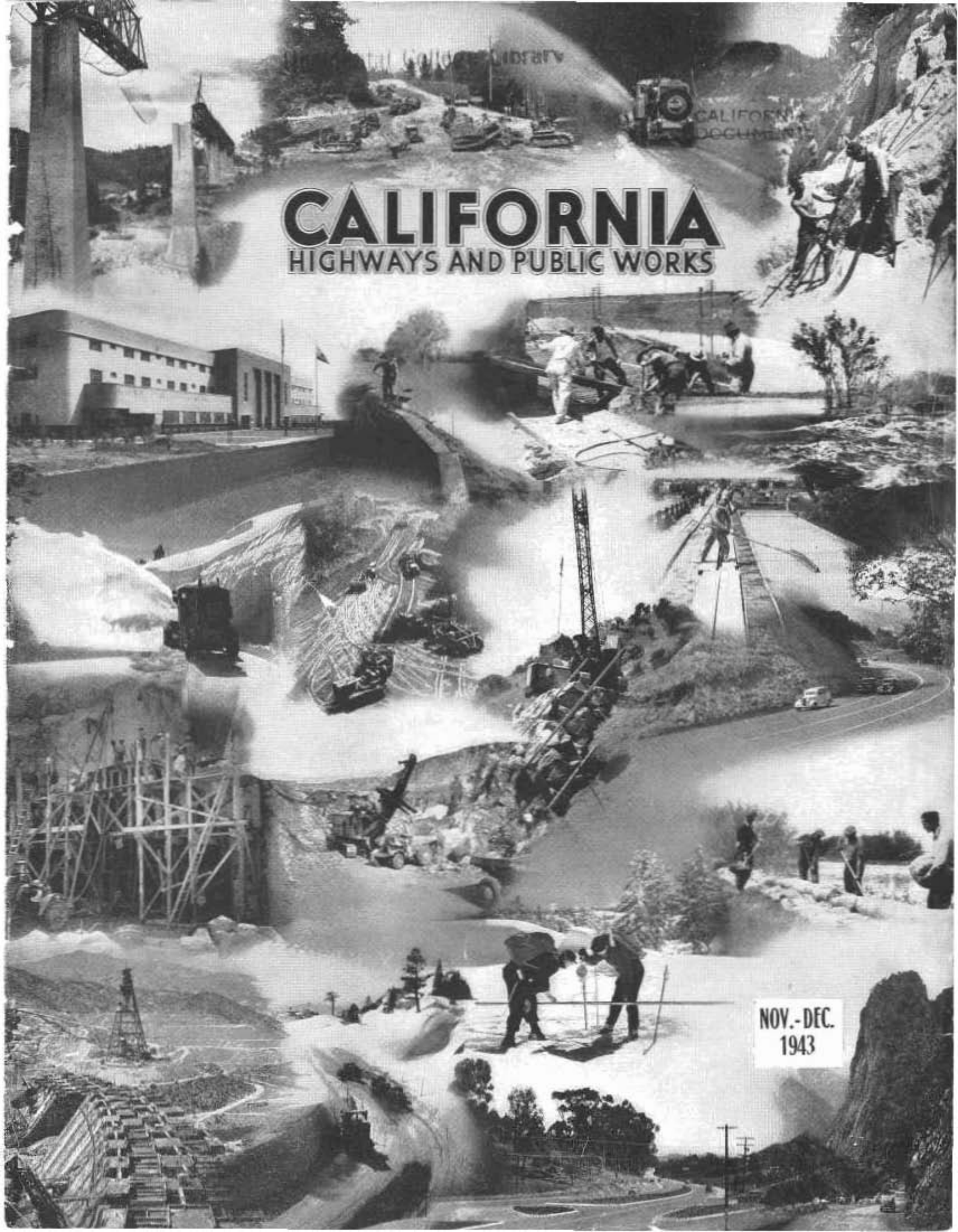
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CALIFORNIA HIGHWAYS AND PUBLIC WORKS

Official Journal of the Division of Highways, Department of Public Works, State of California [PRINTED IN U.S.A.]

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Engineering and Rights of Way for Postwar Road Program Approved By California Highway Commission

By C. H. PURCELL, Director of Public Works and Chairman of California Highway Commission

AN important contribution to Governor Earl Warren's postwar planning was made by the California Highway Commission on November 18th when it approved a $75,000,000 highway construction program submitted to it by George T. McCoy, State Highway Engineer.

This program, designed to be ready for actual building when peace comes, involves 116 projects on the State Highway System, distributed throughout all of the 11 districts of the Division of Highways and balanced between primary and secondary routes and between the northern and southern county groups in accordance with statutory provisions.

While it is conceded that this program will materially aid in solving the anticipated postwar unemployment problem, the fact that California's highway system will be urgently in need of almost complete overhauling, rehabilitation and extension to adequately meet a return to normal conditions is of utmost importance in the conception and carrying out of postwar planning.

The work will include construction or reconstruction of approximately 465 miles of State highways, including extensions and further development of freeways in metropolitan areas in both southern and northern California.*

INCLUDES 76 BRIDGES

Included in this postwar program there are 76 bridges and grade separations of varying sizes and types for which the designs of many are complete or well advanced. Besides these definitely scheduled structures, additional major grade separations will be required for proposed freeway development projects. The number of these additional structures will be dependent upon designs developed as the planning work for the program advances and as the necessary rights of way are determined and acquired.

The last Legislature, under Chapter 564, Statutes of 1943, appropriated the sum of $12,000,000 for surveys, plans, specifications and estimates and for the acquisition of right of way for postwar State highway construction. The Legislature also provided $1,500,000 for planning postwar projects on county roads and city streets.

Including this $12,000,000 the department has unobligated State highway funds totaling $25,000,000 available for the preliminary engineering work and right of way acquisition for the postwar program.

With these available funds, the Division of Highways is proceeding with the preparation of the $75,000,000 postwar highway construction program.

EMPLOYMENT BIG FACTOR

In preparation for its part in the postwar period, the Department of Public Works has given consideration to factors both of general scope and those which apply specifically to the work of the State. Employment is one of the more general phases.

Never before has so great a percentage of industry been withdrawn from civilian manufacture and service and transferred to war production and service. Approximately one-half the persons employed in manufacture today are engaged in war production, and as the Nation reaches the peak of the war effort this percentage may increase.

The period needed for conversion of industry to peace time activities will cause major dislocations of employment. In some sectors a considerable number of the working population will be without employment during the period of retooling.

SERIOUS RETOOLING DELAY

It is estimated that retooling will take anywhere from six to eighteen months and, in some cases, as much as two years. Delay in this retooling may cause serious delay in other conversions. As there will be differences between industries in the time required for conversion, so will there be differences in the rate of recovery in various areas.

As a factor in meeting these conditions during the first two, three, or four years following the war, public works will serve a great need.

One of the important phases of a normal, prosperous economy is found in the activities of the construction industry. Within this industry public works stands as an integral part, and of public works, highway development is the largest unit. Highways are a principal factor in the Nation's transportation system, and upon adequate transportation facilities largely depends the entire economy of the Nation.

While the purpose of public construction is to provide facilities for use of the people, when properly managed, it also appreciably affects employment.

LABOR BENEFITS MOST

It is an established fact that expenditure of public funds in construction projects produces not only employment at the site, but passes down through material vendors and equipment manufacturers to mills and mines until from 85 to 95 cents of every dollar is paid out for labor.

Many students of economics also maintain that additional business induced by this chain is equal to from three to three and one-half times the original expenditure.

The evidence is conclusive that well-planned public works do provide a certain amount of cushioning against conditions of unemployment.

It must be emphasized that the primary purpose of any public works is the provision of public facilities—highways, bridges, water and power

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* See tabulations on Pages 10-12.

Overpass structure at cloverleaf grade separation of U. S. 101 and Mission Valley highways in San Diego

Modern Design Features Mark New Highway Construction in San Diego

By E. E. WALLACE, District Engineer

AN important addition to and modernization of the highway system of San Diego was accomplished recently with the completion of the Rosecrans-Mission Valley Highway.

The highway is 3.5 miles in length and provides a 4-lane divided, concrete paved highway, leading to the east and connecting Point Loma with a proposed new freeway at the southerly end of U. S. Highway No. 395, which will extend through Balboa Park directly into the business center of San Diego.

To facilitate the free movement of traffic, the project includes six sets of traffic-actuated signals, together with a channelization of the intersections; a rotary development at the intersection of Frontier and Rosecrans streets, and a modern cloverleaf grade separation crossing over U. S. Highway No. 101 and the Santa Fe Railway main line into San Diego.

ELIMINATES GRADE CROSSINGS

The relocated highway removes a large volume of traffic from the Rosecrans Street railroad grade crossing, where many serious accidents have occurred in the past, and also relieves traffic congestion at the highway grade crossing.

The grade separation is a reinforced concrete, shallow girder type of structure, which was designed by the State Bridge Department with the intention of conserving critical materials and

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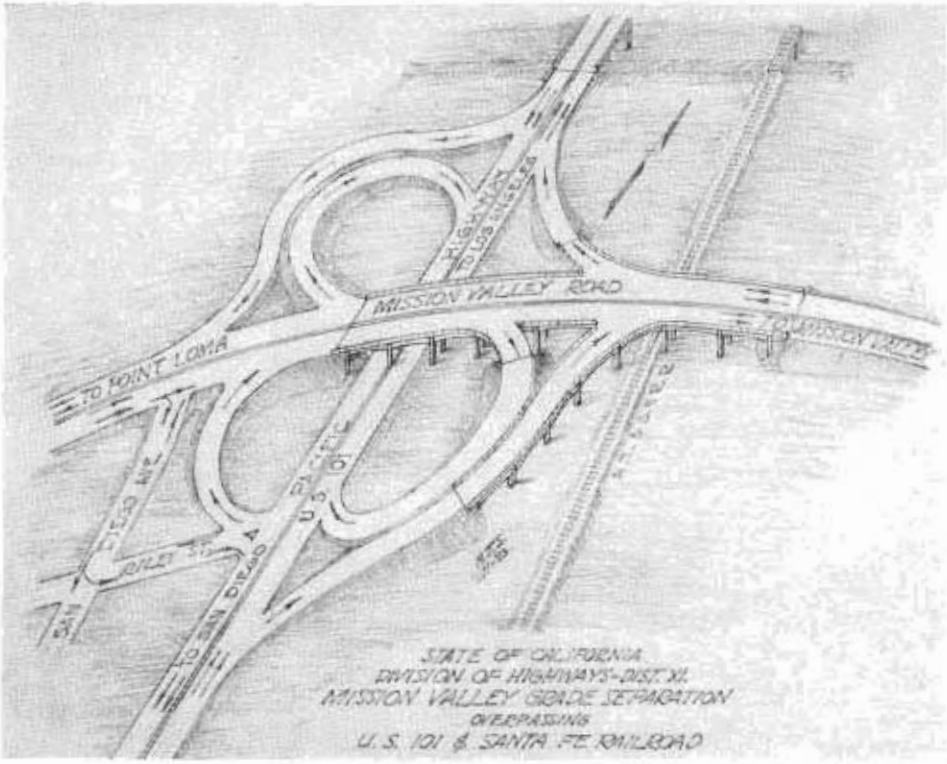
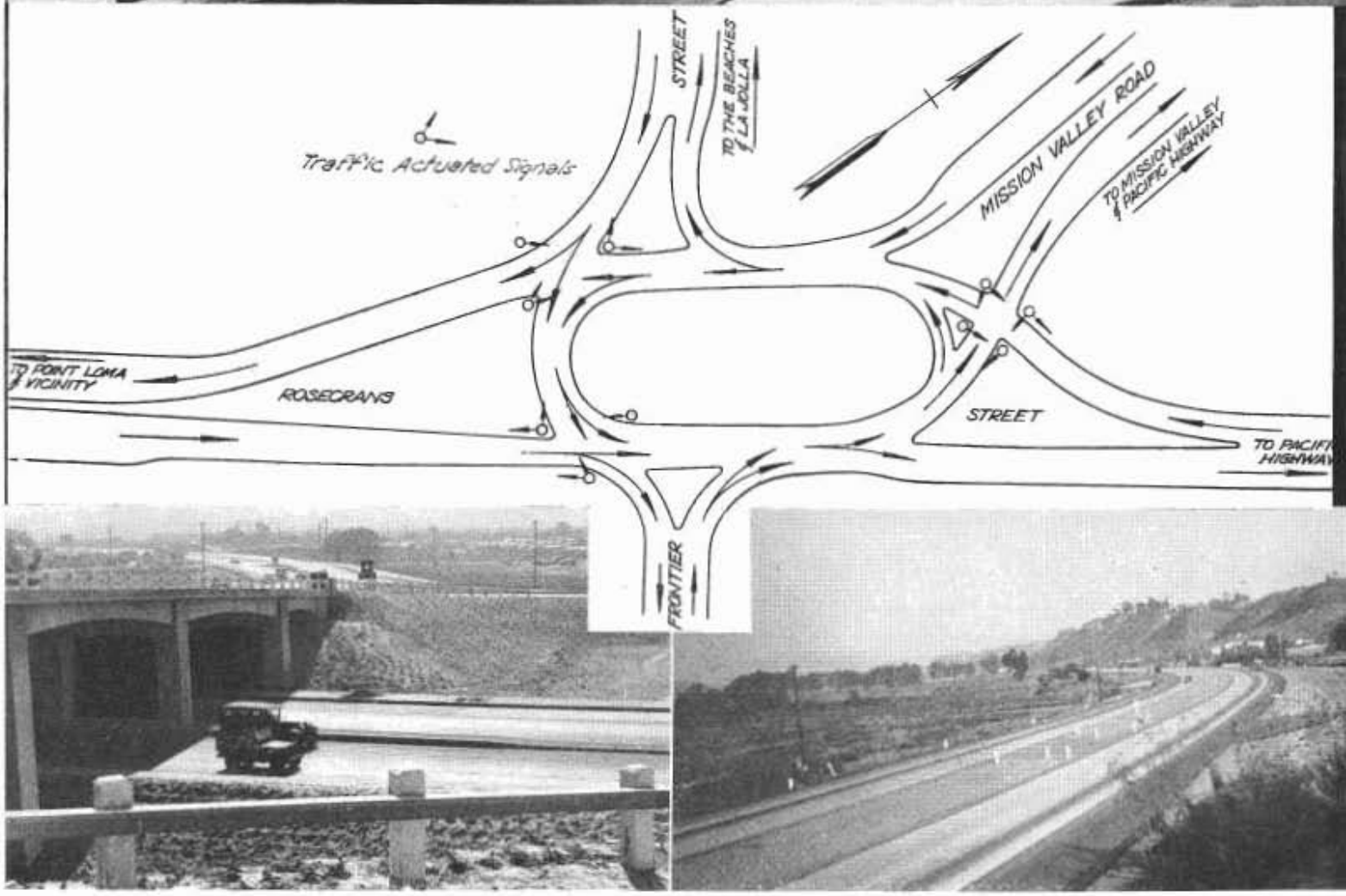


Sketch of Mission Valley cloverleaf grade separation overpassing U. S. 101



At top—intersection of Mission Valley Road and Morena Street after widening and channelizing. Center—Rosecrans and Frontier Street traffic circle showing automatic signal installations. Below—two views of the 4-lane divided highway

Spectacular Steel Erection Job On Arroyo Seco Extension Bridge

By P. R. WATSON, Resident Bridge Engineer

SOON after the completion of the Arroyo Seco Freeway from the City of Pasadena to a connection with the North Figueroa Street Extension just north of San Fernando Road in the City of Los Angeles it became apparent that the North Figueroa Street Extension with its tunnels through the Elysian Hills was no longer adequate to carry the two-way traffic imposed upon it and that steps must be taken immediately to provide a previously planned parallel highway to relieve this traffic congestion.

The proposed highway will extend the Arroyo Seco Parkway southerly an additional 1.8 miles parallel to and on the westerly side of the North Figueroa Street Extension. This extension included a thorough cut through the Elysian Hills and the construction of six grade separations, the largest of which is the Los Angeles river bridge which extends over San Fernando Road, the Los Angeles river, the tracks of the Southern Pacific Railroad on both banks of the river, and Riverside Drive.

The Los Angeles river bridge now under construction consists of five continuous reinforced concrete spans and three continuous steel plate girder spans on reinforced concrete abutments and piers. The concrete piers and abutments are skewed to meet the river channel and existing improvements. The south abutment forms part of the retaining wall supporting the south approach and the inbound Riverside Drive ramp, while the piers on each side of the Los Angeles river form a part of the river protection work.

Moving this 146 foot girder weighing 82 tons closed city streets three hours

This 70 ton member had to be swung 100 feet in the air

HUGE STEEL SPANS

The piers, abutments, and the five northerly reinforced concrete spans of approximately 75 feet each of this structure were built by WPA forces under the sponsorship of the State. The structural steel spans were constructed by the Bethlehem Steel Company under a State contract.

The steel portion or southerly end of this bridge consists of three plate girder spans having a total length of 488 feet 6 inches measured along the centerline of the bridge. The girder spans vary in length; that over the Southern Pacific tracks on the north bank is 102 feet 6 inches; the span across the river is 200 feet; the one over Riverside Drive and the Southern Pacific tracks on the south bank is 197 feet 1 inch in length at the east girder, 163 feet 7½ inches at the center girder, and 150 feet 2½ inches at the west girder, the variation in girder lengths being due to the difference in skew in the pier and south abutment.

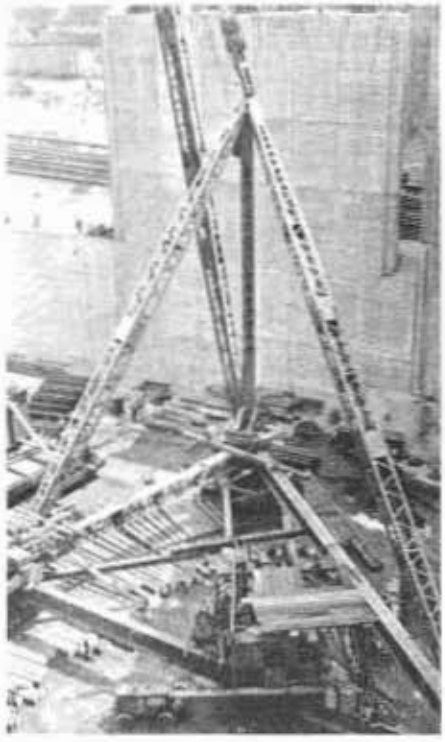
Each span consists of three plate girders, 22 feet on centers, which sup-

port the floor system. The main girders, which are approximately 100 feet above the river floor, are 302 feet 6 inches in length and, in addition to spanning the 200 feet across the river, provide cantilever extensions into the adjacent spans. These cantilevers extend to approximately the 1/3 point of each end-span and are joined to the corresponding simply supported end-girders by means of a link and pin assembly which also acts as an expansion joint.

The structural steel was assembled and fabricated at the Bethlehem Steel Company's plant at Chicago, Illinois, and shipped to the site by rail. The 300-foot main girders were shipped in three sections and connected by field splices at the site after being hoisted into place.

SPECTACULAR GIRDER PLACEMENT

Probably the most spectacular feature of the construction of this bridge was that of raising the main girder sections to a position approximately 100 feet above the paved invert of the river. This operation was performed with an 85-ton stiff-leg traveler derrick. This derrick was one of four built by the Bethlehem Steel Company for use in the erection of the George Washington Bridge in New York. It was moved on five low-bed trucks to the Los Angeles river bridge site and set up on the paved invert of the river channel.



Stiff leg derrick did the work

Steel construction on bridge section fast approaching completion

The derrick, as set up, had the longer leg pivoted, the estimated upward thrust of 25 tons being taken by a steel column acting against the lower flange of the adjoining Figueroa Street Bridge. Under the mast at the end of the short leg were trucks which operated on a mono-rail track constructed on an 80-foot radius.

The location of the derrick was such that it was unnecessary to disturb the pivoted end of the derrick, all changes in the location of the mast for setting the steel sections being made by moving the mast along the mono-rail.

This changing of the mast locations was made by sidelines fastened to eyebolts in the piers, power being furnished by a 35 H. P. donkey engine. When the required position was obtained, the mast and end of the short leg were blocked up thereby removing the load from the mono-rail during the heavy lifts.

85-TON STIFF LEG DERRICK

The 85-ton derrick was operated by a three-drum hoist powered by a 175 H. P. gas engine. The boom of the derrick was 125 feet in length. The load line consisted of 12 parts of ¾-inch steel cable. The topping lift or line for raising and lowering the boom was of 22 parts of ¾-inch cable which alone required approximately 3,000 feet of line.

The sections of the main girders were lifted directly from freight cars spotted on the tracks of the Southern Pacific on the south side of the river and then lowered to the river bottom where contact surfaces were cleaned and girders turned over when required. The mast of the derrick was then shifted to the required position and the girders then hoisted in place and pinned and bolted. The girder sections varied in weight from 56–72 tons.

New bridge parallels existing structure

SWINGING 82-TON GIRDER

The three south end girders, which were out of reach of the big derrick, were set by an entirely different procedure. These girders were unloaded from the cars at the river station track of the Southern Pacific onto heavy house-moving equipment by a trucking concern and brought to the site over city streets to Figueroa Street, which necessitated the closing of the Figueroa Street Extension for three hours during time each girder was brought in.

The longest girder was 146 feet in length and weighed 82 tons. These girders were picked up by 60-ton and

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Grade Separation Eliminates Traffic Hazards to Shipyard Workers

By W. A. RICE, Resident Engineer

SHORTLY after war was declared, the United States Maritime Commission directed the construction of extensive shipbuilding facilities at Sausalito on the north shore of San Francisco Bay. This war plant is known as Marinship and employs many thousand workers in the construction of cargo ships and tankers.

As the construction of the shipyard progressed, and when production of ships began, thousands of new workers migrated into this area where housing facilities were already at a premium.

To relieve this situation, the Marin Housing Authority was created, and, under its supervision, a new city of several thousand population grew up on the marsh lands west of Highway 101, at the foot of Waldo Grade and about a mile north of Marinship.

This site was chosen because its location afforded shipyard workers homes within walking distance of work, thereby saving gasoline and tires.

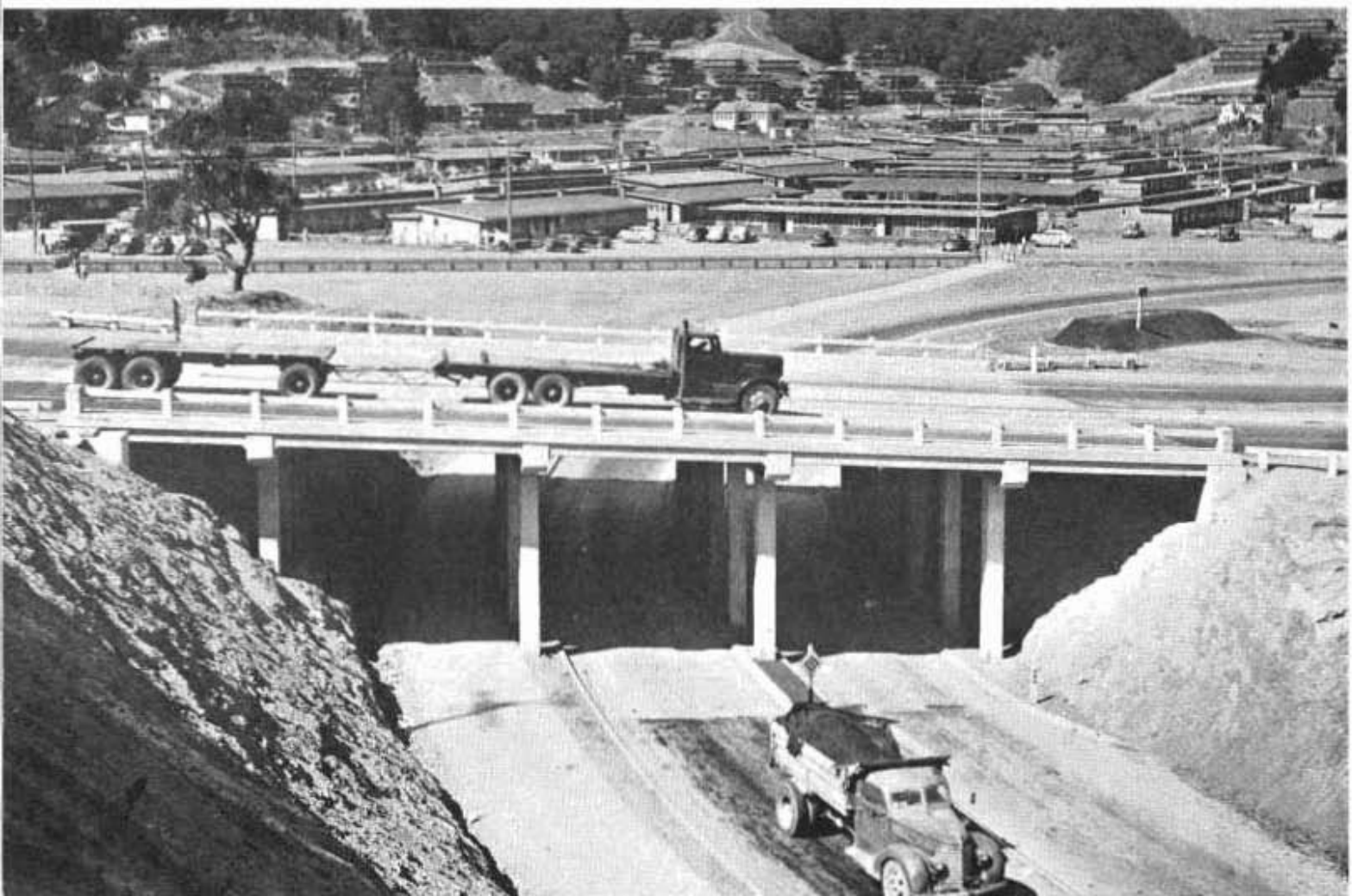
This pedestrian traffic, together with an abnormal increase in trucking and commuter traffic, both by private car and by bus, to either the shipyard or to San Francisco caused a terrific congestion at the Waldo intersection, particularly at shift changing times.

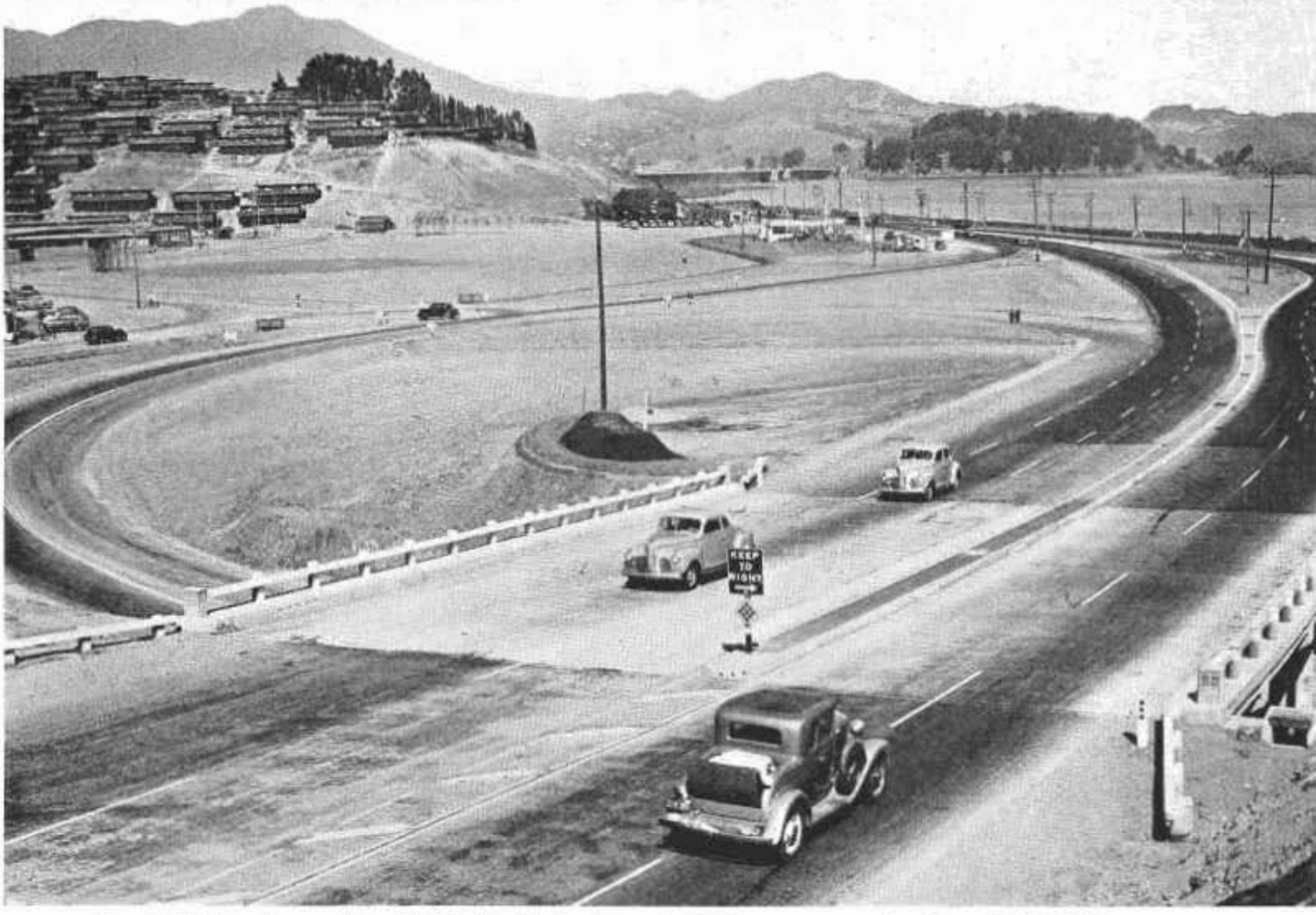
Traffic at Waldo intersection was segregated by means of channel islands, but this method of caring for the increased activities soon proved inadequate and it was decided to construct a modified clover leaf type of intersection. This construction involved an undercrossing which was built approximately eight hundred feet south of the existing channelized intersection.

A contract was awarded to N. M. Ball Sons, of Berkeley, for the construction of this undercrossing together with all incidental work connected with the new grade separation structure. This work involved the construction of a temporary detour around the site of the structure; grading and paving with plant mixed surfacing of the required new roadways together with approaches to the deck of the structure; a new roadway connection to Marin City; pedestrian sidewalks; new curbs, and elimination of the existing channelization.

Work was begun on March 31, 1943, and the undercrossing was rushed to completion, being opened to traffic of Highway 101 on the morning of July 7, 1943. The detour was then removed and all other work was completed by August 31, 1943.

Looking through underpass at grade separation of U. S. 101 and State Sign Route No. 1 at Waldo showing Marin City in background





View of Waldo grade separation of U. S. 101 and Marin City road. Bridge structure carries 5-lane divided highway

The bridge is a reinforced concrete slab structure, consisting of four 19-foot spans and one 13-foot span on concrete bents. It provides two 14-foot traffic lanes and a 10-foot sidewalk beneath the structure. The deck accommodates a 25-foot roadway to northbound traffic and a 37-foot roadway for southbound traffic, separated by a 4-foot curbed division strip.

Upon the completion of the project, traffic may now flow without interruption from northern points to San Francisco, Marinship or Marin City; from San Francisco to northern points or Marinship; from Marinship either north or south; and finally it provides the multitude of worker-pedestrians safe passage beneath the heavily traveled roadway. This grade separation structure and appurtenances also serves the Town of Sausalito.

The project, as a whole, was designed to obtain the desired results with the use of a minimum of critical materials. For reinforcing steel in the structure, salvaged railroad rails were rerolled and used. The rails had previously been purchased by the

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Modern Design in San Diego Highway Construction

(Continued from page 2)

utilization of the lowest grade-line possible. It was necessary to provide for a four foot raise in the grade of the Santa Fe tracks which will be necessary at some future date in order to properly provide for flood control of the San Diego River.

The approach ramps, which provide access to U. S. Highway 101 from the separation structure, were necessarily somewhat restricted because of the limitations which were imposed by the proximity of the railroad on the east and the San Diego River on the north.

A portion of the highway traverses a low tideland flat which required importation of a large amount of select material for the roadway subgrade and embankment. The crossing of this low flat area presented an expensive drainage problem.

A storm drain 2,900 feet in length was installed which will carry the storm waters to a connection with a large concrete sump and pumping system, which was installed by other interests, and from which the storm waters are pumped through the south levee of the San Diego River. A portion of the drain was installed below tidewater elevation and in wet excavation and a system of well points was used to dewater the trench.

From Morena Boulevard easterly, the grade of the new highway was established high enough to clear future maximum floods in the San Diego River, and portions of the embankment were heavily riprapped with rock to withstand the flood erosion.

Wide rights of way were secured to provide adequate width for the divided highway and for possible future landscaping.

Concrete pavement was designed with thickened edges and was thickened at the expansion joints, and the usual steel reinforcement was eliminated in order to conserve a critical material.

The project was approved as an access highway.

Equipment working on new grade of relocated Franklin Canyon highway. Channel change of Franklin Creek below level of old road shown at left

First Unit of Reconstruction on Franklin Canyon Highway Completed

By F. W. MONTELL, Resident Engineer

IN order to provide more modern traffic facilities for the industrial areas of Martinez and Pittsburg as well as local traffic, the Division of Highways, on September 4, 1942, awarded a contract to N. M. Ball Sons for the reconstruction of a portion of State Highway Route 106 in Franklin Canyon, Contra Costa County. The project was duly approved by the Federal Government as necessary to the war effort and recently completed.

Since the funds available were inadequate to cover the cost of reconstruction throughout the canyon, the section was selected in order to cover as much as possible of the worst existing road conditions in respect to alignment, grade, drainage, maintenance cost and traffic service.

The greatly increased traffic due to the war effort made this improvement necessary, especially to eliminate several old wooden bridges on poor alignment.

CHANNEL CHANGES INVOLVED

The existing road was constructed by Contra Costa County, mainly in the years from 1918 to 1922, on alignment and grades which required a minimum of excavation and embankment, and consequently had heavy grades and sharp curves.

The new alignment, 1.9 miles in length, lying in the narrow floor of the canyon, required the construction of five large unreinforced concrete arch culverts totaling 1,330 feet under the main roadway and extensive channel changes to provide a waterway for Franklin Creek. Numerous smaller structures were necessary to provide drainage and access to private property adjacent to the project.

Due to wartime shortages of critical materials, unreinforced concrete structures were installed throughout the project. Broken concrete from the old pavement was utilized in the construction of rubble masonry walls and riprap lining of the channel to prevent erosion of the creek banks during peak storms.

A precipitation of four to five inches in a period of 24 hours and one inch per hour for short periods has been recorded in this area.

FOUR-LANE HIGHWAY PLANNED

The project is designed for stage construction, right of way being ac-

quired for the ultimate development to a four-lane divided highway.

The new construction consisted of a 22-foot width of armor coat and 8-foot penetration treated shoulders placed on a one-foot minimum thickness of select material and eight inches of crusher run base. Plant-mixed surfacing was provided for the gutters on grades of 3 per cent or over.

Curvature was reduced from 414 degrees on the present road to 174 degrees on the new construction, and the minimum radius was increased from 239 feet on the existing road to 1,000 feet on the new construction.

Construction operations were necessarily suspended from December 14, 1942, to May 3, 1943, as the new work required the construction of extensive channel changes and numerous drainage structures that will obliterate the existing road. It was not considered advisable to attempt the heavy grading work under traffic during the rainy season.

The terrain traversed is an open valley at the upper end and a steep-sided canyon at the lower end, with occasional unstable formations in cut areas. As a result, some slides were encountered.

The following were major contract items:

180,000	cu. yds. roadway excavation
36,000	cu. yds. trench and channel excavation
5,000	cu. yds. structure excavation
3,500,000	sta. yds. overhaul
1,500	cu. yds. riprap
750	cu. yds. rubble masonry
1,610	cu. yds. portland cement concrete
29,000	tons imported borrow
1,620	lin. ft. unreinforced concrete pipe
6,630	lin. ft. perforated metal pipe
173	tons liquid asphalt
1,370	tons screenings.

Labor shortage materially affected the progress of the work, which was completed October 23d last.

Excavating cut for new alignment. Old road shown at left

Dragline placing 36-inch reinforced concrete drainage pipe

Postwar Road Program Approved by Commission

(Continued from page 1)

projects and buildings to serve public needs.

CONSTRUCTION AT STANDSTILL

With the efforts of the Nation bent upon successful prosecution of the war and production of war needed equipment and facilities, public construction programs are at a standstill. Normal functions of the State Department of Public Works have been curtailed to the point of holding what we have by maintenance and repair.

Highway development through new construction is static, with the exception of the building of Federal Access Roads and structures requested by the military and financed with Federal funds. In the case of this type of Federal projects, the Division of Highways acts merely in the capacity of engineering and construction agent.

Other field activities of this branch of the department have been reduced to maintenance and reconditioning roadway surfaces and repair of bridges.

Under this cessation of construction and reconstruction, the State Highway System is deteriorating through obsolescence, limited maintenance and the increased rate of damage resulting from large volumes of wartime heavy trucking. The longer the war lasts, the greater will be the deterioration of State roads. California will enter the

(Continued on page 26)

Detail of Projects Approved for Post War Program by

County	Route	Location	Miles	Type of improvement
Alameda	69	6th and Oak Streets to High Street in Oakland	3.7	Grade and pave (multiple lane divided)
Alameda	69	South City Limits of Oakland to High Street	3.7	Grade and pave (6-lane freeway)
Alameda, Contra Costa	69	North City Limits of Emeryville to Junction Routes 69 and 14	5.1	Grade, pave and resurface (2 lanes added)
Alameda	107	Alameda Creek at Brightside, bridge and approaches	------	Bridge and approaches
Butte, Sutter	3	Lomo to 0.4 Mile South of Fagan	8.0	Grade and pave
Contra Costa	14	Junction Routes 69 and 14 to north city limits of Richmond	1.5	Grade and pave (4-lane freeway) and grade separation
Contra Costa, Alameda	69	North City Limits of Emeryville to Junction Routes 69 and 14	5.1	Grade, pave and resurface (2 added lanes)
Del Norte	71	Route 1 to Smith River	5.0	Grade and surfacing
El Dorado	11	2½ miles east of Clarkesville to 1¼ miles east of El Dorado	8.2	Grade and surfacing
El Dorado, Placer	65	North Fork American River Bridge and Approaches	0.2	Bridge and approaches
Fresno	4	Calwa Overhead to Church Avenue	2.1	Grade and pave (4-lane freeway)
Fresno	4	South City Limits of Fowler to Calwa Overhead	6.3	Grade and pave (4-lane divided)
Fresno	4	South City Limits of Kingsburg to Selma	4.7	Grade and pave (4-lane divided)
Fresno	4	Clinton Avenue to San Joaquin River	7.2	Reconstruct to 4-lane (divided)
Fresno	41	San Joaquin River Overflow Bridges	------	Bridges and approaches
Fresno	125	Shields Avenue to Fairmount Avenue; Gould Canal Bridge	1.9	Reconstruction and bridges
Fresno	125	Fairmount Avenue to Herndon Avenue	2.1	Reconstruction
Glenn	45	¼ mile west of Sacramento River to Butte City; Sacramento River Bridge	0.8	Grade, surfacing and bridge
Humboldt	1	North Scotia Bridge to Fortuna; NWPRR Overhead, Strong Creek Bridge; Van Duzen Overflow Bridge	8.6	Grade, surfacing and bridges
Humboldt	20	Willow, Cedar, East Branch Willow Creek Bridges	------	Bridges and approaches
Humboldt	20	Mad River Bridge	------	Bridge and approaches
Humboldt	84	Klamath River at Weitchpec, Bridge	------	Bridge and approaches
Imperial	26	El Centro to Brawley	12.8	Reconstruct to 4-lane (divided
Imperial	26	Trifolium Canal to 2 miles north of Sandy Beach	14.7	Resurfacing and structures
Kern	4	10.8 miles to 1 mile south of Bakersfield	3.2	Reconstruct to 4-lane (divided)
Kern	4	1 mile south of Bakersfield to North City Limits	3.2	Reconstruct to 4-lane (divided)
Kern	4	Cawelo to Famoso	8.5	Reconstruct to 4-lane (divided)
Kern	4	Bakersfield to Snow Road	3.5	Reconstruct to 4-lane (divided)
Kern	23	Ricardo to Freeman Station	16.7	Resurfacing and structures
Kern	23	Cinco to Ricardo	5.2	Resurfacing
Kern	58	Mojave to Muroc Junction	10.2	Reconstruction
Kern	58	Cameron to Mojave	6.8	Grading, resurfacing and structures
Kern	58	Keene to Tehachapi; 2 railroad grade separations, 4 bridges	10.6	Grading, surfacing and structures
Kern, Tulare	129	8.3 miles north of Route 4 to Ducor	15.6	Oiling and structure
Kings	125	5th Standard Parallel to 1.2 miles north	1.5	Reconstruction
Lake	89	Kelsey Creek Bridge	------	Construct bridge
Lassen	21	West County boundary to Route 29; WPRR Overhead	4.3	Grade and pave; construct overhead
Lassen	29	Bird Flat to Doyle	7.6	Grade and pave
Los Angeles	2	Barham Overpass to Vineland; Lankershim Grade Separation	1.6	Grade, pave and structures (8-lane freeway)
Los Angeles	2	Aliso Street Bridge to Vermont Avenue	4.1	Grade, pave and structures (8-lane freeway)
Los Angeles	2	Downey Road to Aliso Street Bridge	4.2	Grade, pave and structures (6 and 8-lane freeway)
Los Angeles	2	Vermont Avenue to Highland Boulevard	3.4	Grade, pave and structures (8-lane freeway)
Los Angeles, Ventura	2	Calabasas to Newbury Park (portions)	------	Reconstruction
Los Angeles	4	Ridge Route, Tunnel Station to N. County Boundary (portions)	------	Reconstruct to 4-lane (divided)

California Highway Commission November 18, 1943

County	Route	Location	Miles	Type of improvemen
Los Angeles	19	Route 77 to Pomona	0.7	Reconstruct to 4-lane (divided)
Los Angeles	60	Latigo Canyon to Winter Canyon	0.6	Reconstruct to 4-lane (divided)
Los Angeles	165	Harbor Freeway from Adobe Street to Fifth Street	1.2	Grade and pave (6-lane freeway)
Los Angeles	168	Huntington Drive to Colorado Street	1.1	Grade and pave (4-lane divided)
Los Angeles	173	Olympic Boulevard, Bundy Drive to Lincoln Boulevard	2.3	Grade and pave (4-lane divided)
Los Angeles	174	Los Angeles River Bridge and Approaches	0.7	Bridge and approaches (4-lane divided)
Los Angeles	178	Lakewood Boulevard to South County Boundary	5.0	Resurfacing
Marin	1	Ignacio to North County Boundary	8.5	Grade and pave (4-lane divided)
Mendocino	1	Red Mountain Creek to Piercy; Sidehill Viaduct	4.9	Grade, surfacing and structures
Mendocino	1	Forsythe Creek to Ridgewood Summit; Forsythe Creek Bridge	8.2	Grade, surfacing and bridge
Mendocino	1	Rock Creek Bridge		Bridge and approaches
Mendocino	16	Dooley Creek Bridge		Bridge and approaches
Mendocino	56	Alder Creek Bridge		Bridge and approaches
Mendocino	56	Mitchell and Hare Creeks, Bridges		Bridges and approaches
Merced	4	Black Rascal Canal to Buhach Station	3.2	Reconstruction to 4-lane (divided)
Modoc	73	South Fork of Pit River Bridge		Bridge and approaches
Mono	23	Rock Creek to Casa Diablo	18.5	Resurfacing and structures
Monterey	2	2 miles south of Salinas to Salinas	1.9	Reconstruct to 4-lane (divided)
Monterey, San Benito	2	Santa Rita to Pestoni Grade	11.0	Reconstruct to 4-lane (divided)
Monterey	56	Del Monte Junction to Seaside Junction	2.6	Reconstruct to 4-lane (divided)
Nevada, Sierra	38	½ mile north of Farad to ¾ mile south of Nevada State Line	3.0	Reconstruction
Orange	2	Broadway to First Street in Santa Ana	2.4	Grade, pave and structures (6-lane freeway)
Orange	2	Doheny Park to Trabuco Creek, Drainage		Drainage correction
Orange	60	Laguna Beach to Dana Point	9.0	Reconstruct to 4-lane (divided)
Placer	3	Roseville Underpass and Approaches	0.7	Construction underpass and approaches
Placer	17	Junction new Route 37 in Auburn to U.S. General Hospital; SPRR Grade Separation	3.3	Grade, surfacing and grade separation
Placer	37	Nevada Street in Auburn to 0.5 mile east of Auburn; SPRR Grade Separation	2.0	Grade, surfacing and grade separation
Placer, El Dorado	65	North Fork American River Bridge and Approaches	0.2	Bridge and approaches
Riverside	19	1 mile east of Mira Loma to 3.0 miles west of Riverside	5.2	Grade and pave (4-lane divided)
Riverside, San Bernardino	19	Los Angeles County Line to 1 mile east of Mira Loma	12.2	Grade and pave (4-lane divided)
Riverside	64	4 miles west of Blythe to State Line	7.8	Grade, pave and structures
Sacramento	3	North Sacramento Viaduct to ½ mile east of Ben Ali	4.1	Grade, surfacing and structures (4-lane divided)
Sacramento, Solano	53	Sacramento River at Rio Vista, Bridge		Bridge and approaches
San Benito, Monterey	2	Santa Rita to Pestoni Grade	11.0	Reconstruct to 4-lane (divided)
San Bernardino, Riverside	19	Los Angeles County Line to 1 mile east of Mira Loma	12.2	Grade and pave (4-lane divided)
San Bernardino	26	State Street to East City Limits of Redlands	2.8	Reconstruct to 4-lane (divided)
San Bernardino	26	Ontario to Colton	17.1	Reconstruct to 4-lane (divided)
San Bernardino	207	Route 190 to Route 43 (City Creek Road)	16.4	Grade and pave
San Diego	77	"A" Street to ½ mile north of San Diego City Limits	6.9	Grade and pave (4-lane divided)
San Diego	77	½ mile north of city limits to Poway	13.5	Grade and pave
San Francisco	68	In San Francisco, South City Limits to Fifth Street	5.2	Grade and pave (8-lane freeway)
San Joaquin	4	Jct. Mariposa Road south of Stockton to Calaveras River	5.5	Grade and pave (4-lane divided)
San Joaquin	4	Calaveras River to Lodi	9.0	Reconstruct to 4-lane (divided)

DETAIL OF PROJECTS APPROVED FOR POST WAR PROGRAM BY CALIFORNIA HIGHWAY COMMISSION NOVEMBER 18, 1943

County	Route	Location	Miles	Type of improvement
San Joaquin	5	Grantline Road to Mossdale; San Joaquin River Bridge	3.6	Reconstruct and bridge (4-lane divided)
San Luis Obispo	2	Miles Station to San Luis Obispo	5.8	Reconstruct to 4-lane (divided)
San Luis Obispo	2	San Luis Obispo to Cuesta	2.7	Reconstruct to 4-lane (divided)
San Mateo	68	North City Limits of South San Francisco to 0.3 mile south of S.P. Underpass	1.8	Grade and pave (6-lane freeway)
San Mateo	68	0.3 mile south of S.P. Underpass to Peninsular Avenue, San Mateo	6.6	Grade and pave (6-lane freeway)
Santa Barbara	2	Sheffield Drive to San Ysidro Road; Romero, San Ysidro and Oak Creek Bridges	1.3	Reconstruct to 4-lane; bridges (divided)
Santa Barbara	2	Hollister Wye to Goleta	5.0	Reconstruct to 4-lane (divided)
Santa Barbara	2	Park Place to Rancheria Street	2.2	Grade and pave (4-lane divided)
Santa Barbara	2	Las Veras Creek to ½ mile east of El Capitan Creek	2.9	Resurface
Santa Barbara	2	Santa Ynez River to Jonata Park; Santa Ynez River Bridge	3.8	Grade, pave and bridge
Santa Clara	2	Santa Clara Avenue in San Jose to Ford Road	7.9	Grade and surface (4-lane freeway)
Shasta	3	South County Boundary to Clear Creek; Anderson and Spring Creek Bridges	10.8	Grade, pave and bridges
Shasta	20	Sacramento River Bridge and Approaches; ACID Canal Bridge	2.0	Bridges and approaches
Sierra, Nevada	38	½ mile north of Farad to ¾ mile south of Nevada State Line	3.0	Reconstruction
Siskiyou	3	Spring Hill to Weed; SPRR Overhead	7.3	Grade, pave and construct overhead
Siskiyou	3	Camp Lowe to Bailey Hill; SPRR Underpass	7.5	Grade, pave and construct underpass
Solano	7	Ulatis Creek to Midway	6.0	Reconstruct to 4-lane (divided)
Solano	7	Midway to 1 mile north of Dixon	6.0	Grade and pave (4-lane divided)
Solano	7	Vallejo Wye to north of Jct. with Route 208	5.0	Reconstruct to 4-lane (divided)
Solano, Sacramento	53	Sacramento River at Rio Vista, Bridge		Bridge and approaches
Stanislaus	4	Salida to North County Boundary; Stanislaus River Bridge	2.2	Reconstruct to 4-lane, bridge (divided)
Sutter, Butte	3	Lomo to 0.4 mile south of Fagan	8.0	Grade and pave
Sutter, Yuba	3	Feather River Bridge and Approaches	2.5	Bridge and approaches
Tehama	3	6 miles north of Red Bluff to North County Line	7.0	Grade and pave
Tehama	3	Cone Lane to Red Bluff; Samson and Sand Slough, Paynes Creek and Sand Creek Overflow Bridges	3.0	Grade, pave and bridges
Tulare	129	1.5 miles north of County Line to Thermal School	2.7	Reconstruction
Tulare, Kern	129	8.3 miles north of Route 4 to Ducor	15.6	Oiling and structure
Tulare	129	Yokohl Creek Bridge and Approaches	0.6	Bridge and approaches
Tulare	132	Packwood Creek to Route 10	2.3	Reconstruction
Tuolumne	13	Stockton Street entrance to Sonora, South City Limits to Sonora Creek	0.5	Grade and surfacing
Ventura	2	At Long Wall North of Ventura		Drainage correction
Ventura	2	Ventura River to S.P. Overpass, Drainage		Drainage correction
Ventura	2	El Rio to Ventura	6.0	Reconstruct to 4-lane (divided)
Ventura, Los Angeles	2	Calabasas to Newbury Park (portions)		Reconstruction
Yolo	6	Washington Underpass and Approaches	0.5	Underpass and approaches
Yolo	50	0.4 mile north of Rumsey to 0.8 mile south of Rumsey	1.2	Grade and surface
Yolo	50	Tule Canal Bridge and Approaches	0.3	Bridge and approaches
Yuba, Sutter	3	Feather River Bridge and Approaches	2.5	Bridge and approaches

Mistakes of Bidders in Submitting Proposals for State Highway Work

By RICHARD H. WILSON, Office Engineer

UNDER provisions of the State Contract Act, major construction operations of the California Division of Highways are conducted in conformance with the democratic practice of competitive bidding.

For the protection of the State and its interests the procedure of bidding is governed by various legal provisions, rules and regulations.

These include such conditions as the requirement of prequalification of contractors as to financial standing and experience before they may bid upon State highway work, the estimated cost of which is in excess of $15,000; the requirement that all contractors be licensed by the State, and that all bids be accompanied by a guaranty in an amount of at least 10 per cent of the bid. The latter provision is to insure that the bidder will accept the contract if it is awarded to him and will furnish bonds for faithful performance of the work and for payment of all labor and materials in connection with it.

While the majority of contractors submitting bids for State highway work are thoroughly familiar with bidding procedure, the number of irregularities which occur has made it advisable to call the attention of bidders to the more common mistakes, omissions and irregularities which jeopardize their bids from consideration for award of contracts.

STATE LICENSE REQUIRED

The basic requirement for a contractor operating in California is that he be properly licensed by the Contractors' State License Board. Failure to secure such a license, of course, precludes operation in the State as a contractor. Many contractors, however, are negligent in renewing their licenses during the thirty day renewal period preceding July first of each year. On several occasions this negligence has resulted in the required rejection by the Department of Public Works of otherwise acceptable bids for proposed highway construction.

BIDS AND AWARDS

OCTOBER, 1943

ALAMEDA COUNTY—Across Cypress Street at 32d Street in the city of Oakland, a pedestrian overpass to be constructed. District IV, Route 68. D. W. Nicholson Corp., San Leandro, $4,522; Dan Caputo, San Jose, $4,857; James B. Allen, San Carlos, $5,523; Lee J. Immel, Berkeley, $6,442; Carlton C. Gildersleeve, Willows, $7,910. Contract awarded to A. A. Teslau & Son, Berkeley, $4,449.

ALAMEDA COUNTY—At the South Verona Underpass, between Sunol and Dublin, about 0.4 mile to be graded and Portland cement concrete pavement and plant-mixed surfacing to be placed. District IV, Route 107, Section B. A. A. Teslau & Son, Berkeley, $28,608; Louis Biasotti & Son, Stockton, $23,089; Piazza & Huntley, San Jose, $31,862; Lee J. Immel, Berkeley, $32,443. Contract awarded to Dan Caputo, San Jose, $22,848.

CONTRA COSTA COUNTY—At Glen Fraser about 3 miles west of Martinez, about 0.1 mile, a reinforced concrete pipe to be placed and related work to be performed. District IV, Route 109, Section A. McGuire and Hester, Oakland, $22,642; Kiss Crane Co., El Cerrito, $22,629; Peter Sorensen, Redwood City, $26,906; A. A. Teslau & Son, Berkeley, $29,479; Louis Biasotti & Son, Stockton, $34,028; Lee J. Immel, Berkeley, $34,448; M. J. Lynch, San Francisco, $36,103. Contract awarded to Carl N. Swenson Co., San Jose, $18,668.

CONTRA COSTA COUNTY—On Harbor Street in and adjacent to Pittsburg, about 0.4 mile to be graded and surfaced with plant-mixed surfacing on crusher run base. District IV, Harbor Street. Lee J. Immel, Berkeley, $19,028; C. M. Syar, Vallejo, $19,156; A. A. Teslau & Son, Berkeley, $19,323; Claude C. Wood, Lodi, $20,322. Contract awarded to Louis Biasotti & Son, Stockton, $16,534.

CONTRA COSTA COUNTY—On Cutting Boulevard between Garrard Boulevard and 14th Street in Richmond, about 1.5 miles, constructing asphalt concrete pavement on the existing pavement and newly constructed crusher run base. District IV, Cutting Boulevard. A. A. Teslau & Son, Berkeley, $74,233. Contract awarded to Lee J. Immel, Berkeley, $70,715.

LOS ANGELES-ORANGE COUNTIES—Between Colorado Street and 0.10 mile south of San Gabriel River, about 1.4 miles long, constructing plant-mixed surfacing on untreated rock base. District VII, Route 60, Sections F, Long Beach, SIII. Griffith Co., Los Angeles, $79,712; Sully Miller Contracting Co., Long Beach, $85,890; J. E. Haddock, Ltd., Pasadena, $88,000; Ansco Construction Co., Long Beach, $90,860. Contract awarded to Owl Truck & Construction Co., Compton, $71,584.

PLACER-EL DORADO COUNTIES—Across North Fork American River 2½ miles east of Auburn. Repair existing suspension bridge. District III, Route 65, Section A. J. Philip Murphy Corp., San Francisco, $12,380; Markwart Co., Sacramento, $12,495; C. C. Gildersleeve, Willows, $14,404; M. A. Jenkins, Sacramento, $14,510; James H. McFarland, San Francisco, $14,680; E. E. Smith, Hilt, $16,520. Contract awarded to Kiss Crane Co., El Cerrito, $11,940.

PLACER COUNTY—Between State Highway Route 17 and U. S. Hospital, north of Auburn, about 1.2 miles to be graded and surfaced with plant-mixed surfacing. District III. Contract awarded to A. Teichert & Co., Sacramento, $88,477.

SAN DIEGO COUNTY—Between San Diego River and La Jolla Junction, portions only, a length of about 4.8 miles to be repaired with plant-mixed material. District XI, Route 2. Daley Corp., San Diego, $36,294; R. E. Hazard & Sons Contracting Co. San Diego, $36,436; Griffith Co., Los Angeles, $37,077. Contract awarded to V. R. Dennis Construction Co., San Diego, $33,597.

SOLANO COUNTY—In Vallejo Township, about 4.7 miles of existing bus routes to be graded and paved with plant-mixed surfacing and asphalt concrete. District X, Bus Routes Project No. 1. C. M. Syar, Vallejo, $88,223; Lee J. Immel, Berkeley, $95,910; Louis Biasotti & Son, Stockton, $96,093; E. A. Forde, San Anselmo, $108,882. Contract awarded to Piazza & Huntley, San Jose, $87,874.

Another oversight which has cost several contractors the award of State highway contracts is change of the status of a firm without notifying the Contractors' License Board of the change. Such instances include change in the partners of a copartnership, or of an individual taking in a partner. In one or two instances a corporation has been dissolved and members of the firm have continued to operate under the old name but as a copartnership, without securing a new license. Similarly two or more contractors desiring to bid on a project as coadventurers, frequently neglect to secure a joint-venture license.

One trouble-causing frailty which seems to apply only to contractors operating as individuals is the practicing of using varying forms of a firm name. These contractors either can not decide upon a name style under which they wish to operate or they forget the style which they have previously used. To be perfectly safe, names appearing on the license, on the prequalification statement and as the signature on the proposal should agree in all details.

JOINT BIDDER CONDITIONS

As the prequalification of bidders on the basis of the statement of financial condition and experience is required before a proposal will be issued by the Division of Highways, little difficulty is encountered from this phase of bidding requirements. The principal source of trouble in this regard occurs when two or more bidders decide to bid jointly on a proposed contract and neglect to file with the Division of Highways an affidavit of intention to bid on a joint-venture basis.

Bidding requirements provide that a proposal may be submitted only by the bidder to whom it was issued. Proposal forms are serially numbered to insure conformance with this requirement. As a bid submitted by two or more contractors jointly is on a different basis than one submitted

by any one of the coadventurers individually it is necessary that the proposal be issued to the bidders jointly. This is accomplished by the filing with and acceptance by the Division of Highways of the joint venture affidavit. The division furnishes these affidavit forms on request.

Many contractors have been disappointed in not being permitted to submit a bid on some particular project because their prequalification statement has expired or there is not sufficient time between the filing of their statement and the date of bid opening.

As it requires some study on behalf of both auditors and engineers to arrive at a bid rating for a prospective bidder, the State requires that prequalification statements be filed at least five days prior to the date of opening bids on any project for which a bidder wishes to submit a proposal. The department notifies prequalified contractors by mail of the expiration date of the prequalification in ample time for them to prepare and submit a new statement before the current one expires.

MISTAKES IN BID PRICES

In the course of many years of bid opening it has been observed that the greatest number of mistakes and errors made by bidders occur in the body of the proposal and on the proposal signature page.

The most frequent mistake appears to be that of incorrectly writing the words of a unit price bid on some item. Requirements stipulate that in discrepancies between words and figures, the words shall prevail. This type of mistake can be attributed only to lack of care in preparation of the bid, for writing a unit bid price in words is no more difficult than writing in words the amount of a check.

The writing of fractions of a cent seems to cause considerable difficulty, particularly when written as a decimal. Bidders frequently write the decimal in terms of dollars but use the word "cents" or in terms of cents and use the word "dollars." This mistake changes the value of the unit price bid and often runs the extension into fantastic figures.

Omission of the words "dollars" or "cents" in writing in the unit bid price frequently leads to an ambiguity as to the intent of the bidder and makes interpretation difficult.

BIDS AND AWARDS

OCTOBER, 1943 (Continued)

SOLANO COUNTY—In Vallejo Township, about 5.5 miles of existing bus routes to be graded and paved with plant-mixed surfacing and asphalt concrete. District X. Bus Routes Project No. 2. Louis Biasotti & Son, Stockton, $94,209; Piazza & Huntley, San Jose, $97,301; C. M. Syar, Vallejo, $99,542; E. A. Forde, San Anselmo, $101,132; Healey-Moore Co., Oakland, $105,802. Contract awarded to Lee J. Immel, Berkeley, $92,740.

SOLANO COUNTY—In Vallejo Township, about 4.7 miles of existing bus routes to be graded and surfaced with plant-mixed surfacing. District X. Bus Routes Project No. 3. Louis Biasotti & Son, Stockton, $86,730; Lee J. Immel, Berkeley, $88,235; C. M. Syar, Vallejo, $91,016; E. A. Forde, San Anselmo, $97,460; A. G. Raisch, San Francisco, $95,376; Healey-Moore Co., Oakland, $101,663. Contract awarded to Piazza & Huntley, San Jose, $80,068.

SISKIYOU COUNTY—Bridge to be constructed across Irving Creek about 9 miles north of Somes Bar. District 1, Route 36, Section A. C. C. Gildersleeve, Willows, $9,556; E. E. Smith, Hilt, $10,115. Contract awarded to J. D. Proctor, Inc., Richmond, $6,849.

VENTURA COUNTY—Between Santa Clara River Bridge and Santa Clara Avenue, 1.5 miles to be repaired with plant-mixed material and bituminous surface treatment to be applied to shoulders. District VII, Route 9, Section A. Oswald Bros., Los Angeles, $20,870; Griffith Co., Los Angeles, $23,367. Contract awarded to G. W. Ellis, North Hollywood, $17,030.

VENTURA COUNTY—Construct Portland cement concrete lined drainage ditch on telephone road near Victoria Avenue about 0.3 mile in length. District VII, Route 9, Section A. Vinson & Pringle, Los Angeles, $10,575; Bebek & Brkich, Los Angeles, $15,500. Contract awarded to Ralph A. Bell, San Marino, $9,910.

NOVEMBER, 1943

CALAVERAS COUNTY—Between Toyon and West Point, about 17.9 miles in net length to be graded and surfaced with road-mixed surfacing on imported base material. District X. Louis Biasotti & Son, Stockton, $250,579; Phoenix Construction Co., Bakersfield, $264,779; A. Teichert & Co., Sacramento, $283,102; Guerin Bros., So. San Francisco, $285,372. Contract awarded to Claude C. Wood, Lodi, $239,595.

CALAVERAS COUNTY—Between Altaville and Murphys about 6.7 miles to be graded and surfaced with road-mixed surfacing on untreated rock base. District X. Phoenix Construction Co., Bakersfield, $130,562; Harms Bros., Sacramento, $137,705; A. Teichert & Company, Sacramento, $137,870; Guerin Bros., South San Francisco, $140,780. Contract awarded to Louis Biasotti & Son, Stockton, $92,542.

HUMBOLDT AND DEL NORTE COUNTIES—At various locations between Orick Maintenance Yard and west boundary of Siskiyou National Forest, furnishing and stockpiling mineral aggregate and screenings. District I, Route 1, Sections R.C. Marshall S. Hanrahan, Redwood City, $11,504; Mercer Fraser Co., Eureka, $13,400. Contract awarded to Tom Hull, Eureka, $10,109.

MARIN COUNTY—A portion of an existing concrete box culvert to be removed and replaced with a new reinforced concrete box culvert on timber pile foundation, near Waldo Point. District IV, Route 1, Section C. John G. Leibert Co. & C. W. Caletti & Co., San Rafael, $8,430; A. G. Raisch, San Francisco, $9,190; G. M. Carr, Santa Rosa, $9,670. Contract awarded to Peter Sorensen, Redwood City, $5,190.

MONTEREY COUNTY—At the Salinas River near Neponset, a detour bridge and approaches to be removed, and related work to be performed. District V, Route 56, Section I. M. J. Murphy, Inc., Carmel, $10,000; Dan Caputo, San Jose, $11,592; Kins Crane Co., El Cerrito, $13,408. Contract awarded to James B. Allen, San Carlos, $9,474.

ORANGE COUNTY—On Ocean Avenue, through the city of Huntington Beach, between west city limits and east city limits, about 3.3 miles to be repaired with plant-mixed material. District VII, Route 90. Griffith Co., Los Angeles, $40,975; Anson Construction Co., Long Beach, $41,690; Pacific Rock & Gravel Co., Los Angeles, $51,750. Contract awarded to Sully-Miller Contracting Co., Long Beach, $34,990.

PLUMAS COUNTY—Across Indian Creek about 11 miles west of Quincy. District II, Route 21, Section B. Contract awarded to C. C. Gildersleeve, Willows, $14,261.

SAN FRANCISCO CITY AND COUNTY—San Francisco-Oakland Bay Bridge east span of west bay crossing, two suspension ropes to be installed and one damaged suspension rope to be removed. District IV. Contract awarded to Columbia Steel Company, San Francisco, $5,916.

SAN FRANCISCO COUNTY—In the city of San Francisco, Funston Avenue approach to the Golden Gate Bridge, about 0.2 mile of barbed wire fence to be constructed. District IV, Route 56. Anchor Post Fence Co. of California, $1,470. Contract awarded to Cyclone Fence Division American Steel & Wire Co., San Francisco, $1,327.

Alteration of the text of items or qualification of the special provisions are sometimes cause for disqualification of a bid. Comparison of bids submitted for State highway work must be made entirely on the basis of the terms of the special provisions and a bid submitted upon any other basis is not comparable to the bids submitted on the special provisions as they are written and therefore can not be considered.

Bidders sometimes attach a letter to their proposals setting forth qualification of one or more items. If the proposal refers to this letter or the letter states that the bid is submitted subject to qualifying terms, the attorneys for the department have ruled that the bid is thereby qualified and can not be considered.

Nor can incomplete bids be given consideration. Bidders unfamiliar with State highway practice sometimes will submit proposals on only certain items, neglecting to bid on the entire proposed work. As the Division of Highways is interested only in contracting for the entire project as set forth in the special provisions such proposals are of no value.

In several instances bidders have detached the special provisions from the proposal and submitted only the sheets showing the unit bid prices and signature page. As the special provisions are an integral part of both the proposal and contract such detached bids are incomplete and can not be considered.

BIDS MUST BE SIGNED

Bidders occasionally get their proposals into difficulty by filling in the items in contract form instead of in the proposal form. The contract form is placed in the back of the special provisions and proposal booklet so that the contract will be a complete document at the time of award. It also shows the bidder just what the form of contract will be, should he be low bidder and the contract be awarded to him.

Proposals submitted for proposed State highway work may be classed as legal documents and as such it is necessary that they be properly signed by the bidder so that there may be no question as to their validity.

An unsigned proposal obviously can not be given consideration, even though the name of the intended bidder appears elsewhere in the proposal. In accepting a proposal for consideration the State must be in a

position where the bidder can not disclaim the authenticity of the proposal and in the case of an unsigned bid, the bidder might readily claim that it was delivered in error and that he had no intention of bidding.

One difficulty which frequently occurs is that of an incomplete signature. This may happen when the firm name appears on the space provided for the signature but there is no signature of an officer, in the case of a corporation; of one of the partners in the case of a copartnership; or the principal in the case of an individual. The reverse of this error likewise occurs. The signature of a partner, the principal or an official may be signed without the firm name appearing as part of the signature. These omissions always raise a question as to the validity of the proposal.

Another signature irregularity which crops up from time to time is that of a proposal signed by a person other than the principal and for whom a power of attorney has not been filed with the Division of Highways. While the fact of the granting of a power of attorney may be established after bids are opened, the lack of it at the time of opening always casts a shadow on the authenticity of the proposal.

In the submission of a proposal by two or more contractors as a joint venture it is most desirable that the bid be signed by all the firms or individuals interested in the bid. Compliance with this practice eliminates any question as to the identity of the bidders.

It is likewise desirable that the names of officials of corporations, members of copartnerships or interested parties be listed in the space provided therefore on the signature page.

As previously stated the form of signature on the bid should agree with the form appearing on the contractor's license and on his prequalification statement.

Another place where irregularities occur is in connection with the bidder's guaranty which accompanies the proposal.

As statutes require that all bids submitted for proposed State highway work be accompanied by a guaranty amounting to at least 10 per cent of the amount bid in the form of cash, cashier's check, certified check or bidder's bond, a proposal submitted without such guaranty can not, of course, be considered.

BIDS AND AWARDS

NOVEMBER, 1943 (Continued)

SANTA BARBARA COUNTY—Across Santa Ynez River about one mile north of Lompoc, the existing concrete bridge to be repaired. District V, Route 56, Section C. Kiss Crane Co., El Cerrito, $61,445; Fred D. Kyle, Los Angeles, $63,079; R. R. Hensler, Glendale, $66,796; Trewehitt-Shields & Fisher, Fresno, $69,395; Carlo Bongiovanni, Los Angeles, $74,938; Ralph A. Bell, San Marino, $93,750. Contract awarded to Dan Caputo, San Jose, $60,567.

SAN BERNARDINO COUNTY—On Waterman, Tippecanoe and Cardiff Avenues, about 4 miles to be graded and surfaced with plant-mixed surfacing. District VIII. Geo. Herz & Co., San Bernardino, $101,034; G. W. Ellis, North Hollywood, $106,680; Griffith Co., Los Angeles, $116,258; Guerin Bros., So. San Francisco, $121,189; Phoenix Construction Co., Bakersfield, $131,190; Oswald Bros., Los Angeles, $139,144. Contract awarded to Lewis Construction Co., Los Angeles, $91,031.

SISKIYOU COUNTY—Near Upton siding, about 2 miles northerly of Mt. Shasta City, and in the vicinity of Station 84 about 2 miles northerly of Yreka. District II, Route 3, Sections A,C. Contract awarded to Clements & Co., Hayward, $4,249.

SISKIYOU COUNTY—Furnishing and stockpiling mineral aggregate and plant-mixed surfacing near Big Springs road about 4.5 miles northeasterly from Weed. District II, Route 72, Section A. Contract awarded to A. R. McEwen, Sacramento, $6,446.

VENTURA COUNTY—Between 0.4 mile north of Nauman road and Calleguas Creek, about 4.1 miles to be repaired with plant-mixed material on untreated rock base, and plant-mixed material on the existing pavement. District VII, Route 60, Section A. Phoenix Construction Co., Bakersfield, $39,037; Griffith Co., Los Angeles, $64,796; Guerin Bros., So. San Francisco, $68,370; Schroeder & Co., Roscoe, $75,300. Contract awarded to G. W. Ellis, North Hollywood, $58,935.

One of the chief difficulties in regard to the guaranty is that the amount is less than the required 10 per cent. This occurs most frequently when the bidder makes an arithmetical error in the extension or addition of his bid and, upon being checked, it is found that the total of the bid is greater than originally figured by the contractor. Attorneys for the department have ruled that the law in this instance is most specific in the statement "at least 10 per cent of the amount bid." Ten per cent of the bid total is a definite amount and the guaranty can not be less than this definite amount.

Other difficulties in connection with the guaranty seem to occur mostly in cases where bidder's bonds are submitted as the guarantee that the bidder will enter into a contract if it is awarded to him. The most frequent irregularity in this regard is that the bidder's bond is not on the form prescribed for State highway contracts. The State form varies from the commercial forms printed by surety companies in several respects, chiefly in that the commercial forms make no guaranty that the bidder will furnish a labor and material bond if the contract is awarded to him. There should be no reason for a surety company not using the prescribed State form as it is included in the proposal form booklet or separate copies may be obtained from the office of the State Highway Engineer in Sacramento.

Bidders bonds are frequently submitted which are not signed by the bidder himself, or the signature of surety is incomplete or not properly acknowledged. There also have been several instances where the notary's acknowledgment of the surety's signature was incomplete.

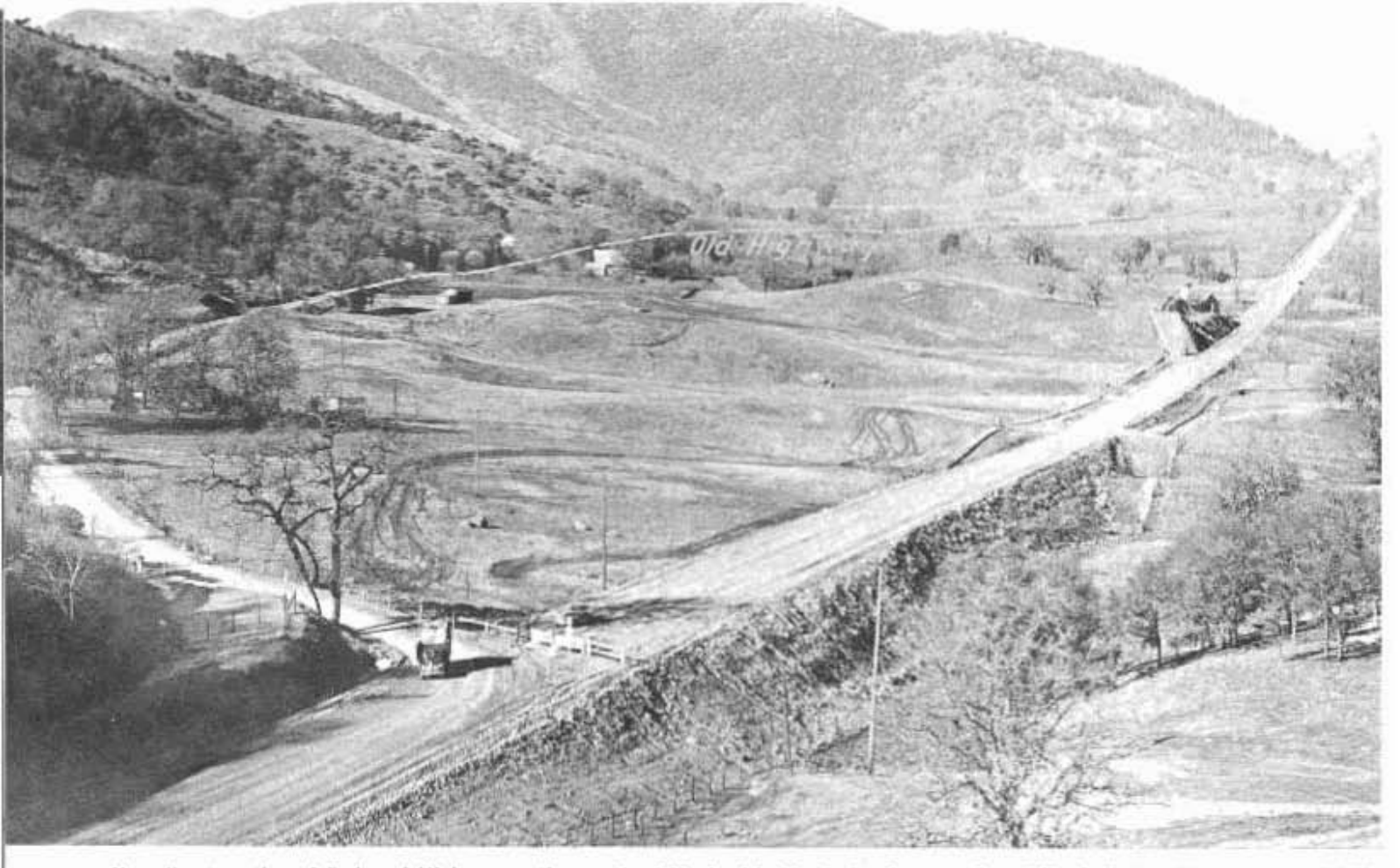
Once or twice in the history of bid opening for State highway work, a bidder, in submitting proposals on two or more projects on the same day, has mixed his 10 per cent guaranty checks between the proposals, with the result that the check for one of the projects was insufficient. Similarly, proposals have been placed in the wrong envelope, with the result that the envelope was not opened until all bids had been read for the project for which the proposal was intended.

DON'T MAIL SPECIAL DELIVERY

Another mistake is to send a proposal by special delivery to the Division of Highways in Sacramento. As the division has a private box in the post office which is opened at 2 o'clock p.m. on bid opening days and special delivery mail is not placed in the box but held for call, the method only delays delivery instead of expediting it. It has happened that this very delay has resulted in a proposal being delivered too late for the opening. Proposals received too late are always returned to the bidder unopened.

In the interpretation of statutes and rules and regulations governing bidding, the Division of Highways has no desire to be hard-boiled or hypertechnical. The desire is to secure the lowest responsible bid possible, but in fairness to the State and to other bidders compliance with all legal technicalities must of necessity be observed. Many of these technical requirements are not of the division's making. The laws governing the licensing of contractors were enacted at the instance of the contractors themselves and the use of bidder's bonds for guaranties was promulgated by surety companies and the highway department exercises no control other than to make sure that the statutes are followed.

One general rule which is followed in passing on the validity of proposals which have a taint of irregularity is: Can the State force the bidder to take the contract if he does not wish to? If he can not legally refuse, the bid is valid.



New direct routing of Redwood Highway section north of Hopland in Mendocino County. Dotted line indicates old route through hills

Curves and Flood Hazards Eliminated by Relocation on Redwood Highway

By A. M. NASH, District Engineer

THE completion of the grading and surfacing project between the town of Hopland and Crawford's Ranch in Mendocino County marks the reconstruction to modern standards at a cost of approximately $327,000 of the last remaining section of obsolete road on the Redwood Highway, U. S. 101, between Cloverdale in Sonoma County and Ukiah in Mendocino County, a distance via the new road of 29 miles.

Ten years ago, the section of road between these termini was an indirect, winding, mountain road with many steep grades and innumerable sharp and dangerous curves, totally unsuited to the demands of modern traffic. Recognition of this condition by the California Division of Highways resulted in a well planned long term program of reconstruction, which has finally been achieved with the completion of this last remaining 6.7 mile unit.

FLOOD HAZARDS REMOVED

After removal of the present wartime restrictions against pleasure driving and recreational travel, motorists from the San Francisco Bay region and the southern part of the State will unquestionably appreciate the final elimination of this section of substandard road, on their excursions to the Lake County resorts and the famous Redwood groves situated in Mendocino, Humboldt and Del Norte counties. In the meantime, this realigned, modern unit will effectively serve the expanding needs of the necessary transportational requirements of war-time business and industry.

The superseded section of highway between Hopland and Crawford's Ranch was originally built in 1923. Not only were alignment and grade standards inferior for modern motor vehicle operation, but a far more serious defect was the flood hazard from high water in the adjacent Russian River.

At 11 different locations, the road was subject to overflow during flood peaks with all the consequent inconvenience to traffic, and upon occasions of extreme high water, complete stoppage of travel over this vital transportation artery.

All of these imperfections have been corrected on the new road, which has not only a more direct and pleasing alignment, but in addition, is located either on higher ground or with suffi-

Before and after views on recently improved section of Redwood Highway in the city of Hopland

ciently high embankments to clear the hazards of these flood waters.

The following comparison of the distance and curvature factors between the old and the new road conveys better than words the improvement which has been accomplished in the relocation of this unit of highway.

	Miles	Curves	Total curvature	Minimum radius feet
Old Road	6.58	34	924° 48′	200
New Road	6.70	10	187° 19′	1150

For a distance of 2,000 feet through the town of Hopland, concrete curbs and gutters were constructed and the street graded to a width of 60 feet between gutters. This width provides an eight foot parking strip on each side of the street without any resulting interference to the through highway traffic.

The graded section for the rest of the project is the standard 36 foot width except that for a distance of 2,650 feet a graded section varying from 36 to 54 feet was used to provide a maximum of 1,600 feet of four lane road over a vertical curve to correct an impaired sight distance for the designed speed.

Work started on this project during the fall of 1941 but because of the rainy season and difficulties of carrying on operations during the early war effort, in which work the contractor was actively engaged, the grading was delayed until the summer of 1942. During the winter season the contractor had completed the numerous reinforced concrete structures which included two reinforced concrete bridges at Crawford and McNab Creeks. Consequently, when grading was finally resumed in July, 1942, there were no delays resulting from lack of grading room.

BIG EXCAVATION JOB

That the contractor took advantage of this ideal working condition is indicated by his progress on grading during the August, September, and October of 1942 in which period he removed and compacted into embankments 401,247 cubic yards of roadway excavation. This work involved 4,068,000 station yards of overhaul or the approximate equivalent of hauling one cubic yard of excavation 113,000 miles or 4½ times around the earth at the equator.

Before the large summit cut between Crawford Creek and McNab Creek had been completely excavated, the designed 1½:1 slope on the right showed development of a major slide. Besides flattening this side of the cut to an approximate 2½:1 slope to stabilize the wet side hill, a pervious blanket of river gravel with an underdrain was placed full width of the excavated area before backfilling the cut to an elevation 11 feet above the original planned grade at the middle of the cut.

This grade raise was made to avoid removing support from deeper sliding planes, and thereby incur greater slide yardage. Subsequent events have conclusively justified the wisdom of this decision.

4-LANE SECTION PROVIDED

Backfilling the cut to this new grade provided sufficient additional width of roadbed to secure a section of four lane roadbed with only a very slight amount of additional excavation, which will eliminate any necessity for striping this section as a "nonpassing zone" due to the greater restriction in sight distance resulting from the raise in grade.

(Continued on page 20)

Redwood Highway improvement north of Hopland involved several long deep cuts on new direct routing

Orinda Junction on Sign Route 24, Oakland-Walnut Creek arterial, has full traffic signal control and channelization

New 4-lane Divided Highway Link Opened in Contra Costa County

By G. L. BECKWITH, Resident Engineer

THE recently completed section of State Sign Route 24, 2.14 miles in length, between one-quarter mile west of Orinda and one and three-quarters miles west of Lafayette, Contra Costa County, has resulted in a modern, four-lane divided highway on the grades and alignment completed under previous contracts in 1937.

For the most part, the earlier contracts provided a three-lane highway, except at the beginning of the present contract and over Charles Hill, where four-lane pavement was placed. The surfacing originally placed consisted of plant mix.

Sign Route 24 serves as the only direct connection between the towns of Walnut Creek, Saranap, Lafayette, Moraga and Orinda and the Oakland-San Francisco area. Since the opening of the Broadway Low Level Tunnel in 1937, the suburban development of these communities has been very extensive, and further development has only been checked because of wartime restrictions on building. In addition, this highway serves as a main route connecting the important industrial and agricultural area to the east of Walnut Creek with the metropolitan Bay District.

During the winter of 1941 and 1942, a slide occurred on this section of Sign Route 24 that resulted in a restriction of roadway width to two traffic lanes and, in addition, caused an uplift of the paved roadbed, causing a serious bottleneck at that point.

Corrective measures within this area consisted of installing during 1942, under day labor, an extensive system of hydrauger pipes to drain the slide area and under the present contract to raise the grade over the entire area, to provide for a change in drainage structures.

These included the installation of 140 lineal feet of 60-inch reinforced concrete pipe, and the placing of a strut of approximately 6500 cubic yards of roadway excavation at the toe of the sliding area.

The project consisted of widening the existing roadbed to a minimum of 64 feet and placing two 23-foot lanes of Portland cement concrete separated by a 4-foot dividing strip of asphalt concrete. The two outer 11-foot lanes of Portland cement concrete pavement were placed on imported borrow with a minimum depth of one foot; the two inner 12-foot lanes used the existing surfacing as base.

The 2-inch asphalt concrete in the central 4-foot dividing strip was placed on crusher run base five inches thick.

Within the slide area, the pavement consisted of a minimum of 12 inches of imported borrow, four inches of crusher-run base and five inches of asphalt concrete.

Median bars, three inches high and spaced at 20-foot intervals, were installed within the 4-foot dividing strip throughout the project, except in the channelized area at the Orinda intersection.

TRAFFIC MOVEMENTS CHANNELIZED

The channelization at the Orinda Junction provides left turn accelerating and decelerating lanes for all highway traffic movements.

In order to dispatch traffic through this intersection with maximum safety, a three-phase, traffic-actuated signal system provides for three separated traffic movements. Magnetic detectors located in each of the traffic lanes approaching the intersection inform the electronic traffic signal dispatcher of approaching vehicles.

The right of way period is then separately allocated to the highway traffic, cross traffic or left turn traffic in accordance with the number of vehicles that have crossed the traffic detectors.

AUTOMATIC SIGNAL CONTROL

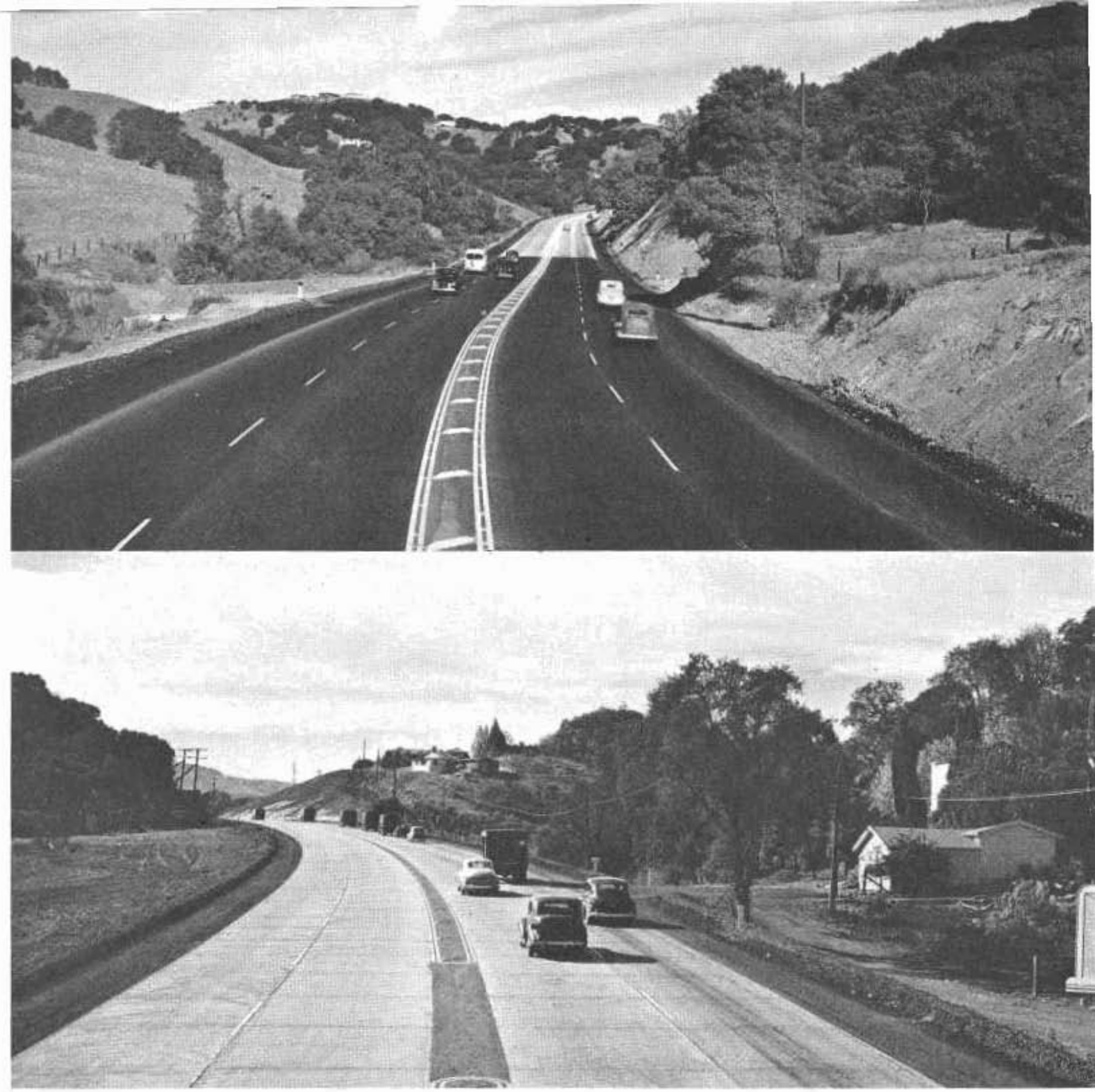
With the absence of cross traffic or left turn traffic, the green interval will remain on the highway, but approaching cross traffic or left turn traffic will in turn be separately allocated the green interval.

The installation has been designed with post-war conditions in view, and the intersection will handle 3,000 cars per hour with a maximum of safety and a minimum of delay.

The approximate major quantities involved are:

Roadway Excavation	64,000 cubic yards
Overhaul	1,000,000 station yards
Imported Borrow	54,000 tons
Crusher Run Base	4,600 tons
Portland Cement Concrete Pavement	9,325 cubic yards
Portland Cement Concrete Structures	350 cubic yards
Asphalt Concrete	7,000 tons

The improvement of this section was let as a contract to Chas. L. Harney,



At top, slide section of State Sign Route 24 rebuilt as 4-lane asphalt concrete highway with hydrauger pipe drainage and 3-inch median bars. Below, section over Charles Hill with two 23-foot lanes of Portland cement concrete and 4-foot asphalt concrete dividing strip

San Francisco, California, at an approximate cost of $464,000.

Resident Engineer G. L. Beckwith was in direct charge of the work under the general supervision of District Construction Engineer R. P. Duffy and District Engineer Jno. H. Skeggs.

Dedication ceremonies were sponsored by the Orinda Fall Festival Committee on October 31, at which time traffic signals were put into operation.

Waldo Overpass Eliminates Marin County Traffic Hazard

(Continued from page 7)

State from an abandoned railroad in Santa Barbara County.

The project was completed at a cost of $88,796.24 including State-furnished materials but exclusive of right of way costs. These construction funds were furnished by the Federal Government from Access Road Funds.

The right of way was purchased by the State from State Funds at an approximate cost of $8,000. Harold W. Ruby was superintendent for the contractor in charge of the work. George A. Crayton of the Bridge Department supervised the construction of the undercrossing structure.

California Signs Mark Solomon Island Road

"WOULD it be possible," wrote Capt. B. W. Decker, United States Navy, from the South Pacific to Thomas H. Dennis, Maintenance Engineer of the State Division of Highways, "to send us some California road signs so that our boys from the Golden State who helped take the Solomons away from Tojo for keeps will feel more at home?"

Upon receipt of Capt. Decker's letter, Dennis transmitted the request

Jeep driver stops to ponder signs

to James Johnson of the California State Automobile Association, which organization furnishes the directional road signs which mark all California highways. Several signs promptly were sent to Capt. Decker.

Dennis recently received a letter of thanks from Capt. Decker and a photograph of a puzzled Marine standing beside his jeep at a crossroad in the Solomons. On a palm tree are three signs, one pointing in the direction of Camp Alligator and above it the familiar marker of State Sign Route 1, the highway that runs from Humboldt County to a connection with U. S. 101 in Santa Barbara County.

Below is a U. S. 40 sign, the like of which motorists follow from San Francisco Bay to the California-Nevada boundary east of Truckee.

"The signs sent to us have been installed and are the pride of all hands at Camp Alligator," Capt. Decker wrote Dennis. "We know our road is the best marked road in the Solomons, for the grand State of California did the marking, thanks to you.

"Tojo has acquired many new worries since December 7, 1941. The enclosed picture represents just one more spike in his coffin. As fast as we drive the Japs out, in comes a road and up goes a sign. We laugh while we fight—we laugh while we work. Yes, Tojo has a barrel of troubles."

Redwood Highway Relocation Eliminates Hazards

(Continued from page 17)

The major items of work on this contract, which required 203,036 man hours of labor of all classifications to complete, were as follows:

505,007	C.Y.	Roadway excavation
6,728	"	Structure excavation
4,915,645	S.Y.	Overhaul
60,327	C.Y.	Imported borrow
124,995	Lbs.	Reinforcing steel
3,883	"	Miscellaneous steel
14,166	L.F.	Culvert and underdrain pipe

The initial contract did not embrace the construction of a surfacing for the road, but was limited to the grading of the roadbed and the placing of a base course of creek-run gravel. Consequently, it was planned to immediately contract for the construction of an armor coat wearing surface over the entire project during this summer.

The completion of this latter item early in July put the new alignment in a satisfactory condition to serve the needs of traffic for many years to come, both in war and in peace.

The grading contract work was performed by the Macco Construction Company of Clearwater, California, the work being under the general direction of Supervising Superintendent H. W. McKinley and Field Engineer O. A. Tucker.

The armor coat surfacing contractor was E. A. Forde of San Anselmo.

The inspection and supervision of the work for the State Division of Highways was by Resident Engineer C. M. Butts and an able staff of assistants.

Francis J. Carr Becomes U. S. Navy Lieutenant

Francis J. Carr, member of the legal staff of the Department of Contracts and Rights of Way, recently commissioned Lieutenant (j.g.), United States Navy, was granted military leave and on October 27th left to take up his new duties.

Lt. Carr is now stationed at Quonset Point, Rhode Island, where he is enrolled in the Navy Training School. A native of Redding, Lt. Carr entered State service on April 9, 1940, later being promoted to the post of attorney, under C. C. Carleton, Chief, Department of Contracts and Rights of Way. He was a graduate of Santa Clara University and of the University of California School of Law.

L. A. Bridge Steel Erection Job

(Continued from page 5)

40-ton crawler cranes and swung into position while one crane held the load steady and the other moved it slowly backward.

The placing of the floorbeams, stringers, and stiffening trusses between the girders was done by a truck crane operated from a runway constructed on top of the girders.

The fabrication of the structural steel was excellent and no difficulties were encountered during the erection.

Postwar Road Program

(Continued from page 9)

postwar period with a State Highway System far below the standards necessary for proper service to traffic.

The greatest handicap confronting the Division of Highways in preparation of its postwar program is sufficient engineering manpower. The division has lost 750 employees to the armed forces, many from key positions, and others have left to take more remunerative positions in war industries. The department, however, is using all personnel, not needed for maintenance operations or Federal Access and Flight Strip construction, on surveys, preparation of plans, specifications and estimates and on work in connection with right of way acquisition.

Details of the State highway postwar construction program approved by the California Highway Commission are given in the tabulations accompanying this article on pages 10-12.

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