Parkway Plans for Metropolitan Los Angeles

By LYALL A. PARDEE

THE full scope of postwar planning for the Los Angeles Metropolitan area embraces every department of civic affairs, and as the plans are carried into effect, their influence will be felt in every community, and in some measure by almost every individual living in the region.

The Parkway Plan is only one of the parts of this larger program of planning, but its place is near the top in interest, as well as in its importance to the people as a whole. The completed system of parkways will represent a very large investment of public funds, on which it will pay a handsome return in increased efficiency of automobile transportation. It will become a major unit in a mass transit system, thus permitting an even greater number of people to profit by the economy and convenience of parkway travel. And by no means least, its network of parklike rights-of-way will form the physical frame within which the pattern of a sprawling community will find its enduring form.

West of a line joining the east city boundary of Pasadena with the east city boundary of Long Beach, and extending from the mountains to the sea, lies an area of about 900 square miles, all of which is dependent upon and within the zone of direct influence of the city of Los Angeles. It contains a great diversity of peoples, of population densities and land uses, of climate and topography and its government and its local loyalties are divided among 32 civic corporations. Yet its people are one people, and its major problems are regional problems.

THE PARKWAY PLAN

In 1938 the Los Angeles Transportation Engineering Board was constituted for the purpose of studying the traffic needs of the whole community of cities, and recommending proper measures of relief. The members of this Board interested themselves primarily in mass transit facilities, and brought engineers of national reputation to assist in making impartial and comprehensive studies, unbiased by local prejudices. The report of the Board, submitted in 1939, recommended among other things the construction of a system of grade-separated limited-access highways, consisting of about 280 linear miles, and covering the entire region without reference to existing political boundaries.

The plan was often branded visionary, and the type of highway recommended was looked upon by many engineers as being mildly desirable, but wholly impossible to construct on a large scale, in spite of the fact that many miles of such roads already existed in the eastern United States, and had been widely copied in Germany and Italy. It may be owing to the successful completion of the Arroyo Seco Parkway project from Pasadena to Los Angeles that public agencies have come to accept the Parkway Plan as a workable, and vitally necessary, solution for transportation problems. Many engineering and planning bodies, both official and semi-official, have contributed to the plan as it now stands, and the wholehearted cooperation among them has been remarkable, not to say revolutionary.

Progress in construction has been slow, for while New York City was extending its system to about 300 linear miles, Los Angeles City has built 10. This includes the Cahuenga Pass link of the Hollywood Parkway, the Arroyo Seco Parkway from Pasadena to Los Angeles, and the recently opened Ramona Parkway, from the east city limits to the Los Angeles River.

Final plans for 26 miles of future parkways are now being prepared in the offices of the California State Division of Highways and the Los Angeles City Engineer, and not only will contract plans be ready when the war ends, but much of the required right-of-way will have been acquired so that there need be no delay in putting available men and equipment to work. The projects now under design include the Santa Ana and Hollywood Parkways, forming one artery from the east city boundary to the San Fernando Valley, via the Civic Center and Cahuenga Pass; the southerly extension of the Arroyo Seco-Harbor Parkway to Fifth Street, and the Sepulveda Parkway from Ventura Boulevard to Venice Boulevard.

This plan is in line with an orderly program of construction covering a theoretical 10-year period. The entire system was divided into 10 parts, of about equal estimated cost, and, on the assumption that these represented the divisions of a 10-year construction program, the several interested public agencies were asked to assign an order of priority. The answers, independently arrived at, showed complete unanimity as to the first two years. The map, *Fig. 1*, indicates that when this portion of the system is completed, this basic pattern of express highways, roughly cross-shaped, connecting all major areas, will serve as a foundation upon which the remainder of the system may be erected.

FREEDOM IN DESIGN

The design of parkways presents to the engineer a new set of problems, and at the same time offers him a wholly unaccustomed freedom in solving them. Surface highways, and more particularly surface streets, are usually confined within very limited rights-of-way, and good design has often to be abandoned in order to salvage existing improvements or to avoid injury to the rights of abutting property. In the case of limited-access highways, such property rights are somewhat abridged, but in the case of parkways, the abutting property retains no access rights whatever, and the designer has one less handicap to contend with.

Another characteristic of parkways which generally reacts to the designer's benefit is that all crossings are on separated grades. In passing through an existing street pattern, all major streets are carried across, either under or over the parkway, and intermediate crossings are provided at intervals of about one-quarter mile. This arrangement usually results in the parkway grades being 20 to 25 feet above or below the ground level, and in the transition from one to the other the designer can often take advantage of a rough terrain in a way impossible with a surface highway.

To compensate for these advantages, parkways combine most of the old problems with a host of new ones, and the whole sums up to the most interesting job of

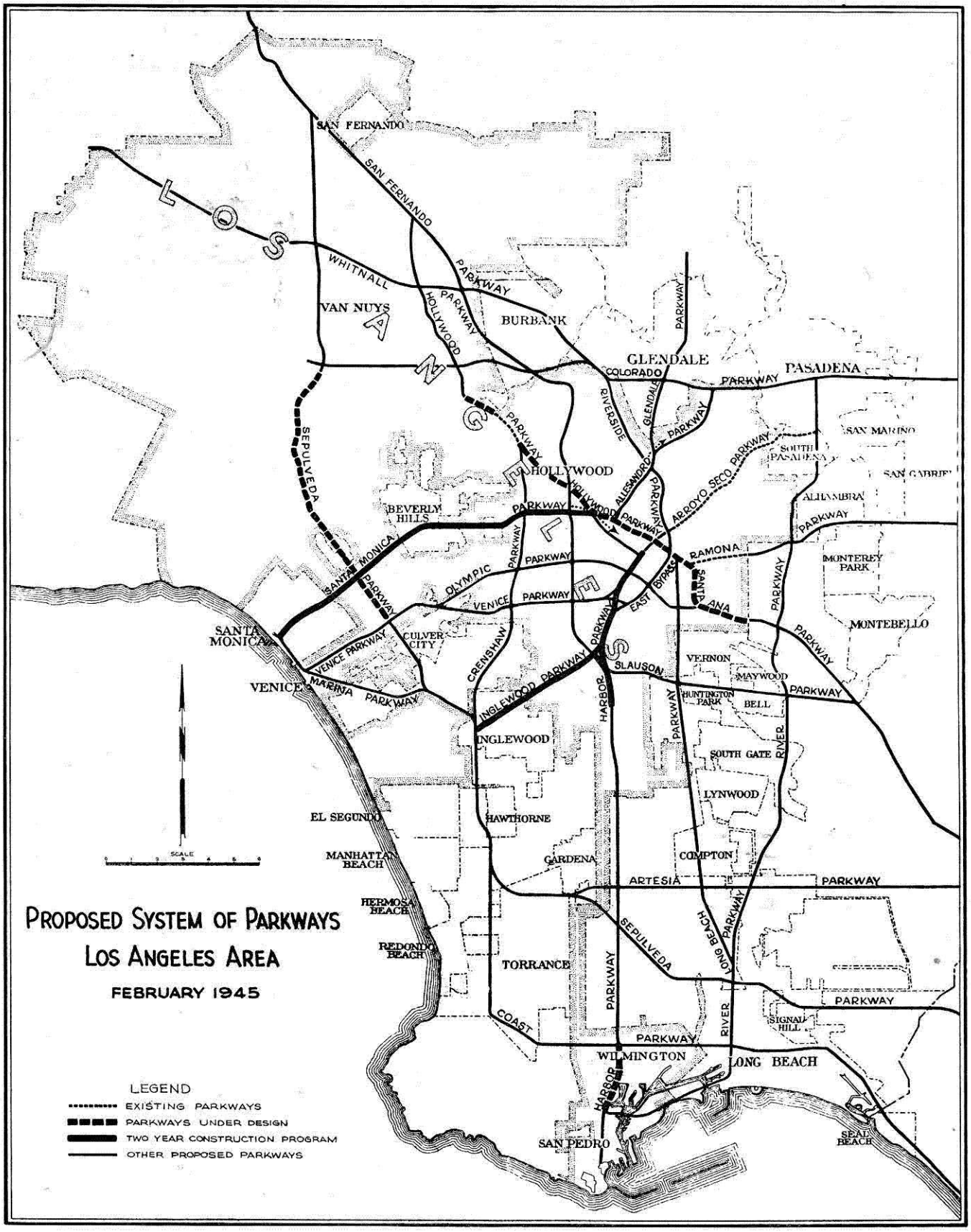
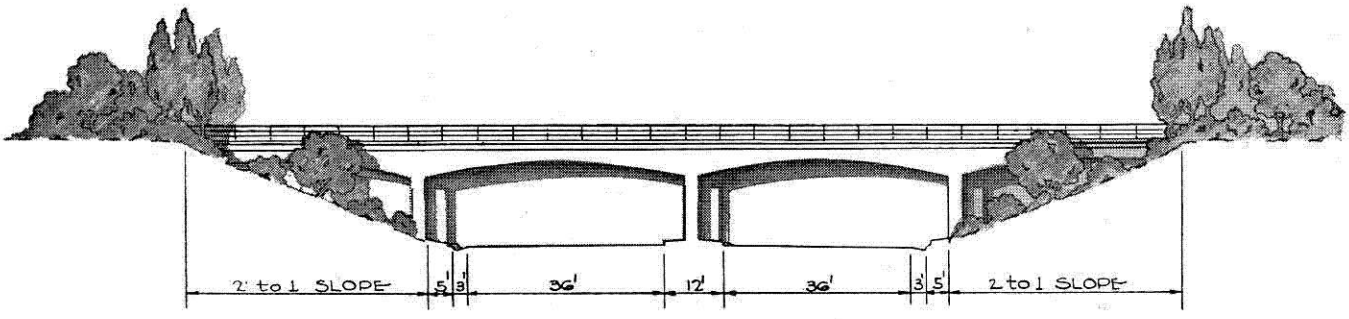


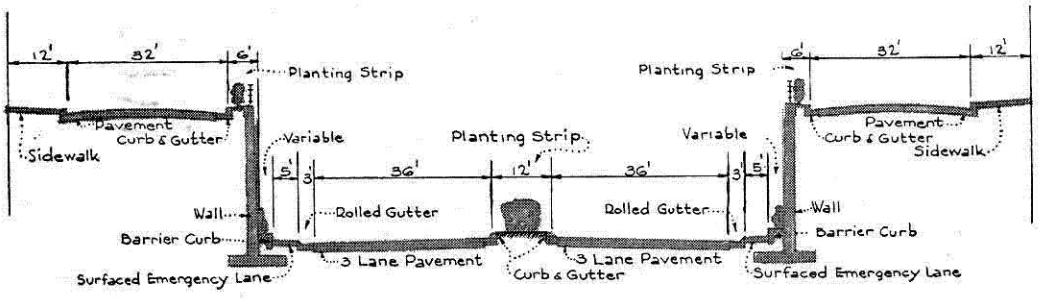
FIG. 1. Map of the proposed Los Angeles Parkway System, showing the order in which construction will proceed.

designing that has ever fallen to the lot of highway engineers. Preliminary design assumes an importance out of all proportion to its former low estate, as it becomes necessary to search out in advance, and find an answer for, every question that will be raised by the proposed construction, and to coordinate, sometimes far in advance, the proposed work with other parts of the system to be built in the more distant future.

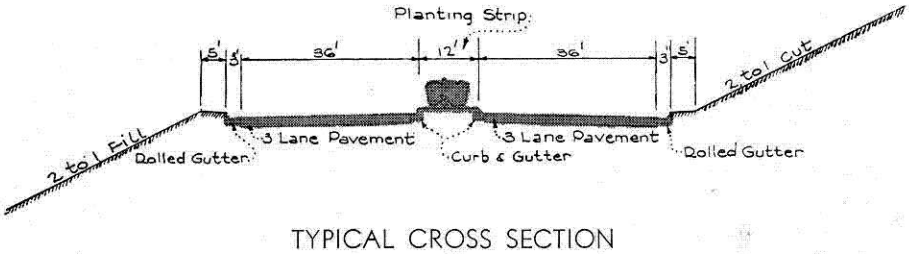
Selection of the general route is the first problem, and it is interesting to note that after five years of



TYPICAL CROSS SECTION
OF PARKWAY IN CUT
SHOWING LANDSCAPING



TYPICAL CROSS SECTION
BETWEEN RETAINING WALLS
WITH ONE-WAY SERVICE ROADS



TYPICAL CROSS SECTION
IN
CUT AND FILL

FIG. 2. Several typical parkway cross sections designed to meet differing local conditions. The middle drawing illustrates the section to be used for the Hollywood Parkway through the Los Angeles Civic Center.

study by many planners and engineers, no major changes have been recommended in the original pattern laid out by the Transportation Engineering Board. There have been many changes in the detail of location, and as studies progress there will be many more, but the basic plan remains unaltered.

INVESTIGATION AND ESTIMATE

Many express highways, and especially interurban routes, are built primarily as a means of getting from one terminus to another, but this is rarely true of metropolitan parkways. The Santa Monica Parkway, for example, will provide means to avoid surface traffic congestion from the central business district to the beach cities, but by far its greatest value will be in the service it will render to Westwood, Beverly Hills, and the Wilshire and East Hollywood districts. It becomes necessary to provide the best possible interchanges between the parkway and surface street systems, without impairing the terminal-to-terminal facility of the former, and in selecting a parkway route, this is a consideration of the first importance.

The present location of centers of population and the highway routes needed for intercommunication among them were largely dictated by geography, and in serving the same general needs, the parkway system encounters few large new problems in topography. Higher standards of gradient and alignment find compensation in the flexibility of an off-surface grade, and in the great economies in excavation costs brought about by recently developed earth-moving equipment. Topography remains a vital factor in location, and in the mountainous sections of the Sepulveda and Hollywood routes, excellent use has been made of aerial surveys in the preparation of photographic and contour maps. This method will no doubt be used even more widely when wartime restrictions are removed.

Owing to the high cost per mile for this type of highway, and to the permanent nature of the improvement, the relatively small expense of a thorough preliminary investigation is well justified. It is not uncommon to explore four or five possible alternates, making complete tentative plans, profiles and cost estimates of each for purposes of comparison, before making a final choice among them. Where costs of land acquisition often equal and sometimes even exceed the cost of construction, this may become a very large item indeed, and will often dictate final alignments. It might be supposed that the proper place for a new parkway would be along the line of an existing boulevard, but as a rule, the required amount of land can be purchased a few blocks off the boulevard at a much lower price, and the boulevard be retained as a useful part of the surface street system. Economy in land and improvement cost is given full value, but is not regarded as the cardinal rule, nor is present economy permitted to outweigh the future safety and convenience of thousands of highway-users.

The same traffic counts and flow charts which proved, in the first instance, that a parkway was called for in a given location are used again to determine the most desirable width, which depends upon the volume of traffic to be carried. Studies of existing traffic in surface streets, combined with source and destination diagrams, modified by estimates of probable increases in automobile use and any foreseen or predicted changes in the local conditions—all these must be weighed, and modified again by estimates of the proportion of all traffic which may be diverted into the proposed parkway. It is evident that the resulting estimate is open to argument, but a higher degree of accuracy, while theoretically desirable, is not necessary in fact. It is possible, by the use of a wide center strip, to provide for the later

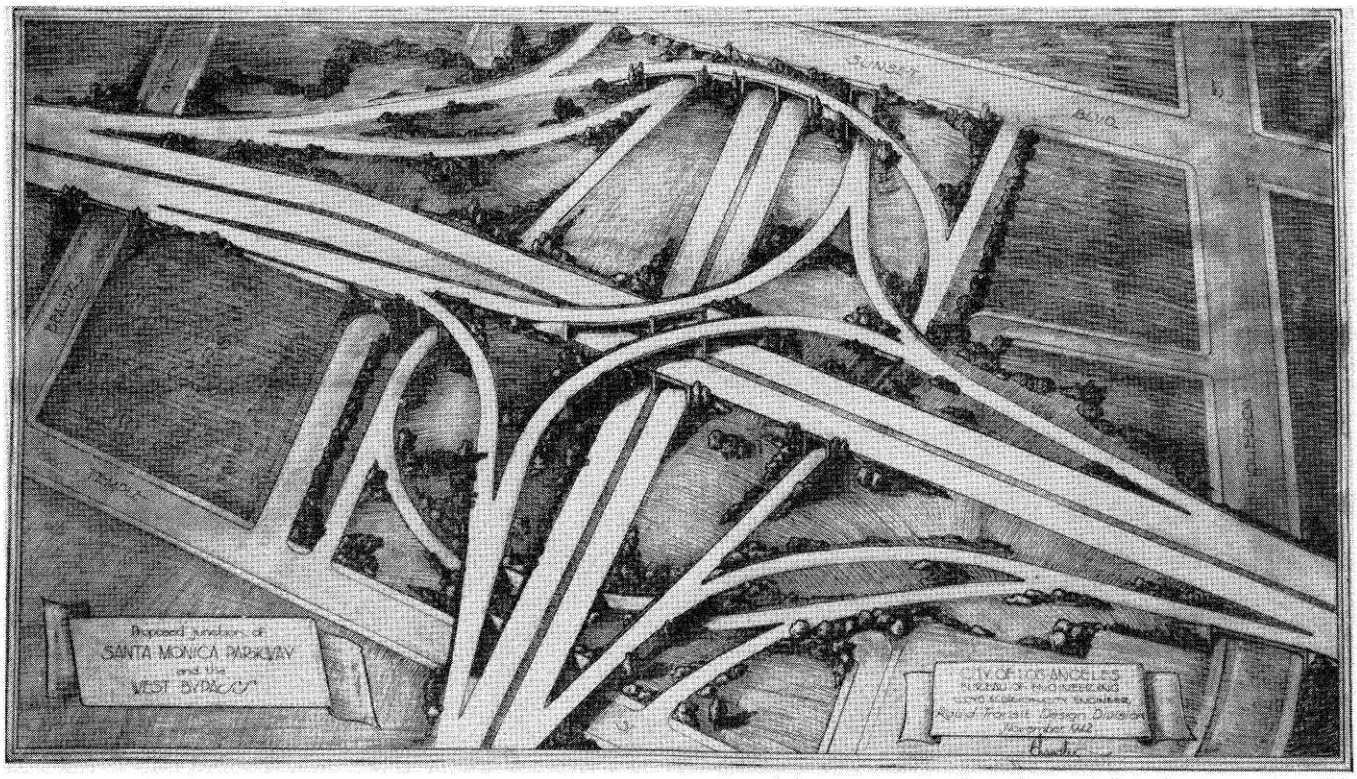


FIG. 3. Perspective drawing of a parkway crossing, all right and left turns being provided for. This design is based on a three-level central bridge.

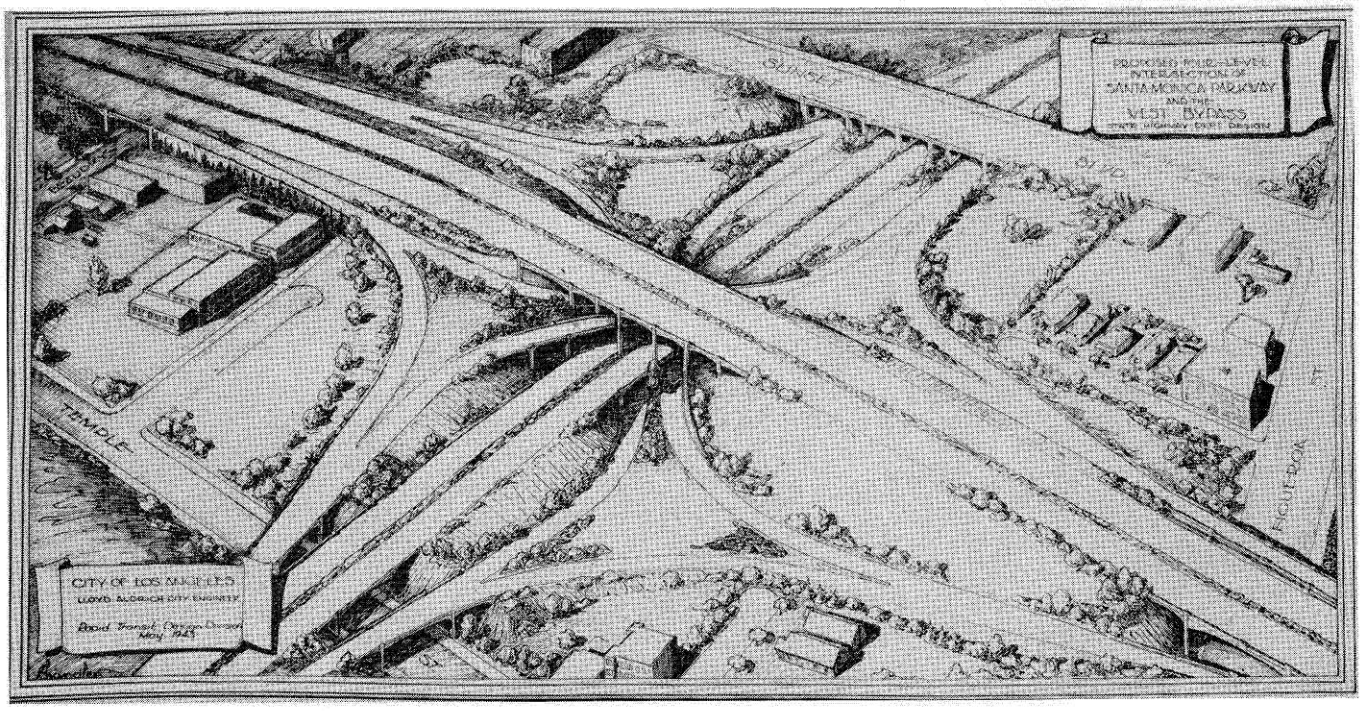


FIG. 4. Same intersection shown in Fig. 3, but with a solution based on a four-level central bridge. This was selected in preference to the other design, and working drawings are being made.

addition of another lane, and in one or two cases, this may be done.

Generally, however, three lanes each way is the optimum width, even though the volume of expected traffic indicates that two might be made to serve. Three lanes allow two for fast through traffic and one for slower cars and for cars entering and leaving the parkway. Four lanes invite weaving by fast drivers, and five are definitely dangerous. If the traffic is too heavy for four lanes, another parkway would seem to be indicated. Plans are being made for four lanes each way in a portion of the Hollywood Parkway, but as a rule three will be used as a standard. The working capacity of a three-lane parkway is estimated to be 31,000 cars in 24 hours, in both directions, and the maximum capacity is said to be double this. So broad a differential does much to compensate for inaccuracies in estimated volumes.

DESIGN FOR SAFETY

To complete the picture of the parkway in cross-section, median strips 12 or 15 feet in width are being designed. The latter is recommended as a standard for interregional highways, and it seems probable that the future tendency will be to widen these strips until they reach 50 or 60 feet, both in the interests of landscaping, and for their light-absorbing value. Lanes are 12 feet wide, and wherever possible, an emergency stopping lane will be provided along the right side, as shown in *Fig. 2*. This will consist of a three-foot gutter with a rolled, mountable curb, and a planted berm not less than five feet wide, and stopping will be permitted only in real emergencies. Rights-of-way are made wide enough to accommodate two-to-one slopes for cuts and fills wherever possible. When width permits, such slopes will be flattened, and in exceptional circumstances they may be somewhat steepened, or even replaced by retaining walls for short distances. In all cases median strips and side slopes will be landscaped, and properly fenced to prevent the entrance of pedestrians to the roadways.

After the volume of traffic, the speed at which it will travel becomes the governing factor. A design speed of 60 miles per hour has been adopted as the parkway standard, with a few miles in the central area, where entrances and exits are frequent, being limited to 50 miles. Thirty-five miles per hour will be the usual minimum for ramps and interchange roads. Uniformity of standards throughout the system is very important, and downward modifications will need to be very clearly marked.

The design speed is taken to be the "safe speed" for the average driver, and all of the elements of surface design will be referred to it. These include degrees of curvature, the introduction of spiral or easement curves, the amount of superelevation on curves, ruling grades and vertical and horizontal sight distances. The American Association of State Highway Officials has lately published, in a series of pamphlets, definitive policies covering these and other matters of design, and preparation of the standards which are now being used by the city engineer and the State Division of Highways was governed very largely by A.A.S.H.O. recommendations. The policies are based on recent and extensive research by many agencies, and this is probably the first time that highway engineers have had available such a complete and authoritative digest of the best in current practice.

The effect of grades up to seven per cent is of much less importance to passenger automobiles than to trucks and buses, and it is assumed that most routes will be used by express buses. Bus stop facilities at parkway level, separated from through traffic, are under design for the Hollywood Parkway at transfer points which are essential to the best operation of the transit system. Desirable maximum grades are set at four per cent on main roadways, six per cent on upgrade, and seven per cent on downgrade ramps or interchanges, but all of these are subject to a one per cent increase when such change is dictated by better overall design or by significant economy.

Drainage facilities will be more extensive than is the practice on surface streets, the intention being to protect the through lanes from any accidental dry weather flow, and to reduce to a minimum the depth and width of flowing water during storms. The low crowns used in parkway design and the elimination of local depressions in the traveled lanes will make many more storm drain catch basins necessary, but the added safety is deemed to be well worth the cost.

Obviously, the introduction of a grade-separated parkway will make serious changes in the pattern of local streets. Some of these will of necessity terminate in cul-de-sacs, while in other cases, circulation can be provided by building new service roads, more or less parallel with the parkway. Studies of local conditions are called for, taking into account the locations of schools, fire stations, bus and car stops, shopping districts and other neighborhood centers. Pedestrian bridges or subways are located between vehicular crossings where necessary, and local convenience is consulted in the location of ramps, service roads and other facilities. The maintenance of existing sewers, storm drains and other substructures raises problems that are sometimes difficult to solve, as in the Civic Center area, where the Hollywood-Santa Ana Parkway crosses the whole system of north-south streets, and the heaviest utility lines must be kept in service.

JUNCTIONS AND CROSSINGS

The most interesting problems, from the standpoint of design, are those involved in the junction or crossing of parkways. Every case is unique in some respects, and not one has yet been found for which a clover leaf proved to be a desirable solution. At the junction of the Hollywood and Santa Monica Parkways, in the vicinity of Vermont Avenue, it was necessary to design a *Y*-type junction which can later be expanded into an *X*-shaped crossing to make possible the east-bound extension of the Santa Monica Parkway.

The difficulties arise out of the necessity for separating all grades, and become most complex at points where all right and left turning movements must be cared for. This is the case at the Hollywood-Arroyo Seco Parkway crossing, where every turning movement may be expected to be heavy at some time of every day. *Figs. 3 and 4* show in the perspective two of the many schemes developed in the course of studying this location. *Fig. 3* is based on a three-level central bridge, while in *Fig. 4* a bridge of four separate levels serves the same purposes at a smaller first cost. Final plans for the four-level bridge are now being drawn, and probably it will be the first structure of its kind to be erected.

A plan view of a multi-level crossing looks like a cross-section of chaos. The perspective drawings, however, clear this up a little, and in the structure itself no great compexity will appear to the motorist. If he wishes to turn, he will leave the parkway on the right, or slow speed side, using an added decelerating lane to adjust from parkway to turning speed, just as he does at all other points in the system except where turning movements are approximately equal in volume. He then turns right or left according to his destination, and enters the other parkway via an accelerating lane added to its right side. He is not called upon to execute a complete right hand loop in order to make a left turn, as in the clover leaf design, and he is presented with only one course at a time.

Los Angeles has set up as a goal a complete metropolitan system of parkways, and this has the indispensable virtue of receding as it is approached, for other parkways, not yet foreseen, will be added to the present system as time moves on. Well within that goal have been set certain limited objectives, and plans are already far enough advanced to provide assurance that they will be accomplished. In the meantime, some new ones will be set up.

THIS MONTH'S COVER

The illustration shown on the cover of the May issue of *Engineering and Science Monthly* repeats the central design of *Fig. 3* shown on page 7, being a perspective drawing of a parkway crossing based on a three-level central bridge.

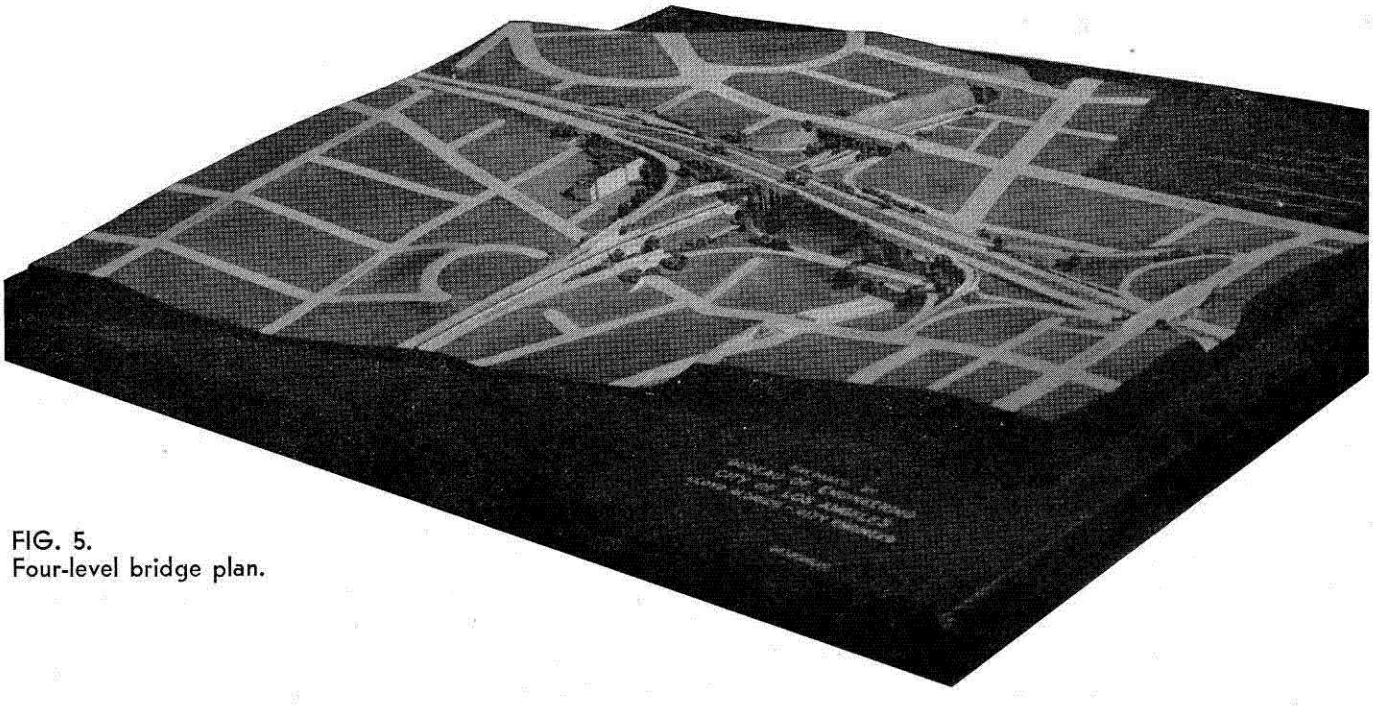


FIG. 5.
Four-level bridge plan.