MAJOR TRAFFIC STREET PLAN
Los Angeles, California.
The Traffic Commission
of
The City and County of Los Angeles
and Public Services
Los Angeles
415 Financial Center Bldg.
May 6, 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-
mision this bound copy of "Major Traffic
Street Plan of Los Angeles".

Yours very truly,

[Signature]

Walter R. Lindesmith
Executive Secretary

WEB/8
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 Commission of the City and County of Los Angeles

by FREDERICK LAW OLMS TED
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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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 plans 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 favor of which the city can advantageously grow, and to which it may gradually adjust itself, making improvements pie by pie as they become necessary, each 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 wise way to safeguard execution of the plan.

We would acknowledge the great value and assistance to our work of the two previous studies, "A Report 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. Byerston, executive secretary, and Clarence R. Doheny, publicity director of the same body; for the valuable aid on legal matters given by David R. Evans, General Counsel for the Automobile Club of Southern California; to W. H. Pierce, former City Councilman, and member of the executive committee of both the Traffic Commission and Planning Commission, for much constructive and helpful advice; to the Planning Commission of Los Angeles, and especially to its President, Sumner P. Hunt, and its Director, G. Gordon Whitall; to Hugh P. Pomeroy, Secretary and Member of Los Angeles County Regional Planning Commission; to Col. John A. Griffin, Assistant City Engineer; Col. John H. Foran, Assistant City Engineer; F. A. Lorentz, Engineer of the Board of Public Utilities; Richard Saboe, J. B. Lipsh샣, H. Z. Osborne, E. E. East, Geo. B. Anderson, George A. Damon, W. W. O'Malley, W. W. Pendle, James W. Reagan, Jay A. Wills, and others who, through conferences 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. 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,

P. P. Sharpless, Chief of Staff.
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, as well as to consider a comprehensive 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 viewing 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 submits, as their principal work, such a general street plan. It limits together all previous suggestions of which record could be found, covers the area in which most of the thirty-five projects are situated, and modifies 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 observed 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 purpose 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, both 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 adequate 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 loss 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, 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 each element will unquestionably call for modifications of the present plan, just as the present plan must properly influence the plan 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 pages 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 pages 28 to 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. A 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 hope 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 conception 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, that and the other project must be gradually planned so as to realize a perfect 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 parkways, prohibition of obstructive turns at particularly busy intersections, reduction of vehicle use of more effective signalling, centralization 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 grid pattern and by-pass streets for business districts and 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 the Boulevard and Parkway System plan supplementing it.

5. Provision for expeditious 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 spirit is a prerequisite of successful accomplishment. Engineering skill, improved legislative measures and an equitable financial plan are necessary accomplishments. 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:

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. Uncollected width and arrangement of streets.
4. Improper use of existing street space.
5. Premature mixing of different types of traffic.
6. Natural or artificial obstructions to circulation.
7. Limiting capacity of street intersections.
8. Concentration of business.

4. Improper use of streets. (Including elimination of jogs and dead-end streets, creation of grid pattern and by-pass streets for business districts, enforcement of radii and inter-district thoroughfares of the major street plan.)

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 319,158 in 1910 and 570,673 in 1920.

4. Improper use of streets. (Including elimination of jogs and dead-end streets, creation of grid pattern and by-pass streets for business districts, enforcement of radii and inter-district thoroughfares of the major street plan.)

From March 1, 1923, to March 1, 1924, there were 84,000 new lots sold by subdividers 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 100,000 new buildings.

New subdivision maps filed of record in the city and county during 1923 were estimated to cover a total of 62,000 acres, nearly all withdrawn from agriculture for lots, lots, lots.

The 1924 assessed valuation of property in Los Angeles County aggregated $1,952,088,009, a gain of $413,069,927 over last year's total. The 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 1923-24, 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 per cent 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 traffic upon the main thoroughfares of the city as recorded for the years 1923 and 1924 respectively. The general increase throughout the whole city and particularly the proportionately greater increase 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 3).

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 coroner counts of the Parking Survey Committee showed 543,374 passengers (including drivers) carried by autos into the downtown district (in 11 hours in November, 1923) as against 740,000 on the street railways in the same area. For 24 hours it is estimated that automobiles carried in and out 600,000 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 arrive at.

In the same way as the trip fares on the street railways, 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 26.5 per cent increase in five years. The average daily passenger haul the first week in December, 1918, was 517,380 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 riding in New York and in the winter there it is small and it is uncomfortable to ride in an automobile), it is small and it is uncomfortable to ride in an automobile.

In Los Angeles average daily passenger haul the first week in December, 1918, was 517,380 and in the same period of 1923 was 1,065,000, an increase of more than 100 per cent.**

*From paper by Gen. B. Anderson in "Arts" for March, 1924.
upon 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 unsatisfactory arrangement that is the natural result of piecemeal, uncontrolled land subdivisions.

There are surprisingly few streets of generous widths in Los Angeles. A width of one hundred feet is quite exceptional, with the greater widths being practically unknown. There is a respectable number of eighty-foot streets but these are not located in residential districts and un-related. The prevailing standard has been the sixty-foot street, a width usually suited 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 improperity related method of land subdivisions 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. More regulation of the laying out of such new streets as subdivisions 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 regulations 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*

<table>
<thead>
<tr>
<th>City</th>
<th>De­voted to Roadways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>22.5</td>
</tr>
<tr>
<td>Buffalo</td>
<td>29.1</td>
</tr>
<tr>
<td>Boston</td>
<td>27.3</td>
</tr>
<tr>
<td>Washington, D.C.</td>
<td>37.5</td>
</tr>
<tr>
<td>Detroit</td>
<td>34.5</td>
</tr>
</tbody>
</table>

Because of this restriction of street and roadway area in Los Angeles, imprudent 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 above, as has been done by bullet'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 7:00 P.M. has helped conditions materially during the evening rush hour and gradually this type of restriction must be extended for longer periods, particularly 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.
Major Traffic Street Plan

The street cars are the most economical carriers of people and goods on available ground. For the right of way for most of this class of traffic its freedom of movement is indispensably provided for. Heavy tractors, whether horse drawn or motor driven, as yet constitute a small proportion of total traffic. Motor trucks find their capacity already fully used, each have their capacity reduced more than 50 per cent in the presence of large groups of traffic. (Theoretically, the capacity of each street would be reduced 50 per cent or less. 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.

Traffic 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.

In general there are several other 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 northwestern sector of the business district (Bunker Hill) bounded by Sunset Boulevard, Hill Street, Fifth Street and Figure Street is a decided handicap to the business district. Construction of the Second and Third Street tunnels, the Broadway road, the hill street tunnel and the opening of Fifth Street, now under construction, in part at least, will do much to counteract this approach. A still further reduction of the serious grades in this area is desirable and should take place as economic conditions warrant. The Los Angeles River and the several railroad yards and vacant lots offer a similar natural and artificial barrier to growth and free traffic circulation. East of the river, few streets have and several viaducts and bridges have already been constructed, while quite recently the city, by assembling a group of six viaducts and bridges (First, Fourth, Seventh, Ninth, 16th and 23rd Streets) has eliminated many of the grade crossings and improved access between opposite sides of the river. Excellent foresight has been shown in providing a line 56 ft. roadway capacity for each of these viaducts, for which bonds were actually sold.

A comprehensive plan of grade-crossing elimination should be worked out as soon as possible for the whole route. The cost of grade separations, although now difficult and expensive, is no longer warranted, and in Los Angeles, because of the decrease in the number of grade crossings between the river and the city, no external traffic and the country, cannot afford to allow the traffic 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 continuous growth west, south and east. Its reflection is most evident in the total volume of traffic entering the business district (Sunset and Figueroa to the west, Figueroa and First to the south, and Figueroa and 20th to the east). Table 2 illustrates the major traffic directions as compiled from the 1924 traffic census (11) taken by the Parking Survey Board.

<table>
<thead>
<tr>
<th>Traffic Direction</th>
<th>Entering Business District</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>41,163</td>
</tr>
<tr>
<td>South</td>
<td>57,385</td>
</tr>
<tr>
<td>East</td>
<td>76,094</td>
</tr>
<tr>
<td>West</td>
<td>209,589</td>
</tr>
<tr>
<td>Total</td>
<td>76,101</td>
</tr>
</tbody>
</table>

The Table 2 shows the traffic entering the business district by north, south, east and west.

This should be continued to include the handling and elimination of congestion in the bottleneck areas between vehicles is impracticable of accomplishment, except in new areas.

The "bottleneck" is the term now appropriately applied to the serious grades in the business district now devoted to street and railroad lines. The plans show opportunity for improvement as well as uninterrupted through movement. The limitations of this sort of plan are the expense of property, 120 feet of street width being required (10), and the impossibility of acquisition.

Traffic actually costs $252,216 for viaduct construction and $269,300 for roadway space (Table 1 on page 12). This is indeed a great thoroughfare intersecting as for instance, in some cases, the plans show opportunity for intercommunication with cross streets and local streets.

Attention has previously been called to the limited areas in the business district now devoted to street and roadway space (Table 1 on page 12). This is indeed a great thoroughfare, for there are fewer thoroughfares that are not occupied at least in part by street cars, and in many cases the lines run unnecessarily from one street to another.

6. Natural or Artificial Obstructions to Circulation

The topography of the district east and west of the city of Los Angeles is roughly shown by Map 1. The city occupies a valley of large dimensions, bounded on the north and south by the Pacific Ocean. There is room for much growth to the west and south, and for unlimited growth to the east.

The north there is less opportunity for growth, but even here traffic congestion is beginning to be feared. The San Fernando Valley can eventually accommodate a population estimated by the Regional Planning Commission at approximately 400,000 per square mile. The railroad barriers have not been a serious handicap to the growth of the city, but have caused inconvenience and waste of time by requiring traffic to travel to avoid them.

The most notable case of this is the pass in the Santa Monica Mountains immediately north of the present business district along the Los Angeles River. This pass was the natural site of the early city. The more favorable nature of the terrain to the south and west caused 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 asphyxiation of much of the level area not occupied by the river and left a limited street space, although additional space for street purposes is now difficult and expensive, as acquisition. The "bottle-neck" is the term now appropriately applied to this pass. This is not an accurate term for the immediate area but 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 continuous growth west, south and east. Its reflection is most evident in the total volume of traffic.

Causes of Street Congestion

The next great cause of street congestion is the concentration of business in 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 15 stories. A few streets, such as Sunset and Glendale Boulevards, where grade separations are possible, and El Pueblo, where certain streets might reduce the above estimates of cost, though at Sunset and Glendale no satisfactory provision for intercommunication with cross streets is made 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 the "bottleneck" or standing within the limited area of concentrated activity. This fact is expressed in the term "bottleneck" in the volume of traffic among thoroughfares, as in the Hollywood and Vine Street area.

Attention has been called to the difficulties of grade separations and improvements. The fact is evident that a considerable volume of traffic is made up of relatively short overlapping movements.

*Traffic actually costs $252,216 for viaduct construction and $269,300 for roadway space (Table 1 on page 12). This is indeed a great thoroughfare, for there are fewer thoroughfares that are not occupied at least in part by street cars, and in many cases the lines run unnecessarily from one street to another. The plans show opportunity for improvement as well as uninterrupted through movement. The limitations of this sort of plan are the expense of property, 120 feet of street width being required (10), and the impossibility of acquisition.

Traffic actually costs $252,216 for viaduct construction and $269,300 for roadway space (Table 1 on page 12). This is indeed a great thoroughfare, for there are fewer thoroughfares that are not occupied at least in part by street cars, and in many cases the lines run unnecessarily from one street to another.
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 become 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 as many 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 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 the city's long range plan.
3. Restrict unnecessary traffic movements.

1. Secure Maximum Use of Existing Street Space

Los Angeles has done much toward accomplishing the first of these three, i.e., to encourage the greatest possible use of existing street space. An extensive code of traffic regulation has been adopted, applicable chiefly to the central business district from 7 A. M. to 4 P. M., prohibiting entirely on certain streets coming near the buildings. As automatic synchronized traffic system has been installed, which provides intervals of $\frac{55}{3}$% of the time for northward and westward traffic, of $\frac{44}{3}$% in each. Right-hand turns have been prohibited in the congested district.

The stopping and loading of street cars greatly slows the volume of flow as at between 10 and 11 A. M. and 4 P. M.

2. Widen and Open Streets in Accordance with the City's Long Range Plan

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.

3. Restrict Unnecessary Traffic Movements

Once the several openings and widenings suggested in this report have been accomplished 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. Every day it is evident that there is a wide difference in the necessity for traffic movements that take place in the most congested centers.

Traffic consists in other cities indicate that the street cars are the most important users of the street area downtown, along the average $\frac{93}{100}$% to $\frac{95}{100}$% 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 F. E. Ry.) carry only a few more passengers than carried by automobiles.

The stopping and loading of street cars greatly slows the volume of flow as at between 10 and 11 A. M. and 4 P. M.

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 vehicle 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 23% of all vehicles were in this class. (Boy Scout count.)

The following table shows the various types of cars in use:

<table>
<thead>
<tr>
<th>Type of Vehicle</th>
<th>Autos Registered April 1, 1924</th>
</tr>
</thead>
<tbody>
<tr>
<td>In California</td>
<td>In Angeles County</td>
</tr>
<tr>
<td>Automobiles</td>
<td>1,056,756</td>
</tr>
<tr>
<td>Trucks</td>
<td>43,527</td>
</tr>
<tr>
<td>Trailers</td>
<td>5,908</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>14,694</td>
</tr>
</tbody>
</table>

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, 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 remitted 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 from more automobiles in general must yield in proportion to more intensive in-
creases of demand, they will be exclusive of passenger transport occupy 14.3 times as much road-
way space per person carried (according to L. A. Rail-
way figures) as do street cars in the Los Angeles busi-
ness district. The flexibility of automobile transport effects to some extent its higher unit cost, but to a
reasonable transportation in whatever form, motor bus, trolley bus, street car, or rapid transit necessary and desir-
able 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 prec-
edents by which to judge measures proposed for relief. The concentration of business, as previously indicated, is responsible for much present congestion. Concentra-
tion of business is more or less necessary and desirable, however, and to what length cities may go in restric-
tion of concentration is a matter for much further study, certainly beyond the limits of this investigation.
Zoning ordinances, by fixing heights limits and the area of the lots which may be covered, and by differentiating between types of residential, commercial and industrial districts, form a foundation upon which the ultimate solu-
tion 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 pos-
able to provide height and area limits to congestion, as well.
Decentralization is a term now used in the minds of those concerned as a solution of city growth. Persons interested in business property, at least in large com-
mercial centers, will be more and more concerned about pro-
esses of decentralization. And yet a very natural ten-
dency of this character that might perhaps better be de-
cribed as specialization, is already taking place in no uncertain way in Los Angeles. The new
Hollywood business district and more recently the Vermont Avenue and Western Avenue districts, are evidences of it. To a certain extent two districts are
but examples of numerous local retail centers that will develop at intervals throughout the whole Los An-
geles district as a whole. They are neighborhood centers for local shopping that the central
business district cannot and should not continue to draw itself at the cost of interfering with kinds of business which are better adapted to central location.
At the very time these centers develop, the central business district continues to grow and expand. Here in specialization-the central business district for such offices, theatres, hotels, department stores and specialty shops, etc., are drawn to the central location.
Mechanical transportation has created a revolution in the volume of business and traffic to the extent that if they are to do business at all—the local neighborhood centers for all business which can be efficiently and productively conducted there. The traffic concentra-
tion is broken up, gradually resulting in mass trans-
portation for the main center and more of the retail
shopping and delivery traffic distributed throughout the neighborhood centers. And that the traffic in the
street system as a whole will grow, and probably increase in the capacity of our 15th century street systems at all comparable with the increase in the 18th century, horse-and-buggy town. They are
neighborhood centers for local shopping that the central
business district cannot and should not continue to draw itself at the cost of interfering with kinds of business which are better adapted to central location.

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 street system. If that limit is doubled, the limit will be raised, but when it is again reached, the final degree of capacity will be just as bad with a smaller limit capacity.

When the limit of increasing vehicular traffic is fixed by the physical capacity of the road or by other
factors, congestion will reach a point approximating the intolerable. Whether the street is as yet of such
width or area in length, the street system as a whole will probably increase the capacity of the street, or by differentiating the use of buildings in such a way as to
avoid interference with lands of use. And this is the sort of
capability that capacity is doubled, that capacity is doubled, that capacity is doubled, that capacity is doubled.

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

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

Establishing a Balanced Plan

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

Establishing a Balanced 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 under-
standing is the sharp distinction that must be made be-
 tween 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 indus-
trial 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, particu-
larly of fast moving vehicles, cities are being driven to
concentrate through traffic on a limited number of con-
venient and adequate major thoroughfares, where ordi-
nary drivers can know they are reasonably safe, and
the reckless ones can be more easily and economically
restrained.

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

Diagram No. 5—Increase of Traffic on Long Beach Boulevard, Valley Boulevard and Harbor Boulevard.
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 these streets. By thus concentrating the heaviest and most destructive wear to streets properly adopted 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 one narrow surface only on material on the local streets and so maintain all the streets in far better condition at a smaller total cost than is possible without such differentiation. The burden of making any all and street improvements under heavy traffic 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 direction.

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 study and more fully balanced systems of streets for handling traffic, is essential. The following table shows the situation:

### Table 4—Street Accidents in Los Angeles, 1918-1924

<table>
<thead>
<tr>
<th>Year</th>
<th>Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1918</td>
<td>114</td>
</tr>
<tr>
<td>1919</td>
<td>597</td>
</tr>
<tr>
<td>1920</td>
<td>128</td>
</tr>
<tr>
<td>1921</td>
<td>172</td>
</tr>
<tr>
<td>1922</td>
<td>203</td>
</tr>
<tr>
<td>1923</td>
<td>322</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Mile</th>
<th>Aggregate Co.</th>
<th>Grooved Gravel</th>
<th>Macadam</th>
<th>Total Cost of</th>
<th>(clusive of Carving and gutters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1913-16</td>
<td>48+</td>
<td>20+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1914-15</td>
<td>20+</td>
<td>40+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1915-16</td>
<td>15+</td>
<td>25+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1916-17</td>
<td>6+</td>
<td>20+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1917-18</td>
<td>24+</td>
<td>7+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1918-19</td>
<td>12+</td>
<td>8+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1919-20</td>
<td>25+</td>
<td>9+</td>
<td></td>
<td>4,555,124</td>
<td></td>
</tr>
<tr>
<td>1920-21</td>
<td>25+</td>
<td>9+</td>
<td></td>
<td>2,385,374</td>
<td></td>
</tr>
<tr>
<td>1921-22</td>
<td>15+</td>
<td>10+</td>
<td></td>
<td>3,810,762</td>
<td></td>
</tr>
<tr>
<td>1922-23</td>
<td>15+</td>
<td>17+</td>
<td></td>
<td>5,000,000</td>
<td></td>
</tr>
<tr>
<td>1923-24**</td>
<td>0+</td>
<td>17+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Major Traffic Thoroughfares

<table>
<thead>
<tr>
<th>Mile</th>
<th>Aggregate Co.</th>
<th>Grooved Gravel</th>
<th>Macadam</th>
<th>Total Cost of</th>
<th>(clusive of Carving and gutters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0+</td>
<td>17+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the past twenty years, there has been a revolution in all former ideas in America as to streets and their use, how they should be laid out, paved, graded or improved. The coming of the fast motor vehicle and trucks and trailers with very heavy loads and rough roads, sometimes to as much as 10 and 12 tons on two wheels—has made necessary more permanent, wider, heavier and more costly hard surface pavements on streets subjected to this traffic. Nothing less will stand up under such a strain. There is no necessity in the making of inadequate pavements constantly breaking down and continually in need of repair and renewal.

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>
<thead>
<tr>
<th>Year</th>
<th>Aggregate Co.</th>
<th>Grooved Gravel</th>
<th>Macadam</th>
<th>Total Cost of</th>
<th>(clusive of Carving and gutters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0+</td>
<td>17+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As soon as a hard surface pavement is now laid on a street of any length, it immediately attracts all the traffic from the surrounding neighborhood, becomes more dangerous for children, dust, dirty and noisy for the houses fronting on it, and also becomes useful in many ways for residences, except for the larger type of traffic which cannot go back from the street. And unless it is a very minor street, the street is at best made dangerous and noisy.

Minor Streets Should Be Narrower and Indirect

It is to be remembered that every street should be laid out through a street, it is now seen to be economical to provide wider and heavier pavements on the more important streets, but the city cannot afford to waste traffic and to keep traffic off the rest of the streets as it now is.

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 house, give preferences in nearly every case to a quiet, out-of-the-way street, free from the framer and through traffic.

As a rule, when 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 with adequate capacity for carrying through the 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 laid out as local quiet streets into additional major traffic streets, sometimes devoted to through traffic, sometimes serving along with the north and south streets between Figueroa and Main Street, south of the central business district.

It may be a very wise policy in city planning to lay out some of the originally local streets intermediate between the original main thoroughfares and the intermediate streets and with such building line setbacks that they can, if necessary, be converted at some future time, without economical additional cost, into intermediate streets for major thoroughfares; but this does not alter the soundness of a thoroughfare system. Each street of a thoroughfare system is adequate for the traffic needs which it was intended to meet. It is 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 with adequate capacity for carrying through the 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 laid out as local quiet streets into additional major traffic streets, sometimes devoted to through traffic, sometimes serving along with the north and south streets between Figueroa and Main Street, south of the central business district.
Six-Line Streets

The minimum capacity for a major thoroughfare should be two lines of rapidly moving vehicles in each direction, completely free from obstruction by vehicles stopping or parked at the curb. Under modern conditions as to width of vehicles, speed, and necessity for clearances, this requires approximately 40 feet. Reduction of this allowance means reduced speed and greater danger. Parallel parking at the curb requires a minimum of 7 feet more on each side. Hence a normal uniform width of 56 feet is necessary between curbs, and 56 feet is preferable. This is called a six-line roadway. It can be provided on a street 80 feet wide between property lines, and has been so provided on a number of such streets in Los Angeles, but this involves sidewalk widths of only 12 or 13 feet. Where a street is residential in character, such a sidewalk width is cramped for tree planting, and where it develops as a business street, as is very apt to be the case sooner or later on major traffic streets, it is cramped for shoppers. An over all width of about 56 feet is therefore distinctly preferable to 60 feet for a six-line thoroughfare.

A six-line street which carries street car traffic has a much reduced capacity for vehicular movement. Even if parking is prohibited opposite the loading places of the cars, and one free gangway is thus kept open on each side even when street cars are stopping, the peak vehicular capacity of the street is reduced almost by half. Inter-district thoroughfares of any considerable importance for vehicular movement which include or are likely to include car tracks (in order to give reasonably well distributed street car service), unless closely paralleled by thoroughfares free from tracks, ought therefore in general to be eight-line streets.

And whenever a six-line street is to be developed, as to the one of the shutting property, in a manner requiring more than the usual amount of sidewalk space or space for parking of vehicles (as by diagonal parking or backing up to the curb for loading and unloading) a corresponding addition to the space between buildings becomes important. The sine qua non is to keep the central 40 feet width constantly clear for moving vehicles.

Eight-Line Streets

For routes likely to carry a heavier traffic, it is important to provide for three lines of fast moving vehicles in each direction, which with parallel parking near the curb requires for speed and safety a minimum of 74 feet between curbs. Figueroa Street, for most of its length, has a width of almost 69 feet between curbs.
MAJOR TRAFFIC STREET PLAN

and just fails to carry three lines of moving vehicles abreast, except occasionally when the bow 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 (see V. 71, p. 64); 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, is a cost within reason, may be regarded as a potential eight-line thoroughfare, but the actual widening of the street is still that 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.

Permanence 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 appportionment 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 31% of property owners in any given improvement districts 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 ordinances 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 cities must apparently be feared 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, scaling and street openings. One of the worst elements in which the city cannot act against the city is to act against property abutting on open parks and widenings and in part against board districts varying in extent according to the character and location of each individual parcel. A legislative provision for a permanent assessment board becomes increasingly evident in this connection in avoiding overlapping and excessive assessments for benefits.

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 the city must usually proceed and great delays are involved in 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.

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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, scaling and street openings. One of the worst elements in which the city cannot act against the city is to act against property abutting on open parks and widenings and in part against board districts varying in extent according to the character and location of each individual parcel. A legislative provision for a permanent assessment board becomes increasingly evident in this connection in avoiding overlapping and excessive assessments for benefits.

Permanence 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 appportionment 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 31% of property owners in any given improvement districts 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.

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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 made 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. Salutary, 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

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 had 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 Streets, 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-Virginia 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 the central business district. Other big cities with wider thoroughfares, have generally laboured 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 earthquakes have to take precautions against the fire menace resulting from the cracking of chimneys and fissures in even moderate quakes, and against the more terrible possibility of rupture of the water system (as happened 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 the setting up also of a most important fire barrier.
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. Sonset 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.

So far as possible, new direct thoroughfares should be developed from Mixed Use Districts, 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.

Diagram No. 9—Interurban Passenger Flow on Pacific Electric Railway.
is south of the Elysian Park Hills and through the business district.

Numerous interdistrict thoroughfares shown on Map I will afford independent communication to some of this traffic, but there will always be need for traffic through this pass in the directions indicated, particularly west to east, because of terminus close to one edge of the business district. In other words, there should be some continuity 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 Bernardino Street, follow approximately the line of New Delta Street from College Street to Alhambra Street, use North Figueroa Street for a short distance, connecting with Fremont Avenue at Starrett 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 interchanges of traffic between Financial District and the northeastern section of the city and the west and southwest thoroughfares. Several large improvements now exist that would make construction easier and less expensive, and there are several grade difficulties to be overcome, some of which, like that at Sixth Street and First Street, would make street grade separation very desirable. It is important in function to be performed by a by-pass thoroughfare such as this one, for proper consideration.

The other by-pass of considerable importance is San Pedro Street, extended northward to connect with Dale Street and to 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 north. 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 our lines (even at the expense of certain streets to auto traffic only. It is recommended that surface car lines with trackage to the bridge to the following east and west streets: First, Third, Sixth, Seventh, Ninth, Eleventh, San Vicente and Washington Streets; and the following should be cleared of all our 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 so as possible, the least delay to traffic movement will result. Some of the more important of these to be corrected are: Figueroa and Eleventh Streets. Figueroa and Ninth Streets. Figueroa and Sixth Streets. Hill and Temple Streets.

As the City of Third and Main Streets, Eighteenth 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 sought above all. As previously noted, certain very desirable improvements are now under way or contemplated in an attempt to make 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 at Moneta, and the Hill Street opening just completed.

Between Tenth Street and Washington Street there is most unscientific, unbalanced roadway plan. This is most unsatisfactory provision for east-and-west traffic. 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 planned thoroughfares of adequate width present in the traffic 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 Broad Street and southward parallel to and one block east of the railroad, L. A. and D., 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 for the objectives of such great 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 Speedeway—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 clear lands adjacent the river west of San Fernando Road and the Southern Pacific. 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 we 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 I 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 line 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.

Sanborn 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, Vermont Avenue, Katherine Street, Figueroa Street, Pico Boulevard, Verdugo Parkway via Cyprus Avenue, Waverly Drive, Granada and Cahoumas Avenue; Los Feliz Boulevard and Franklin Avenue; Riverside Drive, Silver Lake Parkway; and Arroyo Seco Parkway. These lines will form a network of parkways and boulevards in relation with a comprehensive park and boulevard system. It is one of the great problems of the Los Angeles City Plan most important to be studied out at an early date.

Beverly Boulevard An Important Radiant

This boulevard is more important as a radial thoroughfare connecting with First and Temple Streets north Virgil Avenue. It should be extended westward through Beverly Hills to Santa Monica for the purpose of extending its use to the Santa Monica area. The present route, which is one of the shortest and most direct connections with the railroad, 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 planned thoroughfare of adequate width present in the traffic 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.
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, a twenty-foot sidewalk on each side, which may be arched under buildings. A total width of 130 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.

Washington Street (from Figueroa to Maple)

Washington Street is desirable as the distributor street on the north 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 effective 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 through traffic to Figueroa. 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. While it is intended that First Street shall act as the northernly 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 two-way 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, extended)

First Street offers the most practical location for a distributor street and main cross town 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 Wilshire 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 would 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.

The property along First Street 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 a minimum cost. A width of 130 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 too far away from the present business center, but in an open cut of ample width bridged by the north and south streets from Olive to Figueroa inclusive. Figueroa would pass under it as a part of the improvement of Figueroa grades, and it would pass over Figueroa 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, First Street, the northern extension of Hope Street (Com- mounwealth Avenue, Virgil Street and Hillhurst Avenue) Beverly Boulevard, and a diagonal route to Hollywood and Gower. Pass which is discussed below, all of which are important attributes to a good distributor street. See Map 16.
2. RADIAL THOROUGHFARES FROM THE CENTRAL BUSINESS DISTRICT

(See Map I)

North Figueroa Street (above First Street)

One of the most important 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 northward 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.

Cheaves Ravine Road

By extending North Figueroa Street, above College Street, as a 6-line thoroughfare, 74 feet between curbs, through a short tunnel into Cheaves Ravine Road, a valuable outlet to Riverside Drive and connection to Glendale is obtained 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 short distances, namely between Hillhurst and Vermont and from Haydenhurst 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 Gowen Street and from La Brea to Laurel Avenue, and extended directly northwest to meet Sunset Boulevard near Haydenhurst Drive.

Ten�o Street

Ten�o 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 remodeled it will form the western approach.

Glendale Boulevard

Glendale Boulevard, with Second Street from Figuroa Street west, should be widened to an 8-line street (74 feet between curbs 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 travelled thoroughfares of Los Angeles and traffic is sure to increase on it, with the growth of Glendale and the eastern 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 uniform width of 74 feet between curbs. While eventually it may be advisable to extend it with a bridge across the river and by viaduct or highway 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 of 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 northwest into Riverside Drive, so as to provide a good grade through Fletcher Avenue into a new bridge across the river, and into Glencoe Street to an underpass of the Southern Pacific Railroad, continuing through Fletcher Drive and a diagonal extension thereof to connect with Glawood 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 Street from Figueroa Street to Hoover, and its extension as a 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, while enough not merely to give large traffic capacity but to include permanent shade trees and ornamental features, there appears to be no 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 1922 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.
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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 “tubem,” 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 eliminates the short-sightedness 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 (Stret of Maple)

A broad superstreet for both the 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 as an industrial and wholesale district and has some large and costly buildings on both sides, making it costly to widen even by arcading, 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, relining the line of First Street at the viaduct.

First Street Viaduct

Funds being now at hand for rebuilding the First Street viaduct, another 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 widened street and yet leaves 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 northwesterly into Vignes Street as a truck handling thoroughfare, passing under the First Street viaduct approach. It is essential to maintain good access to and from the Santa Fe passenger station by its present location. The best plan, therefore, would seem to be:

(1) The acquisition of 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 an 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 to the west 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 convey 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 (so 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 as 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 cross-town 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 city's now most lamentably lacking; and fourth, as a route through 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.

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 Beverly Street, thence diagonally into Crown Avenue to Columbus Street, and through in a straight line to link up with Ocean View Avenue at Huntington Boulevard, following this avenue to Alvarado Street, and thence out through its approximately straight line to Hoover and Vemond Streets, thence on a straight line to link up with Third Street as it now exists at Vermont Avenue. From Vermont with the same height 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.

 Detailed Improvements of the Major Street Plan

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

The largest and most rapidly growing high class residential districts, least cut off from the central business district by intervening developments of a character foreign to both, lie 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 limits of street traffic, especially passenger automobile traffic, in and out of the central business area. The most satisfactory development of this sector in one which provides numerous radial thoroughfares of good capacity and which facilitates a con-
DETAILED IMPROVEMENTS OF THE MAJOR STREET PLAN

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Assuming, then, radical and general regrading as a certain, 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 hilly property, into Shatto Street, widening Shatto Street which now has good grades, and extending it to Alvarado Street near Sixth. The Sixth Street car line would be transferred to this new thoroughfare, making Fifth Street extended and its continuation by the present Sixth Street from Boyleston 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 East Sixth Boulevard and Wilshire Boulevard (suitably widened) just beyond Benton Boulevard. A short connecting roadway across the northeast corner of Lafayette Park and the new cross streets southeast corner of Sixth and Westlake Boulevard, the streets should 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 Whitley Boulevard to and from points south of Seventh Street would go via Sixth Street straightened and widened, which would be conveniently reached by the proposed widening of Hoover Street. The flow from Seventh and Whitley 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, and the other adjacent streets. East of Maple Street in this latitude a new viaduct in continuation of Sixth Street, connecting with a widening of Sixth Street in Boyle Heights and a diagonal crossing to East Fourth 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 in 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.
TRAFFIC

Street Plan

conditions

mall, it would be advisable to make an eight-line thoroughfare (minimum of 74 feet between curbs) from Pico 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 Main Street to Stanford Avenue. Cutting the streets diagonally across from Pico Street and Griffith Avenue, and continuing on East Fourteenth Street, widened and cut through from Wilma to Santa Clara, and into Mission Street, where it should connect through under piers of the railroad, with the new river Truck Speedway in the bed of the Los Angeles River, and continue under the Union Pacific line on the right of way. At the intersection of the Truck Highway at the foot of the bluff below Boyle Heights, and then on a direct line to Santa Fe Avenue, giving access to the new industrial district and rail 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 a little more than a mile. It is narrow, has bad "jogs" in it, and carries two lines of vehicular traffic, and the congestion of other through streets to the north and south induces a surprisingly large volume of vehicular traffic to use it, so that experience shows a condition between this traffic and the street cars. It seems clearly desirable to resurface and widen 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 a street is worth having, and such a width is now provided. West of Hoover the place of 16th Street in the major highway system is not so great, and the main Pacific Electric line to Vineyard and west branch points. Ultimately, the line must be replaced by a proper rapid transit line for high-speed train service either on the main Pacific Electric line to Vineyard and west branch points. Ultimately, the line must be replaced by a proper rapid transit line for high-speed train service and probably would become a vehicular thoroughfare of second rank, and it's the opinion of the writer that an 8-line thoroughfare south of Washington Street would be the grade of thoroughfare to be provided for the railroad bridge over the Los Angeles River, such as is an industrial freight line, the right of way of which has been already established. A better plan would have been to carry the route through Figueroa Street east to one block west of Hoover, and from there to continue through the rail yards and into the new bridge and viaduct across the river into Mines Avenue and East Ninth Street, and to a connection with the new bridge across the river at Overland Avenue, giving access to this new industrial district and railroad.

Tenth Street

Officially, this other is widened from the center of the city to the west side limits with a uniform section of 100 feet between curbs, but from Colorado Street to Figueroa Street an extra 40 feet wide is given to the street as an automobile and street car thoroughfare. These conditions will be greatly exaggerated when the street improvement is completed and forms a great volume of general through-street traffic by this point.

A better plan would be to carry the route through Tenth Street extended as far as Main Street to Country Club Drive west of the High School, leaving a triangular park along the side of violet Avenue called "Violet Park," and its extension into this wedge as an extra line between Pico and Washington would have more justification than the street car that it follows through the thoroughfare between two existing main routes half a mile apart. The character of the street cannot be altered from the center. At Sherman Drive the grade should be lowered to pass under Sherman and out into the open. Near P. E. if the study of the transit problem shows that the P. E. tracks should remain on 16th Street and ultimately not to put above or below the grade, the street ought to be widened to 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 Carraza 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 Pico 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 Main Street to Stanford Avenue. Cutting through under piers of the railroad, with the new river Truck Speedway in the bed of the Los Angeles River, and continue under the Union Pacific line on the right of way. At the intersection of the Truck Highway at the foot of the bluff below Boyle Heights, and then on a direct line to Santa Fe Avenue, giving access to the new industrial district and rail yards.

Adams Street—Long Beach Boulevard

As an important car-noline auto traffic street, Eighth Street should be widened to a six-line thoroughfare (56 feet between curbs) from Figueroa Street west to a point near Hoover to form a through connection from Santa Monica to the city of Long Beach. An extension of this thoroughfare and its continuation to the ocean, from 16th Street to Santa Monica, will be an important factor in the traffic movement of the downtown business district eastward from Santa Monica.

There has been much talk of a bridge across Westlake Park and a widening of Figueroa Street from its present width of 60 feet to 70 feet as a means of drainage of Wilshire. Such a plan as that seems absurd except as a means of pulling Wilshire Boulevard across Westlake Park, even with the utmost skill and ingenuity which demand in the purpose of a bridge would work great injury to the park, which is one of the very few and worthwhile 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 demands for Figueroa, we believe would be wholly unjustifiable and would add little relief to the traffic, or, however, Orange Street were to be adequately widened and improved in grade, giving space for not less than eight lines of traffic (normal 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 crosstown 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 of the land required are surprisingly little in comparison with the public benefits which such a thoroughfare and the exceptionally high value of such new businesses frontage and corners which would be created. From Hill to Spring Street inclusive the cost of land or an opening would be very great, but again the value of the new frontages, and the securing of streets free from street cars, in the heart of the business district, tracts, etc., is 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 Boulevard extended beyond Boyle Heights would also be great and tend to rejuvenate that whole section of the city.

Eight Street

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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 southward from Hill Street near Nigger Slough, thence diagonally southwest into Benton Street and the main line to meet widened East Third Street and the proposed new Aliso Bridge.

South Hill Street

South Hill Street will become a major automobile thoroughfare. This is the extension south of Olive Street at 18th Street. Olive Street is 100 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.

West Fourth Street

West Fourth Street is now being opened 100 feet wide into Montana Avenue, which is already at least 56 feet wide and must be widened. This extra width will more than ever be needed when the Inglewood-Rodondo Boulevard is extended to connect it with South Park Avenue and overflow into the central parts of the city. West Fourth Street should be widened to a 10-line thoroughfare 74 feet between curbs, and the bridge across the river should be widened also.

North Broadway

North Broadway is one of the heavily traveled streets in the city. It has been the "backbone of the battle" 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 be widened also. East of the river, North Broadway is now an 8-line street to Minnis Road, whence it should be extended eastward 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 Inglewood Drive South, at Cans Drive, may be eliminated.

South Main Street

South Main Street at present is not the principal traveled way to the harbor. It should be widened through the California Street bridge at least to 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 widened to 24 feet to this width. South of Manchester a width of 16 feet of traffic would have to be maintained all the way to the harbor. The bad gap 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 railways. When constructed this viaduct should lead into Alhambra Street, which should be extended through this street. The 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 extending through Cardiel 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-carriage automobile traffic street 80 feet wide from the Plaza to Pico Street except for a short stretch from 3rd to 5th Street in connection with the main line to meet widened South of Pico Street, widening to a minimum of 56 feet between curbs should be brought about and the street extended from 23rd street south into Woodlawn Avenue 376 feet and widened and extended the same width, at least to Spruce 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) to meet widened East Third Street and the proposed new Aliso Bridge.
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 is very dense and of about equal volume.
3. Where high speed urban traffic (morning and evening current of city workers) is inter-t 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 such is the case, or to the point important intersecting artery. To such a location either a subway or viaduct may be used, depending upon the approach grade of the streets and other characteristics of the location later discussed.

Rectangular or cross-town 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 may be impracticable. Where such conditions are present, separate streets might be advantageously employed instead of a single crossing, or the entire traffic might be conveyed by means of a viaduct or subway at strategic points. Usually there are some distance from the principal business centers, so that such methods are not unduly expensive either by reasons 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 material.

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, or need not detract from the commercial availability of that property extending from the point of beginning of the subway to the intersections. 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 is decided in part by the amount of commercial buildings.
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 a level, a subway is much more expensive to construct and the unknown elements entering into its design make it 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 said designed for vehicles only, would cost only about $120,000 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 5 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 $500,000 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 ranges (one at every other street), would cost approximately $1,015,000. To separate the grades at seven intersecting streets by use of subways would cost about $1,250,000, 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 turning 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 viewed 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-
Having the space interval between machines, and assuming an average over all lengths 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 speeds 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 measurable 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 20 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

Genera! Counsel and Associate Counsel of the Automobile Club of Southern California

May 27, 1925.

To the Honorable Council of the City of Los Angeles:

Gentlemen:

You have invited our opinion as to the legal phases of the problems of financing and carrying out the ordinances to accomplish the work contemplated in the plan of major high ways 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 insurmountable, 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 construction of the property to be taken by the city, frequently renders such 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 assisted for the cost of the improvement?

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

6. Can the City of Los Angeles establish and carry out a systematic street-widening program?

7. To what extent can the use of the street surface for parking and similar purposes be regulated 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. First Method: Cost to Be Paid Out of General Fund.

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.

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

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.

C. Third Method: Cost to Be Paid Out of a Bonded Indebtedness Fund.

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.

APPENDIX D—LEGAL PHASES

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 $1,953,901,040.00. 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 City Auditor and County Auditor of Los Angeles County has estimated the assessed value of property for the purpose of taxation at 30% of the fair market value, and wherein the City Auditor for the City of Los Angeles has furnished us with a statement as of May 31, 1924, showing the maximum legal bonded indebtedness for general purposes and the amount voted but not yet sold.

We set forth this table of amounts to us by the City Auditor of the City of Los Angeles Statement of Bonding Capacity of the City of Los Angeles

<table>
<thead>
<tr>
<th>Assessment, (Fair Market Value)</th>
<th>$1,953,901,040.00</th>
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<tbody>
<tr>
<td>Secs. 1A, 1B, Ordinances No. 40,302 (N.S.) No. 46,057 (N.S.)</td>
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</tbody>
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Maximum legal bonded indebtedness for general purposes, being 3% of the amount of the assessed valuation shown above, is $59,171,000.00.

Amount of bonds sold to May 31, 1924. 17,229,487.50

This leaves a difference amounting to $42,441,512.50

However, in addition to the bonds sold, there have been bonds retired, amounting to $16,538,000.00

This leaves a margin which might be voted and sold for street improvement or other general purposes $25,903,512.50

The maximum legal bonded indebtedness for general purposes is 3% of the assessed value as shown above.

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 5% of the assessed valuation.

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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 5% of the assessed valuation.
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 no 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 bonds is largely affected by the assessment statutes of the State of New York governing legal investments for savings banks. In view of the above, 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 bonds 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,

Banding Capacity of Los Angeles Under New York Laws

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<td>7% of assessed value</td>
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<td>Estimated bonding capacity based upon</td>
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<td>valuation 1924-25</td>
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</tr>
<tr>
<td>Municipal net debt outstanding May 31, 1924</td>
<td>$51,062,741.25</td>
</tr>
<tr>
<td>Bond limit net debt outstanding May 31, 1924</td>
<td>$3,705,709.00</td>
</tr>
<tr>
<td>Flood control district debt outstanding May 31, 1924</td>
<td>$3,705,709.00</td>
</tr>
<tr>
<td>Municipal improvement district debt outstanding May 31, 1924</td>
<td>$3,705,709.00</td>
</tr>
<tr>
<td>Retirement of bonds during first year 1924-25</td>
<td>$99,265,914.15</td>
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<tr>
<td>Total municipal debt under New York law</td>
<td>$92,384,530.65</td>
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</table>

<table>
<thead>
<tr>
<th>Bonds authorized but not issued:</th>
<th>$68,188,469.35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Municipal</td>
<td>$25,938,000.00</td>
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<tr>
<td>Flood control district</td>
<td>$32,000,000.00</td>
</tr>
<tr>
<td>Total bonds authorized but not issued</td>
<td>$61,538,000.00</td>
</tr>
<tr>
<td>New total bonds which might be voted and sold within New York limit</td>
<td>$6,350,469.35</td>
</tr>
</tbody>
</table>

It will be noted that the foregoing table includes the estimated increase in the 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 electorate as 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 unused, together with the new school bonds, should be authorized but sold, and that 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 electorate and received the necessary two-thirds vote, as it would be impossible to dispose of such bonds to investors on account of their unsaliability 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) A separate and simultaneous proceeding for the creation of an assessment district for the rating of the funds required for the actual construction work.

(b) A separate and subsequent proceeding for the ratification of the assessment district and the ratification of the bonding of the funds required for the actual construction of the improvements.

APPENDIX B—LEGAL PHASES

5. The City Council adopts a second ordinance, instructing the City Attorney to commence condemnation proceedings.

6. The City Attorney then determines the names of all owners and persons interested in the lands to be condemned. The procedures, with reference to 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 upon which the proposed improvements are to be made, giving its exact dimensions, legal description and the description of the larger parcels of which the land 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, 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, prepares the necessary plans and specifications 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 180 days after the date of the final decree.

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 conducting a hearing upon said objections, may amend the tax list and 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 for the special assessment work.

The Street Opening Act of 1905 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 in the legal papers.

3. Property owners within the assessment district are notified in writing within thirty days.

4. The property 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 requires jurisdiction to proceed.

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.
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 procedures be conducted, one to establish an assessment district under the Street Opening and Widening Act, and a second and subsequent proceeding for the condemnation of the 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 objectives by one proceeding, the improvement proceeding, whereby the assessment 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 assessment procedure. 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 means of modification or elimination of the assessment. An imposition of burdens which in some instances may not be lifted until long after the project has been started, 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 the condemnation suit, which preparation includes the search of titles to secure the names of parties defendant. A necessary step in the preparation of a condemnation suit is the securing of certificates of titles and the preparation of condemnation maps, until after the Council has adopted the Ordinance of Intention. Notice thereof provided for in the Ordinance of Intention, 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 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 invest the money necessary for the expense incident to the preparation 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 necessity of assurance that under the Act condemnation proceedings must be filed, defendants served with summons and complaint, often necessary steps being delayed until the title search is completed. Under a considerable period, the action must be set for trial, the trial must be held, the judgment obtained and the property within the assessment district to be benefited by the improvement assessment. 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 whereby to pay the awards to defendants in the condemnation action. Not until this time is final decree of condemnation. It is extremely desirable that a method be devised to expedite these delays, so that final resolution might be obtained and a preliminary assessment be levied and collected (or bonds representing such assessments be issued) for the purpose of advancing the condemnation costs concurrently with the bringing of the condemnation suit in order that the money necessary 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 undoubtedly 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 injuredly affected. It would remove the necessity for a similar provision where it would be made applicable to condemnation actions brought under local laws, if it were provided that the valuation of property condemned should be taken as of the date that summons is issued rather than postponed to the time the cause is finally decided. In the latter case, the value of the property will constitute an unjust imposition upon property owners.

Delays Not Occasioned by Statute

The foregoing discussion is sufficient to indicate and remedy the delays and consequent increase in cost incident to the street improvement work. There are, in any event, many delays which are not necessarily a part of the statutory procedure. These delays are occasioned by the necessity of the contractors having to pay 150 per cent. of the cost of the improvement work. This condition is usually inequitable to permit of any substantial contribution.

Delays Incident to Proceeding Under Street Opening, Widening and Construction Work

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 involved in the project. The foreclosures of these warrants are usually inadequate, and it is extremely desirable that a method be devised whereby the surety and the contractor may in their own name file suit upon said warrants against the property owners. A method of obtaining a judgment and a second lien on the land of the property involved in the project renders it inexpedient for the city to advance for the payment of the compensation or the cost of the work which is obviously 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 is completed. The desirability is at once apparent for a method of procedure whereby the time of such suits might be greatly reduced or in certain events enabling the city to prosecute the work in the first place, thus enabling the city to let contracts on a cash basis, or in certain events enabling the city to prosecute the work in the first place.

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proceedings had been initiated in Los Angeles but on which no action had been at fifty million dollars, and the time which it would take on each project would vary from several years to ten 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 Automobile Club of Southern California called the existing situation to the attention of the City 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 $200,000 to be used as a revolving fund, designed to facilitate the execution of the work of street work already ordered under the district assessment fund, the plan being to employ additional engineers and other help whose compensation would be paid for, for the most part, to 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 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 improvements are the outgrowth of legislation extending over a considerable period of years. These statutes have many times been submitted to the courts and new forms, acquired by amendment to the original statutes, have, in some measure, been declared to be essential by judicial decisions. The statutes contain certain essential elements, particularly with reference to the giving of notice and the procedures whereby affected property owners are to be made to hear objections to the improvement or particular assessment, which rights must be preserved in any future legislation. The development of legislative statutes has incorporated many features which are cumbersome and conducive to delay and which, in our opinion and in view of judicial decisions, are not in the necessary part of such statutes. It is our view that a thorough study should be made of the statutes and the objection to which would obviate certain present cumbersome methods conducive to delay and which would help to avoid the delay.
either upon commencing condemnation proceedings or
upon commencing construction work. Under the Con-
stitution of California (Article I, Section 14) a city
ordinance may be adopted to secure immediate
possession of the property to be con-
demned. After filing notice and complaint, the
justice of the peace, or the justice of the court
may, after hearing the matter, be reasonably ad-
vised to secure the payment of compensation to the
owners, whose property so affected is to be used
as the work shall require. Los An-
geles has heretofore been able to take advantage
of this constitutional feature above outlined, or
suggested. This, however, involves delay, and, fur-
thermore, that no certain method of procedure 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.

A revolving fund having been created, advances
therefrom might be deposited in court upon commen-
ting 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 any such assessments are
collected, such assessments should be devoted either to
the direct payment of the cost of the improvement or
of the property which the county might carry out highway opening,
work within unincorporated
County territory. Our discussion is directed to meth-
ods of county aid for such improvements lying wholly
within an incorporated or charter city, which incorpora-
tion which the county is not ordinarily concerned with
the street work within Los Angeles and other cities within
the jurisdiction of the city. Improvements of this character within a city
come within what are known as municipal affairs and are not
within the jurisdiction of the city. (Byrne v. Drain, 127 Cal. 605.)
We know of no statute expressly authorizing the
county to acquire rights of way for street purposes
within incorporated cities.

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 meth-
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within incorporated cities.

The county may, however, contribute financial as-
sistance to the cost of constructing or improving cer-
tain streets within Los Angeles and other cities within
our jurisdiction which the county is not ordinarily concerned with
the street work within Los Angeles and other cities within
the county.

Whether County Bond Issue Available

We will consider the first question briefly. The
County has authority to vote and issue bonds for county
purposes. The county has the power to make a special
resolution for the purpose of issuing a bond to
secure a favorable vote for the issuance of such
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MAJOR TRAFFIC STREET PLAN

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
cases at five-thirty but it was imperative to have the
results as early as possible.

The Scouts were given a day's leave of absence
with a record of attendance and one of their reports
was submitted 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 mark
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 streets 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 pass-
ing a station on the side of the street and the vertical
footings give the total vehicles passing on the
opposite side of the street. The sum of the
vehicles 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 Tuesday at 3 p.m.

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

Heaviest Traffic Corners in Los Angeles (from Boy
Scout Scout Count) 7 a.m. to 8:30 a.m., Feb. 14-24.

<table>
<thead>
<tr>
<th>CORNER</th>
<th>HEAVY</th>
<th>SOUTH</th>
<th>WEST</th>
<th>TOTAL TRAFFIC HOURS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figueroa St. &amp; Santa Barbara</td>
<td>23,202</td>
<td>21,127</td>
<td>16,760</td>
<td>59,182</td>
</tr>
<tr>
<td>Vermont &amp; 8th</td>
<td>16,030</td>
<td>15,388</td>
<td>15,395</td>
<td>53,808</td>
</tr>
<tr>
<td>Figueroa</td>
<td>10,729</td>
<td>10,481</td>
<td>10,481</td>
<td>31,691</td>
</tr>
<tr>
<td>Figueroa St. &amp; Adams St</td>
<td>26,107</td>
<td>26,470</td>
<td>5,466</td>
<td>57,043</td>
</tr>
<tr>
<td>Western Ave. &amp; Wilshire Blvd</td>
<td>17,039</td>
<td>16,560</td>
<td>16,560</td>
<td>50,159</td>
</tr>
<tr>
<td>Figueroa St. &amp; Washington St</td>
<td>18,839</td>
<td>18,074</td>
<td>14,071</td>
<td>51,094</td>
</tr>
<tr>
<td>Vermont Ave. &amp; Wilshire Blvd</td>
<td>14,415</td>
<td>13,490</td>
<td>18,638</td>
<td>46,543</td>
</tr>
<tr>
<td>Western Ave. &amp; Pico</td>
<td>21,638</td>
<td>21,638</td>
<td>11,964</td>
<td>55,230</td>
</tr>
<tr>
<td>Glendale Blvd. &amp; Sunset Blvd</td>
<td>23,980</td>
<td>22,127</td>
<td>18,766</td>
<td>50,873</td>
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<tr>
<td><strong>Heaviest</strong></td>
<td><strong>21,431</strong></td>
<td><strong>21,431</strong></td>
<td><strong>21,431</strong></td>
<td><strong>64,313</strong></td>
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<table>
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<tbody>
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