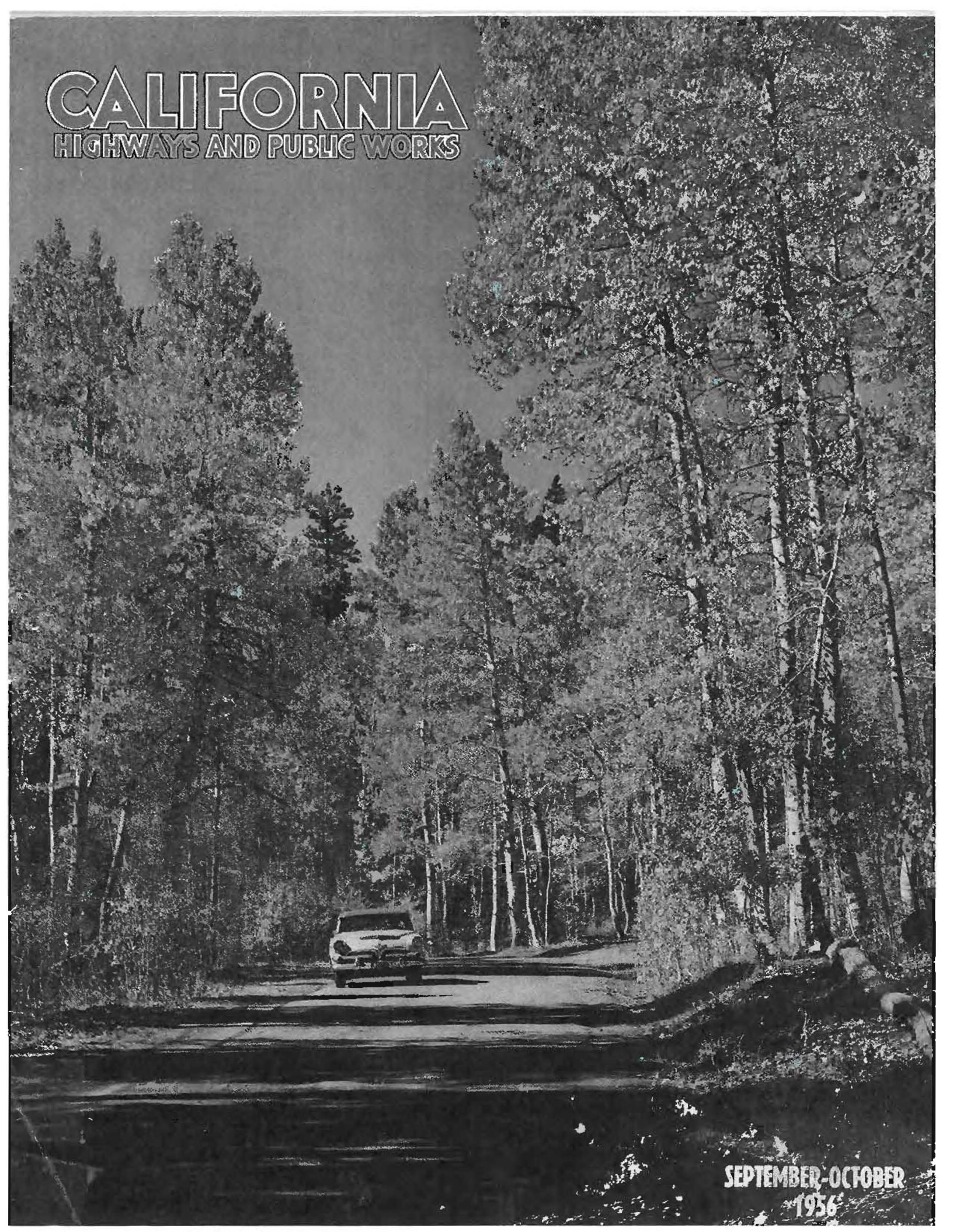


CALIFORNIA

HIGHWAYS AND PUBLIC WORKS



SEPTEMBER-OCTOBER
1956

California Highways and Public Works

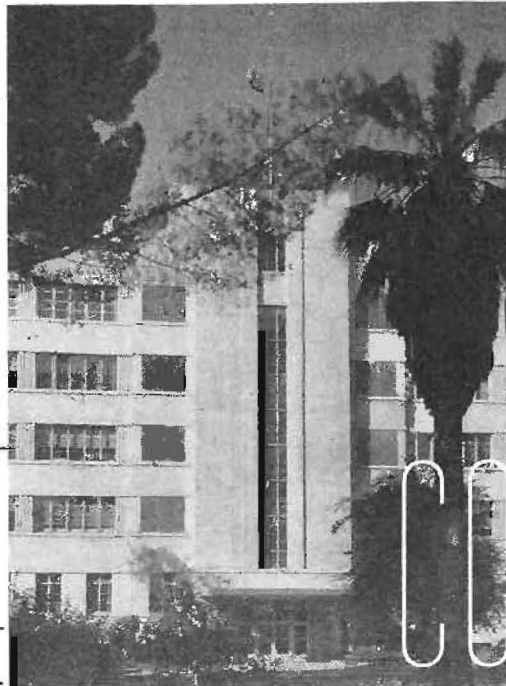
Official Journal of the Division of Highways,
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Sacramento, California

San Fernando

By J. E. ECKHARDT and L. S. VAN VOORHIS
Assistant District Engineers, District VII

*Excellent Progress
Is Being Made*

Valley Freeways

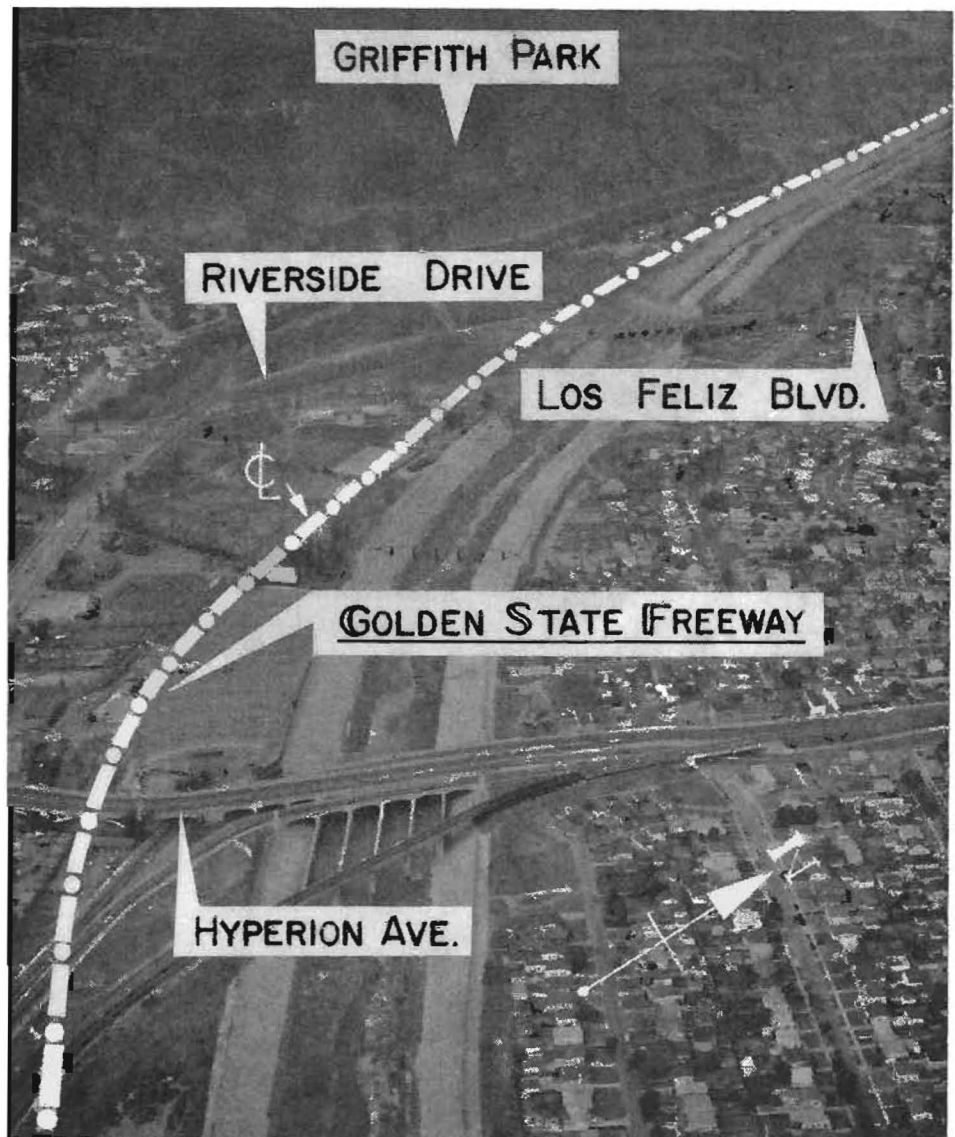
THE SAN FERNANDO Valley is a very important part of the City of Los Angeles lying between the Santa Monica Mountains, the Santa Susana Mountains, the San Gabriel Mountains, and the Verdugo Mountains. In the northerly part of the valley is the City of San Fernando occupying the unique position of being entirely surrounded by another city when the City of Los Angeles in the early twenties extended its limits to include the San Fernando Valley. The valley roughly comprises the same area as the old original "Rancho Mission de San Fernando" of early Spanish days.

Its history, past and present, is most interestingly set forth in the book entitled, "San Fernando Valley," by W. W. Robinson, published by the Title Insurance and Trust Company of Los Angeles, California, that is available to applicants free upon request. A collector of Californiana would do well to obtain this book for his library. From the foreword of this book by Stuart O'Melveny, President of T. I. and T. Company, is quoted the following:

Historical Past

"San Fernando Valley summarizes the story of the whole of California. Formerly there were Indian villages along the water courses of the valley. Antelope once raced its broad plains. Spanish explorers, beginning in 1769, crossed the valley. It had a mission period, then rancho days. Revolutionary armies marched its length. The valley had a gold rush, an era of pioneer settlement. Great sheep and wheat ranches gave way to small farms, fruit orchards, communities, large population areas, and industry."

There is in this book much valuable information about the Mission San Fernando Rey de Espana that was established September 8, 1797, by Fr. Juan Crespi. If even more detailed information is desired concerning the early days of the San Fernando Mission, reference can be made with profit to *California Highways and*



Public Works, issue of January-February, 1945.

Referring again to the T. I. & T. book, Mr. Robinson has considerable of interest to report about the historic trails and roads giving access to the San Fernando Valley, referring to them as "gateways." In the light of recent freeway developments in the valley what he has to say about two

of these gateways is of particular interest:

Gateways to Valley

"By Cahuenga Pass, once so narrow only horsemen could use it, now a broad multi-laned highway crowded with cars, the explorer of the 1950's could quickly leave the San Fernando Valley and be in Hollywood. He may prefer to extend his tour to Burbank, the city which today is usually described as being in the easterly end of San

Fernando Valley. It is at least a 'gateway' to the valley. Before the city existed its land was shown on old maps as the 'Puerto Suelo' —or gateway. Burbank has its own interesting story, for it was a part of the 4,000-acre Rancho Providencia, which—in the 1860's came into the hands of Dr. David Burbank (whence the name of the city), and also a part of the 36,000-acre Rancho San Rafael, whose first owner was Corporal José Maria Verdugo of the Spanish Army. Today Burbank, with its 80,000 people, largely fills the area of the 'gateway' of Spanish days, close pressed by the Verdugo Mountains to the north and the Santa Monicas to the south. Through it runs the old highway, the San Fernando Road, over which in the Spanish and Mexican periods ox-drawn carretas lumbered between the Pueblo of Los Angeles and the Mission of San Fernando. Burbank is a city of homes, parks, schools, churches, manufacturing plants, and is an aircraft and motion picture center. Lockheed Aircraft Corporation is here, so, too, the huge Warner Brothers Studio, the Walt Disney Studio, and the acreage used for outdoor 'shooting' by Columbia Pictures Corporation."

Cahuenga Pass

The Cahuenga Pass gateway, south-erly of the Universal-International Studios called "Universal City," is now the location of the Hollywood Freeway with its 10 miles of completed construction into the Los Angeles Civic Center. The Burbank gateway is now the location for the Golden State Freeway, which is under construction. Another historic gateway into the valley via Sepulveda Canyon is the location for the San Diego Freeway. As the accompanying map shows, the San Diego Freeway will roughly parallel Sepulveda Boulevard, and the Ventura Freeway will be substantially along the general route of Ventura Boulevard, the old "Camino Real." The Golden State Freeway to the northwest leading over the Ridge Route to Bakersfield has a northerly branch, taking off just beyond the City of San Fernando, called the Sierra Highway that goes through Fremont Pass, another important "gateway."

Public Hearings Held

The evolution of the present freeway pattern in the San Fernando Valley from the old historic trails of the padres into modern freeways has been natural and logical as the mode of transportation has changed from ox-cart to automobile. Even so the establishment of freeway routings by the



California Highway Commission and the solving of engineering problems in connection therewith has not been an easy task. The engineers of the State Division of Highways have cooperated with the engineering staffs of the various cities in the valley in working out engineering details of planning and design so that the resulting freeways will provide the greatest traffic service for the lowest possible cost. The California Highway Commission has held many public hearings in establishing the freeway routes in the San Fernando Valley.

Typical of these public hearings was the one held July 14, 1954, regarding the Riverside-Ventura Freeway location and, in this instance, the commission published a report setting forth for the people of the San Fernando Valley the difficult problems which were being faced. Significant statements are quoted from the report as follows:

"The broad aspects of the problem are evidenced by the fact that the San Fernando

Valley is an area of some 200 square miles completely surrounded by physical barriers with only five major gateways susceptible to development to highway standards capable of serving dense vehicular traffic. The main gateways are Calabasas on the west, Weldon Canyon-Newhall on the north, Sepulveda Boulevard and Cahuenga Pass on the south, and the narrow valley of the Los Angeles River to the southeast.

Conclusions of Commission

"Among the conclusions reached by the commissioners, on the basis of the information and data submitted to the commission and upon independent on-the-ground investigation by the commission, are:

"1. An exterior examination of the homes along three lines under consideration indicates, generally speaking, that they balance out in quality though not in quantity. The majority of the homes on any one of the lines are beautiful properties with appropriate lawns and gardens with a value well above the average of California residences but we cannot say that any finer property will be taken on one line than on the other.

"2. Much has been said at the hearing in the documents filed about giving consideration to the human values as well as the engineering considerations. We have knowledge that we have given serious consideration to those values. In last anal-

we have to balance out 159 additional homes and 106 more residential units which Line I requires over Line III, and 270 more homes and 110 more residential units over Line IV, against objectionable features inherent in Lines III and IV. Places of residence can be moved. Admittedly, it takes time to develop gardens and to change residences into homes but a few years accomplishes these adjustments. A freeway located in the wrong place is an uncorrectable error and the whole community suffers irreparably and continuously over a great many years.

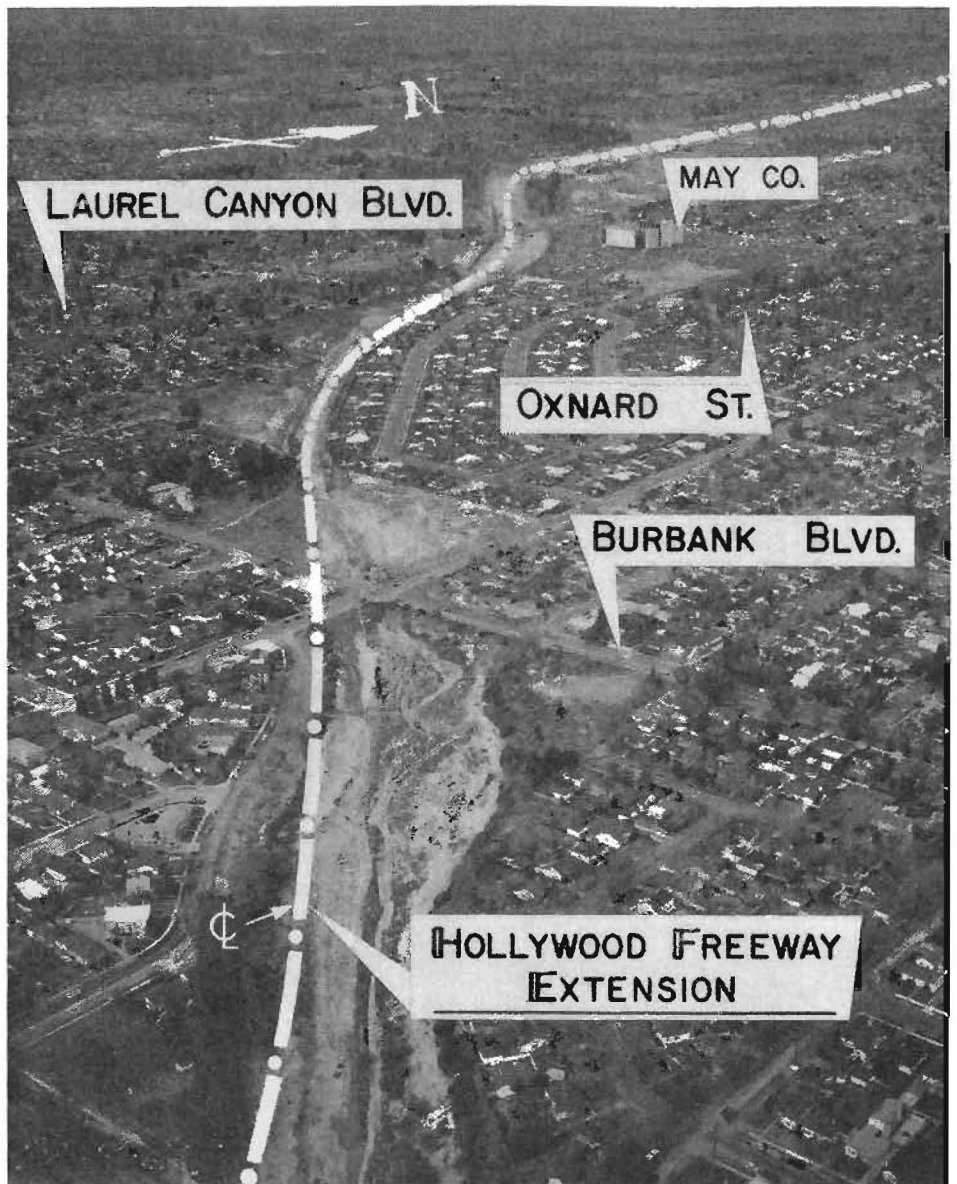
Sound Problems

"3. In speaking of the detriments on Lines III and IV, we are not thinking so much of the potential injuries directly to the sound recording companies except as these are reflected in the general economy of the community. Experience has taught that discontinuance of paychecks over extended periods results in community economic upsets and sometimes in family financial tragedies. These matters are essentially 'human values' and such wounds are not easily healed.

"4. From a community standpoint, the so-called 'disturbance' of the occupants of the homes not taken but left adjacent to the freeway will, in our opinion, more than be offset by the material reduction of identical kinds of disturbance to occupants of homes on city streets for there is certain to be far less start-stop traffic if Line I is constructed. Finally, from the same broad community standpoint, the material reduction of traffic volumes and traffic hazards on the city streets and avenues is a major community value in the favor of Line I. This clearly appears when we measure the over-all character of the traffic in the south portion of the San Fernando Valley. The far greater percentage of it is of local origin and very largely also for local destination."

Highway Commission Action

The above paragraphs are quoted because of their direct application to the problems of freeway location in the San Fernando Valley and also because the situation portrayed is typical of the thoughtful and detailed consideration which the members of the California Highway Commission give to these problems. As shown on the map accompanying this story, all of the freeways for the San Fernando Valley have been covered by the adoption of freeway resolutions by the California Highway Commission. After the commission has adopted freeway resolutions fixing the general location of the freeway route, the State Division of Highways can then start detailed designs, negotiate for the acquisition of rights of way, and proceed with construction contracts as funds can be provided therefor.

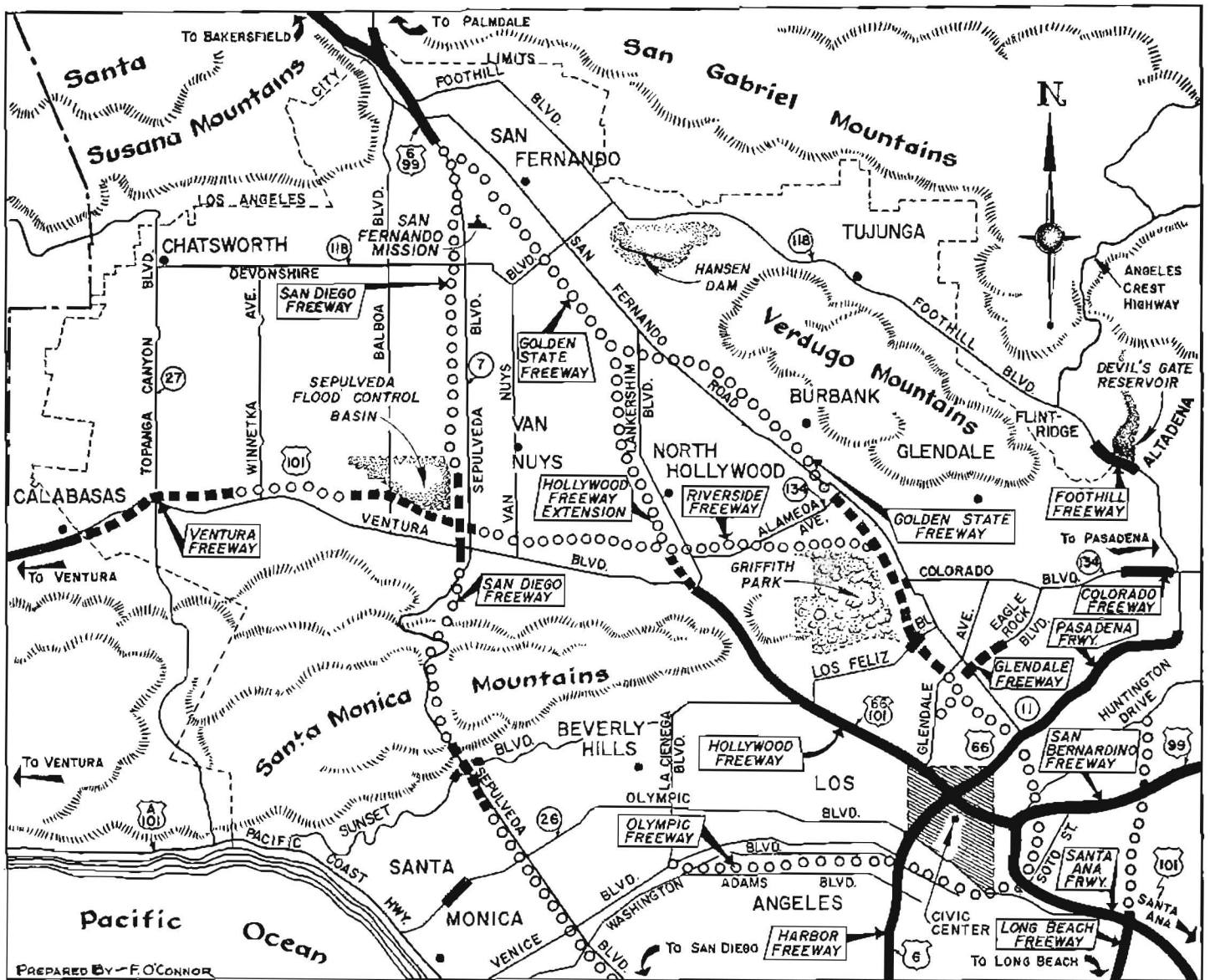


San Fernando Valley, an area where the population has more than doubled in the last 10 years (325,000 in 1946 to 790,000 in 1956), has developed growing pains such as few areas in Southern California have ever experienced. One of the most critical is the problem of transportation. With the Santa Monica Mountains separating the valley from industrial and business developments of other Los Angeles areas, and with the valley lying in the path of the only natural traffic routes leading from Los Angeles to the north, the inevitable result has been the development of very serious traffic problems. The completion of the Hollywood Freeway to Lankershim Boulevard and Vineland Avenue

at a cost of \$55,000,000, while providing some traffic relief, has also been responsible to a degree for the rapid development that has occurred in the valley. This same statement could of course, be made regarding almost any undeveloped area through which a section of freeway is completed. However, it is particularly applicable to the San Fernando Valley.

Golden State Freeway

As shown on the accompanying map, present plans propose the development of the Golden State Freeway and the San Diego Freeway as additional routes connecting the valley with the Los Angeles metropolitan area. By providing the Olympic Free-



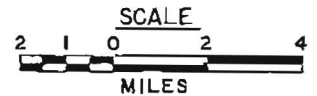
SAN FERNANDO VALLEY FREEWAYS

Legend

COMPLETED ————

UNDER CONSTRUCTION OR BUDGETED - - - - -

UNDER FREEWAY RESOLUTION



way as an east-west route through the industrial area just south of the central business district of Los Angeles, further aid in the distribution of traffic will be provided. The Ventura-Riverside Freeway will provide for east-west movement through the valley, serve as a connecting link with the other freeways proposed and provide for traffic destined for the coastal area

to the north. On the Ventura Freeway westerly of Calabasas, at a cost of \$14,000,000, all but 3.2 miles of the 37 miles to the City of Ventura, have been completed to freeway or expressway standards. The Golden State Freeway will provide the main route from the valley north over the Ridge Route to the San Joaquin and Sacramento Valleys.

Hollywood Freeway Extension

A major step in the rapidly developing freeway construction for the San Fernando Valley occurred when Director of Public Works, Frank B. Durkee, on August 16, 1956, awarded the contract to Griffith Company for construction of a 1.1-mile unit of the Hollywood Freeway Extension. This unit extends from Lankershim Boule-

vard to Moorpark Street and carries a construction allotment of \$2,172,000. The contract plans provide for an eight-lane freeway section, with completion of construction scheduled for October, 1957.

Initial construction work on this freeway link started with the award of contract on January 20, 1956, to Oberg Brothers for the two bridges to carry this freeway over the Los Angeles River and over Vineland Avenue. This bridge construction contract has an allotment of \$1,022,500 and is 35 percent completed, with the estimated date of completion being December, 1956. A part of the Oberg Brothers contract provides for the relocation of Tujunga Wash with a new drainage structure northerly of the existing crossing under Vineland Avenue. By building the channel in the new location it becomes possible to replace the existing Vineland Avenue bridge with roadway embankment.

This new freeway unit will provide better collection and distribution facilities for San Fernando Valley traffic utilizing the Hollywood Freeway because of the new interchange facilities provided at Vineland Avenue and the temporary ramps to be constructed connecting with Moorpark Street. These will be additional traffic facilities supplementing the on-and-off connections from the present westerly end of the Hollywood Freeway at Ventura Boulevard.

Ventura Freeway

The full potential of this one-mile unit of the Hollywood Freeway Extension, however, will not be realized until the interchange system with the Ventura Freeway is provided and the Ventura Freeway is fully completed westerly to Calabasas, the west city limits of Los Angeles. On this later portion of the Ventura Freeway, much has been accomplished with respect to the acquisition and clearing of necessary rights of way, and some bridge construction has already been started.

Construction is under way on two bridges to carry the new Ventura Freeway over Topanga Canyon Road and over existing Ventura Boulevard in the Woodland Hills area of the San Fernando Valley. This contract, also

with Oberg Brothers, is now 70 percent complete and carries a construction allotment of \$703,700. The work is scheduled for completion November, 1956.

Two sections of the Ventura Freeway in the San Fernando Valley are covered by allocations in the 1956-57 Fiscal Year budget as adopted by the California Highway Commission last November. One of these units extends from Kelvin Avenue to Calabasas and will utilize the two bridges now under construction by Oberg Brothers. This section is 3.8 miles in length and carries a budget allotment of \$3,600,000. The plans are completed, the right of way is clear for construction, and bids were opened on August 30, 1956. The low bidder was the Fredericksen & Kasler of Sacramento, and the low bid was \$3,435,889.

Second Section of Freeway

The second section of the Ventura Freeway, 2.6 miles in length, extending from Sepulveda Boulevard to Encino Avenue, is to be combined as a single project with the section of the San Diego Freeway from a point near Valley Vista Boulevard to Burbank Boulevard, 1.8 miles in length, which will include the interchange between the Ventura and San Diego Freeways. An allotment of \$7,535,000 for the combined project is carried in the 1956-57 Fiscal Year Budget. This 1.8-mile section of the San Diego Freeway will provide connections with the bridge to carry the San Diego Freeway over existing Ventura Boulevard now under construction by Oberg Brothers, contractors. This contract carries a construction allotment of \$500,000 and is now 90 percent completed. The estimated date of completion is October, 1956. The plans for this 1.8-mile section of the San Diego Freeway in the San Fernando Valley are complete, and right of way acquisition is satisfactorily progressing so that it is expected that construction will be under way on the combined unit of the Ventura Freeway and San Diego Freeway early this fall.

This leaves two sections of the Ventura Freeway between the west city limits of Los Angeles and junction with the Hollywood Freeway Extension that require future financing be-

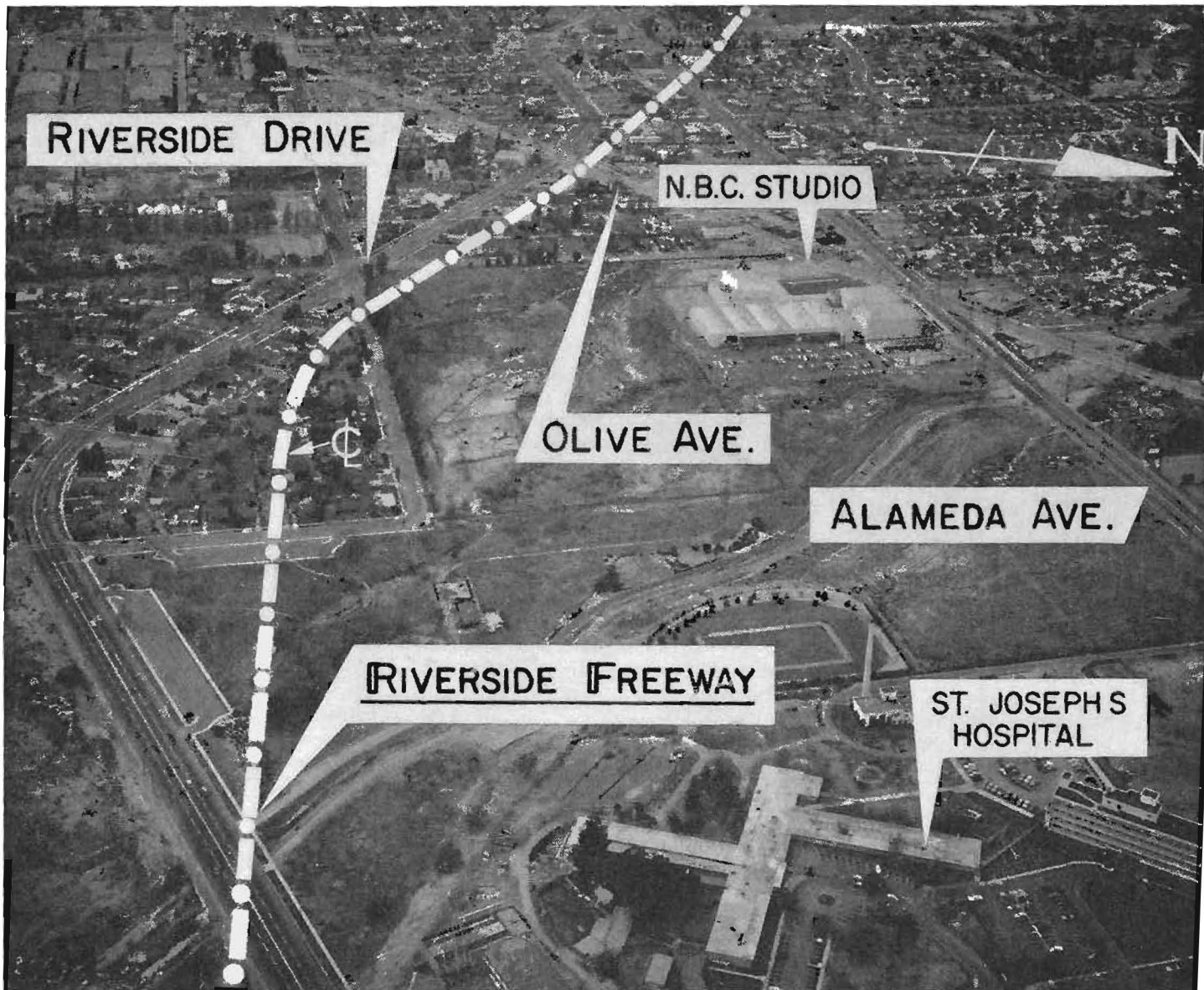
fore construction can proceed. One of these is from Encino Avenue to Kelvin Avenue in the Reseda area, 3.9 miles in length. The other section is from Sepulveda Boulevard to a connection with the Hollywood Freeway Extension through the Studio City area, 5.3 miles in length. Good progress is being made on right of way acquisition for these other sections. On these two units a construction schedule cannot be established at this time because the matter of financing will have to be worked out by the California Highway Commission in its consideration and determination of future state highway budgets.

Riverside Freeway

An easterly extension of the Ventura Freeway, known as the Riverside Freeway, will provide a connection with the Golden State Freeway. Plans are now being prepared on this 4.8-mile freeway. This is a vital link in the freeway system necessary to provide badly needed traffic service to the San Fernando Valley because, when the Riverside Freeway and the Golden State Freeway between Burbank and Boyle Heights in East Los Angeles are completed, an additional traffic arterial will then be available to supplement the existing Hollywood Freeway. This is the most practical and most expeditious way in which we can secure relief from the traffic congestion now existing on the Hollywood Freeway that, according to late traffic counts, is carrying a maximum load of 185,000 vehicles per day.

Completion of these first priority freeway units for the San Fernando Valley will provide an alternate route into or around the Los Angeles Civic Center and downtown area. These freeway units, when completed, will certainly do much to relieve the traffic overload now existing on the Hollywood Freeway between the San Fernando Valley and the Los Angeles Civic Center.

It is very desirable to have these particular sections of freeway completed, or nearly so, before further units of the Hollywood Freeway Extension are put under construction to bring it to its northerly terminus at a junction with the Golden State Freeway near Pacoima, otherwise the



traffic now using San Fernando Road and Riverside Drive would be diverted to the Hollywood Freeway Extension, and additional traffic would then be forced onto the already overcrowded Hollywood Freeway.

San Diego Freeway

Another freeway that should be mentioned that is of great interest to San Fernando Valley motorists, because its development and completion will greatly improve traffic conditions in the valley, is the San Diego Freeway. This freeway is 93.7 miles in length. It extends southerly from junction with the Golden State Freeway near the City of San Fernando

in close vicinity to existing Sepulveda Boulevard over the Santa Monica Mountains through the West Los Angeles area and along the easterly side of the Los Angeles International Airport. Then it swings easterly, passing to the south of the Long Beach Municipal Airport and then southeasterly into Orange County, to a junction with the Santa Ana Freeway at El Toro. Then it proceeds in close vicinity to existing U. S. Highway 101 through San Juan Capistrano and San Clemente to the Orange-San Diego county line.

The construction of the bridge to carry this freeway over Ventura Boulevard has already been described.

Other construction is now in progress in the West Los Angeles area. Work on the Sunset Boulevard Overcrossing and three other nearby bridges costing \$723,000 was completed February of this year. In this same area construction under two contracts with the Thompson Construction Company is now in progress to complete 2.3 miles of the San Diego Freeway between Ohio Avenue and Casia Drive. The construction allotment total \$4,000,000. The estimated date of completion is March, 1957. The construction includes seven reinforced concrete bridges and the extensive traffic interchange system at Wilsh Boulevard.

Right of Way Acquisition

Over the entire length of this freeway at various locations, planning, designing, and right of way acquisition is in progress as well as the construction that has been described. In many locations, advance right of way acquisition funds, frequently called "Chapter 20 Money," have been utilized in the purchase of vacant lands to forestall construction of private improvements which, if allowed to proceed, would have made future right of way cost many times greater. On the San Diego Freeway, \$5,000,000 have been expended from Chapter 20 Money. The total expenditures to date for right of way acquisition and construction on this freeway is close to \$28,000,000. The 1956-57 Fiscal Year budget contains an allotment for right-of-way acquisition on the San Diego Freeway of \$2,740,000.

The San Diego Freeway is a traffic facility badly needed by the San Fernando Valley motorists, being valuable because it will take through traffic around the built-up and heavily congested Los Angeles business and industrial areas. When completed, a large portion of the through traffic now using the Hollywood and Santa Ana Freeways can to great advantage utilize the San Diego Freeway as a bypass route. It will be of further value when the future Olympic Freeway has been constructed for traffic destined for Los Angeles, because then another alternate route supple-

menting the Hollywood Freeway will be available.

Golden State Freeway

In District VII the Golden State Freeway is 72.7 miles in length, extending northwesterly from the junction with the Santa Ana Freeway in the Boyle Heights area of East Los Angeles, skirting Elysian Park, through Griffith Park, through sections of the Cities of Glendale and Burbank, through the San Fernando Valley in the general vicinity of San Fernando Road, and over the Ridge Route to the Los Angeles-Kern county line near Lebec. Forty-five miles of this freeway from the north city limits of Los Angeles over the Ridge Route to the Los Angeles-Kern county line have been completed at a cost of \$12,000,000, as a four-lane divided expressway. In fact, this highway facility operates as a freeway because crossroads are infrequent and roadside development is sparse.

From the north city limits of Los Angeles for three miles southeasterly, therefrom, the Golden State Freeway has been developed as a full freeway providing connections on freeway standards to the north, with the Sierra Highway through Fremont Pass and connections to the east with Foothill Boulevard, and to the south with Sepulveda Boulevard and San Fernando Road. This three-mile section of freeway, that is sometimes called "The Tunnel Station Job," was constructed at a cost of \$3,300,000 and

was opened to public traffic August, 1955.

There are three construction contracts now in progress on the Golden State Freeway in the Burbank-Glendale and Griffith Park area of Los Angeles. These three contracts are with the Vinnell Co., Inc., and Vinnell Constructors. The contracts provide full freeway construction for five miles between Glendale Boulevard in Los Angeles and Ash Street in Burbank. The total of the three construction allotments is \$10,000,000. The work is scheduled for completion late 1957 or early 1958.

While much progress has been made in design and right-of-way acquisition on other units of the Golden State Freeway, a construction schedule for completion is not available at this time because this is dependent upon availability of construction funds as to be determined by the California Highway Commission in its consideration of future budgets.

Foothill Freeway

Of all the freeways that will ease traffic conditions in the San Fernando Valley, the least progress has been made on the Foothill Freeway.

As of this date there are two miles of the Foothill Freeway in the Flint-ridge-Altadena area in the vicinity of Devil's Gate Dam Reservoir, that have been covered by freeway resolution by the California Highway Commission, and completed. A special problem existed at this location due to

LEFT—Construction of bridge across Los Angeles River. RIGHT—This photo shows construction through Burbank.



intolerable traffic conditions where Foothill Boulevard was previously carried on a narrow two-lane roadway over the crest of Devil's Gate Dam. In correcting this situation it was necessary for the State Division of Highways to construct a short section of the Foothill Freeway to full freeway standards. This was completed and opened to traffic in October, 1955, at a total cost of \$2,700,000.

Advance preliminary engineering studies are now in progress upon various sections of the Foothill Freeway in order to expedite its development, although no recommendations have been made to the California Highway Commission by the State Highway Engineer as to specific locations for the Foothill Freeway easterly and westerly from the completed section. It is to be expected that advance planning will now be expedited because the Foothill Freeway has been taken into the U. S. Interstate Highway System and is now eligible for participation in the new federal aid funds that have been created by the Federal Aid Highway Act of 1956.

In Interstate System

Other freeways in the San Fernando Valley that have been taken into the U. S. Interstate Highway System are the Golden State Freeway and the San Diego Freeway. It is to be expected that right-of-way acquisition and construction will be speeded up on all freeways in the San Fernando Valley area by reason of the additional funds made available to California under the Federal Aid Highway Act of 1956.

The California Highway Commission met in Sacramento during the latter part of the month and on August 25, 1956, announced the addition of \$47,245,000 to the state highway right-of-way acquisition program, and \$16,300,000 to the construction program for the 1956-57 Fiscal Year. Of these amounts, \$2,000,000 was allocated by the commission for increase to the right-of-way acquisition program for the Golden State Freeway. In commenting upon this, Director of Public Works Durkee, chairman of the commission, said:

"Our planning is necessarily based on acquiring rights of way in an orderly manner ahead of construction. The necessary

speedup in acquisition of right of way, as reflected in this action by the commission, is very important in the early advancement to the construction stage of many projects. The right of way actions involve some major construction projects which may be included in the 1957-58 Fiscal Year budget, now under consideration by the commission for adoption within the next two months, or in succeeding fiscal years."

Freeways for the San Fernando Valley have created many complicated and difficult problems that have been solved, but many more still lie ahead which have not yet been settled. Successful solutions that have been worked out have been to a large extent because of the splendid cooperation which has been received from the city and county public officials and the engineering departments of the cities through which the freeways are located. We are sure subsequent agreements will be reached on other pending and future matters in a like manner, because there is every reason to believe that the same spirit of mutual cooperation will continue.

"THE BROTHERS OF THE ROAD"

GARDEN GROVE

Few of the countless thousands of automobile and truck drivers who pass over California's fine highways realize the time, money and thought it takes to design, build and maintain these smooth rivers of traffic.

The first ones to come along are the surveyors—those boys who plant stakes in odd spots and make the various measurements in three dimensions necessary to gain the required data, assisted by airplane photographs.

The design boys next do their bit and turn out a roll of plans ready to start construction. The Right of Way boys meantime have secured title to the necessary property over which the highway will be built. Then come the construction men, who, along with the materials department and bridge men, direct the placing of foundation and wearing surface, most of which is done by experienced contractors.

Now the Maintenance Department takes over. These men are truly the "Brethren of the Road." No matter how severe the weather, rain, snow or drought, earthquakes, floods or fire, these determined men are constantly

Division Slates Opinion Survey Among Employees


What do Division of Highways employees think of their opportunities to work effectively, their training needs, their opportunities for advancement, their supervision and other aspects of their jobs?

In the near future the division is planning to conduct a state-wide employee opinion survey to find the answers to these and related questions. Purpose of the survey is to provide a sound basis on which to plan for increased efficiency and decreased employee turnover, particularly with respect to technical personnel.

The first step will be to obtain a frank, forthright expression of the individual employee's point of view. The employee opinion survey is a well-recognized method of providing this information in large-scale private industry and has been adapted to governmental agencies as well. It was tried on a pilot basis in one district of the Division of Highways, and produced worthwhile results.

Forms will be distributed to each employee. Questions will be asked about his views concerning his job. The form will not be signed, and will not be identified in any way with the individual employee who fills it out. Complete anonymity is of course essential to obtaining an objective picture.

When the results of the survey have been tabulated and analyzed they will be published in *California Highways and Public Works*.

on the job, day and night, keeping the highways passable at all times. To them, probably as much as to any other group, we owe much more consideration than has been given at times in the past. Many of these men have been injured or killed in the performance of their duty. Whenever you see an orange-colored pickup, truck or piece of heavy equipment with a diamond , bear in mind that they are trying to serve you 100 percent in spite of all difficulties. Give them your support.

W. V. BRADY

Harbor Freeway

Construction Progress
On Important Project

By MAURICE E. CAMP and RAY A. COLLINS, Resident Engineers, District VII

FREEWAY CONSTRUCTION of considerable interest to the people of Los Angeles and vicinity was completed during 1956 or is now rapidly progressing toward completion on the Harbor Freeway. This freeway when completed will extend for 22.4 miles from its northerly terminus at the intersection with the Hollywood Freeway at the four-level traffic interchange structure near the Los Angeles Civic Center to its southerly terminus at Battery Street in the San Pedro area. As of today the total spent and obligated for rights of way and constructing on the Harbor Freeway stands at \$84,000,000. At the northerly end of the completed 4.3-mile section the average daily traffic is now 175,000 vehicles.

With the football season now at hand it is of special interest to fans attending the Exposition Park Memorial Coliseum games that there are now four freeway traffic lanes available to southbound traffic connecting with outlet ramps at Exposition Boulevard and at Santa Barbara Avenue that lead directly to the coliseum. To facilitate the northbound traffic movement at end-of-game time there are inlet ramps located at Santa Barbara Avenue, at Exposition Boulevard and at Hope Street. To accommodate the heavy pedestrian traffic occasioned by football fans parking on the easterly side of the freeway a 12-foot clear width pedestrian undercrossing has been put into service at 38th Street to take people under the freeway.

Bus Ramps Constructed

Bus ramps have been constructed under an agreement with the City of Los Angeles for north and southbound traffic on Jefferson Boulevard and southbound traffic at Santa Barbara Avenue. Another pedestrian undercrossing has been constructed at 40th Place for use with a bus ramp to be constructed on the adjacent con-

tract, for northbound traffic at Santa Barbara Avenue.

Immediately following the ribbon-cutting ceremony held on March 27, 1956, under the sponsorship of the Los Angeles Chamber of Commerce, a 1.4-mile section of eight-lane freeway and two lanes of a southbound distributor road from 37th Street to Santa Barbara Avenue were opened to traffic, extending the southerly temporary terminus of completed Harbor Freeway 4.3 miles from the four-level traffic interchange structure which distributes traffic to the Hollywood, Pasadena, Santa Ana and San Bernardino Freeways. Lieutenant Governor Harold J. Powers officiated at the ribbon cutting ceremony. With public traffic on the main freeway lanes it was then possible to complete the ramps at Flower Street and 23d Street where temporary widening had been provided to handle traffic at the temporary terminus of the freeway portion that had been opened to traffic after a previous contract was completed.

To speed up traffic movement temporary interchange ramp facilities, in addition to the normal inlet and outlet ramps at Santa Barbara Avenue, were constructed two lanes wide for distribution of traffic via the east and west frontage streets which were also constructed on this and the next contract southerly of Santa Barbara Avenue.

Freeway Contract

This contract for 1.4 miles freeway construction between 23d Street and Santa Barbara Avenue was awarded on April 1, 1954, to J. E. Haddock, Ltd., of Pasadena, California, with a contract allotment of \$3,438,300. The major elements of this work in addition to the roadwork consisted of 10 bridges, 11 retaining walls, one storm water pumping plant and three pedestrian undercrossings. Numerous storm drains and sanitary sewer lines were

relocated by the contractor, and gas, electric, water, and telephone facilities were relocated by the various public utility companies.

Due to a relatively dry winter season and to the fact that the natural soil excavated on this project was of a granular nature very little time was lost because of rain. The project was finished well ahead of the 400 working-day contract time, adjusted to include approved additional time allowances. This was made possible by the very cooperative efforts of the prime contractor who takes pride in doing a good job and making it available to the public as quickly as possible.

Heavy Excavation

The major portion of the fill material on this project came from roadway excavation on the freeway between 24th and 32d Streets and this material was placed between Grand Avenue, near 32d Street, and 39th Street. Borrow areas in the roadway excavation section of the next contract southerly of Santa Barbara Avenue, where the freeway is below existing ground level, supplied the remainder of the earth required to complete the portion between Grand Avenue and Santa Barbara Avenue. There were 542,649 cubic yards of roadway excavation and 13,883,989 station yards of overhaul involved in this contract.

All of the select material placed on this project in the backfill of bridge abutments, retaining walls and storm drain structure backfill, as well as to construct the structural section of the roadbed, was excavated in the vicinity of Adams and Flower Streets where the freeway section cut through an old streambed. During the excavation to a depth 30 feet below the normal street level for a storm drain pipeline north of Adams Boulevard, Assistant Resident Engineer Jack L. Nauslar uncovered the remains of a prehis-

toric animal. The bones were so chalky and in such a state of general disintegration that it was impossible to remove and preserve them as a unit. It was found that the animal had one stubby horn about eight inches long and a very thick skull bone structure. There was a very unusual double row of teeth in a portion of the jawbone.

Structural Section of Roadbed

The material for the structural section of the roadbed was processed at the excavation site by removing oversized materials, including boulders which ran from 6 to 10 inches in diameter, crushing them in a jaw crusher and recombining the product with the fine material which bypassed the crusher. This material was conveyed by a continuous belt into seven-cubic-yard dump trucks which distributed it to the point of use on the grade.

In the roadway section which was within the select material excavation area the select material was left in place with a small working excess at the time of roadway excavation and later processed in place by scarifying and windrowing with a motor grader. This was followed by reduction to material within specification limits by the use of portable hammer-mill type crushers. The material was processed with the use of a rock buster pulled by a tractor at the start of this work. This machine did a good job of reducing the material but all of the material from the largest boulders down to the fine sand was passed through the hammers and more fines were produced than were needed. This equipment was replaced with a loader combined with a grizzly to separate the oversize material which was crushed with a hammer mill and recombined with the fines as discharged onto the roadbed.

Pavement Placed

After placing steel forms the upper four inches of this crushed select material was cement-treated with 3½ percent portland cement for use as subgrade under eight-inch class "B" portland cement concrete pavement and the upper six inches was mixed with 2 percent portland cement where used as base under four-inch type "A" plant-mixed bituminous paving.



Lt. Gov. Harold Powers clips ribbon to open new Harbor Freeway section. Shown are, from left, Supervisors Kenneth Hahn, Chamber of Commerce Vice President John C. McHose, Councilman Dan Allen, Police Chief William Parker, Highway Commissioner Robert McClure.—Los Angeles Examiner photo

This cement treating process was carried out by bulk delivery of cement into the windrowed material, followed by mixing with a mixer through which the water was added, spreading with a land plane, rolling with a three-wheel steel roller, and finish rolling with a pneumatic-tired roller. The surface of this material was sealed with liquid asphalt MC-2 when completed. The pavement was placed with conventional equipment.

Cross-over galvanized steel water lines were placed in four-inch asbestos cement conduit under the roadway structural section prior to cement treatment to facilitate the future installation of watering systems for roadside planting in this area. Testing of completed waterline installations was done with nitrogen gas under pressure. In driving steel headed pins for the concrete paving forms the seemingly impossible happened. One long pin was driven clear through a 2½-inch pipe and casing.

Box Girder Bridges

In constructing the reinforced concrete box girder type bridges over city streets, timber false work was

used to meet city requirements, but structures constructed over freeway cut sections were supported on a minimum tubing falsework for simplicity in handling, moving, and expediting the work.

On the Harbor Freeway contract between 23d Street and Santa Barbara Avenue as above described, Maurice E. Camp was resident engineer and the principal assistants were Ches Palmer and Robert Klesges. The Bridge Department representative was H. J. Scott. Mr. George Wiggers was general superintendent for contractor J. E. Haddock.

Contract Number 54-7VC75-F

In addition to the 1.4-mile section of eight-lane freeway between 23d Street and Santa Barbara Avenue this was opened to public traffic on May 27, 1956, a 2.8-mile length of the Harbor Freeway in the City of Los Angeles between Battery Street in San Pedro and Pacific Coast Highway in Wilmington was completed and put into full use for public traffic on June 19, 1956. Details of this construction were described by Resident Engineer F. E. Sturgeon in the July-August

1955, issue of *California Highways and Public Works*. This contract was with the Vinnell Company, Inc. and Vinnell Constructors of Alhambra under a joint venture. The contract allotment was \$3,395,800. The contractor was represented by Jack Yount, Vice President for Vinnell Constructors, and G. M. McAfee, project manager.

For general description and background information regarding the Harbor Freeway since its inception, about 20 years ago, reference can be made to the comprehensive story by W. L. Fahey, then District Engineer in District VII, who retired from state service a year ago, that was published in May-June, 1954, issue of *California Highways and Public Works*. Since Mr. Fahey's story was published two very important units of construction were put under contract on the Harbor Freeway.

Between Santa Barbara and Gage Avenues

Bids were opened March 17, 1955, for the section of the Harbor Freeway between Santa Barbara Avenue and Gage Avenue with J. E. Had-dock, Ltd., of Pasadena, submitting the low bid of \$4,484,517.10. Clearing

and grubbing operations began on April 11, 1955.

This 2.5-mile section of freeway and the 1.76-mile section following it are on a new alignment roughly mid-way between, and parallel to, the heavily traveled thoroughfares of Broadway and of Figueroa Street, which is existing State Highway Route 165. The major cross streets are Slauson, 54th and Vernon. The typical section provides for eight lanes of concrete pavement with 16-foot asphalt paved median for emergency parking. The same type of surfacing is also to be used on the shoulders, speed change lanes and ramps. Provision is being made for special bus loading ramps at Slauson Avenue and Santa Barbara Avenue. Frontage streets are being constructed on each side of the freeway except at the Slauson Avenue intersection area.

Bridges on Project

Bridges on this project consist of two undercrossings, the Slauson Avenue Overhead, eight overcrossings and five pedestrian undercrossings. In addition there is a pumping plant at 54th Street and numerous retaining walls throughout the job. The contractor

elected to use drilled piling to support the bridge foundations.

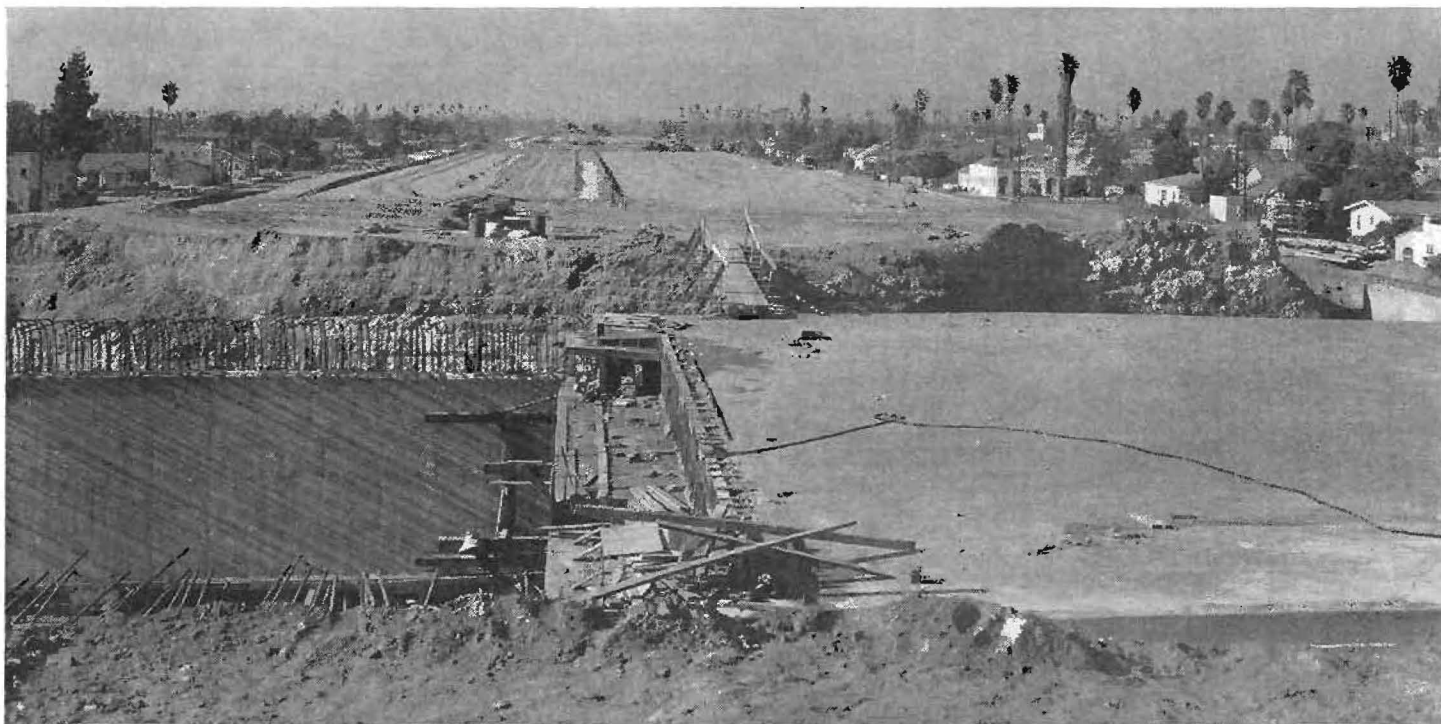
The pumping plant at 54th Street will have three pumps each capable of pumping 5,000 gallons per minute under a 37-foot head. There will also be a small auxilliary cleanup pump.

This section of the freeway is on a fill from the beginning at Gage Avenue until it passes over the Slauson Avenue Overhead, then it ducks below 54th Street and remains in a cut below ground surface until rising to pass over Santa Barbara Avenue to join the previously completed portion of the Harbor Freeway. Considerable rearrangement of public utilities was required in the cut section, particularly at Vernon Avenue where Los Angeles Transit Lines tracks were involved.

Storm Drain Facilities

Extensive storm drain facilities are required to maintain the existing flow pattern of storm waters westerly across the freeway to Figueroa Street. An 8.75-foot x 4.5-foot reinforced concrete siphon at 47th Place and a similar 11.5-foot x 4.5-foot siphon at 45th Street are being built, as well as 36-inch steel pipe storm drains in the

Construction on Harbor Freeway looking north from 79th Street



bridge decks of several of the city street overcrossings. Top of cut walls are being constructed throughout the below ground surface section to prevent overflow of surface run-off water into the freeway. These walls serve to channel overflow surface water across the bridges at the street overcrossings. In the fill section or the above ground surface section of the freeway 60-inch to 72-inch paved invert corrugated metal pipe are used to carry the storm water under the freeway. Surcharges were constructed and left in place for 45 days at the pipe locations to mitigate damage from later subsidence.

This job was 65 percent completed on September 1st and is approximately one month ahead of schedule. Concrete paving operations are scheduled to begin in December of this year and will be finished in three months. This should permit opening this freeway section to public traffic in April, 1957, with all work being completed about June 1, 1957.

George Wiggers is general superintendent for J. E. Haddock and Ray Collins is resident engineer, with Pat N. Scott as principal assistant. Homer Scott represents the State Bridge Department.

Southerly Section

The section of the Harbor Freeway from Santa Barbara to Gage Avenue is followed by another section extending southerly to 92d Street. The contractor on this section is Guy F. Atkinson Company. The job is 1.76

miles long and the amount of the contract allotment is \$4,947,000. Work was commenced August 1, 1955, and was 65 percent completed on September 1, 1956. It is expected that this section will be opened to traffic in April, 1957, and all work will be completed in July, 1957.

The freeway is an eight-lane concrete roadway with a 16-foot median and is constructed entirely on an embankment approximately 20 feet high. There are seven bridges provided for cross-street undercrossings. The structures at Florence Avenue and at Manchester Avenue are welded steel girder bridges 107 feet long. At the five other locations, the bridges are rigid frame structures of the reinforced concrete box girder type varying from 64 feet to 86 feet in length. All bridges have concrete decks and all are carried on Raymond concrete piles. In addition there are seven concrete pedestrian undercrossings 8 feet x 8.5 feet varying from 163 feet to 249 feet long and two concrete pedestrian undercrossings in the Manchester area to serve the bus loading zones.

Twenty-five local city cross streets are brought into the frontage roads, which parallel the freeway the whole length of the job except in the Manchester Boulevard area. These frontage roads are curbed, surfaced with plant-mixed surfacing, have a width of 32 feet, and become an integral part of the city street system the one on the east being designated Grand Avenue and the one on the west being called Flower Street.

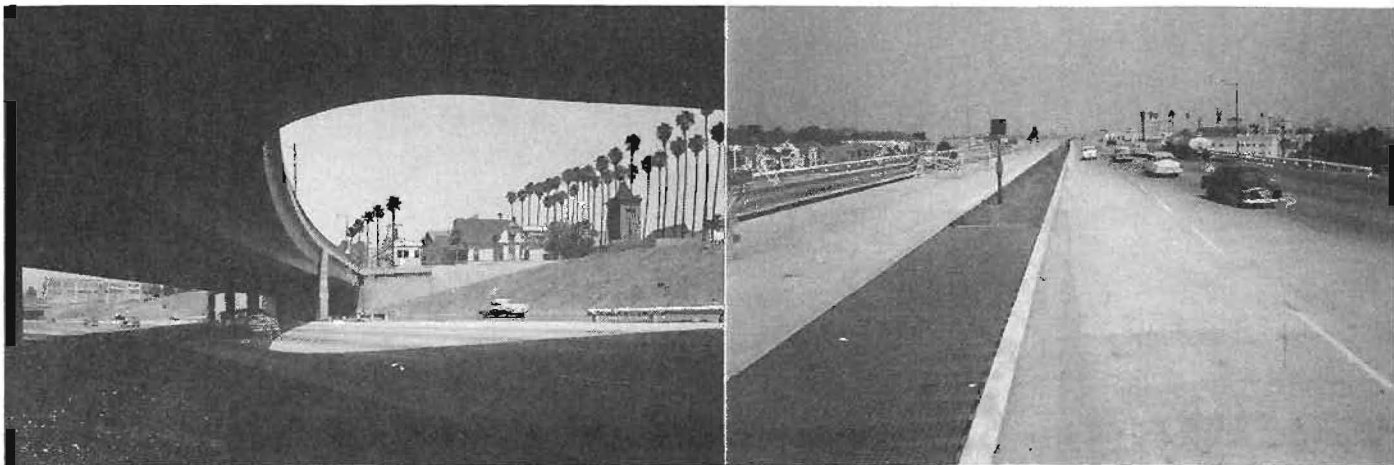
Full Cloverleaf

At Manchester Avenue there is a full cloverleaf interchange. At 77th and 77th Streets there are on and off ramps, the former serving Florence Avenue. From 88th Place to 92d Street, temporary on and off ramps will be constructed to connect the frontage roads, to serve as temporary terminal ramps until the southerly section of the freeway is opened to traffic. All ramps are surfaced with plant-mixed surfacing.

At two locations storm water drainage is carried under the freeway by 9-foot x 6-foot reinforced concrete boxes. At 84th Street a 10-foot x 10-foot reinforced concrete box is built under the freeway. The ends are now closed off by brick bulkheads but the structure will later form part of a county flood control project. At another location a 66-inch corrugated metal pipe acts as a storm chamber to carry storm waters across the freeway. There are, of course, a usual large number of catch basins and storm drains.

The formation of the freeway embankment which constituted 1,050 cubic yards of imported borrow presented an ever-changing problem. The material has come from over 100 different sources, many of these being excavations for large buildings in the vicinity. The sports arena site located in Exposition Park has supplied at least 190,000 cubic yards. This is of unusual interest since the contractor for the Los Angeles Coliseum Commission paid \$23,500 for the privilege of

LEFT—Harbor Freeway looking north from Flower Street. RIGHT—This is a view of Harbor Freeway looking north from Santa Barbara Avenue.

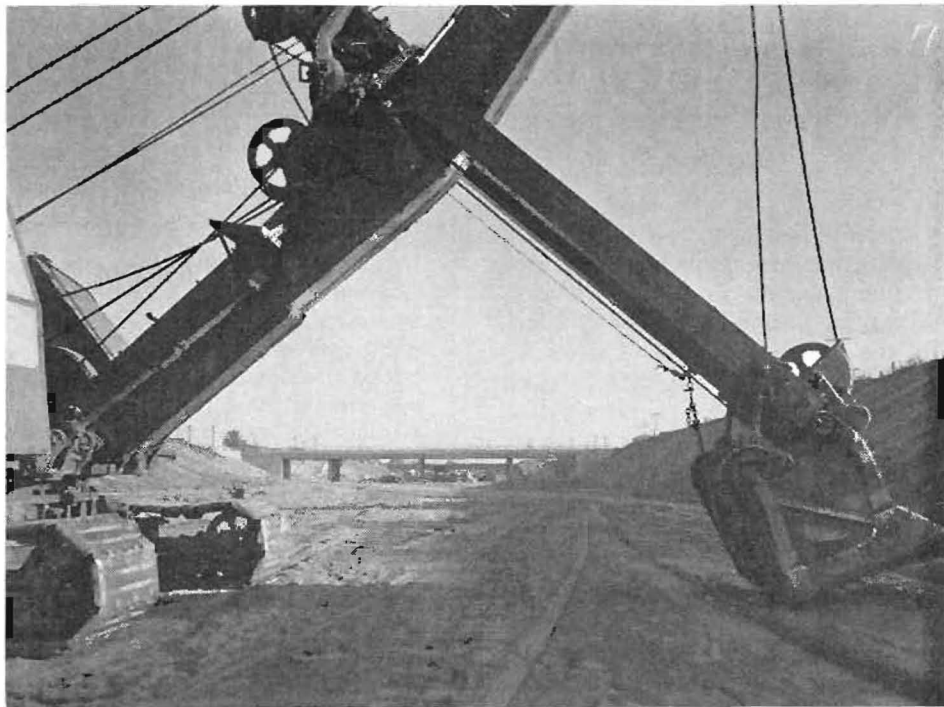


cavating and acquiring this material. It had been previously estimated by this commission that the excavation of the sports arena would cost them about \$200,000. Each borrow pit has furnished a different class of dirt, the only common feature of which has been the satisfaction of the "R" value of 15.

Compaction

This nonuniformity would have required great skill in obtaining satisfactory compaction by the old sheep-foot and air-port roller methods. However, on this job a comparatively new piece of equipment was used. This self-propelled roller with its four 69-inch wheels having tires formed by staggered rows of steel pads, presents an unusual appearance that makes one very skeptical as to its usefulness. However, traveling at five miles per hour in six passes it attains a 90 percent relative compaction. The weight of the roller is 16 tons and the compressions are 580 pounds per inch of face on both front and rear wheels. The speed of the roller enables it to cover large areas before the moisture content has diminished. The front wheels are 23 inches wide and the rear wheels are 31 $\frac{3}{4}$ inches wide. The engine is diesel and the horsepower 110.

Placing the bridge backfill has been an interesting operation since the manufacturers' agents demonstrated new and unusual equipment on this job. The vibrating rollers have been especially effective in securing 95 percent relative compaction in granular material. The model used was a self-propelled roller 28 inches wide and 22 inches in diameter which can be operated 3 $\frac{1}{2}$ inches from a wall. It weighs about 800 pounds but, due to the internal eccentric construction, it delivers a centrifugal force blow of 1 $\frac{1}{2}$ tons at the rate of 60 blows per second. This model roller has a roller 54 inches wide and 30 inches in diameter and weighs 3,200 pounds. This roller is towed by a tractor and can roll 5 $\frac{1}{2}$ inches from a wall. It delivers a 5 $\frac{1}{2}$ ton centrifugal blow at the rate of 75 blows per second. The efficiency of these rollers is due to their ability to produce a wide, deep pond of moving particles instead of the narrow pyramid produced by a static roller.



Construction on Harbor Freeway looking south from 49th Street

New Type Pneumatic Roller

A new type of pneumatic roller for compacting imported subbase material and cement treated subgrade was also used. The roller, with ballast, weighs 13 tons, it is self-propelled by a powerful diesel engine and it is the only type of pneumatic tired roller on which all drive wheels oscillate. There are five front wheels and four rear, or drive, wheels. This roller has produced splendid results.

The description of these rollers and their operation is described in detail above because they show a distinct advance in earthwork compaction, an operation that has rapidly become one of the most prominent and important topics of highway building discussion.

Another exceptional feature of this project is the forming for concrete work on the over-crossing bridges and the pedestrian undercrossings. The forms were designed by the contractor's San Francisco office and were fabricated on the job by Palmer Paulson, the contractor's bridge superintendent. These forms were very substantially made and so designed that they could be reused for duplicate structures without being dismantled. The forms were dragged into place on rollers by a crane. Deck forms for

one-half of a vehicular bridge were moved into place for the other half in 1 $\frac{1}{2}$ hours. Pedestrian undercrossing deck forms were moved ahead and set to grade in about an hour. In the latter operation the deck steel was placed at the same time as the wall steel and the deck forms then rolled under it. The methods of bridge construction and the appearance of the structures are of the highest quality.

Money Saved

Since paving operations on the J. E. Haddock contract and the Guy F. Atkinson contract will commence at about the same time, it was found possible to eliminate the construction of the temporary ramps on the Haddock contract. This not only saves the State many thousands of dollars, but of even more importance, it obviates the necessity for several complicated changes in temporary traffic routing which would have been necessary under the original plan. A mild rivalry has developed between the two adjoining contractors, each trying to finish his project first. It will be interesting to see the result.

John Skells is the project manager for Guy F. Atkinson. The contractor's bridge superintendent is Palmer

... Continued on page 42

The section between Heather Glen and Magra (six miles east of Colfax) and the section between Floriston and the Nevada state line are budgeted and should be under construction this fall.

The routes on the three sections, Magra to Blue Canyon Road; Hampshire Rocks to Soda Springs; and east end of Donner Lake to Floriston, have all been adopted and declared freeways by the California Highway Commission. At present they are in various stages of planning and design, and it is hoped that these sections can be constructed and opened for traffic prior to the 1960 Winter Olympic games to be held at Squaw Valley. The two remaining sections, Blue Canyon Road to Hampshire Rocks and Soda Springs to east end of Donner Lake, have been studied and will be presented to the Highway Commission for adoption within the next few months. With the route adoption of these two sections and the exception through Sacramento and the Yolo Causeway, the entire route of U. S. 40 in California will have been adopted and declared a freeway.

Considerable Progress Made

The speed with which this series of plans along the not-yet-modernized sections of U. S. 40 are translated into actual construction to provide a continuous stretch of divided highway extending from San Francisco to the Nevada state line depends upon the availability of funds.

Considerable progress has been made in bringing U. S. 40 up to modern standards. Financing of this enormous undertaking has not been easy. Progress was accelerated when the California State Legislature increased the highway user taxes in 1953. Undoubtedly many of the projects now under way, or budgeted on this route, would have had to wait several years if the additional revenues provided by 1953 legislation had not been available.

With the additional federal financing provided by Congress on interstate highways, the reality of U. S. 40 becoming a full freeway throughout California will be greatly accelerated. Continuous improvement of this route is one of the outstanding examples of the benefits of long range planning for the development of through routes



Looking easterly—Hallbom Road Undercrossing under construction

which are so important to a vast and growing state such as California and our mechanized nation that has come to depend so heavily on motor vehicle transportation.

HARBOR FREEWAY

Continued from page 23...

Paulson. The State Division of Highways is represented on the job by Ray A. Collins, resident engineer, and his principal assistant, Mitchell L. Gould. Homer Scott represents the Bridge Department, with Pete Hixson as his principal assistant.

On August 24th the California Highway Commission announced the addition of \$47,245,000 to the state highway right of way acquisition program and \$16,300,000 to the construction program for the 1956-57 Fiscal Year. In the construction program allocation, the commission set aside \$6,000,000 to provide construction to extend the Harbor Freeway 2.8 miles southerly from 92d Street to 124th Street. This will provide for grading, paving, and the necessary structures

to build an eight-lane full freeway, complete in every detail.

The plans for this southerly extension of the Harbor Freeway have been completed. The necessary rights of way have substantially all been secured so that advertising the contract is anticipated very soon. Actual construction on this important link of the Harbor Freeway should be in progress before the end of 1956. The construction schedule will provide for completion during midyear 1958.

Taking into account the two construction contracts now in progress and the recently financed 2.8-mile unit, there remains of the 22.4 miles total only a nine-mile link of the Harbor Freeway to be done. Designs and preparation of plans for the remaining link of the Harbor Freeway are well along toward completion and the right of way acquisition program for this future construction is well advanced. Completion of the remaining link of the Harbor Freeway awaits allocation of construction funds by the California Highway Commission when future budgets are under consideration.