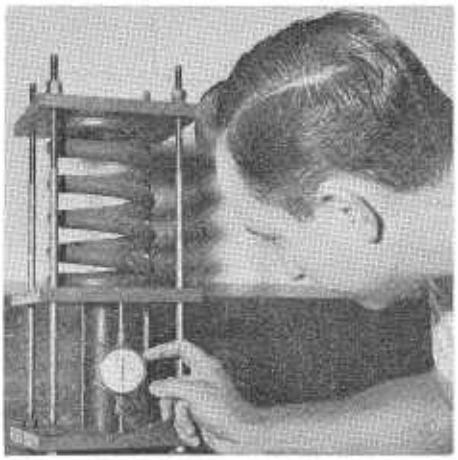
The drill rigs of the department drilled 132 holes, with 2,100 feet for soil sampling, 3,300 feet of cores in rock, and 4,100 feet of rotary drilling in rocky formations during the year.

Foundation explorations included not only highway projects but also several jobs involving state buildings.

The number of geological field studies and geophysical surveys made by the geology unit this year increased considerably. These included cut slope investigations, landslide studies, rippability estimates, materials site investigations, alternate route comparisons, and preparing material to be used in court cases.

The soils mechanics unit prepared 38 comprehensive reports on foundation studies for seven districts, the Bridge Department, and Sacramento County. These studies required the processing of 1,470 soil samples from 274 borings and the performing of 350 consolidation, 1,112 unconfined compression, and 278 triaxial compression tests.

More than 15,000 lineal feet of drains were installed during the year and 47,000 feet of existing drains were



A wide variety of special tests are performed to develop specifications and evaluate materials. Here, a testing engineer makes micromeasurements to determine creep in epoxy resins subjected to axial loading over time periods of up to seven days.

cleaned or rejuvenated. Of particular interest was the work on Interstate Highway 80 east of Baxter, near the Whitmore Maintenance Station, where the extremely wet winter of 1963 produced two major slipout failures which closed the two eastbound lanes of the freeway for several months. In co-operation with District III, 9,500 lineal feet of horizontal drains were installed in the slide area. Large flows of ground water were intercepted which contributed greatly to the stabilization of the roadway. Two large stabilization trenches were designed.

The traveling deflectometer continues to prove useful as an instrument for determining the extent of repair needed to restore wornout roadways. The instrument was used to determine pavement deflections on 35 projects involving 150 miles. From the data obtained with the machine recommendations were made for reconstruction and thickness of the various roadway layers. During the year the machine was rented to the states of Washington and Oregon.

Sound-level studies were conducted at various freeway locations. In cooperation with the Highway Patrol continuing tests were made to evaluate muffler noise. Districts and several state agencies received assistance with other acoustical problems.

Research and Special Investigation

The research activities of the Department were numerous and broad in scope. Approximately 25 percent of the projects were undertaken to solve problems originating in other Division of Highways operating departments.

In co-operation with the Traffic Department studies were conducted to seek better methods for testing reflective materials; extensive tests of new traffic counters were performed; efforts to develop instruments to measure vehicle response to pavements were continued; and further impact tests were conducted to evaluate proposed design changes for median barriers.

In co-operation with the Bridge Department and the University of California instrumentation was provided for the Webber Creek Bridge on U.S. 50 to determine the effect of volume change, corner curling, and stress in steel. Projects were also initiated to study the stresses in a concrete bridge structure over Exposition Boulevard in Los Angeles and in a concrete arch culvert located on the San Luis Reservoir relocation. The arch culvert study included instrumentation of the fill so that pressures around and near the culvert might be determined.

Other projects included studies of ways to prevent corrosion of reinforcing and prestressing steel. Culvert installations using aluminum pipe were observed and evaluated. General research on electrochemical factors of corrosion was continued.

Further progress was made in the investigation of elastomeric bearing pads. Research concerning prestressed concrete fabrication practices was conducted with the co-operation of a local fabricator. Investigations were made to evaluate new methods of bonding concrete to steel in composite construction. Tests were performed to evaluate electroslag welding. The ultrasonic testing of welds was studied; work was continued on welding problems which might be encountered in the use of new low-alloy steels.

Research work on portland cement concrete included two test sections using expanding cement. Other work on concrete included the effects of air-entrained agents, the resistance to cracking, and the effects of other admixtures which have been placed on

This technician is conducting research experimentation on asphalt using the microductility apparatus developed by the Materials and Research Department. The apparatus measures ductility on small samples of asphaltic materials.

the market during the year. A technique for determining the air void system in hardened concrete has been adopted. Mortar tests have been carried on with the American Society for Testing and Materials. Work has continued on the evaluation of various types of pavement markers. Research was performed on paints and adhesives, including thermoplastic traffic paints and a new anticorrosive, inorganic zinc silicate paint for the protection of steel bridges in coastal areas.

A new method of measuring density and of determining maximum density and optimum moisture of soils has been developed and is currently being tested in the field. Studies to relate the effect of earthquake pressure and movements on deep pile footings are being carried on in co-operation with the Bridge Department and the University of California.

Another project being carried out for the department by the University of California involves the study of a method for predicting rock slides by listening to subaudible noise generated by incipient rock movements.

Testing techniques for the analysis of clay minerals and other substances have been developed for use with the X-ray diffraction apparatus.

A new tentative specification for paving grade asphalts has been devel-

oped and presented to the industry. Research is continuing on the development of a test method to measure the resilience of soils. Studies for determining the fatigue characteristics of asphalt concrete are being carried on for the department by the University of California. Work continues on the evaluation of commercial additives to asphalt concrete and several studies have been completed using hydrated lime and other stabilizing agents for the treatment of substandard soils and aggregates.

Training

Sixty Division of Highways engineers, eight Bureau of Public Roads engineers, and four county engineers attended the Materials and Research Department's training course, "Procedures, Testing Methods and Use of Materials for Highway Purposes." In addition to the four regular training courses, a two-day course was held for county materials and design engineers. Thirty-eight engineers attended from 26 counties. The laboratory continues to be popular with foreign engineers, as well as engineers throughout the country. The following tabulation of visitors shows the extent of interest in the work of the department:

168	Division of Highways engineers
9	Bureau of Public Roads and Highway Research Board engineers
38	county engineers
50	engineers from throughout the United States
83	foreign engineers, representing 28 countries
166	high school students and general public
39	engineering students (University of Nevada and Sacramento City College)
553	Total

EQUIPMENT

The primary responsibility of the Equipment Department is the acquisition, maintenance, and eventual disposal, when obsolete, of all automotive and construction equipment used by the Division of Highways. At the end of the 1962-63 fiscal year, 6,710 automotive (including all trucks) and 3,472 maintenance- and construction-type units were on hand.

The Equipment Department is financed by an equipment rental system whereby each department or district is charged a monthly rental for pieces of equipment used. Rentals are based on first cost, salvage value, repair cost, and a percentage of administrative overhead, and are subject to constant review to keep them realistic and appropriate.

The physical plant consists of 12 major shops and 17 subshops which serve the 11 highway districts. The state-owned toll bridges, and the Division of Highways headquarters. These shops also handle special work, such as maintenance and repair of movable-span bridges, pumping stations, ferry boats, light plants, and other items required by the Operations Department. Field forces accomplish emergency repairs on the road.

Research and Training

The technical research and training section investigates equipment operation and construction, fuels and lubricants, and preventive maintenance. The section prepares lubrication charts and maintenance manuals as part of the preventive program. An operating, maintenance, and repair manual was produced for the new cab-controlled traffic striping machine designed and manufactured at Headquarters Shop.

The section also supervised an extensive program of employee training. Special training programs given during the year included a shop mechanic course on alternators used on equipment, and operator training on mechanical features of equipment operation. Employees were encouraged to take training on their own time.

In 1953, a program for training operators of equipment in proper lubrication and preventive maintenance was established by the Equipment Department. This is being continued in co-operation with the Maintenance Department.

Equipment Design and Construction

It is the Equipment Department's responsibility to supply the Operating Department with equipment which will perform efficiently, safely, and economically. To meet these requirements, the Equipment Department is continuing to improve its operations, adding the latest types of equipment developed by industry, and planning, designing, developing and constructing of specialized items needed for the highway program.

The new concepts in overall roadway design as reflected in the routing, lane width, separated grades and landscaping are but a few of the factors that reflect the advance planning of the Division of Highways. These improvements require development of specialized equipment to maintain and service the finished projects.

An interesting example of this changing need is for more efficient snow removal equipment, brought about by the accelerated building of freeways and other multilane roads at the higher elevations.

The practice of allowing snowpack to develop on the roadway is being discontinued; thus it is necessary to remove the snow before a pack develops. Equipment which can remove snow at or near the speed of traffic flow and which will be able to handle increased volumes must be developed.

To take advantage of the more powerful engines now available in trucks, a wider, lighter, push-type plow has been designed and will be placed in service during the 1963-64 winter season. In keeping with the department's policy of standardization, the plow will be adaptable to all but the largest trucks.

Studies on the efficiency of existing large "C" type plows indicated that this equipment should also be redesigned for faster operating speeds. This was accomplished by reducing the weight of the plow and changing moldboard contours to achieve better casting characteristics.

Push-type plows are able to move large quantities of snow to the shoulder area but are unable to stack the material much over five feet in height. As this reef develops, rotary equipment is necessary to dispose of the accumulated snow.

This combination water tanker and roadside spray unit with cab-operated hydraulic spray boom is used for applying liquid fertilizers or soil sterilants.

Plans are being made to develop more efficient equipment for the reef removal phase of the operation. This will include improvements on existing rotary equipment as well as investigation of newer machines and the possible development of new concepts for snow removal.

Emphasis on landscaping and roadside improvement has increased requirements for equipment to maintain and control the vegetation. This includes watering, mowing, edging, and spraying, as well as disposing of the cut material.

Because of the attendant hazard to adjacent cropland, roadside sprayers must be designed to eliminate overspray as much as possible, and must be able to carry large quantities of material. To keep the equipment as versatile as possible, some water tankers are now equipped with spray booms, thus making them a dual-purpose item.

Various types of vegetation are used for ground cover and the prevention of erosion. One of the more popular is iceplant, which grows well in coastal areas. The plant does not require top cutting, but will grow over the curb and into the roadway. To control the overgrowth, an edger has been developed for curbside trimming. Current practice is to pick up and haul the cuttings; however, equipment to grind the material and deposit it back on the roadside is being developed.

Exploration drills are required to operate over unimproved terrain, yet must be able to travel at a reasonable speed between jobsites. To provide the flotation and traction necessary for the off-the-road function, the "duplex" tire is being used for the first time on trucks in this category. Several years of satisfactory use by private industry indicates that these tires are of considerable advantage on certain equipment.

Further improvements have been made to the highway paint striper, including a redesigned steering system, improved pushing attachment and the addition of an outrigger designed to paint lines at 4, 10, 11, 12, and 13 feet. This arrangement permits the painting of barrier lines while using lane lines as a guide. It also makes it possible to stripe seal coats using a previously applied dribble line at the roadside as a guide, thus eliminating the need for "cat tracking."

The addition of a system to transport the beads from the truck to the paint sulky has been made standard on all units. The elimination of the bead container on the sulky improves visibility for the operator, as well as increasing the bead capacity, eliminating frequent stops for bead replenishment.

The two-yard maintenance truck body has been discontinued in favor of a three-cubic-yard capacity body. The new body, although a full eight feet in width, permits the use of the same class chassis.

Improved truck-mounted asphalt heating tanks for the two-ton and four-ton dump trucks have been developed. The tanks use waste heat from the truck engine to warm the material by utilizing a heat exchanger in the tank. This has proven satisfactory, and has eliminated the problem of over-heating (as was the case using exhaust heat from the engine) as well as reducing the repair cost due to corrosion.

A 45-gallon bituminal tank was added to the four-yard maintenance truck which is used in areas where long distances exist between stocks. This tank has a built-in diesel oil tank of approximately five-gallon capacity, and diesel oil is used to flush the lines and hand gun. The air is taken from a compressor driven by the truck engine. Reports received on these units indicate that the combination is satisfactory.

During the past year, the Equipment Department has written specifications for 246 different types of equipment. Specifications are written in a manner to permit the various manufacturers to compete in bidding. A continuation of volume purchasing has resulted in considerable savings. During the past fiscal year, $5,927,514 was expended to purchase automotive and construction units as additional and replacement equipment.

The Equipment Department disposed of 1,030 obsolete units by sealed bids during the 1962-63 fiscal year for a total of $410,000, amounting to approximately 16.4 percent of the original cost of these units.

Procurement of Parts

During the 1962-63 fiscal year, the parts procurement section handled a total of 28,273 requisitions and purchase orders costing a total of $7,993,-

622. Volume purchasing and close attention to needs reduced the number of requisitions required to purchase material by approximately 1,000.

The intershop catalog, showing all critical and hard-to-obtain parts, has assisted in a reduction of inventory. It also has provided flexibility in sending parts when and where needed.

The Division of Highways has been granted a high priority for obtaining surplus items from the U.S. General Surplus Administration. By utilizing this procurement device during the past several years equipment and supplies have been obtained at a small percent of the original cost. In addition, it has been possible to obtain other surplus equipment which has been rebuilt and utilized by the Operating Department. This has resulted in a considerable savings in capital cost on these pieces of equipment.

The Equipment Department also inspects and licenses all of the division's pressure vessels and issues certificates permitting their continued use if in a satisfactory condition. In order to service units which have been added to the Division of Highways' inventory, it has been necessary to license additional inspectors, although no increase in personnel has been necessary.

Buildings and Plants

During the 1962-63 fiscal year, subshops at Burney in District II, at Fairfield in District X, and at Central Maintenance Station in Los Angeles were completed. The land acquired during the previous fiscal year for an equipment storage yard at Headquarters Shop, Sacramento, has been surfaced, fenced, and landscaped. Using this area for temporary storage has enabled the Equipment Department to utilize more fully repair areas which were previously required for temporary storage of equipment.

Funds have been allocated for the design and construction of the new Shop 3 at Linda since the existing shop, located in a rented building, is inadequate. Major repairs at present are handled either in Headquarters Shop at Sacramento, or in the Shop 3 subshop at Truckee.

The existing Shop 4 consists of a two-acre plant area which has been in service since 1920. The plant is too small, and there is no possibility of further expansion at that location.

Land was acquired during the 1961-62 fiscal year for a new Shop 4 in the City of San Leandro. Construction is tentatively scheduled for the 1963-64 fiscal year.

Statistical Section

The Equipment Department maintains a statistical section in its Headquarters Shop for interpreting cost and making adjustments in the rental rates of equipment. Rental charged to the Operation Department for the use of the various units provides the Equipment Department with funds for administration, depreciation, and repair of equipment. The latest revised rental schedule was placed in effect July 1, 1963. This method of accounting is approved by the Bureau of Public Roads and insures that the costs of equipment are fairly distributed to a particular road section or project.

Summary

Equipment Department operations over the past 10 years have grown with the increased workload of the Division of Highways. While inventory value has increased from $14,063,000 in 1950 to $36,718,000 as of June 30, 1963, personnel needs in the Equipment Department have increased only from 570 to a total of 692 in the same period.

EQUIPMENT DEPARTMENT SUMMARY

	June 30, 1962	*June 30, 1963*
Equipment repairs	$4,018,794.70	$4,426,936.80
Miscellaneous expense	645,884.61	659,914.06
Administration and other expense	1,047,247.95	1,210,311.00
Depreciation expense	3,361,477.72	3,912,864.82
Total expense	$9,073,404.98	$10,210,026.68
Total income	$9,163,801.60	$10,144,578.25
1962-63		$65,448.43

INVENTORY

Trucks and Passenger Vehicles

All trucks, ½- to 15-ton	$15,723,233.06
Buses, jeeps and station wagons	409,713.62
Passenger automobiles	4,166,027.83
Subtotal	$20,298,974.51

Maintenance and Construction Equipment

Motor graders	$4,614,585.67
Rotary snowplows (truck mounted)	1,654,605.76
Rotary snowplows (motor grader mounted)	131,649.71
Shovels, power	405,847.71
Loaders	2,262,026.22
Tractors	915,560.34
Snowplows, push	764,677.28
Compressors	375,395.96
Miscellaneous other equipment: rollers, mixers, trailers, pumps, drills, mowers, etc.	5,295,104.51
TOTAL	$36,718,427.67

Administration

The Assistant State Highway Engineer, Administration, exercises control over the following functions: office engineer; city and county projects; service and supply; management analysis; and systems research

OFFICE ENGINEER

The Office Engineer is responsible for a wide range of administrative activities including preparation, review and processing of plans, specifications, estimates, and bid and contract documents; budget and expenditure control; administration of federal funds; industry contacts; bidder prequalification records; reports and statistics; and mail and general files.

Budget and Project Control

Engineering control of the state highway budget involves procedures to insure that provisions and amounts specified in the budget are observed; preparation and processing of contract documents; preparation of financial documents submitted to the California Highway Commission; issuance of work orders; and maintenance of construction records.

During the year 451 financial votes were prepared for commission action; 545 projects were advertised for bids with an estimated cost of $353,163,700; and 501 projects were determined to be satisfactory for contract award.

In addition to the major contract work, the financing of 365 minor and informal contracts with a total value of $586,000 was cleared.

Plans and Estimates

Preparation of projects for advertisement requires reviewing and correlating the plans and specifications to assure that they are in agreement. Estimates of cost for all projects are reviewed periodically prior to opening of bids, and the estimates are adjusted to conform with prevailing construction costs whenever necessary.

Drafting personnel assigned to this unit prepare title sheets for the larger construction projects and location maps for many of the smaller projects; last-minute changes or additions are made to the detail plans for such projects prior to advertising; "as built" changes are placed on the contract plans; standard construction plans, three series of district and metropolitan area maps, various state maps including the road map supplementing the annual report of the division and the progress map, California freeway and expressway system, are prepared and maintained; charts and maps for other units and occasionally for other state agencies are prepared.

A monthly project record-consolidated status estimate, used in conjunction with the progress and payment of all regularly advertised going contracts, is prepared. Various other contract documents are reviewed or prepared. Monthly estimates, varying during the year from 250 to 400, are checked and processed. On June 30, 1963, there were 320 contracts valued at $568,489,800 under construction.

This unit also prepares material information handouts for use by prospective bidders.

Specifications

Specifications were prepared for 545 projects during the year. In addition, specifications were prepared for future projects to expedite advertising for bids when funds are available.

The Division of Highways Standard Specifications for highway projects, placed in use in January 1960, are being revised to include the latest improvements in construction methods and new materials and equipment. The revised specifications are expected to be published and go into effect in 1964.

Reports and Statistics

Statistical records were kept on 501 highway construction contracts awarded during this fiscal year. Records are kept for use in preparation of the quarterly California Highway Construction Cost Index, and for use in forecasting future materials requirements. Weekly and monthly reports for management purposes also are prepared, showing the value of budgeted and nonbudgeted programs, and of other projects for which bids are received. The statistical supplement to this annual report is compiled by this unit.

The contracts placed underway during 1962-63 covered a total of 1,260 centerline miles of state highway, including resurfacing. In addition, the Department of Public Works awarded contracts for construction on 167 miles of federal-aid secondary county roads.

Prequalification of Contractors

Prequalification is required of all contractors who bid on state highway projects estimated to cost more than $50,000. The prequalification rating, representing the maximum bidding capacity for each of the several types of work which a bidder is capable of undertaking, is established from a review of each contractor's statement of experience and financial condition.

The total number of contractors prequalified to bid on the various types of state highway construction decreased from 860 on July 1, 1962, to 835 on July 1, 1963. The combined bidding capacity of these 835 prequalified contractors is $2,532,881,000, which is $84,869,000 less than a year ago.

The following tabulation gives the number of contractors prequalified by the Division of Highways on July 1, 1963, arranged by the several brackets of bid ratings:

Rating	*Number of contractors*
$10,000,000 and over	83
5,000,000 to $10,000,000	141
2,500,000 to 5,000,000	232
1,500,000 to 2,500,000	298
1,000,000 to 1,500,000	355
500,000 to 1,000,000	517
250,000 to 500,000	681
100,000 to 250,000	806
50,000 to 100,000	835

Bids and Bidders

The average number of bidders per project during the year was 5.3, prac-

CONTRACT VALUE RANGE

Range	Number of projects	Percent	Value of projects	Percent
Under $50,000	234	46.7	$4,249,012	1.6
$50,000 to $100,000	62	12.4	4,301,026	1.7
100,000 to 250,000	80	15.9	13,188,699	5.0
250,000 to 500,000	45	9.0	16,029,671	6.1
500,000 to 1,000,000	23	4.6	17,444,986	6.6
1,000,000 to 2,500,000	21	4.2	28,934,441	11.0
2,500,000 to 5,000,000	24	4.8	90,695,405	34.4
Over $5,000,000	12	2.4	88,485,914	33.6
	501	100.0	$263,329,154	100.0

tically unchanged from last year's level of 5.4. The highest monthly average of 7.1 was in February 1962. The low of 4.1 was in August 1962 and June 1963. The contracts awarded during the fiscal year have been arranged in eight value ranges as shown in the accompanying "Contract Value Range" table. Included in the table are the number and total value of projects making up each bracket and the percentage each bears to the total.

STREET AND HIGHWAY MILEAGES

Various highway and street mileages, with which the Division of Highways is directly or indirectly concerned, are shown below:

	Miles	Miles
Total State Highway System (including portions of city streets and FAS System)		16,371
Highways proposed for construction where roads do not exist		2,206
Constructed state highways		14,165
Federal-aid System		
Primary rural (12-31-62)	8,113	
Primary urban (12-31-62)	1,592	
Total		9,705
Federal-aid Interstate System (included in above)		2,177
Federal-aid Secondary System (6-30-63)		
On state highways	3,457	
On county roads	8,836	
Total		12,293
County primary road system (6-30-63)	25,034	
Other county roads (6-30-63)	45,451	
Total county-maintained system		70,485
City streets (estimated 12-31-62)		32,915
City streets on state highway system		1,797

Construction Cost Index

The California Highway Construction Cost Index is founded upon weighted average contract prices for seven principal construction items in place, all referred to the base year of 1940 with a value of 100.

The fiscal year began with a new high index value of 289.1 in the third quarter of 1962, dropped to 232.6 in the following quarter, increased again to 250.4 in the first quarter of 1963 and dropped slightly to 243.7 in the second quarter of 1963. The average value for 1962 is 256.2.

The accompanying graph shows a comparison between the California Index, the Bureau of Public Roads Index and the Engineering News-Record Construction Cost Index. The latter two indices are based on nationwide construction costs and do not reflect the pronounced rises and falls to be found in an index where local conditions are a controlling factor, as in the California Index.

CONTRACTS BY TYPE

This tabulation gives the number of contracts with mileage by types awarded during the 1962-63 fiscal year.

Number of contracts		Centerline miles
26	Portland cement concrete	127.5
174	Asphalt concrete	803.7
6	Road mix	66.1
8	Seal Coat	255.9
2	Grading	7.2
85	Traffic signals and lights	—
27	Bridges	—
104	Miscellaneous	—
432	Total	1,260.4

NOT ON STATE HIGHWAY SYSTEM

County Roads—Federal-Aid Secondary

Number of contracts		Centerline miles
39	Asphalt concrete	148.9
2	Road mix	9.3
2	Seal Coat	3.6
4	Grading	9.0
3	Bridges	—
16	Miscellaneous	—
66	Total	170.8

STATE HIGHWAY MILEAGE BY SURFACE TYPE

TYPE	NORTH			SOUTH			TOTALS		
	Outside cities	Inside cities	Total	Outside cities	Inside cities	Total	Outside cities	Inside cities	Grand total
Concrete	526.287	169.310	695.597	566.777	400.702	967.479	1,093.064	570.012	1,663.076
High bituminous	4,256.773	505.724	4,762.497	3,439.793	614.298	4,054.091	7,696.566	1,120.022	8,816.588
Low bituminous	1,438.225	28.177	1,466.402	865.166	11.521	876.687	2,303.391	39.698	2,343.089
Oiled earth, gravel	515.005	0.714	515.719	600.372	4.329	604.701	1,115.377	5.043	1,120.420
Graded and drained earth	38.345	--	38.345	17.684	--	17.684	56.029	--	56.029
Bridges	70.578	33.761	104.339	33.161	28.636	61.797	103.739	62.397	166.136
Totals—constructed road	6,845.213	737.686	7,582.899	5,522.953	1,059.486	6,582.439	12,368.166	1,797.172	14,165.338
Unconstructed road	1,156.374	143.163	1,299.537	683.646	222.945	906.591	1,840.020	366.108	2,206.128
Total highway system	8,001.587	880.849	8,882.436	6,206.599	1,282.431	7,489.030	14,208.186	2,163.280	16,371.466

STATE PARKS, ETC.

Number of contracts		*Centerline miles*
3	Miscellaneous	—

Federal Aid

A total of $305,256,138 in federal-aid funds was apportioned to California for 1963-64 under the Federal-aid Highway Acts of 1961 and 1962. This included $21,652,107 for primary highways, $10,013,735 for secondary routes, $25,672,496 for urban routes and $247,917,800 for interstate highways. The federal matching ratio on primary, secondary and urban projects is 59.62 percent. On interstate projects the federal ratio is 91.56 percent.

At the start of the fiscal year, construction was in progress on 109 contracts with a total cost of approximately $489,463,000, financed with federal-aid primary, urban and interstate funds in the amount of $374,944,000.

Eighty-one construction contracts involving $16,133,000 of primary funds, $26,764,000 of urban funds and $150,540,000 of interstate funds were completed during 1962-63. These amounts, together with the required state matching funds, bring the combined total cost of such improvements completed during the year to approximately $250,369,000.

Eighty-five contracts were awarded with a total cost of $217,112,000, involving primary, urban and interstate federal-aid funds totaling approximately $166,094,000. Fifty-seven of these contracts provide for improvements on the National System of Interstate Highways with a total cost of $142,129,000 of which the federal share amounts to $127,160,000.

Right-of-way project agreements with the Bureau of Public Roads increased the total of interstate federal-aid funds obligated for participation in right-of-way acquisition costs by $82,460,000 to a total of $440,271,000.

Industry Contact

The industry contact section obtains prevailing wage contract data from contractor and labor organizations; collects information for the establishment of equipment rental rates to be used on force account work; represents the division at hearings of the California Public Utilities Commission concerning dump truck rental and asphalt hauling rates; and processes minor contracts, right-of-way clearance contracts, informal bid and emergency contracts, and service contracts.

Service Contracts: 4,900 service contracts were processed involving a total expenditure of $6,771,000.

This type of contract is used for renting equipment and obtaining a wide variety of services. Its use is confined to work not covered by the State Contract Act and not adaptable to other prescribed procedures.

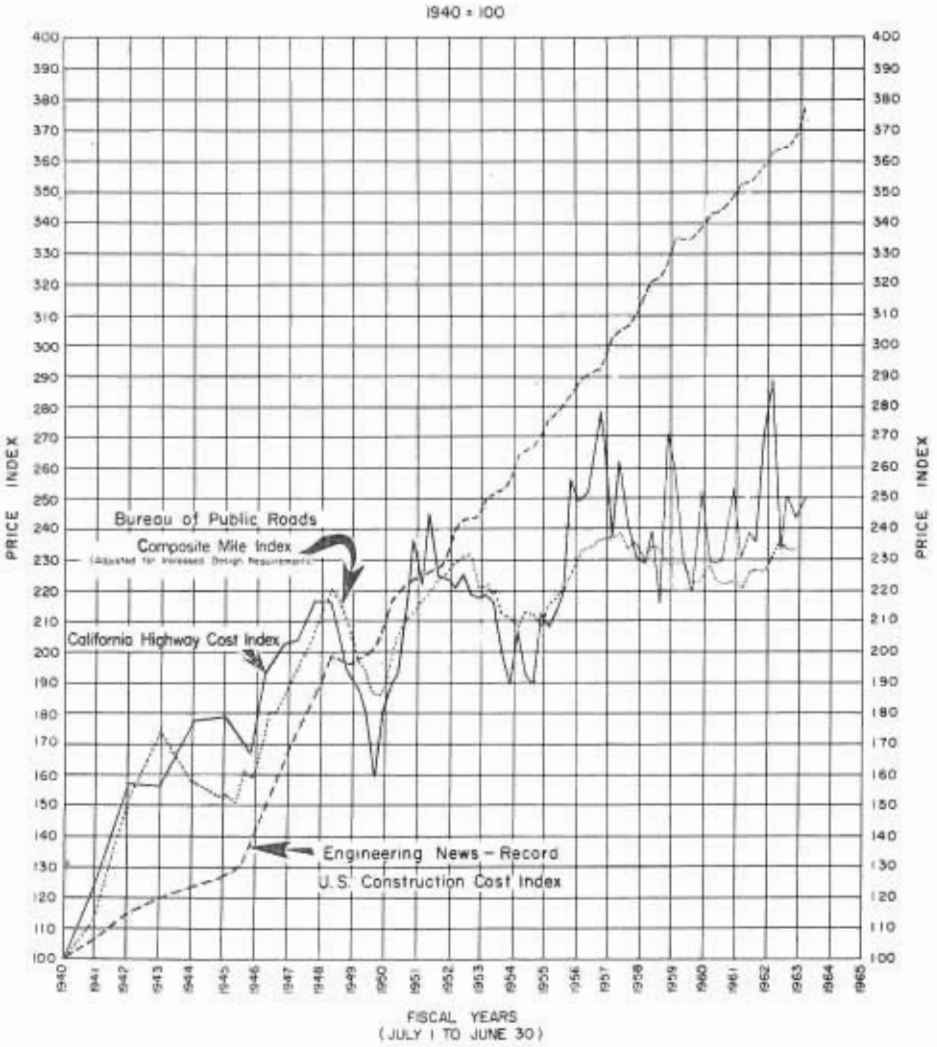
The principal use of service contracts, involving an expenditure of nearly $2,461,000, was for the rental of equipment for highway maintenance, for honor camps, and for occasional day labor projects.

Minor Contracts: Small projects for which the cost will not exceed $5,000 are handled by the districts. A total of 365 minor contracts with a value of almost $586,000 were awarded during the fiscal year, an average per contract of approximately $1,600.

Standard Agreements: Certain types of personal services are obtained under standard agreement. During the fiscal year 102 standard agreements were processed covering such services as appraisers and expert witnesses in right-of-way matters and professional consultants in unusual design and economic investigations.

Right-of-way Clearance Contracts: Contracts awarded to clear rights-of-way in advance of construction included. 477 contracts totaling $724,000 for the demolition of buildings; and 21 contracts totaling $507,000 for altering and moving buildings, relocating irrigation systems and drilling wells.

PRICE INDEX
CONSTRUCTION COSTS



CITY AND COUNTY PROJECTS

Liaison activities in connection with city and county co-operative projects are handled by a unit at headquarters under the Assistant State Highway Engineer, Administration. The head of the unit is titled "city and county projects engineer." There are counterparts in each of the 11 district offices and the Bridge Department.

In addition to the administration of the five-eighths cent of the gasoline tax that is apportioned to the cities, this unit handles liaison activities between the U.S. Bureau of Public Roads and the counties in regard to federal aid secondary projects. This unit also performs administrative and engineering functions concerning county and city construction projects on urban extensions of the FAS system, and flood damage repair projects on the local road and street systems. In addition, it keeps the county road mileage records necessary for the State Controller to apportion funds to the counties from the Highway Users Tax Fund.

(As of September 20, 1963, a select system of city streets and county roads superseded the major city street and county primary road systems under provisions of Senate Bill 344, which provides additional revenue for city streets and county roads.)

City Projects

The Streets and Highways Code provides that five-eighths-cent tax per gallon of gasoline sold shall be allocated annually by the California Highway Commission from the State Highway Fund for expenditures on city streets, on the basis of each city's percentage of the total population of all cities in the State.

The code also provides for the annual allocation by the commission of amounts ranging from $1,000 to $20,000 to each city for engineering costs and administrative expenses in respect to city streets. Since 1961 the code allows cities of less than 10,000 population to use some of these funds for construction.

Funds Budgeted

A total of $46,263,944 was budgeted for city projects during the fiscal year; including $26,809,335 for surveys, plans and construction; $8,928,347 for rights-of-way; and $11,526,262 for maintenance. Funds allocated for engineering and administration amounted to $1,284,500.

State-allocated (five-eighths-cent) funds available to cities for budgeting during this fiscal year were:

Unbudgeted funds in city treasuries and in the State Highway Fund, June 30, 1962	$10,927,652.29
Apportionments during the fiscal year	36,895,189.81
Savings on completed projects and canceled projects and interest and rental receipt accruals	7,374,275.17
Total available for budgeting during the fiscal year	$55,197,117.27
Actual amount budgeted	46,263,944.43
Carryover for budgeting in the 1963-64 fiscal year	8,933,172.84

Major City Street Systems

Each city council is required by law to select a system of major city streets subject to approval of the Department of Public Works. At least three-fifths of the state-allocated (five-eighth-cent) funds must be spent for the construction of streets included in these systems. The remainder of these funds may be spent for the maintenance of any city street.

Master plans being developed by many cities and counties provide a good basis for the selection of these major streets by city councils. During this past year, many cities updated their major city street systems.

During the year, 547 sets of plans, specifications and estimates were reviewed and approved for construction. These plans provided for the improvement of 200 miles of streets at an estimated cost of $31,695,380. To further assist the cities by reducing the time required for plan reviews, the responsibility for the review of routine plans was delegated in January 1963 to each of the districts.

Population Figures, New Cities

Populations of cities, upon which apportionment of state-allocated funds are based, are determined from United States regular or special census figures, modified periodically by estimates of the State Department of Finance and by annexations and incorporations.

The total estimated population of the 382 incorporated cities at the end of the fiscal year was 12,517,780, or approximately 70 percent of the estimated 17,675,000 total state population. The population in cities increased 539,305 during the fiscal year.

There were 1,093 city annexations during the fiscal year. Five new cities were formed by incorporations. The new cities, with dates of incorporation and estimated population, are: Palmdale, Los Angeles County, August 24, 1962, 10,479; Rohnert Park, Sonoma, August 28, 1962, 2,775; Victorville, San Bernardino, September 21, 1962, 8,259; San Marcos, San Diego, January 28, 1963, 2,991; and Vista, San Diego, January 28, 1963, 20,373.

The FAS Program

A major change in the scope of the Federal-aid Secondary Highway Program occurred when the Federal-aid Highway Act of 1962 became law on October 23, 1962. Under this law, California became eligible to expend any of its federal-aid secondary funds within urban areas.

During the 1962-63 fiscal year, 620 miles of county roads and city streets were added to the Federal-aid Secondary System. Most of the increase is attributable to major system revisions in the Counties of San Bernardino, Riverside and Merced. Approval of a major revision in San Diego County was pending at year's end and system studies were being conducted in at least eight others.

While the local system was being expanded, the state highway portion of the FAS system was being decreased 464 miles, reducing the net gain to 156 miles. Virtually all of the decrease may be attributed to transfers of routes to the Federal-aid Primary System.

As of June 30, 1963, there were 12,293 miles of FAS routes, including 8,836 miles on county roads and city streets.

Forty-nine county FAS contracts were awarded during the fiscal year at a total cost of $15,282,279. These

This recently completed widening of Bellevue Road between Buhach and Shaffer Roads in Atwater, Merced County, was financed with federal, state, county and city highway user tax funds.

funds covered construction on 166.721 miles of road and 15 bridges.

Of the federal funds for secondary highways, authorized for the 1963-64 fiscal year, California received $10,-013,735. In accordance with state statutes, 87½ percent or $8,762,019 was reapportioned to the counties. The Division of Highways retains 11 percent of the total allocation for construction on FAS state highways and 1½ percent for planning purposes.

A total of $4,151,028 was provided from the State Highway Fund in accordance with State law to pay the counties' share of the FAS construction projects up to a maximum of $100,000 per county.

The Urban Extension Program

Since 1959 state highway funds have been provided on a matching basis for improving city and county urban extensions of the Federal-aid Secondary System. Selected urban area projects adjacent to others in the contiguous rural area were approved on the basis of anticipated traffic volumes qualifying the sections for development to multilane divided status.

The status of the FASUE program may be summarized as follows:

Fiscal year	*Projects*	*State Funds*
1960-61	5	$861,250
1961-62	10	1,352,789
1962-63	4	376,800
1963-64	9	2,023,925

Twelve projects have been completed, seven are underway and nine are being readied for contract. The 1963-64 fiscal year includes one project utilizing $973,425 of state funds that was carried over from the 1962-63 fiscal year. As of June 30, 1963, 11 additional applications for $3,250,850 in state funds had been received.

The state funds involved in the above 39 projects (including the 11 in the application stage) are segregated as follows: cities $3,317,934, counties $4,547,680.

Flood Damage Repair Program

All projects for which funds were allocated to local agencies according to the 1959 Emergency Flood Relief Law and the Budget Act of 1960 have been completed, with two exceptions. Of the two, one is virtually complete and the other has been suspended pending right-of-way litigation. All projects on prior programs have been completed. Work on local government projects for which funds were authorized by Item 13.6 of the Budget Act of 1962 is proceeding and it is anticipated that these projects will be completed about the end of 1963.

The storms of October 1962 and those of late January and early February 1963 caused extensive damage to roads, streets and bridges in the northwest coastal counties, mountain areas, and in cities and counties around the northern portion of San Francisco Bay.

A "state of disaster" proclamation by the Governor resulted in federal financial assistance being made available by Public Law 875 and the Emergency Relief provisions of Title 23. Public Law 875 funds reimbursed the local agencies for emergency measures to maintain or restore essential public real property damaged by both storms. Federal-aid emergency relief funds were made available toward costs of emergency repairs and the restoration of federal-aid highways damaged by the 1963 storms. State funds activating the Emergency Flood Relief Law to assist local agencies in restoration of damage by both storms were made available by the Legislature through Chapter 81, Statutes of 1963.

At the end of the fiscal year 10 counties, 6 cities, and 2 special districts had applied to the Department

of Finance for a total of approximately $7,400,000 state assistance in the costs of restoration of streets, roads, and bridges. The Division of Highways investigated all street and highway damage and at the close of the fiscal year were filing reports for transmittal to the Department of Finance. By an agreement with the California Disaster Office, engineers of the division also investigated claims of 34 local agencies under Public Law 875 totaling $1,165,471.

County-maintained Roads

Although there were five newly incorporated cities and 1,093 city annexations during the fiscal year the county maintained road mileage increased 457.44 miles during the year to a total of 70,485.13 miles. A total increase of 438.82 miles of county primary roads were approved by the department and the new total is now 25,033.52 miles.

SERVICE AND SUPPLY DEPARTMENT

Since its inception in 1947, the Service and Supply Department has provided many accessory services necessary to the operation of the overall state highway program.

Service

Reproduction—New procedures and equipment are being employed to further the efficiency and utility of this section in headquarters. The blueprint unit processed 7.5 million square feet of prints. The duplicating unit ran 100,000 masters for 15,000,000 impressions.

Many districts as well as headquarters are using the electrostatic photocopying machines that are capable of turning out multiple dry copies rapidly. The convenience and speed of operation of these "automatic" type of duplicators has brought about a decided change in the duplicating habits of the division. A study is being made to ascertain the degree of control necessary for the efficient and economical operation of these machines.

Photography—Headquarters photographic lab processed 1,933 orders (up 18 percent from last year). The orders have more than doubled in the last four years. Changes are now in progress to streamline methods of billing departments and other agencies for photographic services. In order to meet the growing needs for motion pictures, color pictures, and aerial photos consideration is being given to the expansion of facilities.

Record Management—There are 19,427 cubic feet of records now in storage in the Sacramento warehouse, an increase of 6 percent over last year. There were 18,306 references to these records. Two thousand four hundred fifty-five cubic feet reached the destruction period and were sold as scrap paper.

The north record center is now moving into its own building at the Sacramento warehouse site. The south record center has reached its capacity of 4,200 cubic feet of records and provision is being made to increase its size.

Business and Building Services, Property and Building Management—This "housekeeping" function covers many areas. As an example, a study was made to analyze the water used in various districts and headquarters. Reports and recommendations are then supplied to each facility. This enables each facility to treat its water supply so as to eliminate scale and corrosion. The resulting greater efficiency and longevity of equipment will effect large long-range savings to the division.

The review of all requests for service contracts at one central point and comparison of prices in similar areas has resulted in substantial savings, especially in repair of office machines and equipment.

Supply

Procurement—Service and Supply is charged with procuring necessary items at the lowest possible ultimate cost. In order to achieve this objective, the proper choice between direct purchases, local purchases, and warehousing must be exercised. In order to eliminate the additional cost of warehousing, local and direct purchasing have been emphasized where practicable.

In the beginning of this fiscal year, the Department of Finance severely restricted the use of blanket purchase orders for local purchases. In order to minimize the effect of this restriction, the following two procedures have been implemented. (1) Service and Supply successfully petitioned through the Department of Finance to have the limit on cash purchases raised from $4 to $10. This cash purchase procedure saves considerable time and simplifiies recordkeeping. (2) The use of a subpurchase order pad for local purchases is being implemented throughout the division. A pilot test in Districts II and IV has proved successful. The use of this pad will eliminate the need for the local request, the district subpurchase order, the vendor's bill, and the receiving record, thereby substituting one document for four.

As a result of the change in emphasis, warehouse purchases were down 9.8 percent to $5.1 million. Other purchases were up 7.2 percent to $10.4 million. Total purchases were up to $15.5 million as compared to $15.4 million last year. Warehouse disbursements were down 9.3 percent to $5.2 million. Warehouse inventories were down 4 percent to $2.2 million.

Warehouse Operations—In order to expedite the continuing efforts to reduce warehouse inventories, Bridge Maintenance reviewed their needs for steel H piling and beams stocked several years ago to meet emergency needs. As a result, most of this steel has been earmarked for use as state-furnished material on bridge contracts.

There were 34,493 requisitions filled for a total of 117,701 items at the warehouse. This required 14,192 shipments.

In a manner similar to the critical approach used in determining whether items should be stocked in the warehouses, the markups have been reviewed and reduced. The sign markup has been reduced from 10 percent to 6 percent and other items are being reduced accordingly. The overall warehouse markups for June 1963 averaged under 12 percent as compared

pared with 15.4 percent last year. This markup finances office expenses, part of the procurement costs, as well as warehousing, packaging, and freight costs along with costs incurred in disposing of obsolete items.

A contributing factor in the reduction in markups is the growing efficiency of the warehousing operation. For example, more and more items are being palletized, which expedites movement and allows higher stacking with a resulting gain in warehouse area utilization.

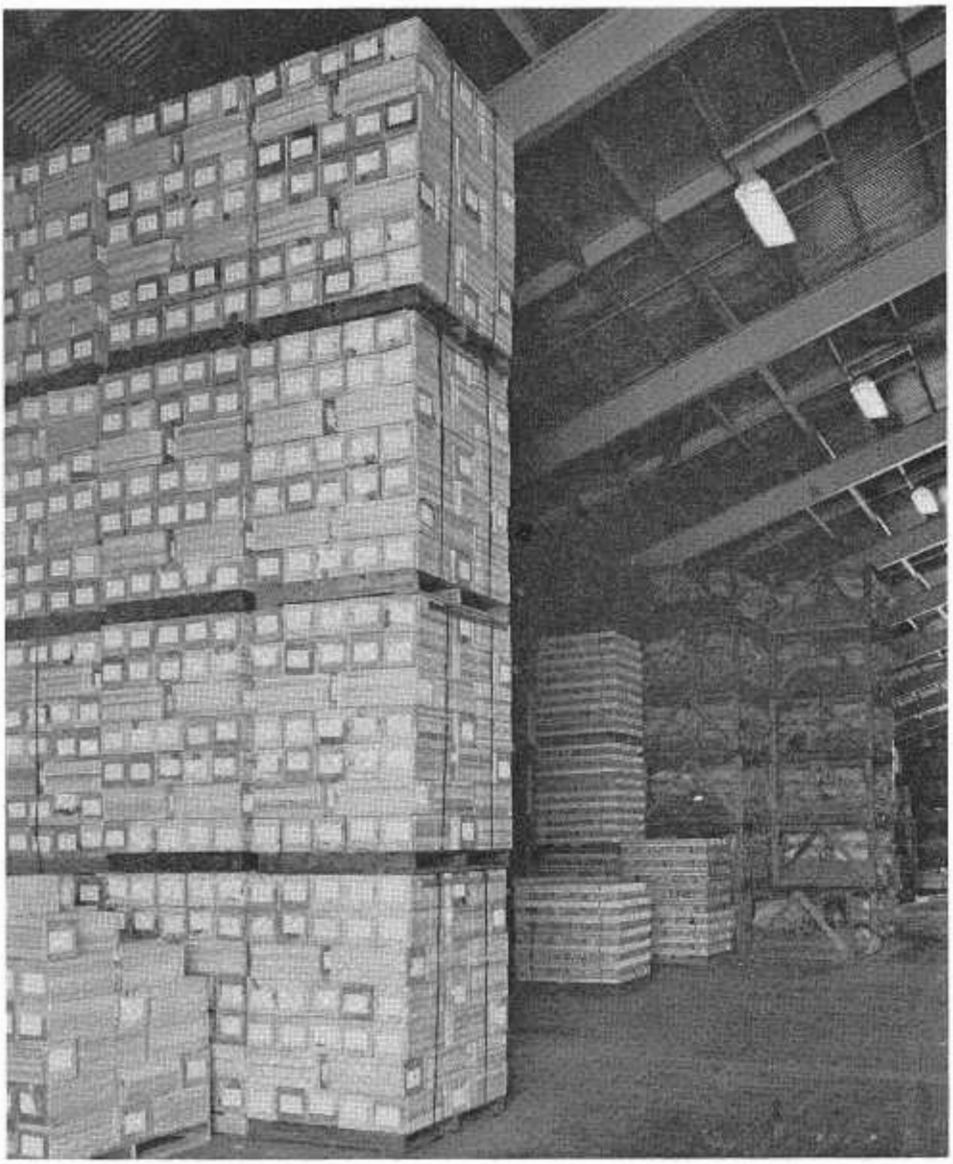
Signs—The sign procurement program has been thoroughly investigated to insure that the methods used are in the best interests of the State. It is tentatively planned to reduce the size of the major sign contract by division into smaller contracts. This will encourage competition. Also discussions have been held with other departments to improve the packaging, shipping, and storage of signs, to insure that sign damage is minimized. The warehouses handled 67,642 signs costing $1,726,000.

Nonrental Budget—The budget for 1962-63 nonrental equipment as submitted to Service and Supply for review was $1,512,000. The revised budget in the amount of $1,000,000 was approved, with an additional $100,000 in the work order reserved for contingencies. The actual expenditures during this fiscal year totalled $891,000. The nonrental inventory as of June 30, 1963, was $15,229,000, up 2.3 percent from the previous year.

Printing—There were 2,568 printing orders processed for the Office of State Printing. In addition, over 150 orders were cleared with the State Printer for accomplishment by private firms.

Co-ordinators—In addition to their manifold liaison duties, the two co-ordinators made a special effort to help the districts dispose of obsolete and surplus material through sales and transfers. This is part of the special effort being made throughout the Service and Supply Department to dispose of all obsolete and surplus items.

Shown is a freeway section of U.S. 50 west of Placerville completed in September. An expressway section west of Camino and a 5.5-mile freeway near Pollock Pines on this route will be completed in 1964.



Palletized stakes, lath and hubs stored at the Division of Highways warehouse in Sacramento.

MANAGEMENT ANALYSIS

The Management Analysis Section undertakes surveys and makes reports at the request of operating departments within the division. Therefore, those projects completed or undertaken during the past year will be only briefly mentioned here, leaving a more detailed description of each study to the requesting department itself.

A study was made to determine whether or not to charge fees for permits for extralegal loads and encroachments on state highways.

In co-operation with the Systems Research Engineer further research has gone into developing and refining work standards to serve as a guide in making manpower projections.

A study for the Materials and Research Department, conducted jointly with the Accounting Systems Section, developed an improved accounting system. Workload guides were developed which will make it possible to estimate future needs more accurately as well as manage day-to-day operations.

A study was made which resulted in an improved distribution of mail within the headquarters office.

Two comprehensive, long-range studies were also begun. The aim of the first study is a more accurate and uniform definition of what should be charged as an administrative expenditure. The second study, conducted in co-operation with the Personnel and Accounting staffs, will work toward developing a more comprehensive personnel and operating expense budget process which could also be extended to the 11 highway districts.

The Management Section also aided in furnishing and gathering information for an outside consulting firm retained by the division to determine ways and means of increasing efficiency through the use of electronic data processing.

During the past year further progress was made on records usage studies for 4 more of the 11 highway districts. These studies are designed to reduce the cost of recordkeeping, save office space, establish uniform filing procedure and provide a plan for handling operations which will require additional space in the coming years.

Savings of more than $49,000 were realized from the divisionwide records program. Nearly a third of these savings resulted from a thorough survey of requests for additional filing equipment.

Continued progress was made in a pilot map study which will provide some ground rules for a systematic review of maps and plans so that obsolete and superseded ones can be removed from the files.

A study of general services functions is being carried on at the request of one of the highway districts with a view to improving the level of such service within reasonable cost.

SYSTEMS RESEARCH

The position of Systems Research Engineer was established in 1961 to study, report and make recommendations concerning the division's engineering costs, production, systems and staffing.

Initial attention has been given to segregating and identifying engineering cost centers through detailed study of the division's coding procedures. Cost data for the 1961-62 fiscal year in the functional areas of planning, design, construction and right-of-way were compiled and discussed with each district to emphasize the need for more accurate recording by employees on input data and source documents and the concurrent need for reduction of charges made to the "undistributed" accounts in each of the primary functions of expenditures.

A revision of the division's Coding Manual was undertaken for better definition of engineering effort areas.

Work was started on delineation of charts showing the relationship of manpower to funds expended or programmed in each district in the areas of preliminary engineering, construction engineering, right-of-way and "other" expenditure groups.

In October 1962 a private consulting firm was engaged to study the manpower and fiscal procedures of the division's electronic data processing operation. For analysis of recommendations made by the consultants, a Division Evaluation Committee was established by the State Highway Engineer at the Assistant State Highway Engineer level. The Systems Research Engineer furnishes liaison and is rendering staff assistance to the committee during the progress of this management survey.

Planning

● *The Assistant State Highway Engineer, Planning, is in charge of advance planning, programs and budgets, design, traffic, and urban planning*

ADVANCE PLANNING

The Advance Planning Engineer is in charge of the Advance Planning and the Photogrammetric Units.

The Advance Planning Section is responsible for processing project reports, co-ordinating route adoptions and freeway declaration procedures, processing freeway agreements, and co-ordinating the Division of Highway planning work with that of other state, federal, or local agencies.

Project Reports

Project reports for 278 proposed projects were processed during the year, 182 of which were major projects.

A project report covers the engineering investigation and analysis of a specific project. This report discusses the need for and the type of the planned highway improvement and how it should be accomplished.

Project reports are required for all proposed improvements. They constitute a control mechanism in planning and budgeting, and provide information for basic design features. They are prepared within the district offices.

The reports are reviewed at the Sacramento headquarters where analysis by various departments is coordinated by the Advance Planning Section after field review. This analysis insures an orderly development of surveys and plans.

Aerial mapping is being used more and more to evaluate topographic controls and expedite the preparation of project reports.

Freeway Routes

Emphasis has been placed for many years on the development of an *integrated system* of freeways. It involves consideration of community values and potential land uses, as well as traffic needs and benefits.

The Division of Highways informs local authorities of the initiation of freeway route studies and of the general features of proposed freeway units as the studies progress. When sufficient information has been developed on a specific freeway project, a well-publicized public hearing is held in the general area to present the results of the study to local officials and the interested public and to learn the local reaction to the project plus any information which may be pertinent to the routing. (Current commission procedural policy, which is contained in subchapter 4 of the California Administrative Code under which the Division of Highways operates in freeway route location matters, is included in the statistical supplement of the annual report.)

Transcripts of proceedings of public hearings, together with reports on the results of conferences, are made available to the Highway Commission for consideration in the determination of freeway routings.

During the 1962-63 fiscal year, the district staffs of the Division of Highways held 51 of these formal public hearings to discuss proposed freeway routings. A number of conferences with city and county officials and their technical staffs were also held, as were several hundred preliminary informational meetings and map displays. The California Highway Commission itself also held 10 public hearings during the year, 7 at the request of the local authorities and 3 on its own initiative. (The public hearings held by both the Highway Commission and the Division of Highways are listed in the statistical portion of the annual report.)

The California Highway Commission had under consideration during the year some 69 freeway projects and adopted routings on 60 of them. These adoptions increased the freeway mileage 419.3 miles, making a new statewide total of 6,622.7 miles of declared freeway as of June 30, 1963.

Looking southward along the James Lick Memorial (Bayshore) Freeway from above the Southern Freeway Interchange in San Francisco.

Freeway Arrangements

Close co-operation between the State and cities and counties resulted in working out and concluding 171 freeway agreements during the year. In some cases, original agreements were replaced by supplemental agreements which incorporated improved design standards or provided for changes in traffic patterns or local planning.

Interstate Highway System

Approval of the U.S. Bureau of Public Roads is required on the final locations of all routes on the Interstate Highway System. This is done for each interstate section after adoption by the Highway Commission.

At the end of the year, the locations for approximately 2,097 miles, about 96 percent of the Interstate System in California, had been approved. This leaves only approximately 72 miles of interstate routing yet to be approved, and 45 miles of this is now under active consideration.

National Forest Highways

The Division of Highways acts jointly with the U.S. Bureau of Public Roads and the U.S. Forest Service in an annual improvement program on California roads designated as forest highway routes. The forest highway network in California covers approximately 2,580 miles, about 77 percent of which is on state highway routes.

The California apportionment of forest highway funds for the 1962-63 fiscal year was $4,726,004. Including funds remaining from previous apportionments, the distribution of forest highway money in the State as agreed upon by the three agencies were as follows: projects on state highways, $5,360,000; projects on county roads, $200,000; system surveys, $250,000.

The Bureau of Public Roads plans, designs, advertises and supervises the construction of federally financed forest highway projects. For projects on state highways, the Division of Highways works with the bureau in the planning and design phases and also obtains the required rights-of-way, including clearance of utilities and options on material sites.

PHOTOGRAMMETRIC MAPPING AND AERIAL PHOTOGRAPHY

Aerial photography is an important aid in advanced planning, design, right-of-way, and traffic studies; it is used to some extent in other phases of the highway program.

Photogrammetric mapping is frequently used during the advanced planning phase in conjunction with the study of possible alternate routes, and is used on most projects for the location and design of adopted routes. Most of this work has been obtained by contract, although a portion of it has been done by the Photogrammetry Unit.

Following is a resume of expenditures for contracts completed during the fiscal year:

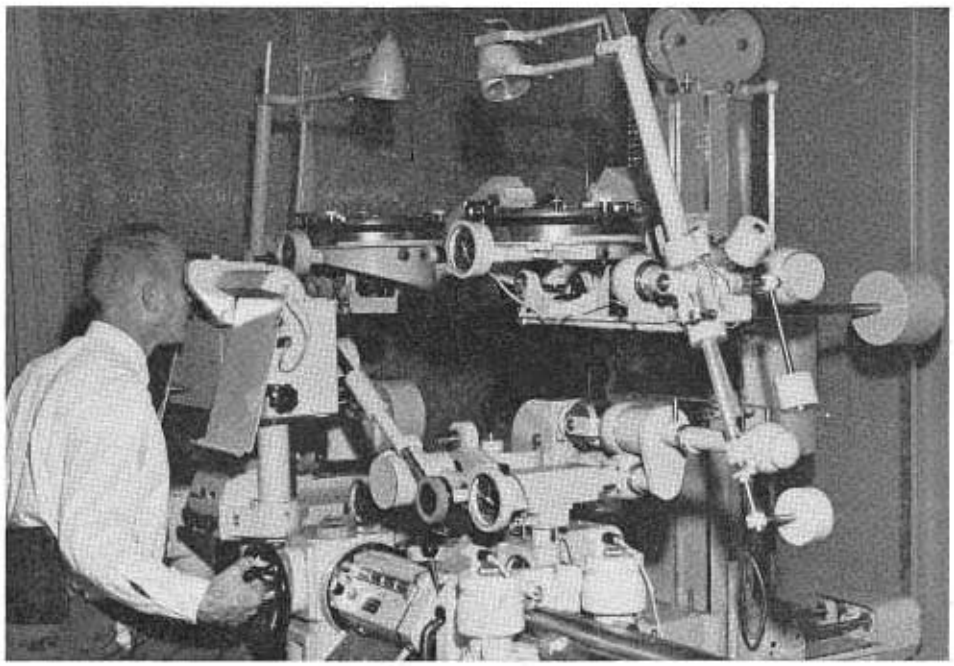
	Contracts	*Highway strip miles*	*Contract amount*
Contour mapping projects for design	16	119.9	$164,677.60
Contour mapping projects for reconnaissance	3	53.2	32,618.00
Stereoplotter rental contracts	26		199,872.65
(Compilation for design)		318.4	
(Compilation for reconnaissance)		111.6	
Aerial photography contracts	19		58,060.01
Aerial photography contracts (blanket)	11		117,063.57
Total			$572,291.83

Another important activity is the taking of photogrammetric cross-sections for particular construction projects. The cross-section data are automatically recorded on punch cards by means of an electronic attachment to a stereoscopic plotting instrument. Five projects, a total of about 28 miles, have been completed this year.

Precision aerial photography of the terrain prior to construction provides a permanent and valuable record which can be referred to anytime after construction has commenced. For this purpose it is necessary to premark or target the staked centerline, or its equivalent, before the photography is taken to insure positive identification of the line.

Developments

Two instruments of significant importance were acquired which permit a greater flexibility of photogrammetric procedure.



The stereoplanigraph, a plotting instrument of great versatility and accuracy, is used for establishing photo control, both vertical and horizontal, by aerotriangulation.

One instrument is known as a *co-ordinatograph*. This is a precision instrument for plotting points according to X and Y co-ordinate values, which can also be used for plotting grid sheets. The accuracy of plotting is about 0.001 inch for individual points. The instrument is now in continuous use for the preparation of photogrammetric map manuscripts, and for the plotting of centerlines prior to the taking of photogrammetric cross-sections.

The second instrument is a *stereoplanigraph*. This is a precise photogrammetric plotting instrument of great versatility and accuracy. In the hands of a skilled photogrammetrist, the instrument is capable of being used for establishing photocontrol, both vertical and horizontal, by a procedure known as aerotriangulation, or sometimes called bridging. The instrumental data produced are in the form of X, Y, and Z co-ordinates for particular points, and the final data are adjusted by an electronic computer program utilizing the principles of least squares.

Another use for the instrument has been developed with the assistance of the District IV Right of Way Department in connection with determining final right-of-way lines. The original research was financed under federal-aid 1½ percent highway planning and research funds. Two projects utilizing this research have been completed this year.

Map Checking

About two-thirds of the total mapping mileage obtained by contract is reviewed photogrammetrically. This is an established service which provides advanced information to the districts as a guide for performing accuracy test surveys by field methods.

Geodetic Distance Measurement

Recent technical developments permit the use of geodimeter equipment as a daylight instrument whereas hitherto it has been strictly a nighttime operation. Five state-owned nighttime operated instruments have been converted to daylight operation. The division now has a total of nine instruments, seven of which can be operated day or night.

Special Project

A contract between the U.S. Coast and Geodetic Survey and the Division of Highways was effected for a geodetic control survey of the San Diego metropolitan area. The purpose of the survey is to establish correct geodetic positions of the intersections of many state highways in this area, and is expected to reduce confusion in future development of the highway routings. The fieldwork is being performed by state forces, and all computations and adjustments will be handled by the Coast and Geodetic Survey.

PROGRAMS AND BUDGETS

The Programs and Budgets Section is responsible for co-ordinating the development of statewide long-range planning programs, preparing the annual state highway budget, scheduling and controlling the advertising of construction projects, maintaining a constant check on the present and future availability of funds, and administering the buildings and plants program.

Planning Programs

Planning program development is a continuing process formalized annually to reflect current data with respect to highway needs, availability of funds, and legislation.

The annual planning program is prepared by each district office for its area. These district programs are carefully reviewed by affected headquarters departments for conformity with established controls and continuity on a statewide basis.

The district programs as adjusted and combined become the formal statewide planning program and are presented to the California Highway Commission for review. The planning program is the guide by which the division's efforts are directed in administering the highway program.

Annual State Highway Budget

The annual state highway budget is prepared using the latest planning program as a guide to project priorities. Many factors must be carefully analyzed to insure the most efficient use of funds. Estimates of revenue from both state and federal sources are made after consultation with other agencies involved.

After allowance for the operating needs of the division, the remaining funds estimated to be available are allocated to specific construction and right-of-way acquisition projects, in accordance with applicable legislative controls, to best serve the needs of traffic and the overall economy of the State. The responsibility for final adoption of the annual budget rests with the California Highway Commission.

The 1962-63 fiscal year budget included approximately $658,000,000 of which approximately $287,000,000, or 44 percent, represented federal-aid apportionments. The budget included nearly $460,000,000 for construction and right-of-way acquisition, providing 255 miles of multilane freeway, 23 miles of multilane expressway, 110 miles of two-lane expressway and 108 miles of conventional highway.

Advertising Schedules

Since California's highway program is operated on a pay-as-you-go basis, careful scheduling of expenditures is necessary to insure solvency of the State Highway Fund.

Revenue comes from two sources, state highway-user taxes and fees and federal-aid subventions. User taxes are received monthly and motor vehicle fees annually, and can be estimated rather accurately. Federal-aid revenue is received on a reimbursement basis and is therefore dependent on the rate at which projects which are financed in part with federal funds are placed under construction. Great care must be exercised to maintain a balance between federal-aid and regular state highway projects to insure that expenditures do not exceed revenues.

To maintain a steady flow of construction work throughout the State and thus make the most efficient use of both state and contractors' personnel, the Programs and Budgets Section maintains a close liaison with the various district offices to co-ordinate the many functions necessary to eliminate delays in completion of plans, acquisition of right-of-way and clearance with other agencies.

Buildings and Plants Program

During the fiscal year, construction was begun on a new branch laboratory for the Materials and Research Department at Los Angeles and an addition to the District I office building in Eureka. Funds were provided for acquiring additional land for expansion of the District VII office building at Los Angeles, the District XI office building at San Diego, and for the construction of a District VII laboratory building at Los Angeles. Maintenance stations at Kyburz, Tarzana, McGee Creek, and Crestview were constructed or enlarged.

Plans were being developed and/or property being acquired for new maintenance stations or additions at South Sacramento, Eureka, Redding, Mott, Lake Valley, Elk Grove, Redwood City, Napa, Santa Maria, Bakersfield, Tarzana, Newhall, Yucca Valley, Mountain Pass, Riverside, Crestview, Tracy, Lodi, Chula Vista and San Diego.

DESIGN

To keep abreast of steadily increasing usage of the state highway system, the Design Department of the Division of Highways is continuously engaged in the development of new methods and standards. As a means toward evaluation of current practices, completed jobs are inspected and operational reports are prepared for each new section of highway opened to traffic. These reports cover field review of every detail of highway design and the success of each feature under actual operating condition. Such items as drainage features, roadway delineation and aesthetics are checked and overall traffic operation is noted.

A second source of information is the reports of studies made through the Bureau of Public Roads, the Highway Research Board, the American Association of State Highway Officials, the Western Association of State Highway Officials and other allied technical or commercial sources. These reports cover all phases of highway operation. Notably there were the AASHO Road Tests. A current study includes the use of atomic power for roadway excavating.

New information relative to driver behavior and design practices is analyzed and where improvement can be accomplished, new instructions are issued. During the 1962-63 fiscal year 18 such instructions were issued relating to design features.

Another responsibility of the Design Department is the co-ordination of design activities with the Bureau of Public Roads in regard to development of the federal-aid systems. Close liaison with bureau officials is maintained in obtaining clearance of federal-aid projects and to facilitate review of any unusual situations which would require deviation from standard practice.

Geometric Design and Plan Preparation

Each interchange location or design situation presents individual circumstances, usually with some unique features. This requires constant attention to detail and consideration of areas where standards can be improved. Notable among the past year's developments are the following improvements:

a. New standards for freeway entrances and exits were developed.

b. Sight distance requirements were revised as a result of the lower profile of recent passenger automobiles.

c. The development of improved standards for providing more efficient traffic service at major freeway-to-freeway interchanges is under investigation.

d. A study is underway aimed at increasing the basic width of medians on divided highways.

During the year, 593 interchange or intersection locations were submitted by the districts and cleared by the Geometric Design Unit. There were 171 freeway agreements examined to insure that the final geometric design patterns could be developed in conformance with accepted practice. In addition, 57 requests for new freeway connections were processed and the necessary data prepared for presentation to the California Highway Commission. Twenty-six locations for bus stops, truck weighing facilities or safety rest areas were considered, and the geometric designs for these have been completed.

In the 1962-63 fiscal year, plans for 360 projects including 6,400 sheets of plans were processed through the Contract Plan Unit of the Design Department. Standardization of plans and conformance to established planning and design concepts are the responsibility of this unit.

Structural Design of the Roadbed

The Structural Design Unit is concerned with all the structural aspects of the roadbed, including thickness of base and surfacing and the selection of the most economical pavement type. During the past fiscal year a revised procedure was developed and has now been adopted for the economic comparison of alternate types of pavement for each project. This procedure underlines a growing trend toward greater emphasis on the use of economics and documentation in the selection of alternate materials.

Approximately 200 structural sections were investigated during the year, covering such features as documentation of pavement type, availability and quality of materials, side slopes, drainage and foundation treatments.

Frequently field observations are made to determine the effectiveness of current design. Features of portland cement concrete pavements studied included the performance of various joint spacings, extension of treated base layers beyond edges of pavement and the correction of faulted slabs by grinding methods. Another current study concerns the properties of thick asphalt concrete designs which have been used at selected locations throughout the State.

Drainage and Co-operative Agreements

Each project is investigated as plans near completion to insure proper drainage, and new techniques for improving drainage practices are constantly sought.

For example, in co-operation with the Materials and Research Department, the use of aluminum culverts is being investigated.

Also, in co-operation with the Bridge Department, new tables for computing the allowable height of fill over corrugated steel culverts based on the ring compression theory are being prepared coupled with changes in bedding and backfill requirements relative to height of fill and size of culverts.

The construction of freeways and the rapid growth which the urban areas are experiencing necessitates constant drainage improvements which benefit both the State and local developments. These improvements are performed under co-operative agreements. Highway funds are used for area improvements in proportion to the benefits accruing to the highway facility.

Special Studies

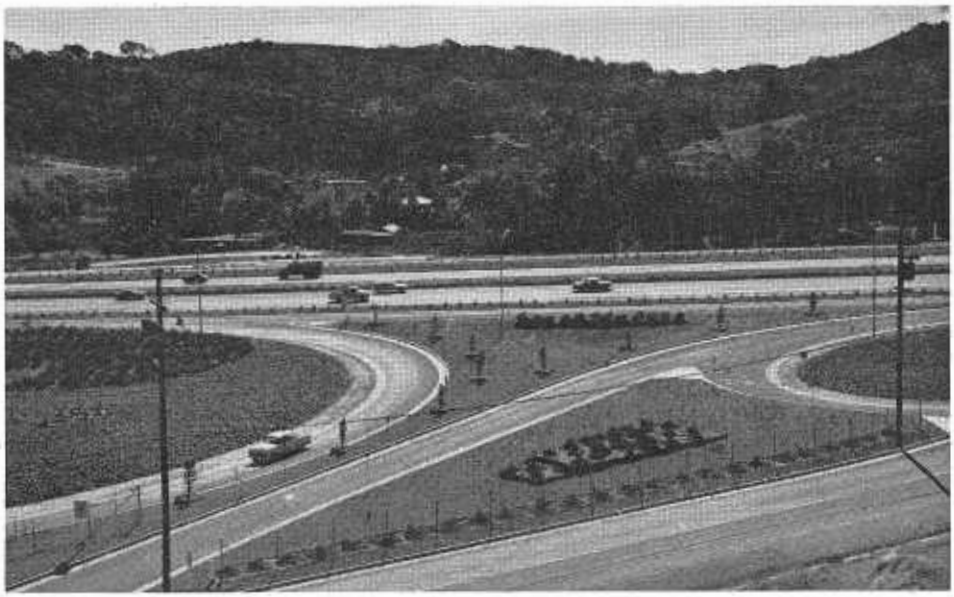
During the past year encouraging results have been obtained by the critical path method of programing design activities. In the field of data processing, a new program has been developed for plotting cross-sections using electronic equipment. This process is in the developmental stage; however, the program is expected to provide a useful service.

Another function of the Special Studies Unit is to keep close liaison among the various districts. As new techniques are developed they are introduced into all the districts as quickly as possible. One such process which has received considerable favor throughout the State is the use of the dropout reproduction process.

Highway Aesthetics

Highway aesthetics have always been considered in the development of plans for California's highways. This is evidenced by the flattened and rounded cut slopes and the aesthetic consideration in structure design. The recent expressions by the legislators through the investigation aimed at a scenic highway system for California, a roadside rest system and the consideration of special recreational and scenic elements to be incorporated into the design of the Westside Freeway have placed a renewed emphasis on the amenities in highway design.

The Design Department is meeting this emphasis by the addition of such features as contour-graded interchanges and increased attention to the impact of drainage and other structures on the highways' appearance. This aspect of highway design receives diligent consideration throughout the design processes.



The Lafayette Bypass landscaping showing paved traffic islands with shrubs massed in geometric patterns. This treatment provides adequate sight distance for the motorist and at the same time minimizes maintenance costs.

Roadside Development

The Roadside Development Unit is concerned with the contour of the roadside and the type of planting for erosion control or related measures which contribute to a pleasing and natural roadside appearance. Planting must be consistent with public safety and properly designed for ease of maintenance. This unit is headed by a landscape architect.

Thirty-seven planting projects were processed during the fiscal year.

To take advantage of price benefits realized by performing certain preparatory landscape work under major construction contracts, all typical cross-sections for highway projects are studied by the Roadside Development Unit. Preparatory landscape items include such work as temporary erosion control, contour grading, deep cultivation, topsoil, paving island points and other areas too confined for planting, and placing water lines and conduits under roadways for future irrigation systems. This unit also assists in preparing the specifications for all erosion control work to be performed under construction contracts.

Most of the plant material is furnished by the contractors from commercial sources. A major portion of the state-furnished trees and shrubs also are purchased by the State from commercial nurseries. In many cases a contract to propagate and grow such plants is entered into between the State and a commercial grower. When the plants have reached the proper size they are delivered to the state nursery near Davis or to the holding yard in Los Angeles, where they are picked up by the various contractors.

Some plants not generally popular for garden use and therefore not grown by commercial nurseries but which have proved adaptable for roadside use are propagated at the state nursery. Also many freeway planting projects require larger quantities of certain plants than commercial nurseries are willing to grow without definite commitments. These, along with plants for experimental purposes also can be better furnished by the State.

Representatives of the landscape units continue to meet with beautification or improvement committees of

various communities in order to promote mutual understanding and acceptance of the overall roadside development program.

During the fiscal year, 31 contracts for landscaping, functional planting and tree planting were financed at an approximate total cost of $4,111,-252. These projects involved the planting of approximately 184,350 assorted trees and shrubs and 5,648,000 ground cover plants and cuttings.

TRAFFIC

Motor vehicle travel on the state highway system in 1962 was approximately 36.4 billion vehicle-miles, an increase of approximately 5 percent over 1961. This represents approximately 47 percent of the total motor vehicle travel in the State.

Nearly half of the travel on the state highway system was in the cities. Freeways totaling only 1,152 miles of highways accounted for 14.4 billion vehicle-miles, or 40 percent of the travel on the 14,168-mile constructed state highway system and 18.5 percent of the total motor vehicle travel throughout the State.

Average accident rates on the state highway system in 1962 were as follows:

	Total accidents per million vehicle-miles	*Fatal accidents per 100 million vehicle-miles*
Urban conventional	5.26	3.71
Rural conventional	2.53	9.10
Urban freeways	1.55	2.63
Rural freeways	1.22	4.88

Before January 1963, only those accidents occurring on the rural state highway system and on rural and urban freeways were coded and key punched for electronic data processing. Starting with 1963, all accidents on all state highways are being coded, regardless of rural or urban area or access control classification. This has doubled the number of reports being coded, from approximately 56,000 in 1962, to a projected 110,000 or more in 1963. At the same time, the information being coded and the coding procedures have been revised to improve efficiency and to tabulate more meaningful and useful data.

Research on Safety and Traffic Operation

Some highway safety research projects currently underway are:

1. Evaluation of minor improvements and development of criteria to predetermine their probable effectiveness at other problem locations.
2. Ways of preventing wrong-way driving on freeways and their connections.
3. Comparison of similar freeway sections to determine reasons for dissimilar safety records.
4. Before and after evaluation of median barriers.
5. Relation of ramp types to accident rates.
6. Multiple-vehicle accidents in fog.

The safety evaluation of minor improvements is a continuing study. An interim evaluation in 1962 indicated that minor improvement projects have been successful in reducing accidents at many problem locations. Those projects studied to date have averaged a 32 percent reduction in the number of accidents, notwithstanding increased traffic volumes.

Phase 1 of the study of wrong-way driving on freeways has been completed—the analysis of wrong-way incidents reported by the California Highway Patrol for a nine-month period in 1962. The study indicates that the wrong-way driving problem is greater than originally believed. Since 60 percent of the wrong-way drivers on freeways were found to have entered at offramps, special emphasis is being placed in the second phase of the study on measures to prevent this infraction. Pavement arrows have been painted at the offramp terminals, and several problem locations have been further improved by signing and channelization. Special signs are being tested at the University of California Los Angeles driving simulation laboratory and special devices such as retractable directional barriers will be tested.

Research continued on several phases of freeway operation to develop relationships between traffic operation and geometric design. Studies in progress include the evaluation of the effects of trucks on highway capacity being conducted by the Institute of Transportation and Traffic Engineering in co-operation with the U.S. Bureau of Public Roads. The Traffic Department has issued a report (Traffic Bulletin No. 4) summarizing freeway capacity studies to date and discussing the various aspects of capacity related to design.

A special research study was made of delay to traffic due to lane closures

An experimental illuminated sign with a changing message to warn fast traffic of a stop or slow moving traffic ahead at the signalized intersection of U.S. 50 and Sign Route 33 near Tracy.

during construction. This study involves the observation of traffic backups on various freeways, mostly in metropolitan areas, when a lane is taken out of service due to widening, repairs to structures, or resurfacing of the freeway itself.

Traffic Counting

The mechanized traffic census program adopted in 1961, while yielding much more data on all traffic, produces no vehicle classification information. In June 1963, a new manual truck classified count was initiated to update the previous 1960 truck data. Although less extensive than the 1960 and prior manual counts, it will suffice to establish new truck data in each axle classification on all state routes. Information from the 1963 counts will establish truck patterns in the two-axle, three-axle, and four-or-more axle classification.

Research and testing are being continued on various types of traffic detectors for traffic counting. A mechanical truck counter is also being developed by the Materials and Research Department which will classify vehicles automatically by number of axles. If successful, it will replace manual classification counting. A prototype of the counter was constructed by and is in use in one district.

Traffic Signals and Illumination

Contract plans were completed for 137 new traffic signals and modernization of 136 existing signals. Contract plans were also completed for 4,718 lighting standards and 392 illuminated traffic guide signs. The total estimated cost of the electrical work was $7,374,741, not including the cost of steel sign structures.

A total of 169 traffic reports reviewing conditions at approximately 416 intersections were made to determine the need for traffic signals and lighting.

Research projects completed include the following:

1. Research by a private firm to develop a nuclear-energized self-luminous highway directional sign.

2. Development and installation of fluorescent lighting fixtures in the pavement for illuminating the underside of trucks at truck weigh station inspection areas.

3. Development of a rotating-type changeable message sign for use at truck weigh stations and for lane control.

An installation of a new expressway-type traffic signal was completed at the junction of U.S. 50 and State Sign Route 33 (Bird Road) near Tracy. A large overhead changeable message sign placed in advance of the signal reads "PREPARE TO STOP" when the motorist will be required to stop, even though he may see the signal ahead is still green. This gives the motorist advance notice of a coming change in the signal. Immediately after the signal turns green again for the expressway, the sign changes to "SLOW TRAFFIC AHEAD" to warn approaching motorists that traffc at the signal is just beginning to accelerate.

This installation has been effective in preventing accidents.

Traffic Regulation and Control

During the fiscal year, studies were made in connection with the proposal for renumbering the state highway system to eliminate the long-standing multiplicity of various route designations for legal, administrative and traffic purposes. Senate Bill No. 64 providing for renumbering of the state highway system was signed into law by Governor Edmund G. Brown on May 14, 1963. Changes and elimination of some U.S. route numbers were recommended to the American Association of State Highway Officials and approved by that body in June.

Upon completion of the inventory of existing highway signing which began last year, a schedule was established for systematic revisions of state highway signing to comply with the 1961 National Uniform Manual for Traffic Control Devices. This is required by the Bureau of Public Roads for all federal-aid highways.

Traffic control measures taken during the year included:

1. 138 restricted speed zones were established and 37 speed limit orders were rescinded, resulting in 117 additional miles of speed restrictions on state highways.

2. 67,642 signs were approved for installation, comprised of 25,738 warning signs, 14,750 regulatory signs, 14,444 guide signs and 12,710 miscellaneous and construction signs.

A continuing function is the review and processing of traffic regulations initiated by cities, counties, and the districts involving parking, turning movements, and one-way operation of streets in the state highway system.

URBAN PLANNING

The Urban Planning Section was formed on July 1, 1962, as part of the division's growing concern in urban transportation planning. Its first project was the preparation of the "Prospectus for a San Francisco Bay Area Transportation Study" in conformity with Senate Concurrent Resolution No. 20 (1962). This was submitted to the Legislature on October 30, 1962.

Highway Planning Survey, charged with statewide and special planning studies, was combined with Urban Planning on November 1, 1962. The consolidation of the two sections increased the resources available for urban transportation planning without lessening consideration of rural highway planning.

Four general units comprise the new department: Urban Transportation, Highway Inventories and Legislative Reports, Research and Special Studies, and Electronic Data Processing. The Planning Library, which serves the entire Division of Highways and the director's office, also is included.

The 11th Annual Western Association of State Highway Officials Planning Conference was sponsored by California in San Francisco in July 1962. It was attended by highway planning officials from the western states and by representatives of the Bureau of Public Roads.

Urban Planning Studies

The Federal-Aid Highway Act of 1962 demands that a continuing comprehensive urban transportation planning process be underway in California's 11 urbanized areas by July 1965. Results are now being analyzed and procedures to meet the requirements are being formulated.

State highway planning, financed by the Bureau of Public Roads, and the local planning financed by the U.S. Housing and Home Finance Agency have been co-ordinated through a close working relationship with the State Office of Planning, which administers HHFA grants, and the federal representatives of the HHFA and BPR.

A two-day conference on urban transportation planning for local, state and federal officials responsible for planning and engineering, was held in Sacramento in February 1963.

Looking west at the recently completed Crosstown Freeway in San Diego from above Balboa Park.

Metropolitan Transportation Studies

Major efforts were devoted to work on the Los Angeles Regional Transportation Study (LARTS). Progress for this long-term study has included improvements in methodology and computer programming and the completion of the processing for an initial development and assignment of traffic to a 1960 system of streets and highways. The assigned traffic data included the results from a 1960 truck survey, a 1960 external cordon survey, and simulated trips for all internal residents of the study area. The combined trips for an average weekday totaled 14.1 million and represented 84.5 million vehicle miles.

Processing of network data for obtaining trips, developing routes and obtaining traffic volumes required an average of about 200 hours of computer processing per month throughout most of the year. These extensive calculations included the processing for the calibration of the 1960 traffic simulation model, the final 1960 trip simulation and assignment, and, the development of a 1980 street and highway network.

In co-operation with the Bureau of Public Roads and District I (Eureka), the transportation phase of the Eureka Area Planning and Transportation Study has been undertaken at the request of the City of Eureka and Humboldt County.

Statistical and Nonmetropolitan Studies

Field operations were begun in June 1963 for the loadometer (truck weight) study which is conducted each year in co-operation with the BPR. The survey was expanded this year to collect additional information necessary for the development for axle weight trends, trip characteristics, and vehicle classification information. Trip characteristics involve type and location of terminal, trip length, and commodity carried. These data are useful in estimating intercity ton-miles and for comparisons of ton-miles between highways and other modes of transportation.

The data handling and statistical reporting unit took part in the continuing studies of pavement life, interstate traveled way, and other studies reported to the BPR. It also has taken part in special studies, such as a pavement evaluation study for the BPR and outdoor advertising legislation for the State Legislature.

The status of highways and the federal-aid log were changed to accommodate the renumbering and revision of the federal-aid systems and, at the same time, the federal-aid logs were improved.

Highway Inventories and Legislative Reports

Updating the state highway inventory was continued on a statewide basis. Capacity adequacy ratings for

all projects were recomputed as new data became available from project reports, planning studies, and final reports.

Legislative studies completed included:

Senate Concurrent Resolution No. 4 (1962) which recommended that the Legislature designate nearly 5,000 miles of California roads as "state scenic highways." This report was submitted to the Legislature in March 1963. The Department of Public Works co-ordinated the study in collaboration with the Departments of Conservation, Parks and Recreation, Water Resources, and the State Office of Planning. The scenic highway system was described in the March-April 1963 issue of *California Highways and Public Works*.

S.C.R. 6 (1962) was a study of feasibility of a Humboldt Bay crossing. This study gave cost estimates for various bridge crossing proposals.

S.R. 26 (1962), concerning the development of recreational areas along rivers where crossed by bridges, made recommendations in regard to the provision of recreational facilities.

As the result of a request from the Senate Fact Finding Committee on Transportation and Public Utilities, a master plan and estimate for a system of roadside rests (safety rests) in California was completed.

In November 1962 a final report was submitted to the Legislature on the feasibility of renumbering the state highway system, as requested by the Legislature through S.C.R. 8 (1962). Following passage of Senate Bill 64, which requires renumbering the state highway system, work was continued on the many far-reaching changes in mapping, in administrative recordkeeping, and sign installations. The provisions of S.B. 64 become operative on July 1, 1964. It will eliminate the long-standing multiplicity of various route designations for legal, administrative, and traffic purposes.

Necessary preliminary work was started for several periodic studies for the Legislature, such as the State Highway Needs Study, the City Street and County Road Deficiency Study, and the review of the California freeway and expressway system and the state highway system.

Monthly reports on the status of completion and development of the interstate system and the California freeway and expressway system have been initiated.

Research and Special Studies

Co-ordination of research financed under federal-aid 1½ percent planning and research funds was continued. These activities involve not only division personnel, but also contracts with universities and private consultants. In conjunction with the BPR, new procedures to attain better control and information on research under way were adopted.

Special studies for the BPR covered the use of certain lanes exclusively for mass transit (buses), and an analysis of cost and other effects of resurfacing with various thicknesses of asphaltic concrete.

Interstate system studies are continuing. Various highway features have been reviewed with respect to their accident incidence and traffic characteristics in order to aid in refining geometric design standards. Another study was the listing of recreation areas adjacent to interstate routes.

Electronic Data Processing

The Data Processing Unit is a balanced processing center with EAM (electronic accounting machines) and EDP (electronic data processing) equipment, as well as some data transmission facilities to the Los Angeles area. Nearly all of the data processing for Headquarters Office and district offices are handled by this unit.

A wide variety of data was processed throughout the year, including engineering computations, accounting, LARTS origin and destination studies, freeway studies, traffic data, personnel records, bridge design computations, accident data, statistical data, and Division of Architecture accounting. During the past year the engineering computations, accounting, and traffic studies (including LARTS) were the major users of the equipment; these three areas accounted for 80 percent of the available production time of the computers.

In comparison with the previous fiscal year, engineering computations decreased 18 percent in volume, accounting increased 311 percent, and traffic studies increased 44 percent. Part of the decrease in engineering computation time reflects completion of reprograming IBM 650 work to the IBM 704 unit. The large increase in accounting reflects assignment of the IBM 1401 unit acquired the previous year to almost full-time accounting work in order to reduce backlog.

Through co-operative effort with the Fiscal Management Department and the districts, reporting of monthly accounting transactions through the EDP system was greatly improved over the previous year.

A team of consultants spent the last eight months of the fiscal year studying the division's operations. Particular emphasis was placed on the accounting and data processing work with a view to streamlining the operations and organization. At the same time new areas of applications for data processing techniques and equipment were investigated and reports submitted by July 1, 1963. The study has resulted in a decision to place key punch equipment in the district offices for the input of accounting data. Additional results of the study may be expected in the year ahead.

Bridges

The Bridge Department is under the administration of the Assistant State Highway Engineer—Bridges and is responsible for the design, construction and maintenance of all bridges and structures on the state highway system

A branch office of the Bridge Department is located in Los Angeles to maintain liaison with southern area districts, perform planning functions and supervise construction and maintenance of structures within these districts. All other functions, including design work, are handled at headquarters in Sacramento.

The department is divided into five sections—Planning, Operations, Special Studies, Office Engineering, and Special Projects. The maintenance and operation of state-owned toll bridges have also been under the administration of the Bridge Department (until November 18, 1963; see page 57).

BRIDGE PLANNING

Advance Planning

The Advance Planning Section's work of bridge site investigations, preparing preliminary design reports, reviewing project reports and collecting and assembling data for design continued at the same intensified pace as during the last fiscal year. Engineering design was initiated on 566 structures, one less than during the 1961-62 fiscal year.

Close co-ordination with the districts was maintained in all phases of highway design. Special consideration was given to Interstate Route 280 in Santa Clara and San Mateo Counties. A consulting architect was employed to advise on the design of the structures on this route which traverses the east side of the coast range, lying adjacent to the Crystal Springs Reservoir and passing through Woodside, Hillsborough and the Stanford University Campus.

Special attention was devoted to the structures along proposed routes through Beverly Hills and along U.S. 101 Alternate Freeway in Orange County.

Also, the new freeway through Sacramento, that is Interstate 5 along the Sacramento River, Interstate 80 through the 29th-30th Street and W-X Street corridors and have been studied extensively so that architecturally pleasing as well as functional structures will be provided for the traveling public and the community.

During the 1962-63 fiscal year studies were continued for metropolitan freeways for single- and double-decked viaducts, multilevel interchanges, tunnels, long-span structures and a large variety of highway separations.

Bridge Architectural Design

With more and more emphasis being placed on aesthetics in bridge design there was a definite increase in the workload of the Bridge Architectural Design Section during the fiscal year. Some district personnel were trained in photo retouch techniques.

Some 130 architectural design renderings, sketches and photo retouches were prepared; the results of which will ultimately be seen in new column and superstructure shapes, textured walls and architecturally treated slope paving. Models were constructed for design purposes for four major interchanges. One noteworthy model was made covering the whole of Emerald Bay. Both proposed upper and lower routes were shown for comparison on the same model.

Foundation Section

This past fiscal year the foundation section added a seismic unit to the exploration equipment for making subsurface investigations. With this unit it is possible to make studies more

The bridge across the South Fork Eel River at Myers Flat, Humboldt County, was awarded the American Institute of Steel Construction's first prize as most beautiful bridge of its class (fixed spans under 400 feet) opened to traffic in 1962.

rapidly in areas where access problems are difficult for conventional drilling equipment. Less time required for foundation studies results in lower costs for this phase of bridge planning.

A computer program which has been set up for the reduction of field notes makes it possible to have the results of a seismic field survey the following day, thus reducing the time required for office work.

The section is continuing its pile load test and fill settlement program. Feasibility investigations for the installation of large piles up to six feet in diameter are also being made.

This past year the section made studies for more than 500 structures and numerous retaining walls.

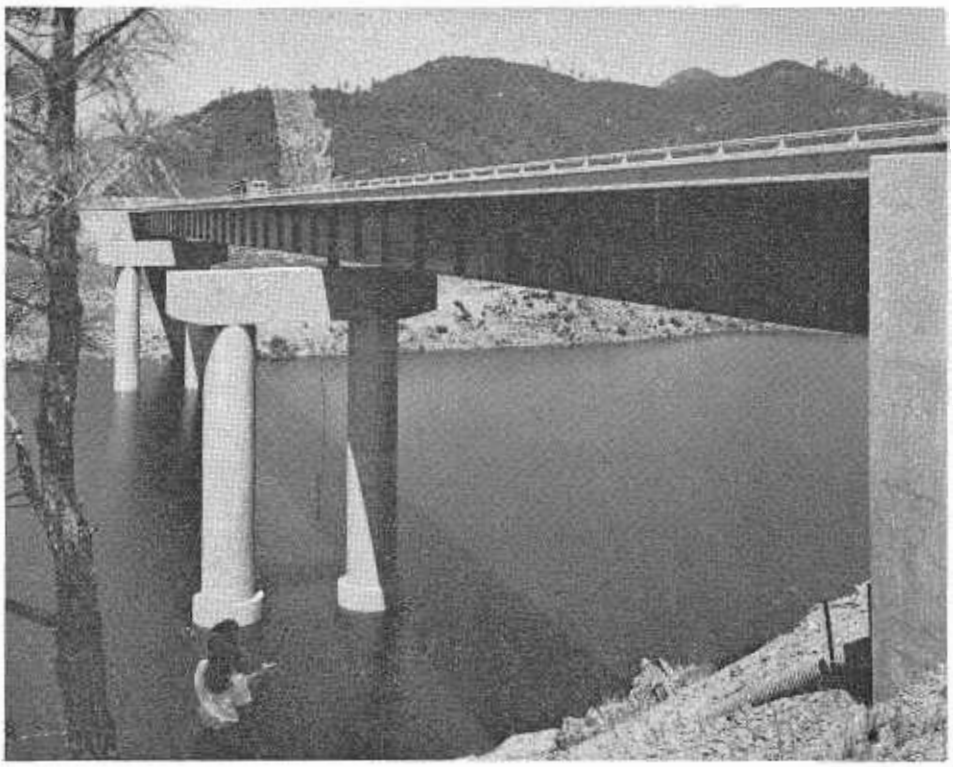
Obsolete equipment used for foundation exploration work has been replaced with modern units, resulting in greater operating efficiency.

Design

Although the total plan output was comparable to recent past years, the "glamorous" jobs which are usually mentioned in detail are missing from this year's production.

The most notable accomplishment was the completion of the structures on the Westside Freeway (Interstate 5) from the southern terminus at U.S. 99 in Kern County to the San Joaquin county line. There are 123 structures on this 222-mile section of the freeway which have a total estimated cost of $12,900,000.

An interesting phenomenon of the area traversed by the Westside Freeway is a peculiar type of subsidence which has influenced the design of the highway and the structures. Portions of the highway traverse alluvial fans which have never been consolidated because of the extremely low rainfall prevailing on the west side of the San Joaquin Valley. This area may come under irrigation as the California Water Project extends canals into the area and an unusual shallow subsidence is expected to occur. The bridges in this area are articulated so that they can be adjusted to compensate for subsidence of the bridges or the highway.



One of the structures pioneering use of high-strength steel is the Whiskey Creek Bridge where rerouted U.S. 299 crosses the Whiskeytown Dam reservoir.

A new trend during the past year was the more extensive use of alternative designs. In cases where preliminary estimates show two or more types of structures to be nearly the same cost, alternative designs were prepared and the contractor was given the option of selecting the type of structure he wished to build. Typical of the alternative designs which went to contract were the Hot Springs Creek Bridge on the Monterey Coast which permitted either reinforced concrete or prestressed concrete construction and the bridge across the North Yuba River near Downieville which featured both steel girder and prestressed concrete girder alternatives.

Bridge Construction Costs

Bridge construction costs, as measured by the department's cost index began the year with an index value of 288 which fluctuated during the succeeding quarters from 274, 264, 290 and 264. Bridge construction costs during the 1962-1963 fiscal year were virtually the same as the preceding fiscal year.

BRIDGE OPERATIONS

Sixty-one structures in 45 Bridge Department administered contracts were completed during the year at a total dollar value of $35,620,000. This included the San Pedro-Terminal Island suspension bridge substructure ($2,800,000), the Benicia-Martinez Superstructure ($8,900,000), and the Webster Street Tube ($16,500,000).

There were 445 structures in 97 district-administered contracts, these structures having a value of $71,293,000. Also, there were a number of retaining walls constructed, and widening and repair of existing structures. There were 162 structure projects, with an approximate cost of $163,600,000, underway at the end of the fiscal year. These included the San Pedro Terminal Island suspension bridge superstructure (Vincent Thomas Bridge) contract, projects financed from various fiscal year budgets, and work on federal-aid secondary projects.

The 1962-63 state highway budget had $85,302,000 in structure work in

109 projects. Miscellaneous projects, including maintenance, FAS, and work for other agencies, amounted to $2,736,000 structure work in 21 projects. The grand total of all structures in this budget year that were advertised and placed under contract in 130 projects was $88,038,000.

Metropolitan Area Freeway Structures

In Oakland, one more section of the MacArthur Freeway (Interstate 580), including six major structures, was opened to traffic. The freeway is now open as far as Park Boulevard. Three more sections of freeway are under construction. The first section, from Park Boulevard to Buell Street, including structures at 12 locations, is nearing completion. The next two contracts, which extend the freeway into San Leandro, include structures at 21 locations, costing approximately $5,000,000.

Widening of Nimitz Freeway to eight lanes as far as Hegenberger Road, which included widening of three major structures costing over $2,500,000, was completed.

The $17,000,000 Webster Street Tube, which connects Oakland and Alameda, was opened to traffic February 13, 1963. This facility, which provides two more lanes of traffic, was under construction for more than three years. The tube is made up of 12 precast sections, 37 feet in diameter and 200 feet long, plus a 783 foot cast-in-place section. This was the 12th tube built by this method, the adjacent Posey Tube being the first.

The Posey Tube, now being remodeled under a $1,100,000 contract, will be reopened sometime in December 1963.

On the Santa Monica Freeway Viaduct in the Los Angeles area, three major contracts totaling 8.24 miles of structures were under construction during the year. This is an increase of nearly four miles of viaduct carrying eight lanes of traffic from the heart of the industrial section of Los Angeles toward Santa Monica.

On the Golden State Freeway, 13 structures were completed and 22 others were under construction.

Progress on the San Diego Freeway was highlighted by the opening of nearly 10 miles of continuous freeway. This section of the new freeway, which extended from Burbank Boulevard in the City of Burbank to Rinaldi Street in San Fernando, included three contracts involving 30 structures.

In the San Bernardino-Riverside area, 47 structures were completed and 43 structures were under construction. Thirty structures were completed in the San Diego area and 52 structures are under construction.

In addition to the Benicia-Martinez Bridge over the Carquinez Straits, located just 200 feet west of the existing Southern Pacific railroad bridge, there were major structures completed on Interstate 680 at eight locations in Solano County and 11 in Contra Costa County.

In Contra Costa County there were 2 major freeway projects under contract having large amounts of structure work. In Concord, on Sign Routes 21 and 24, nine structures were under construction at a cost of $2,000,000. South of Walnut Creek, on Route 21, there were 13 bridges and interchanges being built under a $13,750,000 freeway contract.

In Alameda County, two major railroad undercrossings were completed at Jackson Street and Orchard Street in Hayward.

In the San Francisco West Bay area, construction is in progress on the Southern Freeway from Orizaba Avenue across the James Lick Memorial (Bayshore) Freeway to Newcomb Avenue. This section includes 27 bridge structures and a half-mile section of double-deck viaduct extending northeast from the Alemany intersection of the Bayshore Freeway. The half-mile viaduct section, which is a portion of the planned 4½-mile section that will extend to the Embarcadero Freeway, will have a construction cost of about $3,000,000.

Other Major Projects

Work continued on the new bridge and fill crossing of the Yolo By-pass. The structure was opened to traffic on September 14, 1962, with two-way traffic using the eastern structure.

Work started on the substructure of the new Sacramento River Bridge at W-X Streets in Sacramento. This substructure work consists of constructing three river piers. The bridge is to be a nonmovable type with a minimum vertical clearance of 55 feet. It is estimated that the contract will be completed in June, 1964. Work on the superstructure contract is scheduled to begin early in 1964.

The steel arch bridge across Cold Spring Canyon on Route 80 in Santa Barbara County continued to take shape. The steel arch ribs were erected with connection being made June 27, 1963.

Tunneling operations continued on the 3,300-foot-long Caldecott Tunnel through the Berkeley Hills. Seven percent of the concrete tunnel lining had been placed at the end of the fiscal year. Successive stages of work on this project will continue throughout the coming year, with completion anticipated in late 1964. The total estimated cost is $11,000,000.

The Randolph Collier Tunnel, located in the extreme northwestern portion of California on U.S. Highway 199, was dedicated and opened to traffic on July 20, 1963. The tunnel is 1,836 feet in length, entirely concrete lined, and provides two 13-foot traffic lanes and safety walks on each side.

Construction of the tunnel, started in January, 1961, cost approximately $4,300,000.

County and City Bridges

During the year the City and County Bridge Projects Engineer reviewed plans for bridges and minor structures in 59 projects financed from gas tax apportionments to the cities.

In addition, 15 bridges with a total contract cost of $600,000 were included in eight FAS contracts. The county engineering departments prepared plans for 14 of the structures and provided the construction engineering for 13.

The floods of October 1962 and February 1963 caused heavy damage to bridges in some counties. At county request the department evaluated the amount of storm damage on 27 structures. Proposed plans for repairs or replacement were reviewed as submitted by the counties.

Bridge Maintenance

Periodic field investigations were made of the 7,398 bridges on the state

highway system. Capacity ratings for all structures were reviewed and kept up to date and the replacement of structurally critical bridges was scheduled.

On January 31, 1963, the westerly two spans and intermediate pier of the North Yuba River Bridge on State Sign Route 49 in Sierra County were carried away by flood. A single 120-foot welded plate girder span was designed, constructed and was carrying traffic 13 days later to replace the pony trusses.

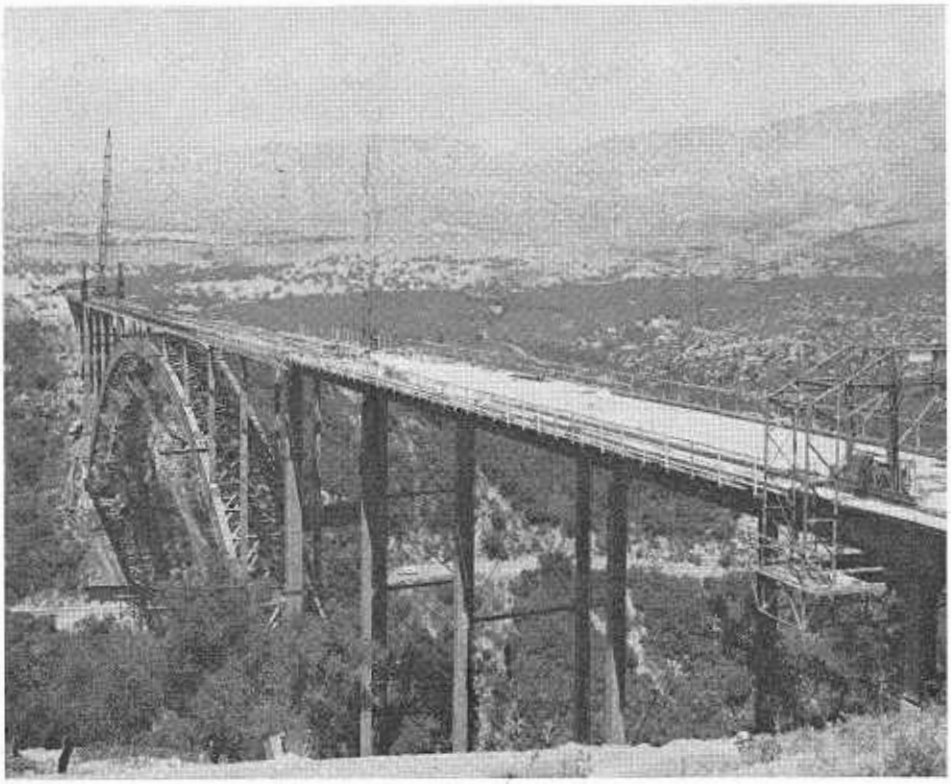
On February 1, 1963, two bents of the Spanish Creek Bridge on U.S. 40 Alternate near Quincy were undermined by scour and settled, closing the bridge to traffic. Repair work, under emergency contract, consisted of driving steel H-piles through holes cut in the concrete deck, supporting the settled bents in place and constructing a temporary supplementary superstructure. This bridge was opened to one-way traffic in 12 days.

Critical Problem

A critical problem developed on the bridges across New River near Seeley on U.S. Route 80. The continued deep-seated movement of the large mass of earth at the west end of the bridge made it necessary to undertake emergency repairs to maintain a safe traveled way. Even though the structures had been designed to accommodate movement of the substructure, with respect to the superstructure, the actual movement of about 5 feet required numerous repairs. The structures are being replaced with a quadruple 10x8-foot box culvert and fill.

Hyde Street Pier

At the request of the Division of Beaches and Parks plans were prepared for renovating and improving a pier at Hyde Street in the San Francisco Maritime State Historical Monument. The contract for this work was handled by the Bridge Department, at a cost of approximately $400,000.



Construction work on the Cold Spring Canyon Bridge on Sign Route 150 between Santa Barbara and Santa Ynez. It is listed among the 10 longest steel arch bridges in the United States.

The Bridge Maintenance Section made engineering investigations at the request of local authorities for 69 city and county bridges to establish their load-carrying capacity. Eight public hearings were held, as a result of which 20 of these bridges were posted for less than legal loads.

Bridge Maintenance Painting

Four maintenance painting contracts involving repainting four structural steel bridges and railings on six bridges were initiated by the Bridge Department during the past fiscal year. The small number which required repainting indicates the extent of progress made in prolonging the paint service life on our steel bridges during the last decade.

Inspections Made

Bridge painting inspectors made inspections on more than 500 steel structures during the past year. They were also assigned as resident inspectors on all maintenance painting contracts as well as assisting on various phases of new construction work.

Experimental work with recently developed materials and methods continues, its aim being to further increase the protective service life of paint coatings on steel structures.

SPECIAL STUDIES

The scope of structural research work continues to expand. The total number of active projects has about doubled in the past year. In final stages of data reduction and report preparation are projects on concrete box girder characteristics; concrete bridge deck cracking; epoxy adhesive and sealant performance; seismic forces on long piles; and bridge barrier railing behavior under dynamic loads.

In middle stages of testing and data accumulation are projects on friction losses in prestressing steel; service life of bridge bearings; viaduct deck drain characteristics; orthotropic structural frame behavior; and arch culverts under high fills.

Preliminary Planning Underway

Preliminary planning and initial study are underway on new projects

concerning bridge deck insulation; reinforcing steel corrosion; bridge deck joints; and the effects of aerodynamic and seismic loads on a suspension bridge. Efforts in the electronic computer service area have emphasized development of a program to analyze concrete bridge substructure frames. A companion to a completed program for superstructure analysis, it will feature automatic load selection and application, flexibility to handle most frame sizes and configurations, minimum input data requirements, and comprehensive results.

Program Conversion

Other efforts resulted in completion of a program to construct structural influence lines, and continued progress in revision and effective conversion of old computer programs to current data processing equipment.

Analyses of specific site problems in the fields of hydrology, hydraulics and bank protection are being continued. Initial study is underway on a combined structural-hydraulics research project concerning the undermining of bridge foundations by hydraulic scour.

Special Studies

Special studies undertaken include participation in a co-operative study of concrete deck deterioration, evaluation of corrosion of reinforcement in structures located in marine environment, and measurement of airflow in the ventilation system of the Webster Street Tube.

Bridges on the State Highway System Segregated as to Number, Length and Area by Structure Type, as of June 30, 1963

Structure type	Number 1963	Number 1962	Length [a] (feet) 1963	Area [b] (square feet) 1963
Concrete arch	232	239	36,818	851,326
Concrete girder	2,158	1,892	491,294	31,648,940
Concrete slab	2,414	2,358	145,885	6,250,426
Masonry arch	33	33	962	21,735
Subtotal concrete and masonry	4,837	4,522	674,959	38,772,427
Steel arch	5	5	1,400	22,439
Steel plate girder	358	350	171,930	7,423,968
Steel stringer	277	282	60,504	3,479,474
Steel deck truss	30	29	33,166	1,550,439
Steel pony truss	29	30	10,524	168,548
Steel through truss	63	65	115,999	1,491,740
Suspension	2	2	15,097	884,145
CMP multiplate and arch	77	74	1,482	50,503
subtotal steel	841	837	410,102	15,071,256
Timber arch	1	2	59	780
Timber stringer	585	605	42,473	1,502,440
Timber deck truss	6	8	1,576	23,974
Timber pony truss	0	1	0	0
Timber through truss	1	1	79	1,722
subtotal timber	593	617	44,187	1,528,916
TOTAL BRIDGES	6,271	5,976	1,129,248 (214 miles)	55,372,599 (1,271 acres)
Underpasses	181	182		
Overheads *	266	242		
Combined bridge and overheads *	54	48		
State highway separations *	294	272		
Road undercrossing *	1,179	952		
Road overcrossings	813	725		
Pedestrian undercrossings *	176	157		
Pedestrian overcrossings	86	78		
Cattlepasses *	90	88		
Tunnels	21	20	17,549	
Retaining walls	6	6	4,707	
Miscellaneous	20	19	400	10,325
TOTAL STRUCTURES	7,398	7,006	1,151,904	55,382,924
Drainage pumping plants	193	185		
Railroad grade crossings	641	676		

* Separations so noted are listed under structure type above.
NOTE: One underpass, 19 overheads, 1 tunnel and 3 bridge and overheads also serve as state highway separations.
[a] Structures of assorted types and lengths of spans are by number and length of main span.
[b] Areas are based upon clear width of roadway between curbs and clear sidewalk width.

BRIDGE OFFICE ENGINEERING

Bridge office engineering includes the administration and management of the various service units.

A major function is the negotiation and preparation of maintenance and construction agreements with railroads in connection with construction of railroad grade crossings and grade separations.

Railroad Grade Crossings

Construction was started, underway or completed on 53 highway projects requiring negotiations with railroads which involved right-of-way encroachments, installation of additional crossing protection, construction, alteration or abandonment of grade crossings. At the end of the fiscal year, negotiations with the railroads were in progress for 23 additional highway projects on which construction had not yet started. In addition, 34 projects involving improvement of existing crossing protection were completed or underway.

On federal-aid secondary routes, negotiations were underway or completed on 14 projects with railroad involvement.

Railroad Grade Separation Structures

At the beginning of the year, 63 railroad-highway grade separation structures were under construction. A total of 43 railroad separation structures were placed under contract during the year of which 5 were underpass structures and 38 were overhead

structures. Three of these structures were completed during the year. During the year a total of 35 railroad separation structures was completed. The railroads are contributing an estimated $163,064 toward the cost of constructing 5 of the 35 completed structures and for removing Kerman Underpass.

$5 Million Grade-crossing Fund

The Public Utilities Commission issued the 1962 priority list containing 33 proposed separation projects to eliminate railroad grade crossings and reconstruct existing separation structures on county roads and city streets. In accordance with state law, $5,000,000 in state funds is set aside by the Highway Commission each year to pay half the cost of each separation project after deducting the railroad contribution.

As of June 30, 1963, allocations totaling $4,286,056.20 had been made by the Highway Commission from the 1962-63 fiscal year funds for 8 of the 33 projects on the PUC priority list.

Corps of Engineers and State Reclamation Board Permits

During the past year, permits have been received from the Corps of Engineers to construct twin bridges across the Sacramento River, a ferry slip, and install underwater cables.

Seven permits have been received from the State Reclamation Board for construction projects.

SPECIAL PROJECTS

The substructure contract for replacement of the Napa River Bridge at Vallejo was completed in April 1963. The new bridge will be a high-level fixed span to allow waterway navigation to pass underneath. Present span (right) has a bascule span which must be opened an average of a hundred times a month.

On September 15, 1962, the Benicia-Martinez Bridge was opened to traffic. The completion of this structure provides another new highway facility across the Carquinez Strait completed and opened to traffic within the past four years. The Carquinez Strait has for many years been one of California's most difficult and costly barriers to highway transportation. The Benicia-Martinez Bridge adds four modern traffic lanes across this water barrier in addition to the seven at the Carquinez Bridge. This is estimated to provide adequately for the traffic needs across the Carquinez Strait until well into the 1980's.

The Benicia-Martinez Bridge and approaches required seven contracts with a total construction cost of about $23,203,300. The bridge proper was constructed in two contracts at a construction cost of about $14,302,500, which is considered very economical for this type of construction. The new type of foundation construction and the use of new high-strength steels contributed a great deal to the economy of this major deep-water bridge construction.

Traffic across the bridge since opening has been about as anticipated. Traffic figures to date indicate that for the first year of operation the average monthly count should be about 190,000 vehicles.

On April 25, 1963, Governor Brown signed Senate Bill 50 redefining the limits of the Benicia-Martinez Bridge, which extends the Solano County approach to the bridge from the toll plaza to Interstate Route 80 at Cordelia. Refinancing the Carquinez Strait Bridges Revenue Bonds (authorized by the California Toll Bridge Authority later in the year) makes it possible for unused funds to go toward construction of the Solano County approaches as set forth in the legislation.

The Vincent Thomas Toll Bridge between San Pedro and Terminal Island was scheduled for opening to traffic on November 15, 1963. Completion of cable spinning and hanging of the 1,500-foot main suspended span were the primary achievements in the construction progress of this bridge. All contracts were completed during the fiscal year except for the last stages of work on the superstructure.

There were three major contracts and three smaller contracts involved in the construction of the bridge with its approaches and toll plaza. The total cost, including right-of-way and engineering costs, was $18,883,000.

This 6,000-foot structure with its four traffic lanes is Southern California's first suspension type highway bridge. It was dedicated as part of a community celebration on September 28, 1963.

STATE-OWNED TOLL BRIDGES

San Francisco-Oakland Bay Bridge

A record total of 42,058,144 vehicles crossed the San Francisco-Oakland Bay Bridge during the year. This is an increase of 3.8 percent over the preceding year. The daily average for the year was 115,228 vehicles.

The month of highest average daily traffic was June 1963, with a new record high of 123,297 vehicles per day. The previous high was in June 1962, when the daily average was 115,709 vehicles. New high figures for a single day's traffic were established in two successive months during the fiscal year—first on May 24, 1963, with 133,772 vehicles, and again on June 28, 1963, with 143,456 vehicles. Both these records were on Fridays, and it is interesting to note that every record high day in the history of the bridge has been a Friday. The highest record for the preceding year was 133,604 vehicles on September 1, 1961.

The revenue derived from vehicular tolls, rent, and miscellaneous services, exclusive of interest, was $12,858,464, an increase of $511,660 over the preceding year.

The contract for remodeling the westbound toll plaza was completed in May 1963. The rebuilt and enlarged plaza provides 17 toll lanes to accommodate all westbound traffic after conversion of the bridge to one-way traffic on each deck. The final contract for the lower deck traveler system was completed, providing rail-mounted travelers for maintenance of the entire length of the lower deck floor systems. A similar system of travelers for the upper deck floor systems was completed in 1953.

The painting of the structural steel in the Transit Terminal loop was 95 percent complete at the end of the fiscal year. Because the work was principally over heavily traveled streets and parking lots in downtown San Francisco, steam cleaning, sandblasting and painting was done on Saturdays and Sundays.

The Division of San Francisco Bay Toll Crossings continued work on the $35,000,000 remodeling of the Bay Bridge. At the end of the fiscal year, all necessary contracts had been completed except that of resurfacing the upper deck for conversion of the bridge to five lanes of one-way traffic on each deck.

Richmond-San Rafael Bridge

Total traffic on the Richmond-San Rafael Bridge amounted to 4,000,250 vehicles, an increase of 7 percent over the previous year. Correspondingly, revenue amounted to $3,332,578, an increase of 6.6 percent.

A bridge tow service was inaugurated on January 1, 1963, to reduce toll lane congestion on account of stalled vehicles and to provide better service and reduce hazard to the motoring public.

Two contracts were let: one to install two additional air compressors on the structure to provide an adequate air supply for bridge maintenance operations, and the other to expand and improve facilities at the Administration Building.

Safety devices were installed on the outside bridge ladders. These devices are so designed that a workman wearing a safety belt can move up or down the ladder in a normal manner, but any sudden movement downward or toward the ladder causes a pawl attached to the safety belt to engage notches in a vertical safety rail and arrest the man's fall.

San Mateo-Hayward and Dumbarton Bridges

The total traffic on the San Mateo-Hayward Bridge for the year was 4,285,404 vehicles, and the corresponding toll revenue amounted to $1,655,800. For the same period, the traffic on Dumbarton Bridge was 3,352,777 vehicles, with a corresponding toll revenue of $1,243,618. These traffic figures, compared to those of the previous year, indicate an increase in traffic of 6.7 percent and 13.5 percent respectively, over the preceding year.

A fifth toll lane was added at the Dumbarton plaza during the year, to accommodate the rapidly increasing volume of traffic. Planning is underway to provide an administration building and an improved canopy structure at this toll plaza.

The deck of the Dumbarton Bridge was resurfaced during the year to improve the riding quality of the original asphaltic concrete surface.

The high water on January 31, 1963, destroyed the Yuba River Bridge on Sign Route 49 west of Downieville. Thirteen days later a single 120-foot welded plate girder replacement span had been designed and constructed and was carrying traffic.

Plans are also underway to provide maintenance elevators at the Dumbarton lift span, to eliminate the need for raising the span to take personnel and equipment to the tower tops, with the resultant delay and inconvenience to traffic.

The Division of San Francisco Bay Toll Crossings continued operations which will ultimately result in increasing the width of the San Mateo Bridge and the replacement of the lift span by a high-level structure. During the year a three-mile length of new four-lane structure was opened to traffic.

The lift span operation was continued at both bridges, as required by Federal Law. During the year there were 2,292 lifts at the San Mateo-Hayward Bridge and 1,041 lifts at the Dumbarton Bridge.

Emergency tow service was instituted at the San Mateo-Hayward Bridge to improve safety and minimize delays to traffic.

Carquinez Straits Bridges

A total of 13,697,648 vehicles used the Carquinez Bridge during the year and $4,681,278 was collected. This was a 2.9 percent decrease in traffic and a 2.5 percent decrease in revenue over the previous year. These decreases were caused by diversion of some of the traffic to the new Benicia-Martinez Bridge and by a long rainy season. The combined traffic for Carquinez and Benicia-Martinez Bridges amounts to an increase of 8.2 percent over the previous year's traffic for Carquinez Bridge.

A contract for repairing damage that occurred to the Pier 3 fender when it was hit by a barge was completed during the year.

The principal bridge maintenance at the Carquinez facility consisted of the paint maintenance program. Most of the work involved the west bridge, but an increasing amount of work is being required on the east bridge.

The new Benicia-Martinez Bridge was officially opened to traffic on Saturday, September 15, 1962, at 12 noon, and toll collection was begun at 12:01 a.m. on September 16, 1962. As of June 30, 1963 the span had carried 1,563,749 vehicles, producing a total revenue of $465,092 since toll collection was begun.

STATE TOLL CROSSINGS DIVISION IS REORGANIZED

Responsibility for planning and constructing future transbay crossings in the San Francisco area and other major port areas in California, plus the maintenance and operation of existing toll bridges has been assigned to an expanded State Division of Bay Toll Crossings.

State Director of Public Works John Erreca has appointed E. R. "Mike" Foley, a state bridge and highway engineer since 1932, as the division's chief engineer.

Purpose of the reorganization of the State's toll bridge functions, Erreca said, is to eliminate the "divided responsibility" which has been in effect since the Division of San Francisco Bay Toll Crossings was established in December 1947 by administrative order. The Legislature this year established the division as a statutory unit of the Department of Public Works and revised its title.

E. R. FOLEY

Since 1947 the Division of San Francisco Bay Toll Crossings has been planning, designing and constructing some of the State's toll bridge projects, such as the Richmond-San Rafael Bridge, the current widening of the San Mateo-Hayward Bridge and the reconstruction of the San Francisco-Oakland Bay Bridge. The Division of Highways has been operating and maintaining these bridges with state highway funds and has designed and constructed other toll structures, notably the Carquinez parallel bridge, the Benicia-Martinez Bridge, and the new Vincent Thomas Bridge between San Pedro and Terminal Island.

In addition, the Division of Bay Toll Crossings has been conducting preliminary studies for other crossings, such as the Southern Crossing of San Francisco Bay and a Marin-San Francisco crossing, while the Division of Highways has carried on studies for a proposed crossing structure between San Diego and Coronado and for a possible crossing of Humboldt Bay in Northern California.

Under Erreca's order, which became effective November 18, 1963, the new Division of Bay Toll Crossings, under Foley, assumed responsibility for all of these functions, incldlng toll collection, maintenance, planning studies for new crossings, and design and construction of new bridges.

Foley, the new division chief, has been district engineer for the Division of Highways, with headquarters at San Luis Obispo, since April 1961. For five years before that he was district engineer at Bishop.

Foley, a native of Nevada City, joined the Division of Highways shortly after graduation from the University of California as a civil engineer in 1932. Most of his first 10 years were spent in bridge design and construction work.

After four years of U.S. Navy service in World War II, including two years as an officer with the Seabees in the South Pacific, Foley returned to the Division of Highways and was active in bridge construction until 1950. He was then transferred to other duties, and just prior to his promotion to district engineer in 1956 was in charge of a statewide county road inventory and mapping project.

The former Division of San Francisco Bay Toll Crossings, which is being incorporated into the new division, was headed until last July by Norman C. Raab as projects engineer.

Charles L. Sweet, Division of Highways bridge engineer in charge of operating and maintaining state-owned toll bridges, will continue in his present capacity under the new division.

Personnel & Information

The functions of personnel, training, safety, audio-visual services and public information are grouped administratively under the direction of the engineer in charge of Personnel and Public Information

PERSONNEL

As of the end of the 1962-63 fiscal year, total Division of Highways staff was 16,944 employees, an increase of approximately 900 over the previous year. About 400 of this increase was in engineering classes, with other increases occurring in accounting, clerical, programmer and maintenance classes.

On July 1, 1963, there were 8,648 engineering employees, 4,144 maintenance employees, 559 right-of-way agents, 493 equipment repair employees and 3,064 in accounting, clerical and miscellaneous functions.

A civil service candidate for highway maintenance man II is given a performance test on equipment he will be required to operate on the job.

Recruitment Efforts

In the recruitment of employees, several fields were covered. More than 500 job offers were made to graduating engineering students by our recruiters in schools all over the United States. About 185 of these have now reported and been assigned to the junior civil engineer job rotation program consisting generally of six months in construction, six months in design, six months in surveys and six months in one of the other engineering functions of the division. A comparable number completed their two-year rotation program and have been placed in regular assignments.

Recruitment efforts for junior right-of-way agents were stepped up to tie in with a new long-range training and development program. Recruitment of accountants and electronic data processing programmers continues to be a problem. Performance examination procedures for new maintenance men were improved. In many of the areas where recruitment difficulties are being experienced, the inequity of state pay scales appears to be a major part of the problem.

Programs Completed

As a result of the Personnel Management Report on the Division of Highways issued by the State Personnel Board in November of 1962, a number of programs were firmed up and completed. Since there was active participation by division staff in the study and the consequent report, many of these developments such as improved sick leave administration and better classification techniques were started before the report was completed. Still under study are improved reporting procedures for overtime and more easily understood standards on various levels of engineering positions.

Other projects that have been completed or studied include organization of the landscape function, conversion to electronic data processing and resulting organizational changes, staffing standards for maintenance field offices, accounting department reorganizations, and a revised classification structure and function of the Equipment Department field shop offices.

Classification Studies

Specific classification studies are underway in the series of radiotelephone technician, highway traffic signal technician, and highways administrative officer. Nine new classes were established during the year, and a number of class specifications were revised to reflect current needs.

During the year, 20 employees were dismissed—13 from permanent positions. Twenty-four were rejected during probation, four were demoted

and forty were suspended. A total of 232 employees retired. Ninety-five 25-year awards were given, making a total of 2,221 for the division.

During this year, 197 visitors from 35 countries were guests of the division, generally under the auspices of federal government programs. Discussions and training programs, varying from a few hours to several months, were arranged for each individual.

TRAINING

Training activities participated in by Division of Highways employees can be classified into three broad areas: inservice training, outservice training, and on-the-job training. The Division Training Section is responsible for all formal training given to Highways employees.

Inservice Training. To determine inservice training needs, the members of the training staff consult with district and headquarters supervisors and managers. The training staff then works with districts and departments to work out content and format of a formalized program designed to meet recognized needs. Depending upon course content, the instruction staff may be composed of the division training staff, organizational unit staff, outside technical experts, or a combination of these.

Outservice Training. Outservice, or "specialized" training, includes courses which are developed and presented by training facilities outside the state civil service. Selected Highways employees attend these courses in order to develop needed skills which cannot be obtained through inservice training programs.

On-The-Job Training. On-the-job training consists of learning processes which are guided by the employee's supervisor. The Training Section directs the individual development program for the division and consults and assists supervisors and managers in formulating both self-development and employee-development plans. The Training Section administers the planned two-year rotation program for junior civil engineers, in which planned rotation and experience is combined with on-the-job training (as described in the May-June, 1963, issue of *California Highways & Public Works*). Six hundred junior civil engineers took part in the two-year rotation program this year.

During the year division employees participated in 198,842 man-hours of training. Subject areas included orientation, supervision and management, professional and technical, engineering and right-of-way, maintenance, and clerical.

Supervision and Management

A total of 1,790 management and supervisory personnel completed a total of 28,624 man-hours of training.

The management and supervision course for professional and technical supervisors was taken by 285 employees in various districts. The 14-session, 70-hour course is designed to improve managerial talent in preparation for more responsible assignments.

A two-day course in data processing for highway managers was given to 49 of our top-level management in December 1962. This course was developed by the Training Section and instructors from private industry and outside educational institutions participated with division personnel in giving the training.

Seventeen top level managers participated this year in the Interagency Management Development Program sponsored by the Governor's Committee on Personnel and Training. Nine of these attended the annual Management Development Conference at Davis in July. This year's course title was "Management by Objectives." Examples of other management development courses our managers are participating in are "Fiscal Management for Administrators," and "Administrative Law."

Technical and Professional

A wide variety of courses was given throughout the division in the professional and technical fields. Some examples of division-wide programs are listed below:

The University of California's Institute of Transportation and Traffic Engineering at Berkeley presented a series of "short courses" which were attended by Highways employees. Fifty-five construction inspectors completed one such course designed to acquaint them with current developments and procedures in their line of work. One hundred seventy-eight of our engineers attended "Soil Engineering—Street and Highways Applications."

A course was initiated and given in the districts this year for 458 accounting personnel, to orient these employees to basic developments in electronic data processing.

A total of 10,075 district personnel participated in 136,603 man-hours of training developed and conducted within the districts. Some examples of district-originated courses given this year are:

District III's super orientation course designed to train newer engineers. The course includes a study of division functions, a review of mathematics, engineering drawing and surveying, and a coverage of highway planning, design, and construction processes.

District VII completed a program for field control and record testing personnel. It covered test procedures, methods of sampling, construction procedures, rock plant operations and test record maintenance.

District IV developed a program to introduce professional-technical personnel to critical path planning methods.

Specialized Programs

Forty-seven division employees participated in specialized (outservice) training this year. Twelve of these attended a five-day course, "Fundamentals of Traffic Engineering," which was presented by I.T.T.E.

Other courses of a specialized nature which were given included "Real Estate Appraisal," "Motor Vehicle Fleet Supervision," "Motor Vehicle Fleet Maintenance," and "Asphalt Paving and Construction."

EMPLOYEE SAFETY

The Safety Section obtains statistical information, promotes safety and develops and makes accident prevention methods and procedures available to operating departments.

Safety Supervisors

Each of the 11 districts has a full-time safety supervisor. Part-time safety supervisors are assigned to the Bridge Department, State-owned Toll Bridges, Service and Supply, Materials and Research, and the Equipment Department. They serve as secretaries to the district and department safety committees, investigate accidents and work methods, recommend procedures and protective devices which may assist in accident prevention, and perform other duties recommended by the safety committees.

Committees Appointed

Committees are appointed in each district and major department to review motor vehicle and industrial accidents and to recommend appropriate action to prevent reoccurrence. They also review the district safety program and make recommendations to improve its effectiveness.

Accidents Are Coded

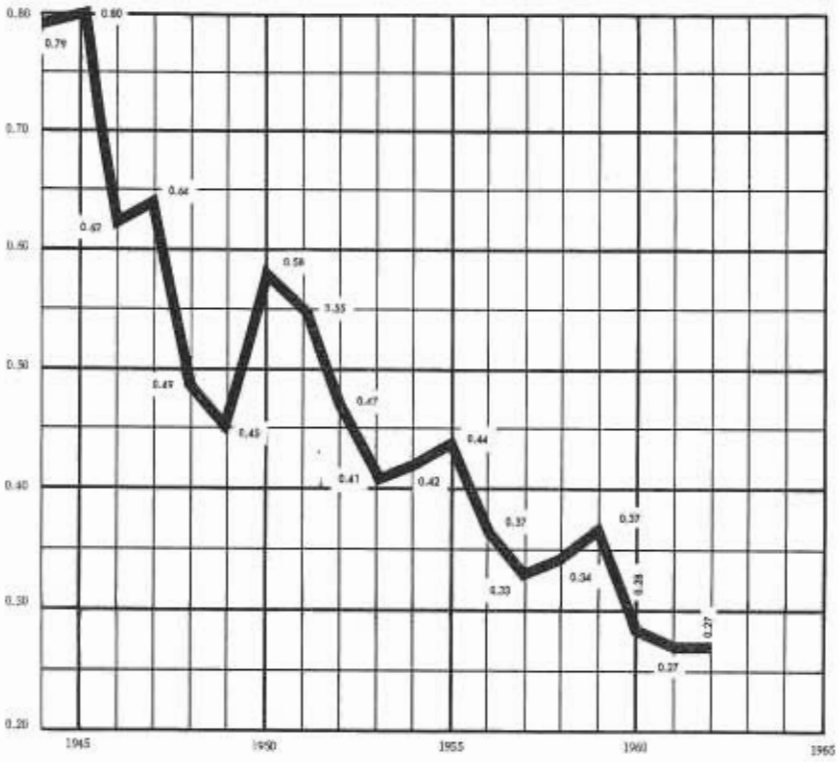
All accidents involving Division of Highways personnel or equipment are coded and processed by electronic machines to develop annual statistical reports. The American Standards Method of Recording and Measuring Work Injury Experience is used for reporting and recording of accidents. Frequency and severity rates are compiled monthly and compared to previous monthly and yearly rates to determine program effectiveness.

Records

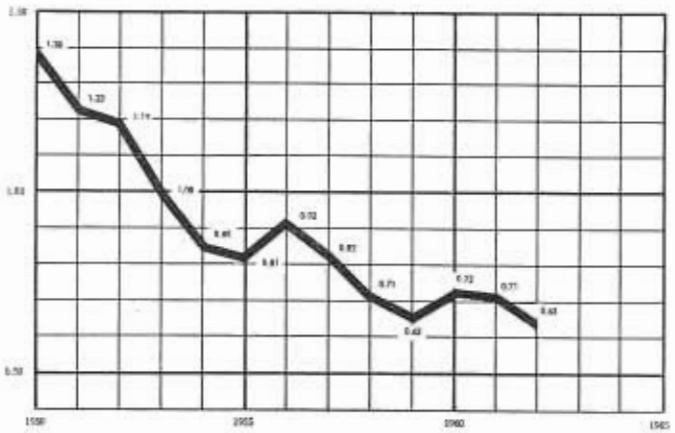
Since the establishment of the Safety Section the frequency rate for both industrial injuries and motor vehicle accidents has shown an almost continuous decline. For example, the frequency rate for industrial injuries in 1941 was 49.85 and in 1962 was 11.66. The frequency rate for motor vehicles has been reduced from 1.38 in 1950 to 0.64 in 1962.

The reduction in the personal injury frequency rate has been accompanied by a reduction in compensation insurance payments. In 1945 the

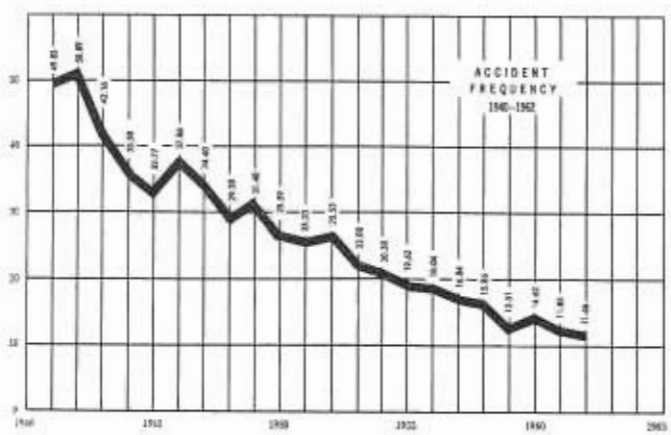
COMPENSATION INSURANCE PAYMENTS PER $100 OF PAYROLL



MOTOR VEHICLE ACCIDENT FREQUENCY



PERSONAL INJURY



insurance rate per $100 of payroll was 0.80 and in 1962 it was 0.27.

The frequency rate for personal injuries is the number of lost-time accidents per million working hours of exposure. For motor vehicles, the frequency rate is the number of recordable accidents per million vehicle miles.

Driver Training

All employees who drive a Division of Highways motor vehicle at any time have been given a special course in "Defensive Driving Techniques." They must complete the lecture and psychophysical test within three months of employment. New employees are also given a driver observation run before being allowed to drive a state car.

When an employee has had three or more accidents in any one year and his driving record at the Department of Motor Vehicles indicates a number of other accidents and citations, he is given supplemental driver training and counseled regarding his driving ability and/or attitude. If these steps prove ineffective he may be grounded or disciplined.

Driver Training Record

Number of new employees given driver training	2,143
Number of employees given special training	11
Total number of all employees who drive state vehicles in performance of their duties	11,750

Fire Prevention

Fire extinguishers were demonstrated at various maintenance stations and employees were encouraged to try out the equipment. This is a continuing program to familiarize employees with modern extinguishers and their use.

Employees Suggestion Program

Suggestions from the Merit Award Board have increased in about the same ratio as the number of employees. This program is handled by the Safety Section and the record for the 1961-62 fiscal year is as given below:

Total number of suggestions	513
Total given cash awards	103
Total granted for cash awards	$4,307
Total "Certificates of Commendations" issued	37
Total amount of estimated savings resulting from adopted suggestions	$61,039.21

State Liability for Damage Claims

The Safety Section co-ordinates its program of accident investigations with the Legal Division and the districts if the division may be involved in damage claims.

AUDIO-VISUAL

The Audio-Visual Section produces a wide variety of material for employee training and public information.

The section maintains an extensive library of colored slides on highway scenes and operations for use in training and public information presentations. It also maintains a variety of projection and recording equipment for use throughout the division. The section also advises the district offices and departments on equipment needs.

Some of the more outstanding accomplishments of this section during 1963 were: publications or reports on "Urban Transportation Planning Conference, Scenic Highways, Legislators Facts, Flagging Manual (Employee Safety)"; National Engineers' Week Exhibit (Sacramento), Career Day display (Eureka), State Fair exhibit (Sacramento); transparency and slide presentation for the Right of Way Training Academy; sound color motion picture of the Governor's opening of the San Diego Freeway in Los Angeles; and the five-section color sound motion picture on "Concrete Testing Procedures" for training Construction Departmnet inspectors.

PUBLIC INFORMATION

Interest in highway matters was widespread in California during the year and expressed itself in dedications and ribbon cuttings on completed projects throughout the State, attendance at public hearings, extensive press comment and many individual inquiries.

Attracting statewide interest as a boon to every traveler bound in or out of western Los Angeles to or from the north was the opening of the San Diego Freeway between West Los Angeles and the San Fernando Valley. This 5.7-mile section through Sepulveda Canyon in the Santa Monica Mountains was built as part of an 11.9-mile project costing more than $20,000,000. It was opened to traffic following ceremonies Friday, December 21, 1962.

Another through route completion of interest was the opening early in November 1963, of the final segment of the Golden State Freeway between the East Los Angeles Interchange and north of San Fernando.

The 6,060-foot Vincent Thomas Toll Bridge between San Pedro and Terminal Island opened to traffic November 15, 1963. It is the first major suspension bridge in Southern California and the third largest in the State. A celebration prior to opening was held in conjunction with the San Pedro Fishermen's Festival. A booklet describing engineering features of the project was prepared by the division.

Far to the north near the Oregon border crowds turned out Saturday, July 27, to mark the opening of the Randolph Collier Tunnel through Oregon Mountain on U.S. Highway 199. The 1,835-foot bore eliminated 128 curves, five hairpin switchbacks and a steep grade between Crescent City and Grants Pass. Its cost was $7,500,000.

Although these opening ceremonies were arranged by local civic groups, information on the events and the projects were furnished by the Division and its district offices to communications media, and both routine and special news releases were used extensively. Many inquiries by specialist writers were answered and a large number of photographs were made available.

Thousands of Californians viewed a freeway exhibit at the 1963 State Fair, which featured color photographs and a model of the 29th-30th

Fairgoers inspect the exhibits and ask questions at the division's booth at the State Fair in Sacramento.

Street Freeway in Sacramento which will connect the existing South Sacramento and Elvas Freeways.

The Division of Highways and its district offices co-operated in observation of the third annual National Highway Week (May 26-June 1, 1963). Through the media of press, radio, television, speeches, and graphic displays hundreds of thousands of Californians were enabled to know more about their state highway system.

A special Southern California National Highway Week Committee was in operation in the Los Angeles area where the observance was highlighted by the dedication on May 28 of a key section of the San Diego Freeway. There were special displays in many other parts of the State, including a traveling exhibit of color projections in the San Francisco Bay area. Many newspapers published a specially prepared progress report on the highway system.

Publications

The bimonthly magazine *California Highways and Public Works* continued as the principal publication of the Department of Public Works and the Division of Highways. While its main distribution is in California to employees of the division and other interested persons, there was a growing demand for it in other states and foreign countries. Numerous articles from the magazine were reprinted and many photographs were furnished to editors and writers for foreign and domestic publications.

Public information material issued in published form included, in addition to regional material prepared by the various districts:

"California Highways—1962," a 12-page illustrated reprint from *California Highways and Public Works* magazine constituting a concise, nontechnical version of the division's annual report.

"California's Freeway Planning Team," a leaflet prepared principally for the use of legislators and public service organizations in explaining highway planning procedures.

"Freeway Facts," an illustrated booklet containing basic information about freeways and route adoption procedures, widely used at district public hearings (revised in August 1963).

Reprints of articles and district roundups published in *California Highways and Public Works*, used as informational mailing pieces to answer a wide range of inquiries.

"Clip Sheet," which provides information for use in employee publications issued by each district and some headquarters departments.

News releases on routings considered and acted on by the California Highway Commission totaled 86 during the fiscal year, of which 33 were accompanied by maps specially prepared for newspaper reproduction. This was in addition to previous extensive publicity given to route hearings at the district level. Advance publicity was also given eight public hearings scheduled by the Commission.

Other News Releases and Media Contacts

The quantity and scope of news releases issued by the division continued to increase, especially on the part of the district offices.

Information on the highway program was also issued through telephone calls, office interviews, correspondence and appearances by division personnel on radio and television programs, and before local civic organizations and service clubs.

Right-of-Way

The responsibility of the Right of Way Department is to provide land for the construction of state highways. This involves appraisal, acquisition and management of properties required for highway purposes, removal of all buildings and relocation of utility facilities prior to construction. Each of these activities is handled by a special operational unit

Right of Way Engineering

Right of Way Engineering produces the basic working tools consisting of maps for the appraisers, deeds and subordinate documents for the negotiators, legal documents for condemnation, record maps and documents for administration, and director's deeds, relinquishment and abandonment documents for the disposal of excess properties.

Data are supplied in the form of: maps from Design, showing centerline and the minimum width of right-of-way needed for a proposed highway; survey notes tying in features on the ground; and ownership information searched from public records. From such information Right of Way Engineering determines the precise amount of land required from each ownership along the proposed highway route.

After the area has been determined and calculated, maps are prepared for the appraisal unit to start the acquisition process.

Appraisal

The first step in the acquisition process is the determination of just compensation—the amount of money an owner is entitled to in the transfer of his property to the public. A staff of skilled appraisers determine the value of a property by comparing it with sales of similar properties in the same neighborhood. They inspect each property thoroughly, analyze variations in price, weigh good and bad features, and check all items which tend to create value on the open market.

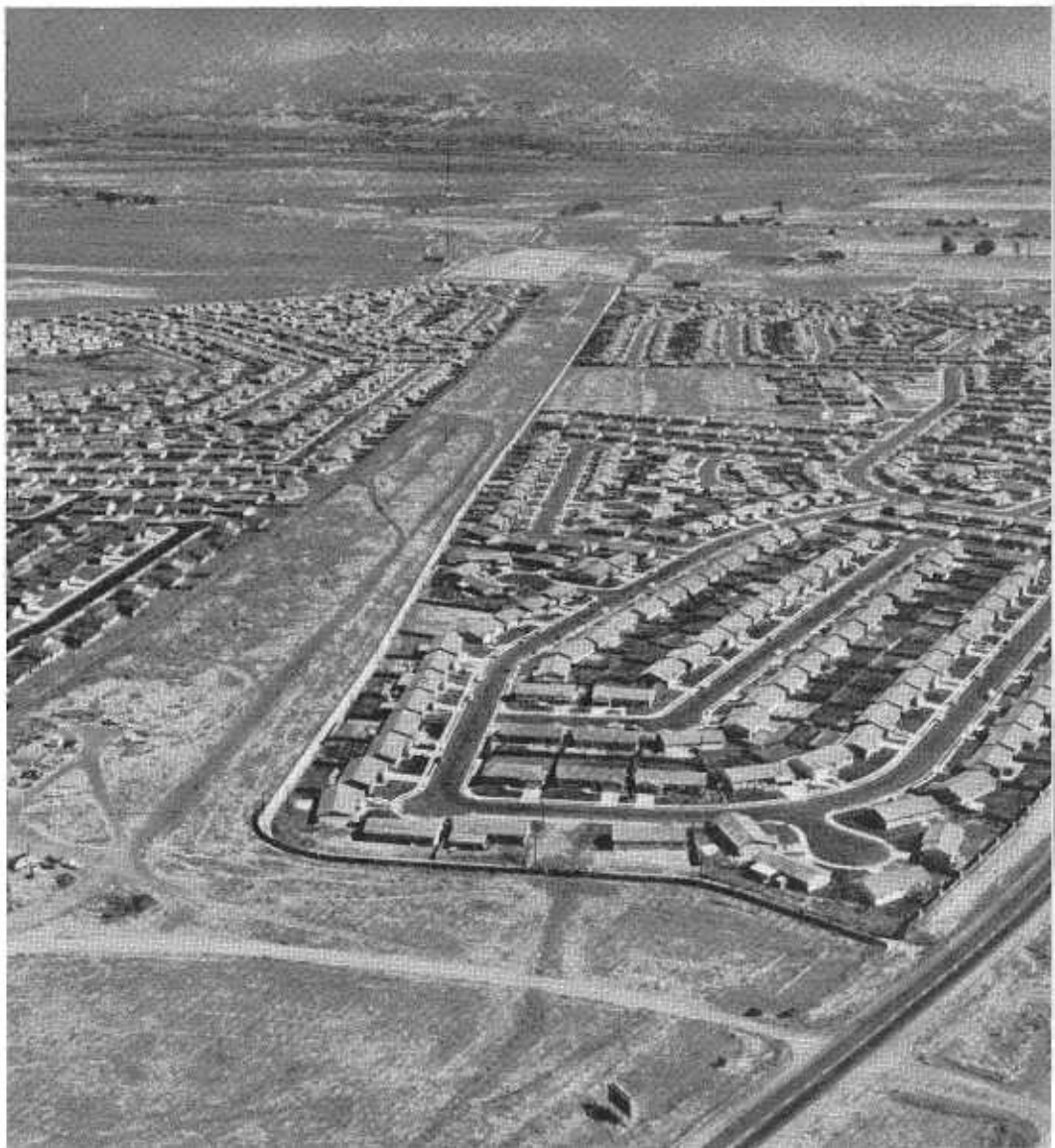
During the 1962-63 fiscal year, the Right of Way staff appraised 8,493 separate parcels and completed appraisal reports with a total valuation of $150,742,325. The average parcel took nearly four days to appraise and had a value of $17,750.

Of these parcels, nearly half were partial takings, leaving a remainder in private ownership. In these circumstances, the appraiser must also determine the extent of damages or benefits to the remainder. Right of Way appraisers have been researching this subject for several years; they have compiled the largest file of remainder parcel resale examples in the United States. These sales provide an objective reference in the determination of damages and benefits; the use of the open market assures the property owner of fair and equitable treatment.

Acquisition

The completed appraisal report is the basis for negotiations with the property owner. Since great care has been taken during the appraisal process to determine fair market value, then only a settlement at that value can be fair and equitable to the State, the taxpayers, and the property owner.

A southerly view along future Interstate 680 in Alameda County where early adoption of the freeway route permitted planned development of San Ramon Village residential areas around rights-of-way reserved for future freeway construction.



The Acquisition Unit's most important tool is an accurate appraisal report.

The accuracy of our appraisal reports is reflected in our acquisition record. During the 1962-63 fiscal year, 8,131 parcels were acquired for highway right-of-way. Expenditures were $145,510,858—an average of $17,895 per parcel.

Since property owners are customarily allowed a reasonable time to consider the State's offer and to relocate, there is usually a lag, from year to year, between the number and total value of parcels appraised and the number and value of parcels acquired. Nevertheless, it is interesting to note the close correspondence in the average value of parcels appraised and the average value of parcels acquired. The difference amounts to $145—less than eight-tenths of 1 percent of average value.

Another indicator of the success of the right-of-way program is the small number of parcels acquired through condemnation proceedings. During this fiscal year, of 8,131 parcels only 220 were acquired through contested court actions. This amounts to 2.7 percent, a figure that has remained fairly constant through the years. The other 97.3 percent of acquisitions were by amicable agreement between the property owner and the State.

The negotiator's primary function is, then, to assure a fair deal for *all* parties; he must represent not only the State and the taxpayers, but also protect the interests of the property owners. He must assure that the property owner receives fair market value —neither more nor less. The record indicates that, again this year, this primary goal has been achieved.

Property Management

Highway projects are scheduled to allow property owners adequate time to carefully consider the State's offer to purchase and, then, after purchase, time to relocate their household or business. Consequently, a property may be available for rental or lease prior to removing all improvements in preparation for construction.

The Property Management Unit is responsible for rentals, leasing, relocation advisory assistance, clearance and excess lands disposal.

Property Management returns approximately $12,800,000 to the State Highway Fund annually. This income results from: interim rental and leasing of approximately 5,000 properties which produces more than $4,000,000 annually; the sale of approximately 2,000 unimproved parcels of excess land returns about $6,800,000 annually; and the sale of 4,000 major improvements, nearly $2,000,000 annually.

Improvements which cannot be sold are scheduled for demolition and an average of 360 demolition contracts are let annually on the basis of bids totalling about $720,000.

The Relocation Advisory Assistance Program, established last year, has continued to provide assistance and advice, upon request, to all persons involved in the highway right-of-way clearance process. It functions to minimize hardships which might stem from inability to find suitable new homes and business locations.

Utilities

The Right of Way Department, as part of its clearance responsibilities, must make provision for the removal or relocation of utility facilities which may be affected by highway projects. This activity includes predesign liaison with utility companies to insure against economic waste where new utility facilities may conflict with highway plans.

Through mutual planning and cooperation, millions of dollars have been saved by both Highways and the utility companies. During the fiscal year, Right of Way concluded 743 agreements requiring adjustment of utility facilities. These agreements involved a highway expenditure of $11,750,044.

Other Acquisitions

The department, under contractual agreements, handles acquisition of property for other state agencies, such as the Department of Water Resources and the Department of Finance. During the fiscal year 430 nonhighway parcels with a total value of $10,136,109 were acquired. In summary, then, Right of Way acquired and expended this year:

	Parcels	*Value*
Highway right-of-way	8,131	$145,510,858
Utility agreements	743	11,750,044
Other acquisitions	430	10,136,109
Total	9,304	$167,397,011

Administration

During the year several important changes were initiated in Administration. For example, the headquarters office was reorganized, a new training program was inaugurated, and a new research unit was created.

1. *Headquarters Office Reorganization*

Because of the growth and increasing urbanization of California in the past several years, the overall right-of-way program has grown exceedingly complex. To deal with the growing complexities, to maintain standards of operational efficiency with low operational costs, the headquarters unit was critically analyzed, and on the basis of that analysis, reorganized

The headquarters staff now administers the right-of-way program not on a geographical but on a functional basis; i.e. appraisal, acquisiton, etc. This permits the staff to supervise the functions in greater depth, to recognize strong and weak points in operational procedures, and to suggest areas where greater economies of operation might be achieved or procedures might be improved.

2. *Personnel and Training*

The loss of experienced personnel to other organizations has increased at an alarming rate in recent years. During this year the department lost 75 experienced right-of-way agents or approximately *14 percent* of its total. Last year the rate was *9 percent;* the year before, 7 *percent.* Since it takes at least three years for even the best new agent to attain the associate, or journeyman level, the department must maintain a constant and intensive training program for new agents.

As a first step in offsetting these staff losses, the department, with the co-operation of the State Personnel Board, carried out an intensive recruitment program on college campuses throughout the State. This program culminated in the Right of Way Academy—two weeks of intensive training for new agents—held in August of 1963 at the Davis Campus of

the University of California (see *California Highways and Public Works*, September-October 1963).

This first Right of Way Academy is primarily an improvement and intensification of the established intraining program for junior right-of-way agents. This improvement, however, will only solve part of the personnel problem. The attrition rate in the ranks of experienced personnel threatens grave consequences to the continued success of our acquisition program—the loss involved 9 percent of the management ranks and 10 percent of the journeyman ranks. The department is now planning advanced level academies in an effort to regain the necessary experience level.

During 1962-63 more than 25,000 classroom and home study hours were devoted to right-of-way instruction. This figure must increase significantly in coming years.

3. *Research and Development*

A third change was the creation of a Right of Way Research and Development unit. The duties of this unit absorbed the responsibilities of the former Land Economic Studies Section and added the responsibilities of Operations Research and Methods Development.

The unit is charged with providing much of the raw data required by management in the decision-making process. For example, during the past fiscal year, this unit has carefully analyzed such variables as land use, type of taking, and length of negotiations on each of the 8,131 parcels acquired. This has provided management with objective information to estimate lead time, to predict staffing, and to predict operational costs under the varying conditions of the right-of-way program.

Of course, the land economic function has continued as a vital research effort. This year the research emphasis shifted in response to the needs in planning activities. For example, in highway location problems, Advance Planning considers how alternate route proposals may affect, among other factors, community values and land use. This year Right of Way's major research efforts have been in the analysis of the economic component of community values and land use changes to provide objective data for planning decisions. This research is directed toward the prediction of economic impact and how it may vary with alternate route proposals.

Additionally, the unit produced *Community Benefits – A Suggested Method of Analysis* which is a discussion of the methodology of highway socioeconomic impact projection. This publication will serve as a useful tool, not only to those right-of-way agents doing impact research, but as a tool for engineers in Advance Planning in the interpretation and integration of the economic material in right-of-way reports.

Conclusion

Fifteen hundred employees contributed their efforts to a successful completion of the right-of-way program in the 1962-63 fiscal year. An average 540 right-of-way agents, 550 right-of-way engineering people, and 430 clerical and accounting personnel worked throughout the State to carry through the multiple responsibilities of the Right of Way Department.

Legal

The Division of Contracts and Rights of Way is the legal division of the Department of Public Works and renders a variety of legal services to the department and its Division of Highways

The following tabulations indicate the volume of work performed by the legal division involving court appearances before various administrative agencies for the past year.

Condemnation Proceedings

Some idea of the volume of the condemnation casework is given by the following tabulation. (The parcel count is based on a count of parcels in condemnation resolutions.)

Suits filed	583
Parcels involved	2,868
Defendants involved	16,151
Suits closed	467
Contested trials	220
Uncontested judgments	384
Default judgments	27
Suits pending 7/ 1/62	888
Suits pending 6/30/63	1,004

There was a notable increase in suits filed as compared to the previous fiscal year—a 13 percent increase from 516 to 583. The total suits closed, 467, represented total awards of $23,871,-931.47 and represented 1,235 days in court.

Appellate Cases

During the fiscal year a number of appellate court briefs were written by the legal division and various appeals were argued. Decisions were rendered in *People* v. *Forster*, 58 Cal. (2d) 257 (23 Cal. Rptr. 582); *Thelander* v. *Superior Court*, 58 Cal. (2d) 811 (26 Cal. Rptr. 643); *Peter Kiewit Sons' Co.* v. *Pasadena City Junior College Dist.*, 59 A.C. 253 (28 Cal. Rptr. 714); *Eden Memorial Park Assn.* v. *Department of Public Works*, 59 A.C. 431 (29 Cal. Rptr. 790); *Healy* v. *Brewster*, 59 A.C. 473 (30 Cal. Rptr. 129); *People* v. *Valley Drive-In Theater Corp.*, 206 Cal. App. (2d) 309 (23 Cal. Rptr. 626); *People* v. *Mascotti*, 206 Cal. App. (2d) 772 (23 Cal. Rptr. 846); *People* v. *Gutierrez*, 207 Cal. App. (2d) 529 (24 Cal. Rptr. 441); *Consumers Holding Co.* v. *County of Los Angeles*, 208 C.A. (2d) 419 (25 Cal. Rptr. 215); *Reid* v. *State*, 208 Cal. App. (2d) 725 (25 Cal. Rptr. 535); *People* v. *Alexander*, 212 A.C.A. 85 (27 Cal. Rptr. 720); *People* v. *Hayward Building Materials Co.*, 213 A.C.A. 487 (28 Cal. Rptr. 782); *Perati* v. *Atkinson*, 213 A.C.A. 502 (28 Cal. Rptr. 898); *People* v. *Lipari*, 213 A.C.A. 514 (28 Cal. Rptr. 808); *People* v. *Hartley*, 214 A.C.A. 406 (29 Cal. Rptr. 502); *People* v. *Lagiss*, 216 A.C.A. 148 (30 Cal. Rptr. 852); *People* v. *Salem Development Co., Inc.*, 216 A.C.A. 708 (31 Cal. Rptr. 193).

Perhaps the most significant of these decisions is *Eden Memorial Park Assn.* v. *Department of Public Works.* The Supreme Court upheld the right of the department and the State Highway Engineer to request the Secretary of Commerce to acquire certain cemetery land for the State to complete a freeway on the Interstate Highway System. Prior efforts of the department itself to acquire this property were unsuccessful when the district court of appeal held in *Eden Memorial Park Assn.* v. *Superior Court*, 189 Cal. App. (2d) 421 (11 Cal. Rptr. 189) that certain provisions of state law precluded condemnation of cemetery property.

The legal division also filed amicus curiae briefs in two construction contract cases, *Peter Kiewit Sons' Co.* v. *Pasadena City Junior College Dist.* and *Healy* v. *Brewster.* In the former case, the Supreme Court held that the rule against apportionment of liquidated damages for delay in completion of the work is not applicable to contracts which provide procedures for extensions of contract time or apportionment of liquidated damages. The latter case was concerned with whether a contractor is entitled to recover for additional costs resulting from unknown subsurface conditions. The Supreme Court did not answer this question and decided the case upon other grounds.

In *Thelander* v. *Superior Court*, the Supreme Court held that although the 1961 moratorium legislation suspends a party's right to bring a tort action against the State to trial until after the close of the 1963 Legislative Session, the State is nevertheless required to file an appearance to the complaint within the usual time prescribed for ordinary actions. The court pointed out that if additional legislation is enacted during the moratorium period making governmental immunity applicable in such cases, a judgment on the pleadings in favor of the State would be proper.

Perati v. *Atkinson* involved a most unusual set of facts. Plaintiff, a civil service toll collector, brought suit against his toll sergeant for intentional infliction of emotional distress. The sergeant had directed plaintiff to stop an automobile as the driver was suspected of intoxication. When plaintiff failed to do so, the sergeant entered this fact in his official log. The court ruled that these circumstances did not give rise to a cause of action since the sergeant's conduct could not be regarded as "outrageous" or "beyond all reasonable bounds of decency." The judgment of dismissal by the trial court was affirmed.

In *People* v. *Hayward Building Materials Co.*, the court held that a property owner in a condemnation proceeding was not entitled to an award for the cost of restoration of his remaining property in addition to severance damages. Such costs of restoration merely constitute evidence bearing on severance damages. And in *People* v. *Salem Development Co., Inc.*, it was held that a property owner was not entitled to interest from the date the order of immediate possession was signed and filed but only from the "effective" date of the order, which first required service of a notice upon the property owner. Since the notice was never served and possession was not taken until after trial and judgment, no interest was allowed.

Several other cases are now pending before the appellate courts, awaiting argument or decision.

Other Litigation

In addition to the condemnation proceedings, the department's attorneys handled a large number of miscellaneous cases. The following tabulation covers a wide variety of litigation and indicates a continuing increase in this aspect of the department's work.

At the start of the fiscal year there were 659 cases pending, and 519 cases were filed during the year, for a total of 1,178 cases being processed. There were 420 cases closed during the year, leaving 758 cases pending on June 30, 1963.

Some of these cases involve claims for damage to state highway facilities, such as bridges, signals, guardrails, or damage to state vehicles, or unlawful detainer actions. During the fiscal year collections from these cases by the division amounted to $105,190.76.

The case total includes many cases where the department was represented as a defendant, such as inverse condemnation, suits by contractors for additional compensation on construction contracts; proceedings for damage to public property by reason of state highway operations; suits filed because of alleged dangerous or defective condition of highways; and suits enjoining the construction and building of highways. Other types of suits, such as stop notice actions, are defended by the department and the department has filed interpleader actions in which it assumes a neutral position between the contractor and the party suing on a stop notice.

Proceedings Before Public Utilities Commission

The division handles matters before the Public Utilities Commission having to do with crossings of grade at highways and railroads and the construction of grade separations. The following tabulation indicates the volume of this type of work for the fiscal year:

Applications pending, June 30, 1962	11
New applications filed	30
Total applications before PUC	41
Applications processed to completion prior to expiration date of order	1
Adjusted total applications	40
Decisions received	30
Applications pending, June 30, 1963	10

In addition to formal applications, 18 proceedings under PUC General Order 88, relating to crossings at grade, were processed. In all instances the approval of the Public Utilities Commission must be obtained as to engineering details and, in the event of a failure to reach an agreement with the railroad involved as to apportionment of cost, the applicant seeks such determination by the Public Utilities Commission. The enactment by the Legislature in 1957 of a new formula for apportionment of cost, except for federal-aid highways, has substantially reduced the number of contested cases.

Board of Control and Other Claims

Claims against the State by reason of activities of the department are filed with the State Board of Control. The following tabulation illustrates the increase in the volume of this work:

	Number of claims	*Amounts of claims*
Pending on 7/1/62	102	$8,217,096.80
Filed	309	14,903,130.81
Total	411	23,120,227.61
Claims disposed of	258	10,642,553.34
Pending 6/30/63	153	$12,477,674.27

There was an increase of 31 claims filed over the previous year, amounting to $3,041,591.56. This was an increase of 11 percent. The principal types of Board of Control claims as listed above are for negligence, dangerous or defective condition of state highways, breach of contract and inverse condemnation.

Other claims filed with the department and its employees and the Governor number 46.

The primary reason for the increase in the number of claims filed with the board is due in a large part to the recent decision by the California Supreme Court in the case of *Muskopf* v. *Corning Hospital District*, 55 Cal. (2d) 211.

This decision greatly expanded the liability of the State, particularly for accidents arising out of the dangerous or defective conditions of state highways. The 1963 Session of the Legislature enacted Chapter 1681 which greatly expands the liability of the Department of Public Works. The legislation makes the State liable for the negligent acts or omissions of its employees as well as for the dangerous condition of public property, including state highways. This liability will necessitate the careful investigation by Division of Highways personnel of all claims.

It is anticipated that because of the *Muskopf* decision and this legislation, the number of claims will increase substantially as well as the work in investigating these claims and the handling of the resulting litigation.

Contractors' claims before the State Highway Engineer's Board of Review for additional compensation have continued to increase. These claims have required considerable work, both in the analysis and handling of claims as well as the resulting litigation. Directly proportional to the number of Board of Review hearings in the increased number of lawsuits against the department arising out of construction contract claims.

House Counsel Work

The "house counsel work" of the division has also continued to increase. This work consists of legal opinions directed toward *preventing* litigation.

Other routine work has increased, such as approval of contracts and leases, reviewing forms and accident reports. This work is directly proportional to the increased volume of the highway program. In addition, there were 30 contested hearings before the State Personnel Board, an increase of 5 over the previous fiscal year.

Fiscal Management

- *Administration of all accounting activities of the Division of Highways is under the direction of the Comptroller of the Division of Highways and his staff*

Cash Resources and Obligations

As the State Highway Fund (SHF), has no borrowing authority, it must operate on a cash basis. This requires the maintenance of sufficient working capital to meet payrolls and payments to contractors. Monthly cash outlays have peaks and valleys which do not coincide with fluctuations in monthly transfers into the SHF. May and June 1963 were the highest income months of the year because of the receipt of:

(1) Approximately $55,000,000 in SHF share of the annual motor vehicle receipts, and

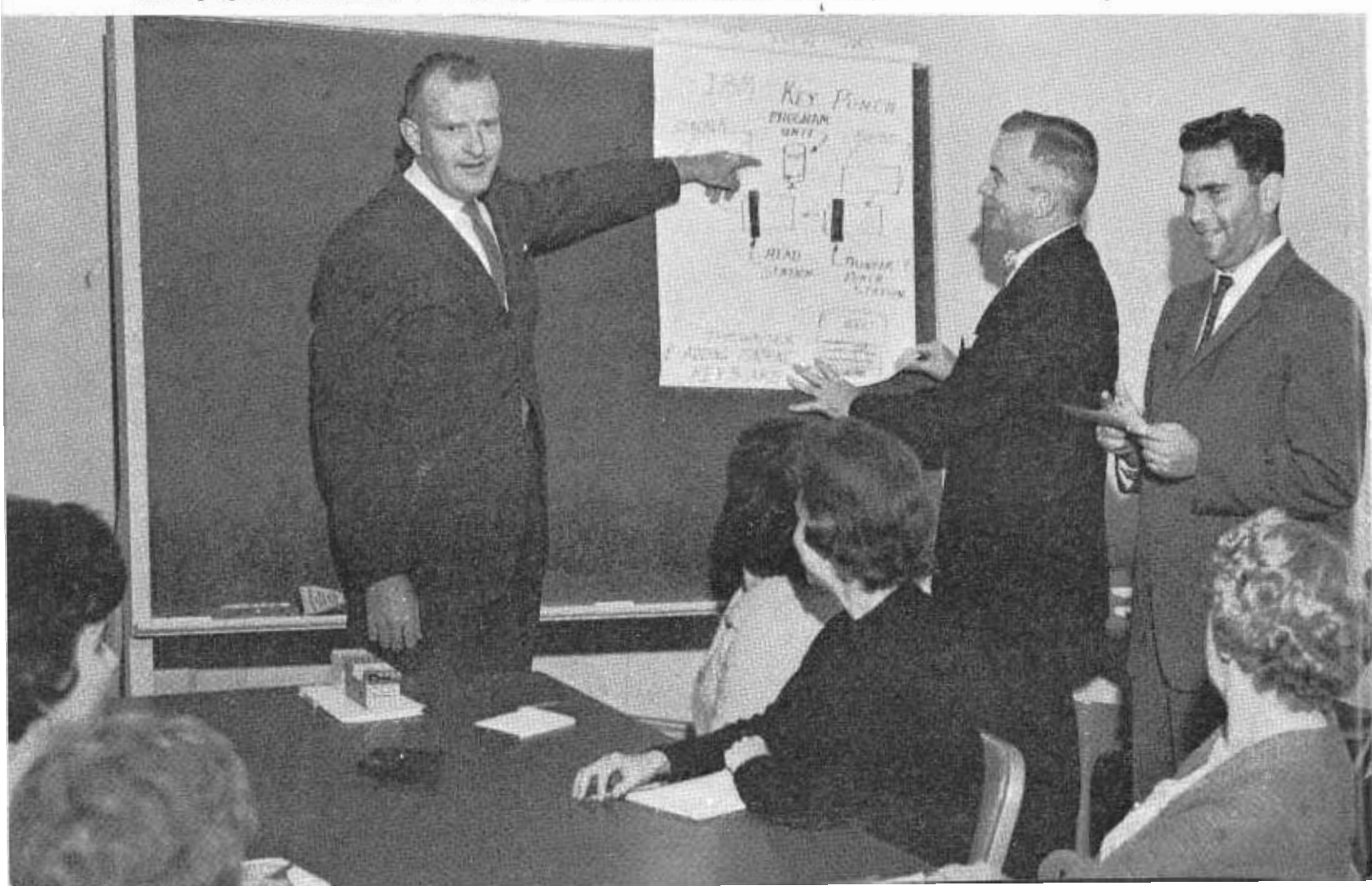
(2) Approximately $23,000,000 of federal funds anticipated in July.

Thus, the June 30, 1963, balance of $88,192,800 was the high point of the year. At the low point in February 1963, the balance fell to approximately $3,000,000, for one day. Monthly expenditures vary from $44,000,000 to $67,000,000, depending on construction weather. A major portion of the June 30, 1963, balance, $59,391,703, was invested in U.S. government securities. Also, on that same date, outstanding obligations in uncompleted contracts and day labor jobs amounted to $315,735,377.

Revenue and Expenditures

Revenues budgeted for the 1962-63 fiscal year amounted to $678,557,151, of which $257,625,425 remained to be collected on June 30, 1963. Revenue not received, which consists of $248,392,210 of federal aid and $9,233,215 of contributions from state and local agencies and other sources, will be collected as applicable work is completed or billed. Revenues budgeted for the prior fiscal year amounted to $645,832,590, the increase in the 1962-

Seminars in data processing for accounting were held throughout the State in 1963. The training team was made up of Robert G. Haness of Fiscal Management (standing right), E. J. Wintermute of the Training Section (center) and the manufacturer's representative (left). This meeting was held in Eureka.



63 fiscal year being caused primarily by a larger apportionment of federal funds.

Expenditures and obligations incurred applicable to the fiscal year ended June 30, 1963, amounted to $680,845,507, as compared to $615,-605,478 for the prior fiscal year. As revenue budgeted exceeded obligations incurred by approximately $2,200,000, the unobligated budget funds increased from $116,404,664 on June 30, 1962, to $118,187,621 on June 30, 1963.

Fiscal Management Improvement

1. As a result of a drive to reduce the amount of unbilled federal reimbursement, this backlog was reduced by approximately $2,000,000 during the first six months of the fiscal year, by approximately $5,000,000 during the next four months, and by approximately $11,000,000 during the last two months, for a total reduction of approximately $18,000,000. This not only improved the cash balance of the State Highway Fund by $18,000,000 as of June 30, 1963, but also increased revenue through investment of temporary cash surplus. On an annual basis, investment of $18,000,000 would produce additional investment income of approximately $540,000.

2. Certain forms, including the Equipment Report and Motor Vehicle Log ("car tag"), were improved to make them suitable for data processing.

3. Certain tort claims will be transmitted directly to branch indicated offices in San Francisco and Los Angeles, rather than via Headquarters in Sacramento, to provide more efficient handling and improvement in collection efforts. Since timely action increases the success ratio in any bill collection effort, more tort claims will be collected under the improved procedure.

4. In January 1963, a new Reconciliation Manual was completed in time for distribution and explanation to district accounting personnel convened in annual conference in Sacramento. This manual has accelerated reconciliation of computer trial balances with those prepared manually in the districts. This has saved labor and expedited completion of accounting reports.

5. A cost analysis for rental equipment costs throughout the division was completed, with the result that the Bureau of Public Roads approved an increase in the reimbursable mileage rate for staff vehicles from .0547 cents to .0696 cents. This increased the amount of federal reimbursement by approximately $180,000 per year.

6. In co-operation with the Management Analysis Section, a study of the Materials and Research Department accounting system was completed. The result streamlined internal accounting procedures in the Laboratory, with the resultant saving of administrative effort there. It also increased federal reimbursement by .25 percent of construction cost for testing charges on interstate projects, producing an annual increase of federal reimbursement of approximately $275,000.

7. In co-operation with the Equipment Department, a standard material cost system was developed and tested successfully by Shop 10. As a result, this system is being extended throughout the Equipment Department to produce an estimated annual saving in labor cost of approximately $48,000.

Training

A significant increase in training for accounting personnel, both in districts and at Headquarters, occurred. This training not only recognized the need to give accounting personnel an awareness of technical developments in accounting equipment, particularly electronic data processing equipment, but also the need for improved communications between district and Headquarters staffs, and between accounting personnel and the engineers for whom prompt, accurate financial information is necessary in order to make good management decisions. This training included:

1. A 4-day training course, entitled "Data Processing Accounting For Management Personnel." This course was conducted both in San Francisco and Los Angeles for all district accounting officers, and key personnel from Headquarters Office. The individual most concerned with data processing in each district accounting office also attended.

2. Electronic data processing seminars were conducted in each district office. In the initial pilot program in District X, this seminar required almost two complete days, but streamlining enabled the seminar to be completed in two morning sessions in remaining district offices. This "road show" became so popular that requests for participation by various Headquarters departments led to additional sessions in Sacramento.

1964-65 Highway Budget

The California Highway Commission on October 30 budgeted $577,212,100 for state highway construction purposes, including rights-of-way and engineering, for fiscal year 1964-65.

This figure, up $22,535,016 from the 1963-64 highway budget adopted a year ago, contains $406,268,000 for major construction and improvement (including engineering), $155,444,100 for rights-of-way, plus smaller amounts for contingencies, resurfacing programs, signs and striping and minor improvements.

The $22,535,016 increase resulted from a $8,986,990 gain in federal aid for the state highway system, mostly on interstate routes, plus the expected normal increase in motor vehicle registrations which will produce additional revenue in highway user taxes.

The budget provides construction funds for 282 miles of multilane freeways, 25.2 miles of multilane expressways and 37.6 miles of two-lane expressways planned for future expansion to four-lane divided when traffic conditions warrant, in addition to numerous widening and other projects.

In submitting the budget to Governor Edmund G. Brown, Highway Transportation Agency Administrator Robert B. Bradford, Commission Chairman, said that California will continue to give priority to construction of its 2,177-mile share of the national system of interstate and defense highways. Federal law requires the system's completion by 1972.

Construction on Schedule

"Our construction progress on interstate routes is right on schedule except in San Francisco," Bradford said. "I believe we made a wise decision in concentrating our earliest interstate efforts on the more difficult and expensive portions in urban areas where traffic volumes are greatest. Interstate projects in this new budget, while still mainly on heavily traveled routes, are for the most part outside the built-up areas.

"But although a substantial portion of the new budget is earmarked for interstate routes in accordance with the federal government timetable, we have not forgotten the highway needs of motorists in any area of the State. The money is spread to remedy the most urgent highway deficiencies in line with a continuing orderly and balanced program to provide greater safety and traffic capacity for our rapidly growing population."

The budget contains $305,708,240 in federal funds, of which $256,149,540 is designated for interstate system routes.

In addition to the construction items, the Highway Commission also budgeted $78,142,000 for highway purposes other than construction, including: $45,500,000 for maintenance, $14,522,000 for administration, $7,500,000 for buildings and plants, $5,500,000 for maintenance of landscaping and functional planting, $2,800,000 for highway research and development, $1,200,000 for highway planning, $1,100,000 for honor camps, and $20,000 for legislative claims.

Nonstate Highway Items

A third budget segment totaling $140,563,101 was allocated for functions not under state highway jurisdiction.

The largest nonstate highway items are $67,714,846 for construction and rights-of-way for streets and roads on the select system of cities and counties as established by the 1963 Legislature, and $47,205,060 for improvements and maintenance work on city streets.

The other such items are $8,923,539 in federal aid for county roads on the federal aid secondary system and $4,183,306 in state funds to counties for use in matching these federal funds; $5,000,000 in state funds to help finance railroad grade separation projects on local streets and roads; $3,139,350 in state funds to pay part of the cost of extending federal aid secondary county roads into urban areas; $2,870,000 for maintenance of state-owned toll bridges; $1,400,000 in engineering funds for cities; and $127,000 for administration of the Outdoor Advertising Act.

The total estimated revenue from all state sources is $481,285,422, a gain of $90,964,380 over such revenue for the present fiscal year. This increase, however, was caused largely by Senate Bill 344, enacted during the last session of the Legislature, which added 1 cent to the gasoline tax and increased weight fees. All of the money thus obtained under Senate Bill 344, approximately $75,000,000, is earmarked for cities and counties, not for state highways.

The revenue from state sources will derive from $350,468,554 in gasoline taxes, $86,883,346 in motor vehicle fees, $27,250,000 in taxes on diesel fuel, $14,656,522 in taxes on for-hire vehicles, and $1,900,000 in interest.

Bradford pointed out that for the first time in several years the 1964-65 highway budget includes some interstate system projects which are only partly financed in the budget year, but which under current federal government procedures can be placed under contract in their entirety with the assurance that the balance will be included in the 1965-66 budget.

"This method of budgeting," he said, "allows us to go ahead with construction earlier on some of the larger projects, which will take two years to complete, without tying up the entire amount of money involved. In other words, we can start more projects earlier by spreading the financing over two budgets instead of one."

1964-65 State Highway Budget By Region, Counties

NOTE 1—The term "freeway" means a multilane divided highway with full access control, no crossings at grade, no stoplights and no left-turn movements. An "expressway" has the same access control as the freeway but does permit left turns and crossings at grade at some intersections which may or may not be signalized. "Two-lane expressways" are two-lane highways with some measure of access control, and are usually planned for future expansion to four lanes.

NOTE 2—Projects which overlap county lines are listed in both counties.

NOTE 3—Construction contracts financed in this new budget may be awarded beginning January 1964; right-of-way funds may not be spent until July 1, 1964, the start of the fiscal year.

NOTE 4—At the last session of the Legislature, a bill was passed which renumbers the state highway routes effective July 1, 1964. Projects in this budget are listed by both old and new route designations. If only one route number appears, the route number will not change.

NORTH COASTAL COUNTIES PROJECTS

Del Norte County

Construct two lanes of ultimate four-lane U.S. 101 Freeway between Klamath South Bank Road and the junction of existing U.S. 101 and State Highway Route 46 (new Route 169) in Klamath with an interchange for relocated Route 169 near Hoppow Creek, a distance of 1.1 miles. The project includes a 2,000-foot, two-lane bridge across the Klamath River. Estimated cost, $2,700,000.

Rights-of-way on various state highway routes—$280,000.

Humboldt County

Extend the four-lane freeway on U.S. 101 (recently completed or under construction between Englewood and Sylvandale) another 2.6 miles southerly to Dean Creek, about six miles south of Phillipsville. Estimated cost, $2,300,000.

Construct interchange at Fourth Street in Arcata, an overcrossing for Old Arcata Road-Seventh Street and new ramp connections to South G Street south of the city to convert 1.5 miles of U.S. 101 Expressway to four-lane freeway. Estimated cost, $1,160,000.

Extend U.S. 299 Expressway four miles easterly as a four-lane freeway from 0.2 mile west of Mad River to west of Chartin Road (County Road 364), and construct a two-lane road between the end of the freeway and U.S. 299 at Greenwood Road in the City of Blue Lake. Interchanges will be provided at North Bank Road (State Highway Route 85), Essex Lane Road, and Glendale Road. The project includes grading another 0.8 mile of roadway north of Blue Lake for future easterly extension of the freeway. Estimated cost, $5,600,000.

Install culverts and grade for two-lane expressway on U.S. 299 on new alignment between 1.6 and 2.2 miles east of Redwood Creek, about 18 miles east of Blue Lake. Estimated cost, $270,000.

Replace two sidehill viaduct bridges and eliminate two others by minor realignment and replace three crib retaining walls on State Sign Route 96 between 5.4 miles north of Willow Creek and 4.5 miles south of Weitchpec. Estimated cost, $270,000.

Widen and realign portions of State Sign Route 36 to ease curves between 1.3 and 10 miles east of Bridgeville. Estimated cost, $100,000.

Rights-of-way on various state highway routes—$940,000.

Lake County

Resurface State Sign Route 29 and State Highway Route 243 (new State Sign Route 29) between Kelseyville and Lower Lake, a distance of 14.8 miles. Estimated cost, $270,000.

Rights-of-way on various state highway routes—$600,000.

Mendocino County

Construct two-lane expressway on State Sign Route 1 on new alignment between Russian Gulch north of Mendocino and existing State Sign Route 1 west of Jughandle Creek, a distance of about 4.6 miles, and a two-lane expressway section on existing alignment northerly to Mitchell Creek, a distance of about 1.1 miles, for a total length of 5.7 miles. The project includes an 860-foot bridge across Casper Creek. Estimated cost, $2,230,000.

Realign U.S. 101 to eliminate a dangerous curve at Red Hill between 2.3 and 1.6 miles south of Laytonville. Estimated cost, $135,000.

Rights-of-way on various state highway routes—$605,000.

SACRAMENTO VALLEY AND NORTHERN VALLEY PROJECTS

Butte County

Construct four-lane freeway section on U.S. 99E (new U.S. 99) between Palmetto Avenue and north of Mud Creek with interchanges at Cohasset Road, East Avenue and Eaton Road, a distance of 5.4 miles, to complete freeway construction through Chico. Estimated cost, $4,100,000.

Landscape U.S. 99E (new U.S. 99) Freeway now under construction between Little Chico Creek and East Eighth Street in Chico. Estimated cost, $50,000.

Rights-of-way on various state highway routes—$120,000.

Colusa County

Rights-of-way on various state highway routes—$272,500.

El Dorado County

Extend U.S. 50 Freeway (between Sunrise Boulevard and 0.5 mile east of Folsom Junction in Sacramento County) 10 miles easterly, to 1 mile east of Bass Lake Road in El Dorado County with interchanges at Prairie City Road, relocated Scott Road, El Dorado Hills Boulevard and Bass Lake Road. Estimated cost, $6,200,000. (This project also listed in Sacramento County.)

Widen U.S. 50 from two lanes to four between 2.1 and 2.9 miles east of Phillips to provide passing lanes. Estimated cost, $110,000.

Construct two-lane State Highway Route 93 (new State Sign Route 193) on new alignment between two and four miles east of Cool. Estimated cost, $100,000.

Rights-of-way on various state highway routes—$375,000.

Glenn County

Construct four-lane Interstate 5 Freeway between one mile north of Artois and the Tehama county line with interchanges at County Roads 16, 7 and 33 and State Sign Route 32—Newville Road, a distance of 11 miles. The project involves extending State Sign Route 32 from its terminus in Orland westerly to the new freeway. Estimated cost, $6,600,000, of which $3,500,000 will be budgeted in fiscal year 1965-66.

Replace a narrow bridge on State Highway Route 45 (new State Sign Route 162) across a Sacramento River overflow channel, approximately 0.2 mile west of Afton Road, with a 32-foot-wide bridge. Estimated cost, $60,000.

Rights-of-way on various state highway routes—$325,000.

Lassen County

Widen and add a truck climbing lane for westbound traffic on State Sign Route 36 between 0.6 mile west of Eagle Lake Road and Main Street in Susanville, a distance of 3.2 miles. Estimated cost, $310,000.

Rights-of-way on various state highway routes—$90,000.

Modoc County

Surface U.S. 299 between U.S. 395 northeast of Alturas and 3.4 miles easterly and realign another 4.6 miles to County Road 58-A west of Cedarville. Estimated cost, $850,000.

Rights-of-way on various state highway routes—$53,000.

Nevada County

Construct the first unit of the four-lane Grass Valley-Nevada City Freeway (State Sign Route 20) between Brunswick Road through Nevada City and 0.7 mile easterly, a distance of 3.3 miles. Estimated cost, $4,150,000.

Widen and improve alignment of State Sign Route 49 between 0.2 mile south of Bridgeport Road and 1 mile south of North San Juan, a distance of 1.2 miles. Estimated cost, $80,000.

Rights-of-way on various state highway routes—$275,000.

Placer County

Construct the Crystal Springs Interchange on U.S. 40 (Interstate 80), approximately 0.5 mile west of Baxter. Estimated cost, $300,000.

Rights-of-way on various state highway routes—$660,000.

Plumas County

Construct two-lane expressway on new alignment on U.S. 40 Alternate (new State Sign Route 70) between 1.8 miles east of Sloat Road and 1.8 miles west of State Sign Route 89 at Blairsden, a distance of 4.8 miles. Estimated cost, $1,730,000.

Rights-of-way on various state highway routes—$131,500.

Sacramento County

Construct the superstructure of the W-X Street Bridge and the six- and eight-lane freeway approaches between 0.3 mile west of Westacre Road in Yolo County and Fifth Street in Sacramento, a distance of 2 miles. Estimated cost, $18,200,000 of which $7,200,000 will be budgeted in fiscal year 1965-66. (This project also listed in Yolo County.)

Construct the eight-lane Interstate 80 (29th-30th Street) Freeway connecting the South Sacramento and the Elvas Freeways between Fifth Avenue and north of A Street in Sacramento, and portions of the interchange with the future W-X Street Freeway, and connections to city streets. Estimated cost, $12,700,000 of which $3,950,000 will be budgeted in fiscal year 1965-66.

Construct the Capitol Mall Overcrossing for the future Interstate 5 (Second and Third Street) Freeway in Sacramento and approaches, completing mall construction between Fourth Street and the Tower Bridge. Estimated cost, $1,200,000.

Extend U.S. 50 Freeway (between Sunrise Boulevard and 0.5 mile east of Folsom Junction in Sacramento County) 10 miles easterly, to 1 mile east of Bass Lake Road in El Dorado County with interchanges at Prairie City Road, relocated Scott Road, El Dorado Hills Boulevard and Bass Lake Road. Estimated cost, $6,200,000. (This project also listed in El Dorado County.)

Reconstruct the Madison Avenue Interchange on Interstate 80 east of McClellan Air Force Base to provide for four lanes on Madison Avenue and future freeway widening. Estimated cost, $655,000.

Improve alignment on portions of State Sign Route 16 between Grant Line Road and the Amador county line. Estimated cost, $200,000.

Rights-of-way on various state highway routes—$14,235,000.

Shasta County

Extend four-lane Interstate 5 Freeway construction in progress (between 0.7 mile north of Red Bluff and 2 miles north of the Tehama county line) another 5 miles northerly to the Sacramento River through Anderson with interchanges at South Anderson, Deschutes Road, Balls Ferry Road, North Street and Riverside Avenue. Estimated cost, $4,320,000, of which $1,920,000 will be budgeted in fiscal year 1965-66.

Widen Pit River Bridge on U.S. 99 (future Interstate 5) from 44 to 56 feet. Estimated cost, $920,000.

Extend two-lane State Sign Route 44 Expressway (between Airport Road east of Enterprise and Deschutes Road in Palo Cedro) another 4 miles easterly to 0.9 mile east of Millville. Estimated cost, $880,000.

Rights-of-way on various state highway routes—$1,483,000.

Sierra County

Widen and resurface portions of State Sign Route 49 between Bassetts and Yuba Pass. Estimated cost, $70,000.

Rights-of-way on various state highway routes—$30,000.

Siskiyou County

Construct the Park Avenue frontage road including a bridge across the Sacramento River and an interchange with U.S. 99 to convert four-lane U.S. 99 Expressway to Interstate 5 Freeway between 0.2 mile south and 0.9 mile north of the Sacramento River Bridge in Dunsmuir, in Siskiyou County. Estimated cost, $1,430,000.

Rights-of-way on various state highway routes—$460,000.

Sutter County

Widen State Sign Route 20 from two lanes to four between Harter Road and U.S. 40 Alternate (new U.S. 99) west of Yuba City, a distance of 1.1 miles. Estimated cost, $290,000.

Widen U.S. 40 Alternate (new State Sign Route 113) from the Sutter Bypass Causeway northerly to Tudor Road, a distance of 2.4 miles. Estimated cost, $53,000.

Rights-of-way on various state highway routes—$235,000.

Tehama County

Extend Interstate 5 Freeway construction in progress (between 2 miles north of Tehama-Shasta county line and 0.7 mile north of Red Bluff) another 22.1 miles southerly to Corning Road near Corning with interchanges at Finnel Avenue, Gyle Road, Las Flores Avenue, South Red Bluff, U.S. 99E (new U.S. 99) and North Red Bluff. Estimated cost, $13,460,000, of which $4,850,000 will be budgeted in fiscal year 1965-66.

Replace a timber bridge across Long Gulch on State Sign Route 36 with a wider reinforced concrete bridge and reconstruct approaches, about 18 miles west of Red Bluff. Estimated cost, $80,000.

Rights-of-way on various state highway routes—$270,000.

Trinity County

Widen and surface Bramlot and Cold Creek roads, newly acquired in the state highway system for improved realignment of State Sign Route 36, between Dubakella Mountain Road and 4.5 miles west of the Shasta county line, a distance of 9.6 miles. Estimated cost, $200,000.

Rights-of-way on various state highway routes—$105,000.

Yolo County

Construct the superstructure of the W-X Street Bridge and the six- and eight-lane freeway approaches between 0.3 mile west of Westacre Road in Yolo county and Fifth Street in Sacramento, a distance of 2 miles. Estimated cost, $18,200,000 of which $7,200,000 will be budgeted in fiscal year 1965-66. (Project also listed in Sacramento County.)

Landscape U.S. 40 between Jefferson Boulevard in West Sacramento and the Tower Bridge. Estimated cost, $150,000.

Rights-of-way on various state highway routes—$1,810,000.

Yuba County

Construct two-lane expressway on State Sign Route 20 between Sampson Street in Marysville and the north city limit, a distance of 1.5 miles. Estimated cost, $330,000.

Install and modify traffic signals and construct channelization at various locations on U.S. 99E (new State Sign Route 70) and State Sign Route 20 in Marysville. Estimated cost, $195,000; State's share, $125,000; Marysville, $70,000.

Rights-of-way on various state highway routes—$132,000.

SAN FRANCISCO BAY REGION PROJECTS

Alameda County

Construct two additional lanes to convert new State Sign Route 92 from two-lane highway to four-lane freeway between the east end of the San Mateo-Hayward Bridge and Hesperian Boulevard in Hayward, with interchanges at Industrial Boulevard and Eden Landing-Clawiter Road, a distance of three miles. Estimated cost, $3,500,000.

Construct four-lane Warren Boulevard Freeway (new State Sign Route 13) between Atlas Avenue and the MacArthur Freeway (Interstate 580) near Calaveras Avenue in Oakland, with interchanges at Redwood Road and Carson Street, a distance of 1.3 miles. Estimated cost, $1,800,000.

Construct Interstate 580 Freeway between U.S. 50 east of Livermore southeasterly to the San Joaquin county line, a distance of 1.2 miles, with an interchange at U.S. 50. Estimated cost, $1,350,000. (This project continues in San Joaquin County between the Alameda county line and future State Sign Route 132, which will be extended six miles westerly from its present terminus near Vernalis, with interchanges at Patterson Pass Road, Corral Hollow Road and State Sign Route 132, a distance of 11 miles. Estimated cost, $7,350,000.

Renovate ventilating equipment, paint, improve drainage and resurface portions of the Caldecott Tunnel (State Sign Route 24). Estimated cost, $1,250,000.

Resurface Nimitz Freeway (State Sign Route 17) and interchanges between Williams Street in San Leandro and Hegenberger Road in Oakland. Estimated cost, $300,000.

Install overhead directional signs on Interstate 80 (U.S. 40) between the San Francisco-Oakland Bay Bridge distribution structure and 0.2 mile north of Powell Street in Emeryville. Estimated cost, $105,000.

Rights-of-way on various state highway routes—$11,593,000, including approximately $4,500,000 on Interstate 580, most of it in and east of Castro Valley; $4,640,000 on new State Sign Route 24 (Grove-Shafter route) in Oakland.

Contra Costa County

Construct four-lane State Sign Route 4 Freeway between 0.2 mile west of Cummings Skyway and 0.1 mile west of Howe Road in Martinez, a distance of five miles, with interchanges at Cummings Skyway, McEwen Road and Alhambra Avenue; and reconstruct portions and resurface this route between Willow Road east of Interstate 80 in Hercules and 0.2 mile west of Cummings Skyway, a distance of 4.2 miles. Estimated cost, $8,075,000.

Construct six-lane Interstate 680 Freeway between 0.7 mile north of the Alameda county line and one mile south of Danville, a distance of 5.7 miles, completing freeway construction between Dublin and Walnut Creek, with an interchange at Crow Canyon Road. Estimated cost, $7,700,000, of which $3,000,000 will be budgeted in fiscal year 1965-66.

Install traveling scaffolds for painting under the Crockett approaches to the northbound Carquinez bridges on Interstate 80, and traveling scaffolds, and air and water lines on the southbound structure. Estimated cost, $390,000. (Project repeated in Solano County listing.)

Construct an additional on and off ramp on Interstate 80 north of County Road 20 in and near Richmond. Estimated cost, $300,000.

Rights-of-way on various state highway routes—$915,000.

Marin County

Extend Grand Avenue across San Rafael Creek to the U.S. 101 Freeway frontage road; grade and pave Second Street between Grand Avenue Extended to Francisco Street; and realign the Irwin Street off ramp in San Rafael prior to future freeway widening. Estimated cost, $500,000.

Construct various types of median barrier on U.S. 101 between 0.4 mile south of Waldo Undercrossing north of Sausalito and Corte Madera Creek. Estimated cost, $231,000.

Resurface, reconstruct shoulders and install underdrains on portions of U.S. 101 between State Sign Route 37 in Novato and the Sonoma county line. Estimated cost, $180,000.

Rights-of-way on various state highway routes—$50,000.

Napa County

Widen State Sign Route 37 between 2.0 and 3.2 miles northeast of Vichy Avenue, northeast of Napa, a distance of 1.2 miles. Estimated cost, $65,000.

Rights-of-way on various state highway routes—$485,000.

San Francisco County

Landscape U.S. 101 (new State Sign Route 82) in San Francisco between Havelock Street north of Ocean Avenue and Mission Street. Estimated cost, $75,000.

Rights-of-way on various state highway routes—$2,190,000.

San Mateo County

Construct eight-lane Interstate 280 Freeway between Eastmoor Avenue in Daly City and 0.5 mile south of Arroyo Drive west of South San Francisco with interchanges at Westborough Boulevard, the future Hickey Boulevard extension at Collins Avenue and the future State Sign Route 1 Freeway. Estimated cost, $8,200,000, of which $4,200,000 will be budgeted in fiscal year 1965-66.

Construct two four-lane bridges across San Mateo Creek for the future Interstate 280 Freeway in and near Hillsborough. Estimated cost, $7,600,000, of which $5,100,000 will be budgeted in fiscal year 1965-66.

Widen State Sign Route 1 from two lanes to four as an interim project between 1 mile south of Sharp Park Road and Linda Mar Boulevard in Pacifica, a distance of 1.3 miles. Estimated cost, $200,000.

Resurface Skyline Boulevard (State Sign Route 5—new State Sign Route 35) between the State Sign Route 1 Interchange and Alemany Boulevard in Daly City. Estimated cost, $120,000.

Install freight elevators in the lift span towers of the Dumbarton Bridge on State Sign Route 84. Estimated cost, $120,000.

Construct median barrier and install overhead directional signs on the Bayshore Freeway (U.S. 101) between Redwood Creek Bridge in Redwood City in San Mateo County and Guadalupe Parkway Overcrossing in San Jose in Santa Clara County, completing median barrier construction between the San Francisco-Oakland Bay Bridge and San Jose. Estimated cost, $371,000. (This project repeated in the Santa Clara County listing.)

Rights-of-way on various state highway routes—$12,898,000, including $10,300,000 on the Interstate 280 Freeway.

Santa Clara County

Construct six-lane Interstate 280 Freeway between Mountain View-Stevens Creek Road in Los Altos and 0.2 mile north of Page Mill Road in Los Altos Hills, with interchanges at Magdalena and El Monte Avenues and ramp connections to Page Mill Road, a distance of 7.2 miles. Estimated cost, $8,000,000, of which $5,000,000 will be budgeted in fiscal year 1965-66.

Landscape the Interstate 280 Freeway between one mile east of Doyle Road and Forest Avenue in San Jose. Estimated cost, $250,000.

Construct the Capitol Expressway and Hellyer Avenue interchanges on the Bayshore Freeway (U.S. 101) to convert the section between 0.6 mile south of Tully Road and Coyote Creek in and near San Jose to full freeway standards. The project includes construction of frontage roads. Estimated cost, $1,155,000.

Construct the Oregon Avenue Interchange on the Bayshore Freeway (U.S. 101) and connections to the Oregon Avenue Expressway now under construction by Santa Clara County in Palo Alto. Estimated cost, $775,000.

Construct median barrier and install overhead directional signs on the Bayshore Freeway (U.S. 101) between Redwood Creek Bridge in Redwood City in San Mateo County and Guadalupe Parkway Overcrossing in San Jose in Santa Clara County, completing median barrier construction between the San Francisco-Oakland Bay Bridge and San Jose. Estimated cost, $371,000. (This project repeated in the San Mateo County listing.)

Widen three-lane Monterey Highway (U.S. 101, new State Sign Route 82) in San Jose to four lanes divided between Ford Road and 0.2 mile north of Curtner Avenue, a distance of five miles. Estimated cost, $1,135,000.

Reconstruct and widen State Sign Route 152 between 0.2 mile west of Bloomfield Road east of Gilroy and San Felipe Road west of the Hollister Wye, a distance of five miles. Estimated cost, $350,000.

Rights-of-way on various state highway routes—$5,405,000.

Santa Cruz County

Rights-of-way on various state highway routes—$60,000.

Solano County

Construct superstructure of four-lane, dual-structure Napa River Bridge on State Sign Route 48 (new State Sign Route 37) near Vallejo to replace an existing two-lane drawbridge, and place embankment for future bridge approaches. Estimated cost, $4,400,000.

Add two lanes to U.S. 40 expressway to provide six-lane Interstate 80 Freeway between 1 mile and 2.1 miles northeast of the Milk Farm north of Dixon and construct an interchange at Pedrick Road. Estimated cost, $810,000.

Construct channelization on State Sign Route 29 in Vallejo at the intersections of Mini Drive, Donner Pass Road and Redwood and Idaho Streets, and install traffic signals at the latter two intersections. Estimated cost,

$180,000; state's share, $165,000; city, $15,000.

Widen shoulders and resurface State Highway Route 101 (new Route 113) between State Sign Route 12 and Dozier, 8.2 miles north. Estimate cost, $180,000.

Install traveling scaffolds for painting under the northbound Carquinez Bridge structure approach on Interstate 80, and traveling scaffolds, air and water lines on the southbound structure. Estimated cost, $390,000. (Project repeated in Contra Costa County listing.)

Rights-of-way on various state highway routes—$215,000.

Sonoma County

Construct an interchange at Steele Lane and frontage roads to convert U.S. 101 between 0.1 mile south of Edwards Avenue and Russell Avenue in Santa Rosa from expressway to freeway standards. Estimated cost, $1,170,000.

Landscape and plant trees on the U.S. 101 and State Sign Route 12 interchanges in Santa Rosa and a total of 1.9 miles of State Sign Route 12 east and west of the interchange. Estimated cost, $200,000.

Rights-of-way on various state highway routes—$815,000.

CENTRAL COAST COUNTIES PROJECTS

Monterey County

Extend previously budgeted four-lane freeway project on U.S. 101 (between the San Luis Obispo-Monterey county line and 1.6 miles north of Gate 1, Camp Roberts) to 1.5 miles north of Bradley. The project includes constructing bridges across the Nacimiento and San Antonio Rivers and the East Garrison and North Bradley interchanges. Mileage—6.7. Estimated cost, $3,800,000.

Construct a bridge across the Salinas River, to replace the Hilltown Bridge, and a portion of an interchange at relocated Reservation Road for a future relocation of State Sign Route 68 as a four-lane freeway between 0.5 mile south of Reservation Road and 0.2 mile north of Foster Road, southwest of Salinas. The project includes grading and paving to relocate approximately one mile of Reservation and River Roads as a cooperative project with the county. Estimated cost, $1,450,000.

Widen and construct left-turn storage lanes for westbound traffic on State Sign Route 68 at the intersections of Laureles Grade, Corral de Tierra and San Benacio Roads, east of Monterey. Mileage—0.7. Estimated cost, $115,000.

Rights-of-way on various state highway routes—$750,000.

San Benito County

Widen State Sign Route 156 to four-lane expressway between U.S. 101 and San Juan Bautista. Mileage—2.4. Estimated cost, $760,000.

Resurface U.S. 101 between 0.9 mile north of State Sign Route 156 and the Santa Clara county line. Mileage—3.5. Estimated cost, $140,000.

Reconstruct shoulders on State Sign Route 25 (becomes State Sign Route 180) between State Sign Route 156 and the Santa Clara county line. Mileage—8.6. Estimated cost, $120,000.

Rights-of-way on various state highway routes—$105,000.

San Luis Obispo County

Construct the San Anselmo Road, North Templeton and State Sign Route 41 interchanges on U.S. 101 south of Paso Robles (continuing conversion of this highway from expressway to freeway standards). Estimated cost, $1,600,000.

Construct stopping area for southbound trucks on U.S. 101 at the summit of Cuesta Grade, about three miles south of Santa Margarita. Estimated cost, $60,000.

Reconstruct and widen State Sign Route 178 (becomes State Sign Route 58) between 0.5 mile east of Indian Creek and San Juan Creek, northeast of Santa Margarita. Mileage—17.3. Estimated cost, $210,000.

Rights-of-way on various state highway routes—$345,000.

Santa Barbara County

Construct four-lane freeway on State Sign Route 1 between Harriston and State Highway Route 2 (becomes State Route 135) and an interchange between the two routes, and a two-lane expressway between the interchange end 1.4 miles west of Orcutt; and construct a four-lane freeway on State Highway Route 2 (135) between the interchange and 0.3 mile north of Clark Avenue in Orcutt. Mileage—9.9. Estimated cost, $4,860,000.

Install traffic signals, highway lighting and channelization at the intersection of State Sign Route 1 and Central Avenue in Lompoc. Estimated cost, $110,000.

Construct new bridge and approaches across San Antonio Creek on State Highway Route 2 (becomes State Route 135), about seven miles west of Los Alamos. Estimated cost, $105,000.

Rights-of-way on various state highway routes—$970,000.

Ventura County

Convert 3.6 miles of the four-lane Ventura Expressway to six-lane freeway between Vineyard Avenue in El Rio and the completed freeway section near Telephone Road in Montalvo, with interchanges at Victoria Avenue, U.S. 101 Alternate and Sherwin Avenue, and an additional bridge across the Santa Clara River. Estimated cost, $7,500,000.

Replace the seawall protecting U.S. 101 2.9 miles north of Ventura. Estimated cost, $325,000.

Landscape the interchange area between the Ventura and State Sign Route 126 Freeways in Ventura, and functional and tree planting on the SSR 126 Freeway between the interchange and Wells Road northeast of the city. Estimated cost, $210,000.

Construct a northbound off ramp from the Ventura Freeway to Vista Del Mar Drive in Ventura and landscape. Estimated cost, $88,000.

Construct uphill passing lane on Ventura Boulevard (U.S. 399—new State Sign Route 33) between San Antonio Creek and Oakview, and widen to four lanes in Oakview to Santa Ana Way. Estimated cost, $175,000.

Rights-of-way on various state highway routes—$6,911,000.

SAN JOAQUIN VALLEY AND CENTRAL MOUNTAIN COUNTIES PROJECTS

Alpine County

Rights-of-way on various state highway routes—$15,000.

Amador County

Construct two-lane expressway on State Sign Route 104 (new State Sign Route 124) between 2.4 miles north of Ione and State Sign Route 16, a distance of 5.6 miles, including a bridge across Dry Creek about six miles north of Ione. Estimated cost, $1,800,000.

Rights-of-way on various state highway routes—$70,000.

Calaveras County

Rights-of-way on various state highway routes—$150,000.

Fresno County

Construct six-lane overhead structure, 0.6 mile in length, over Southern Pacific Railroad and U.S. 99 Business Route (Golden State Avenue) between Lorena Avenue and Fulton Street in Fresno, for future State Sign Route 41 freeway. Estimated cost, $3,220,000.

Construct bridge across San Joaquin River and approaches on State Sign Route 145, between 0.3 mile south of Barstow Avenue in Fresno County and 0.2 mile north of Avenue 5½ in Madera County, a length of 1.3 miles. Estimated cost, $372,000. (This project repeated under Madera County.)

Rights-of-way on various state highway routes—$2,732,000.

Inyo County

Construct two-lane highway on new location between 0.7 mile west of Cal-Electric Power Plant No. 3 and Otey's on Route 76 (new Route 168), a distance of 6.7 miles. Estimated cost $770,000.

Widen State Sign Route 127 for 7.3 miles from Death Valley Junction to Nevada state line. Estimated cost, $130,000.

Rights-of-way on various state highway routes—$100,000.

Kern County

Construct six-lane freeway on State Sign Route 178 from M Street to Mount Vernon Avenue in Bakersfield, with interchanges at Golden State and Beale Avenues, Alta Vista Drive, and Haley Street; and on new State Sign Route 58, widen 24th Street from Oak Street to B Street and convert to one-way street couplet on 23d and 24th Streets from B Street to M Street. Total length, 5.2 miles. Estimated cost, $7,885,000, not including co-operative drainage project with Kern County and City of Bakersfield.

Paving to complete four-lane freeway (grading and structures now under contract) on U.S. 466 (new State Sign Route 58) between 0.2 mile east of Keene and 0.8 mile west of Tehachapi Overhead, a distance of 8.3 miles. Estimated cost, $1,550,000.

Functional and tree planting for 5.9 miles on U.S. 99 (West Bakersfield Freeway) between 0.2 mile south of Planz Road and Minkler Spur. Estimated cost, $275,000.

Construct two-lane expressway on U.S. 395 between 0.5 mile south of China Lake Road and 1.5 miles north of Inyokern, a distance of 11.8 miles, with an interchange structure and railroad overhead at Brown Road. Estimated cost, $1,040,000.

Widen Route 142 (new Route 155) for 14.7 miles between 0.1 mile east of Woody and 1.1 miles west of Sequoia National Forest boundary. Estimated cost, $100,000.

Rights-of-way on various state highway routes—$3,018,000.

Kings County

Rights-of-way on various state highway routes—$605,000.

Madera County

Construct bridge across San Joaquin River and approaches on State Sign Route 145, between 0.3 mile south of Barstow Avenue in Fresno County and 0.2 mile north of Avenue 5½ in Madera County, a length of 1.3 miles. Estimated cost, $372,000. (This project repeated under Fresno County.)

Rights-of-way on various state highway routes—$231,000.

Mariposa County

Place base and surfacing on a two-lane expressway section on State Sign Route 49 (grading recently completed) between two miles east of Mariposa and State Sign Route 140 in Mariposa, a distance of 2.0 miles, including construction of a bridge across Stockton Creek. Estimated cost, $125,000.

Rights-of-way on various state highway routes—$140,000.

Merced County

Construct four-lane Interstate 5 Freeway between 0.2 miles south of State Sign Route 152 and 2.8 miles north of junction with State Sign Route 33 with interchanges at State Sign Route 152, Jensen Road-State Sign Route 33 and Whitworth-Romero Roads, a distance of 7.1 miles, and grading for future Interstate 5 Freeway between Snyder Road and 1.8 miles south of the Stanislaus county line, a distance of 1.5 miles. Estimated cost, $5,400,000.

Rights-of-way on various state highway routes—$535,000.

Mono County

Construct two-lane and four-lane expressway between 3.3 miles north of McGee Creek and 1 mile north of Casa Diablo on U.S. 395, with 0.5 mile of improved connection on Mammoth Lakes Highway (Route 112, new Route 203), a distance of 6.6 miles. Estimated cost, $565,000.

Widen U.S. 395 from two lanes to four, with improved drainage, for 0.3 mile in the town of Lee Vining. Estimated cost, $50,000.

Rights-of-way on various state highway routes—$231,500.

San Joaquin County

Construct four-lane Interstate 580 Freeway between Alameda county line and future State Sign Route 132 which will be extended six miles westerly from its present terminus near Vernalis, with interchanges at Patterson Pass Road, Corral Hollow Road and State Sign Route 132, a distance of 11 miles. Estimated cost, $7,350,000. This project connects to another on this route in Alameda County between the San Joaquin county line and U.S. 50 east of Livermore, a distance of 1.2 miles, with an interchange at U.S. 50. Estimated cost, $1,350,000.

Resurface U.S. 50 between 1 mile south of French Camp and State Sign Route 4 in Stockton, a distance of 5.1 miles. Estimated cost, $400,000.

Modify existing warning signals on U.S. 99 at the Sacramento, Tidewater and Eastern Railroad tracks near Washington Street in Stockton. Estimated cost, $60,000.

Rights-of-way on various state highway routes—$3,900,000.

Stanislaus County

Replace bridge across Tarantula Creek on State Sign Route 132 west of La Grange with a culvert and realign 0.5 miles east and west of the creek. Estimated cost, $75,000.

Rights-of-way on various state highway routes—$1,255,000.

Tulare County

Rights-of-way on various state highway routes—$240,000.

Tuolumne County

Extend the four-lane Twain Harte Grade Expressway recently completed on State Sign Route 108, 2.9 miles easterly as a two-lane expressway between Hunts and Confidence, and convert the two-lane expressway between 1.7 miles east of Long Barn and 2.1 miles easterly to four-lane expressway, extending a two-lane expressway section under construction between Lyons Dam Road and 1.7 miles east of Long Barn. Estimated cost, $2,040,000.

Widen State Sign Route 49 to ease a sharp curve about 5.3 miles west of Sonora, and widen and reconstruct 0.4 mile of this route about 3.9 miles west of Sonora. Estimated cost, $66,000.

Rights-of-way on various state highway routes—$180,000.

SAN BERNARDINO-RIVERSIDE COUNTIES PROJECTS

Riverside County

Reconstruct and add lanes to U.S. 60-70-99 to extend the eight-lane Interstate 10 Freeway (now under construction to the east city limit of Cabazon) another 6.1 miles easterly and construct interchanges at Verbenia Avenue and State Sign Route 111 at Palm Springs Junction west of Whitewater and bridges across Millard Canyon. Fornat and Stubby Canyon washes; and widen State Sign Route 111 Expressway from two lanes to four between U.S. 60-70-99 (Interstate 10) and the existing four-lane expressway at Windy Point, a distance of five miles, and construct an overhead across the Southern Pacific Railroad tracks and bridges across the Whitewater River Overflow and San Gorgonio River. Estimated cost, $6,300,000.

Extend a four-lane freeway project in progress on Interstate 10 (between 3.5 miles east of Indio and 10 miles easterly) to 4.4 miles east of Cottonwood Springs Road, with an interchange at State Sign Route 195-Cottonwood Springs Road, an access interchange near the Southern Counties Gas Company's compressor station 6.5 miles west of the Cottonwood Springs Interchange, and a safety rest area near former Cactus City, a distance of 14.1 miles. Estimated cost, $5,300,000.

Construct an interchange on U.S. 60-70-99 four miles northwest of Thousand Palms with extensions of Vista Chino Road from Palm Springs and Date Palm Drive from Cathedral City, and close remaining access openings to convert 3.4 miles between 4 miles northwest of Thousand Palms and Ramon Road from four-lane expressway to Interstate 10 Freeway. Estimated cost, $625,000.

Landscape Interstate 10 Freeway within the city limits of Beaumont. Estimated cost, $175,000.

Construct two additional lanes on U.S. 60 to convert a four-lane divided highway to six-lane freeway between Eighth Street in Riverside and U.S. 395 with interchanges at University Knolls, Watkins Drive, Fischer Road and U.S. 395. This project completes freeway construction between Sunnyslope and State Sign Route 79 near Moreno. Estimated cost, $3,350,000.

Widen the U.S. 91 Freeway from four lanes to six between Arlington Avenue and U.S. 60 in Riverside, a distance of 4.1 miles. Estimated cost, $735,000.

Widen State Sign Route 74 from two lanes to four between State Sign Route 79 and 1.5 miles east of Hemet, a distance of 2.1 miles. Estimated cost, $140,000.

Rights-of-way on various state highway routes—$2,535,000.

San Bernardino and Riverside Counties

Install guard railing at bridge approaches on U.S. 91 between State Sign Route 71 and Interstate 10; on portions of U.S. 60 between U.S. 91 and the University Undercrossing in Riverside; on portions of Interstate 10 between the Los Angeles county line and the east city limit of Banning; on portions of Interstate 15 between Interstate 10 and Cima Road, about 25 miles east of Baker; and on Interstate 40 at the Montara Overcrossing near the east city limit of Barstow. Estimated cost, $110,000.

San Bernardino County

Reconstruct and widen U.S. 91-466 between Cronese Valley and two miles east of Baker to convert the last segment between Barstow and the Nevada line from two-lane conventional highway to four-lane Interstate 15 Freeway, and construct the Rasor and Soda Roads, West and East Baker and State Sign Route 127 Interchanges and a bridge across the Mojave River. Distance—18.1 miles. Estimated cost, $6,600,000.

Construct an interchange on Interstate 15 (U.S. 91-66) at Townsend Street near Lenwood, 0.7 mile southwest of Barstow. Estimated cost, $400,000.

Convert the four-lane Barstow Expressway (U.S. 66-91) to Interstate 15 Freeway between Phelan Road and Palmdale Road in and near Victorville by constructing frontage roads and interchanges at Phelan Road and Bear Valley Cutoff. Estimated cost, $2,500,000.

Construct a four-lane divided highway bridge across the Colorado River on U.S. 66 for the future Interstate 40 Freeway. Estimated cost, $3,250,000; California's share, $1,850,000; Arizona's share, $1,350,000.

Widen the San Bernardino Freeway (Interstate 10) from four lanes to eight between Vineyard Avenue in Ontario and Valley Boulevard, 5.4 miles easterly. Estimated cost, $4,500,000, of which $2,000,000 will be budgeted in fiscal year 1965-66.

Widen State Sign Route 18 from two-lane highway to four-lane freeway between Camp Waterman and Panorama Point, south of the Crestline Interchange, a distance of 1.6 miles. Estimated cost, $1,175,000.

Resurface I Street in San Bernardino between Highland Avenue and 30th Street, and widen 30th Street between I Street and Valencia Avenue as a temporary route for State Sign Route 18, a distance of 2.5 miles. The 30th Street improvement will serve as a collector road for the future State Sign Route 30 Freeway. Estimated cost, $275,000.

Pave gutters and widen the cross streets through the median on Euclid Avenue (State Sign Route 30—new Route 83) between the San Bernardino Freeway and 19th Street in Upland, a distance of three miles. Estimated cost, $130,000; State's share, $100,000; city, $30,000.

Install traffic signals and channelization at various intersections on U.S. 66 between Sierra Avenue in Fontana and Muscott Street in San Bernardino. Estimated cost, $245,000; State's share, $175,000; balance to be paid by cities involved.

Install traffic signals, highway lighting, and channelization on Mission Boulevard (U.S. 60) at San Antonio, Vine, Euclid, and Sultana Avenues in Ontario. Estimated cost, $83,000; State's share, $60,000; Ontario, $23,000.

Rights-of-way on various state highway routes—$4,215,000.

LOS ANGELES REGION PROJECTS

Los Angeles County

Extend the eight-lane Pomona Freeway project (soon to be in progress between the East Los Angeles Interchange and Third Street in East Los Angeles) another 1.4 miles easterly to Woods Avenue, and construct an interchange with the Long Beach Freeway. Estimated cost, $9,750,000.

Construct the eight-lane Pomona Freeway between 0.1 mile west of Arroyo Drive in South San Gabriel and 0.3 mile east of Workman Mill Road near Industry, a distance of 4 miles, with interchanges at San Gabriel and Rosemead Boulevards, Tyler Avenue, Peck Road and the Interstate 605 Freeway. Estimated cost, $9,430,000.

Construct the eight-lane Interstate 605 Freeway between the Orange county line and the future State Sign Route 91 Freeway in Dairy Valley, a distance of 5.3 miles, with interchanges at Spring Street, Carson Avenue, Del Amo Boulevard, and South Street, and a portion of the interchange with SSR 91. Estimated cost, $14,050,000.

Extend the four-lane Antelope Valley Freeway project (now in progress between Red Rover Mine Road and Angeles Forest Highway) another 6.2 miles northeasterly to Avenue P8, with interchanges at Avenue S and Palmdale Boulevard (State Sign Route 138); and widen Palmdale Boulevard from two to four lanes divided between the freeway and Sixth Street East in Palmdale. The project includes constructing a temporary connection on Avenue P8 from the northern end of the freeway construction to Sierra Highway. Estimated cost, $5,100,000.

Construct an embankment for the future Hollywood Freeway on portions between Laurel Canyon Boulevard and the Golden State Freeway; extend the eight-lane Hollywood Freeway between Magnolia Avenue and Victory Boulevard in North Hollywood, a distance of 2.5 miles, with interchanges at Magnolia Avenue, Burbank Boulevard, Laurel Canyon Boulevard-Oxnard Street and Victory Boulevard. Estimated cost, $8,100,000.

Add one northbound lane to the six-lane Hollywood Freeway between the Franklin Avenue onramp and Pilgrimage Overcrossing in Los Angeles as first stage of widening six-lane sections to eight lanes between Sunset Boulevard and Pilgrimage Overcrossing. Estimated cost, $800,000.

Relocate ramps to and from Hollywood Freeway and Vineland Avenue in Los Angeles to connect the freeway with Ventura Boulevard and landscape. Estimated cost, $176,000.

Revise signing on the Hollywood Freeway between the four-level interchange and Sunset Boulevard in Los Angeles. Estimated cost, $140,000.

Construct portions of an interchange between the San Diego Freeway (Interstate 405) and the future State Sign Routes 1 and 90 Freeways in Los Angeles and Culver City. Estimated cost, $3,500,000.

Landscape the San Diego Freeway (Interstate 405) between El Segundo Boulevard near Hawthorne and La Tijera Boulevard in Los Angeles, and between Moraga Drive and 0.2 mile north of Chalon Road in Los Angeles. Estimated cost, $550,000.

Install irrigation system and plant screen and trees as first stage of landscaping the San Diego Freeway (Interstate 405) between the Ventura and Golden State Freeways. Estimated cost, $310,000.

Install irrigation system and plant screen and trees as first stage of landscaping the Golden State Freeway (Interstate 5) between Roscoe Boulevard and San Fernando Road. Estimated cost, $325,000.

Revise channelization on U.S. 99 at the northern and southern city limits of San Fernando to convert San Fernando Road and Truman Street from one-way to two-way operation prior to their relinquishment to the city, soon to be superseded as state highways by completion of the Golden State Freeway (Interstate 5). Estimated cost, $200,000.

Add eastbound lane to the six-lane San Bernardino Freeway between 0.4 mile west and 0.7 mile east of Vincent Avenue in West Covina and reconstruct the southern half of the Vincent Avenue Interchange. Estimated cost, $660,000.

Extend acceleration - deceleration lanes on the Harbor Freeway at three locations near the Santa Monica Freeway Interchange. Estimated cost, $252,000.

Construct a westbound offramp and eastbound onramp to the Ventura Freeway at De Soto Street in Woodland Hills. Estimated cost, $100,000.

Reconstruct four-lane divided Venice Boulevard and add two lanes in the median between Lincoln Avenue and Sepulveda Boulevard in Los Angeles and Culver City as future State Route 187. Estimated cost, $2,400,000; State's share $1,200,000. Balance to be shared by Los Angeles and the county.

Construct an interchange between Sepulveda Boulevard (U.S. 101 Alternate-new State Sign Route 1) and Century Boulevard in Los Angeles. Estimated cost, $1,700,000; State's share $850,000; balance, city.

Extend the widening of Devonshire Street (State Sign Route 118) from two to four lanes, recently completed between Sepulveda Boulevard and Zelzah Avenue, another 3.7 miles westerly to De Soto Street in Chatsworth. Estimated cost, $1,000,000.

Resurface and improve shoulders on Pacific Coast Highway (U.S. 101 Alternate-new State Sign Route 1) between Western Avenue in Los Angeles and Crenshaw Boulevard in Torrance, a distance of 1.6 miles. Estimated cost, $226,000.

Modify traffic signals and highway lighting and install channelization at various intersections on Pacific Coast Highway (U.S. 101 Alternate-new SSR 1) between Palos Verdes Boulevard in Torrance and Gould Lane in Hermosa Beach. Estimated cost, $361,000; State's share, $172,000; balance to be shared by cities involved.

Modify traffic signals and install channelization at 22 intersections on Pacific Coast Highway (U.S. 101 Alternate-new SSR 1) between Anaheim Street and Santa Fe Avenue in Long Beach and Signal Hill. Estimated cost, $202,000; State's share, $125,000; balance to be shared by cities involved.

Widen Manchester Boulevard (State Sign Route 42) to provide left-turn storage lanes between Ash and Prairie Avenues in Inglewood. Estimated cost, $325,000; State's share, $295,000; balance to be paid by Inglewood.

Modify traffic signals and install channelization at 31 intersections on Manchester Boulevard (SSR 42) between Lincoln and Central Avenues in Los Angeles and Inglewood. Estimated cost, $395,000; State's share, $212,000; balance to be paid by the cities involved.

Modify traffic signals and highway lighting at 21 intersections on Firestone Boulevard (SSR 42) between Central and Garfield Avenues in South Gate. Estimated cost, $170,000; State's share, $90,000; balance to be paid by South Gate and the county.

Construct the Jackson Street Overcrossing of the future State Sign Route 134 Freeway in Glendale, and a frontage road between Brand Boulevard and Kenwood Street. Estimated cost, $250,000.

Widen Angeles Crest Highway (SSR 2) from two to four lanes between Foothill Boulevard (Interstate 210) northerly to La Canada Arch Bridge, a distance of 1.8 miles. Estimated cost, $250,000.

Reconstruct Verdugo Boulevard (State Sign Route 2) between Montrose Avenue and Foothill Boulevard (SSR 2) in and near Glendale, a distance of 1.2 miles. Estimated cost, $210,000.

Widen Alosta Avenue (U.S. 66) from two to four lanes between Ben Lomond and Loraine Avenues in Glendora, a distance of two miles. Estimated cost, $250,000.

Rights-of-way on various state highway routes—$56,855,000, including approximately $13,600,000 on Interstate 210 (mostly in the Pasadena-Glendora area), $9,500,000 on the Glendale Freeway, and $8,100,000 on the SSR 134 Freeway.

Orange County

Connect a six-lane construction project in progress on the Garden Grove Freeway between the San Diego Freeway and 0.5 mile east of Bolsa Chica Road with a second project underway between 0.2 mile southeast of Garden Grove Boulevard near Knott Avenue and Newland Street in Garden Grove. The new 1.7-mile project includes construction of an interchange at relocated Knott Avenue-Garden Grove Boulevard-Golden West Street. Estimated cost, $2,500,000.

Extend the six-lane Garden Grove Freeway (now under construction) another five miles easterly between Newland Street and 0.1 mile northeast of Garden Grove Boulevard near Haster Street in Garden Grove. The linking section between Haster Street and the completed section to the Santa Ana Freeway is financed in the 1963-64 construction budget. The project includes interchanges at Cannery, Brookhurst and Verano Streets, Trask Avenue-Harbor Boulevard, and part of the Haster Street-Garden Grove Boulevard-Berrydale Street interchange. Estimated cost, $10,700,000.

Extend the four-lane Newport Freeway (now under construction) another 3.9 miles southeasterly between Warner Avenue at the east city limit of Santa Ana and Palisades Road-Bristol Street at the east city limit of Costa Mesa, with interchanges at Talbert Avenue, MacArthur Boulevard and Baker Street-Paularino Avenue, and structures for an interchange with the future San Diego Freeway. Estimated cost, $6,300,000.

Construct embankment for future extension of the San Diego Freeway (Interstate 405) on portions between Newland Street in Westminster and Harbor Boulevard in Costa Mesa; and extend the eight-lane construction soon to be in progress for 3.1 miles southeasterly between Beach Boulevard (State Sign Route 39) and Brookhurst Avenue in Fountain Valley with interchanges at Cannery Street-Warner Avenue and Brookhurst Avenue. Estimated cost, $8,700,000, of which $4,000,000 will be budgeted in 1965-66.

Widen the Riverside Freeway from four to six lanes between 0.1 mile west of Lemon Avenue in Fullerton and the Newport Freeway in Anaheim, a distance of 5.8 miles. Estimated cost, $5,100,000.

Widen the Interstate 5 Freeway (along portions of the San Diego and Santa Ana Freeways) from four to six lanes between 0.3 mile south of Ortega Highway (State Sign Route 74) in San Juan Capistrano and the Laguna Freeway south of Irvine, a distance of 13.8 miles. Estimated cost, $2,300,000.

Landscape Interstate 5 Freeway between 0.2 mile southeast of Camino De Estrella in San Clemente and 0.1 mile northwest of Via California north of the city. Estimated cost, $175,000.

Widen State College Boulevard (new State Route 250) from two to four lanes between the Santa Ana and Riverside Freeways, a distance of 4.5 miles. Estimated cost, $700,000.

Widen existing four-lane Pacific Coast Highway (U.S. 101 Alternate-new State Sign Route 1) to four lanes divided between the south city limit and Mountain Road in Laguna Beach, and between Astor Street-Cliff Drive in Laguna Beach and the south city limit of Newport Beach. Estimated cost, $635,000.

Install traffic signals, highway lighting and channelization at the intersection of MacArthur Boulevard (new State Route 73) and Palisades Road-San Joaquin Road. Estimated cost, $67,000; State's share, $56,000; balance to be shared by the county and Newport Beach.

Rights-of-way on various state highway routes—$9,468,000, including approximately $4,000,000 on Interstate 405 (San Diego Freeway).

SAN DIEGO-IMPERIAL COUNTIES PROJECTS

Imperial County

Construct four-lane U.S. 99-State Sign Route 111 Expressway between State Sign Route 98 in Calexico and County Road 16, 0.5 mile south of the future Interstate 8 Freeway; and widen and resurface State Sign Route 111 between County Road 16 and U.S. 80 east of El Centro. Estimated cost, $2,350,000.

Widen and resurface State Sign Route 98 between 0.1 mile west of Eighth Street Extension and 0.1 mile west of State Sign Route 111 in and near Calixico, a distance of 3.5 miles. Estimated cost, $118,000.

Rights-of-way on various state highway routes—$986,000.

San Diego County

Extend the eight-lane San Diego Freeway (Interstate 5) in San Diego 2.4 miles northerly to Rosecrans Street, with interchanges at Washington and Trias Streets, a viaduct crossing of the AT&SF railroad tracks, U.S. 101 and Rosecrans Street, and temporary connections to U.S. 101. Estimated cost, $8,250,000, of which $5,250,000 will be budgeted in fiscal year 1965-66.

Construct the eight-lane San Diego Freeway (Interstate 5) in Rose Canyon on improved alignment between 0.1-mile and 4.3 miles north of Balboa Avenue in San Diego, and construct a connection with existing U.S. 101 and an interchange with Ardath Road-future Route 52 Freeway. Estimated cost, $7,750,000.

Construct six-lane section for future San Diego Freeway (Interstate 5) between Miramar Road at the north limit of Camp Mathews and 0.5 mile south of Carmel Valley Road in San Diego with interchanges at Genesee Avenue, Sorrento Valley Road, and the future Interstate 805 Freeway in Sorrento Valley, a distance of 3.4 miles. Estimated cost, $6,230,000.

Construct eight-lane section for future San Diego Freeway (Interstate 5) between 0.1 mile south of San Marcos Road near Encinitas and 4.4 miles south of State Sign Route 78 Expressway with interchanges at San Marcos Road, Woodley Road and La Costa Avenue and a bridge across Batiquitos Lagoon, a distance of 5.4 miles. Estimated cost, $4,800,000.

Landscape the San Diego Freeway (Interstate 5) between "A" Street and Park Boulevard in San Diego and the interchange with State Sign Route 94. Estimated cost, $150,000.

Construct four-lane Interstate 8 Freeway (U.S. 80) between 0.3 mile west of Harritt Road and 4.3 miles west of Alpine, with an interchange at Harritt Road, a distance of 3.5 miles. Estimated cost, $3,250,000.

Widen U.S. 395 from two lanes to four to provide a freeway section between 0.6 mile south and 2.6 miles north of Miramar Road in San Diego with interchanges at Miramar Road and Mira Mesa Boulevard, a distance of 3.2 miles. Estimated cost, $1,800,000.

Widen U.S. 395 from two lanes to four to provide an expressway section between 0.3 mile and 2.6 miles north of State Sign Route 78 Freeway as an interim improvement pending U.S. 395 Freeway construction in and near Escondido, a distance of 2.3 miles. Estimated cost, $500,000.

Widen the Clairemont Mesa Boulevard Overcrossing from two lanes to four and revise the interchange connections to U.S. 395 in San Diego. Estimated cost, $390,000; State's share, $340,000; city, $50,000.

Construct four-lane State Sign Route 67 Freeway between 1.5 miles and 3.2 miles north of Interstate 8 near Santee. The project includes additional grading and frontage road construction northerly to Riverford Road and construction of on and off ramps at Prospect and Woodside Avenues. Estimated cost, $1,250,000.

Realign 0.8 mile of State Sign Route 94 to ease curves within the Campo Indian Reservation, about 8.2 miles east of Campo. Estimated cost, $115,000.

Construct additional on and off ramps on the State Sign Route 94 Freeway west of 56th Street in San Diego to provide service to and from the west. Estimated cost, $100,000.

Construct a frontage road to connect College Boulevard in Oceanside to the State Sign Route 78 Expressway to serve the Oceanside-Carlsbad Junior College now under construction. Estimated cost, $165,000.

Resurface portions of U.S. 101 in National City and San Diego; and in San Diego on U.S. 395, State Sign Route 94, and Wabash Boulevard prior to relinquishment to the cities. These sections have been superseded as state highways by freeway construction. Estimated cost, $200,000.

Rights-of-way on various state highway routes—$11,047,000.

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