

MAJOR TRAFFIC
STREET PLAN
Los Angeles, California.

16

TR. 8104
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The Traffic Commission
of
The City and County of Los Angeles
415 Financial Center Bldg.
Los Angeles

May 8, 1929

Mr. Robert Dominguez,
Clerk of the City of Los Angeles,
Los Angeles, California.

Dear Mr. Dominguez:

We take pleasure in presenting
to you with the compliments of Mr. Frederick
L. Olmstead and the Los Angeles Traffic Com-
mission this bound copy of "Major Traffic
Street Plan of Los Angeles".

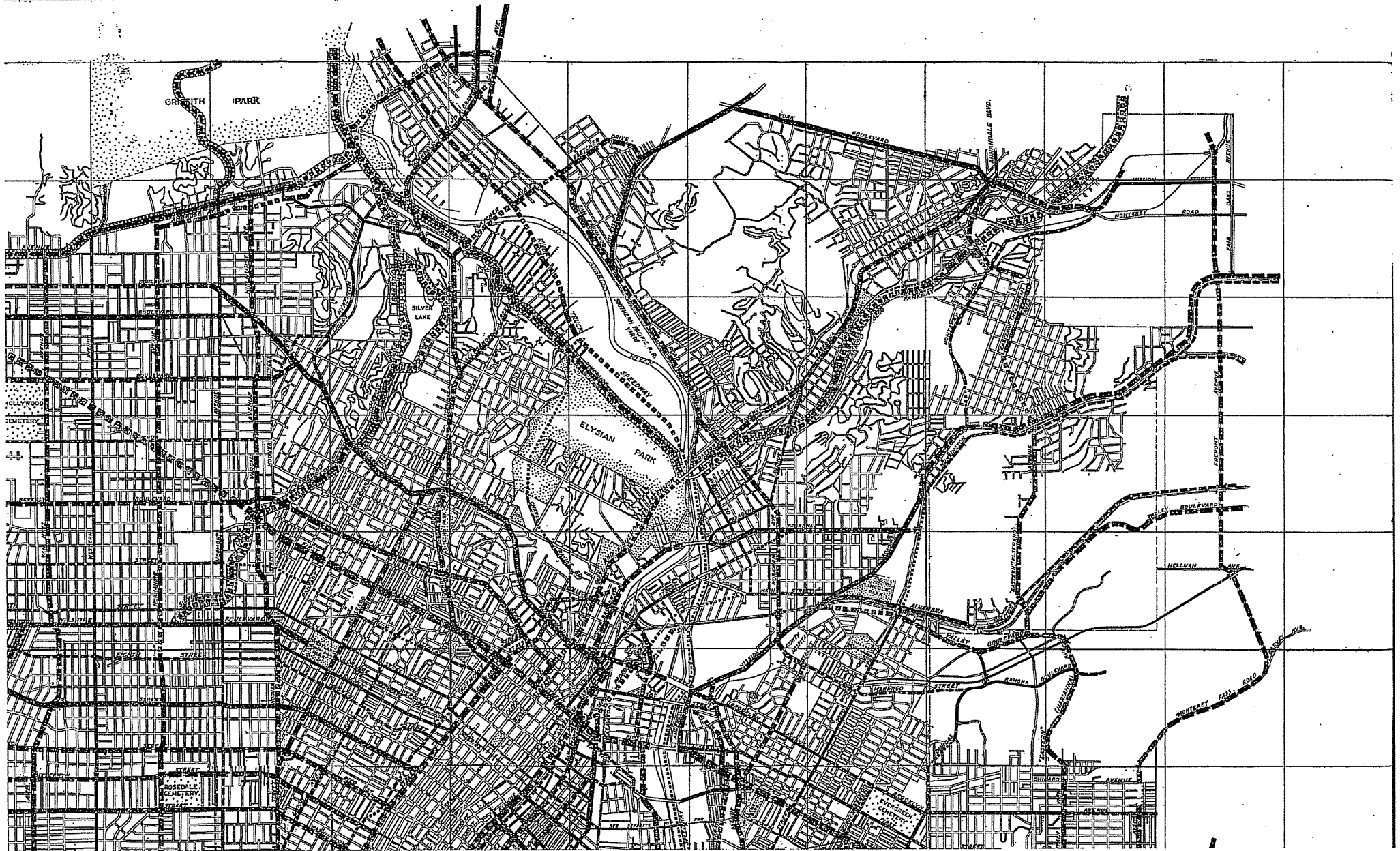
Yours very truly,

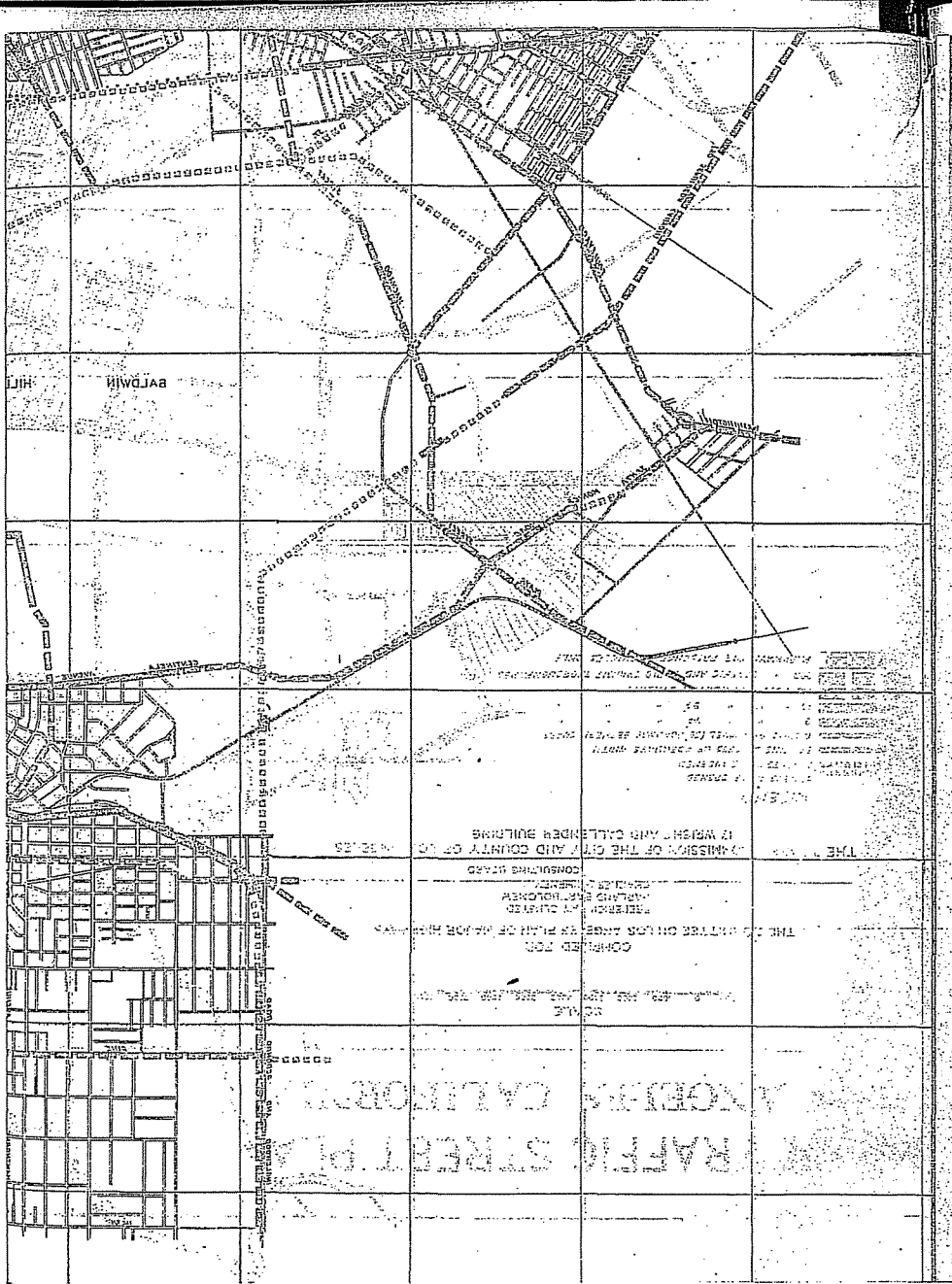
Walter R. Lindersmith
Walter R. Lindersmith
Executive Secretary

VRL/S

(Frontispiece)

Map 1.—The Major Traffic Street Plan





A Major Traffic Street Plan for Los Angeles

Prepared for the
Committee on Los Angeles Plan of Major
Highways of the Traffic Commis-
sion of the City and County
of Los Angeles

by
FREDERICK LAW OLMSTED
HARLAND BARTHOLOMEW
CHARLES HENRY CHENEY
Consulting Board

LOS ANGELES, CALIFORNIA
MAY, 1924

Traffic Commission of City and County of Los Angeles

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FOREWORD

The Major Highways Committee of the Los Angeles Traffic Commission was organized for the specific purpose of developing a comprehensive plan for the reconstruction of the ill-arranged collection of streets of Los Angeles into a well ordered system of traffic arteries.

Valuable surveys and recommendations had previously been made, notably the Automobile Club of Southern California's Plan of 1921, prepared by J. B. Lippincott, and the Los Angeles Plan published by the Traffic Commission in 1922. Studies of individual projects had also been made by the City Planning Commission, the City Engineer and the Community Development Association. It was felt, however, that

the importance of the subject warranted the employment of experts of national reputation to review the existing plans, making such adjustments and additions as changed conditions dictated, and knitting all into one compact and related whole.

Frederick Law Olmsted of Brookline, Mass., Harland Bartholomew of St. Louis, Mo., and Charles H. Cheney of Redondo Beach, Calif., three city planners of unquestioned standing, were therefore secured to do this work. The report published herewith is the result of their studies and deliberations. The Major Highways Committee considers it a very creditable pattern upon which future detailed programs may be safely based.

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*Note—A new city map of Los Angeles had to be prepared at a scale of 800 ft. to the inch for a base map of these studies. It can be had at cost from the Traffic Commission, 215 Wright-Callender Bldg.

Letter of Transmittal

To the Committee on Los Angeles Plan of Major Highways, Los Angeles, California.

GENTLEMEN: We have the honor to submit herewith, a report containing our recommendations and conclusions for the development of a comprehensive Major Traffic Street Plan for Los Angeles, accompanied by a statement of some of the more important considerations that have entered into the preparation of this plan, which we trust will be of constructive use to the city.

The nature of our engagement, the need for early decision upon certain projects and the evident influence upon any such plan as this of certain as yet indeterminate factors, particularly the rearrangement and amplification of transit facilities, has caused us to direct our attention to and plan for the larger problems of the city's main thoroughfare needs, rather than matters of particular detail.

We have studied more closely the main body of the city, though not ignoring the wider aspects of thoroughfare planning throughout the metropolitan district. We have also examined existing legislation and financial methods and measures and suggest certain changes and additions to them believed advisable of early adoption.

While not attempting to secure estimates of costs or to prepare detailed plans for individual projects, we have examined by personal field investigation each of the proposals contained herein and are persuaded of their desirability, even though all may not be possible of immediate realization.

In short, we believe the Major Traffic Street Plan here presented provides a broad, practical, well-balanced scheme for handling traffic toward which the city can advantageously grow, and to which it may gradually adjust itself, making improvements piece by piece as they become necessary, each as part of a finished plan. The primary purpose of any plan should be threefold: (1) To correct mistakes of the past; (2) to meet existing needs; and (3) to anticipate further requirements.

Such a plan is not always easy to carry out—it will take many years to accomplish. There is need for constant study, for adjustment as changing conditions may warrant, and for a wider public understanding of the city's needs in street arrangement. We therefore recommend and strongly urge the establishment of your committee upon a permanent basis as the *sine qua non* for adequate execution of the plan.

We would acknowledge the great value and assistance to our work of the two previous studies, "A Re-

port on Los Angeles Traffic Problems," prepared for the Automobile Club of Southern California by J. B. Lippincott, Consulting Engineer, and "The Los Angeles Plan," prepared by the Traffic Commission of the City and County of Los Angeles.

Many of the recommendations contained in these reports have been incorporated in whole or in part in the present plan, as may be seen by examination of the "Description of Thoroughfares included in the Major Street Plan" in Chapter VII of this report.

The work of our board has met with the most uniform and generous cooperation of officials and individuals, upon whom we have called for information and assistance. Especially would we express appreciation of the far-sighted policies, courage and energy of Paul G. Hoffman, president of the Traffic Commission, and Henry W. Keller, Chairman of the Major Highways Committee, who were so largely responsible for this report, and of the fine cooperation of H. S. Ryerson, executive secretary, and Clarence R. Snetten, publicity director of the same body; for the valuable aid on legal matters given by David R. Faries, General Counsel for the Automobile Club of Southern California; to W. H. Pierce, former City Councilman and member of the executive committees of both the Traffic Commission and City Planning Commission, for much constructive and helpful advice; to the City Planning Commission of Los Angeles, and especially to its President, Sumner P. Hunt, and its director, G. Gordon Whitnall; to Hugh R. Pomeroy, Secretary and Member of Los Angeles County Regional Planning Commission; to Col. John A. Griffin, City Engineer; John H. Prince, Assistant City Engineer; F. A. Lorentz, Engineer of the Board of Public Utilities; Richard Sachse, J. B. Lippincott, H. Z. Osborne, E. E. East, Geo. B. Anderson, George A. Damon, H. W. O'Melveny, D. W. Pontius, James W. Reagan, Joy A. Winans and others who, through conference and otherwise, have furnished much useful information. The board is also under special obligations to the Boy Scouts, who so enthusiastically and efficiently, under the direction of their leader, Mr. E. B. de Groot, counted more than a million vehicle movements in one day and made possible a graphic representation of Los Angeles street traffic.

Respectfully submitted,

FREDERICK LAW OLMSTED
HARLAND BARTHOLOMEW
CHARLES HENRY CRENEY

Consulting Board

P. P. SHARPLES, *Chief of Staff.*

MAJOR TRAFFIC STREET PLAN

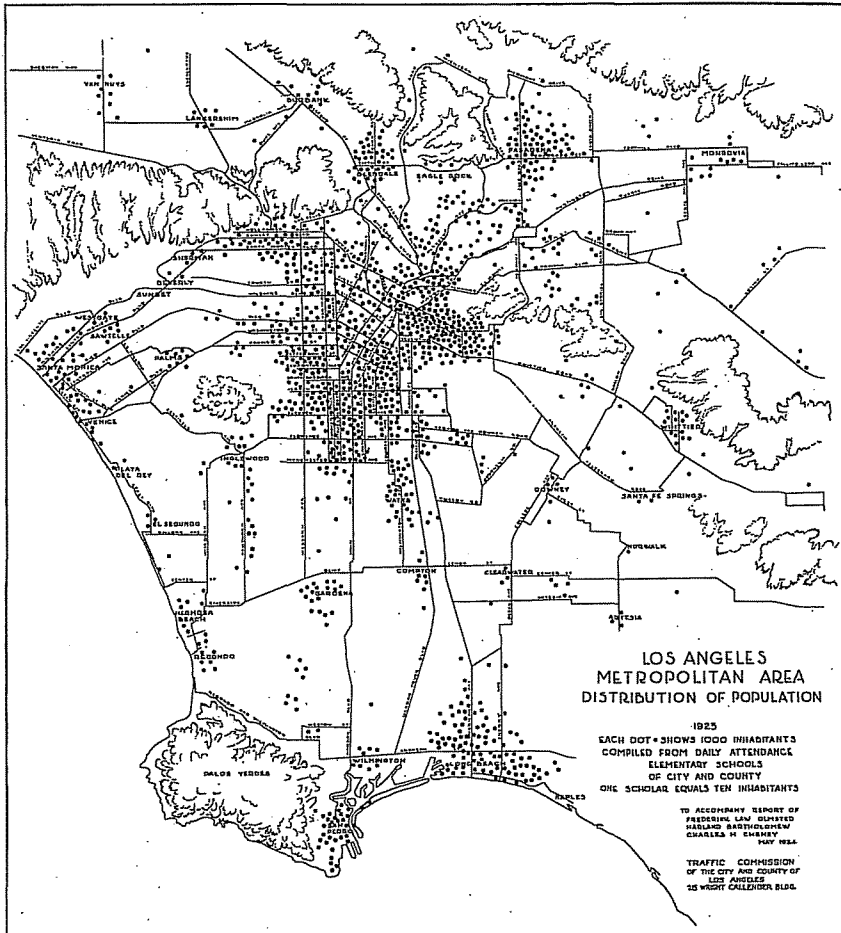


Diagram No. 2—Distribution of Population and Topography in Metropolitan Area—1923.

Gist of the Report

The Consulting Board was asked to advise in general concerning the problem of congested and inadequate thoroughfares in Los Angeles, and specifically as to the advisability of the city's proceeding with thirty-five definite street improvement projects*—were they to be considered as essential parts of an ultimately attainable, well-balanced system of major thoroughfares, reasonably adapted to the needs and resources of Los Angeles.

A Major Street Plan Prepared and Submitted

These questions could be intelligently answered only by seeing how the specific projects fitted in with some general plan for a comprehensive system of major thoroughfares.

No such plan existed which could be accepted as sufficiently complete and well-balanced.

The Board therefore prepared and herewith submit, as their principal work, such a general street plan. It knits together all previous suggestions of which record could be found, covers the area in which most of the thirty-five projects are situated, and embraces these projects, with certain modifications discussed in detail elsewhere.

About 144 square miles in the central part of the metropolitan district are included in this street plan, which was studied in relation to existing and prospective traffic needs, even beyond these limits, as developed by the City and County Planning Commissions and other agencies, and as checked by the Board's own observations. Most of the elements in it have been put forward by others in the past as desirable individual projects.

The Nature of This Major Street Plan and Its Future

This is a balanced scheme for handling a tremendous traffic flow. To give adequate relief the plan must be carried out as a whole. Details are of secondary importance. Alternative methods of accomplishing the same purposes may in some cases be adopted later, without impairing the plan, so long as the purposes are all served.

The plan as a whole will have to be a living, growing thing, put into effect piece by piece and developed, modified, added to and subtracted from, but *only* in such a way as will clearly improve and not impair its quality in two vital matters. These are: First, to maintain a reasonable balance of all parts of the street system (existing and proposed), as to their traffic capacities relative to each other, and to traffic needs in different places; and, second, to maintain an *absolute* scale of traffic capacities, prevailing throughout the whole system, neither wastefully small nor wastefully large. Consideration must always be given to the prospective demand for vehicular traffic, and great economic losses through retarded movement, and the probable limits of the community's ability to provide greater facilities without having to give up things which it may need more.

A properly coordinated city plan must provide a street system related to street railways, rapid transit,

*Set forth in the Community Development Association Program.

railroads, flood protection and drainage, schools, playgrounds, and parks, and these have been taken into account as far as possible in the time and with the limited resources at the Board's command. Further study of such elements will unquestionably call for modifications of the present plan, just as the present plan must properly influence the plans for those elements. This is particularly the case with regard to street railways and rapid transit, study of which is now going forward.

The Causes of Street Congestion follow on page 11.

Solutions of the Problem of Street Congestion are discussed on page 16.

Some Principles Underlying the Design of a Major Thoroughfare System are outlined on page 19.

Financial, Legal and Executive Methods relative to carrying out the plan are discussed on page 25 and in Appendix B.

The Plan Itself is set forth graphically in the frontispiece, with a brief general outline on page 27, and with detailed descriptions of its several parts on page 33.

Future Work

The street traffic congestion problem of Los Angeles is exceeded by that of no other city. Various conditions peculiar to this city justify measures providing for unusual traffic movement. The limitations of time and expense of the present study have not permitted the exhaustive study warranted by the facts disclosed. There is need for much more detailed study of the proposals here made. There is need for an extension of a study such as this to include the entire metropolitan district. The traffic congestion in the area surrounding the central business district, to which this study has necessarily been more or less confined, will in the future find repetition in numerous sub-centers that are even less prepared to accommodate great growth.

The present plan is frankly presented as a foundation upon which to erect a much broader structure of streets for the accommodation of the vast volume of traffic the future is bound to produce throughout the entire metropolitan district. No plan of this character is easily realized. There will be much discussion and considerable opposition. The realization of this or any other plan can only be the result of continuous study and strong leadership by those best qualified to discern the community's need and who are willing to give sufficient time and effort to overcome the inertia and perilous delays that characterize all public work of any magnitude.

Certain new legislation is needed to permit of the speedy execution of work here suggested. Speculative exploitation of the city's need of land for street improvements must be checked. Delays should be minimized. Projects that fall within the jurisdiction of several municipalities should not be allowed to lapse because of the difficulty of cooperative municipal action. A comprehensive scheme for financing and executing this work must be evolved.

A program such as this can only be accomplished over a period of years. Satisfactory progress will never be made if the execution of the plan is left to the whims of changing political administrations. Some specific agency must assume the responsibility for preserving the integrity of the plan. Step by step, as occasion permits, the execution of this, and the other project must be secured until gradually a complete and satisfactory traffic circulation scheme is evolved. Your present committee should be continued, enlarged if necessary, and so constituted as to form a permanent sponsor for the development of a comprehensive plan of major streets for the entire metropolitan district.

The problem of street traffic congestion must be progressively solved in a growing metropolis. The various steps that should be taken from time to time to afford the greatest freedom of traffic circulation in Los Angeles are:

1. Regulation to secure maximum capacity of existing space (including elimination of parking, prohibition of obstructive turns at particularly busy intersections, ranking of vehicles, use of most effective signalling, curtailment of unnecessary movements, and so forth).
2. Separation of classes of traffic (including rerouting of transit lines).
3. Improvement of street plan (including elimination of jogs and dead-end streets, creation of distributor and by-pass streets for business districts and improvement of radial and inter-district thoroughfares of the major street plan).

4. Extension of major street plan to cover the whole metropolitan district, and completion of a Boulevard and Parkway System plan supplementing it.
5. Provision for expedited mass transportation by subways in business district and by rapid transit lines.
6. Provision for the readjustment and extension of steam railroad lines and simplification of terminals, with gradual elimination of grade crossings.

To execute such a program involves much labor and expense. A broad-visioned, unselfish and unifying agency is a prerequisite of extensive accomplishment. Engineering skill, improved legislative measures and an equitable financial plan are necessary accompaniments. Public understanding and support must be secured.

No fixed program can be adopted and rigidly adhered to. Continuous study of conditions, of details, of plans, and of costs, will alone determine the relative importance and order in which various measures should be undertaken. There is no simple single remedy for the complex traffic problem in a rapidly growing metropolis.

Establishment of a permanent Citizens' Committee on City Plan, similar to that which has so successfully operated for the past four years in Pittsburgh, or to that of Chicago which for ten years has been accomplishing most notable results is the procedure most likely, in the Board's opinion, to do what needs very much to be done in Los Angeles. Such a committee will probably need a budget of one hundred thousand dollars a year for not less than three to five years, and a lesser, but still very considerable, budget thereafter in order to do its work adequately and promptly.

Causes of Street Congestion

The causes of street congestion in Los Angeles are, except for the important one of climate, not unlike those in most other cities. They are:

1. Rapid growth of the city and of the volume of traffic.
2. Climate and other conditions peculiar to Los Angeles, intensifying both elements of the first factor and raising certain special problems.
3. Unscientific width and arrangement of streets.
4. Improper use of existing street space.
5. Promiscuous mixing of different types of traffic.
6. Natural or artificial obstructions to circulation.
7. Limiting capacity of street intersections.
8. Concentration of business.

1. Rapid Growth of the City and of the Volume of Traffic:

The rapid growth of Los Angeles is without parallel among cities. Official census records show an increase in population from 102,479 persons in 1900, to 319,198 in 1910 and 576,673 in 1920. Reliable estimates based upon school increases, street car riding, telephone users and other utility company records indicate a present population (1924) of approximately 1,000,000 persons within the city limits, while the total population of the city and immediately contiguous cities and towns is approximately 1,500,000.*

From March 1, 1923, to March 1, 1924, there were 84,000 new lots created by subdividing acreage in Los Angeles county and 125,000 houses erected, according to figures presented to the Realty Board recently by County Assessor Ed. W. Hopkins. In the twelve months previous there were 81,000 new lots and 102,000 new buildings.

New subdivision maps filed of record in the city and county during 1923 were estimated to cover a total of 65,000 acres, nearly all withdrawn from agriculture for town lot purposes.

The 1924 assessed valuation of property in Los Angeles County aggregates \$1,992,068,094, a gain of \$418,649,927 over last year's total. The total assessed valuation of all property in the county has increased approximately 1,000 per cent in the last twenty years, according to Assessor Hopkins, and this assessed valuation is about 50 per cent of the market value placed on property. The County tax levy for the fiscal year 1923-1924, which is now being collected, totals \$61,281,000.

Los Angeles County contains an area of 4,000 square miles, of which three-fifths is in the Angeles National Forest Reserve. A little over 400 square miles or 10% is in the city limits of Los Angeles.

Great as has been the increase in population, buildings and property values, vehicular traffic has increased even faster. Maps 6 and 7 represent the volume of

*Compare Detroit's growth from 160,000 in 1880 to 993,000 in 1920 (40 years) and Chicago's growth from 109,000 in 1860 to 1,099,000 in 1890 (30 years) and then to 2,701,000 (in the succeeding 30 years).

traffic upon the main thoroughfares of the city as recorded by counts made in 1922 and 1924 respectively. Observe the general increase throughout the whole city and particularly the proportionately greater increases east and south.

No more graphic illustration of the remarkable traffic increase in Los Angeles could be had than that showing traffic year by year upon certain main thoroughfares (Diagram 5).

The total registration of automobiles in California and particularly in Los Angeles County (Diagram 4) further emphasizes the remarkable growth of Los Angeles traffic. Registrations in Los Angeles County increased from 110,000 in 1918 to 430,000 in 1923, an increase of 400 per cent in five years, and the present registration in Los Angeles County very nearly equals the total of all other counties in the state.

Even in the downtown area, the automobile brings in a large percentage of the daily influx of people. The cordon count of the Parking Survey Committee showed 643,374 passengers (including driver) carried by autos into the downtown* district (in 11 hours in November, 1923) as against 750,000 on the street railways in the same area. For 24 hours it is estimated that automobiles carried in and out 800,000 passengers, including drivers, and the street cars (all lines) 950,000 passengers on a typical day in the downtown* district. See Diagrams Nos. 10 and 11 for actual figures.

What the total passenger movement by automobile per day may be in Los Angeles is difficult to surmise. Counted in the same way as the trip fares on the street railroads, it is probably in excess of 2,000,000.

The maximum number of street cars in service was 750 per day during the first week in December, 1918, and 964 during the first week in December, 1923. The maximum number operated any day in December, 1923, was 1,045 or 28.6% increase in five years. The average daily passenger haul the first week in December, 1918, was 517,580 and in the same period of 1923 was 1,065,000, an increase of more than 100 per cent.** This class of traffic (street cars) represents a most important form of the use of public thoroughfares.

2. Climate and Other Conditions Peculiar to Los Angeles

The climate of this city has undoubtedly contributed much to its remarkable growth. This climatic condition also contributes much to the traffic problem. When it is considered that here exists the largest percentage of automobile ownership in the world—one (1) automobile for each two and nine-tenths (2.9) persons—and that a uniformly mild climate encourages constant use of cars every day of the year (as against 8 months enjoyable use at most in the eastern states), it is small wonder that a street congestion problem of great magnitude results.

The place of the automobile in the transportation problem of Los Angeles is far more important than in the cities of the East. There is no day in the year when it is impossible or even uncomfortable to ride in an

*Downtown district taken was from Sunset to Washington and from Figueroa to San Pedro Streets.

**From paper by Geo. B. Anderson in "Aera" for March, 1924.

open car. The widely scattered population, and the almost universal housing in detached single family dwellings, situated on lots large enough to admit of housing automobiles, encourage their use.

Philadelphia is usually spoken of as a city with a very high proportion of single family dwellings, but there the houses are in solid rows on lots 15 or 20 feet wide by 60 feet deep, while in Los Angeles the houses are of the detached bungalow type on lots seldom less than 40 feet and ordinarily 50 feet in frontage with generally more than 100 feet of depth. The number of houses per acre in Philadelphia is thus four or five times that in Los Angeles. The spreading out of the residential area here naturally leads to greater use of the automobile.

3. Unscientific Width and Arrangement of Streets

Few cities possess street systems that even approach adequacy in the performance of the functions expected of them, or of demands made upon them. Growth has been unexpected and unplanned for. It is not so much that cities lack sufficient area devoted to streets, or that there is lack of a sufficient number of streets, as that there has been no adequate attempt to provide an orderly scheme of thoroughfares, differentiated as to width and arrangement so that the growth of the city and consequent traffic movements might have more of order and less of chaos and confusion. Map 12 shows widths of all existing streets of over 65 feet cross-section, some of which are so located or on such grades as to be of no value for through traffic; the whole forming a discontinuous and unsystematic arrangement that is the natural result of piecemeal, uncontrolled land subdivision.

There are surprisingly few streets of generous width in Los Angeles. A width of one hundred feet is quite exceptional, while greater widths are practically unknown. There are a respectable number of eighty-foot streets but these are noticeably discontinuous and unrelated. The prevailing standard has been the sixty-foot street, a width totally unsuited for a traffic street of great capacity.

Standardization in the width and arrangement of streets has produced much of present day street congestion, and constant repetition of this improperly related method of land subdivision in newly developed areas has been constantly producing still greater problems for future generations to contend with. The attempt to cope with this evil, recently inaugurated by the City and the County Planning Commissions through control of platting, is of the utmost importance. But both these important agencies labor under severe handicaps, because of the lack of personnel and resources to keep the general planning sufficiently ahead of the tide of new subdivisions. Their offices are crowded with purely administrative duties. Mere regulation of the laying out of such new streets as subdividers can be expected to dedicate primarily for local benefit, will never, alone, meet the needs of a great metropolis.

4. Improper Use of Existing Street Space

Space now available for street purposes is most improvidently used. This is more particularly true in the business districts than upon approach thoroughfares. It was not to be expected that the vast increase in street traffic could be quickly adjusted to present street space. Gradually through more and more stringent traffic regu-

lations more efficient use of existing street space will be secured.

The percentage of area devoted to street space in the business district of Los Angeles is surprisingly small as compared with that of other cities.

Table I—Proportionate Area of Downtown Business Districts Devoted to Roadways*

	Per Cent
Washington, D. C.	44
San Diego, Cal.	41
Cleveland	39.5
Seattle	37.5
St. Louis	37
San Francisco	34.5
Pittsburgh	34
Portland	34.5
Minneapolis	30.5
Detroit	29.5
Chicago	29
Denver	27.5
Salt Lake City	25.5
Toledo	24
Los Angeles	21.5

Because of this restriction of street and roadway area in Los Angeles, improvident use of street space must be avoided. If the economic losses due to retarded or prohibited traffic movements are to be reduced to a minimum the fullest possible use must be made of roadways for accommodation of the greatest number of persons and commodities. This applies especially to reduction of space devoted to automobile parking.

A further handicap in the business district of Los Angeles is the lack of alleys in most blocks. This necessitates loading and unloading of vehicles upon the public streets, causing interference with pedestrian movement upon the sidewalks and with vehicle movement in roadways. Alleys should be extended to serve all business blocks. Opened only one story high, and bridged over above, as has been done by Bullock's Department Store, very valuable space on upper floors can be commercially utilized without impeding alley service in the least.

The present restriction which prohibits parking from 4:00 to 6:15 P. M. has helped conditions markedly during the evening rush hour and gradually this type of restriction must be extended for longer periods and presumably throughout the day on the most heavily used streets. In the narrow streets of the Boston business district all loading and unloading of goods, as well as all storage of passenger automobiles, has long been prohibited during daylight hours. Where these streets lack alleys, goods are shipped and received only at night.

5. Promiscuous Mixing of Different Types of Traffic

Experience with automobile traffic congestion problems is of such comparatively short duration that many opportunities for improving freedom of circulation are yet to be taken advantage of.

Traffic is of three distinct types: (1) street cars, (2) automobile trucks, and (3) passenger automobiles.

*From article "Traffic Relief in Los Angeles," in Electric Railway Journal, March 8, 1924, by George Baker Anderson, Manager of Transportation, Los Angeles Railways (yellow car surface lines).

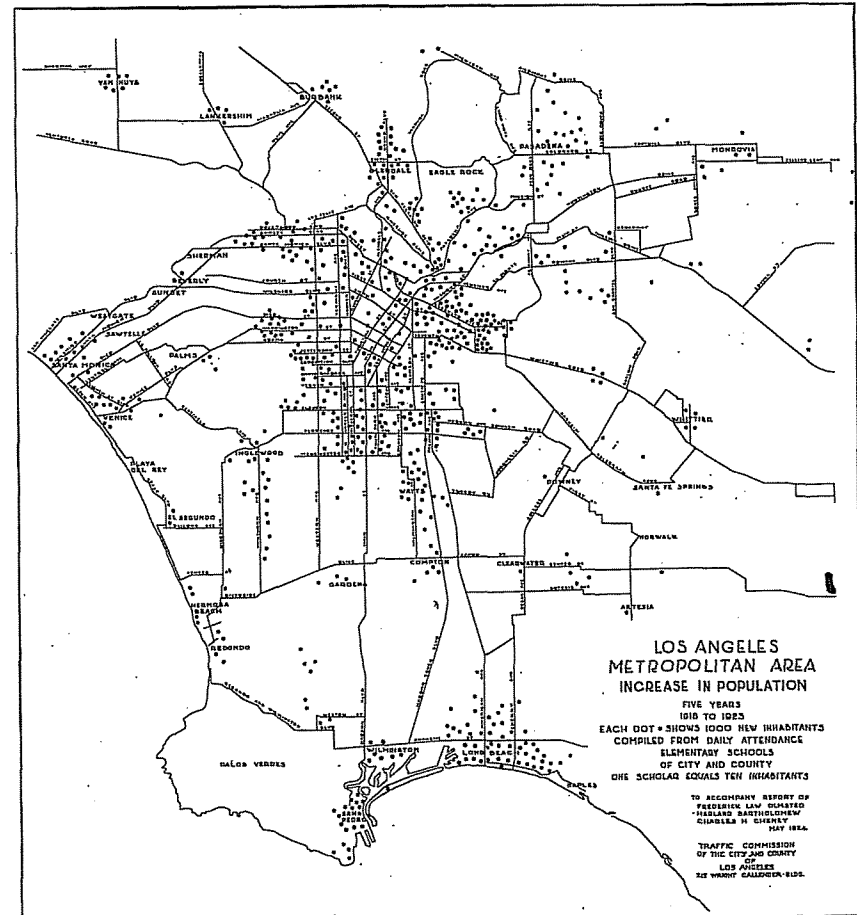


Diagram No. 3—Location of Increase in Population, 1918-1923. Compared with Diagram No. 2, the increases on the east and south sides of the city are quite marked.

The street cars are the most economical carriers of people and since the street is the only available present right of way for most of this class of traffic its freedom of movement should and must be provided for. Heavy trucks, whether horse drawn or motor driven, as yet constitute a small proportion of total traffic. Motor truck traffic is beginning to increase rapidly, however, and will continue to increase in even greater proportion than in the past.

These three types of traffic are more or less incompatible, particularly upon streets of limited width. Passenger automobiles obstruct street car movements, especially in congested centers. Street cars obstruct the freedom of automobile movements on radial highways of less than eight line (74 ft.) roadway capacities between curbs. Auto trucks are more or less obstructive to street car and passenger automobile traffic, depending somewhat upon the width of roadway. It is desirable to the utmost practicable extent to provide opportunities for segregation of these three classes of street traffic, thereby facilitating the operation of each and immeasurably adding to the total volume and speed of traffic. The present arrangement of street car tracks and routing in the business district of Los Angeles and in approach streets is not such as to facilitate the best movement of either street cars or automobiles, for there are few thoroughfares that are not occupied at least in part by street cars, and in many cases the lines jog unnecessarily from one street to another.

6. Natural or Artificial Obstructions to Circulation

The topography of the district in and about the city of Los Angeles is roughly shown by Map 2. The city occupies a valley of large dimensions, enclosed on the north by mountains and on the west and south by the Pacific Ocean. There is room for much growth to the west and south, and for unlimited growth eastward. To the north there is less opportunity for growth, but even here the splendid San Fernando Valley can eventually accommodate a population estimated by the Regional Planning Commission at approximately 400,000 persons. Topographic barriers have not been a serious handicap to the growth of the city, but have caused some serious obstructions to traffic circulation. The most notable case of this is the pass in the Santa Monica Mountains immediately north of the present business district through which the Los Angeles River flows. This pass was the natural site of the early city. The more favorable nature of the terrain to the south and west caused new growth in those directions, for the path of least resistance is the natural direction of city growth.

The narrowness of this pass early resulted in the absorption by the railroads of much of the level area not occupied by the river and left a limited street space. Much additional space for street purposes is now difficult, if not impossible, of acquisition. "The Bottle-Neck" is the term now appropriately applied to this pass. The traffic flow diagram (Map 7) indicates the extent of the congestion at this throat. Relief in the form of increased capacity here or new routes elsewhere must be provided.

The limitations of convenient and level building areas contiguous to the business district on the north, plus the handicap of "the bottle-neck" accounts for the preponderance of contiguous growth west, south and east. Its reflection is most evident in the total volume of traf-

fic entering the business district (Sunset to Washington and Figueroa to San Pedro) from the four compass directions as compiled from the 1924 traffic census (11 hours) taken by the Parking Survey Board.

Table 2—Total Traffic Entering the Business District

	In	Out
*North	21,664	17,498
*South	41,163	39,093
*East	61,668	57,086
*West	76,094	62,624
Total.....	200,589	176,301

These figures in part explain the south and westward expansion and drift of the business district so noticeable in evidence the past few years.

In general there are few other serious topographic barriers to growth and free traffic circulation in Los Angeles, although poor land subdivision has made difficult good street access in certain areas. The Baldwin Hills district and the passes of the Santa Monica Mountains to the extreme northwest are examples of topographic impediments. The large hill in the northwest corner of the business district (Bunker Hill) bounded by Sunset Boulevard, Hill Street, Fifth Street and Figueroa Street is a decided handicap to the business district. Construction of the Second and Third Street tunnels, the Broadway tunnel, the Hill Street tunnel and the opening of Fifth Street, now under construction, have in part obviated the difficulties of approach. A still further reduction of the serious grades in this area is desirable and should take place as economic conditions justify.

The Los Angeles River and the several railroad yards and terminals have long offered a combined natural and artificial barrier to growth and free traffic circulation eastward. Fortunately, few streets have been vacated and several viaducts and bridges have already been constructed, while quite recently the city, county and railroad authorities have agreed upon a program of six new viaducts and bridges (First, Fourth, Seventh, Ninth, Macy and Aliso Streets) that will eliminate several grade crossings and improve access between opposite sides of the river. Excellent foresight has been shown in providing six line (56 ft. roadway) capacity for each of these viaducts, for which bonds have been voted, and construction will soon start.

A comprehensive plan of grade-crossing elimination should be worked out as soon as possible for the whole metropolitan area. For lack of proper grade separations, much delay occurs that is expensive and no longer warranted, to say nothing of the traffic accidents and dangers to life and property involved. Other states have long ago started on definite programs of elimination of all grade crossings and Los Angeles, with the greatest auto traffic in the country, cannot afford to neglect this matter.

Closely allied is the problem of unification of rail lines and terminals for which the joint study of the city and State Railroad Commission is an admirable be-

*Traffic actually entering the central district on its North, South, East and West sides respectively. On account of the "bottle-neck" much traffic from outlying portions of the north sector reaches the central district through its east and west sides.

ginning. This should be continued to include the harbor and whole metropolitan area.*

7. Limiting Capacity of Street Intersections

The limiting capacity of street intersections is one of the most prolific causes of street congestion. Two roadways of equal width, intersecting at grade and fully used, each have their capacity reduced more than 50 per cent because of the alternate stopping of traffic movement. (Theoretically, the capacity of each street would be reduced 50 per cent, but actually it is reduced far below this figure because of the necessity for slowing down, stopping and starting on each street, and waiting for left hand turns.) How important are the factors of speed and of interval between vehicles is illustrated by Diagrams 17 and 18.

While traffic capacity might be increased by enlargement of roadways at street intersections, this is more or less impracticable of accomplishment, except in new areas. Such a method cannot be used in areas already built up and where traffic congestion is now greatest.

What might seem to be a more logical method of avoiding the congestion caused by intersections of streets at grade, would be to provide for separation of grades for strictly automobile streets. This method, however, has distinct and positive limitations. Diagrams 19 and 20 illustrate two methods of street grade separations where level ground exists and where two great thoroughfares intersect, as for instance, in some outlying district such as Wilshire and Santa Monica Boulevards. The plans show opportunity for intercommunication as well as for uninterrupted through movement of four lines of traffic on each street.

The limitations of this sort of plan are the expense of property, 120 feet of street width being required (a condition seldom possible), the cost of construction (\$126,216 for viaduct construction and \$269,300 for subway, per intersection), the extreme length of approaches and the possibility of damage claims by abutting property owners. The cost estimates above are based upon Los Angeles unit prices as of April 1, 1924. Unusually difficult soil conditions might increase the above costs. Occasional favorable grades, such as at Sunset and Glendale Boulevards, where grades have already been separated, or at Vermont and Wilshire, might reduce the above estimates of cost, though at Sunset and Glendale no satisfactory provision for intercommunication has yet been made, the cost for which would be considerable.

An estimate has been made of the cost of building an elevated street of four-line capacity, being virtually a continuous viaduct similar to the construction shown by Diagram 21. This would cost \$929,808 per mile, exclusive of property damage, unusual soil conditions, or ramps for intercommunication with cross streets (allow \$55,000 each).

The difficulties and expense of single street grade separations make this device still less practicable as a means of relief of street traffic congestion for general application. Occasional opportunities at the intersec-

*See "Unification of Rail Lines and Terminals," by Chas. H. Cheney and Committee in Proceedings of National Conference on City Planning at Cincinnati, 1920.

tion of two main thoroughfares may be found. The excessive cost for this type of construction (or for a modified or more intricate type of construction throughout business districts) is prohibitive because of property damage and the limited ability of the city or abutting frontage to defray the expense. Even if the cost might be met no permanent solution of the street traffic congestion problem would have been found, for the new thoroughfares thus created would soon be crowded to capacity. A still more intricate system might then be evolved, providing multi-story streets, to visualize which is to appreciate that no solution can be found in this direction. For more detailed discussion, see Appendix A.

Attention has previously been called to the limited area in the business district now devoted to street and roadway space (Table 1 on page 12). This is indeed a prolific cause of street congestion. Add to this fact that the long blocks, 660 feet, are laid out north and south, with the narrower streets at greatest intervals in the direction of heaviest traffic movement (Table 2 on page 14), and it becomes evident that much of the present street congestion is due to an unusual amount of turning of corners and to obstructed flow. While new east and west streets might be introduced into the business district, their cost must in each case be justified. It is clear, however, that anything which can be done to facilitate direct and continuous movement on these streets and to eliminate left-hand turns at the narrow corners, by getting vehicles on to the street on which their destinations lie before they enter the congested zone, would be of great value.

8. Concentration of Business

The next great cause of street traffic congestion is the concentration of business within small areas. High buildings are the greatest producers of congestion, and Los Angeles is to be commended for its courage and foresight in adopting and maintaining a building height limit of 150 feet in the central business district. From a traffic standpoint, this height is too great, but other considerations will probably cause the limit to remain as at present. Building height limits in outlying districts and on certain main thoroughfares, particularly Wilshire Boulevard, are now too great and should be reduced.

It is important in this connection to note that except in a limited number of special cases, including the case of a brief "peak load" of pleasure travel on certain routes on Sundays and holidays, the majority of the vehicles causing traffic congestion are not those engaged in long distance movements but those circulating or standing within the limits of a localized area of concentrated activity. This fact is expressed in the local "bulges" in the volume of traffic along many thoroughfares, as at Hollywood Boulevard and Vine Street (Diagram No. 7). These "bulges" show the net increases in the long traffic stream due to local movements, but if a complete analysis of the traffic were available it would probably show that a very large part of the apparently continuous flow is made up of relatively short over-lapping movements.

Solution of the Problem of Street Congestion

There are three factors involved in any solution of the problem of street congestion, namely: (1) the width, (2) arrangement, and (3) use of streets.

The best solution involves, in any city, direct and uninterrupted movement between centers, and good distribution at these centers. A given city may or may not be able to solve its problem of street congestion, depending upon the nature of its existing street plan, its financial ability to improve that plan, the extent of ownership and use of motor vehicles, the intensity of development permitted in business areas, and the degree of regulation of use of streets.

Measured by present standards, a certain degree of growth is desirable in cities. But the greater the size of a city and the more rapid its growth usually the more acute will be its street traffic congestion problems.

Los Angeles is unique in the importance of its automobile traffic, in relation to its general transportation problem. The checks taken for purposes of study show that almost as many people daily enter the congested area of the city by automobile as enter it by all other means of transportation.

Considering the several factors above mentioned, it is evident that traffic congestion is a progressive problem and requires a progressive solution. The measures to be taken and their approximate order is as follows:

1. Secure maximum use of existing street space by traffic regulations that speed up movement.
2. Widen and open streets in accordance with some well defined plan of circulation.
3. Restrict unnecessary traffic movements.

1. Secure Maximum Use of Existing Street Space

Los Angeles has done much toward accomplishing the first of these steps, i.e., to secure maximum use of existing street space. An extensive code of traffic regulation has been adopted, applicable chiefly to the central business district. Parking is limited to 45 minutes from 7 A. M. to 4 P. M. and prohibited entirely on certain streets comprising most of the business district from 4 P. M. to 6:15 P. M. Left hand turns have been eliminated at many corners and all turns at some. An automatic synchronized traffic system has been installed which provides intervals of 55% of the time for north and south movement at all intersections, and 37% of the time for east and west movement, with 8% of the time in the two pauses between signals (4% in each). Much relief can still be accomplished by further regulation, including complete prohibition of parking on certain thoroughfares and the confinement of different types of traffic to separate streets.

Los Angeles has a capable and progressive police traffic squad, but unless public opinion and the courts are in sympathy with the regulations it endeavors to enforce, the effectiveness of the police department in handling traffic matters will be greatly diminished.

2. Widen and Open Streets in Accordance With a Definite Plan

Los Angeles' greatest immediate need in solving its street congestion problem is the development of an or-

derly and well-balanced system of thoroughfares throughout the city, i.e., a scheme of thoroughfares of such width and arrangement as will facilitate direct and uninterrupted movement from center to center and incidentally facilitate distribution within centers. This is the purpose of the present study. Several projects of the character here described and of much merit are now being carried out and have, of course, been incorporated in the plan later described—Tenth Street widening, Fifth Street extension, Broadway, Olive and Flower Street extensions, etc.

3. Restrict Unnecessary Traffic Movements

Once the several openings and widenings suggested in this report have been executed in whole or in part and traffic regulation has reached its limit, there is but one alternative thereafter should congestion still continue—a distinction will have to be drawn between necessary and unnecessary, or between less necessary and more necessary traffic movements wherever congestion prevails. Even today it is evident that there is a wide difference in the necessity for traffic movements that take place in the most congested centers.

Traffic censuses in other cities indicate that the street cars are the most important users of the street area downtown, carrying on the average 85% to 95% of the passenger traffic entering and leaving the business district. In Los Angeles, however, as shown in Chapter II, the street cars (yellow cars of L. A. Ry. plus local line red cars of P. E. Ry.) carry only a few more passengers than carried by automobiles.

The stopping and loading of street cars greatly slows up automobiles on carline streets, cutting down the volume of flow probably as much as 50 per cent. Hence the segregation of streets, some primarily for carlines and some primarily for automobiles and free from carlines, is very important, so far as this is possible without limiting the carrying capacity of the street car system to less than limit fixed by other factors.

But the street car, owing to its economy of space and low cost of operation per passenger, must take precedence over other forms of vehicles in the congested area whenever the traffic capacity of the arteries approaches its limit, and prior to reduction in use of surface street cars by the still more intensive mass transportation offered by subways or elevated lines.

A traffic count of what is called the "congested district" of the downtown business district (from 1st to 9th Streets and from Figueroa to Los Angeles Streets) covering approximately ninety blocks, showing the movement therein of all classes of vehicles from 6 A. M. to 6 P. M. on December 17, 1923, shows 263,110 automobiles, 48,556 trucks—a total of 311,666 automobiles of all classes—and 12,025 street cars. During the rush hour from 5 P. M. to 6 P. M., there was a total of 34,449 automobiles and trucks, and 1,436 street cars used. The average car load for this period was 77.7 passengers, and the average automobile load was 1.67 passengers, including drivers.*

*Figures compiled by the L. A. Railway from counts of Public Utilities Board. Compare counts in November, 1923, given in Chapter II, on Diagrams 10 and 11.

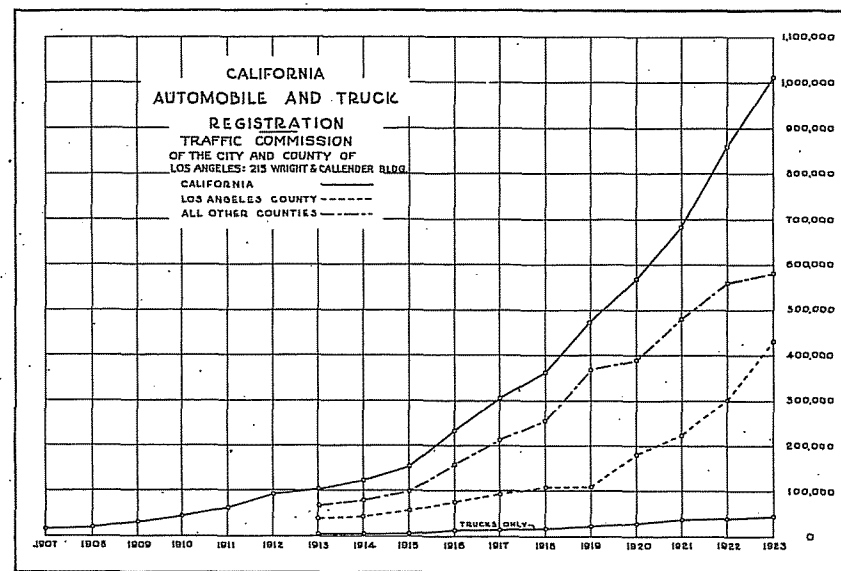


Diagram No. 4—Automobile Registration in California and in Los Angeles County, 1913-1923.

The percentage of traffic that is exclusively of the motor truck variety differs considerably in various cities. In Los Angeles this class of traffic comprises about 11% (1924 census) of the total vehicular traffic and (from figures compiled by the L. A. Railway) occupied 16% of the total occupied roadway space on streets measured. The growing importance of this character of traffic is recognized and must be provided for. The heaviest traveled trucking street today was found to be Santa Fe Avenue, at one crossing of which 25% of all vehicles were in this class. (Boy Scout count.) The following table shows the various types of cars in use:

Table 3—Autos Registered January 31, 1924

	In California	In Los Angeles County
Automobiles	1,056,756	410,517
Trucks	43,527	15,065
Trailers	5,808	2,151
Motorcycles	14,694	4,753

Autos Registered April 1, 1924

From February 1, 1924, the beginning of the present registration year, to April 1, 1924, the latest date for

which figures are available, there were registered in Los Angeles County:

391,947 Automobiles
36,124 Pneumatic tired commercial vehicles (Last year these were included under the heading of automobiles)
13,247 Solid tired trucks
441,318 Total automobiles (in L. A. County, April 1, 1924)

The passenger automobile traffic is by far the largest in volume. How much of this latter type is of a distinct commercial character, that is to say, is directly concerned with the proper activities of the central business district, it is impossible to determine. Some of it, and perhaps a large percentage, contributes very little to the proper activities of the business district, and, when remedial measures have reached their limit in the avoidance of traffic congestion, this portion ought, as far as possible, to be excluded, or at least induced to use thoroughfares on which it will not interfere with other more important forms of traffic movement.

It is practically impossible by regulations to discriminate between the more necessary and the less necessary passenger automobiles, but those who have least to gain by using automobiles in a congested area are apt to be

squeezed out first by increasing pressure. And when the pressure is heavy enough, passenger automobiles in general must yield in proportion to more intensive increase of transport. Automobiles used exclusively for passenger transport occupy 14.3 times as much roadway space per person carried (according to L. A. Railway figures) as do street cars in the Los Angeles business district. The flexibility of automobile transport effects to some extent its higher unit cost, but mass transportation in whatever form, motor bus, trolley bus, street car, or rapid transit, is necessary and desirable to meet present and future needs in congested centers.

The problems of street congestion are as yet of such comparatively recent origin that we have few precedents by which to judge measures proposed for relief. The concentration of business, as previously indicated, is responsible for much present congestion. Concentration of business is more or less necessary and desirable, however, and to what lengths cities may go in restriction of concentration is a matter for much further study, certainly beyond the limits of this investigation. Zoning ordinances, by fixing height limits and the area of the lot which may be covered, and by differentiating between types of residential, commercial and industrial districts, form a foundation upon which the ultimate solution of traffic congestion will in part depend. While the present zoning (which applies to use of buildings only) is helpful, it should be extended as soon as possible to provide height and area limits to congestion, as well.

Decentralization is a term now much in the minds of those concerned with problems of city growth. Persons interested in business property, at least in large commercial centers, are not over-enthusiastic about processes of decentralization. And yet a very natural tendency of this character that might perhaps better be described as specialization of centers, is already taking place in no uncertain way in Los Angeles. The new Hollywood business district and even more recently the Vermont Avenue and Western Avenue districts, are evidences of an inevitable tendency. These two districts are but examples of numerous local retail centers that will develop at intervals throughout the whole Los Angeles district as the city continues to grow. They are neighborhood centers for local shopping that the central business district cannot and should not continue to draw to itself at the cost of interfering with kinds of business which have a better right to a central location.

At the very time these centers develop, the central business district continues to grow and expand. Here is specialization—the central business district for such offices, theatres, hotels, department stores and specialty shops, etc., as must have a central location if they are to do business at all—the local neighborhood centers for all business which can be efficiently and profitably conducted there. Thereby much of the traffic concentration is broken up, gradually resulting in mass transportation for the main center and more of the retail shopping and delivery traffic distributed throughout the neighborhood centers. Both will grow, and probably grow faster than provision for traffic accommodation can be made, at least as long as the city continues to increase in population.

The Limits of Traffic Congestion

Increasing traffic congestion is ultimately self-limited. If not previously limited by other factors, the amount

of traffic will be limited by the width or capacity of the streets, and by that only. If that capacity is doubled, the limit will be raised, but when it is again reached, the final degree of congestion will be just as bad as with a smaller limit capacity.

When the limit of increasing vehicular travel is fixed by the physical capacity of a street and not by other factors, congestion will reach a point approximating the intolerable whether the street is wide or narrow. That means a degree of congestion such that if it got any worse fewer people would be willing to endure it and the numbers using it would fall off.

In business districts at least, it is improbable that any limitations on the size of buildings and hence on the concentration of business, or any limitations on the ability of people to pay for automobiles in which to go to business, will keep the amount of traffic congestion much below the limits determined by the width or capacity of the streets, no matter how much the latter may be increased.

If, then, no matter what we do about increasing street capacity, we must approach the same degree of almost but not quite intolerable congestion, why not be fatalistic and do nothing?

There are, among others, two very sound reasons:

1. If the street system is ill-balanced, so that congestion at some places causes many other places in the system to be used far below their capacity and causes abutting property to be used below its convenient and satisfactory capacity, there is an enormous waste; to avoid which would justify large expenditures for increasing the capacity of the undersized parts. That is a matter of relative capacity as between different parts of a street system.

2. As a matter of absolute capacity, if any city with the mechanisms for transportation now available to us, including the street car and the automobile, were to struggle along with streets as narrow and crooked as prevailed in cities in the days of pack-animals and human portage streets, the waste of opportunity would be absurd; and the economic gain of increasing the average scale of the street system as a whole would justify almost any amount of reconstruction by slashing through a major street system on a "modern" scale of street width and of directness. That is the sort of reconstruction Paris did in the 18th and 19th centuries. Tokio and Canton are doing it now.

Mechanical transportation has caused a revolution in the volume of street traffic, and in the space required for getting the legitimate benefit obtainable from this new agency; it is precisely comparable with the revolution wrought by the general introduction and multiplication of horse-drawn wheeled vehicles in the cities of Europe between the 14th and the 19th centuries.

Los Angeles, like practically every other large American city, has a street system laid out on the scale of a 19th century, horse-and-buggy town.

We do not yet know enough about the ultimate economics of motor transportation to feel justified in making the huge sacrifice of fixed capital necessary for increases in the scale of capacity of our 19th century street systems at all comparable with the increase in scale which the 19th century showed over the 14th. It is well to be fairly conservative in such matters, even though America's industrial progress has been due largely to courage in putting old machinery on the scrap heap when better was to be had.

But the trend of things is so manifest as to make at least this mild statement perfectly safe:

When choice is open, and when in doubt, it is the part of wisdom and of conservatism to aim for greater thoroughfare capacity rather than for less. And for

capacities at least remotely comparable with 20th century facts and tendencies in a large metropolis; not for such as were in fact dictated by 19th century conditions, even in the small provincial town that Los Angeles then was.

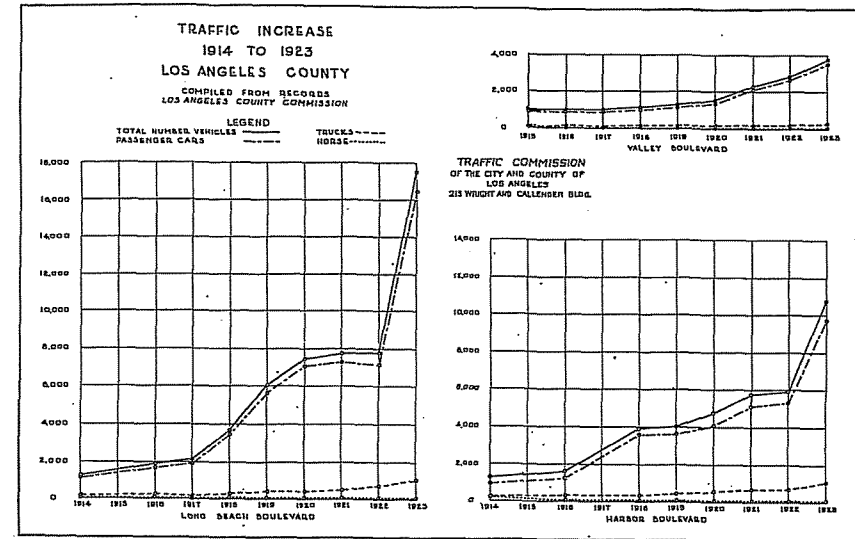


Diagram No. 5—Increase of Traffic on Long Beach Boulevard, Valley Boulevard and Harbor Boulevard.

Establishing a Well Balanced Street Plan

SOME PRINCIPLES UNDERLYING THE DESIGN OF A MAJOR TRAFFIC STREET SYSTEM

Distinction Between Major and Minor Streets

An important point on which to have a clear understanding is the sharp distinction that must be made between major thoroughfares (which form the subject of this report) and minor or local streets.

While most of the streets of any city are primarily residential, and local streets are also needed in industrial districts and in business districts opening off major thoroughfares, the reasons for this basic distinction can be brought out most clearly in residential areas.

The main reasons are *economy* and *safety*.

With the recent rapid increase in vehicles, particularly of fast moving vehicles, cities are being driven to concentrate through travel on a limited number of convenient and adequate major thoroughfares, where ordinary drivers can know they are reasonably safe, and the reckless ones can be more easily and economically regulated.

Chicago, Los Angeles and a number of other cities have already designated certain traffic ways for through travel, on which higher speed can be maintained with

safety, because no one is allowed to turn in from a side street without first coming to a dead stop. This is called the "boulevard stop" plan. One of the greatest causes of street accidents has been found to be from cars dashing out of minor streets across main arteries.

Los Angeles will have to consider very soon the adoption of an ordinance establishing definitely the major traffic streets, which all vehicles, particularly hauling vehicles, must use for travel until the nearest point of their destination has been reached. Only thus can the city furnish enough wide, heavy, through traffic pavements and pay the bills for their maintenance.

Safety Requires Designation of Definite Streets for Through Traffic

Wear and tear is so great, the danger to children and pedestrians so serious, and the cost of permanent wide traffic pavements and their upkeep so large, that most cities can afford to have only about every sixth or eighth street established and paved as a traffic street in outlying sections. This is becoming particularly true of Los Angeles.

Another type of regulation which becomes logically possible with the designation of an adequate system of properly selected main thoroughfares, is the exclusion of commercial vehicles, especially heavy trucks, from local residential streets, except for access to property abutting on those streets. By thus concentrating the heaviest and most destructive wear to streets properly adapted for it, it is possible to provide, where most needed, pavements heavy enough to stand up under this traffic and wide enough to carry it, and at the same time to use narrower and lighter surfacing material on the local streets and so maintain all the streets in far better condition at a lower total cost than is possible without such differentiation. The burden of making any and all streets fit to stand up under heavy trucking would be too great; and the indiscriminate use of heavily loaded vehicles on streets not fit for them is extravagantly destructive.

But it is not merely an economic problem. Safety for children and pedestrians demands that local residential streets should in general be free from high-speed through travel and from trucking—a condition which can be maintained only if there are well-recognized thoroughfares designated as such, properly paved and of adequate width and directness.

Street Accidents a Most Serious Problem

With street accidents in Los Angeles reaching such alarming proportions both in death and injury to persons, and in property damage, a safer and more carefully balanced system of streets for handling traffic, is essential. The following table shows the situation:

Table 4—Street Accidents in Los Angeles*

Year	Fatal	Injuries
1918	114	3597
1919	84	3302
1920	128	4249
1921	172	5027
1922	277	5908
1923	322	6719

Streets Must Be Arranged to Suit Their Use

To meet these problems it has become necessary, for economy, safety and convenience, to divide all streets into three general classes, according to use, width, and plan of improvement, with regulation of traffic varying to meet the specific needs of each. These three classes as now generally accepted are:

1. Major Traffic Thoroughfares.
2. Parkways or Boulevards for Passenger Vehicles only.
3. Minor Streets, mainly residential but including also special local streets for other purposes as in industrial districts and in some local retail business districts opening off main thoroughfares.

Adoption of a well-defined policy of differentiation in width of street, of roadway and character of paving will soon produce results more satisfactory than have been achieved heretofore. On the radial thoroughfares and cross-town streets the first essential is ample width.

Economy and Safety of This Distinction

During the past twenty years, there has been a revolution in all former ideas in America as to streets and

*Furnished by the Traffic Bureau of the Police Department.

their use, how they should be laid out, paved, parked or improved. The coming of the fast motor vehicle and of trucks and trailers with very heavy loads—amounting sometimes to as much as 10 and 12 tons on two wheels—has made necessary more permanent, wider, heavier and far more costly hard surface pavements on streets subjected to this traffic. Nothing less will stand up under the punishment. There is no economy in the makeshift of inadequate pavements constantly breaking down and continually in need of repair and renewal.

But the city cannot stand the economic burden of providing such pavements on all streets or on nearly all streets. And for the local purposes of the abutters on most of the streets of a city, especially on the minor residential streets (which enormously outnumber in mileage all the others put together) there is no need for wide or costly pavements. Indeed, the more completely such streets can be kept free from the kind of traffic which alone justifies heavy, costly pavements, the better they are for local purposes.

Overwide and unnecessary pavements on minor streets involve an extravagant waste which sometimes reaches enormous figures. Adoption of a Major Traffic Street Plan should forestall waste of this kind.

The following table covers some general indication of the financial magnitude of the paving problem in Los Angeles:

Table 5—Street Work Done in Los Angeles, 1913-1924*

Year	Miles of Asphalt, Concrete, or Hard Surface	Miles of Graded and Oiled, or Macadam	Estimated Total Cost of all Kinds (including Curbs and Gutters)
1913-14	48+	20+	
1914-15	59+	20+	
1915-16	56+	14+	
1916-17	36+	20+	
1917-18	14+	6+	
1918-19	12+	8+	
1919-20	5+	3+	\$ 455,124
1920-21	25+	9+	2,386,374
1921-22	26+	18+	2,139,263
1922-23	35+	19+	3,608,752
1923-24**	60+	17+	5,000,000

During the next five years, it is estimated that \$25,000,000 to \$100,000,000 of street work will be done by the city, in the natural course of events. Hence the importance of a Major Traffic Street Plan to work to

As soon as a hard surface pavement is now laid on a street of any length, it immediately attracts all the travel from the surrounding neighborhood, becomes more dangerous for children, dusty, dirty and noisy for the houses fronting on it, and therefore less desirable in many ways for residences, except for the larger type of dwelling which can afford to set well back from the street. And unless it is a very heavy and costly pavement the diversion to it of trucking traffic is liable very promptly to break it down. The abutters are assessed

*In addition to the above work, the City Engineer's office has about two years of petitions for street work, held up until a larger engineering force can be secured, amounting to an estimated total cost of \$10,000,000.00, and up to \$40,000,000.00 of other engineering work. It is understood that the City Council will make a special appropriation, so that plans may be gotten out immediately for this work.

**Estimated.

for something that they want, that would serve their needs and that they can afford to pay for; and then their improvement is promptly worn out by others. If not soon abandoned to them, their street is at best made dangerous and noisy.

Minor Streets Should Be Narrower and Indirect

Where-city engineers used to think that every street should be laid out a through street, it is now seen to be economical to provide wider and heavier pavements on a limited number of selected Major Traffic Streets and to keep through traffic off the rest of the streets as far as possible.

On minor residential streets width and directness are no longer considered essential. In fact, on these minor residential streets a roadway width sufficient only for the purely local traffic, when combined with more or less irregularity in alignment, discourages the use of the street for traffic purposes, gives more room for planting and adds greatly to the desirability of the street for residential purposes. Families with children, seeking either to rent or buy a home, give preference in nearly every case to a quiet, out-of-the-way street, free from the speeder and through traffic.

As a matter of city planning, the chief, if not the only objections to making all local residential streets so interrupted and indirect as to exclude automatically all through traffic are, first, that direct major streets are often not provided of adequate capacity for carrying the through traffic of the present and the immediate future; and, second, that conditions are liable to change so as to demand the conversion of intermediate streets originally intended and used as local residence streets, into additional major traffic streets, sometimes devoted to business, as has been recently happening with the north and south streets between Figueroa and Main Street, south of the central business district.

It may be a very wise precaution in city planning to lay out some of the originally local streets intermediate between the original main thoroughfares on such lines and with such building line setbacks that they can, if necessary, be converted at some future time, without extravagant cost, into supplementary intermediate major thoroughfares; but this does not alter the soundness of the policy of deliberately selecting a series of major streets adequate for the through traffic needs which can be clearly forecast, of concentrating the wide and heavy pavements on those streets, and of seeking economy and safety and quietude on all the minor residential streets that intervene between them.

Minor Industrial Streets May Be Closed

It is to be noted also that heavy industries need larger areas uninterrupted by streets than the ordinary residence blocks offer. If Major Traffic Streets are properly provided for through hauling, minor streets in industrial areas can be closed, wherever desired for business reasons. The Major Street Plan should help industries by settling the question of what streets are needed for through traffic so that the others may be closed without question, if proper easements for sewers, drainage, utilities, etc., are retained.

Many American municipalities have begun to recognize the necessity for thus settling definitely which are to be the Major Traffic Streets of the city, and a fairly complete Major Traffic Street Plan has been worked out and adopted in St. Louis, Pittsburgh, Memphis, Cleveland, Portland (Ore.), and in a number of other

cities. The Major Traffic Street Plan of Los Angeles is along similar lines.

Parkways and Boulevards

A parkway or boulevard, in the sense used in this report (regardless of the occasional misapplication of these terms to the most ordinary kinds of local streets) is a route limited to passenger vehicles (excluding all commercial vehicles and truck-hauling) and made exceptionally agreeable as a route of pleasure travel by every possible means, but especially by the feeling of openness that comes only with plenty of width and by an ample enframement of trees, shrubs, and other plantations in the parallel wide sidewalk areas.

There is justification for providing such a parkway or boulevard as one of the main thoroughfares of a city wherever conditions are such that commercial traffic can be taken care of in other or nearby routes, and that the amount and kind of passenger traffic over the proposed route would make the extra public enjoyment afforded by the parkway or boulevard worth its cost.

A parkway or boulevard may be used mainly by people going to and from business and yet give them a great deal of incidental recreation and pleasure; but ordinarily the justification for such treatment is greatest on routes used also largely by people who are traveling solely for pleasure—as to and from the beaches, the mountains, etc.

Such parkway thoroughfares, as far as possible, should lead past the principal fine buildings and parks and scenic views of the city showing it to the best advantage to visitors, while at the same time contributing much to the enjoyment of local people. Los Angeles, with its ever-increasing number of visitors, has more than usual justification for establishing this kind of thoroughfare.

It is important to note the distinction between the class of parkways and boulevards here discussed as forming part of the thoroughfares system of the city and those which are not intended for direct communication between points, but which are simply elongated parks in which people circulate for the pleasure they find in them. The latter may be valuable purely as parts of a park system, but are not parts of a thoroughfare system.

Width in boulevards and parkways is necessary to secure ample permanent spaces for planting. Such parking and planting are what make a boulevard desirable, refreshing and useful as distinct from ordinary traffic streets.

A street 100 feet wide would be a street or avenue of handsome width, but a mean boulevard. Residence streets commonly have two rows of sidewalk trees. A boulevard should have something more. If it depends for its distinction on its rows of trees, four rows (two on each side) are little enough, and three rows on each side are not uncommon. A width of 150 feet would generally be a minimum, but more is usually desirable.

In the case of all boulevards and parkways, houses should be set back 25 feet or more from the sidewalk, and suitable legal methods for securing this should always be adopted at the time of laying out a boulevard or parkway.

Widths of Major Thoroughfares

Widths of major thoroughfares should be determined, primarily by the number of lines of traffic to be carried.

and just fails to carry three lines of moving vehicles abreast, except occasionally when the flow is checked at crossings. It is by no means true, as sometimes stated, that a roadway 60 or 65 or 69 feet wide has no greater capacity than one 56 feet wide. The extra width has some value in permitting higher speeds with a given degree of safety (or vice versa); but there is a marked increase of peak load capacity when the full eight-line dimension is reached, provided the traffic is well regulated. A 74-foot roadway can be installed on a street 100 feet between property lines, but again this allows only 13 foot sidewalks, which for practical reasons, are very narrow for a main thoroughfare, and alongside of a 74-foot roadway look extremely cramped.

An over all width of 110 or 120 feet for an eight-line thoroughfare is very much to be preferred.

A street for which a width of 100 feet between property lines can be secured, and 110 feet is not obtainable at a cost within reason, may be regarded as a potential eight-line thoroughfare, but the actual widening of the roadway to full eight-line width should not be undertaken without the most careful consideration.*

*For further discussion see "Remedies for Street Congestion" by Harland Batholomew, paper before American Electric Railway Association, March 4, 1924, published in Aera for March, 1924, and in Engineering News Record for April, 1924.

Legal and Administrative Methods

The present procedure of legal and administrative methods in opening, widening and improving streets, is fraught with delay—many projects have required from five to ten years between the preparation of the ordinance and the actual completion of the improvement. Legislation should be enacted permitting the city to expedite work in various ways, including early acquisition of title to property in order to insure early completion of work, leaving the litigation to be settled as time will permit. This is the reverse of present procedure under which litigation usually precedes and greatly delays the execution of work. The recommendation above offered would tend to decrease litigation. A detailed legal discussion of procedure now followed and possible remedies is given in Appendix B.

Permanent Assessment Board

The city should be prepared to prosecute condemnation work rapidly. It would seem to be wise, if the city is to enter upon a considerable condemnation program, to enlarge the legal department and to provide for a permanent board for apportionment of damages and assessment of benefits. In other words, there should be a well-functioning mechanism established for expediting this character of work, which today we understand is more or less confused with numerous other activities in certain departments of the city government.

The provision in existing state law whereby 51% of property owners in any given improvement district may, by protest, cause abandonment of any proceeding is not to be found in other states. Abutters have a right to every proper safeguard against unjust or extravagant assessments, but this is a very clumsy device for that purpose, and permits a local group to block an improvement needed by the city at large even when the local assessments might be very small and eminently just.

City Should Take Immediate Possession

One of the greatest difficulties to be met in street openings and widenings in Los Angeles is the increase in cost that has been and may be brought about by land speculation within the thirty day notice required under present state law for public hearing previous to enactment of ordinance and in the often much longer period before the date as of which values are determined. There is precedent in this county and in municipal practice elsewhere for procedure which will meet these conditions. Some means must apparently be found whereby possession may be secured without long public notice of intent.

Taking the large view of the local situation it is evident that the county should possess powers similar to those now existing or here recommended for the city in virtually all city planning activities including the creation of park districts, zoning and street openings. One of the worst drawbacks in accomplishment of important metropolitan projects is the inability of either the city or the county to bring about the opening of streets required for the whole metropolis through small incorporated municipalities which by their very nature are unwilling and usually incapable of viewing public improvements in any way except in a local manner.

There should be state legislation, if found to be necessary, permitting the county as well as the city of Los Angeles to establish building lines upon streets by the condemnation of an easement for a limited period of

years, which legislation might also provide the manner in which the cost of such easement might be defrayed.

Constitutional Amendment Advisable

There is no rule of thumb that can universally be applied in distributing the cost of street opening. Assuming that the city of Los Angeles is to enter upon an extensive program of street opening and widening it is believed that the city should possess all powers commonly possessed or used by other cities undertaking this character of work. With the exception of the power of excess condemnation, Los Angeles appears now to possess adequate legislative authority for undertaking a comprehensive program of street opening and widening. It is recommended that a legislative provision for a constitutional amendment on excess condemnation be prepared.

This power is most important, because when new streets are cut through, there are remnants of lots and uneven parcels not properly usable for building sites left by the present law, which only allows the actual width of street needed for street purposes to be taken. The damage is often so much to these parcels that the city practically pays for the whole parcel, and cannot take the remnant, and must make bad building sites fronting the new improvement.

Many states have by constitutional amendment authorized their cities to take at least enough land in addition to the street width to form well-shaped lots squarely fronting on the new improvement. These include Massachusetts (1911), Ohio (1912), Wisconsin (1912), New York (1913), Rhode Island (1916), and New Jersey (by statute 1870). The simplest of these constitutional provisions is that of New York, which reads as follows:

"Art. 1, Sec. 7. The legislature may authorize cities to take more land and property than is needed for actual construction in the laying out, widening, extending, or re-locating parks, public places, highways or streets; provided, however, that the additional land and property so authorized to be taken shall be no more than sufficient to form suitable building sites abutting on such park, public place, highway or street. After so much of the land and property has been appropriated for such park, public place, highway or street as is needed therefor, the remainder may be sold or leased."*

Revolving Fund Should be Established

Once a complete and comprehensive street plan has been finished, a general program of procedure and orderly financing might be adopted. It should make orderly provision for the raising of the city's share of such costs as may be levied against it. It is here assumed that, generally speaking, costs for street openings will be distributed in part against the city, in part against property abutting on openings and widenings and in part against benefited districts varying in extent according to the character and location of each individual project. The value of a permanent assessment board becomes increasingly evident in this connection in avoiding overlapping and excessive assessments for benefits.

*For further facts on excess condemnation see Williams—"The Law of City Planning and Zoning," Chap. III, page 128; also Chapter in Lewis—"Planning the Modern City."

MAJOR TRAFFIC STREET PLAN



The city should, as soon as possible, establish a revolving fund of several million dollars to use in street opening and widening proceedings so that funds can be deposited in court on starting action and immediate possession be taken of lands and buildings needed, leaving damages to be adjudicated later. This will forestall

much of the unwarranted speculation in lands needed by the city. As assessments are made and collected, the fund will be replenished and can be used over and over again on successive improvements. Saint Louis, in last year's large bond issue, voted \$2,500,000 for this purpose. Other big cities have similar funds.

The Major Street Plan of Los Angeles

Map 1 (frontispiece) shows the plan of the Major Traffic Street System as finally worked out for Los Angeles. It is a comprehensive and well-balanced plan, but has necessarily left numerous matters of detail in various parts of the city to be dealt with later. While possibly falling short in some respects of ideal standards, it was felt more important to aim toward early accomplishment than to undertake more ideal solutions less possible of realization. It should provide adequately for the needs of the city for many years to come, without prohibitive or unjustifiable cost.

The plan is discussed under six headings:

1. Distributor Streets.
2. Radial Thoroughfares from Central Business District.
3. Interdistrict Thoroughfares.
4. Business District Improvements.
5. Truck Hauling Thoroughfares.
6. Parkways and Boulevards for Passenger Automobiles.

1. Distributor Streets

While the present plan attempts to provide through connections for practically all business district streets, these connections will not necessarily prove to be completely satisfactory. Traffic entering or leaving a business district will seldom, if ever, find that the particular location which it seeks in the district is located upon the thoroughfare by which that vehicle approaches and leaves. This leads to much needless circulation and turning of corners within the central area, which adds materially to congestion.

What percentage of traffic movement within this area is thus composed of vehicles "milling around" between approach thoroughfares, point of business transaction, and departure thoroughfares, is impossible of exact determination. Needless to say, such movement is of considerable proportions. It is therefore suggested that four streets of ample dimensions, for which a width of 110 feet is desirable between curbs (sidewalks of 15 to 20 feet in width in addition on each side being provided, either in the clear or arched under buildings), be established on each side of the business district to perform the functions of "distributor streets," as shown on Map 1.

Such thoroughfares if of ample size and located at the edges of the business center, would invite vehicles from

the several approach thoroughfares to sort or rearrange themselves in such a manner as to enter the business district upon that street where the particular business of the vehicle was to be conducted. This would materially reduce the present unnecessary movement in the business district. Left hand turns could be eliminated and right hand turns much restricted. Figueroa Street, First Street, Maple Street and Washington Street are the thoroughfares recommended as distributor streets. Even though the business district of the future be not confined to the area bounded by these four streets, their use for the particular function here described would nevertheless be highly desirable. In fact, a fifth distributor street is recommended through the downtown district in the form of a new east and west crosstown thoroughfare midway between Sixth and Seventh Street, which would be an extension of Wilshire Boulevard. Such a street with eight or ten-line vehicle capacity, would certainly tend to reduce much present unnecessary traffic movement now existing within the central business district. Secondary distributor functions will also be supplied by Boyle Avenue and Hoover-Virgil Avenue.

If a full total width of 150 feet between buildings can be established on these distributor streets, a fire barrier or gap around the business district will be provided that will be of great importance in the proper protection of Los Angeles. Conflagrations such as the disastrous fire of San Francisco in 1906, destroying hundreds of millions of dollars' worth of property, and other more recent fires of large proportion have generally had to burn until a wide street or natural barrier was reached. At Van Ness Avenue, 150 feet wide, the San Francisco fire was brought under control, and even then the 150 foot width was not sufficient to prevent the fire jumping across it in several places. All cities subject to earthquake have to take precautions against the fire menace resulting from the cracking of chimneys and flues in even moderate quakes, and against the more terrible possibility of rupture of the water system (as happened also in San Francisco) making a general conflagration almost impossible to check except with ample fire barriers.*

The important traffic sorting function of a distributor street of approximately 150 feet in width on each side of the central business district, however costly it may be to establish, would thus be doubly justified because of setting up also a most important fire barrier.

*In a letter of June 18th, 1924, the head of the Fire Department says:
"With reference to the distributor traffic loop surrounding the central business district, I do not hesitate to say that such a barrier of a width of 150 feet around such district would be a master stroke in the direction of fire protection.
"Conflagrations usually are attendant to some other catastrophe, as history will show. It is well known that one fire of any magnitude is all that any fire department can successfully cope with at one time. Also, it is well known that in this city traffic congestion may at any time prevent the arrival of fire apparatus at the scene of a fire in time to stop it. When, due to adverse conditions of this kind, a fire has had an opportunity to reach the proportions of a conflagration, no fire department can successfully combat it, due to the great heat attendant thereto which prevents the approach of apparatus and men to points close enough to be effective. In addition, burning brands are carried into the air by the wind that always accompanies a conflagration, which are carried for some distance, and start new fires. Any fire department is powerless when occupied at a large fire, and fires are set by the dozen in the neighborhood. This is the history of all serious conflagrations in this country. On hot, dry days, such as are common in Southern California, these conditions are aggravated and fire may spread with great rapidity.
"For the above reason, any movement looking to the establishment of real fire barriers, such as a clear width of 150 feet would furnish, will meet with my unqualified approval and support.

"Yours very truly,
R. J. SCOTT, Chief Engineer, L. A. Fire Dept."

2. Radial Thoroughfares from Central Business District

The central business district should be directly accessible from all parts of the city. Certain excellent radial thoroughfares now lead directly into this district, such as Glendale Boulevard, Figueroa Street south, Broadway and its connections north and south, Main Street and its connections. Others less wide and direct exist that can be developed more or less easily. Sunset Boulevard is an excellent radial that carries much traffic but whose connections to the business district are not good. Wilshire Boulevard is a splendid radial of metropolitan characteristics which comes to an abrupt end one mile from the business district. Sixth Street, which collects a large part of the traffic from Wilshire, has an abrupt jog, a severe grade, and restricted width, before reaching the business district.

The plan shown by Map 1 represents what is believed to be a reasonable number of street widenings and openings, falling into consideration widths of existing streets, probable traffic requirements and costs involved. Good access to the central business district is afforded from almost all parts of the community either by direct radial thoroughfares or by easy connection therewith through interdistrict thoroughfares.

Of primary importance in this scheme of radial thoroughfares is the proposed widening and extension of First Street. It is proposed to develop this route as at least a 200 foot thoroughfare with a rapid transit line from Caluenga Pass to the business district and from thence eastward to the city limits.

The justification for this plan lies in the need for more direct and adequate access to the central business district from the San Fernando Valley via Caluenga Pass, from Hollywood and from the eastern sections of the city. All of these districts not merely require better access downtown today but will sooner or later require opportunity for rapid transit service. With the exception of these districts there exist today private rights of way suitable for rapid transit routes to most other sections of the city.

The Glendale Avenue to Hill Street tunnel would link well into such a rapid transit system if its grade were lowered from the present plans, at the Hill Street end so as to provide for ultimate extension as a subway in the business district. In addition to the many obvious advantages of this route its effect in revitalizing the north end of the business district and arresting a trend to disastrous shifting would be of incalculable value.

Wilshire Boulevard should be extended directly into and through the business district, as shown on Map 14.

If not so undertaken on a large scale, connections should be made from Wilshire to Sixth, Seventh and Eighth Streets in the vicinity of Hoover Street, as shown on alternate plan (Map 13). See detailed statement in Chapter VII.

The cost of bringing Wilshire Boulevard into and through the central business district has not been estimated. It would be great. Further study of detail will determine its true value. It has numerous great advantages such as providing a much-needed wide, strictly vehicular thoroughfare as a major outlet for the vast volume of westbound traffic, increased street space in the business district, a new and direct strictly vehicular thoroughfare connecting through the eastern part of the city.

Other proposed radial thoroughfares of major importance shown upon the plan are the Inglewood-Rondo Boulevard, to the large southwestern district, now so indirectly served by the existing rectangular pattern streets; the extension of the Pacific Boulevard Route from Long Beach into Adams Street, affording greatly improved accessibility to and from the business district and Long Beach, the next largest city of the metropolitan area; and a new radial thoroughfare to the north from Olive Street, through Elysian Park by tunnel and viaduct to a connection with Dayton Street, and the proposed Arroyo Seco Boulevard at San Fernando Road. These routes are described in more detail in Chapter VII. The desirability of each, despite cost and physical difficulties of construction, would seem to justify their undertaking.

New or improved radial thoroughfares of considerable importance and involving less difficult and costly construction, contained in the plan, are Third Street, Pico and Washington to the west, Chavez Ravine Road and Fletcher-Glassell Avenue to the north, East Eighth to Hollenbeck Avenue, the new Valley Boulevard route, Holabird Avenue and Bandini Boulevard to the east.

3. Interdistrict Thoroughfares

The growth of Los Angeles is not confined to municipal boundary lines. Throughout the metropolitan district there are numerous centers of development within which traffic originates or terminates whose relation to the central business district is more or less remote. These centers are some of a local shopping character, some of an industrial character, and some even of an agricultural character, such as the San Fernando Valley.

A secondary structural element of the major street plan is composed of the thoroughfares connecting these various centers. For convenience they are called "interdistrict thoroughfares." They are to be distinguished from the radial thoroughfares in that they afford inter-communication between parts of the community outside the central business district.

There are few streets in Los Angeles today that afford direct and adequate communication between the various centers of importance other than the downtown business district. There should be as complete a system of direct, wide interdistrict thoroughfares of this character, doing a service similar to that of the radial thoroughfares connecting directly with the central business district.

Map 1 shows as a part of the major street plan the system of interdistrict thoroughfares that might be developed by numerous widenings of existing streets, by extensions, and by new openings. It is proposed, for instance, that to facilitate communication between Hollywood, Glendale, Eagle Rock, and Pasadena, a parallel thoroughfare to Los Feliz Road (Ambrose Avenue) be constructed between Normandie Avenue and Riverside Drive, relieving something of a bottle-neck condition now existing between these two points and segregating passenger vehicles from mixed traffic.

Manchester Avenue, widened and extended, would become an important interdistrict thoroughfare for mixed traffic.

In the eastern part of the city a route is suggested that might be called "Eastern Avenue," affording very desirable direct thoroughfare connection from Pasadena to Long Beach. On the west, Hoover Street

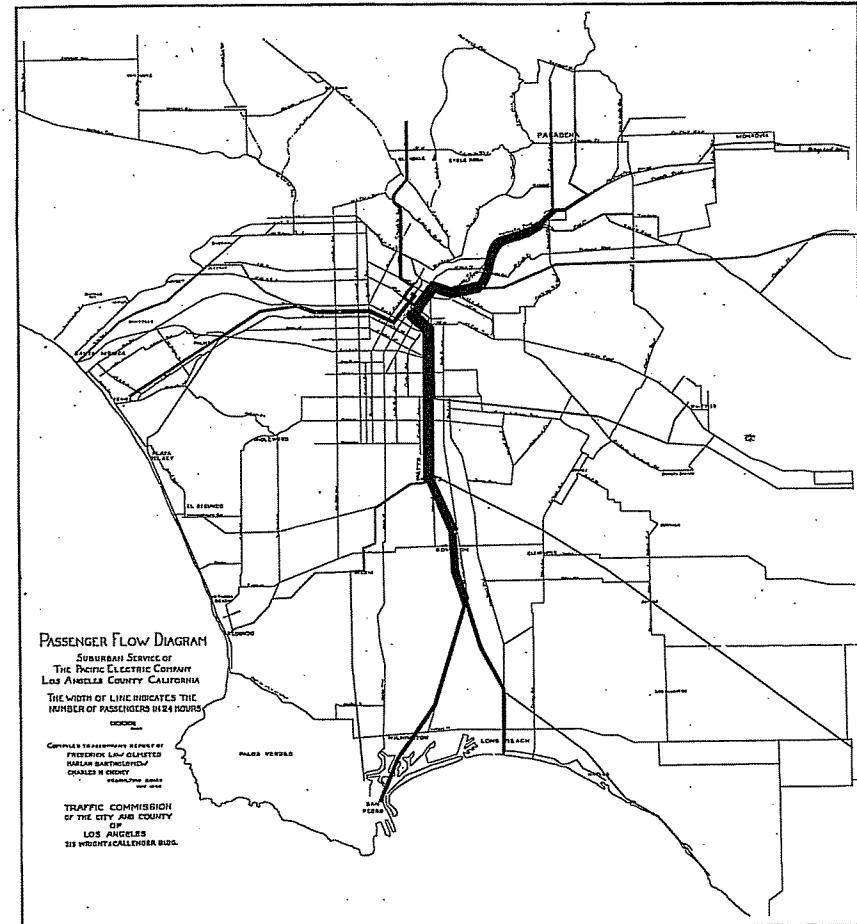


Diagram No. 9—Interurban Passenger Flow on Pacific Electric Railway.

should be extended south into Figueroa Street, and connected north through Virgil and Hillhurst Avenues, to Los Feliz Boulevard. Numerous other interdistrict thoroughfares are shown in Map 1 and listed in detail on page 33.

4. Business District Improvements

In the central business district, the degree of present congestion is due in part to external conditions as well as to conditions within the business district itself. Lack of adequate interdistrict thoroughfares outside of the

business district produces a certain percentage of traffic within the business district having no relation thereto. This traffic cannot now be diverted because of the lack of interdistrict thoroughfares. For this reason certain projects that might be characterized as "by-pass" thoroughfares are here suggested.

The principal interdistrict means of communication between the northeast communities of Pasadena, Alhambra, Eagle Rock, Glendale, and communities to the west and south of the downtown district of Los Angeles

is south of the Elysian Park Hills and through the business district.

Numerous interdistrict thoroughfares shown on Map 1 will afford independent means of communication for some of this traffic, but there will always be need for traffic through this pass in the directions indicated, particularly where such traffic originates or terminates close to one edge of the business district. In other words, there should be opportunity for traffic using this pass to get around the business district without being forced into the congestion at the center.

Two thoroughfares are here suggested. One of these routes, which might be called Fremont Street Extension, would connect with North Broadway in the vicinity of Bernardo Street, follow approximately the line of New Depot Street from College Street to Alpine Street, use North Figueroa Street for a short distance, connecting with Fremont Avenue at Bartlett Street, using Fremont Avenue extended to Seventh Street, connecting with Francisco and thence southward by way of several different streets so connected as to make a continuous thoroughfare terminating at Hoover Street and Exposition Boulevard. This thoroughfare would permit of interchange of traffic between Pasadena and the northeastern section of the city and the west and southwest thoroughfares. Several large improvements now exist that would make construction more or less expensive, and there are several grade difficulties to be overcome, some of which, like that at Sunset Boulevard and First Street, would make street grade separation very desirable. But the important function to be performed by a by-pass thoroughfare such as this is believed to justify its construction.

The other by-pass of considerable importance is San Pedro Street, extended northward to connect with Date Street and to a new bridge across the Los Angeles River connected with Mozart Street at north Main Street. This thoroughfare would permit by-passing of the business district for traffic between the south and the northeast. Except for the expense of bridging the river, it offers no serious difficulties and would undoubtedly be of great value in the general circulation scheme.

Another important aid to greater traffic movement downtown would be the concentration of car lines on fewer streets and the dedication of certain streets to auto traffic only. It is recommended that surface car lines with tracks be gradually limited to the following east and west streets: First, Third, Sixth, Seventh, Ninth, Eleventh, Pico, Sixteenth and Washington Streets; and that the following be cleared of all car lines for auto traffic only: Second, Fourth, Fifth, Eighth, Tenth and also Figueroa, Olive, Los Angeles and Maple Streets.

One of the principles of good circulation within the large central business district is provision for elimination of jogs and dead-end streets. By securing right-angle, or as nearly right-angle, street intersections as possible, the least delay to traffic movement will result. Some of the more important jogs that should be corrected are:

Figueroa and Eleventh Streets.
Figueroa and Ninth Streets.
Figueroa and Sixth Streets.
Hill and Temple Streets.
Third and Main Streets.
Eighth Street and San Pedro Street.
Twelfth Street and San Pedro Street.

Provision for the most direct possible movement of traffic in the business district should be secured. As previously noted, certain very desirable improvements are now under way that will greatly improve traffic circulation by making possible more direct movements in the business district, notably the Tenth Street opening and widening, Fifth Street extension westward, and several openings and extensions to the south such as the proposed Broadway extension to Moneta, and the Hill Street opening just completed.

Between Tenth Street and Washington Street there is most unsatisfactory provision for east-and-west traffic movement at the present time.

Eleventh Street should be opened from San Pedro Street to Crocker Street. Pico Street should be widened, the jog removed at Main Street, and a direct connection made with Fourteenth Street.

Sixteenth Street should be widened and several bad jogs removed, particularly at Figueroa, Hope and Main Streets.

The extremely long blocks between San Pedro Street and Griffith Avenue, between Fourteenth and Eighteenth Streets, should be bisected by extending Stanford Avenue from Fourteenth to Eighteenth Streets, between which streets it is now discontinuous.

Fifteenth Street should be extended from Figueroa to Hope, and from Griffith Avenue to Central Avenue.

A study of roadway and sidewalk widths throughout the business district as shown by Maps 15 and 16, indicates that there is little waste room and until a complete study of transit routing has been made, few improvements of material benefit to traffic movements can now be suggested. The most evident instance of unbalanced roadway widths is that of Fourth Street, which has a uniform pavement width of 40 feet, capable of carrying four lines of traffic throughout its length in the business district, excepting only between Main and Los Angeles Streets, where a 32.7 foot pavement exists, reducing the capacity of the roadway to three lines of movement on this one section. On certain other thoroughfares 46-foot roadways have been constructed that could profitably be changed to 40 ft., thereby allowing six feet more of available sidewalk space without reducing vehicle capacity. There is none too generous provision of sidewalk space in any of the streets in the business district today. Map No. 16 illustrates the principle of roadway widths recommended and the correction of jogs and new openings desirable.

Observation of traffic movement in the business district leads one to the conclusion that there is an undue amount of corner turning. Dead-end streets have much to do with this condition. Unless all streets in the business district are given satisfactory connections with main thoroughfares beyond the limits of the business district, there will always be more or less unnecessary traffic movement in the business district through vehicles attempting to reach, while still within the congested area, a particular street which it is desired to use beyond the confines of the business district. Establishment of the wide loop of distributor streets recommended above will remedy this.

5. Truck Hauling Thoroughfares

As the City of Los Angeles continues to grow and as industrial development becomes greater, there will be need for numerous well-defined trucking routes. An

attempt to create a thoroughfare of this character has already been made in the form of the Harbor Truck Boulevard. The purpose of this latter thoroughfare is precisely of the nature here discussed, but a serious mistake was made both in the location and width of its route. It parallels the railroad so closely as to interfere with industrial expansion at a point where such expansion would most naturally be expected and desired. The problem of providing proper access to the harbor, as well as for proper distribution of traffic within the harbor district for traffic of the heavy motor truck variety, is second only to the problem of street traffic congestion in the central business district. As industrial expansion takes place and heavy truck traffic increases, the present thoroughfare deficiencies of the harbor district and approaches will become increasingly evident. Here is one of the city's most splendid opportunities for constructive city planning in creating a well arranged plan of thoroughfares of adequate width previous to the time when the erection of buildings and the construction of various other improvements will make the realization of this plan a tremendous financial burden to the community.

Santa Fe Avenue Main Industrial Highway

To create at least one wide, direct thoroughfare from the harbor to and through the principal industrial warehouse sections, it is recommended that Santa Fe Avenue be widened to a ten-line thoroughfare (minimum of 94 feet between curbs) with an extension northward to College Street at Broadway and to the river, and also southward parallel to and one block east of the railroad, as indicated on Map No. 1, for direct connection to the harbor. This route would be the main industrial highway of Los Angeles. Certainly a ten-line traffic capacity is none too ambitious an objective for a thoroughfare of such great future importance to industrial development of the city. Few opportunities for thoroughfares of this character now exist. Traffic counts show today a larger proportion of trucks on Santa Fe Avenue than on any other street.

The New River Truck Speedway

Another strictly trucking thoroughfare of great importance is the proposed River Truck Speedway—a direct connection from the San Fernando Valley through the industrial districts to the harbor. The route follows the valley of the Los Angeles River (the greatest potential industrial section of the whole metropolitan area) throughout its length. From Burbank

to approximately Dayton Street it would traverse the level lands adjoining the river west of San Fernando Road and the Southern Pacific tracks. Because of the impossibility of new street openings across railroad lines and heavy traffic streets between Dayton Street and Washington Street, it is proposed that use should be made of the bed of the Los Angeles River. South of Washington Street this route would emerge from the river-bed to the west bank, which it would follow to the harbor. (See Map 1 and detailed discussion in Chapter VII.)

An East Side Trucking Street

A third trucking route is recommended in the rapidly developing industrial section on the east side of the Los Angeles River. This would follow the edge of the flat at the base of Boyle Heights bluff, passing under the main east and west streets. It would connect with Boyle Avenue at Aliso on the south, and would connect with the River Truck Speedway just south of Aliso Street.

Slauson Avenue is an established east and west trucking way and should be enlarged to a minimum of eight lines of vehicles (74 feet between curbs).

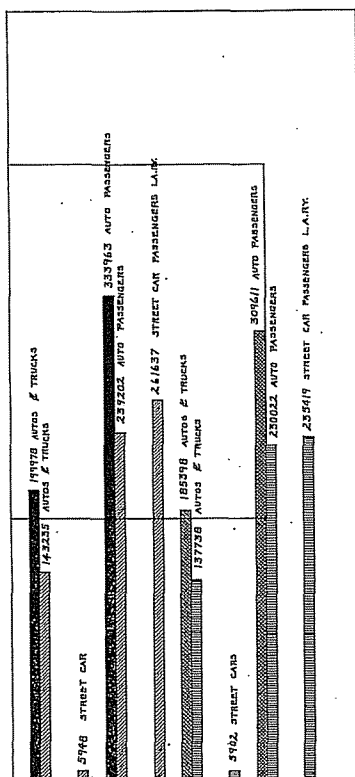
6. Parkways and Boulevards

While no complete system of parkways and boulevards (for passenger vehicles only) has been worked out in the present study, certain streets of this character with an important traffic function have been noted by a distinctive designation on the plan and described in detail in Chapter VII, including Wilshire Boulevard, West of Crenshaw Boulevard; the Hollywood-Palos Verdes Parkway via Cypress Avenue, Mesa Drive, Crenshaw and Cahuenga Avenue; Los Feliz Boulevard and Franklin Avenue; Riverside Drive; Silver Lake Parkway; and Arroyo Seco Parkway. These links should be extended and connected up with others in relation with a comprehensive park and boulevard system. This is one of the parts of the Los Angeles City Plan most important to be studied out at an early date.

Beverly Boulevard An Important Radial

This boulevard is most important as a radial thoroughfare connecting with First and Temple Streets near Virgil Avenue. It should be extended westward through Beverly Hills to Santa Monica to form another through outlet to the beaches, and should be not less than an eight-line thoroughfare, 74 feet between curbs (100 to 120 feet between property lines).

PARKING SURVEY COMMITTEE,
R.W. PRIDHAM - CHAIRMAN,
BOARD OF PUBLIC UTILITIES
CITY OF LOS ANGELES
FRED A. LORENZ - CHIEF ENGINEER



SCALE - 1 inch = 4000
 ENTIRE DISTRICT - INBOUND
 CONGESTED DISTRICT - INBOUND
 ENTIRE DISTRICT - OUTBOUND
 CONGESTED DISTRICT - OUTBOUND

CHART SHOWING RELATIVE TRAFFIC FLOW.

NOVEMBER 1925
 FROM 7 AM. TO 6 PM.

Detailed Improvements of the Major Street Plan

Detailed improvements of the Major Street Plan are given below, without relation to the order of their importance, or to the time for carrying them out. An index alphabetically arranged is given at the end of the report.

1. DISTRIBUTOR STREETS

Figueroa Street (from First to Washington)

Figueroa Street is, because of its situation with good north and south connections, the logical north-south distributor street for traffic coming in from the west. A width of 110 feet between curbs is desirable, with a twenty-foot sidewalk on each side, which may be arched under buildings. A total width of 150 feet between buildings if obtainable, would form a very important fire gap or barrier for the west side of the business district. The widening may be made on one side of the street, or both, as may cause the least expensive building damage. Slight bends or angles in direction would be permissible to avoid such monumental buildings as the Cathedral and the Friday Morning Club. A few such bends already exist. They will not noticeably interfere with the usefulness of the street, and would add to the architectural effect. Car lines should be removed, Flower Street becoming the parallel car line street on the east, and Fremont Street extended, the through automobile by-pass street on the west. See Map 16.

Washington Street (from Figueroa to Maple)

Washington Street is desirable as the distributor street on the south end of the business district, and should have a 110-foot roadway between curbs, with proper sidewalks, from Figueroa to Maple. Such a width, in addition to its important traffic function, will form an effectual fire-break on the south of the business district. See Map 16.

Maple Street (from Washington, extended north to First)

A wide distributor street on the east of the business district with 110 foot roadway between curbs is very desirable. Maple Street has been selected because it is not too far away from the present business center and since its continuation forms a good outlet for traffic south of Washington Street. The plan contemplates extending Maple Street thus widened, north from Sixth Street to the intersection of Wall and Third, thence north to the center of the blocks between Los Angeles and San Pedro Streets to about 100 feet north of First Street, and thence diagonally into Los Angeles Street, including a widening of Los Angeles Street to 110 feet between curbs, thence northerly to the Plaza. While it is intended that First Street shall act as the northerly distributor street at the upper end of the business district, it is important that Maple Street, with its extension through upper Los Angeles Street, be kept a wide by-pass thoroughfare around the civic center to connect with Sunset Boulevard and North Main Street. If the Union Depot should finally be located as planned at this end of town, Los Angeles Street, thus widened, would become the west boundary of the depot plot and

with North Main Street would give much needed street capacity by the station, relieving the pressure which would otherwise exist for invading the civic center with through traffic. See Map 16.
 First Street (from Figueroa to Maple Street, extended)

First Street offers the most practical location for a distributor street and main crosstown thoroughfare at the north end of the central business district.

Sunset Boulevard, with its prospective easterly connection into Macy Street, is separated from the main business district by the hilly area set apart for the Civic Center. To carry the traffic of all the north and south streets of the business district in and out of the northern distributor and cross town artery through this area would inconvenience that traffic and be bad for the Civic Center, also for the traffic of the Union Station if and when it is built here, and for the traffic to and from points further north which *must* flow through this neck.

Second Street, while it will always be an important line, is limited in capacity by the size of its tunnel and by the business buildings which line its 60 foot width east of Hill Street, making any increase of width very costly. Also it is needed as a direct intown connection for the heavy radial travel through Glendale Boulevard.

On First Street the city is acquiring for the Civic Center all the property on the north side from Hill to Main except the Times Building, which latter will presumably be rebuilt during the development of the Civic Center and by a suitable exchange of land with the city would be set back at that time, so as to effect a liberal widening of First Street from Hill to Main Street at minimum of cost. A width of 150 feet is desirable for First Street from Hill to Maple Street, extended.

The property along First Street from Hill to Figueroa and westward is relatively inexpensive, and it would be practicable, by taking a whole row of lots, to provide a two-level street, one part of which could rise over the hill substantially like the present street to connect at grade with the north-south streets on the hill, while the main road would go through on easy grades, not in a costly and unpleasant tunnel, but in an open cut of ample width bridged by the north and south streets from Olive to Flower inclusive. Figueroa would pass under it as a part of the improvement of Figueroa grades, and it would pass over Fremont as a part of the improvement of its own grades, but with ramps to facilitate interchange at one or both of these crossings. Similarly at Glendale Avenue, First Street should be carried over, with a marked improvement in its grades and avoidance of congestion, while providing interchange connections at substantially the present grades. The northwesterly and westerly connections are or can be made excellent, via Glendale Avenue, Alvarado Street, the northern extension of Hoover Street (Commonwealth Avenue, Virgil Street and Hillhurst Avenue) Beverly Boulevard, and a diagonal direct to Hollywood and Cahuenga Pass which is discussed below, all of which are important attributes to a good distributor street. See Map 16.

MAJOR TRAFFIC STREET PLAN

2. RADIAL THOROUGHFARES FROM THE CENTRAL BUSINESS DISTRICT (See Map 1)

North Figueroa Street (above First Street)

One of the most important of traffic relief items is the widening and extension of North Figueroa Street as an 8-line thoroughfare (normally 74 feet between curbs) beginning at First Street, north across Sunset Boulevard, through New Depot Street, diagonally into Yale Street, and northerly through Elysian Park, with short tunnels and viaducts, to a point directly opposite the end of Dayton Avenue. A new high level bridge across the river, also over Avenue 20, would take it into Dayton Avenue, which should also be widened to an 8-line thoroughfare into Pasadena Avenue, and continue at this uniform width to the city of Pasadena. This will afford a direct outlet to Pasadena over the shortest route at easy grades. The city already owns most of the right of way for the new portion through Elysian Park, and while some heavy construction is necessary, it will form one of the greatest and most important connections or by-passes for Pasadena traffic, to all that part of the city immediately west of the business district.

Chavez Ravine Road

By extending North Figueroa Street, above College Street, as a 6-line thoroughfare, 54 feet between curbs, through a short tunnel into Chavez Ravine Road, a valuable outlet to Riverside Drive and connection to Glendale is opened up. This road exists today and can easily be widened the full length. The tunnel is the only expensive part of the route.

Sunset Boulevard

Sunset Boulevard is one of the heaviest travelled thoroughfares of the city and one of the few of adequate width, except for two short distances, namely between Hillhurst and Vermont and from Hayvenhurst Drive westward in Beverly Hills, where it should be brought to a uniform width of 74 feet between curbs.

Hollywood Boulevard

Hollywood Boulevard is the direct radial extension of Sunset Boulevard, west of Hillhurst, as well as the main street of Hollywood. It should be widened to a minimum between curbs of 74 feet, from New Hampshire to Gower Street and from La Brea to Laurel Avenue, and extended diagonally southwest to meet Sunset Boulevard near Hayvenhurst Drive.

Temple Street

Temple Street is one of the oldest established thoroughfares, and an important traffic outlet. It should be widened to an 8-line thoroughfare, with a minimum of 74 feet between curbs, from the civic center west to Virgil Street, and to a direct connection with Beverly Boulevard. When the civic center is completed it will form the western approach.

Glendale Boulevard

Glendale Boulevard, with Second Street from Figueroa Street west, should be widened to an 8-line street (normally 74 feet between curbs) and grades arranged to pass under First Street. An early separation of grades at the crossing of the Southern Pacific northeast of the river is imperative, both to eliminate danger and to avoid delay. Glendale Boulevard is already one of the heaviest traveled radial thoroughfares of Los An-

geles and traffic is sure to increase on it, with the growth of Glendale and the easterly part of the San Fernando Valley.

Allesandro Street

Allesandro Street is a valuable cross connection from Glendale Boulevard, at Fargo Street to Riverside Drive and the new River Truck Highway and should be widened and extended for this distance as a 6-line thoroughfare with a minimum of 56 feet between curbs. While eventually it may be advisable to extend it with a bridge across the river and by viaduct or subway across the railroad yards and Southern Pacific main line, San Fernando Road and the Montrose Railway, into Hallett Street and Verdugo Road, this extension was abandoned (temporarily at least) for the Fletcher Avenue route, which would accomplish much the same purpose at lesser cost.

Fletcher Avenue and Fletcher Drive

Fletcher Avenue and Fletcher Drive is a most important new thoroughfare connection, leaving Glendale Boulevard at a point one block east of Farwell Avenue, cutting northeast into Riverside Drive, so as to produce a good grade through Fletcher Avenue into a new bridge across the river, and into Glorietta Street to an under pass of the Southern Pacific Railroad, continuing through Fletcher Drive and a diagonal extension thereof to connect with Glassell Avenue and Verdugo Road. It thus forms a most valuable new route for Eagle Rock and Pasadena traffic. It should be an 8-line thoroughfare (normally 74 feet between curbs).

First Street Diagonal Extension to Hollywood

One of the most important and necessary improvements in the City Plan is the widening of First west from Figueroa Street to Hoover, and its extension, in practically a straight line, diagonally northwest to connect with Cahuenga Pass.

To serve the combined purposes of a rapid transit route and a trunk line boulevard for vehicular traffic, wide enough not merely to give large traffic capacity but to include permanent shade trees and ornamental features, there appears to be ample justification for such a radical and costly proposition. The route indicated on the plan is purely diagrammatic. That and the width, which could hardly be less than 200 feet and probably ought to be more, must be dependent on further studies of the rapid transit problem and careful estimates of cost under alternate plans of treatment and routing. The plan for a diagonal boulevard such as this was originally put forward by the Automobile Club in the report of 1921 prepared by Mr. Lippincott.

It would be difficult to overestimate the volume and importance of the combined radial traffic of Hollywood and Cahuenga Pass to and from the central district, and points eastward best reached by this First Street extension. Nevertheless, considering only automobile traffic, and recognizing the high cost of opening such a diagonal through a district extensively built up with residences of more than average price, it might be questionable to embody such a diagonal in this program of street openings. But consideration of the future rapid transit needs of the whole metropolitan area, makes it seem inevitable that to serve Hollywood and a great part of the San Fernando Valley there must be provided, sooner or later, a high-speed, rapid transit line from the central business district through Cahuenga

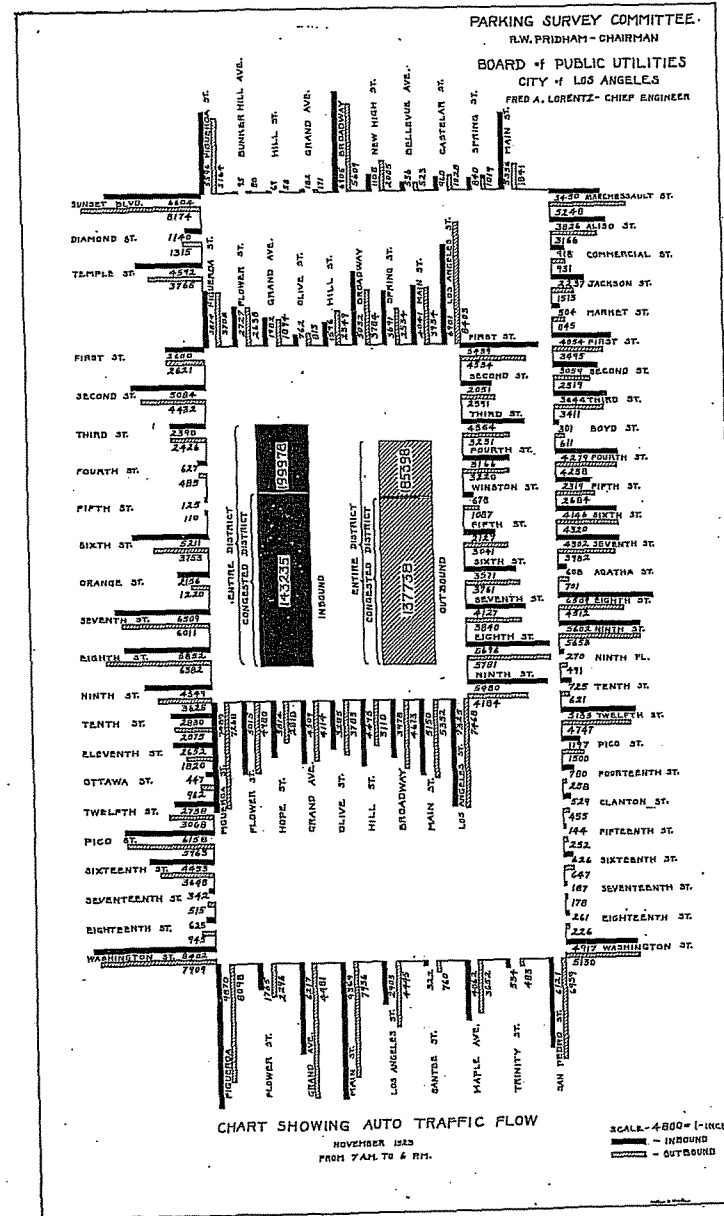


Diagram No. II.

Pass on lines much shorter and straighter than any existing streets. To do this by deep tunnelling without interfering with surface improvements, as in the case of the London "tubes," would almost certainly impose a heavier economic burden on the community than to open a boulevard in which a rapid transit line could be carried, either depressed in open cut or elevated, so as to avoid all grade crossings.

This First Street line could connect with the rapid transit tunnel now under construction from Glendale Avenue near First Street to the Hill Street Station, and the possibility of linking this tunnel into an extensive system of rapid transit lines emphasizes the shortsightedness of one great defect in the present tunnel plan, namely: that it meets Hill Street at grade, blocking all possibility of its extension either eastward or southward in subway through the business district without very costly and difficult reconstruction after the line is in operation. It is not yet too late, at this writing, to correct this error by lowering the grade of the Hill Street end of the tunnel to a subway terminus.

First Street Extension (East of Maple)

A broad superstreet for both a very large automobile traffic and future rapid transit is also necessary through East First Street turning into East Fourth Street east of the river and continuing to Montebello.

East of Maple Street, a possible alternative to widening and improving First Street, which is here locally serving an industrial and wholesale district and has some large and costly buildings on both sides, making it costly to widen even by arcing, would be to open a new street almost exclusively for through traffic, through inexpensive structures and vacant land lying to the north of the large First Street buildings, rejoining the line of First Street at the viaduct.

First Street Viaduct

Funds being now at hand for rebuilding the First Street viaduct, and any final determination upon the large project for the First Street extension described being impossible to reach promptly, it is a matter of grave concern to proceed with the First Street viaduct in a manner not unduly complicating the situation. The new viaduct needs to be wider and its approach on a better grade than the present one, which rises within the limits of the unwidened street and yet keeps open, after a fashion, an approach at grade to Santa Fe Avenue and the Santa Fe Station south of the ramp, and a narrow lane on the north side, all within the limits of an 80 foot street.

It is important to provide for the ultimate extension of Santa Fe Avenue northerly into Vignes Street as a truck hauling thoroughfare, passing under the First Street viaduct approach. It is essential to maintain good access to and from the Santa Fe passenger station from First Street as long as it remains in its present location. The best plan, therefore, would seem to be:

- (1) The acquirement of the lots on the north side of First Street from Center Street at least to Vignes.
- (2) The widening of First Street in that block to approximately 150 feet.
- (3) The construction in the middle of the widened street of a viaduct approach with a roadway of approximately 56 feet, beginning to separate grades at Vignes Street.

(4) Leaving a good one-way street at the present street level on each side of the viaduct approach with an under-crossing to connect them under the viaduct near the line of Center Street and the Santa Fe Station.

Traffic approaching the Station from the city would reach it at grade on the south side of the viaduct on the present street grade undisturbed. Traffic leaving the Station for the city would pass under the viaduct and turn left on the north half of the lower level of the widened street. The same under-pass would carry Santa Fe Avenue, when extended north to reach the Vignes Street route past the gas works.

First Street Extension (east of the river)

An excellent, adequate, and immensely valuable eastern outlet can be provided by cutting a new wide boulevard through cheap property from the east end of the new First Street bridge over the river to the angle in East Fourth Street on Boyle Heights, widening East Fourth Street, connecting it with East Third Street at the City boundary and widening East Third Street eastward into the County, with a branch through the proposed East Beverly Boulevard (on which the County is already securing some dedications, although at an insufficient width) leading to Montebello and Whittier.

The First Street Improvement as a Whole

First Street so treated and so connected, would serve admirably; first, as a north end distributor for the business district; second, as a much-needed east and west crosstown route serving the whole north-central part of the metropolitan area; third, as a dignified, agreeable and rapid route of approach to the heart of the city from the northwest and from the east, now most lamentably lacking; and fourth, as a through route connecting the San Diego roads and the San Francisco roads, passing between and immediately adjacent to the central business district and the Civic Center but without congesting either of them.

One reason for preferring the First Street connection eastward into East Fourth Street to the proposition of concentrating on Second Street and building a viaduct to connect the latter through Traction Avenue with Whittier Boulevard at Boyle Avenue is that the latter would tend to deflect into the extreme north end of the business district a good deal of Boyle Heights traffic really bound to points in the business district south of Fourth Street, making for needless congestion and inconvenience.

West Third Street

Another direct through east and west artery of travel is needed between First Street and Sixth Street, and as a tunnel has been built through Third Street from the business district to the west this street should be extended and opened as a six-line thoroughfare (normally 56 feet between curbs) west of Figueroa Street to Beaudry Street, thence diagonally into Crown Hill Avenue to Columbia Street, and through in a straight line to link up with Ocean View Avenue at Burlington Street, following this avenue to Alvarado Street, and thence cut through in approximately a straight line to Hoover and Vendome Streets, thence west in a straight line to link up with Third Street as it now exists at Vermont Avenue. From Vermont west the same width of roadway should be established and the street extended through to a connection with Santa Monica Boulevard. The city engineer's office has already mapped out this line.

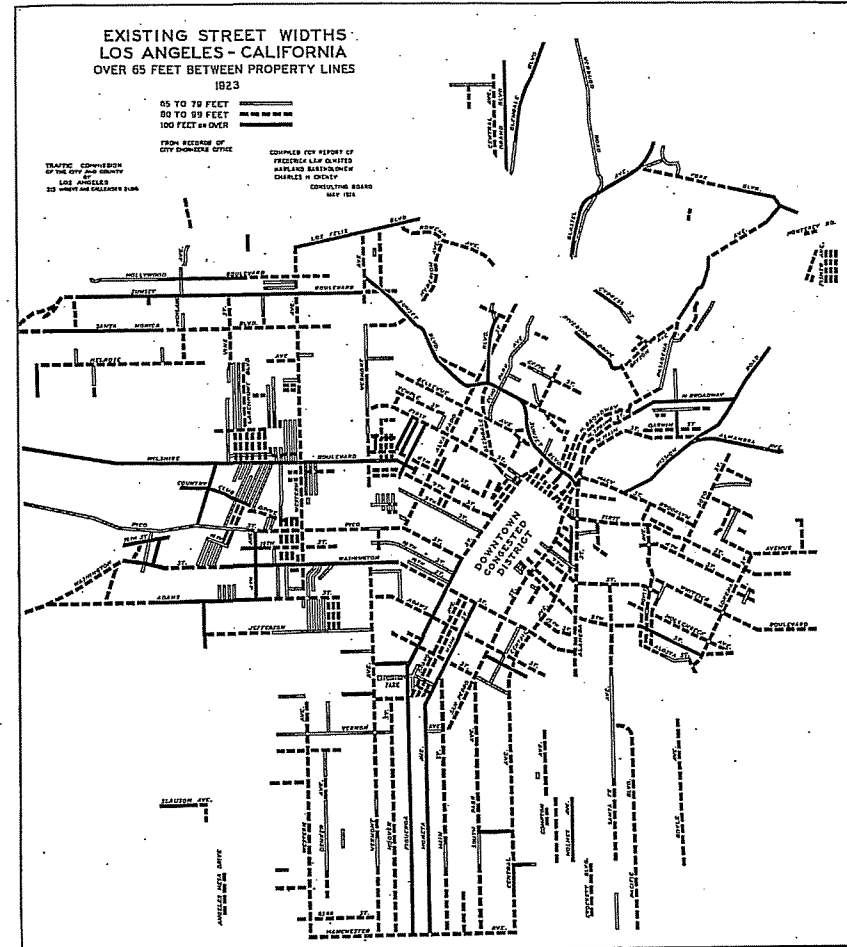
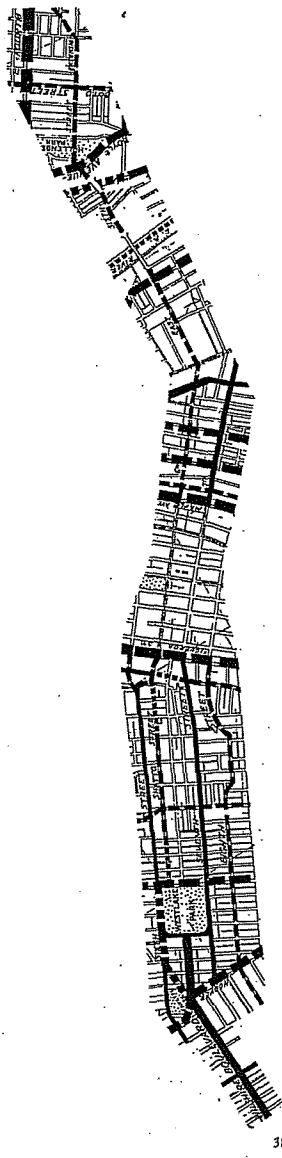


Diagram No. 12.

East and West Routes between the Westlake Park District and the Central Business District

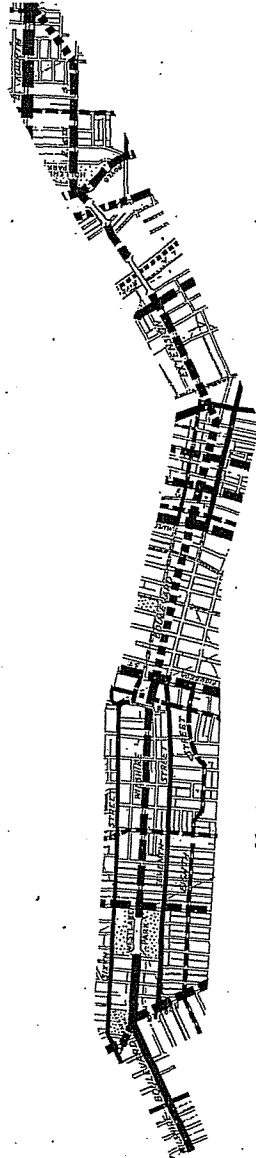
The largest and most rapidly growing high class residential district, least cut off from the central business district by intervening developments of a character foreign to both, lies to the west of Westlake Park. Under such conditions there is a strong, legitimate

tendency toward the growth of the high-class retail trade, in the direction of this high purchasing power, developing heavy tides of street traffic, especially passenger automobile traffic, in and out of the central business area. The most satisfactory development of this sector is one which provides numerous radial thoroughfares of good capacity and which facilitates a con-



Map No. 13—Alternate Plan for Handling Wilshire Boulevard Traffic.

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Map No. 14—Recommended Plan of Wilshire Boulevard Extension Across Town.

tinuous and gradual outward growth of the business district.

On the east, north, southeast, northeast, and northwest, the central business section of Los Angeles is hemmed in by intervening districts of alien character (wholesale, semi-industrial, etc.), separating it from the outlying residential districts, and in those quarters the best that can be done is to provide adequate radial thoroughfares bridging the gap from retail center to the purchasing power in the home neighborhoods beyond. To the south and southwest absence of topographic difficulties makes for a broad, steady, continuous and conservative expansion of business uses in contact with great sectors of middle class residential development and small industries.

To the west, in the sector now under consideration, where broad continuity of development is in many ways most important, serious topographical difficulties (and the defective thoroughfare plan which has resulted from them) give rise to a situation of grave danger to the city as a whole as well as to the property owners in this intervening sector, to those of the central district and to those of the outlying Wilshire district.

Seventh Street is the only thoroughfare in this sector which has even tolerably good lines and grades, and those are none too good. Orange Street is steep, narrow and blocked at both ends. Sixth Street is steep, crooked and in part very narrow. Eighth Street is crooked, narrow and dangerously close to absorption by another class of occupation lying to the south. The opening of Fifth Street west from the central business district to connect with Sixth is good in plan, but without wholesale regrading, its 10 per cent grade will make it ineffective. North of Fifth Street, no direct outgrowth of the central district westward seems possible.

The situation can be successfully met only by a bold and wholesale operation dealing with the entire district from Fifth to Eighth Street. The cost will be large under any reasonably effective plan but the values at stake for all concerned are enormous and cannot possibly be conserved by a policy of tinkering, half-way measures affecting one street at a time. Nothing will do the business short of a radical and almost simultaneous regrading of practically all the streets between Fifth and Eighth, from Figueroa to the vicinity of Lucas, together with certain openings and widenings.

The City Engineer has prepared profiles for the Fifth Street extension and its continuation on the present Sixth Street west of Boylston, which, in order to reduce the wholly impracticable grade of 10 per cent to a little over 4 per cent, involve a maximum cut at the summit on Sixth Street of about 25 feet, affecting all the entering streets for some distance back. There is a strong demand from abutters and the general public for reduction of the grade of Seventh Street. It would be a serious matter, alike for the city and for the property owners specially concerned, to let slip the opportunity for making efficient thoroughfares out of the two streets which now run continuously through this critical area, which is afforded by the present transitional condition of property here. But also it would be a calamity to make these two improvements, and all the resultant grade changes which they would involve on connecting streets, without at the same time radically improving the rest of the street grades and forming the necessary additional thoroughfares.

Assuming, then, radical and general regrading as a

certainty, two special thoroughfare plans are presented for this district which may be regarded as either alternative or supplementary—first, via Sixth and Shatto Streets; or, second, Wilshire Extension across the business district to Boyle Heights.

Sixth Street Shatto Street Improvement (alternative plan)

The first (shown on Map 13) would provide a new business thoroughfare in continuation of downtown Sixth Street from Figueroa, by widening and improving the grade of the present Sixth Street from Figueroa to Loomis, removing the jog at Figueroa, extending in heavy cut, with or without a short tunnel through the hospital property, into Shatto Street, widening Shatto Street which now has good grades, and extending it to Alvarado Street near Sixth. The Sixth Street carline would be transferred to this new thoroughfare, making Fifth Street extended and its continuation by the present Sixth Street from Boylston to Alvarado an automobile route free from car tracks. From Alvarado Street, either as a part of the original improvement or at a later date when the additional investment would be justified by the combined volume of street car and automobile traffic past the north side of Westlake Park, the street cars could be carried in a short subway, entered by an incline east of Alvarado Street and passing under Alvarado Street and the northeast corner of the park, along the north side of the park under the south sidewalk of Sixth Street widened into a terrace overlooking the park, and under Sixth Street west of the park to subway exits in Rampart Boulevard and in Sixth Street (suitably widened) just beyond Benton Boulevard. A short connecting roadway across the southeast corner of Lafayette Park and the now vacant southeast corner of Sixth Street and Benton Boulevard would then provide a direct automobile thoroughfare without car tracks and on reasonable grades in continuation of Wilshire Boulevard to Pershing Square and to Olive Street which is clear of car lines and capable of being made into a very important north and south route. (See Olive Street improvement, page 42.)

The traffic of Wilshire Boulevard to and from points south of Seventh Street would go via Eighth Street straightened and widened, which would be conveniently reached by the proposed widening of Hoover Street. The flow between Seventh and Wilshire Boulevard would be facilitated by rounding the two right angle corners as shown. Under this plan Orange Street would be widened only slightly and much improved in grade toward its east end, and would continue to develop as a local business street, as would the other adjacent streets. East of Maple Street in this latitude a new viaduct in continuation of Sixth Street, connecting with a widening of East Sixth Street in Boyle Heights and a diagonal crossover to East 4th Street would provide a valuable outlet to Boyle Heights and the country beyond, as shown on Map 13.

Wilshire Boulevard Extension Across Town

The second and more thoroughgoing plan for solving the traffic problem in this district in a big and substantial way is to extend Wilshire Boulevard eastward across Westlake Park and through Orange Street widened and extended, straight across town between Sixth and Seventh Streets to Central Avenue, thence connecting with East Sixth Street and a new bridge across the river to East Sixth in Boyle Heights and East Fourth Street, as shown on Map 14.

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There has been much talk of a bridge across Westlake Park and a widening of Orange Street from its present width of 60 feet to 70 feet as a continuation of Wilshire. Such a plan as that seems absurd except as a means of pulling local chestnuts out of the fire. To carry Wilshire Boulevard across Westlake Park, even with the utmost skill and lavish expenditure upon the proposed bridge would work great injury to the park, which is one of the very few and very precious good local parks of the city. To do this at great expense only to dump the Wilshire Boulevard traffic in Alvarado Street opposite a sixty or seventy-foot street which dead-ends at Figueroa, we believe would be wholly unjustifiable and would afford little relief to the traffic conditions. If, however, Orange Street were to be adequately widened and improved in grade, giving space for at least eight lines of vehicles (normally 74 feet between curbs) as a proper continuation of Wilshire Boulevard, and extended eastward across Figueroa Street into and through the central business district between Sixth and Seventh Streets, with a direct continuation to Boyle Heights, the city would have in this cross-town Wilshire Boulevard an asset of such value as might well justify its cost in money, as well as the sacrifice of local park values.

As far as Hill Street and east of Spring Street the buildings which stand in the way and the value of the land required are surprisingly little in comparison with the direct public benefit of such a thoroughfare and the exceptionally high value of the new business frontage and corners which would be created. From Hill to Spring Street inclusive the cost of such an opening would be very great, but again the value of the new frontage and of securing *one* adequate cross-town street, free from street cars, in the heart of the business district, a street comparable in many of its functions with Fifth Avenue in New York, and with Michigan Boulevard in Chicago, would be almost incalculably great. The value of having Wilshire extended through Boyle Heights would also be great and tend to rejuvenate that whole section of the city.

Eighth Street

As an important non-carline auto traffic street, Eighth Street should be widened to a six-line thoroughfare (56 feet between curbs) from Figueroa Street west to Van Ness, cutting off the bad jogs at Golden Street, Valencia Street and Western Avenue. East Eighth Street should be straightened at San Pedro and widened east of Central Avenue as a six-line thoroughfare, cutting through the short gap from Wilson Street to Mateo, and extending through ultimately by a new bridge across the river, to connect with Hollenbeck Avenue, already 80 feet wide all the way to Mines Avenue.

Tenth Street

Officially ordered widened from the center of the city to the west-city limits with a uniform section of 100 feet, Tenth Street will be one of the greatest central thoroughfares of Los Angeles. Easterly, Tenth is opened into Ninth Street at San Pedro and forms a great traffic artery connecting across the river with Mines Avenue and Telegraph Road. On the west end, this improvement as now planned runs directly past the Los Angeles High School at Rimpau Boulevard without enlargement of capacity. There is today serious congestion and danger here, when the large number of pupils leave the school in a body by automobile and

street cars. These conditions will be greatly exaggerated when the street improvement is completed and turns a great volume of general through-street traffic by this point.

A better plan would have been to carry the route through Tenth Street extended so as to join the line of Country Club Drive west of the High School, leaving a triangular park of now vacant land between the thoroughfare and the school. If at this late date such a change cannot be made, at least the street ought to be widened in front of the High School into a liberal traffic plaza so as to disentangle the through traffic from the business of loading and unloading high school pupils.

Pico Street

Pico Street is a through route from the downtown district to Santa Monica. It would be advisable to make it an eight-line thoroughfare (minimum of 74 feet between curbs) from Figueroa Street west. The extension and straightening of this street across the business district eastward from Main Street is also important, with a minimum width of 56 feet between curbs east of Maple Street to Stanford Avenue, cutting thence diagonally across to Fourteenth Street and Griffith Avenue, and continuing on East Fourteenth Street, widened and cut through from Willis to Santa Clara, and into McPherson Street, where it should connect through under passes of the railroads, with the proposed new River Truck Speedway in the bed of the Los Angeles River, and continue under the Union Pacific line on the east bank to meet the new Eastside Truck Highway at the foot of the bluffs below Boyle Heights, and thence southeasterly into Alosta Street, giving access to the new industrial district and railroad yards.

Sixteenth Street

In the central district, East of Figueroa, 16th Street is the only continuous east and west street between Pico and Washington, a distance of nearly half a mile. It is narrow, has bad "jogs" in it, and carries two lines of street cars, but in spite of these drawbacks the absence of other through streets for such a distance north and south induces a surprisingly large volume of vehicular traffic to use it, with a corresponding mutual interference between this traffic and the street cars. It seems clearly desirable to remove the jogs in this section and to widen the street so as to provide at least eight lines of traffic (74 feet between curbs). West of Figueroa to Hoover such widening is but little less important.

West of Hoover the place of 16th Street in the major highway system is not so clear. It now carries the main Pacific Electric line to Vineyard and west beach points. Ultimately this line must be replaced by a proper rapid transit line for high-speed train service, whether on this route or some other. If it is to remain here as an elevated or depressed line, 16th Street ought to be very much widened; otherwise 16th Street would become a vehicular thoroughfare of rather secondary importance, paralleled as it is by Pico and Washington within a quarter of a mile on each side. Those are, however, car track streets and will probably remain so. With the possible removal of the P. E. tracks from the surface of 16th Street it would draw a good deal of vehicular traffic to itself.

It is to be noted, also, that west of Vineyard, Pico and Washington Streets spread very wide apart and

that with the development of the great wedge of territory between them an unusually large amount of radial traffic is likely to be concentrated by topographic conditions toward the point of the wedge, so that the development of 16th Street as a vehicular thoroughfare and its extension into this wedge as an extra line between Pico and Washington would have more justification than would ordinarily exist for an intermediate thoroughfare between two existing main routes half a mile apart at this distance from the center. At Sherman Drive the grade should be lowered to pass under Sherman Drive and continue east at the grade of the P. E. If then the study of the transit problem shows that the P. E. tracks should remain on 16th Street and ultimately be put above or below grade, the street ought to be widened with reference to the construction of such a rapid transit line; if otherwise it should probably be widened to an eight-line thoroughfare and extended past Vineyard to connect with Venice Boulevard and a new route via Cattaraugus Street and through the hills into National Boulevard. The best method of extending 16th Street past Vineyard again depends on the future rapid transit plans.

Washington Street

At present the most important through route to Venice, with also a heavy local traffic from the west side of town, Washington Street should be widened to an eight-line thoroughfare (74 feet minimum between curbs) from Figueroa Street to one block west of Hoover, and for the various stretches from there westward not already established this width. Washington Street should also be widened easterly from Maple Street to a width of 74 feet between curbs, and extended this width from Alameda Street eastward to a new bridge and viaduct across the river into Mines Avenue and East Ninth Street, and to a connection with Anaheim-Telegraph Road.

Adams Street—Long Beach Boulevard

An important thoroughfare to the west, Adams Street should be widened to not less than 74 feet between curbs from Broadway west, and extended this width across Washington Street near Culver City into National Boulevard at Arnaz Avenue and thence via Featherstone Drive widened, to a connection with Rose Avenue, Venice.

More important still is the widening of Adams Street east of Broadway as an eight-line thoroughfare to Nevin Avenue, and its extension southeasterly to meet Pacific Boulevard at the Santa Fe tracks, with an eventual underpass at this point. A much more direct entry for Long Beach traffic will thus be provided into the center of the city, and Slauson Avenue and other cross-town streets will be relieved of this traffic. The improvement is of such substantial value to the city as to warrant immediate construction. Long Beach Boulevard, from its connection with Pacific Boulevard at Florence, should be widened uniformly to an 8-line street (not less than 74 feet between curbs). Much of this widening has already taken place, but the gaps should be attended to before too much building occurs along this route, as it is the most important trunk highway between Los Angeles and the next largest city of the metropolitan area.

Jefferson Street

Jefferson Street is now 80 feet in width from Broadway west to Orchard Avenue. It should be widened to make possible a six-line street (56 feet between curbs)

from Orchard to Arlington Avenue and extended at the west end to turn into Exposition Boulevard. East Jefferson Street should also be widened from San Pedro Street to provide for six lines of vehicles (56 feet between curbs) to Griffith Avenue, where Exposition Boulevard extended as shown on the plan will merge with it and thence it should be an 8-line street or a minimum of 74 feet between curbs and extended this width diagonally from Central Avenue across to 38th and Hooper, thence following 38th Street and Jefferson until it meets the new extension of Adams Street, thence diagonally northeasterly to meet East 37th Street and following this to a future bridge across the river and a junction with Bandini Boulevard.

Exposition Boulevard

Exposition Boulevard should be extended as an 8-line thoroughfare from Figueroa Street east to Hill, thence into 36th Street widened, cutting across the corner between San Pedro and South Park into 35th Place widened, and extended easterly into Jefferson Street at Griffith Avenue. From Vermont Avenue West, Exposition Boulevard should be widened to an 8-line thoroughfare (74 feet between curbs) and extended parallel to the railroad right of way all the way to Santa Monica. As this is an industrial freight line, the right of way should be swung clear of the permanent industrial zones along the railroad. This will give another important through lead to the beaches and the most direct connection between Santa Monica and the southern part of the city. At a point near Moynier Lane east of Culver City, a branch of Exposition Boulevard (also an 8-line thoroughfare) should skirt the Baldwin Hills following in general the new trunk line sewer to Playa del Rey, giving a new line to the ocean over city property.

Santa Barbara Avenue

Santa Barbara Avenue is an important trunk thoroughfare for the Los Angeles Railway main line to Inglewood and carries heavy automobile travel, as Broadway, Hill and Grand all now end at Santa Barbara. The congestion of travel on this street where it crosses the much-traveled Figueroa Street, makes the intersection of Santa Barbara and Figueroa the heaviest traffic corner in the city; 40,222 vehicle movements were counted passing this point in eleven and one-half hours on February 14th. By opening Broadway and Hill further south, this congestion can be somewhat relieved. Santa Barbara should be widened as an 8-line thoroughfare with a minimum of 74 feet between curbs from Broadway west and extended this width across Mesa Drive around the northerly edge of the Baldwin Hills to meet Overland Avenue where it crosses the P. E. Playa del Rey line. There should also be a branch of Santa Barbara Avenue following the Los Angeles Railway car line on a curve from 6th Avenue into Mesa Drive near Vernon Avenue. Santa Barbara should be widened east of Broadway as an 8-line thoroughfare and extended from Griffith Avenue through into 36th Street widened, to connect with Jefferson Street as extended.

South Figueroa Street

South Figueroa Street is a splendid, wide through thoroughfare south of Washington Street to Manchester and is one of the few examples in the city of what an 8-line thoroughfare ought to be. It is generally 68 feet now between curbs with a total width of 100 feet from property line to property line, so that

the roadway can ultimately be widened to 74 feet. As a major traffic thoroughfare, it is one that any city can be proud of. It should be extended the same width south of Manchester Street to Griffith Street near Nigger Slough, thence diagonally southwest into Hoover Street and through Hoover Street extended into Macado Street, Wilmington, and thence to the Wilmington and San Pedro Boulevard.

Olive Street (northerly improvement and outlet)

The two humps in Olive Street, at Third Street and Court Street, respectively, should be cut down, and the street extended northward, crossing over Temple Street and Sunset Boulevard, maintaining also connection at grade with the latter, and descend at not more than 5% into Yale Street widened and partly regraded; thence connecting by the proposed extension of Figueroa Street to Dayton Street (toward Pasadena, Eagle Rock, Glendale and San Fernando Valley), with a cross connection to North Broadway as shown on the map. This is the most practicable through route for automobile traffic without car-tracks north and south in the hill district between Figueroa Street and the area occupied by the narrow north part of the congested business district and by the Civic Center. It provides another direct through street for the wider part of the congested district south of Fourth Street and west of Hill Street.

A less direct alternative route studied by the City Engineer, perhaps less costly, would divert Olive Street north of First Street into Hill Street over the Hill Street tunnel, cross Temple Street by a viaduct joining the present grade of Hill Street at California Street. Hill Street would be widened on the west from Temple to California to provide direct outlet north at grade from the Hill Street vehicular tunnel. The street would cross Sunset Boulevard by a high diagonal viaduct from the bend of Hill Street and descend diagonally along the side hill to Yale Street. This has the disadvantage of throwing traffic through the area which will be needed for the upper level of the Civic Center, and should not be done if it can be avoided.

Olive Street (southerly extension)

Olive Street should be carried from Pico Street southerly into Hill Street at 18th Street, south of the more congested district, where the convergence of Main and Grand makes another through route independent of carlines impracticable and where Hill Street is and can probably remain a non-cartrack street. This improvement is now under petition. Valuable in itself, it is rendered much more important by the possibility of extending Olive Street northward as a non-cartrack vehicular thoroughfare.

In this connection it is important to note that the rapid transit tunnel now under construction from Glendale Avenue to the Hill Street Station is planned at a grade which would make impossible its ultimate extension southward as a subway under Olive Street, a proposition of much apparent merit, which certainly ought not to be thus blocked. (See also under First Street.)

South Hill Street

South Hill Street will become a main automobile thoroughfare without carlines after the extension south of Olive Street into it at 18th Street. Hill Street is 80 feet wide from Washington to Santa Barbara Street and should be extended at this width south as far as the

proposed new Inglewood Boulevard diagonal. The Hill Street tunnel north of Temple Street, now used by street cars only, should be widened and opened for automobiles or an automobile tunnel opened alongside of it. Pending the building of a tunnel, the southeast corner of Temple and Hill should be removed to allow freer movement of traffic. The situation now is about impossible.

Broadway—South

South Broadway is now being opened 100 feet wide into Moneta Avenue, which is already that width south to 96th Street. The same width should be carried through to Wilmington and San Pedro Boulevard.

North Broadway

North Broadway is one of the heaviest traveled streets in the city, sometimes called the "neck of the bottle" because of the converging of so many traffic routes through it. It should be widened to a 10-line thoroughfare 100 feet between curbs, and the bridge across the river should eventually be widened also. East of the river, North Broadway is now an 8-line street to Mission Road, whence it should be extended easterly to an over-pass of the Pacific Electric and a connection with Soto Street extended, so that the very dangerous grade crossing of Mission Road into Huntington Drive South, at Canto Drive, may be eliminated.

South Main Street

South Main Street is at present the principal traveled way to the Harbor and should be carried through as a 6-line thoroughfare. It is now 100 feet wide to 36th Street and 80 feet wide from there to Manchester except for a small gap between 66th Street and Florence Avenue which should be brought to this width. South of Manchester a width of 56 feet between curbs should be maintained all the way to the Harbor. The bad jog between Lemon Street and the Compton Road near Gardena should be eliminated.

North Main Street

Elimination of grade crossings on North Main Street at Alameda Street and Redondo Street will ultimately be necessary and a new viaduct provided across the river over the railroads. When constructed, this viaduct should lead into Albion Street widened to 80 feet and extended to North Broadway. The North Main Street traffic east of the river should then be diverted through a new street leading into a proposed new bridge for San Pedro-Central Avenue extension through Cardinal Street. The Main Street traffic will in this way be kept separate from the Spring Street traffic.

Los Angeles Street

Los Angeles Street is now an important non-carline automobile traffic street 80 feet wide from the Plaza to Pico Street except for a short stretch from 3rd to 5th which should be brought to this width. South of Pico Street, widening to give a minimum of 56 feet between curbs should be brought about and the street extended from 23rd street south into Woodlawn Avenue at 37th and widened and extended the same width, at least to Slauson Avenue.

Maple Avenue

Maple Avenue will become an important traffic artery south of Washington Street when Maple is widened

north of Washington Street as a distributor street. It should be at least 74 feet between curbs for eight lines of traffic and extended this width from 38th Street South into Wall Street widened, and then southerly to Slauson.

San Pedro Street

San Pedro Street is a heavily traveled thoroughfare through the industrial district now 80 feet wide from Commercial Street to Vernon Avenue, which, on account of the car lines on it, and the backing up of trucks for sidewalk deliveries on so much of its length, should be widened to an 8-line thoroughfare 74 feet between curbs. This extra width will more than ever be needed when the Inglewood-Redondo Boulevard is extended to connect with it and South Park Avenue is opened through as an 8-line street to the Harbor. At Jackson Street it should connect diagonally into Central Avenue extended to a proposed new bridge opposite Cardinal Street connecting with North Main Street east of the River.

Inglewood-Redondo Boulevard

Extension of the important Inglewood-Redondo diagonal highway (which already exists most of the way from Inglewood to Slauson Avenue) across the main southerly lines of travel to the end of San Pedro Street at Vernon Avenue, will give the city a most useful direct route for the whole southwest sector, at a cost which should not be prohibitive. This should be at least an 8-line roadway, and if possible sufficient width obtained for 10 lines (94 feet) between curbs. It should be maintained at least to a connection with Market Street, Inglewood (Hawthorne Boulevard), and continued from its intersection with Manchester Avenue and Redondo Boulevard diagonally southwest to meet the Coast Boulevard at Collingwood Street in El Segundo.

South Park Avenue

South Park Avenue is an important radial, really a continuation south of San Pedro Street, which it joins at Jefferson. As a through route to the harbor it should be widened to an 8-line thoroughfare 74 feet between curbs and extended into Canal Street at Wilmington.

Central Avenue

Central Avenue, now 80 feet wide from 6th Street to Manchester, should be extended at least this width southerly to connect with Wilmington Avenue and the Harbor. North of 6th Street Central Avenue is 100 feet wide to 2nd and should provide at least a 74 ft. roadway between curbs north to Jackson Street to connect with the extension of San Pedro Street to the proposed new bridge opposite Cardinal Street and thence on the East side of the River into North Main Street.

Compton Avenue

Compton Avenue is an important north and south artery which should be widened to an 8-line thoroughfare from Washington Street south to the harbor, cutting through from 27th Street due south to connect with Compton Street as it is south of 38th Street, cutting off the corner at Vernon Avenue and cutting diagonally across the block to remove the jog at Wilson Avenue in Watts and continuing in a straight line south from Linwood Road to Carmelita Avenue or Stockwell Avenue, thence diagonally southeast into Wilmington Avenue to the harbor.

Whittier Boulevard

Whittier Boulevard should be widened to a 6-line thoroughfare east of Pasadena Avenue and provided with a diagonal connection from Soto to Seventh at Boyle. The present congestion will be further relieved when the completion of Ninth and Mines Avenue takes over the traffic running into the city on Telegraph Road.

East First Street

First Street is now 80 ft. wide from the River to Indiana Street, whence it should be extended in a straight line to meet widened East Third Street and the proposed new trunk highway.

Brooklyn Avenue

Brooklyn Avenue is now 80 ft. from Aliso Street east to Marianna, except for a short distance between Soto and Evergreen, which should be enlarged to the same width. It should be extended east with at least a 6-line roadway of 56 ft. between curbs to a connection with Montebello. At the west end Aliso Street should be widened to at least 56 ft. between curbs, from its intersection with Brooklyn Avenue straightened, and the grade improved to bring the Brooklyn Avenue traffic directly into the new Aliso Street bridge.

Macy Street—Mission Road—Valley Boulevard

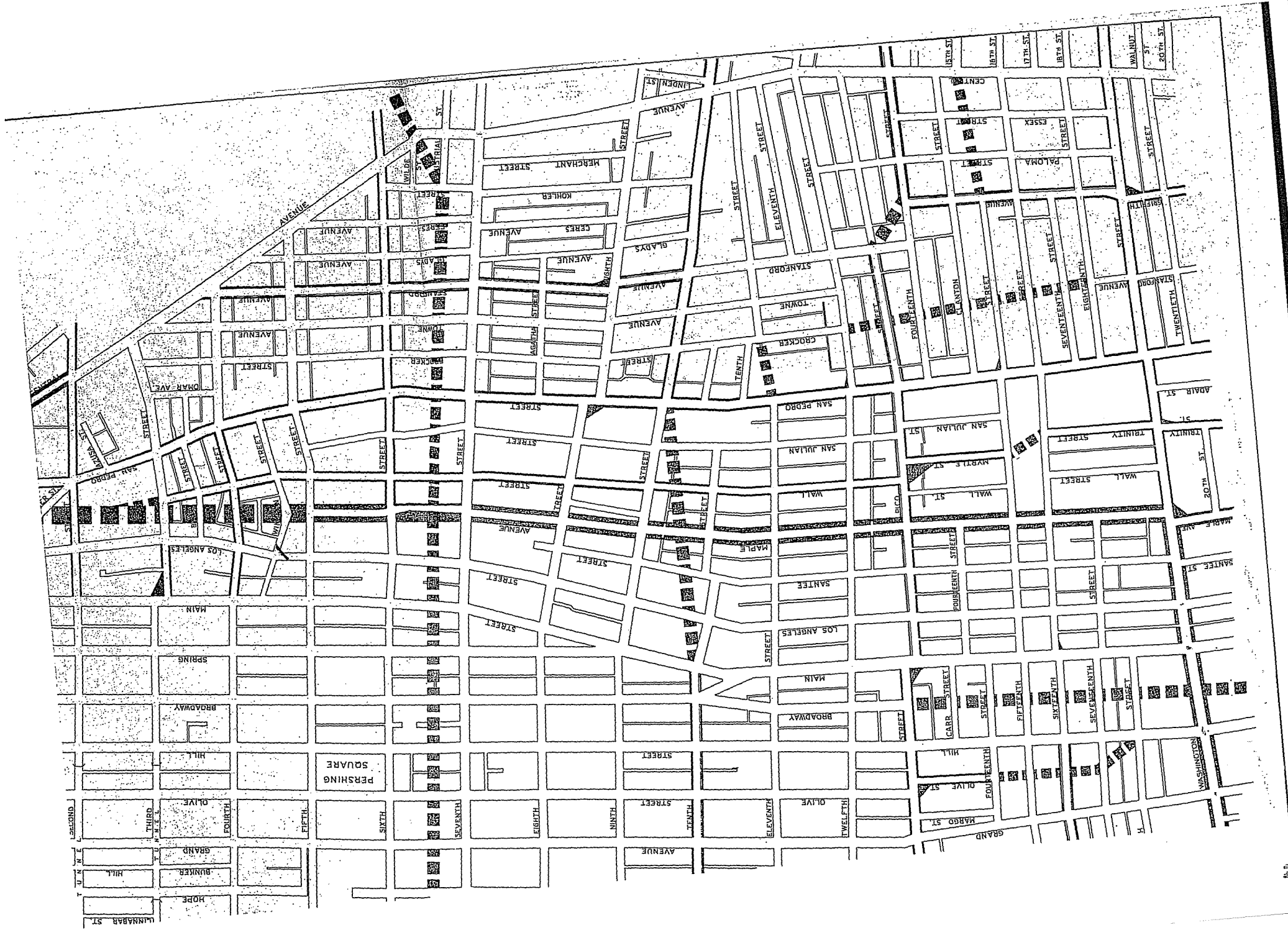
One of the most urgent cut-offs and connections to be made is the extension of Macy Street westward to connect with Sunset Boulevard near Castellar Street. It should be a continuous 8-line thoroughfare not less than 74 ft. between curbs, and on the east end connect with the new viaduct across the River into Mission Road. The latter is one of the best thoroughfares to the Northeast, now 100 ft. wide from the bridge to Huntington Drive. The most important branch of Mission Road is Valley Boulevard, which is now to be kept entirely on the south side of the Southern Pacific main line, in order to do away with the two bad grade crossings at El Sereno Avenue, and at Alhambra Avenue and Mission Road, which it will join near East Lake Avenue. Valley Boulevard should be an 8-line thoroughfare all the way to Alhambra.

Alhambra Avenue

Alhambra Avenue is an important branch of Mission Road, and is now 100 feet wide from Gates Street to Boca Avenue. It should be widened and extended as an 8-line thoroughfare, continuing on the north side of the Southern Pacific main line, all the way to Alhambra.

Huntington Drive

As an extension of both North Broadway and Mission Road, Huntington Drive carries a very heavy traffic from Pasadena, Alhambra and the whole northeast sector of the metropolitan area. It is recommended that Huntington Drive north be widened to an 8-line thoroughfare from Yorba Street to Monrovia, and that Huntington Drive south be made a 6-line thoroughfare (56 feet between curbs) from the extension of North Broadway to Main Street at Raymond Avenue, Alhambra, with a continuation passing under the Alhambra branch P. E. tracks at El Sereno Station to continue along the south side of main line northeast as a 6-line thoroughfare to Huntington Drive and Garfield Avenue. As it follows the principal pass through the hills used by a great territory, two substantial streets for traffic purposes are here needed.



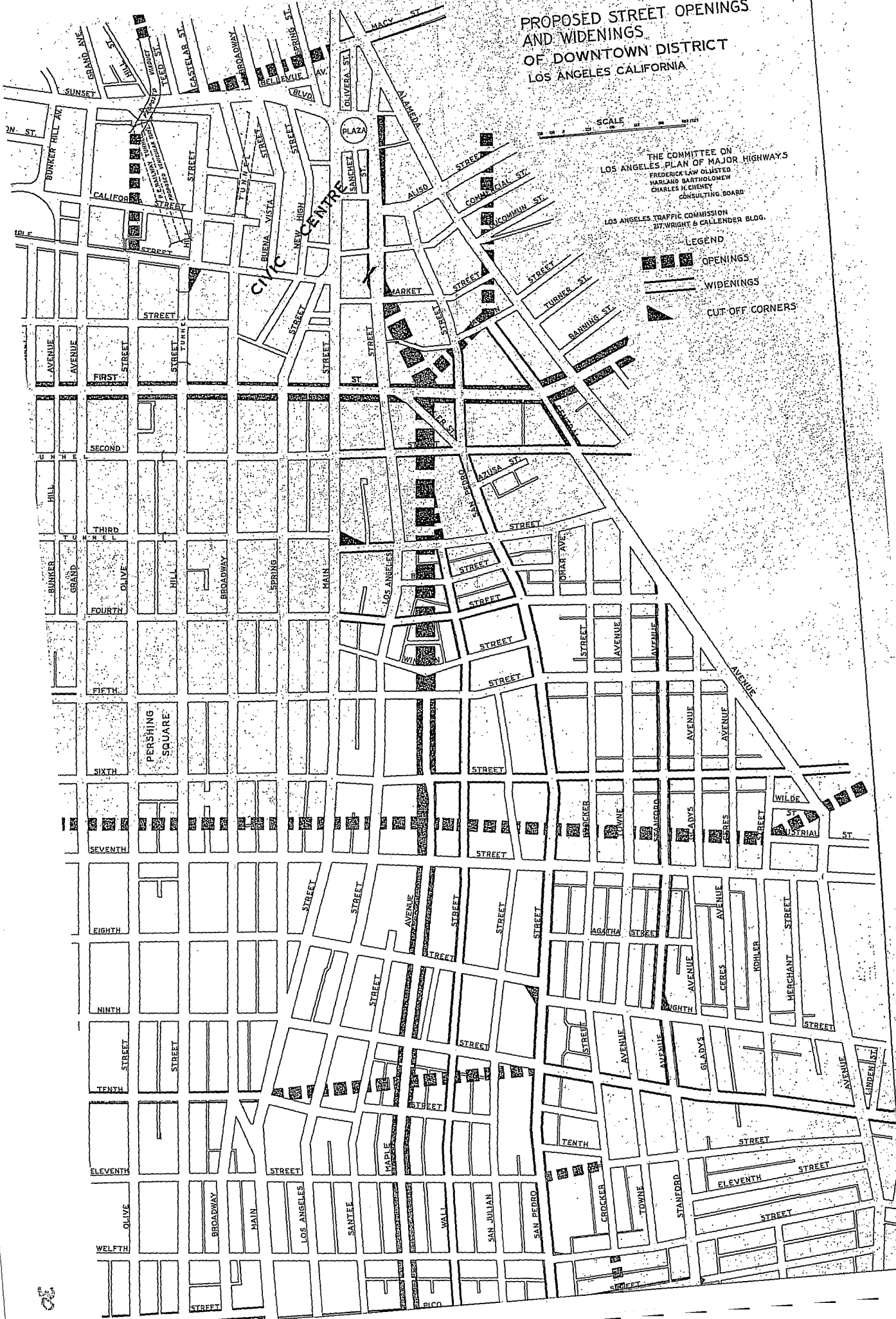
PROPOSED STREET OPENINGS AND WIDENINGS OF DOWNTOWN DISTRICT LOS ANGELES CALIFORNIA

SCALE

THE COMMITTEE ON LOS ANGELES PLAN OF MAJOR HIGHWAYS
FREDERICK LAW OLSTED
HARLAN BARTHOLOMEW
CHARLES H. CHENEY
CONSULTING BOARD
LOS ANGELES TRAFFIC COMMISSION
217 WRIGHT & CALLENDER BLDG.

LEGEND

- OPENINGS
- WIDENINGS
- CUT-OFF CORNERS



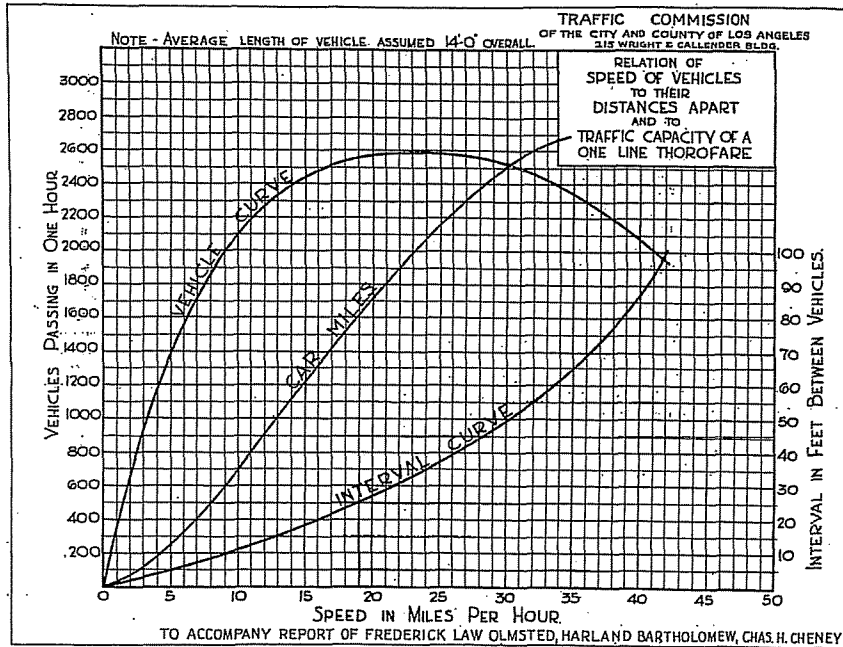


Diagram No. 17

Appendix A

REDUCTION OF TRAFFIC CONGESTION BY MEANS OF STREET
GRADE SEPARATION

By WM. D. HUDSON

Relief of traffic congestion by means of grade separation is justified only at the intersections of great streams of traffic, such as:

- (1) Where high speed arterial (state) highway traffic is crossed by urban traffic,
- (2) Where the more or less rectangular or cross-town intra-city traffic itself is very dense and of about equal volume,
- (3) Where high speed urban traffic (morning and evening current of city workers) is intersected by the slow moving but dense flow of commercial vehicles.

Type of Structure Required

Crossings made by arterial (state) highway traffic and traffic bound towards or away from the city, are usually at infrequent intervals so that the elimination

of a single crossing is immensely effective in increasing the capacity of both street and highway for from several blocks to a mile each side of it, or to the next important intersecting artery. In such a location either a subway or viaduct may be used, depending upon the approach grades of the streets and other characteristics of the location later discussed.

Rectangular or crosstown intra-city traffic presents a problem more difficult of solution, as important intersections are likely to be so frequent that separation of grades at a single one will not appreciably increase the efficiency of the street, just as enlarging a short section of pipe will not measurably add to the flow.

Where the tendency toward decentralization is decidedly marked and business centers are grouping themselves in various sections of the city, rectangular or crosstown currents of traffic are set up which in some instances can be materially accelerated by the use of

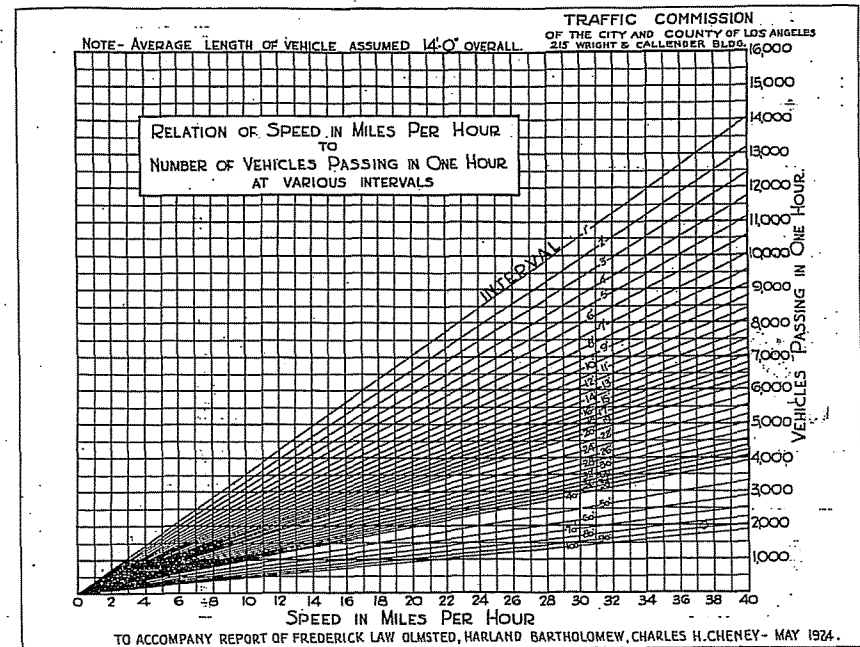


Diagram No. 18.

subways or viaducts at strategic points. Usually these are some distance from the principal business center, so that such methods are not unduly expensive either by reason of consequential damages or construction costs. The nearer the approach to the heart of the city, the more frequent and the more costly will the grade separations become. Both subways and viaducts can be used. Where every street is an important thoroughfare, the main street and intersecting streets may be alternately elevated or depressed, as indicated by the drawings.

Probably the most acute situation is that arising from the daily surge of city workers and shoppers whose general destination in the morning hours is toward the central business and retail district and in the evening, outlying residential sections. As this traffic approaches the downtown district it is gradually concentrated from many into a few principal thoroughfares, crossed by transverse movements of street cars, slow moving trucks, and other vehicles. It is to provide for this class of traffic that a complete separation of roadway may become advisable and for this purpose the continuous elevated highway, with approach ramps from side streets is suggested.

Description and Cost of Grade Separation Methods
Subways

A subway built for four lines of travel in a street 120 feet wide, will also permit of four lines of vehicles at surface grade and two sidewalks 18 feet 6 inches wide. This is the ideal condition and one likely to cause a minimum of claims for consequential damages, as it need not detract from the commercial availability of that property extending from the point of beginning of the subway to the intersection. This is accomplished by permitting through traffic on the surface portion.

In a 100 foot street, four lines at surface and four lines in subway can still be obtained by cutting down the sidewalk width to 9 feet 6 inches. Surface roadways will then be 10 feet wide.

An 80 foot street with a 4-line subway will permit of only two lines of traffic at the surface, one on each side of the subway, and sidewalks 8 feet 6 inches wide. It is probable that for streets 80 feet wide and less, two-line subways might be profitably considered.

Viaducts or Subways

The choice between the use of a viaduct or subway to separate traffic is suggested.

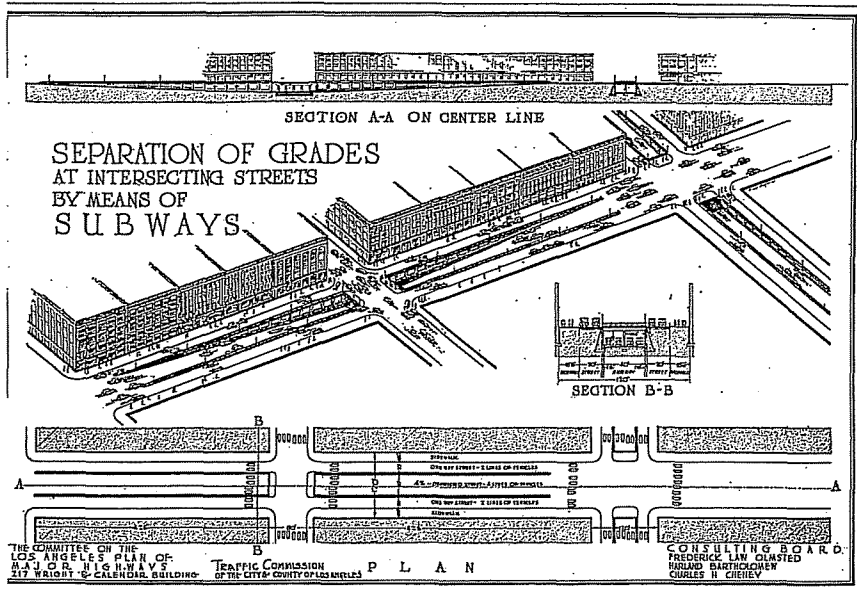


Diagram No. 19

and environment. If the approach grades are rising toward the intersection, the length of the subway would be correspondingly shortened, while that of a viaduct would be increased. Of the two types, existing grades being level, a subway is much more expensive to construct and the unknown elements entering into its design more numerous.

The estimated cost of a 4-line subway, existing street grades level, is about \$270,000. Sub-surface changes to sewers, water mains and facilities of public utilities constitute a substantial portion of the cost as does also the maintenance of traffic on the intersecting street during construction.

A viaduct to perform the same service as the subway and designed for vehicles only, would cost only about \$130,000 and would provide a considerable amount of parking space under the approaches. In each case a grade of 4% is used as this is considered about the maximum desirable. An overhead clearance of 14 feet is allowed. In both estimates it is assumed that a soil pressure of 2 tons per square foot is permissible, and that piles are unnecessary.

The inherent objections to viaduct construction in city streets are their obtrusiveness and darkening effect. In deciding upon the type of structure to be used, much depends upon the character of and uses to which adjacent property is put as to how much weight should be given to those which may be called semi-psychological objections. A viaduct in a street 100 or 120 feet

wide could not possibly cast a shadow on a store window, and with an 80-foot street the maximum height shadowed above sidewalk level would be about 6 feet. It is believed that artistic design can overcome much of the objection to viaducts, and their comparative cheapness recommends their adoption. In the use of subways especial attention must be given to the possibility of future underground rapid transit, the tubes or tunnels for which must necessarily follow or cross under the vehicle subway.

Continuous Elevated Roadways for Vehicles

The continuous elevated roadway, built of reinforced concrete, and 40 feet wide between curbs, would cost approximately \$930,000 per mile and each approach ramp from side streets about \$55,000. The estimate is based upon a 2-post structure providing sufficient side and overhead clearance to permit of two lines of travel underneath the viaduct. Refuge bays in which to make emergency repairs should be provided, but sidewalks for pedestrians are thought to be unnecessary and undesirable both on account of the difficulty of controlling such traffic and the increased width of the viaduct that would be required. All estimates of cost are exclusive of consequential damages.

A mile of elevated structure, together with seven ramps (one at every other street), would cost approximately \$1,315,000. To separate the grades at seven intersecting streets by use of subways would cost about

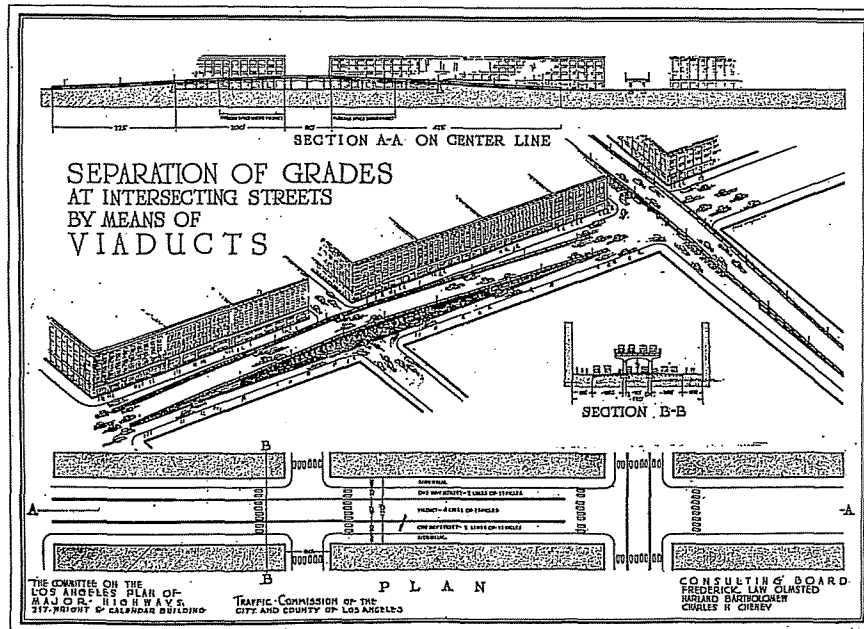


Diagram No. 20.

\$1,790,000, and the efficiency of the street itself would be considerably reduced. The comparison is valuable only in that it indicates that under special conditions a continuous elevated roadway is worthy of thought. In any event it is practically the only solution for a strictly high speed traffic way that can be used to its theoretical capacity.

Street Cars

Where either subway or viaducts are used, street car lines, if desired, can be maintained on the surface, on either side of the viaduct or subway. They should not be permitted on the elevated or in the depressed roadway.

With either a 100 foot or 120 foot street, one street car line immediately adjacent to the viaduct or subway will permit of one line of parked vehicles along the curb. Through moving vehicles would then necessarily follow the street car. This would tend to discourage the use of the surface portion of the street for through traffic, and further relieve the intersection from congestion. Beyond the subway or viaduct approaches, the street car lines should retain the same spacing thus providing a four-line vehicle trafficway between them. By leaving the street car line immediately adjacent to the subway or viaduct, a longer turn-

ing radius can be obtained at the intersection for such lines as are to be routed over the cross street.

Conclusion

It is not possible to estimate directly the benefits of street grade separation. No immediate increase in value of adjacent property can be expected. The effects are much more widely disseminated and may approximate those that follow the extension of rapid transit lines, namely, better development and higher values of suburban sections.

This method of accelerating street traffic must be classed as an heroic measure to be adopted only when an impasse has been reached and the other usual means of relief prove inadequate.

Roadway Capacity

Roadway capacity measured in number of vehicles passing a point in one hour is primarily a function of roadway width and vehicular speed.

Capacity varies directly as the width of roadway, measured in unit widths of about 10 feet. That is, a straight away roadway 40 feet wide can be assumed to carry about four times as many vehicles as one 10 feet wide, provided that all lines are moving.

Vehicular speed is influenced by the physical condition of the roadway, type of vehicle, personal charac-

MAJOR TRAFFIC STREET PLAN

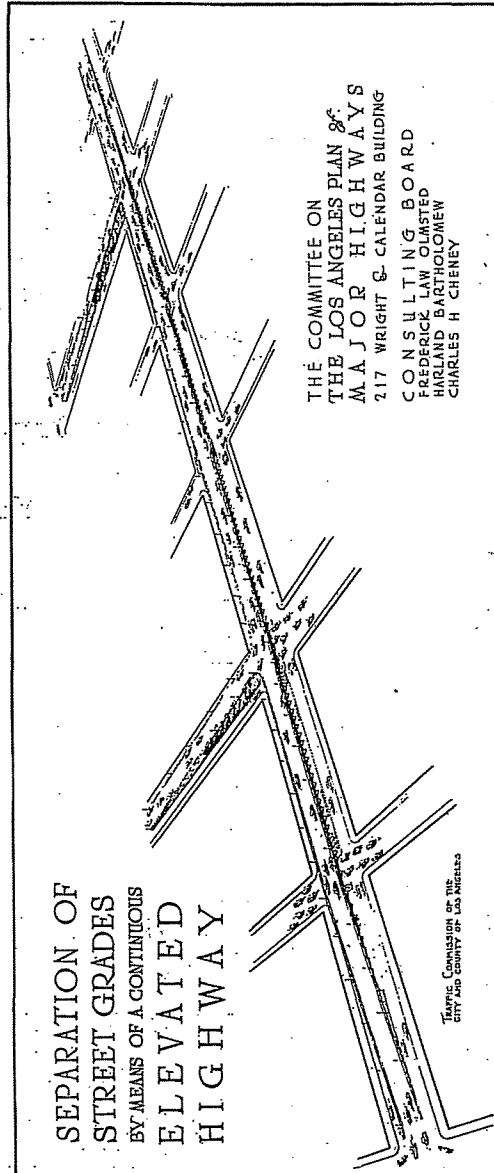


Diagram No. 21

APPENDIX A—STREET GRADE SEPARATION

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teristics of driver, and amount of known interferences such as arise from cross movements, stop or slow signs, etc. No definite weight can be assigned to any of those considerations so it is obviously impracticable to reach accurate conclusions regarding speed as it is actually manifested, through abstruse theories of the mechanics of rolling vehicles. However, in actual practice there is a fairly definite relation between speed and space interval between cars, and it is from this relation that a fair estimate of roadway capacity can be obtained, average conditions prevailing.

In order to determine the space interval corresponding to various speeds, a number of observations were made both in crowded and high speed thoroughfares, and the approximate space intervals were plotted and the curve obtained as shown in the accompanying diagram No. 17. Even this rough method produced a very smooth curve, indicating that under the then existing conditions of fair weather and dry, smooth pavement, a fairly definite relation exists between speed and interval between cars, at least up to 35 or 40 miles per hour. It is believed that the interval remains practically stationary at from 90 to 100 feet for higher speeds. From the curve it will be noted that at 5 miles per hour this interval is 5.5 feet; at 10 miles, 11 feet; at 15 miles, 18 feet; at 20 miles about 27 feet, and at 25 miles per hour the interval between machines is about 37 feet.

Having the space interval between machines, and assuming an average over all length of car (in this case 14 feet) it is a simple matter to plot the vehicle curve showing the number of vehicles passing a given point in one hour. From this curve it appears that the maximum number of vehicles passing a given point of the roadway (single line) is reached when the average speed of the vehicle is about 22.5 miles per hour. For higher speed the number notably decreases as the increasing space intervals overcome the effect of higher speeds. See diagram No. 18.

There is very likely some definite relation also between the number of lines of vehicles and speed, the latter decreasing somewhat with an increase in number of lines. It is probably safe to assume that a four line trafficway may develop at least 75% of its theoretical capacity.

Although the number of vehicles passing a given point remains so nearly constant for such a wide range of speed, the effect on the efficiency of the individual car in getting to its destination is still measured by the speed. In other words, the effective traffic capacity of the street in producing car miles is still increasing rapidly even though the number of cars passing a given point remains stationary or even decreases. The rise in car miles with the speed is shown on the diagram by a curve plotted on a scale of 30 car miles per unit of the scale for number of cars.

Appendix B

LEGAL PHASES OF THE PROBLEM

By DAVID R. FARIES AND J. ALLEN DAVIS

General Counsel and Associate Counsel of the Automobile Club of Southern California

Messrs. Frederick Law Olmsted, Harland Bartholomew and Charles H. Cheney.

Gentlemen:

You have asked our opinion as to the legal phases of the problems of financing and carrying to ultimate completion the work contemplated in the plan of major highways for the City of Los Angeles known as the Los Angeles Plan which you are preparing for the Major Highways Committee of the Los Angeles Traffic Commission. We conclude, from a discussion of the matter with you and from our correspondence concerning it, that you are interested in securing answers to these questions:

1. What are the methods now available in Los Angeles for financing a street opening, widening and construction program of large magnitude?

2. How can discouraging delays, which have in many cases in the past history of Los Angeles been almost interminable, be eliminated?

3. How can speculation in real estate values which is likely to be attendant upon street improvement activities and which, by the artificial stimulation of the cost of the property to be taken by the city, frequently renders such taking financially impossible, be eliminated?

4. How can we prevent the blocking of a needed improvement of benefit to the whole city by the protests of property owners who will be assessed for the cost of the improvement?

In addition to these questions you have asked others which are scarcely less important:

5. How can the improvement of streets through suburban municipalities adjoining the City of Los Angeles be secured when such improvement is desirable from the standpoint of the City of Los Angeles or of the County as a whole but is not desired by the smaller municipalities?

6. Can the City of Los Angeles establish set-back lines? If so, how can this be done?

7. To what extent can the use of the street surface for parking and similar purposes be prohibited or regulated under the police power?

We will endeavor to answer these questions as briefly as possible consistent with giving you complete information on each subject.

What Are the Methods Now Available in Los Angeles for Financing a Street Opening, Widening and Construction Program of Large Magnitude?

The work of acquiring the necessary rights of way and doing the construction work may be financed in any one or more of the following methods:

A. The cost of acquiring the necessary rights of way and of paying the expense of construction may be paid for out of the general fund of the city.

Charter of the City of Los Angeles, Art. 1, Sec. 2, Subsec. 13, p. 16.

See also proposed Charter of the City of Los Angeles, Art. 3, Sec. 37.

Statutes 1903, p. 376, Sec. 1, see Henning's General Laws, Act. 4946. City of San Diego v. Potter, 153 Cal. 288.

B. The cost of acquiring the rights of way and doing the work of construction may be paid for by the issuance and sale of city bonds after the voting of a bond issue therefor if a two-thirds majority of the electors voting at the election favor such bonds.

Charter of the City of Los Angeles, Art. 1, Sec. 2, Subsec. 29, p. 21.

New Charter of the City of Los Angeles, Art. 1, Sec. 3, subdivision (4).

Municipal Improvement Act of 1901, Statutes 1901, p. 27, Henning Act, 3051.

C. The cost of such rights of way and improvements may be paid for by the owners of real property located in special assessment districts benefited by the improvements.

A. First Method: Cost to Be Paid Out of General Fund

The cost of acquiring the necessary land for rights of way for new streets and of widening existing streets in accordance with the plan you propose will be a very large sum. The cost of constructing or reconstructing these highways, once the necessary property is acquired, will likewise be a very large sum. It seems to us that these sums will be so large that it may at once be declared impracticable to pay the entire cost of the improvements contemplated out of the general fund of the City.

The maximum tax rate of the City of Los Angeles is fixed by the present Charter and by the newly adopted Charter, which, assuming that it is approved by the 1925 California Legislature, becomes effective July 1, 1925. The maximum tax levy under either charter is \$1.25 per annum on each \$100 of assessed valuation. (Charter of Los Angeles, Article 1, Sec. 2, Subdivision (18). (Statutes 1923, p. 1435); New Charter, Article 1, Sec. 3). Six cents of this amount is definitely allotted to the work of acquiring and constructing public improvements including street improvements (Los Angeles Charter, Article 1, Sec. 2, Subdivision 18a (Statutes 1923, p. 1417); New Charter, Article 1, Sec. 3, Sub-section (1-b)). This is the fund from which contributions have been made to aid in the opening and widening of Tenth Street and which will likewise be used to provide the City's share of the cost of extending Broadway. This fund is inadequate to meet existing demands for the City's contribution to street improvement work and is virtually pledged for

several years to come. The six cent levy now amounts to approximately \$598,170.00 per annum. This annual revenue will increase correspondingly with the expected increase in the assessed value of property in Los Angeles.

The remaining \$1.19 of annual city tax levy is apparently all required to meet the cost of maintaining the general city government. It may be possible to secure an allocation of some portion of a fund to be used for street improvement work, but we doubt the chances of success for any step seeking to accomplish this result.

The present assessed valuation of all real and personal property in the City of Los Angeles for the purpose of taxation is approximately \$996,950,520.00. This does not include operative property of railways, banks and other public utilities which are taxed solely for state purposes.

We suggest that if it is decided to finance the city's contribution to street improvements out of the general fund of the city that it will probably be necessary for the citizens of the city to adopt an amendment to the City Charter which will authorize the City Council to levy a tax in addition to the tax levy now authorized, such additional levy to be used exclusively for paying the city's share of street opening, widening and construction. In view of the fact that each one cent of tax levy imposed upon property subject to city taxation will produce annually approximately \$99,695.00, it should be easy to fix the additional tax levy necessary whenever the amount to be raised is determined. Such a Charter amendment might be more palatable to the electorate if it provided that such additional tax levy could be made by the City Council only during a limited number of years.

This amendment to the City Charter could be proposed to the citizens either by action of the City Council or by an initiative measure which would require the names of 15% of the registered voters to be submitted to the voters at any general election or special election to be called for that purpose. An amendment may be adopted by vote of a majority of the electors voting upon the question, whereupon the proposed amendment must be submitted to the Legislature at its next session for its approval or rejection without power of alteration.

B. Second Method: Cost to Be Paid By City Bond Issue

Necessary funds for either acquisition of rights of way or street construction might be provided by a city bond issue. This would require the voting of bonds at an election by a two-thirds majority of those voting at such election. This election may be held at a general election or at a special election. Special elections involve an expense and City Councils are apt to be unwilling to incur this expense and voters are frequently opposed to the incurring of the extra expense and hence vote against the project submitted.

It would be advisable that any proposal to incur a bonded indebtedness be placed upon the ballot at a regular election.

The procedure for the incurring of a bonded indebtedness by the city is regulated by a general law known as the "Municipal Improvement Act of 1901" (Act 3051—Henning's General Laws of California.) Whenever the City Council by a two-thirds vote determines that the cost of street work is too great to be paid for

out of the general revenues, it may order the question of issuing bonds to be submitted to the people at an election. The act provides that bonds voted shall be payable serially, bearing interest not to exceed 6% per annum, and must be sold for not less than par. The act also provides for an annual tax levy to pay the interest upon the bonds and any installments of principal due.

Limit on Bonded Indebtedness

The present Charter in Section 223 and the new Charter in Section 3, Subdivision (3), places a limitation upon the bonded indebtedness of the city.

The indebtedness of the city must not exceed 3% of the assessed value of all taxable real and personal property within the city, except that a further indebtedness not exceeding 12% of such assessed value may be incurred for the purpose of acquiring, constructing or completing any municipally owned public utility, including, among others, water, power and harbor utilities.

Bonds issued for the purpose of acquiring rights of way or constructing street work must come within the 3% limitation.

The City of Los Angeles, for the purpose of determining the maximum legal bonded indebtedness of the city, certifies an assessed valuation, being the fair market value, of all taxable real and personal property within the city in the amount of \$1,993,901,040.00. Reference is made to Ordinances No. 40,302 (N.S.) and No. 46,057 (N.S.), wherein the City Council has taken cognizance of the fact that the Assessor of Los Angeles County bases his estimate as to the assessed value of property for the purposes of taxation at 50% of the fair market value. The city certifies as to the assessed valuation of the city for the purpose of determining the maximum legal bonded indebtedness a sum equal to double the amount of the assessed valuation determined by the County Assessor as the basis for city taxation.

We express no opinion as to whether or not the City of Los Angeles may legally certify the assessed valuation (being represented as the fair market value) as the sum of \$1,993,901,040.00. The City Auditor has furnished us with a statement as of May 31, 1924, showing the maximum legal bonded indebtedness for general purposes and the amount of bonds sold and the amount voted but not yet sold. We set forth this table as given to us by the City Auditor.

Statement of Bonding Capacity of the City of Los Angeles

Assessed Valuation, (Fair Market Value)	\$1,993,901,040.00
Secs. 1A, 1B, Ordinances No. 40,302 (N.S.) No. 46,057 (N.S.)	
Maximum legal bonded indebtedness for general purposes, being 3% of the amount of the assessed valuation shown above	\$59,817,000.00
Amount of bonds sold to May 31, 1924.	17,229,487.50

This leaves a difference amounting to \$42,587,512.50. However, in addition to the bonds sold, there have been voted but not yet sold 16,538,000.00

This leaves a margin which might be voted and sold for street improvement or other general purposes \$26,049,512.50

This margin representing the amount of bonds which might be voted and sold will, of course, be increased by the future retirement of outstanding bonds and also by the expected increase in the assessed valuation of real and personal property within the City of Los Angeles. However, assuming that an additional bond issue for street improvement purposes was voted, either at the present time or in the near future, there is very little possibility that such bonds would find a ready market. This is due to the fact that the marketability of Los Angeles City bonds is largely affected by the statutes of the State of New York governing legal investments for savings banks in that state. Unless the bonds of the City of Los Angeles can be sold upon the New York market, the chance for consummating such sale is materially decreased. The situation as affected by the New York bond market is more fully discussed under the following heading:

New York Bond Market

In New York State the law prevents the purchase by savings banks of bonds issued by a municipality in excess of 7% of the total assessed value of real and personal property within the municipality. The New York law requires that in estimating the 7% there shall be included the bonds issued for general purposes and,

in addition, any income producing bonds. While, as noted above, the Los Angeles City Charter permits a total bonded indebtedness of 15% (this includes the 3% for general purposes and 12% for utility and revenue producing purposes), the sale on the New York market is for all practical purposes limited to 7%.

In addition, the New York law requires that there be included in estimating the bonded indebtedness of the city the bonded indebtedness of any municipal district, school district or any other district any part of which is within the city limits. This requires that there must be included as a part of the bonded indebtedness of Los Angeles City the total bonded indebtedness of the Los Angeles Flood Control District and the Los Angeles City School District. The New York law does permit that the bonded debt for the development of water may be excluded in determining whether the 7% limitation has been reached.

With this preliminary discussion in mind, we set forth a statement of the bonded indebtedness of the City of Los Angeles showing all the items necessary to determine the bonding capacity of the city under the statutes of New York.

The following statement showing the situation as of May 31, 1924, was obtained from the office of the City Auditor of Los Angeles:

Bonding Capacity of Los Angeles Under New York Laws		
Assessed valuation (Fair market value) 1923-24, Secs. 1A, 1B, Ordinances No. 40,302 (N.S.), No. 46,057 (N.S.)		\$1,993,901,040.00
7% of assessed valuation (Bonding capacity under laws of New York)		139,573,000.00
Estimated added bonding capacity based upon 1924-25 valuation		21,000,000.00
Total bonding capacity based upon estimated valuation 1924-25	\$	160,573,000.00
Municipal net debt outstanding May 31, 1924	\$56,026,742.15	
School district net debt outstanding May 31, 1924	30,471,392.00	
Flood control district net debt outstanding May 31, 1924	3,706,709.00	
Municipal improvement district's net debt outstanding May 31, 1924	5,062,000.00	
	\$95,266,843.15	
Retirement of bonds during first year 1924-25	2,882,312.50	
Total municipal debt under New York law	\$92,384,530.65	\$ 92,384,530.65
		\$ 68,188,469.35
Bonds authorized but not issued:		
Municipal	\$26,538,000.00	
Flood control district	35,300,000.00	
Total bonds now authorized but not issued	\$61,838,000.00	\$ 61,838,000.00
Total new bonds which might be voted and issued within New York limit		\$ 6,350,469.35

It will be noted that the foregoing table includes the estimated increase in assessed valuation for 1924 and 1925. Upon this estimate it will be observed that if all bonds now authorized are sold, there will be a margin left under the New York law of only \$6,350,469.35.

The Los Angeles City School District proposes to submit the question of issuing an additional \$35,000,000.00 of school bonds to the electors at an election to be held in June, 1924. Assuming that these bonds are voted, it is apparent in view of the foregoing table that not all of the bonds now authorized but unsold, together with the new school bonds, assumed to be authorized but not sold, can find a market in the State of New York.

A consideration of the foregoing matter conclusively establishes that there is no possibility in the immediate future of selling an issue of Los Angeles City bonds for street improvement purposes, even assuming that such a proposal was submitted to the electors and received the necessary two-thirds vote, as it would be impossible to dispose of such bonds to investors on account of their unsalability on the New York market.

C. Third Method: Cost to Be Paid By Special Assessment Districts

The third proposition, that of paying for the improvements by special assessment districts, is the means ordinarily adopted to provide the necessary funds for

street improvement. In the event that it is utilized for doing the work contemplated in the Los Angeles Plan, two proceedings will be necessary:

- (a) The formation of an assessment district to pay for the cost of acquiring the property needed for additional rights of way or the widening of existing rights of way. Street Opening Act of 1903, Statutes 1903, p. 376, Henning—Act 4946; Special Improvement Bond Act, Statutes 1911, p. 1192, Henning—4955.
- (b) A separate and subsequent proceeding for the creating of an assessment district for the raising of the funds required for the actual construction work. Vrooman Act, Statutes 1885, p. 147, as amended, Henning—Act 4948; Street Improvement Bond Act of 1893, Statutes 1893, p. 33, Henning—Act 4950; Improvement Act of 1911, Statutes 1911, p. 730, as amended, Henning—Act 4956.

This method is extremely likely, past experience shows, to involve considerable delay, and there is a possibility of successful protest against the improvement. The Street Opening Act of 1903, cited above, provides in Section 4 "that if the owners of a majority of the frontage of the property fronting on streets or parts of streets within the proposed assessment district file written protest against such improvement, then all proceedings must be abandoned and cannot be renewed for six months after the filing of the protest, unless within such period of time the owners of a majority of the property fronting on streets or parts of streets within said assessment district shall petition the City Council to proceed with said improvement." Each of the several statutes above cited contains similar provisions with reference to protest by property owners, except that the Act of 1911 cited provides that the City Council may, by a four-fifths vote, overrule a majority protest. The 1911 Act is the act being most used by the City of Los Angeles at the present time. This act relates solely to an assessment district to pay the cost of construction and does not provide for acquisition of rights of way.

Our understanding of some of the reasons for delay may be clarified if we review briefly the nature of proceedings under local assessment statutes. As mentioned above, proceedings must be first carried out for acquisition of property, then a separate and subsequent proceeding for the actual construction work.

The Street Opening Act of 1903 may be outlined as follows:

1. City Council adopts an Ordinance of Intention describing in general terms the land to be taken and the extent of the assessment district.
2. Notice of adoption of this ordinance must be published and posted.
3. Property owners within the assessment district may file written protest within thirty days.
4. Hearing is held upon this protest and if protests are filed by the owners of less than the majority of the frontage on streets lying within the assessment district, then the City Council acquires jurisdiction to proceed.

5. The City Council adopts a second ordinance, instructing the City Attorney to commence condemnation proceedings.
6. The City Attorney then ascertains the names of all owners and persons interested in the lands to be condemned. These names and the descriptions of the several parcels are then sent to the City Engineer's office for the preparation of what is known as a condemnation map. This map must show each and every parcel of land to be condemned, its exact dimensions, legal description and the description of the larger parcel of which the land to be condemned is a part.
7. The City Attorney then prepares and files the condemnation suit and service is made upon the defendants, who may come in and answer and contest the amount of damages to be awarded them, although such property owners may not raise the point as to the necessity of the taking. The question of necessity is determined by the ordinance of the Council and cannot be contested.
8. The question of damages is ordinarily referred to three referees, though the defendants may insist upon a trial of this question by jury or court.
9. The court, having determined the amount of damages to be awarded to the owners of property taken, enters what is known as an interlocutory judgment directing that the city may have its final decree upon paying the amounts awarded to the defendants.
10. The city then, through its Street Superintendent, proceeds to assess the total expenses of the proposed improvement upon the lands within the assessment district in proportion to the benefits to be derived from said improvement. The assessment must be completed within not to exceed 150 days.
11. The City Clerk then publishes notices of said assessment and persons interested may file objections to the assessment within 30 days.
12. The Council conducts a hearing upon said objections and may confirm, modify or correct the assessment or may order a new assessment.
13. The assessments having been confirmed, the same become due and payable and are collected.
14. The act permits the issuing in certain instances of bonds to represent assessments, which bonds mature in either five or ten years.
15. The city, having secured the necessary funds by assessment or sale of bonds, pays the money into court for the benefit of defendants and secures a final order of condemnation vesting title in the city and giving it the right of possession.

Proceedings for Construction and Improvement Work

The city having acquired the necessary rights of way by proceedings above outlined, a separate assessment district is then organized to meet the cost of construction.

Los Angeles has ordinarily availed itself of the provisions of the Improvement Act of 1911. Briefly outlining this statute, it provides:

- (1) The City Council adopts a resolution of intention to carry out certain construction work upon one or more streets. The resolution must be published and a time set for hearing objections. The resolution declares that the cost shall be paid by assessment, either upon the lands fronting upon the improvement or the lands within a larger district benefited by the proposed improvement.
- (2) Property owners within the assessment district may protest. A majority protest may be overruled by four-fifths vote of the members of the City Council.
- (3) The city having acquired jurisdiction, plans and specifications and estimates of cost must be prepared and a resolution adopted ordering the work.
- (4) Notice is published and sealed proposals or bids are received. The contract is let and notice published.
- (5) The City Engineer prepares a diagram of the property within the assessment district. When the contractor has completed his work, the City Engineer spreads the assessments against each lot and parcel of land within the district, preparing a diagram showing the amount of such assessment. Property owners may appeal from said assessment to the City Council. The City Council may confirm, amend, alter, modify or correct the assessment.
- (6) The City Council having confirmed said assessment warrants are issued representing said assessment. These warrants are issued to the contractor who makes demand for payment thereof upon the owners within the district.
- (7) In the event said assessments are not paid, the contractor may in his own name file suit upon said warrants against the property owners. Upon such suit, properties for which assessments have been unpaid may be sold upon execution.

Both the Street Opening and Widening Act of 1903 and practically all of the statutes authorizing construction and payment therefor upon the local assessment plan authorize the city to make contributions toward the expense from its general funds. The general fund is, however, usually inadequate to permit of any substantial contribution.

Delays Incident to Present Statutory Methods of Procedure. Suggestions as to Possible Revision of Methods

Careful consideration of the foregoing outline of the Street Opening and Widening Act of 1903 and of the Improvement Act of 1911 discloses a number of features contained therein which are not merely conducive to but necessitate undue delay in the carrying out of street opening, widening and improvement projects. We shall point out briefly a number of the more-obvious features of this nature.

I. Delays Incident to Separate Proceedings for Acquiring Rights of Way and Construction Work

The laying out and construction of a new highway necessitates that two separate and distinct proceedings be conducted, the one to establish an assessment district under the Street Opening and Widening Act, a second and subsequent proceeding to establish an assessment district which is called upon to pay the cost of construction work, as provided in the Improvement Act of 1911. By statute in some of the states provision is made for the accomplishment of both of these objects by one proceeding and the formation of one district to meet the cost of both the acquisition of rights of way and the cost of construction of the highway. California might profit by adoption of methods of procedure permitting the acquisition of rights of way and the construction of the proposed highway under one street opening, widening and improvement statute authorizing the creation of one district to be assessed to pay the total cost of such undertaking.

II. Delays Incident to Proceedings Under Street Opening and Widening Act of 1903

The Street Opening and Widening Act of 1903 contains in itself an order of procedure which is conducive to delay. Among these we mention the following:

(a) The possibility of successful protest against the proceeding. Elimination of this feature would give greater assurance that a proposed project would be carried through to completion. On the other hand, it may be thought desirable to retain this feature as a measure of protection to property owners against the imposition of burdens which in some instances may not be of vital necessity and would constitute an unjust imposition upon property owners.

(b) Delay is occasioned by reason of the fact that the City Attorney is not authorized to prepare for the condemnation suit, which preparation includes the search of titles to secure the names of parties defendant and the preparation of condemnation maps, until after the Council has adopted first the Ordinance of Intention, notice thereof published, protests received, a hearing thereon held and a second and subsequent ordinance has been adopted, authorizing the City Attorney to commence condemnation proceedings. After this second ordinance has been adopted, a period of 150 days is allowed for the preparation and filing of suit. It would seem desirable that the City Council upon adopting the original Ordinance of Intention should at that time instruct the City Attorney and the City Engineer's office to conduct the necessary search of titles and prepare the necessary condemnation maps and to immediately file the necessary condemnation action. At present the possibility of successful protest against the project renders it inexpedient for the city to incur the expense incident to search of titles and preparation of condemnation maps until the period within which protests may be filed has elapsed.

(c) Delay is also brought about by the circumstance that under the Act condemnation proceedings must be filed, defendants served with summons and complaint, often necessitating publication of summons through a considerable period, the action must be set for trial, the trial must be conducted and an interlocutory decree secured before the city proceeds to spread the assessment upon the district to be benefited by the improvement. The statute allows a total of 150 days for

the spreading of the assessment. The assessments must then be collected or bonds issued representing said assessments before the necessary funds are secured wherewith to pay the awards to defendants in the condemnation action. Not until this time is final decree of condemnation secured.

It is extremely desirable that a method be devised whereby the condemnation costs might be estimated in advance and a preliminary assessment be levied and collected (or bonds representing such assessments be issued), these proceedings to be conducted concurrently with the bringing of the condemnation suit in order that funds might be immediately available for the payment of awards upon the determination of the amount thereof by the court in the condemnation action. A supplemental assessment, which is a common feature of some of the statutes, might be utilized to make up any deficit resulting from too low an estimate of the cost being made in the first instance.

(d) The Street Opening and Widening Act of 1903 also contains a provision which fixes the value of the land to be condemned as of the date the order is made setting the action for trial. This unduly postpones the date upon which the compensation and damages shall be deemed to have accrued. Upon ordinary eminent domain proceedings by the state, county or city under the California Code of Civil Procedure, Section 1249, compensation and damages are deemed to have accrued at the date of the issuance of summons, and the actual value of the property at that date shall be the measure of compensation and the basis of damages to property not actually taken but injuriously affected. It would seem desirable that a similar provision should be made applicable to condemnation actions brought under local assessment proceedings and the value of property condemned should be taken as of the date that summons is issued rather than postponed to the time the cause is set for trial. Advancing the date upon which the valuation of the property shall be determined, as suggested, would be effective in curbing speculative increases in value of property during the conduct of street improvement proceedings.

III. Delays Incident to Proceedings Under the Improvement Act of 1911

The Improvement Act of 1911 requires a certain order of procedure which involves both delay and expense.

(a) All of the preliminary proceedings must be gone through with (note steps 1 to 5, inclusive, in our outline of the Improvement Act of 1911) and the contractor must have completed the construction work to the satisfaction of the Superintendent of Streets or the City Council before the City Engineer spreads the assessment against the lands within the assessment district. There would appear to be no legal objection to a procedure calling for the estimate of the cost at any time after the first resolution of intention is adopted by the City Council. Ten per cent might be added, and when the city has acquired jurisdiction, the assessment might be spread and collected. There is no constitutional objection to spreading an assessment before the construction work is commenced or completed (Hayne v. San Francisco, 174 Cal., 185).

If this method is not thought desirable, it would seem to be possible to base the estimate of cost upon the contract price at the time the contract was let, and the spreading and collection of the assessment be car-

ried on concurrently with the prosecution of the work of improvement. There appears to be no necessity for delaying the spreading of the assessment until after the work is completed, as is required by the Improvement Act of 1911. The possibility and the desirability for an alteration in the order of procedure discussed above is demonstrated by consideration of methods of street improvement procedure which have been found of superior practical advantage in certain other states. We refer particularly to the following:

State Improvement Act of Tennessee, Statutes of 1907, Chapter 341, as amended;
Public Acts of Michigan, Statutes of 1917, page 204.

(b) The Improvement Act of 1911 provides that upon the spreading of the assessment warrants shall be issued by the city representing said assessments and delivered to the contractor who has completed the construction work. The contractor must advance to the city the incidental expenses, including the cost of publication of notices, resolutions, orders and matters required under the Act. These expenses are, of course, included in the assessment and in the warrants issued representing such assessment. The contractor receiving the warrants makes collection thereof from the property owners, and in the event of non-payment, the contractor or his assignee may after a certain period bring suit upon said warrants against the owners of land for which the assessments are unpaid. The contractor in such action is entitled to interest on the amount unpaid at 10% per annum until paid, also attorney's fees and all taxable costs, notwithstanding that the suit may be settled or a tender may be made before a recovery in said action and he may have judgment therefor. Under this method of procedure, the contract price and the cost of the work will obviously be greater than it would be in the event the contract was let upon a cash basis, the city paying the contractor by cash in installments as the work progresses. The desirability is at once apparent for a method of procedure whereby the assessments might be levied before or during the progress of the work or provision made for the issuance and sale of bonds during this time, thus enabling the city to let contracts upon a cash basis, or in certain events enabling the city to prosecute the work by day labor.

Delays Not Occasioned by Statute

The foregoing discussion is sufficient to indicate some of the statutory delays incident to street improvement work. There are, in addition, many delays which are not necessarily a part of the statutory procedure. These additional delays are occasioned primarily by the lack of sufficient employees in the City Engineer's and other offices of the City Government. We are advised that at the present time the City Engineer's office has on file petitions for street opening, and widening, also street improvement work, in such numbers that new petitions for such projects cannot possibly receive attention within a period of many months. This is a condition which must be remedied before it can be hoped to carry out any comprehensive program for the opening, widening and construction of additional streets.

Relief Being Afforded

So serious had this situation become that reliable estimates placed the value of the street work on which

proceedings had been initiated in Los Angeles but on which no actual work had yet been done, at fifty million dollars, and the time which it would take on each project involved, at approximately two years from the time of the commencement of proceedings until the physical work of constructing the street could be commenced.

In an effort to expedite this tremendous program of street construction, the directors of the Automobile Club of Southern California called the existing situation to the attention of the Mayor and the Council of the City of Los Angeles at a luncheon held May 23, 1924.

As a result of this effort on the part of the Automobile Club in calling the attention of the city officials to the existing delays which have accumulated until there was presented the condition described, the City Council on May 27, 1924, appropriated the sum of \$50,000 to be used as a revolving fund, designed to facilitate the execution of the street work already ordered under the district assessment plan, the fund being used to employ additional engineers and other help whose compensation would ultimately, for the most part, be refunded to the City by the assessment districts to be formed to pay for the proposed street work.

Wisely administered this fund, inadequate as it is, should be of very great assistance to the City in expediting its present plans of street improvement and should eliminate many of the delays which have heretofore existed.

Suggestions Intended to Facilitate Accomplishment of Major Street Plan and to Prevent Speculation

The present statutory methods of carrying out street opening, widening and construction work are the outgrowth of legislation extending over a considerable period of years. These statutes have many times been submitted to test in the courts and their present form, acquired by amendment to the original statutes, has, in some measure, developed along lines declared to be essential by judicial decisions. The statutes contain certain essential elements, particularly with reference to the giving of notices and the opportunity afforded property owners to be heard in opposition to an improvement or particular assessment, which rights must be preserved in any future legislation. The development of these statutes has, however, accumulated many features which are cumbersome and conducive to delay and which, in our opinion and in view of judicial decisions, are not a necessary part of such statutes. It is our view that a thorough study should be made of the situation and legislation devised which would obviate certain present cumbersome methods conducive to delay and which would at the same time retain all provisions necessary to the validity of such statutes under the Constitution and laws of the State of California.

With the above thought in mind, we enumerate certain possibilities of legislation intended to accomplish the results suggested.

Procedure Ordinance Under City Charter

The present Los Angeles City Charter in Section 2, subdivision 19 (Statutes 1921, page 1802), and the new Charter, recently approved by a vote of the people, in Article III, Section 37, authorizes the city to open, widen, lay out and to do all construction work, including changing of grade, and other improvement work

upon streets and other public places, and to pay the costs thereof, including the amount of any damages to private property occasioned by the taking thereof, from the general fund of the city or from such other fund as the Council may designate; or the city may make such costs and expenses a lien upon the abutting property or upon property in districts according to benefits and may issue bonds representing such assessments. The City Council is also authorized to adopt an ordinance or ordinances designating the procedure to be followed in the creation of any district to include abutting property or to include property in a larger district to be benefited by the improvement.

The City Council of Los Angeles has heretofore adopted Ordinance No. 47,306, declaring the procedure for the formation of districts benefited to pay the cost of construction or improvement work upon streets. This ordinance, adopted November 7, 1923, has not, as we are advised, ever been utilized, although the City Attorney's office prepared the ordinance and has expressed its opinion that said ordinance is valid. This ordinance contains some features which are an improvement over existing general statutes providing for construction or improvement work upon city streets. It also contains some features which our previous discussion has disclosed to be conducive to delay and which possibly might be altered.

The City of Los Angeles has not prepared or adopted any procedure ordinance for the creation of districts to pay the cost of acquiring necessary rights of way incident to an opening and widening project.

It is our suggestion that the City Council of Los Angeles might adopt a procedure ordinance or ordinances providing for the following matters:

One ordinance prescribing a procedure for the laying out, opening, extending, widening or straightening of public streets, the condemnation of property and for the establishment of assessment districts and the assessment of property therein to pay the expense of such improvement.

Another ordinance might be adopted prescribing the procedure for all kinds of construction work upon streets and the creation of districts to be benefited and to be assessed to pay the cost of such improvement.

The City Council in place of adopting two ordinances, as above suggested, might adopt one ordinance providing one procedure under which streets might not only be opened and widened but the actual construction work thereon be carried out. An examination of the charter provisions above mentioned discloses nothing therein to prevent the adoption of one ordinance of procedure covering both of the matters above mentioned. Such an ordinance might, we believe, be so drawn as to decrease the time ordinarily consumed in such proceedings to an extent perhaps not heretofore thought possible.

Such an ordinance or ordinances should include all constitutionally necessary provisions relative to the hearing of protests and other matters required as "due process of law" under the Constitution. Included also should be the most desirable features of existing statutes which have stood the test of judicial scrutiny. All unnecessary delay incident to procedure under present general statutes should be eliminated.

The City and County of San Francisco, under authorization of its charter, has adopted and made extensive use of procedure ordinances in street improvement proceedings containing some of the features here-

inafter suggested, and these ordinances have been declared valid by the courts. (Hayne v. San Francisco, 174 Cal. 185; Larsen v. San Francisco, 182 Cal. 1.)

Outline of Procedure Ordinance

Assuming that one ordinance is adopted to provide for both opening and widening and for construction work, it should contain a complete plan for the carrying out of street improvement projects. The procedure ordinance should set forth all necessary steps to be taken by the City Council and by all other municipal officers.

In providing for the condemnation of necessary rights of way, the procedure ordinance should provide that the valuation of any property taken shall be determined as of the date summons is issued. (See discussion as to the desirability of this provision on page 61. The procedure ordinance should also provide for the filing of a *lis pendens*, or notice of action, at the time summons is issued. Such provisions in conjunction with the provision we suggest for the early filing of suit would effectually prevent speculative increase in realty values ordinarily incident to street improvement proceedings.

The procedure ordinance should provide that the City Council shall initiate any desired improvement proceeding by the adoption of an Ordinance of Intention authorizing the opening, widening and construction of a specified street or either of such undertakings. The procedure ordinance should declare what matters must be included in such an Ordinance of Intention and in any subsequent resolutions or ordinances which it makes a necessary part of the proceedings. The procedure ordinance might specify the contents of the Ordinance of Intention as follows:

Contents of Ordinance of Intention

The Ordinance of Intention should include the following matters:

- (a) A description of the proposed improvement;
- (b) A description of the property, if any, to be taken;
- (c) A declaration that the cost shall be assessed against the property fronting on the improvement or upon a district to be benefited to be described in the ordinance;
- (d) The proportion of the expense, if any, which is to be paid by the city out of any general fund or bond fund available;
- (e) A direction to the proper city officers to immediately estimate the cost of the improvement, including both necessary rights of way and construction work;
- (f) A direction to the City Engineer and City Attorney to commence any search of titles and preparation of condemnation maps necessary to the filing of condemnation suit and a direction to the City Attorney to forthwith file the condemnation suit or suits necessary.

(All work preliminary to the actual filing of suit should in fact be done by the City Engineer and City Attorney upon informal instruction of the City Council prior to the adoption of this Ordinance of Intention, and the City Attorney should be prepared to file suit immediately upon the adoption of this ordinance.)

- (g) Provision for the publication of notices, the time within which protests may be filed and the date set for hearing of protests.

The inclusion of all these matters in the original Ordinance of Intention would permit that much necessary work be commenced immediately, including the estimates as to cost, the preparation of the condemnation suit and the filing of said suit.

At the time set in the Ordinance of Intention for the hearing of protests, the City Council should either sustain such protests, abandon all proceedings and order the City Attorney to dismiss any condemnation suit previously filed, or the City Council may overrule such protests and should then adopt an ordinance ordering that the construction work be done as soon as possession is acquired. Such an ordinance should include or be followed by the following steps:

- (a) The City Council, if construction is contemplated, to order advertising for bids and then proceed to the letting of a contract or contracts;
- (b) The City Council to order the immediate spreading of the assessment based upon the estimated cost plus 10% to cover contingencies and set a date for the hearing of protests against such assessments. (There might be included as a part of the cost any amount necessary to wholly or partially reimburse a revolving fund from which advances had been made, as is hereinafter suggested.)
- (c) The City Council having heard and determined the protests against the individual assessments, it might then order the collection of such assessments or the issuing of bonds representing unpaid assessments and proceed to sell such bonds at not less than par.
- (d) City Council upon collection of such assessments or sale of such bonds may thereupon devote said revenues to pay the award determined to be due owners of property in the condemnation proceedings,

Or

Such revenues to be devoted to the payment of the costs of actual construction work;

- (e) Additional assessment might be authorized in the event the original estimates and assessments did not produce the total amount required.

Provision should also be made concerning certain other necessary features of such proceedings, including the retirement of any bonds by collection of deferred assessments. Provision should be made safeguarding the letting of contracts, such as requirement for competitive bidding, filing of contractor's bonds, certification as to satisfactory completion of the work by the Street Superintendent, etc.

The foregoing suggestions are not intended as being final or necessarily determinative of the exact order of procedure to be followed but are merely indicative of measures and an order of procedure which, we believe, would greatly facilitate the accomplishment of street improvement projects.

A Revolving Fund Would Be Desirable

Distinct advantages would result in the event a fund was available from which money might be advanced,

either upon commencing condemnation proceedings or upon commencing construction work. Under the Constitution of California (Article I, Section 14) a city upon commencing condemnation proceedings may secure immediate possession of the property to be condemned upon paying into court such amount as the court may determine to be reasonably adequate to secure the payment of compensation to the owners whose properties will be taken or injured. Los Angeles has not heretofore been able to take advantage of this constitutional provision in large street improvement projects for the reason that sufficient funds have not been available. The city, in order to create such a revolving fund, might set apart a portion of its general revenue. Such a proceeding is, we believe, legally possible, but we doubt whether any revolving fund of a size sufficient to be of any practical value could be created in this manner. The city might also by a charter amendment provide for a special tax levy for a limited period to create a revolving fund to be used for the purposes herein suggested. Revenue from a possible city bond issue might be utilized in part for the purposes suggested.

A revolving fund having been created, advances therefrom might be deposited in court upon commencing condemnation proceedings, thereby enabling the city to take immediate possession and proceed with actual construction work.

The City of Los Angeles upon adopting a procedure ordinance, as suggested above, might provide therein that whenever in street proceedings assessments are collected, such assessments should be devoted either to the direct payment of the cost of the improvement or to reimburse any fund in the amount of advances which had been made from that fund toward the improvement for which the assessments were levied.

A method of procedure which would allow the city upon commencing condemnation suit to take immediate possession and to proceed with actual construction work would afford a speed and facility in carrying out such projects which is unknown at the present time. As suggested, the revolving fund from which advances are made to initiate such proceedings might be reimbursed by revenue derived from assessments subsequently collected. This feature is, we believe, one which should receive the utmost consideration in any contemplated improvement ordinance or statute.

Our suggestion for the adoption of a procedure ordinance by the City of Los Angeles under its charter provisions is in part prompted by the thought that such ordinance may be prepared and adopted at any time and proceedings carried on without the necessity of waiting for action by the State Legislature. Necessarily, the preparation of such an ordinance would require legal skill of the highest order, it would require careful examination of all constitutional and legal principles involved and would require that an attorney devote at least two or three months to its preparation. The work of preparing such an ordinance should be done in co-operation with or by the City Attorney of Los Angeles, upon whose opinion as to the validity of such ordinance the City Council would undoubtedly rely.

The validity of such an ordinance would need to be tested by court procedure before the assessments levied would be recognized as valid and the bonds marketable. This could be done in some minor project

before extensive use was made of the method. We believe that properly handled such a test case could be expedited to such an extent that no great delay would be necessary.

State Legislation Might Be Secured Which Would Incorporate Desired Method of Procedure

The California Legislature will convene in January of 1925. Previous to that time there might be prepared for presentation to it a statute governing street procedure embodying the features above outlined or suggested. This, however, involves delay, and, furthermore, there is no certainty that such a statute would be adopted. The City Council, on the other hand, could adopt an ordinance of procedure at any time, and this method seems to us the most practical and desirable.

It might be well, however, out of an abundance of caution to make a serious effort to secure the adoption of our proposed procedure ordinance by the Legislature as a state statute.

We shall now proceed to consider various other points involved in our general consideration of methods available for financing a street opening, widening and construction program of large magnitude.

Possibilities of County Aid to Construction Cost

We will not here discuss the various methods under which the county might carry out highway opening, widening and construction work within unincorporated county territory. Our discussion is directed to methods of county aid for such improvements lying wholly within an incorporated or charter city.

The county is not ordinarily concerned with the opening, widening or construction of streets within a city. Improvements of this character within a city come within what are known as municipal affairs and are exclusively within the jurisdiction of the city. (*Byrne v. Drain*, 127 Cal. 663.)

We know of no statute expressly authorizing the county to acquire rights of way for street purposes within incorporated cities.

The county may, however, contribute financial assistance to the cost of constructing or improving certain streets within municipalities. The Legislature, in 1923, adopted an act (Statutes 1923, p. 123) authorizing counties to improve or assist in the improvement of streets lying in municipalities. This statute may be outlined as follows:

1. The Board of Supervisors of the county, by four-fifths vote, may determine by resolution that the improvement of a street within an incorporated city is of general county interest and that county aid should be extended therefor.
2. Thereafter, and in accordance with such resolution, the county may give aid in one or more of the following ways; viz: it may contribute money, acquire material and deliver the same, furnish engineering service or labor, or loan its road building machinery.
3. The expense of such aid may be paid from the general fund, the general road fund or the fund composed of moneys received from the state pursuant to the Vehicle Act.

An alternate method provided by the statute permits the Board of Supervisors, by a four-fifths vote, to declare any street within an incorporated city to be a

part of the county system of highways. The legislative body of the city may, by ordinance, consent to the street becoming a part of the county system of highways and thereupon the Board of Supervisors may improve such street and maintain the same as other county highways are improved and maintained, and may pay the cost thereof out of any of the funds above mentioned. The Board of Supervisors may thereafter at any time adopt a resolution declaring that such street is no longer a part of such county system.

The County of Los Angeles annually receives from the State a considerable sum representing one-half of the Motor Vehicle License Fees collected from motorists within this county. During the present year this sum will probably amount to between \$400,000 and \$500,000. It is our understanding that the county has already promised this money to aid in street work in various municipalities.

The county's general taxes are, of course, levied upon real and personal property, both within and without municipalities within the county. A large portion of this revenue is derived from the City of Los Angeles, and it might be anticipated that the Board of Supervisors in making up their budget during May and June of this year for the next fiscal year might be induced to include a levy for the purpose of aiding in street work within Los Angeles and other cities within the county.

Whether County Bond Issue Available

Whether a county bond issue is available to aid in defraying the cost of major highways in the City of Los Angeles presents two vital questions:

- (1) Whether the county may legally devote bond money to this purpose;
- (2) Whether it is politically expedient to secure a favorable vote for the issuance of such bonds.

We will consider the first question briefly. The county has authority to vote and issue bonds for county purposes. The county apparently has no legal authority to issue bonds for the purpose of paying the cost of acquiring necessary rights of way for streets within incorporated municipalities.

The county may legally issue bonds, the proceeds of which may be used in part to pay for paving streets within cities which constitute a part of a county highway system. The Statutes of 1921, page 215, provide that whenever county bonds shall be voted for paving a county highway system and the natural course of such highway system runs into or through any municipality, it shall be the duty of the County Board of Supervisors to include in and pave such portion of said system located within such municipality as may be designated by the Mayor or other chief executive thereof and the County Supervisor in whose district such portion of the highway is located.

We may say that in our opinion municipalities outside of Los Angeles could hardly be induced to vote for a county bond issue, the proceeds of which would be used for the benefit of one municipality alone. However, a bond issue might be voted which provided funds to be used upon a complete county highway system connecting and passing through several municipalities.

Acquisition and Construction of Highway Lying in More Than One Municipality

Assuming that a highway forms the boundary line between two municipalities, provision is made whereby the respective municipal authorities have concurrent jurisdiction to construct or improve an existing highway, the cost to be borne by a local assessment district including a part of the territory of each city. This is provided by the Boundary Improvement Act of 1911—Henning Act 4957.

Assuming that it is desirable to lay out a new street extending through two municipalities, each city must acquire the necessary rights of way within its own boundaries. Each city must thereafter construct or improve that portion of the highway lying within its own jurisdiction. No method is now provided for the creation of a district to include more than one municipality for the acquisition of rights of way.

Construction Work in More Than One Municipality

The Los Angeles County Charter contains a provision authorizing the formation of a highway construction district to include lands lying in more than one municipality. This charter provision has never been utilized and the validity of proceedings thereunder has, therefore, never been judicially determined. The charter section provides for the organization of a highway construction district by the Board of Supervisors. The supervisors may provide for the inclusion in any such district of the whole or any part of any incorporated city upon ordinance passed by such incorporated city authorizing the same, and upon the assent to such inclusion by a majority of the qualified electors of such incorporated city or portion thereof proposed to be so included, at an election held for that purpose. Special ad valorem taxes may be levied in the district upon the assent of a majority of the electors voting at an election held for that purpose, and bonds of such district may be voted by two-thirds of the qualified electors of the district voting at an election held for that purpose.

Additional Legislation Suggested

The foregoing charter provision, as will be noted, relates solely to construction of highways and does not provide for the acquisition of rights of way which may be needed for highway purposes.

We have in mind certain possible legislation which would permit the organization of districts to include territory both within and outside of municipal boundaries, or to include portions of two or more municipalities, which territory would be assessed to meet the costs of acquiring or constructing highways regardless of their location as to boundaries. We believe that statutory provision for the creation of such districts, or a single metropolitan highway district including all the metropolitan area of Los Angeles, would aid materially in solving the city's highway problems.

Establishing Building Set-back Lines

One of the questions raised in your communication is with reference to the adoption of a set-back ordinance. The proposal, as we understand it, is that the city might adopt a set-back ordinance upon streets which have not as yet developed into business. Such

an ordinance would prevent building in advance of the lines established and would, therefore, leave such areas available for future street purposes at less cost than would be true if building were permitted to the original property lines. Inquiry may be made as to whether municipal authorities may establish such set-back lines under either of two powers—

- (1) The police power of the municipality;
- (2) The power of eminent domain.

Without setting forth all of our reasons we may state that it is extremely doubtful whether a municipality in California may adopt a set-back ordinance under its police power.

With reference to the establishing of a set-back line under the power of eminent domain, we call attention to the following California Statute:

Statutes of 1917, page 1421. This statute in two sections reads as follows:

"Section 1. Whenever public interest or convenience may require, the city council of any municipality shall have full power and authority to provide a procedure for the fixing and establishing of set-back lines on private property bordering on the whole or part of any street, avenue or other highway, to prohibit the erection of buildings, fences or other structures between such setback lines and the lines of any such street, avenue or other highway, and to condemn any and all property necessary or convenient for that purpose.

"Sec. 2. The ordinance prescribing such procedure shall provide, among other things, for the passage of a resolution of intention describing the land deemed necessary to be taken or damaged therefor, also the exterior boundaries of the district of lands to be benefited by said work or improvement and to be assessed to pay the damages, costs and expenses thereof, and shall require that a written protest signed by the owners of a majority of the frontage upon the streets and parts of streets within the district to be assessed, and filed with such city council, shall be a bar to such proceeding for a period of six months from the date of the filing of such protest. The procedure shall provide for due notice and hearing to property owners liable to be assessed, also a method for the assessment and collection of benefits and the payment of damages, together with such other matters as may be necessary or convenient to promote the objects hereof."

The City of Los Angeles has never made use of this statute, nor has any other city within California so far as we are advised. We do not find any court decisions discussing the validity of this act. The City Attorney of Los Angeles is inclined to believe that the statute

is not workable for the reason that the second section does not state definitely whether the assessment district is to include the land fronting upon the street to which the set-back line is applicable, or whether the assessment must be made against a larger district. It is not clear whether the property fronting upon the street to which the set-back line is applicable may or may not be included within the assessment district. Possibly an amendment to this statute may be necessary before an attempt is made to establish set-back lines under its provisions. This is a point which we would wish to consider further.

Parking Ordinances

The City of Los Angeles is vested by the constitution with power to enact all local police and sanitary regulations not in conflict with general laws. The general laws in this state do not in any material measure regulate parking within cities. This field, therefore, may be covered by city ordinance. The City of Los Angeles may under the police power adopt all reasonable regulations either restricting or prohibiting parking upon its streets which do not violate the general rule that all such ordinances must be reasonable. The City Council may in the first instance exercise its judgment as to what is a reasonable restriction or prohibition under particular circumstances referable to particular streets. This determination will not be disturbed by the courts unless the Council acted arbitrarily or without reason. The City Council of Los Angeles may without doubt adopt what may be determined to be the necessary regulations to govern parking on public streets, alleys and other public places within the city. The Council may limit the time and manner of parking, or may prohibit parking altogether in congested districts, if such regulation is reasonably necessary to permit freedom of travel on such streets.

Conclusion

Our discussion has treated of present ways and means of financing the plan for major highways for the City of Los Angeles. We have suggested various methods which might be employed; we have suggested certain new methods. We hesitate to further prolong this communication. We conclude it, therefore, by saying that if we can assist you or the Traffic Commission in bringing about the early accomplishment of the traffic relief you are planning, we will be very glad to do so.

Yours very truly,

DAVID R. FARRIES,
General Counsel.

J. ALLEN DAVIS,
Associate Counsel.

June 1, 1924.

Appendix C

LOS ANGELES TRAFFIC COUNT BY THE BOY SCOUTS

By PHILIP P. SHARPLES

Traffic counts already made have been rendered obsolete by the growth of traffic and its change of direction. The present study of traffic movement has been divided into surveys of the downtown district by the Parking Survey Board and a study of the traffic in outlying sections by the Consulting Board (Messrs. Olmsted, Bartholomew and Cheney).

The Parking Survey count was made by paid workers and included in addition to downtown cordon traffic count a detailed study of each parking space whether on a public street or on private property in the central business district. These studies showed 200,584 vehicles entering the business district between 7 A. M. and 6 P. M. and 176,301 leaving. The balance showed the number of vehicles still left in Los Angeles business district at six o'clock minus the equivalent already there at 7 A. M. A count outside of this district was necessary to show the direction and volume of traffic at outlying points in order to indicate the point or points at which traffic relief was most urgent.

Paving and topography cause the street traffic in Los Angeles to follow very definite routes and it was possible to pick out stations of a reasonable number which in addition to the cordon count around the business district made by the Parking Survey Board would give a very comprehensive idea of the traffic movement in and about the city.

Various agencies were considered for making this count. Owing to the limited funds available for the work volunteer workers were considered essential. The Boy Scouts were chosen on the ground that they had the proper kind of discipline, that they were drawn from every part of the city and that they were greatly interested in civic matters. Mr. E. D. DeGroot, the Scout Executive for Los Angeles, gave his hearty support to the idea, and to his enthusiasm and power of kindling a response in his organization is largely due the success of the count. Mr. A. G. Seiler, Field Executive, had charge of the details.

The count was taken on Thursday, February 14, 1924, from 7 A. M. to 6:30 P. M. There is no virtue

in the day but preliminary studies had indicated that Thursday was the most nearly average traffic day of the week. The time of year is faulty in that daylight ceases at five-thirty but it was imperative to have the results at as early a date as possible.

The Scouts were given a day's leave of absence from school with a record of attendance if they were reported by the Scout organization to be on duty on the count day. The permission of a parent or guardian to take part in the count was also required.

An examination of the cards showed naturally a great variation in workmanship. Few failed to make their records clear.

As a check on the accuracy of the count, adjacent corners were carefully compared and in case of any discrepancy the cards were carefully gone over. In this way mistakes in sorting and tabulating were in several cases detected and the boys' work proved to be correct.

The tabulation was done on large sheets with a ruling for each fifteen minutes during the counting time and vertical columns for each of the four stations and for passenger and trucks separately. This made a total of twenty-four columns for a standard corner.

The columns were totaled separately and the traffic in every direction from the corner for both trucks and passenger automobiles was figured separately.

The cross footings give the number of vehicles passing a station on the same side of the street and the vertical footings give the total vehicles passing on the opposite side of the street. The sum of the two gives the total traffic flow on the street. The sum of the trucks and the passenger cars is entered on the traffic flow map. As each vehicle is counted twice in the table the total flow at the corner will be half the sum of the four street totals. The heaviest traffic hour was tabulated in the same way.

The tabulation of the results shows some very heavy traffic counts. The following table shows the twelve heaviest corners counted. The north and south is in each case given first.

Heaviest Traffic Corners in Los Angeles (from Boy Scout Count) 7 a. m. to 6:30 p. m. Feb. 14, '24.

CORNER	NORTH	SOUTH	EAST	WEST	TOTAL	HEAVIEST TRAFFIC HOUR
Figueroa St. & Santa Barbara.....	23,980	22,127	18,766	15,571	40,222	7,227
Vermont & 8th.....	16,030	16,338	19,395	20,393	36,078	4,352
Figueroa & Pico.....	19,588	21,315	14,401	15,282	35,293	4,123
Figueroa St. & Adams St.....	26,107	26,470	9,466	7,752	35,098	5,440
Western Ave. & Wilshire Blvd.....	16,400	17,929	16,943	15,376	33,394	4,135
Figueroa St. & Washington St.....	16,839	18,704	14,671	16,242	33,228	3,823
Vermont Ave. & Wilshire Blvd.....	14,415	15,490	18,638	17,871	33,207	3,781
Western & Pico.....	22,344	20,387	11,638	11,637	33,003	5,336
Glendale Blvd. & Sunset Blvd.—Two Levels:						
Upper Level.....	596	49	21,431	21,914		
Lower Level.....	9,799	10,407	619	3	32,409	4,272
Western Ave. & Santa Monica.....	14,534	15,870	18,327	15,737	32,234	4,105
Main & Adams.....	26,019	24,352	6,941	6,624	31,968	3,587
Figueroa St. & 9th St.....	22,419	23,541	8,513	8,797	31,635	4,054

MAJOR TRAFFIC STREET PLAN

A traffic flow map was constructed by plotting the net counts as a cross on a map of the city drawn to a scale of 1/600 feet to the inch. Each arm of the cross is made a width to correspond to the traffic flow along 50,000 vehicles to the inch in width. The adjacent corners were connected. The resulting diagram indicated where relief was necessary to provide for normal flow either by diverting into other channels by widening and straightening existing streets. The traffic flow map must needs be studied with a rough understanding of street paving widths. Theaviest traffic flow is not always where it would naturally be but where it is forced by street widths, by set car routes, by sub-business centers and other factors that reduce effective traffic width. As Prof. Thur E. Johnson has so well pointed out in his studies traffic capacities of the Baltimore-Washington road, uninterrupted flow can pass one thousand vehicles an hour on each line of traffic and this number, owing to wider spacing, varying roughly as the square of the width, does not change within rather wide limits of width.

The limiting capacity of streets lies largely in the interruptions to traffic flow. The traffic flow map shows points where it is most necessary to study the interruptions and to provide for traffic control. The data collected does not furnish a complete traffic survey as it was thought inexpedient to burden the city Scouts with more than a rough classification of trucks and passenger cars. The ratio between trucks and passenger cars is roughly 1 to 10. The following areas are from points selected to show the variation between districts:

STATION	% TRUCKS OF TRAFFIC	CHARACTER
Figueroa St. & Santa Barbara	13	Mixed
Figueroa St. & Wilshire Blvd.	9	Residential
Santa Fe Ave. & Vernon Ave.	25	Industrial

No attempt has been made as yet to plot a separate truck flow diagram but the results would prove valuable in showing where special provision should be made in trucking regulations and for heavier pavements. The count has proved of inestimable value in the studies of the Consulting Board. Without it, the conditions and volume of traffic would have been with difficulty realized. The accuracy and dependability of the work of the Boy Scouts have reflected great credit on the boys and their training.

Traffic counted at principal corners in Los Angeles by Boy Scouts 7:00 A. M. to 6:30 P. M., Feb. 14, 1924.

	Passenger Vehicles and Trucks		
	N-S	E-W	Total
and Blvd. & Colorado Blvd.	15,303	6,423	21,926
Broadway & Mission	15,150	7,397	22,547
oadway Bridge & Pasadena	6,949	16,323	23,272
oadway & Bernard	21,320	3,484	28,487
Broadway & College	19,091	5,259	24,356
colyn & Indiana	239	5,066	5,305
huenga	10,927	86	11,013
entral & Ninth	13,358	16,047	29,405
entral & Washington	13,496	8,577	22,073
entral & Jefferson	12,787	6,690	19,477
entral & 38th	10,963	3,425	14,338
entral & Vernon	11,443	6,105	17,548
entral & Slauson	6,572	12,415	18,986
gueroa & Sunset	13,098	16,705	29,803
gueroa & First	11,597	3,997	15,594
gueroa & Ninth	22,980	8,655	31,736
gueroa & Pico	20,452	14,842	35,294

First & Indiana	723	4,300	5,022
Figueroa & Washington	17,772	15,457	33,229
Figueroa & Adams	26,289	8,609	34,898
Figueroa & Exposition	21,951	4,193	26,144
Figueroa & Santa Barbara	23,054	17,569	40,722
Figueroa & Vernon	13,818	9,930	21,748
Figueroa & Slauson	9,400	7,787	17,188
Figueroa & Manchester	2,248	4,994	7,242
First & Alvarado	1,711	6,468	8,179
First & Vermont	13,079	5,710	18,788
Florence & Alameda	7,617	5,897	13,514
Glendale & Riverside Drive	9,391	1,647	11,028
Hollywood & Highland	6,759	11,481	18,240
Hollywood & Vine	4,707	15,393	20,100
Hollywood & Western	8,627	15,364	23,990
Hoover Street & First	171	7,263	7,434
Hoover & Manchester	975	5,653	6,628
Hooper & Vernon	1,749	6,443	8,193
Jefferson & Grand	9,317	12,336	21,654
Jefferson & Vermont	11,781	7,725	19,506
Jefferson & San Pedro	16,411	10,541	26,952
Los Feliz & Vermont Avenue	3,979	10,308	14,287
Los Feliz & Riverside Drive	14,432	1,355	15,786
Macy & Mission	12,058	8,977	21,036
Macy & Aliso	616	3,960	4,576
N. Main & Mission Road	3,087	243	3,330
N. Main & Workman	4,647	6,399	11,046
N. Main Bridge	8,933		8,933
Main & Adams	18,668	4,792	23,460
Main & Jefferson	18,083	11,585	29,668
Main & Santa Barbara	8,468	5,241	13,708
Main & Slauson	9,393	10,215	19,608
Main & Vernon	11,039	10,893	21,932
Main & Manchester	7,243	4,482	11,724
Maple & Jefferson	9,183	11,913	21,096
Mission Road & Alhambra Ave.	8,895	5,300	14,195
Moneta & Santa Barbara	10,591	4,793	15,384
Moneta & Slauson	8,336	6,610	14,946
Moneta & Florence	5,443	2,027	7,470
Moneta & Manchester	3,261	5,226	8,487
Normandie & Santa Barbara	3,913	7,334	11,246
Pasadena Ave. & Dayton Ave.	13,116	3,974	17,090
Pico & Alvarado	9,707	10,495	20,202
Redondo Blvd. & Walnut St.	7,254		7,254
San Fernando Rd. & Pasadena Ave.	11,179	12,106	23,285
San Fernando & Los Feliz	6,612	12,467	19,078
San Fernando & Dayton	3,490	13,320	16,810
San Fernando Rd. & Brand Blvd.	8,097	6,974	15,071
Santa Monica & Western	15,202	17,032	32,234
Santa Monica & Highland	3,371	13,422	16,793
Santa Monica & Vermont Ave.	15,514	10,038	25,551
Santa Fe & Vernon	20,306	5,690	25,996
Santa Fe & Seventh	9,808	11,169	20,977
Santa Fe & Ninth	13,518	13,904	27,422
Santa Fe & Florence	7,268	10,334	17,602
Seventh & Hoover St.	8,510	8,549	17,058
Seventh & Mateo	1,807	5,567	7,374
Seventh & Boyle Sts.	12,484	4,655	17,138
Sixth & Alvarado	5,568	19,791	25,360
Sixth & Rampart	5,843	15,564	21,406
Slauson & Alameda	10,100	21,701	31,801
South Park & Manchester	3,387	5,525	8,912
South Park & Vernon	9,999	6,681	16,680
North Spring Street Bridge	8,449		8,449
Sunset Blvd. & Santa Monica Blvd.	19,585	4,506	24,091
Sunset Blvd. & Laurel Canyon Dr.	1,896	6,738	8,634
Sunset & Highland	5,914	10,907	16,822
Sunset & Western	10,986	12,535	23,522
Sunset & Vermont	11,882	8,435	20,317
Sunset & Glendale Blvd.	10,103	21,673	31,776
Sunset & Vine St.	5,247	18,040	23,288
Vermont & Sixth	12,536	9,695	22,232
Vermont & Eighth	16,184	19,884	36,078
Vermont Ave. & Tenth	14,628	6,089	20,718
Vermont & Pico	12,897	8,416	21,312
Vermont & Sixteenth	10,639	9,342	19,980
Vermont & Slauson	7,664	7,362	15,026
Vermont & W. Adams	12,676	10,482	23,158
Vermont & Santa Barbara	14,023	10,160	24,182
Vermont & 5th St.	8,070	6,695	14,765
Vermont & Manchester	4,310	5,814	10,124
Vermont & Exposition	12,389	4,404	16,793
Vermont & Washington	12,063	12,885	24,948
Western & Franklin Ave.	5,618	6,020	11,632

APPENDIX C—TRAFFIC COUNT

Western & Fountain	12,979	1,483	14,462
Western & Beverly	18,070	9,622	27,692
Western & Tenth	11,663	3,172	14,834
Western & Pico	21,366	11,658	33,024
Western & Washington	13,218	12,607	25,825
Western & Sixteenth	13,593	6,092	19,686
Western & Adams	15,272	11,039	26,309
Western & Slauson	8,934	8,201	17,134
Western & Manchester	4,711	2,405	7,116
Western & Vernon	9,762	2,907	12,669
Western & Exposition	7,987	620	8,607
Western & Santa Barbara	14,930	4,438	19,368
Whittier & Downey Road	1,071	13,725	14,796
Whittier Blvd. & Pasadena	3,134	10,610	13,744
Whittier & Boyle	11,572	15,737	27,309
Whittier Blvd. & Indiana	1,231	15,134	16,365
Wilshire Blvd. & Vermont	14,953	18,255	33,208
Wilshire & Western	17,165	16,165	33,324
Wilshire & Highland	330	13,195	13,524
Wilshire & Santa Monica	5,397	3,936	9,382
York Junction	7,400	6,908	14,308

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